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Culture, Diversity, and the Welfare State

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Culture, Diversity, and the Welfare State

Abstract

We show that culture and diversity strongly influence welfare systems around the globe. To disentangle culture from institutions, we employ regional instruments as well as data on the prevalence of the pathogen *Toxoplasma Gondii*, linguistic differences, and the frequency of blood types. The generosity of the welfare system is higher in countries with loose family ties and individualistic attitudes, high prevalence of trust and tolerance, and low acceptance of unequally distributed power. Apart from their direct effects, these traits also exert indirect impact by influencing the transmission of inequality to redistribution. Finally, we show that redistribution and diversity are linked non-linearly: moderate levels of diversity impede redistribution, while higher levels offset the negative effect.

JEL-Codes: H110, I380, Z100, D310.

Keywords: culture, redistribution, diversity.

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1. Introduction

Disparities in the generosity of the welfare state across countries are substantial and persistent. While social security systems in the OECD countries have reduced market inequality by an average of 16.77 Gini-Points during the 2010-2014 period, the differences in redistribution between OECD member states are remarkable, reaching from less than 3 Gini-Points in Chile, Mexico, and South Korea to more than 20 Gini-Points in Sweden, Germany, and the Netherlands.[1] The well-known hypothesis from Meltzer and Richard (1981) argues that large parts of these differences can be traced to an unequal distribution of market incomes, which enhances preferences for redistribution and channels to an expansion of the welfare system via voting behavior of the households. While the "Meltzer-Richard effect" has found some support in empirical studies (Milanovic, 2000; Scervini, 2012), the recent literature emphasizes that preferences for redistribution do not only depend on the "true" level of inequality, but also on perceptions of individuals (Cruces et al., 2013; Gründler and Köllner, 2017) and the judgment they make about the level of inequality (Alesina and Angeletos, 2005; Durante et al., 2014). However, the determinants of these subjective assessments of well-being and fairness are thus far largely unexplored. Recent studies in psychology and sociology have shown that the ways in which individuals think, feel, and act in response to social issues vary systematically across countries and have their roots in so-called "mental programs", which are influenced by the social environment and passed from one generation to the next (Hofstede, 2001; Oyserman and Lee, 2008). In consistence with this perspective, psychological experiments demonstrate that subjective status (Arrindell et al., 1997) and judgments about fairness (Gelfand et al., 2002; Hoffmann and Tee, 2006) largely depend on cultural socialization. The consequence from an economic point of view is that by influencing perceptions of inequality and fairness, cultural differences may play a crucial role in explaining cross-country differences in the generosity of social security systems.

The question of how culture influences the welfare state is also relevant for other, more tangible reasons, given that the past few years saw the highest level of human displacement on record. Roughly 65 million people around the world were forcibly displaced, 21 million among them having escaped war or political pressure and seeking refuge in foreign countries (UNHCR, 2016). This development has led to an increase in ethnic, cultural, and religious diversity in immigration countries, which may affect social security systems via two mechanisms: first, preferences for redistribution of immigrants are strongly determined by their country of birth and often deviate from the preferences of the native population (Luttmer and Singhal, 2011). Consequently, we might expect an impact on national social security systems via different voting behavior compared with the native population due to

[1]The data is collected from the Standardized World Income Inequality Database (SWIID) 5.1, which is described in detail in Section (3.1).

different social norms. Second, the increase in diversity may reduce the native population's support for redistribution as a result of cultural protectionism and fear of unemployment (Oesch, 2008; Blanchflower and Shadforth, 2009; Dahlberg et al., 2012; Stichnoth and Van der Straeten, 2013). Moreover, Luttmer (2001) demonstrates that individuals decrease their support for welfare spending as the share of local recipients from other racial groups rises ("racial group loyalty").

In this paper, we empirically study the effects of culture and diversity on the welfare state using a large panel of cross-national data. Our contribution to the literature is twofold: first, we examine the extent to which different cultural traits can explain cross-country differences in the generosity of welfare systems. Second, we analyze the effect of ethnic and religious diversity on the size of the welfare state, thereby investigating group loyalty based on a large international sample.

With regard to both research questions, there is a surprising scarcity of empirical evidence in the economic and political science literature. This scarcity has its origins in two challenges that accompany cross-country studies concerned with redistribution and cultural values. The first difficulty lies in the acquisition of comparable international data on inequality and redistribution, while the second hurdle is to disentangle cultural traits from institutions. Fortunately, in recent years the empirical literature has made some major progress towards meeting both challenges. The *Standardized World Income Inequality Database* (SWIID) from Solt (2016) has significantly increased the availability of cross-nationally comparable inequality data, covering 174 countries from 1960 to the present and enabling access to roughly 4,600 country-year observations on inequality before and after taxes and transfers that are comparable to those obtained by the LIS Cross-National Data Center. The distinction between inequality before and after government intervention allows us to measure redistribution via the "pre-post-approach". Furthermore, our analysis is based on four types of external instruments for culture emphasized by the recent empirical literature. These instruments include jack-knifed regional averages of cultural traits (as used in the literature on democracy, see Acemoglu et al., 2014; Madsen et al., 2015), language differences and pronoun drop (Kashima and Kashima, 1998), and two biological variables associated with different types of culture: genes, measured via frequencies of blood types (Gorodnichenko and Roland, 2017), and prevalence of the pathogen *Toxoplasma Gondii* (Maseland, 2013). Taking the critique recently leveled against application of IV strategies seriously (Bazzi and Clemens, 2013), the results are reported along with extensive weak instrument diagnostics, including tests for weak-instrumentation, weak-instrument robust confidence intervals and rejection probabilities, as well as detailed evaluations of the exclusion restriction.

We find that culture plays an important role for the generosity of welfare systems, and this role manifests in three channels: (i) strength of family ties, (ii) acceptance of differences in status and power, and (iii) attitudes towards unknown situations. More specifically, countries with a strong preference for tightly knit connections with other members of society and strong family ties feature lower degrees of redistribution. In contrast, societies that are shaped more by individualistic values tend to have more expansive welfare systems, shifting insurance from the family level to the state level. In addition, we find that support for the indigent is weaker in countries that accept an unequal distribution of power and that consider obedience a desirable behavior. The results also suggest that redistribution is lower if people are convinced that hard work rather than connections or luck is key to success. Finally, we provide strong evidence that societies whose members exhibit a high level of trust and tolerance towards unknown individuals outside their social group tend to be more supportive of equalizing policies.

We further find that cultural values do not only *directly* influence social policies, but also trigger *indirect* effects by influencing the transmission of inequality to redistribution. While we find a strongly significant average effect of market inequality on redistribution that is in line with Meltzer and Richard (1981), this effect only sets in in societies with low acceptance of unequally distributed power, a high level of trust, a lower preference for hard work, and in those that are predominantly shaped by feminine values. In contrast, countries with strong family ties that promote collectivist values tend to be much more reluctant to respond to periods of increasing inequality with redistributive policies. In these countries, the family provides the most important social safety net, which is why members of collectivist societies do not consider the provision of social security to be an important task of the state.

Finally, our results demonstrate that an increase in diversity yields a significantly negative effect on the generosity of the welfare state that is most pronounced with regard to cultural and ethnic fractionalization. While this result provides support for the racial group loyalty hypothesis, a closer look at this relationship reveals that diversity and redistribution are linked via a non-linear function. The negative effect of diversity is most strongly pronounced in countries with an ethnic, religious or cultural majority, and much less prevalent once a certain tipping point of variety is exceeded.

The paper is organized as follows. Section (2) discusses the various facets of culture and their potential consequences for redistributive policies, while Section (3) describes the data used for our analysis and illustrates the differences in cultural traits across countries. Section (4) details the employed estimation and instrumentation strategy, which is applied in Sections (5) and (6), the latter sections reporting the empirical effects of culture and diversity on redistribution. Finally, Section (7) concludes.

2. Economic consequences of culture and the recent literature

2.1. Cultural values, economic outcomes, and redistribution

Economists have long been reluctant to consider culture as a possible source of economic outcomes. A substantial part of this reluctance originated from the vagueness of the notion of culture: frequently used in common parlance, the broadness of the term impeded formulation of testable, refutable hypotheses (Guiso et al., 2006). The first step towards more rigorous analyses was the work of Hofstede (1980, 2001), who provided a statistically exploitable classification of the term, along with a series of data on cross-country differences in cultural values. In brief, Hofstede (1980) distinguishes three levels of uniqueness in human mental programming: (1) the *universal* level, accommodating the "biological system" that is shared by all mankind, (2) the *collective* level, comprising those values that are shared only with people who belong to a certain social group, and (3) the *personality*, which uniquely distinguishes individuals from one another even if they belong to the same social group. In this classification, the second level comprises the entire area of human culture, capturing collective values that are passed from one generation to the next and that may be examined in international social surveys.

In recent years, a number of studies utilizing data from cross-country surveys on collective preferences showed that cultural legacy contributes substantially to the way people interact and, consequently, to economic outcomes (see, e.g., Gorodnichenko and Roland, 2011; Alesina and Giuliano, 2015). This literature stresses the impact of culture on institutions and economic performance (Tabellini, 2010; Alesina et al., 2015), corruption (Licht et al., 2005; Jing and Graham, 2008), and collective decision making (Fine, 2001; Knack, 2002). However, with respect to the relationship between culture and the welfare state, empirical evidence is rather scarce and mainly confined to *preferences* for redistribution in the United States (see, e.g., Alesina and Giuliano, 2011 and Luttmer and Singhal, 2011). Yet potential effects running from culture to the generosity of national social security systems are unexplored so far. Moreover, the recent literature only takes into account a limited set of cultural traits that may affect attitudes towards redistribution.

2.2. Different dimensions of culture and their effect on the welfare state

In this paper, we argue that different cultural traits may have different consequences for the generosity of welfare states. This is in line with the recent literature, which emphasizes that culture as such does not exert a uniform influence on economic outcomes. Rather, it stresses that culture's various dimensions trigger different—and often opposing—effects (Alesina and Giuliano, 2015). While there are numerous attempts to capture the different facets of culture (see, e.g., Schwartz, 2006, Inglehart and Baker, 2000, Weber, 2001), we employ the cultural dimensions proposed by Hofstede (1980) and Alesina and Giuliano (2015). These traits are best suited to describe our theoretical hypothesis concerning the link between culture and the welfare state. Table (1) provides a brief description of these dimensions and illustrates our hypotheses on how these collective values may influence the level of redistribution.

Most importantly, we stress three general transmission channels from culture to redistribution, which we evaluate based on several traits that reflect different aspects of these

Table 1 Summary of the cultural traits and their effect on the welfare state.

Cultural trait	Description	Effect	Expected channel from theory
Channel 1: Social safety net provided by the family and the social group			
Individualism	Measures the extent to which individuals are integrated into a cohesive group	positive	Looser ties between individuals reduce the importance of protection against social risks through family networks and increase the demand for public redistribution
Family ties	Signifies the importance of small family/kin networks	negative	Family network provides an alternative means of protection against social risks without governmental intervention
Channel 2: Acceptance of differences in status and power			
Power distance	Reflects the extent to which less powerful individuals are willing to accept unequal distributions of power	negative	Societies with higher degrees of powers distance and class mentality are less willing to equalize differences in status
Masculinity	Describes prevalence of masculine (advancement, competition) or feminine (cooperation, tolerance) values	negative	Stronger focus on masculine values reduces cooperation and therefore reduces the tendency to provide aid for the indigent
Obedience	Extent to which members of a society insist on submissive behavior of subordinates	negative	Learned acceptance of differences in status reduces support of equalizing governmental policies
Hard work vs. luck	Relates to an individual's attitude of whether hard work or luck is more relevant in determining success in life.	negative	Societies in which success is considered to be the result of hard work provide less support for correcting mechanisms via the welfare state
Channel 3: Attitudes towards unknown situations			
Uncertainty avoidance	Expresses an individual's degree of aversion to unpredictable situations	negative	Higher uncertainty avoidance raises private insurance, reducing the need and demand for public redistribution
Generalized Trust	Comprises mutual confidence between a respondent and people whom they do not know	positive	Trust is the basis for economic activities outside a small network of known individuals. It raises redistribution by enhancing confidence in governmental institutions
Tolerance	Degree to which a society accepts differences in individual characteristics	positive	Higher tolerance facilitates public support for individuals with deviating lifestyles
Long-term orientation	Reflects a society's time horizon and indicates whether people attach more importance to the future or to the present	negative	Individual protection against social risks (i.e. without governmental intervention) is more relevant with a long-term planning horizon

mechanisms. First, we argue that individualistic societies with loosely knit social frameworks have a greater need for public redistribution, as members in these societies lack the social safety net typically provided by collectivist societies, in which individuals maintain close relationships with their social group and family.[2] As a second channel, we hypothesize that societies with greater acceptance of unequally distributed power tend to be less supportive of redistributive policies. Finally, we draw on the literature that stresses a close connection between uncertainty and redistribution (Rawls, 1971; Rehm, 2009) and views redistribution as a form of insurance (Arrow, 1963). The traditional argument is that a higher risk exposure of individuals in terms of incomes increases preferences for redistribution. In contrast to these studies, our analysis does not evaluate the effect of risk *as such*, but rather the attitudes of individuals towards unknown or uncertain events.

[2] It is often emphasized that this dimension accounts for the most substantial part of cultural variation (Heine and Ruby, 2010).

However, a greater aversion to uncertainty may also raise private insurance. In this case, there would be less need for public provision of insurance via redistribution.

3. Measuring Culture and Redistribution across the Globe

3.1. Data and measurement of cultural values

To acquire measures for the cultural traits summarized in Table (1), we collect data from different sources. The levels of individualism (IND), power distance (PDI), masculinity (MAS), uncertainty avoidance (UAI) and long-term orientation (LTO) are taken from Hofstede (2001). Data on these dimensions stems from national surveys where each dimension is calculated on the basis of a multitude of different questions. Altogether, the questionnaire of the Hofstede (2001) study consists of 60 core questions and 66 recommended questions, which are consolidated to reflect what is broadly known as the five "Hofstede-dimensions".[3]

In addition, we use data from the World Value Survey (WVS) to construct our measures of family ties, trust, morality, and the work-luck nexus in accordance with a recent literature survey conducted by Alesina and Giuliano (2015). More specifically, we employ three survey questions from the WVS to measure the strength of kinship ties. These questions involve the importance of the family in one's life (V4 in the most recent wave of the WVS), as well as the degree to which people agree with the statements *"Regardless of what the qualities and faults of one's parents are, one must always love and respect them"* (V13) and *"It is the parents' duty to do their best for their children even at the expense of their own well-being"* (V14). With respect to V13 and V14, we combine the data with that obtained from identical questions included in the European Value Survey (Q49 and Q50 in the EVS) to fill the gaps for European countries for whom this information is missing. The variables are denoted by FAMILY_1 - FAMILY_3, where larger numbers reflect an individual's greater devotion to the family. Alesina and Giuliano (2015) evaluate generalized morality by using the principal component of three questions involving obedience, tolerance, and trust, respectively. As we argue that each of these traits influences redistribution differently (see Table (1)), we use each of these variables separately.[4] Finally, we use V100 of the WVS to obtain a measure that gauges whether individuals view success as the result of hard work or luck.

3.2. Data and measurement of public redistribution

To measure redistribution, we make use of the "pre-post-approach", which gauges governmental intervention in the income distribution via the difference of inequality before and

[3]Note that Hofstede et al. (2010) added a sixth dimension named "Indulgence versus Restraint". This dimension, however, is computed based on data from the World Value Survey, which we include separately in our analysis.

[4]The data stems from questions V16 (tolerance), V21 (obedience), and V24 (trust).

after taxes and transfers (see Lupu and Pontusson, 2011 and Van den Bosch and Cantillon, 2008 for a detailed discussion). This measure can be computed based on Gini coefficients, i.e.

$$\text{REDIST}_{it} = \text{GINI(M)}_{it} - \text{GINI(N)}_{it} \tag{1}$$

where GINI(M) and GINI(N) denote market and net Ginis, and REDIST is the amount of redistribution in country $i = 1, \ldots, N$ at time $t = 1, \ldots, T$. In computing this measure, the main challenge is to acquire comparable data on inequality pre and post taxes and transfers that use the same uniform set of definitions and assumptions. In fact, the conceptualizations upon which inequality series are based often vary substantially across countries, with the result that considerable pitfalls are encountered when utilizing secondary datasets (Atkinson and Brandolini, 2001). While the database of the LIS Cross-National Data Center provides data of unparalleled comparability and quality, application of the harmonized LIS micro data results in a total of 232 country-year-combinations with data from 41 countries, seven of which are each represented by only one observation. This limitation is particularly serious with respect to our analysis, where the included countries are strongly biased towards Western societies with similar cultural values.

The incorporation of a larger number of country-years, however, comes at the cost of sacrificing the benefits of harmonization, imposing an inevitable trade-off between coverage and comparability (Jenkins, 2015). While both the "World Income Inequality Database" (WIID) provided by UNU-WIDER (2017) and the "Standardized World Income Inequality Database" (SWIID 5.1) compiled by Solt (2009, 2016) are particularly successful in providing a broad sample of country-years based on the highest possible degree of comparability, there are some strong arguments for the utilization of the SWIID in our study. Whereas the revised version 3.4 of the WIID brings about a substantial expansion in the coverage of Gini indices, it does so with significantly reduced scope compared to the SWIID. This particularly applies to developing economies, where only a few country-years include market *and* net Ginis, prohibiting calculation of effective redistribution for a broad sample of country-years.[5] The SWIID seeks to maximize comparability by using the LIS series as baselines and filling in the missing observations via generation of model-based multiple imputation estimates derived from source data.

Since its introduction in 2008, the SWIID has expanded considerably over time, presently covering 176 countries from 1960 to 2013 with estimates of net income inequality comparable to those obtained from the LIS Key Figures for 4,631 country-years, and estimates of market income inequality for 4,629 country-years. The SWIID further provides a sub-set

[5] In addition, comparability of the WIID data is restricted, as it features substantial differences in the definitions of taxable income and the tax unit as well as the degree of evasion and tax avoidance across incomes. For this reason, the WIID is advantageous when comparing trends over time across countries, but not levels. For a detailed discussion of this argument, see Solt (2016).

of the country-years with superior data quality. Coverage of this subsample—which we denote as REDIST(S)—includes 2,030 country-years. Whenever feasible, we rely on the high-quality observations included in REDIST(S).

3.3. Cultural differences in the world and their relationships to redistribution

How large are the differences in cultural values across the globe? Figures (1)–(6) map the distribution of six cultural dimensions in the world. The figures point to substantial variation in collective mental programming. For instance, only 5.6 percent of the Philippines believe that most people can be trusted, which stands in sharp contrast to the Norwegian attitude, where trust is deeply anchored in the thinking of the population (67 percent). In addition, there is no distinct pattern in terms of a general correlation between the cultural dimensions. With respect to some of the depicted dimensions, we see a clear correlation between the distribution of values across countries. This is particularly noticeable when considering the distribution of individualism in Figure (1) and the distribution of family ties depicted in Figure (2), which appear to be mirror images of each other. This is because kinship ties are much more prevalent in collectivist societies. In contrast, there are other dimensions where no such pattern is visible at all. For instance, the correlation between the prevalence of tolerance and that of obedience is < 1 percent, pointing to no noteworthy relationship at all.

Figures (1) and (2) show that individualism is predominantly prevalent in Western cultures of Europe, Northern America, Australia, and New Zealand. In contrast, societies in all parts of Asia and Latin America seem to be much more influenced by collectivist attitudes and exhibit a strong sense of obligation to their family. We also observe a strong correlation between the income level and the degree to which nations are shaped by individualistic values (60 percent) or family ties (-66 percent). Figure (4) displays the distribution of trust, which presents a very heterogeneous picture. While people in Australia, Northern America, China, and the Scandinavian countries show a strong tendency to trust other people, the opposite is true in large parts of Latin America and Africa.

Table (2) reports the correlations between the cultural variables used in our analysis. These results suggest a strong negative relationship between trust and family ties (-82 percent), implying that societies with strong kinship ties tend to distrust people outside their social group. Trust is also less pronounced in societies with strong acceptance of power distances (-66 percent). The data further reveals a strong link between family ties and both power distance (68 percent) and the belief in hard work (67 percent).

We argue that cultural traits substantially influence social security systems around the globe. To provide a first impression of this relationship, Figure (7) illustrates the link between the cultural dimensions and the pre-post measurement of redistribution. The figure points to a strong entanglement of redistribution with national cultural traits, which is most strongly pronounced with respect to individualism (correlation: 77 percent), power

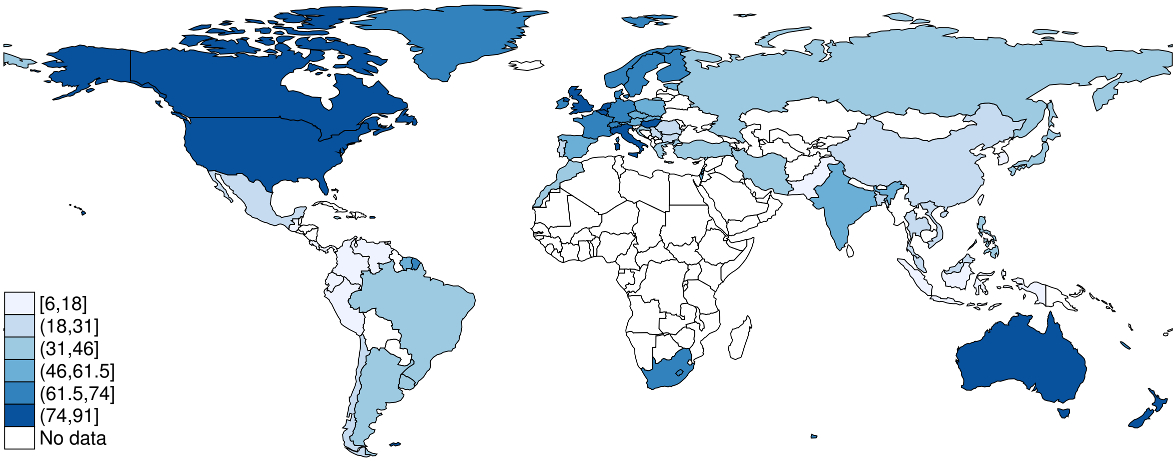

Figure 1 Distribution of individualism (IND) in the world.

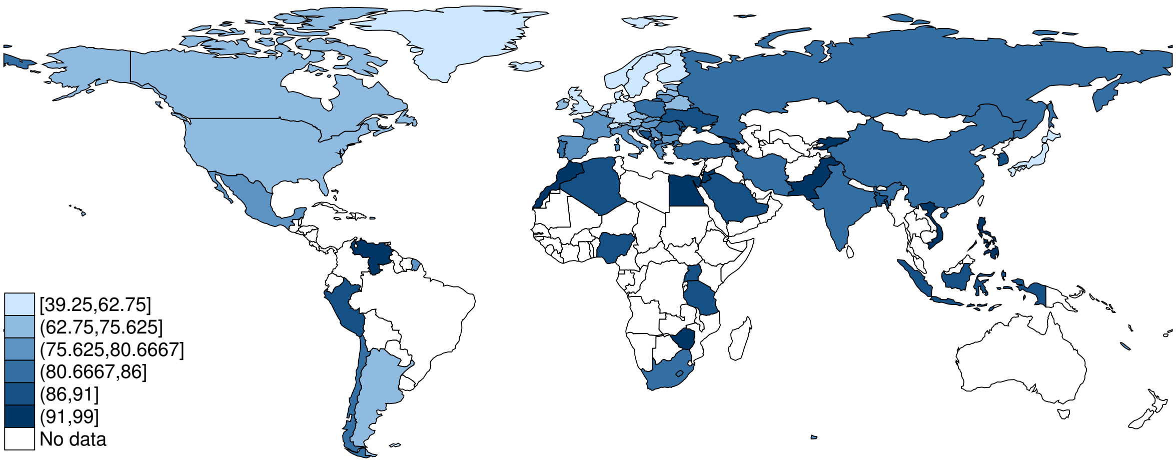

Figure 2 Distribution of family ties (FAMILY_1) in the world.

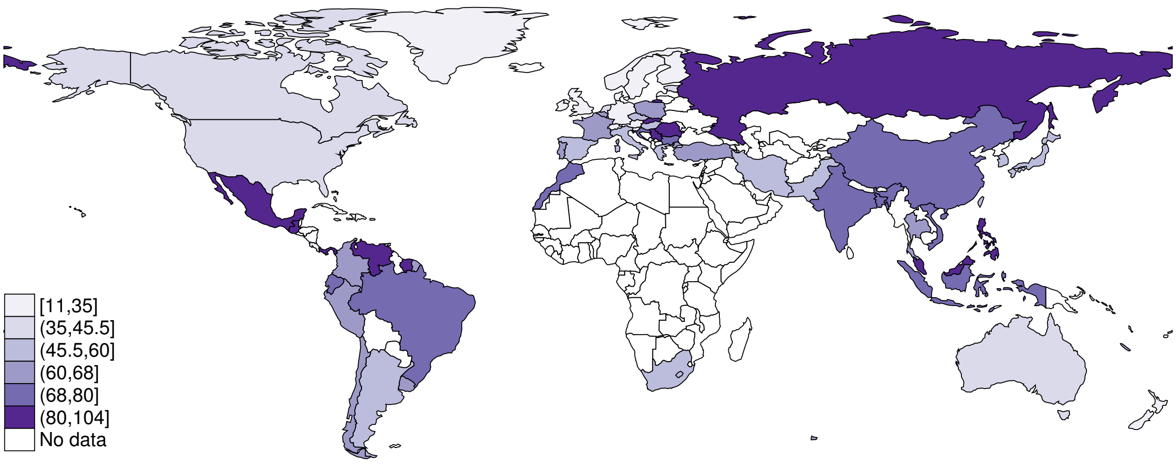

Figure 3 Distribution of power distance (PDI) in the world.

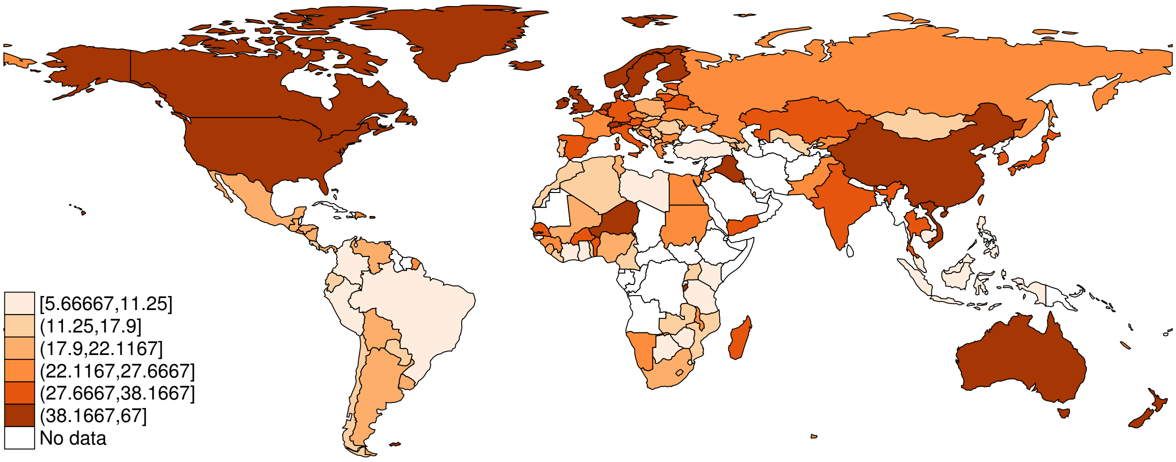

Figure 4 Distribution of trust (TRUST) in the world.

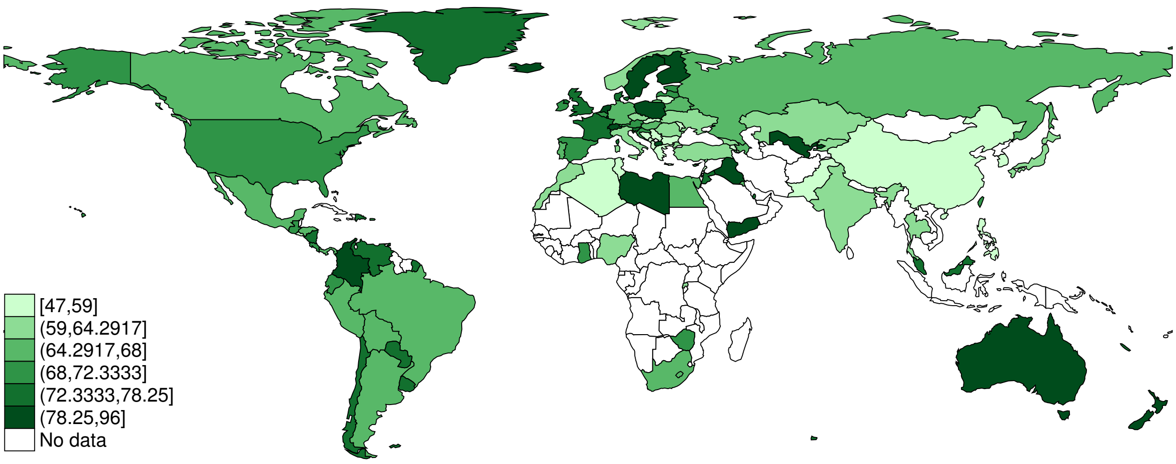

Figure 5 Distribution of the degree to which individuals agree that tolerance is a quality children should be encouraged to learn at home (TOLERANCE).

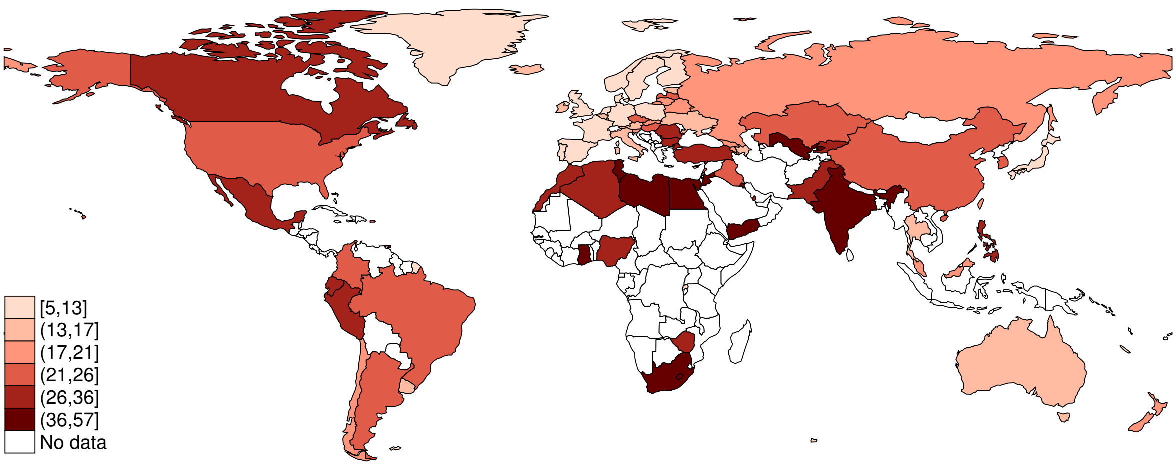

Figure 6 Distribution of individuals that believe that hard work brings success (WORK).

Table 2 Correlations among cultural dimensions.

	IND	PDI	MAS	UAI	LTO	FAM.$_1$	TRUST	TOLER.	OBED.
PDI	-0.59								
MAS	0.04	0.25							
UAI	-0.26	0.27	0.07						
LTO	0.10	-0.10	0.18	-0.37					
FAMILY$_1$	-0.60	0.68	0.37	0.33	-0.29				
TRUST	0.35	-0.66	-0.43	-0.43	0.25	-0.82			
TOLER.	0.58	-0.55	-0.41	-0.08	-.30	-0.62	0.48		
OBED.	-0.15	0.31	0.08	0.03	-0.39	0.51	-0.51	0.01	
WORK	-0.37	0.46	0.27	0.12	-0.34	0.67	-0.55	-0.63	0.43

distance (-49 percent), long-term orientation (-61 percent), family ties (-64 percent), trust (42 percent), and the belief in hard work (-53 percent). In contrast, the correlations suggest a less distinct connection to masculinity and uncertainty avoidance.

4. Empirical strategy

4.1. Empirical model and estimation technique

While the raw correlations depicted in Figure (7) are informative, they cannot be interpreted as a causal link. In addition, Figure (7) does not control for other factors that potentially affect redistributive policies. To address these concerns, we study the statistical effect of culture on redistribution based on the following econometric model

$$\text{REDIST}_{it} = \lambda C_{it} + \gamma \mathbf{D}_{it} + \theta \mathbf{I}_{it} + \xi_t + v_{it}. \quad (2)$$

In this setting, the extent of redistribution in country i at time t depends on the applied measurement of culture C_{it}, a set of covariates that account for the income distribution $\mathbf{D}_{it}$, and institutional controls $\mathbf{I}_{it}$. To estimate long-run effects, and to rule out short-term fluctuations, we construct a panel where t and $t-1$ are five years apart. Equation (2) also captures time effects ξ_t in order to account for exogenous period-specific shocks such as economic crises. The term $v_{it} \equiv u_{it} - \xi_t$ denotes the idiosyncratic error of the model. The model does not include unobserved heterogeneity, as the inherent nature of collective programming requires that cultural time-series are strongly persistent, making them—fully or partly—time-invariant when exploring panel data in the "small T" context, i.e. $C_{it} \approx C_i$. This rules out application of traditional within-group or differencing approaches.

Our list of control variables is based on an earlier study concerned with the exploration of the roots of governmental redistribution (see Gründler and Köllner, 2017). These determinants comprise a set of variables that describe the level of inequality and the shape of the income distribution, and also a number of institutional controls. In the standard

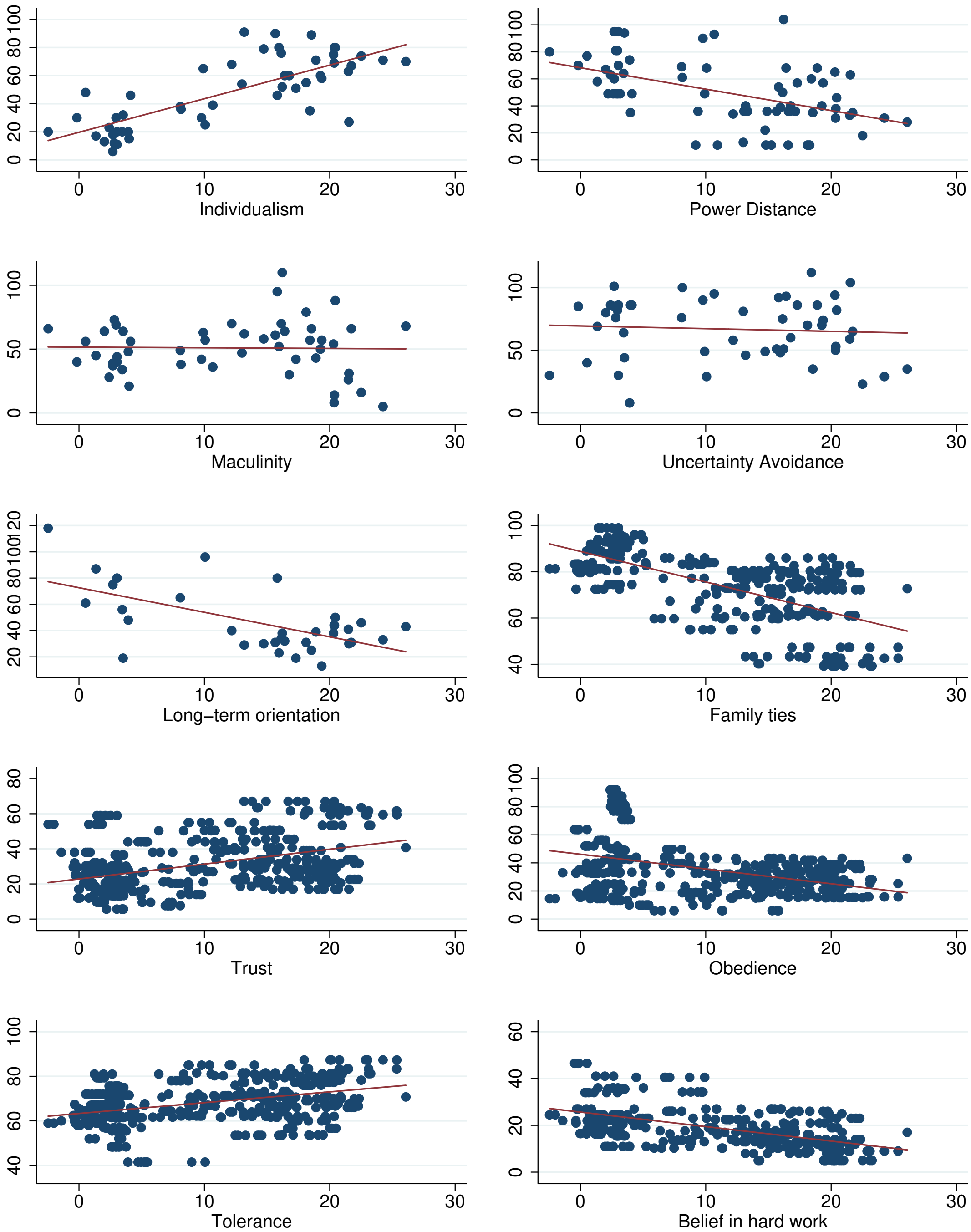

Figure 7 The relationship between cultural values (y-axis) and the generosity of national social security systems (x-axis).

economic model, voting behavior for redistributive policies is exclusively motivated by the expected benefit or loss which would result from such policies (Meltzer and Richard, 1981). To test this assumption, we include the level of market inequality GINI(M) in the set of distributional controls, as a higher level of inequality before taxes and transfers suggests that a larger share of the population will benefit from redistribution. Recent research further shows that the shape of the income distribution is decisive in determining the extent of redistribution, as levels of political power vary between income groups. For this reason, we account for the income share held by the richest 1 percent (TOP-1) as well as that of the middle class (MIDDLECLASS). The latter is modeled by adding the income shares of the lower middle, middle, and upper middle quintiles of the income distribution. The institutional controls include the level of political rights (POLRIGHT) to account for the differences in redistribution between democracies and non-democracies. While inequality reduction is only 2.8 Gini points in autocratic regimes, the extent of redistribution is substantially higher if democratization has reached a sophisticated level (8.4 Gini points). Furthermore, we incorporate the logarithmic value of the fertility rate, denoted with Log(FERT), as higher fertility rates imply a more binding budget constraint for the household, which may affect redistributional policies of the government. The labor market enters into the regression by inclusion of the unemployment rate (UNEMP).

Data regarding fertility, unemployment, and the quintiles and deciles of the income distribution is taken from World Bank (2016). The level of political rights is extracted from Freedom House (2014). The income share held by the top-1% is taken from SWIID 4.0, which is the latest version covering data on the income share of top income earners.[6] Finally, market inequality and redistribution are taken from the SWIID 5.1. Table (A-1) in the appendix provides descriptive statistics for the variables used in the empirical analysis, including their means, standard deviations, and the number of observations, as well as their minima and maxima.

To estimate Equation (2), we employ two different empirical strategies. The first strategy is pooled OLS, which has been used in a number of recent studies dealing with the consequences of culture for economic outcomes (Gorodnichenko and Roland, 2011, 2017; Alesina et al., 2015). Application of pooled OLS, albeit afflicted with some obvious drawbacks, follows from the time-invariance of many of our cultural variables, which prohibits exploitation of the panel structure with respect to C. While pooled OLS offers a tool to control for distributive and institutional factors, it provides little information on

[6]Note that there have been some concerns about the data quality of version 4.0 of the SWIID. For this reason, we assessed robustness of our results by employing data on top incomes from the World Wealth and Income Database (WID), compiled by Alvaredo et al. (2015). As there were no noteworthy changes in the results, we decided to work with the SWIID 4.0 data, which enables inclusion of a considerably larger number of country-year observations. In addition, as data regarding the shape of the income distribution is partly from World Bank and partly stems from the SWIID, we tested for consistency across the two groups of data. The results of our tests imply a high degree of comparability between the data.

causality. The second strategy therefore uses an instrumental variable approach to rule out reverse causation. The 2SLS version of Equation (2) is given by

$$\text{REDIST}_{it} = \alpha_R + \lambda_R C_{it} + \gamma_R \mathbf{D}_{it} + \theta_R \mathbf{I}_{it} + u_{R,it} \tag{3}$$

$$C_{it} = \alpha_C + \lambda_C \Omega_{it} + \gamma_C \mathbf{D}_{it} + \theta_C \mathbf{I}_{it} + u_{C,it} \tag{4}$$

where Ω is the instrumental variable for culture.

4.2. Instruments used for the 2SLS regressions

When studying culture, a substantial challenge is to disentangle its effects from those of institutions. While it is argued that culture and institutions exhibit a symbiotic relationship (Hofstede, 2001; Tabellini, 2008) and complement each other (Alesina and Giuliano, 2015), there is still a potential causal link running from culture to institutions and vice versa. To tackle this issue, the most commonly applied strategy is the epidemiological approach, linking behavior and attitudes of immigrants to measures of culture available for their countries of origin (Luttmer and Singhal, 2011; Fernández, 2011). However, this approach does not entirely solve the problem of endogeneity, as different groups of immigrants may well encounter different informal institutional frameworks (Rauch and Trindade, 2002; Maseland, 2013).

In our analysis, we follow two relatively new branches of the literature relying on (1) regional cultural values and (2) making use of the observation that cultural differences are strongly correlated with biological (Gorodnichenko and Roland, 2017) and linguistic (Tabellini, 2008) characteristics.

Regional instruments

Utilization of jack-knifed regional levels as instruments for national measures is on the rise in many areas of economic research (for democracy see Madsen et al., 2015; Acemoglu et al., 2014, for trade see Autor et al., 2013; Dauth et al., 2014). We argue that a similar instrument can be constructed for culture. A considerable difficulty in measuring culture at the national level is that collective values are shared by social groups which often do not correspond directly to the national population (Hofstede, 2001). The relevant social group may well extent beyond a country's frontiers, particularly since cultural values are often much older than national borders. This argument is most obvious with respect to the partitioning of African countries during the Congo Conference of 1884–85. More generally, a distinct empirical pattern found in Section (3.3) is that in most cases, culture has a strong regional character. We can make use of this feature to construct an external instrument for national culture by making the following assumption:

Assumption 1. *(Exclusion restriction of national culture): Let $\tilde{C}^r_{it}$ be the regional cultural value that is used as an instrument for country-year $\{i, t\}$ and that is defined for some* *disjoint sets of regions* $r = 1, \ldots, R$. *Then it must hold that*

$$E(v_{it}|REDIST_{it-1}, \ldots, REDIST_{it_0}, \tilde{C}^r_{it-1}, \ldots, \tilde{C}^r_{it_0}, \xi_t) = 0 \quad (5)$$
$$\forall\ REDIST_{it-1}, \ldots, REDIST_{it_0}, \tilde{C}^r_{it-1}, \ldots, \tilde{C}^r_{it_0}, \xi_t \text{ and } \forall i, t \geq t_0.$$

This assumption essentially means that, conditional on covariates, cultural values in neighboring countries should be uncorrelated with a country's national level of redistribution. In order to satisfy the exclusion restriction, we leave out the value for i in the calculation of $\tilde{C}^r_{it}$. In constructing $\tilde{C}^r_{it}$, we split each continent into four disjoint regions as illustrated in Table (A-8) in the appendix. Let $\mathcal{R} = \{1, ..., R\}$ denote our set of regions, where each country i belongs to exactly one region r. In addition, let N_{rt} be the number of countries in region r at period t and C_{it} denote the cultural dimension in country-year $\{i, t\}$. Then the instrumental variable $\tilde{C}^r_{it}$ is calculated via

$$\tilde{C}^r_{it} = \frac{1}{N_{rt} - 1} \sum_{\{j \neq i | r' = r, r' \in \mathcal{R}\}} C_{jt}. \quad (6)$$

Figure (B-1) in the appendix illustrates the relationship between cultural values and their regional instruments. The figure highlights strong correlations ranging from 27 percent (tolerance) and 49 percent (family ties) to 66 percent (uncertainty avoidance) and 73 percent (obedience).

Biological instruments

In order to rule out the possibility that the results are triggered by the chosen instrumentation strategy, the second set of instrumental variables uses biological conditions to isolate the effect of culture. This strand of the literature is relatively new and involves the linkage of pathogen prevalence to culture and an individual's personality (Fincher et al., 2008; Murray and Schaller, 2010). These studies argue that societies in which infectious diseases are prevalent tend to be more reluctant to interact with individuals outside their group, viewing them as potential fomites. Consequently, these societies are shaped by collectivist values and a lower degree of trust (Fincher et al., 2008). While pathogens offer an interesting tool for studies linking their prevalence to political outcomes (such as democracy, see Thornhill et al., 2009), a distinct disadvantage for our study is that the dissemination of (life-threatening) diseases has been shown to affect institutional quality (Easterly and Levine, 2003) and most likely results in a higher demand for redistribution. For this reason, we rely on the prevalence of *Toxoplasma gondii*, a protozoan parasite commonly found in felines (Maseland, 2013). While Toxoplasma gondii has been shown to alter the behavior of its intermediate hosts (Skallova et al., 2006), it very rarely leads to manifest disease (Havelaar et al., 2007). More specifically, biological studies have found that the parasite causes impaired motor performance (Hutchinson et al., 1980) and reduced avoidance of both predators and open spaces (Berdoy et al., 2000), increasing the chance of the host being eaten by felines.

About one third of the human population has been exposed to Toxoplasma gondii, with prevalence rates differing considerably across countries (Hill and Dubey, 2002). While causing only mild physical health effects, infection with the parasite leads to a stronger focus on competition and personal achievement and yields a decrease in the host's morality, trust, and concern for others (Flegr et al., 1996; Webster, 2001; Lindova et al., 2006). These changes in behavior translate into observable differences at the societal level and explain a substantial part of the cross-country variation in cultural values (Laferty, 2005, 2006). As there are no immediately perceptible effects of a Toxoplasma gondii infection, a higher prevalence rate may—unlike with pathogens infections—not yield an increase in redistribution policies via better public health provision. Therefore, we assume that the usual exclusion restriction holds:

Assumption 2. *(Exclusion restriction of national culture): Let G^r_{it} be the prevalence rate of Toxoplasma gondii in country i at time t. Then it must hold that*

$$E(v_{it}|REDIST_{it-1},\dots,REDIST_{it_0},G_{it-1},\dots,G_{it_0},\xi_t)=0 \quad (7)$$
$$\forall\ REDIST_{it-1},\dots,REDIST_{it_0},G_{it-1},\dots,G_{it_0},\xi_t \text{ and } \forall i,t\geq t_0.$$

Data on the prevalence of Toxoplasma gondii is extracted from Pappas et al. (2009), who provide a survey of the global status of seroprevalence of the parasite based on a large number of country-based studies.[7]

As a second strategy, we use genetic data to form an alternative biological instrument. The rationale for using genes is that parents transmit DNA to their offspring in addition to their transfer of cultural values. Consequently, we do not argue that there is any causal link running from genes to culture, but rather exploit the correlation between genetic markers and culture. Application of genes can be reasonably expected to satisfy the exclusion restriction in Equation (2), as redistribution is very unlikely to affect the genetic pool of nations, at least in the relatively short time period which we are able to reconstruct with empirical data. We follow Gorodnichenko and Roland (2017) in using the frequency of blood types as specific genetic markers for two reasons. First, blood types are neutral in that they do not directly influence health. Second, the frequency of alleles distinguishing blood types is by far the most widely accessible genetic information when working with cross-national data. In constructing our instrument, we use the Euclidean distance for frequencies of blood types A and B (see Gorodnichenko and Roland, 2011 for a detailled description). Data on blood types is gathered from the Red Cross, Mourant

[7]Prevalence of Toxoplasma gondii is measured routinely, as prenatal infection may cause ocular conditions and mental retardation later in life. In addition, the parasite may cause complications for organ transplant patients and individuals infected with AIDS.

et al. (1976), and Tills et al. (1983). Figures (B-3) and (B-4) in the appendix display the relationship between our biological instruments and culture, the latter measured as the principle component of family ties, trust, obedience, and uncertainty avoidance. In each case, the correlation is roughly 40 percent.[8]

As a final robustness check, we use the entanglement between culture and language, as with Tabellini (2008) and Licht et al. (2007). Utilization of language as an instrument for culture may be traced back to what is now referred to as the "Sapir-Whorf" or the "Linguistic Relativity" hypothesis (Whorf, 1956; Sapir, 1970). As argued by Kashima and Kashima (1998), culture can be linked to linguistic phenomena, particularly to pronoun drop in the case of person-indexing pronouns. For instance, while the English phrase *"I run"* refers to the German expression *"Ich renne"*, neglect of the pronoun is quite common in other languages such as Spanish and Italian (where it most often would be simply *"corro"*, and the pronouns "*Yo*" and "*Io*" are dropped and the context can be recovered from the verb). The hypothesis of Kashima and Kashima (1998) is that the requirement of pronoun usage is a result of the psychological differentiation between speakers and their social context, where utilization of pronouns is particularly prevalent in individualistic societies. As with blood type distance, it is unlikely that language affects redistributive policies of the government, thus satisfying the required exclusion restriction.

5. Empirical results: The influence of culture on the welfare state

5.1. Baseline Results

We now turn to the empirical investigation of the effect of cultural values on government redistribution. Table (3) reports the results of the POLS estimations and of the IV regressions based on regional culture as instruments. For each of our cultural variables, we show the outcomes of three different specifications of the empirical system. The first column (labeled "isolated effect") displays the reduced effect of a given cultural variable on redistribution. The second ("distribution controls") and third ("institution controls") columns gradually introduce a number of covariates, including the Gini coefficient of market incomes, the income share held by the middle class, and the income share held by the Top-1% (Column 2), as well as the unemployment rate, the degree of democratization, and the fertility rate (Column 3).

The dependent variable used to proxy redistribution in Table (3) is REDIST(S), the sub-sample of high-quality observations provided by the SWIID which relies entirely on national micro data. As the cultural variables vary in their availability, we use all obtainable country-year observations to compute the regressions illustrated in the table in order to

[8]We use principal component analyses (PCA) to illustrate the relationship in order to reduce the number of scatter graphs. Selection of the cultural variables is based on (1) capturing the most important cultural dimensions and (2) maximizing data availability. Naturally, the PCA only draws on the intersecting set of the available country-years provided by the included components.

Table 3 The effect of culture on redistribution. Baseline results using all available redistribution data. Dependent variable is REDIST(S).

	POLS estimates			IV estimates		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
	Panel A: Hofstede Dimensions					
IND	0.218***	0.0827***	0.0618***	0.291***	0.140***	0.119***
	(23.44)	(5.70)	(4.52)	(17.73)	(4.82)	(4.25)
N (R^2)	352 (0.56)	225 (0.82)	186 (0.85)	352 (0.49)	225 (0.81)	186 (0.84)
PDI	-0.175***	-0.0449***	-0.0283**	-0.408***	-0.205***	-0.267**
	(-11.85)	(-3.80)	(-2.18)	(-9.06)	(-2.92)	(-2.09)
N (R^2)	352 (0.30)	225 (0.81)	186 (0.84)	352 (0.30)	225 (0.64)	186 (0.54)
MAS	-0.0224	-0.0211**	-0.00898	0.323***	0.0570*	0.0187
	(-1.12)	(-2.30)	(-0.92)	(4.39)	(1.77)	(0.85)
N (R^2)	352 (0.01)	225 (0.80)	186 (0.84)	352 (0.41)	225 (0.76)	186 (0.85)
UAI	-0.0181	0.00636	-0.0134	-0.111***	-0.0389***	-0.0547***
	(-1.09)	(0.52)	(-1.29)	(-4.42)	(-2.79)	(-2.66)
N (R^2)	352 (0.01)	225 (0.79)	186 (0.84)	352 (0.68)	225 (0.79)	186 (0.84)
LTO	-0.0112	-0.00758	0.0185	-0.447***	0.0153	0.0954
	(-0.79)	(-0.53)	(1.46)	(-4.08)	(0.22)	(0.55)
N (R^2)	352 (0.01)	225 (0.79)	186 (0.83)	338 (0.09)	220 (0.78)	180 (0.79)
	Panel B: Alesina and Giuliano Dimensions					
FAMILY_1	-0.306***	-0.137***	-0.101***	-0.383***	-0.208***	-0.200***
	(-21.28)	(-10.83)	(-6.05)	(-15.32)	(-7.85)	(-5.39)
N (R^2)	318 (0.40)	220 (0.83)	192 (0.86)	318 (0.38)	220 (0.80)	192 (0.83)
FAMILY_2	-0.146***	-0.0568**	-0.0559***	-0.201***	-0.0488	-0.215***
	(-4.37)	(-2.33)	(-2.71)	(-2.87)	(-0.71)	(-2.76)
N (R^2)	318 (0.05)	220 (0.78)	192 (0.84)	318 (0.04)	220 (0.77)	192 (0.79)
FAMILY_3	-0.117**	0.0204	-0.0275	-0.0142	-0.156	-0.274**
	(-2.09)	(0.52)	(-0.76)	(-0.10)	(-1.47)	(-2.07)
N (R^2)	355 (0.01)	237 (0.78)	204 (0.83)	355 (0.03)	237 (0.76)	204 (0.80)
TRUST	0.205***	0.0431***	0.0456***	0.348***	0.118***	0.116***
	(10.49)	(2.76)	(3.16)	(12.13)	(5.20)	(4.54)
N (R^2)	431 (0.17)	298 (0.81)	258 (0.85)	431 (0.08)	298 (0.79)	214 (0.84)
OBEDIENCE	-0.141***	-0.0291*	-0.0254*	-0.189***	-0.0149	-0.0907*
	(-12.35)	(-1.82)	(-1.78)	(-11.64)	(-0.44)	(-1.94)
N (R^2)	422 (0.15)	291 (0.81)	251 (0.85)	422 (0.13)	291 (0.81)	251 (0.84)
TOLERANCE	0.286***	0.144***	0.120***	0.662***	0.484***	0.469***
	(9.03)	(6.72)	(5.01)	(7.33)	(6.13)	(4.11)
N (R^2)	422 (0.14)	291 (0.83)	251 (0.86)	422(0.61)	291 (0.70)	251 (0.74)
WORK	-0.449***	-0.203***	-0.136***	-0.942***	-0.397***	-0.332***
	(-15.50)	(-5.69)	(-3.43)	(-11.07)	(-7.47)	(-4.80)
N (R^2)	345 (0.28)	235 (0.82)	203 (0.85)	345 (0.66)	235 (0.78)	203 (0.81)

Notes: Table reports OLS and IV regression results with Huber-White-robust standard errors. t (OLS) and z (IV) statistics in parentheses. IV regressions use jack-knifed regional cultural values. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

exploit as much of the information as possible. Given the inevitable trade-off between comparability and a sample-selection bias, we carefully chose this strategy due to the fact that the intersecting set of all cultural variables is much smaller than the total set of data available for each of the variables.[9] The most drastic reduction in country-years, however, comes from the time-dimension. As culture is *per se* time-invariant in the medium-term, the issue here is not the familiar one of missing data, but rather the more deep-rooted problem that it is simply *not possible* to observe changes in collective programming over a few decades. While some recent studies (e.g. Gorodnichenko and Roland, 2017; Tabellini, 2010) use cross-sectional analyses to assess the effect of culture on economic and political outcomes, such a strategy always involves the arbitrary selection of the time-period during which culture's influence should be measured. Since cultural values do not change over time, arbitrary selection of the dependent variable may influence the obtained results. For this reason, we use data from a panel consisting of 134 countries that are evaluated at eight 5-year periods, these being 1975-1979; 1980-1984; 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009; and 2010-2014.[10]

The results show that culture substantially influences redistributive policies of the government. Panel A reports the consequences of culture implied by the Hofstede dimensions. The positive effect of individualism on redistribution (along with the negative influence found with respect to all of our measures of family ties in Panel B) provides evidence that collectivist societies have less expansive social security systems. Historically, people living in patrilineal or matrilineal extended families or in tribal units based on kinship ties typically developed a broad sense of responsibility for the members of their group (Hofstede, 2001). While people living in collectivist groups may only see a limited need for public redistribution, societies shaped by a high degree of individualism lack family-based safety nets, thus insurance is shifted from the family level to the government level.

The findings also point to a negative effect of power distance on redistribution. If collective values emphasize (innate) differences across social classes, people are much more willing to accept their individual fate and are less ready to support the indigent. In contrast, members of societies with a lower degree of power distance tend to favor equalizing government policies.

The Alesina and Giuliano dimensions illustrated in Panel B provide further evidence for the influence of culture on redistribution. We find that trust and tolerance are strong predictors of redistributive policies, reflecting that cooperative behavior towards other members of a society increases positive attitudes regarding societal and government institutions. In contrast, greater devotion to obedience reduces public equalization of incomes, which is

[9] For instance, using the identical sample would reduce the number of countries included in WORK to 39, whereas the results in Table (3) are based on data from 54 nations.

[10] Note that the variation in the remaining variables is sufficiently high to allow for this strategy. Note also that we intentionally do not account for unobserved heterogeneity in the empirical model, see Section (4).

in line with the negative effect found with respect to power distance. Finally, societies whose members are convinced that success is the result of hard work tend to support public redistribution to a much lesser degree than those who consider success to be a matter of luck and connections. Citizens from countries with high levels of WORK are typically confident that each individual has the potential to succeed in the labor market. In these societies, being indigent is mainly thought of as resulting from a lack of effort and devotion, a situation which is not considered worthy of support via public policies.

In each case, the identified marginal effects of the IV estimates are (much) stronger than those obtained by OLS, emphasizing the need to expunge endogeneity via IV strategies in order to satisfyingly identify causality. With respect to masculinity (MAS) and uncertainty avoidance (UAI), the IV estimates further point to a robust link between culture and redistribution that is not detectable via OLS. As expected, the parameter estimates tend to be smaller once we introduce institutional and distributional controls. However, the level of significance is relatively unaffected from introduction of the covariates.[11]

Naturally, the IV results hinge critically on the ability to instrument culture with jack-knifed regional averages. To investigate the strength of our instruments, Table (A-2) in the appendix reports the results of three different statistical tests: The first is the F-statistic of the first-stage regressions, which can be used to test for weak instruments in the case of a single endogenous variable (Sanderson and Windmeijer, 2016). As benchmarks, the table displays critical values based on the maximal size of the Wald test, distinguishing between a 10 % and a 15 % maximal IV size obtained from Stock and Yogo (2005). As a second diagnostic of weak instrumentation, we conduct the test proposed by Olea and Pflüger (2013), which—in contrast to traditional weak IV tests—is robust to heteroscedasticity, autocorrelation, and clustering. Critical values are reported for thresholds of $\tau = 10\%$, $\tau = 20\%$, and $\tau = 30\%$. Finally, we perform the LM version of the rk test of Kleibergen and Paap (2006) to test for under-identification. For all of our regional instruments, the weak instrumentation tests point to satisfactory instrument strength, resulting in consistent estimates and correct standard errors. In addition, the null of under-identification is significantly rejected for each of the models.[12]

As additional weak instrument diagnostics, Figure (B-2) in the appendix depicts weak-instrument-robust confidence intervals and rejection probabilities computed based upon the AR-test initially developed by Anderson and Rubin (1949) and compares them with

[11] In a further set of robustness checks, we also control for other channels that might influence the culture-redistribution relationship, most notably geographic variables. The recent literature has stressed that there is a close entanglement between culture, geography, and long-run development (Spolaore and Wacziarg, 2013). We find that latitude and longitude seem to have some effect on redistribution, the parameter estimates of culture, however, remain largely unchanged in their significance level and magnitude.

[12] Table (A-3) in the appendix further displays the first-stage results of the 2SLS regressions. In each case, the regional instruments are significant at the 0.01 level. The marginal effects range from 0.44 (LTO) to 0.89 (FAMILY_1), providing strong indication that regional values satisfyingly instrument national culture.

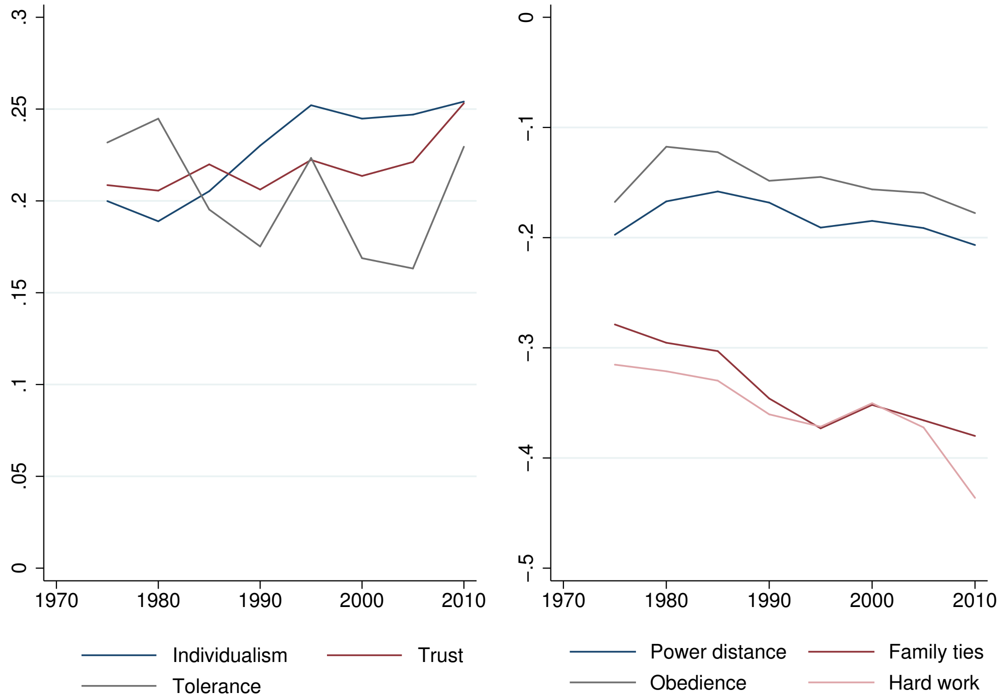

Figure 8 Development of the influence of cultural dimensions over time. The figure illustrates the computed marginal effect of the cross-sectional regressions in the respective 5-year time period, variables with a positive (left panel) and a negative (right panel) effect.

the non-robust intervals suggested by the Wald test. The intervals obtained via the AR-test are robust to weak instruments in the sense that they have the correct size in cases when instruments are weak, and in those when they are not. Figure (B-2) highlights that the AR-interval obtained via instrumentation of culture with jack-knifed regional values strongly resembles the traditional Wald interval. In fact, the weak-instrument-robust and the non-robust intervals are nearly identical, suggesting a considerable degree of instrument strength.

5.2. Cross-sectional analyses, multiply-imputed redistribution, and different proxies of the generosity of welfare states

While Table (3) identifies strong effects running from culture to national social security systems, there is still the possibility that these implications have their roots in the chosen estimation strategy. This strategy relies on three crucial assumptions: First, we argue that application of panel data is more appropriate to reveal culture's consequences on redistribution than use of cross-sectional analyses at a given (more or less arbitrary) point in time. Second, we rely on point estimates of Gini coefficients before and after taxes and transfers, and third, we assume that the exclusion restriction (Assumption 1) is valid.

In this section, we alter the first two of these assumptions. Table (A-4) in the appendix estimates the effect of the cultural variables based on a cross-section of countries that uses data from the 2005-2009 period, which maximizes the sample of available country-years. Qualitatively, the findings are strongly comparable to those obtained via panel data methods in Table (3), but there is a slight deviation in the parameter estimates.

These deviations have their origins in differences in the strength of the influence of cultural traits over time. Figure (8) re-estimates the model of Table (A-4) for each 5-year period between 1975-1979 and 2010-2014 and plots the computed estimates. The figure shows that there is only a weak change over time in the effect of tolerance, power distance, and obedience. In contrast, individualism currently seems to play a greater role than during past decades. This is indicated by both an increase in the estimated parameter of IND and an effect of family ties that becomes increasingly negative. Likewise, the support for redistribution within societies that believe in hard work has fallen during the observed time period. The deviations in the effect of culture on redistribution over time underscore the advantage of employing panel data, as this technique allows us to capture the bigger picture rather than merely focusing on one of its brushstrokes.

Thus far, we relied on point estimates of inequality obtained via averaging of the 100 multiple imputations for each country-year provided by the SWIID. In a further step, we use these imputations to directly compute multiple imputation (MI) estimates, which allows us to account for the uncertainty in the inequality data upon which our redistribution measure is built. Table (A-5) in the appendix displays the results of this approach, indicating a high degree of robustness of the baseline findings in Table (3).

As a further robustness check of our baseline results, we use four alternative strategies to measure redistribution. The first variant (REDIST (WIID)) replicates the traditional pre-post approach based on data obtained from the WIID, allowing us to rule out the possibility that the results are driven by the selected underlying data source. The second variant (REDIST (rel)) is based on relative redistribution, which relates the degree of inequality reduction to the initial level of market inequality, i.e.

$$\text{REDIST (rel)}_{it} = \frac{\text{GINI(M)}_{it} - \text{GINI(N)}_{it}}{\text{GINI(M)}_{it}}. \tag{8}$$

The third and fourth measures of redistribution concentrate on specific dimensions of the social security system, including social transfer payments and the progressivity of the tax system, respectively. To gauge the generosity of transfer payments (SOT), we employ the share of social transfers relative to total expense using data from the World Bank (2016). In addition, we follow Arnold (2008) and Attinasi et al. (2011) by utilizing an index of tax progressivity that is computed via

$$\text{Tax} = 1 - \frac{100 - \text{marginal tax rate}}{100 - \text{average tax rate}}, \tag{9}$$

where average and marginal tax rates are evaluated at the average production worker wage, with higher values of Tax implying higher progressivity.

To facilitate comparison and presentation of the results, Figure (B-6) in the appendix illustrates the standardized coefficients of the reduced POLS model of Table (3). Standardization is necessary due to the large differences between the means as well as the standard deviations of the four redistribution measures. Owing to the lower number of available country-year observations compared with our standard measure of redistribution, the figure focuses on the reduced specifications estimated via POLS, as inclusion of covariates and instruments or concentration on the cross-sectional information would be statistically unjustifiable.

Overall, the parameter estimates strongly coincide with the baseline results, suggesting a strong positive effect of individualism, trust and tolerance on redistribution and a negative influence of power distance, family ties, obedience, and a belief in hard work. In addition, as previously indicated in Table (3), the effects of masculinity, uncertainty avoidance, and long-term orientation are less distinct and much smaller in magnitude. In most cases, the size of the computed parameter is largest for relative redistribution, and smaller if the WIID data is used to compute the pre-post measure. However, these differences originate in a sample selection bias which arises as a result of the reduced number of country-year observations for which pre-post redistribution can be calculated using the WIID data.[13] If the models are based on the identical—yet strongly reduced—sample of data, the estimated parameters of REDIST (WIID) approximate those obtained via our standard redistribution measure.

5.3. Blood type distance and prevalence of Toxoplasma Gondii

One crucial assumption remains to be tested: the exclusion restriction formulated in Assumption (1). While both the weak IV and underidentification tests, as well as the first-stage results, suggest that the IV strategy is valid, this section further employs a second set of external instruments, drawing on biological characteristics prevalent in the countries (see Section 4.2). Table (4) illustrates the effect of the cultural dimensions when the Euclidean distance between blood types A and B as well as the seroprevalence of Toxoplasma gondii are used as instruments.

The results obtained via application of the biological instruments strongly resemble the previous findings, with two exceptions. First, the effect of tolerance is less pronounced. While contributing significantly to redistribution when a reduced specification based on blood type distance is used, TOLERANCE becomes insignificant in each of the remaining estimations. Second, whereas the IV outcomes of Tables (3) and (A-5) tentatively point to a positive influence of masculine values and a negative impact of long-term orientation, both effects vanish when using biological instruments. Apart from these deviations, the table again confirms each of the previously drawn conclusions.

[13] While the number of included observations in the baseline model ranges from 318 (FAMILY_1) to 431 (TRUST) country-years, it is reduced to 221 (FAMILY_1) and 254 (TRUST) when using REDIST (WIID).

Table 4 The effect of culture on redistribution. IV regressions using Toxoplasma Gondii prevalence and blood type distance as instruments. Dependent variable is REDIST.

	Blood Type Distance			Prevalence of Toxoplasma Gondii		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
	Panel A: Hofstede Dimensions					
IND	0.273***	0.201***	0.150***	0.198***	0.162***	0.112**
	(22.53)	(8.92)	(4.55)	(6.14)	(3.53)	(2.32)
N (R^2)	464 (0.52)	216 (0.78)	164 (0.83)	387 (0.62)	187 (0.74)	141 (0.81)
PDI	-0.430***	-0.412***	-0.347**	-0.354***	-0.352***	-0.317
	(-12.89)	(-4.14)	(-2.33)	(-4.61)	(-2.75)	(-1.60)
N (R^2)	464 (0.59)	216 (0.24)	164 (0.52)	387 (0.05)	187 (0.25)	141 (0.47)
MAS	-1.099	-0.572	-0.339	0.659	-0.0997	-0.0790
	(-1.58)	(-1.33)	(-0.96)	(0.69)	(-1.54)	(-1.53)
N (R^2)	464 (0.46)	216 (0.39)	164 (0.35)	387 (0.26)	187 (0.69)	141 (0.81)
UAI	1.018	1.338	0.764	-0.197***	-0.150**	-0.0836**
	(1.23)	(1.51)	(1.00)	(-3.62)	(-2.57)	(-2.00)
N (R^2)	464 (0.00)	216 (0.01)	164 (0.01)	387 (0.55)	187 (0.50)	141 (0.76)
LTO	-2.199	0.388	0.216	0.033	0.0562	-0.0912
	(1.71)	(1.12)	(1.54)	(1.11)	(1.16)	(-1.25)
N (R^2)	464 (0.01)	216 (0.32)	164 (0.82)	387 (0.58)	187 (0.84)	141 (0.78)
	Panel B: Alesina and Giuliano Dimensions					
FAMILY_1	-0.491***	-0.312***	-0.186***	-0.161	-0.422***	-0.688**
	(-18.02)	(-7.28)	(-3.80)	(-0.88)	(-3.77)	(-2.09)
N (R^2)	394 (0.39)	193 (0.76)	151 (0.85)	311 (0.53)	159 (0.57)	124 (0.23)
FAMILY_2	-2.846***	-1.473**	3.434	-0.121	-0.641***	-0.892*
	(-3.00)	(-2.08)	(0.41)	(-0.77)	(-2.62)	(-1.71)
N (R^2)	394 (0.01)	193 (0.07)	151 (0.00)	311 (0.40)	159 (0.46)	124 (0.23)
FAMILY_3	-4.309**	-14.74	1.514	-1.653***	-1.903	-2.108
	(-2.38)	(-0.44)	(0.92)	(-2.71)	(-1.14)	(-0.24)
N (R^2)	437 (0.01)	198(0.01)	152 (0.62)	377 (0.38)	190 (0.38)	146 (0.52)
TRUST	0.641***	0.369***	0.253***	0.0468	0.127***	0.121**
	(10.26)	(5.84)	(4.03)	(1.13)	(2.88)	(2.56)
N (R^2)	504 (0.40)	236 (0.56)	187 (0.76)	391 (0.08)	198 (0.66)	152 (0.79)
OBEDIENCE	-1.679***	-0.382***	-0.340***	-0.249***	-0.257	-0.257*
	(-3.42)	(-4.87)	(-2.63)	(-3.94)	(-0.32)	(-1.90)
N (R^2)	466 (0.01)	214 (0.52)	167 (0.66)	377 (0.42)	183 (0.48)	138 (0.76)
TOLERANCE	1.328***	4.774	-1.855	-0.191	0.174	0.696
	(6.88)	(1.38)	(-1.20)	(-0.81)	(0.38)	(1.30)
N (R^2)	466 (0.20)	214(0.01)	167 (0.06)	377 (0.52)	183 (0.55)	138 (0.55)
WORK	-0.969***	-0.867***	-12.59	-0.286***	-0.0379	-8.186
	(-14.31)	(-4.82)	(-0.16)	(-2.80)	(-0.15)	(-0.12)
N (R^2)	436 (0.62)	197(0.32)	152 (0.01)	324 (0.50)	157 (0.73)	118 (0.01)

Notes: Table reports IV regression results with Huber-White-robust standard errors. z statistics in parentheses. IV regressions use seroprevalence of the parasite Toxoplasma gondii as well as the distance between blood types A and B as external instruments. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Tables (A-2) and (A-3) provide a rich set of weak IV and underidentification diagnostics to assess the ability of biological characteristics to instrument culture. These tests point to a satisfying degree of instrument strength, as implied by both the first-stage F-test and Olea and Pflüger (2013) test. The first-stage regression results further imply that both blood type distance and seroprevalence of Toxoplasma gondii significantly influence cultural values. However, while each of the instruments exceeds at least the critical value of a 15 % maximal IV size, both the first-stage F-test and the Olea and Pflüger (2013) test suggest that, on average, regional instruments are stronger than biological characteristics. In addition, Figure (B-2) in the appendix emphasizes that the weak-instrument-robust confidence intervals strongly coincides with those obtained by the traditional Wald test, underscoring a high degree of instrument strength with respect to both biological variables. As a final robustness check, Table (A-6) in the appendix reports the effect of culture on redistribution, obtained via instrumentation with language. The estimates based on the prevalence of pronoun drop strongly support the previous findings, pointing to a higher level of redistribution in individualistic societies and in those which consider trust and tolerance to be desirable attitudes. Furthermore, a higher degree of power distance, obedience, and the belief in hard work are negatively associated with redistributive policies. However, while the weak instrument tests imply that the employed biological characteristics are universal instruments in the sense that they provide strong instrumentation for all of the applied cultural dimensions, the first-stage results and the SW χ^2 F-test provide a heterogeneous picture in the case of our language variable. These tests show that pronoun drop is a very strong instrument—even stronger than biological characteristics—for individualism, power distance, trust, tolerance, and most dimensions of family ties. In contrast, this instrument fails with respect to masculinity and FAMILY_3. The data does not imply any noteworthy relationship between societies with masculine values and the tendency to drop pronouns (correlation: 1.9 percent), whereas there are considerable correlations with IND (83 percent), PDI (-72 percent), FAMILY_1 (-66 percent), TRUST (57 percent), and TOLERANCE (40 percent).[14]

The results obtained via alteration of the instrumentation strategy indirectly suggest that the exclusion restriction of Assumption (1) is valid, as the results based on different instruments are highly comparable. Another strategy to investigate this restriction more directly is assessing the change in the outcome if Assumption (1) was *not* fulfilled. The union of confidence intervals (UCI) test of Conley et al. (2012) provides a technique for performing inference while relaxing the exclusion restriction. Briefly, in the standard IV setting

$$y_i = X_i\beta + Z_i\gamma + u_i,$$

[14]Note that the variable is coded as: 1 – pronoun drop, 2 – no pronoun drop.

the necessary assumption is $\gamma = 0$. The UCI test deviates from that assumption, using some $\gamma \neq 0$ that is specified by the researcher and returning the union of all interval estimates of β conditional on a grid of all possible values for γ, which is reported in Table (A-7) in the appendix as UCI (lower) and UCI (upper).[15] The results emphasize that even if we substantially relax the exclusion restriction, inference based on our instruments would still be informative.

5.4. Cultural values and the Meltzer-Richard effect

The popular Meltzer and Richard (1981) suggests that higher inequality triggers stronger demand for redistributive policies. In this section, we investigate whether there are conditionalities in this effect that depend on cultural mental programs. Tables (3)–(4) show that governments of countries whose cultural values promote equality among individuals tend to redistribute more. But on top of that, we may also expect that a higher degree of market inequality results in a stronger redistribution-enhancing effect than in countries with a higher prevalence of power distance. Motivated by this thought experiment, Table (5) investigates the *conditional* effect of culture dependent on the level of market inequality.

To study these conditional effects, we introduce an interaction term $\text{GINI(M)}_{it} \times C_{it}$ between the given cultural trait C and the extent of market inequality in the baseline specification of Equation (2). However, regressions of $\text{GINI(M)}_{it} \times C_{it}$ on redistribution (and vice versa) suggest that the relationship between the interaction terms and redistribution runs in both directions.[16] In the absence of a plausible instrument for $\text{GINI(M)}_{it} \times C_{it}$, we construct a dynamic panel model that seeks to eliminate the endogenous components based on internal instruments. In this case, the econometric model adjusts to

$$\begin{aligned}\text{REDIST}_{it} = \alpha\text{REDIST}_{it-1} + \psi\text{GINI(M)}_{it} + \phi\text{GINI(M)}_{it} \times C_{it} + \lambda C_{it} \\ + \gamma\mathbf{D}_{it} + \theta\mathbf{I}_{it} + \eta_i + \xi_t + \tilde{v}_{it}, \qquad (10)\end{aligned}$$

specifying that redistribution in t also depends on its level in $t-1$, which includes path dependencies. This incorporation reflects the idea that institutions, once established, are difficult to change in the short to medium term (Acemoglu et al., 2015). In contrast to the baseline model in Equation (2), Equation (10) also captures country-specific effects η_i and period effects ξ_t. Accounting for various historical and environmental aspects of the countries is necessary in this setting, as reliance on internal instruments creates the need to disentangle the effects of culture and institutions via inclusion of unobserved heterogeneity

[15] Following Persson and Tabellini (2009), we use a regression of growth rates on both our cultural variable and our instrument to obtain an estimate of the degree of the bias, which serves as an estimate for γ.
[16] For instance, $\text{REDIST}_{it} = \alpha + \beta(IND \times \text{GINI(M)})_{it} + \varepsilon_{it}$ yields $\beta = 0.0045^{***}$, whereas $(IND \times$

Table 5 Culture and the Meltzer-Richard effect. Conditional effect of culture on redistribution dependent upon market inequality. Dependent variable is REDIST(S).

	IND	PDI	MAS	FAMILY_1	TRUST	WORK
C	-0.0043	0.0948	0.208	0.487***	-0.398*	0.996*
	(0.0647)	(0.0898)	(0.140)	(0.163)	(0.238)	(0.550)
GINI(M)	-0.1560**	0.170	0.167	1.041***	-0.187	0.648**
	(0.070)	(0.134)	(0.182)	(0.289)	(0.156)	(0.262)
GINI(M)$\times$ C	0.0043***	-0.0033*	-0.0043	-0.0132***	0.00933*	-0.0263*
	(0.0015)	(0.0018)	(0.0031)	(0.0037)	(0.0053)	(0.0138)
REDIST($t-1$)	0.6049***	0.799***	0.956***	0.769***	0.885***	0.645***
	(0.0499)	(0.0664)	(0.0439)	(0.0819)	(0.0613)	(0.190)
Observations	300	346	346	314	422	344
Countries	52	52	52	50	69	54
Hansen p-val	0.132	0.373	0.156	0.118	0.292	0.390
Diff-Hansen	0.234	0.811	0.705	0.370	0.335	0.151
SW F-statistic (diff)	5.64	22.11	38.35	11.99	3.31	56.97
SW F-statistic (lev)	8.13	19.04	24.50	16.10	12.87	20.98
SY 20% max IV bias	6.11	6.46	6.09	6.05	6.16	6.11
SY 30% max IV bias	4.31	5.39	4.29	4.25	4.35	4.31
SW χ^2 p-val	0.000	0.000	0.000	0.000	0.000	0.000
AR(1) p-val	0.052	0.043	0.023	0.068	0.030	0.086
AR(2) p-val	0.554	0.618	0.501	0.487	0.557	0.836
Instruments	39	41	41	44	44	44

Notes: Table reports two-step system GMM estimations with Windmeijer-corrected standard errors in parentheses. All regressions include period fixed effects. Hansen p-val gives the J-test for overidentifying restrictions. Diff-in-Hansen reports the p-value of the C statistic of the difference in the p-values of the restricted and the unrestricted model. The unrestricted model ignores the Arellano and Bover (1995) conditions. The SW F-Stat reports the F-statistic of weak instrumentation of the interaction term following Sanderson and Windmeijer (2016), with critical values reported as SY 20% max IV bias and SY 30% max IV bias that are taken from Stock and Yogo (2005). SW χ^2 p-val documents the p-value of the underidentification test of Sanderson and Windmeijer (2016). AR(1) p-val and AR(2) p-val report the p-values of the AR(n) test. Instruments illustrates the number of instruments. The instrument matrix is collapsed to prevent instrument proliferation. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We estimate Equation (10) by System GMM, which also exploits the cross-sectional information in the data if researchers are willing to assume a mild stationary restriction on the initial conditions of the underlying data generating process.[17] In System GMM, inclusion of our time-invariant regressors C is possible, but they would disappear entirely when using Difference GMM or traditional fixed-effects models. Asymptotically, the inclusion of time-invariant regressors also does not affect coefficient estimates for other regressors, as all instruments for Equation (10) are assumed to be orthogonal to fixed effects and other time-invariant regressors (Roodman, 2009a).[18] In constructing our estimator, we use a collapsed version of our matrix of internal instruments which is based on all

$\text{GINI(M)})_{it} = \alpha + \beta\text{REDIST}_{it} + \varepsilon_{it}$ gives $\beta = 121.78^{***}$. A similar pattern is observable for most of the interaction terms.

[17]The assumption on the initial condition is $\text{E}(\eta_i \Delta\text{REDIST}_{i2}) = 0$, which holds when the process is mean stationary, i.e. $\text{REDIST}_{i1} = \eta_i/(1-\alpha) + v_i$ with $\text{E}(v_i) = \text{E}(v_i\eta_i) = 0$.

[18]In addition, removal of time-invariant regressors does not affect the moments upon which the identification is based.

available lags. Roodman (2009b) emphasizes the necessity of the collapsing procedure, as otherwise the problem of "instrument proliferation" may lead to severe biases.[19]

Empirically employing the econometric model of Equation (10), we do not identify any significant conditionalities of uncertainty avoidance, long-term orientation, or obedience. However, we find that the remaining cultural values distinctively influence the degree to which inequality translates into redistribution. These conditionalities are reported in Table (5). The most important conclusion is that the strength of kinship ties matters for the Meltzer-Richard effect. Both the results for individualism and those for devotion to family show that the magnitude of inequality's influence on redistribution is much stronger in societies with individualistic values. In countries shaped by collectivist attitudes, a higher degree of inequality does not yield an increase in redistribution. A similar observation is that countries whose citizens accept an unequal distribution of power (PDI) and those favoring masculine values (MAS) tend to be reluctant to demand higher redistribution in the presence of rising inequality. With respect to MAS, however, this effect is not significant at the 10 percent level.

Another conditionality has its roots in the level of trust. If people do not trust others, there is virtually no effect of market inequality on redistribution at all. However, the more individuals trust others outside their group, the higher the transmission from inequality to redistributive taxes and transfers. Finally, the results also suggest that people who believe that hard work is a major condition for success are much less supportive of equalizing policies. Figure (9) provides a graphical illustration of the results.

The lower part of Table (5) documents that the identified effects are statistically stable. While Hansen's p-value suggests validity of the over-identifying restrictions, the difference-in-Hansen test shows that the additional orthogonality conditions of System GMM are valid. Our results hinge crucially on the strength of the utilized internal instruments to expunge the detected endogeneity with respect to GINI(M)$\times$ C. We therefore replicate the strategy to test for weak instrumentation as proposed by Bun and Windmeijer (2010) and Bazzi and Clemens (2013), constructing the exact System GMM instrument matrix for both the difference and the levels equations, based upon which 2SLS diagnostics are possible. The Table reports the F-statistics of the weak identification test of Sanderson and Windmeijer (2016) for individual endogenous regressors, with critical values displayed for a 20 % and a 30 % max IV bias that have been obtained from Stock and Yogo (2005). The results of the test generally suggest strong instrumentation, particularly with respect to the levels. However, in the case of TRUST, the SW F-statistic does not exceed the 30%

[19]In principle, our specification can be estimated using one-step or two-step GMM. Whereas one-step GMM estimators use weight matrices independent of estimated parameters, the two-step variant weights the moment conditions by a consistent estimate of their covariance matrix. Bond et al. (2001) show that the two-step estimation is asymptotically more efficient. Yet it is well known that standard errors of two-step GMM are severely downward biased in small samples. We therefore rely on the Windmeijer (2005) finite sample corrected estimate of the variance, which yields a more accurate inference.

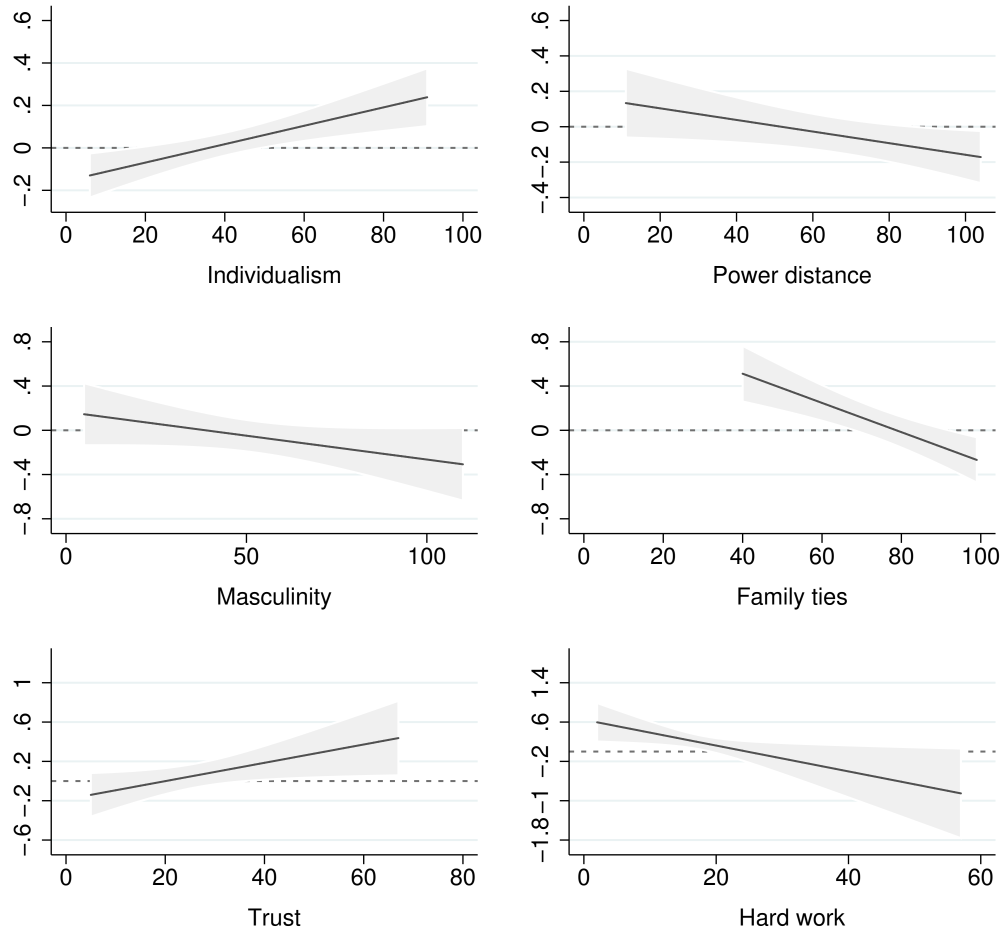

Figure 9 Marginal effect of market inequality on redistribution conditional upon different cultural traits. The area marked in light red shows the 90 % confidence interval, the dashed grey line marks the point at which the effect of market inequality on redistribution is zero. The graphs are generated based on the results of Table (5).

critical value. Meanwhile, the Sanderson and Windmeijer (2016) χ^2 test does not find any trace of underidentification.

The conditional results explain many of the observable differences in the redistributional responses of governments to market inequality. For instance, it has been shown that preferences for redistribution in Finland are much higher than would be implied by the degree of Finnish market inequality, while Italians tend to have disproportionately low preferences for redistributive policies (Finseraas, 2009). A substantial part of this deviation can be traced back to culture. Exhibiting a high degree of trust (63) and individualism (63), along with the belief that hard work does not necessarily bring success (9), the results illustrated in Figure (9) suggest that the Meltzer-Richard effect should be strongly pronounced in Finland. In contrast, Italians on average possess a much lower degree of trust (32) and live together with strong family ties (81). Both attitudes are insignificantly—or negatively—related to the strength of the Meltzer-Richard effect.

6. The influence of diversity on the welfare state

The findings of the previous chapters highlight that different cultural values are associated with different redistributive policies. The implicit assumption of these analyses was that each nation possesses a form of "ubiquitous culture" shared by all members of the society. However, during the past decades and centuries, migration between countries has led to a rich diversity within nations, and many national populations are increasingly composed of different cultures, religions, and ethnic groups. Apart from the direct effect of culture on redistribution, a higher degree of diversity may also influence voting behavior and thus redistributive policies. In a pioneering paper, Luttmer (2001) shows that *racial group loyalty* crucially influences interpersonal preferences for redistribution, emphasizing that individuals tend to increase their support for welfare spending as the share of local recipients of their own racial group increases. In contrast, individuals typically prefer that less transfer payments be received by indigents outside their social group. While Luttmer (2001) uses data on individual support for redistribution in the United States, this section examines the group loyalty effect based on a broad panel of countries. In line with recent research on the topic (Habyarimana et al., 2007; Fong and Luttmer, 2009; Eger, 2010), our hypothesis is that a higher degree of diversity is negatively related to redistribution. Due to past comparability issues with the redistribution variable, cross-country evidence on the effect of diversity on fiscal policy and the welfare state is surprisingly scarce. There is, however, a rich literature investigating this effect at the country-level, commonly featuring experimental designs (see Stichnoth and Van der Straeten, 2013).

We construct four different series to measure a country's diversity, which are based upon two different data sources. First, we use the CREG (2016) database from the Cline Center for Democracy at the University of Illinois, which compiles national data on religious and ethnic groups for 165 countries between 1945 and 2013. Based on this data, we follow Alesina et al. (2003) in computing a Herfindahl-Hirschman index (HHI) measuring the degree of ethnic and religious concentration that is re-coded so that higher values reflect a higher degree of diversity. Second, we use data on ethnic and cultural fractionalization collected by Fearon (2003).[20]

Table (A-9) investigates the effect of diversity on redistribution based on four different specifications. The first panel reports the isolated effect of diversity, obtained via a reduced specification in which the only determinant of redistribution is diversity. Subsequently, we introduce distribution controls (Panel B) and covariates capturing institutional differences (Panel C) in the same way as in Table (3). Finally, in Panel D we examine potential non-linearities in the impact of diversity on redistribution, which has been hypothesized by Selway (2011) but thus far neglected in recent empirical studies. To estimate the

[20] Fearon (2003) constructs a measure of cultural fractionalization using the structural relationship between languages to proxy cultural distance between groups in a country.

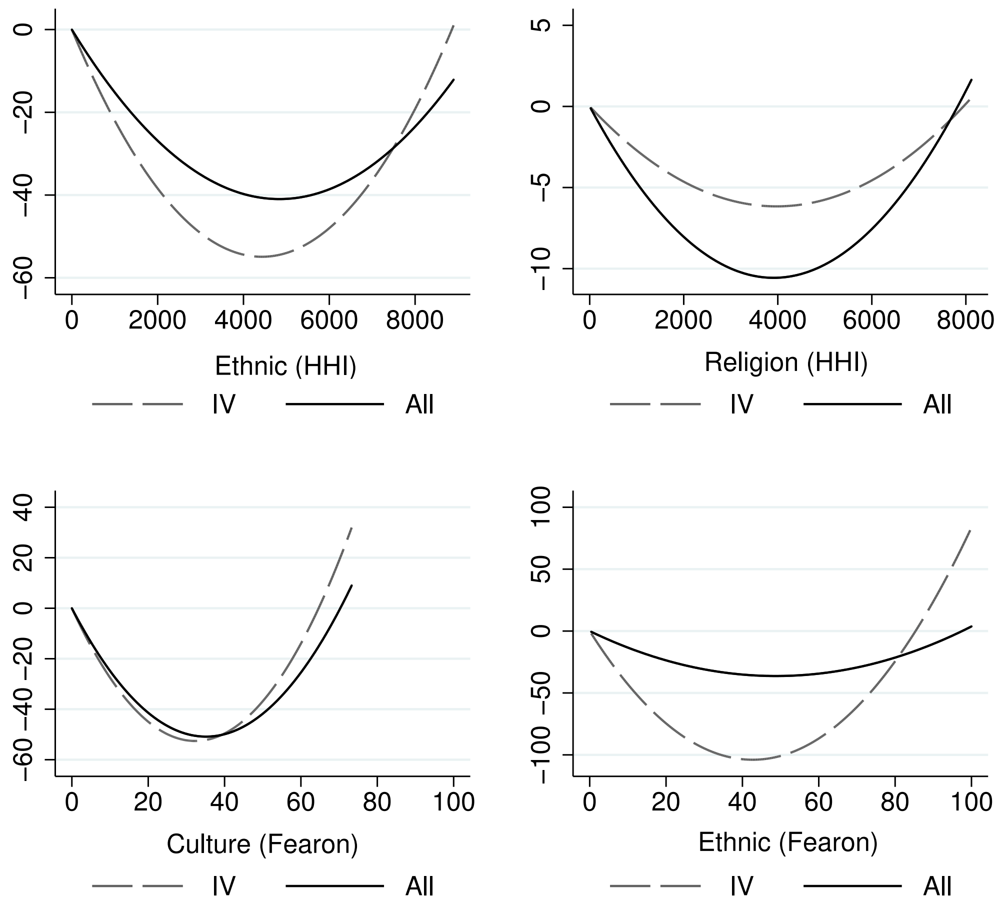

Figure 10 Non-linear effects of ethnic, religious and cultural fractionalization on redistribution. Function labeled "IV" refers to the outcomes of the IV estimations with REDIST(S) as dependent variable, "All" refers to the regression sample that includes all available information. The graphs are generated based on the results of Table (A-9). The HHI is re-scaled so that higher values reflect a greater extent of diversity, the Fearon (2003) data is re-scaled to fit the interval $[0, 100]$.

specifications, we again rely on both POLS and 2SLS. For the instrumentation strategy, we use jack-knifed regional degrees of diversity as instruments, obtaining a variable via a strategy similar to that applied in Equation (6). Utilization of regional instruments is motivated by previous empirical findings using the gravity model to explain migration patterns (see, e.g., Karemera et al., 2000; Lewer and Van den Berg, 2008). This model emphasizes that immigration is impeded by the costs of moving from one country to another. As a result, a substantial portion of the individuals migrating to a destination country were born in a geographically nearby state. Consequently, there are strong regional correlations with regard to the share of cultural and regional fractionalization, as is illustrated in Figure (B-5) in the appendix.

The results reported in Table (A-9) illustrate that diversity plays a crucial role in determining the extent of redistribution. Panel A shows that redistribution is lower in countries with a higher degree of ethnic and cultural diversity. These results are obtained via both the POLS and the IV strategies. However, we do not find any significant effect with respect to religious fractionalization. Inclusion of distribution and institution controls in Panels B and C, respectively, supports our finding of a significantly negative effect on redistribution emanating from greater cultural and ethnic diversity. As in Panel A, however, there is no such effect visible with respect to religion.

While Panels A–C investigate linear effects, Panel D emphasizes that diversity and redistribution are linked via a non-linear function. We study non-linearities based on three different reduced specifications. The first specification uses POLS as the estimation strategy, while the second specification again applies regional levels of fractionalization as instruments. While we use REDIST(S), the sample of high-quality observations, to obtain the previous results, the final specification draws on all available observations in order to investigate the link based on the broadest possible sample of countries. Taken together, the results strongly indicate a parabolic relationship between diversity and redistributive policies, which is illustrated in Figure (10).

In countries that are shaped by a low level of diversity, an increase in religious, cultural, and ethnic variety results in a lower tendency to support redistributive policies. In this case, ethnic minorities may be perceived as posing a political or economic threat to the cultural majority in the country. However, once a crucial tipping point of diversity has been surpassed, the negative effect on redistribution becomes increasingly relativized until the point—which is reached only in a minority of extremely fractionalized countries—at which diversity eventually triggers positive effects on redistribution. When the relationship between the variables is modeled using a non-linear function, the effect of religious diversity reaches a significance level similar to those of the impact of ethnic and cultural diversity. There are two possible explanations for why the effect of diversity changes once a certain level of fractionalization is reached. First, in the absence of a leading majority, social segregation between different groups may be less prevalent, resulting is less prejudice and resentment towards members of other social groups. Second, Luttmer and Singhal (2011) demonstrate that immigrants from countries with a high average preference for redistribution are more likely to vote for more redistributive policies. The effect seems to be even stronger if individuals are less integrated into the society of the destination country. Consequently, a higher degree of diversity that is the result of immigration from high-preference countries may also result in more expansive welfare systems.[21]

[21] Due to the varying degrees of fractionalization across the world, Table (A-10) in the appendix reports the effects of diversity on redistribution separately for different regions in the world. The results suggest that diversity has by far the largest negative impact in Europe, while it is positively related to redistribution in Africa.

7. Conclusion

Our results provide strong evidence that culture and diversity matter for the formation of equalizing government policies. Apart from their general implications, our findings also relate to a more recent question raised by economists: Does migration yield changes in the social security system? To answer this question from the perspective of our paper, it is important to consider both sides of the coin, which include the effect of different collective values as well as the effect arising from increasing diversity. Given the substantial differences between cultural traits and their different effects on redistributive policies, the results suggest that migration may contribute to a change in national social security systems. However, the findings also stress that the magnitude and the direction of this change depend on the composition of different cultural traits that are prevalent in the country of origin and the host country, as well as the initial level of fractionalization.

Additionally, it is crucial to emphasize that these results are based on average effects obtained via cross-country regressions, whereas in a single-country context we might expect country-specific differences that have their roots in institutional frameworks and resentment towards specific cultural and ethnic groups. A further issue concerns immigrants' voting rights, which are a prerequisite for the transmission of the cultural preferences of migrants into policy actions. Finally, a further interesting area of study lies in the examination of changes in ethnic ties and the consequences of such changes for the social security system. Economists have hardly begun to draw on knowledge offered by other disciplines about the nature and the consequences of culture and ethnicity. We are convinced that therein lies promising potential for future research.

A Supplementary Tables

Table A-1 Descriptive statistics of the variables used in the estimations.

	N	mean	std.	min	max
	Panel A: Redistribution variables				
REDIST	1,128	6.556924	6.443803	-14.73038	26.06834
REDIST(S)	453	9.646837	7.347301	-2.461385	26.06834
REDIST(WIID)	264	8.592245	7.682834	-21.275	24.30342
REDIST(rel)	453	.214097	.159624	-.0483195	.5343646
SOT	517	37.15542	21.03387	.5685228	81.75859
Tax	606	.054579	.0685522	-1.76e-07	.3524257
	Panel B: Control variables				
GINI(M)	1,128	44.00543	8.58483	18.75223	71.29995
TOP-1%	1,139	9.453331	4.38978	2.467996	29.64182
MIDDLECLASS	613	47.08253	6.258872	20.27	57.42
POLRIGHT	1,624	4.06414	2.182818	1	7
Log(FERT)	2,029	1.283300	.5502135	-.1369659	2.21336
UNEMP	855	8.955421	6.1094	.5333334	36.95
	Panel C: Cultural dimensions				
IND	726	44.0303	24.11509	6	91
PDI	726	50.66667	23.98318	11	104
MAS	726	50.57576	18.93638	5	110
UAI	726	66.90909	23.987	8	112
LTO	726	45.97143	23.65	13	118
FAMILY_1	803	79.45959	14.26083	39.25	99
FAMILY_2	803	73.74726	12.28036	37.33333	96
FAMILY_3	858	87.58056	7.150792	64.66666	98
TRUST	1,397	24.7563	13.70009	5	67
OBEDIENCE	1,078	41.66258	21.42133	6	92
TOLERANCE	1,078	67.26173	10.31181	37	96
WORK	858	24.22436	12.30376	2	57
	Panel D: Instruments				
T. GONDII	539	35.47143	17.26755	2.3	75.2
BLOOD Dist.	715	0.1865569	0.1151366	0.006	0.42
LANGUAGE	803	1.287671	0.4529592	1	2

Notes: Table reports the number of observations (N), the means, standard deviations (std.), minima (min.) and maxima (max.) of our employed variables. See Section (4) for a description.

Table A-2 Weak instrument diagnostic and tests for underidentification of the instruments used in Tables (3), (4), (A-4), and (A-5).

	First-stage F-statistic			KP rk Wald F-statistic		
	regional	T. gondii	blood	regional	T. gondii	blood
Instrument statistics						
IND	470.10	34.45	448.14	0.000	0.000	0.000
PDI	160.88	13.73	143.27	0.000	0.000	0.000
MAS	53.20	21.08	25.78	0.000	0.000	0.000
UAI	327.97	38.92	17.48	0.000	0.000	0.000
LTO	27.81	38.92	18.87	0.000	0.000	0.000
FAMILY_1	326.76	11.97	102.98	0.000	0.000	0.000
FAMILY_2	84.28	14.79	9.13	0.000	0.000	0.002
FAMILY_3	78.52	22.57	13.10	0.000	0.000	0.000
TRUST	318.60	141.50	32.30	0.000	0.000	0.000
OBEDIENCE	356.10	24.07	12.56	0.000	0.000	0.000
TOLERANCE	92.20	13.01	14.13	0.000	0.000	0.000
WORK	124.49	30.79	41.36	0.000	0.000	0.000
Critical values of Stock and Yogo (2005)						
10 % maximal IV size	16.38	16.38	16.38			
15 % maximal IV size	8.96	8.96	8.96			
Critical values of Olea and Pflüger (2013)						
$\tau = 10\%$	23.11	23.11	23.11			
$\tau = 20\%$	15.01	15.01	15.01			
$\tau = 30\%$	12.04	12.04	12.04			

Notes: Table reports weak instrument diagnostics. First-stage F-statistic gives the standard F-statistic of the first-stage regression. The table reports critical values based on the maximal size of the Wald test, where we distinguish between a 10 % maximal IV size and a 15 % maximal IV size. Critical values are from Stock and Yogo (2005). As a second diagnostic of weak instruments, we compute the test proposed by Olea and Pflüger (2013) that is robust to heteroscedasticity, autocorrelation, and clustering. In our just-identified case, the effective test statistic of the test equals the robust F-statistic reported in the table. We report critical values for three different thresholds: $\tau = 10\%$, $\tau = 20\%$, and $\tau = 30\%$. The columns labeled "regional", "T. gondii" and "blood" refer to the instrumental variables used in the regressions: Regional culture, prevalence of Toxoplasma gondii, and the Euclidean distance between blood types A and B. A detailed description is provided in Section (4.2).

Table A-3 First-stage results of the regressions based on the instruments used in Tables (3), (4), (A-4), and (A-5).

	Estimated parameters in first-stage		
	Regional instruments	Toxoplasma gondii	blood distance
IND	0.810*** (21.68)	-0.413*** (-5.67)	151.82*** (22.51)
PDI	0.584*** (8.44)	0.232*** (3.85)	-96.56*** (-13.48)
MAS	-0.863*** (-7.29)	-0.081* (-1.71)	-37.74*** (-5.08)
UAI	0.866*** (18.11)	0.417*** (6.07)	40.76*** (4.18)
LTO	0.435*** (3.80)	-0.501*** (-5.66)	45.75*** (4.65)
$FAMILY_1$	0.899*** (18.08)	0.103** (2.52)	-97.86*** (-17.34)
$FAMILY_2$	0.741*** (9.18)	0.137*** (3.85)	-16.87*** (-3.02)
$FAMILY_3$	0.595*** (8.86)	0.049*** (2.60)	-8.61** (-2.26)
TRUST	0.854*** (17.85)	-0.480*** (-12.99)	64.35*** (10.01)
OBEDIENCE	0.873*** (18.87)	0.257*** (4.91)	-25.28*** (-3.29)
TOLERANCE	0.651*** (9.60)	0.102*** (3.54)	31.97*** (7.04)
WORK	0.816*** (11.16)	0.165*** (5.55)	-43.95*** (-12.83)

Notes: Table reports first-stage regression results, t statistics in parentheses. A detailed description of the instruments is provided in Section (4.2). The underlying 2SLS specification refers to Section (4) * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A-4 The effect of culture on redistribution. Cross-sectional regression results, average of the period 2005-2009. Dependent variable is REDIST.

	OLS estimates			IV estimates		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
	Panel A: Hofstede Dimensions					
IND	0.247***	0.0948**	0.0639**	0.320***	0.199***	0.193**
	(11.29)	(2.36)	(2.20)	(7.72)	(2.62)	(2.33)
N (R^2)	64 (0.61)	51 (0.79)	51 (0.83)	61 (0.60)	49 (0.78)	49 (0.80)
PDI	-0.191***	-0.0406**	-0.0295	-0.410***	-0.185*	-0.311
	(-5.55)	(-2.07)	(-1.63)	(-4.14)	(-1.82)	(-1.30)
N (R^2)	64 (0.30)	51 (0.87)	51 (0.87)	60 (0.60)	48 (0.73)	48 (0.45)
MAS	0.00290	-0.0175	-0.0200	0.445*	0.117	0.0423
	(0.05)	(-0.61)	(-0.91)	(1.76)	(1.54)	(1.08)
N (R^2)	64 (0.01)	51 (0.76)	51 (0.82)	60 (0.19)	48 (0.66)	48 (0.80)
UAI	-0.00229	0.0132	-0.0488***	-0.0538	-0.00764	-0.0932**
	(-0.05)	(0.46)	(-2.91)	(-0.82)	(-0.28)	(-2.33)
N (R^2)	64 (0.01)	51 (0.76)	51 (0.92)	60 (0.62)	48 (0.78)	48 (0.91)
LTO	0.0316	-0.0448	-0.0190	-0.694	-0.0276	0.0882
	(0.79)	(-1.28)	(-0.61)	(-1.19)	(-0.47)	(0.40)
N (R^2)	64 (0.01)	51 (0.76)	51 (0.82)	52 (0.00)	40 (0.83)	40 (0.72)
	Panel B: Alesina and Giuliano Dimensions					
$FAMILY_1$	-0.366***	-0.156***	-0.108***	-0.449***	-0.205***	-0.174***
	(-11.46)	(-5.43)	(-2.97)	(-8.75)	(-3.66)	(-2.66)
N (R^2)	72 (0.43)	59 (0.83)	59 (0.86)	72 (0.44)	59 (0.82)	59 (0.85)
$FAMILY_2$	-0.208***	-0.00447	-0.0247	-0.376***	-0.0545	-0.167
	(-3.04)	(-0.11)	(-0.65)	(-2.64)	(-0.42)	(-1.06)
N (R^2)	72 (0.10)	59 (0.78)	59 (0.84)	72 (0.05)	59 (0.89)	59 (0.80)
$FAMILY_3$	-0.313***	-0.0362	-0.0400	-0.593**	-0.223	-0.296
	(-2.78)	(-0.60)	(-0.68)	(-2.44)	(-1.22)	(-1.18)
N (R^2)	77 (0.08)	64 (0.84)	64 (0.88)	77 (0.60)	64 (0.73)	64 (0.76)
TRUST	0.222***	0.0991***	0.0708**	0.448***	0.124*	0.131**
	(4.98)	(2.92)	(2.21)	(6.19)	(1.88)	(2.34)
N (R^2)	120 (0.19)	97 (0.77)	97 (0.80)	120 (0.49)	97 (0.75)	97 (0.79)
OBEDIENCE	-0.159***	-0.0155	-0.0186	-0.212***	-0.120*	-0.193*
	(-6.26)	(-0.57)	(-0.71)	(-6.15)	(-1.72)	(-1.90)
N (R^2)	93 (0.20)	74 (0.80)	74 (0.86)	93 (0.18)	74 (0.78)	74 (0.77)
TOLERANCE	0.163*	0.113**	0.0873*	0.624**	0.519**	0.541*
	(1.86)	(2.23)	(1.90)	(2.39)	(2.41)	(1.75)
N (R^2)	93 (0.05)	73 (0.81)	73 (0.83)	93 (0.39)	73 (0.62)	73 (0.60)
WORK	-0.436***	-0.162**	-0.178**	-0.753***	-0.207**	-0.199*
	(-5.46)	(-2.63)	(-2.50)	(-5.31)	(-2.33)	(-1.73)
N (R^2)	73 (0.31)	55 (0.82)	55 (0.85)	70 (0.58)	55 (0.82)	55 (0.86)

Notes: Table reports OLS and IV regression results with Huber-White-robust standard errors. t (OLS) and z (IV) statistics in parentheses. IV regressions use jack-knifed regional cultural values. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A-5 The effect of culture on redistribution. Regressions based on multiply-imputed redistribution data (Imputations = 100). Dependent variable is $\text{REDIST(S)}_{\text{MI}}$.

	POLS estimates			IV estimates		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
	Panel A: Hofstede Dimensions					
IND	0.218***	0.0827***	0.0620***	0.291***	0.141***	0.120***
	(22.13)	(5.36)	(4.09)	(17.12)	(4.62)	(4.05)
N	352	225	186	352	225	186
PDI	-0.174***	-0.0447***	-0.0284**	-0.408***	-0.205***	-0.267**
	(-11.44)	(-3.61)	(-2.06)	(-8.90)	(-2.85)	(-2.06)
N	352	225	186	352	225	186
MAS	-0.0229	-0.0212**	-0.00926	0.318***	0.0561*	0.0185
	(-1.13)	(-2.21)	(-0.89)	(4.30)	(1.66)	(0.80)
N	352	225	186	352	225	186
UAI	-0.0169	0.00689	-0.0132	-0.110***	-0.0386**	-0.0548**
	(-1.00)	(0.53)	(-1.20)	(-4.28)	(-2.50)	(-2.52)
N	352	225	186	352	225	186
LTO	-0.0124	-0.00808	0.0184	-0.442***	0.0148	0.0951
	(-0.84)	(-0.52)	(1.35)	(-4.08)	(0.21)	(0.54)
N	352	225	186	352	225	186
	Panel B: Alesina and Giuliano Dimensions					
FAMILY_1	-0.305***	-0.137***	-0.102***	-0.382***	-0.208***	-0.201***
	(-17.52)	(-8.51)	(-5.33)	(-13.75)	(-7.21)	(-5.20)
N	318	220	192	318	220	192
FAMILY_2	-0.144***	-0.0562**	-0.0552**	-0.196***	-0.0458	-0.213**
	(-4.15)	(-2.11)	(-2.28)	(-2.70)	(-0.61)	(-2.43)
N	318	220	192	312	214	187
FAMILY_3	-0.114*	0.0220	-0.0259	-0.0151	-0.156	-0.273*
	(-1.93)	(0.52)	(-0.63)	(-0.10)	(-1.28)	(-1.73)
N	355	237	204	355	237	204
TRUST	0.204***	0.0426**	0.0451***	0.348***	0.118***	0.116***
	(9.77)	(2.27)	(2.70)	(11.01)	(4.49)	(4.28)
N	431	298	258	431	298	258
OBEDIENCE	-0.141***	-0.0291*	-0.0251	-0.189***	-0.0147	-0.0909*
	(-11.16)	(-1.71)	(-1.60)	(-10.81)	(-0.39)	(-1.76)
N	422	291	251	422	291	251
TOLERANCE	0.285***	0.144***	0.119***	0.661***	0.484***	0.470***
	(8.42)	(5.65)	(4.35)	(6.87)	(5.39)	(3.77)
N	422	291	251	422	291	251
WORK	-0.449***	-0.203***	-0.136***	-0.942***	-0.397***	-0.332***
	(-13.55)	(-5.10)	(-3.21)	(-9.95)	(-6.31)	(-4.42)
N	345	235	203	345	235	203

Notes: Table reports the results of multiple regressions based on 100 multiply-imputed redistribution values available in the SWIID 5.1. Results are obtained via OLS and IV regressions with Huber-White-robust standard errors. t (OLS) and z (IV) statistics in parentheses. IV regressions use jack-knifed regional cultural values. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A-6 Sensitivity analysis of the effect of culture on redistribution. Estimates based on language (pronoun drop) as instrument. Dependent variable is REDIST.

	isolated effect	distribution controls	institution controls	First-stage	SW F-stat (10 % IV size)
	Panel A: Hofstede Dimensions				
IND	0.238***	0.85***	0.156***	44.342***	1754.82
	(23.50)	(7.65)	(5.56)	(41.89)	(16.38)
N (R^2)	570 (0.55)	272 (0.77)	207 (0.82)		
PDI	-0.335***	-0.242***	-0.22***	-31.544***	565.13
	(-18.01)	(-6.43)	(-5.07)	(-23.77)	(16.38)
N (R^2)	570 (0.17)	272 (0.60)	207 (0.70)		
MAS	-25.83	5.135	1.370**	-0.409	0.05
	(-0.22)	(0.71)	(1.72)	(-0.22)	(16.38)
N (R^2)	570 (0.01)	272 (0.01)	207 (0.01)		
UAI	-0.576***	-0.228***	-0.135***	-18.350***	102.09
	(-8.59)	(-4.85)	(-4.97)	(-10.10)	(16.38)
N (R^2)	570 (0.01)	272 (0.34)	207 (0.74)		
LTO	1.073***	0.477***	0.327***	9.847***	24.98
	(5.05)	(2.83)	(3.06)	(5.00)	(16.38)
N (R^2)	570 (0.01)	272 (0.07)	207 (0.19)		
	Panel B: Alesina and Giuliano Dimensions				
$FAMILY_1$	-0.496***	-0.327***	-0.304***	-21.06***	1297.78
	(-17.94)	(-6.58)	(-5.39)	(-17.26)	(16.38)
N (R^2)	463 (0.38)	219 (0.75)	173 (0.80)		
$FAMILY_2$	-2.440***	-1.415***	-0.890***	-4.278***	19.14
	(-4.57)	(-2.40)	(-2.87)	(-4.38)	(16.38)
N (R^2)	463 (0.01)	219 (0.01)	173 (0.14)		
$FAMILY_3$	38.37	-13.43	-5.953	0.2677	0.29
	(0.53)	(-0.97)	(-1.45)	(0.54)	(16.38)
N (R^2)	530 (0.00)	253 (0.00)	197 (0.00)		
TRUST	0.509***	0.323***	0.253***	20.15***	291.33
	(16.12)	(5.70)	(5.17)	(17.07)	(16.38)
N (R^2)	619 (0.55)	299 (0.62)	234 (0.76)		
OBEDIENCE	-0.967***	-2.036	-0.615***	-10.42***	52.24
	(-7.90)	(-1.40)	(-2.73)	(-7.23)	(16.38)
N (R^2)	580 (0.00)	277 (0.01)	214 (0.58)		
TOLERANCE	1.106***	0.925***	1.309***	9.109***	167.66
	(12.16)	(3.57)	(2.03)	(12.95)	(16.38)
N (R^2)	580 (0.21)	277 (0.23)	214 (0.46)		
WORK	-1.594***	-2.325**	-4.975	-6.485***	52.02
	(-8.71)	(-2.42)	(-0.92)	(-7.21)	(16.38)
N (R^2)	495 (0.01)	230 (0.00)	177 (0.00)		

Notes: Table reports IV regression results with Huber-White-robust standard errors, z and t statistics in parentheses. Column labeled "First-stage" gives the results of the first stage with respect to the reduced specification of Column "isolated effect". SW F-stat reports the Sanderson and Windmeijer (2016) weak instrument test, Stock-Yogo critical value of a 10 % IV size in parentheses. See Section (4.2) for a detailed description of the employed instrument. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A-7 Union of confidence intervals (UCI) test of plausibly exogenous instruments (Conley et al., 2012).

		Regional instruments	Toxoplasma gondii	Blood distance
		Panel A: Hofstede Dimensions		
IND	lower	0.132	0.073	0.147
	upper	0.462	0.325	0.406
PDI	lower	-0.814	-0.524	-0.826
	upper	-0.070	-0.190	-0.089
MAS	lower	0.051	-2.261	-2.900
	upper	0.658	4.947	0.075
UAI	lower	-0.299	-0.144	0.215
	upper	0.067	2.900	2.260
LTO	lower	-1.189	0.051	0.171
	upper	0.082	0.283	1.742
		Panel B: Alesina and Giuliano Dimensions		
$FAMILY_1$	lower	-0.637	-0.738	-0.827
	upper	-0.139	0.531	-0.182
$FAMILY_2$	lower	-0.394	-0.612	-6.704
	upper	-0.010	0.430	-0.613
$FAMILY_3$	lower	-0.871	-2.953	-11.045
	upper	-0.072	-0.571	-0.680
TRUST	lower	0.026	-0.257	0.098
	upper	0.689	0.328	1.291
OBEDIENCE	lower	-0.339	-0.478	-4.108
	upper	-0.043	-0.035	-0.286
TOLERANCE	lower	0.071	-1.176	0.123
	upper	1.324	0.602	2.876
WORK	lower	-1.870	-0.484	-1.812
	upper	-0.129	-0.086	-0.258

Notes: Table reports Union of confidence intervals (UCI) test of plausibly exogenous instruments of (Conley et al., 2012). "Upper" and "lower" refer to the lower and upper bounds of the UCI results.

Table A-8 Classification of regions in the IV regression.

I. ASIA	
Central Asia	Afghanistan, Armenia, Azerbaijan, Bhutan, Georgia, India, Iran, Kazakhstan, Kyrgyzstan, Maldives, Mongolia, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, Uzbekistan
East-Southeast Asia	Bangladesh, Cambodia, China, Japan, Laos, Myanmar, North Korea, South Korea, Taiwan, Thailand, Vietnam
Arabic Region	Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen
Oceania	Australia, Brunei Darussalam, Fiji, Indonesia, Malaysia, New Zealand, Papua New Guinea, Philippines, Samoa, Singapore Solomon Islands, Tonga, Vanuatu
II. EUROPE	
Central-Northern Europe	Austria, Belgium, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom
South-Southwest Europe	Cyprus, France, Greece, Italy, Malta, Portugal, Spain
East Europe	Belarus, Czech Republic, Estonia, Latvia, Lithuania, Moldova, Poland, Russia, Slovakia, Ukraine
Balkan States	Albania, Croatia, Bulgaria, Hungary, Kosovo, Macedonia, Montenegro, Romania, Serbia, Slovenia
III. AFRICA	
North Africa	Algeria, Egypt, Libya, Morocco, Tunisia
Central-East Africa	Cameroon, Central African Republic, Chad, Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan
West Africa	Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
Southern Africa	Angola, Burundi, Comoros, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea, Gabon, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, São Tomé and Príncipe, Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe
IV. AMERICA	
North America	Bahamas, Canada, United States
Central America	Belize, Costa Rica, El Salvador, Grenada, Guatemala, Honduras, Mexico, Nicaragua, Panama
South America	Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela
Caribbean	Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent, Trinidad and Tobago

Table A-9 The effect of diversity on redistribution. Linear and non-linear effects. Dependent variable is REDIST(S).

	Ethnic (HHI)	Religion (HHI)	Culture (Fearon)	Ethnic (Fearon)
	Panel A: Reduced models			
$\text{FRAC}_{\text{POLS}}$	-0.0012***	0.0001	-0.081***	-0.115***
	(-7.28)	(0.75)	(-4.44)	(-7.80)
FRAC_{IV}	-0.004***	0.0001	-0.253***	-0.031***
	(-6.11)	(0.16)	(-5.59)	(-6.91)
	Panel B: Distribution controls			
$\text{FRAC}_{\text{POLS}}$	-0.0002**	5.2E-05	-4.804***	-3.489**
	(-2.47)	(0.61)	(-3.31)	(-2.56)
FRAC_{IV}	-0.002***	-3.4E-05	-0.145***	-0.133***
	(-2.60)	(0.11)	(-3.98)	(-3.73)
	Panel C: Institution controls			
$\text{FRAC}_{\text{POLS}}$	-0.0002*	0.0001	-2.483*	-1.964
	(-1.75)	(1.40)	(-1.67)	(-1.42)
FRAC_{IV}	-0.0018	0.0001	-0.066*	-0.091**
	(-1.60)	(0.36)	(-1.85)	(-2.54)
	Panel D: Non-linear effects			
$\text{FRAC}_{\text{POLS}}$	-0.0025***	-0.001	0.179***	-0.2018***
	(-5.29)	(-1.26)	(3.32)	(-4.40)
$\text{FRAC SQUARED}_{\text{POLS}}$	1.8E-07***	1.3E07	-0.045***	0.00117**
	(3.48)	(1.41)	(-5.57)	(2.23)
FRAC_{IV}	-0.0248***	-0.0031	-3.2534	-4.8701*
	(-3.03)	(-0.34)	(-1.53)	(-1.86)
$\text{FRAC SQUARED}_{\text{IV}}$	2.8E-06***	3.9E-07	0.05033	0.05756*
	(2.93)	(0.35)	(1.49)	(1.84)
FRAC_{ALL}	-0.0161***	-0.0054**	-2.8927***	-1.4886****
	(-3.81)	(-2.57)	(-2.22)	(-4.47)
$\text{FRAC SQUARED}_{\text{ALL}}$	1.75E-06***	6.9E-07**	0.04114**	0.01526***
	(3.64)	(2.54)	(2.14)	(4.18)

Notes: Table reports pooled OLS and IV regression results with Huber-White-robust standard errors. t and z statistics in parentheses. IV regressions use regional levels of diversity and fractionalization as instruments. Control variables are identical to the baseline specification with regard to the effect of culture on redistribution. Columns "Ethnic (HHI)" and "Religion (HHI)" denote the Herfindahl indices based on ethnic and religious subgroups. "Culture (Fearon)" and "Ethnic (Fearon)" denote the degrees of cultural and ethnic fractionalization as computed by Fearon (2003). Regressions based on all available data on redistribution include a dummy variable for African countries. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A-10 Regional differences in the effect of diversity on redistribution. Dependent variable is REDIST.

	Ethnic (HHI)	Religion (HHI)	Culture (Fearon)	Ethnic (Fearon)
EUROPE	-0.00125***	0.000177	-0.143***	-0.142***
	(-5.83)	(0.96)	(-7.16)	(-4.97)
ASIA	-0.000189*	-0.0000588	-0.0193**	-0.0374***
	(-1.94)	(-0.49)	(-2.07)	(-3.59)
AFRICA	0.0000714*	0.0000397	0.00706*	0.00188
	(1.88)	(0.99)	(1.72)	(0.39)
LATIN AMERICA	-0.000368***	0.000195**	-0.0344***	-0.0440***
	(-4.14)	(2.09)	(-3.97)	(-5.54)
OCEANIA	-0.00125***	0.000819***	-0.0993***	-0.121***
	(-7.77)	(3.17)	(-5.19)	(-4.18)
NORTH AMERICA	0.000291	0.00248***	0.156	-0.0723
	(0.41)	(17.11)	(0.67)	(-0.70)

Notes: Table reports pooled OLS regression results with Huber-White-robust standard errors based on subsamples that are composed of countries from different continents. t statistics in parentheses. Column "Ethnic (HHI)" and "Religion (HHI)" denote the Herfindahl indices based on ethnic and religious subgroups. "Culture (Fearon)" and "Ethnic (Fearon)" denote the degrees of cultural and ethnic fractionalization as computed by Fearon (2003). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

B Supplementary Figures

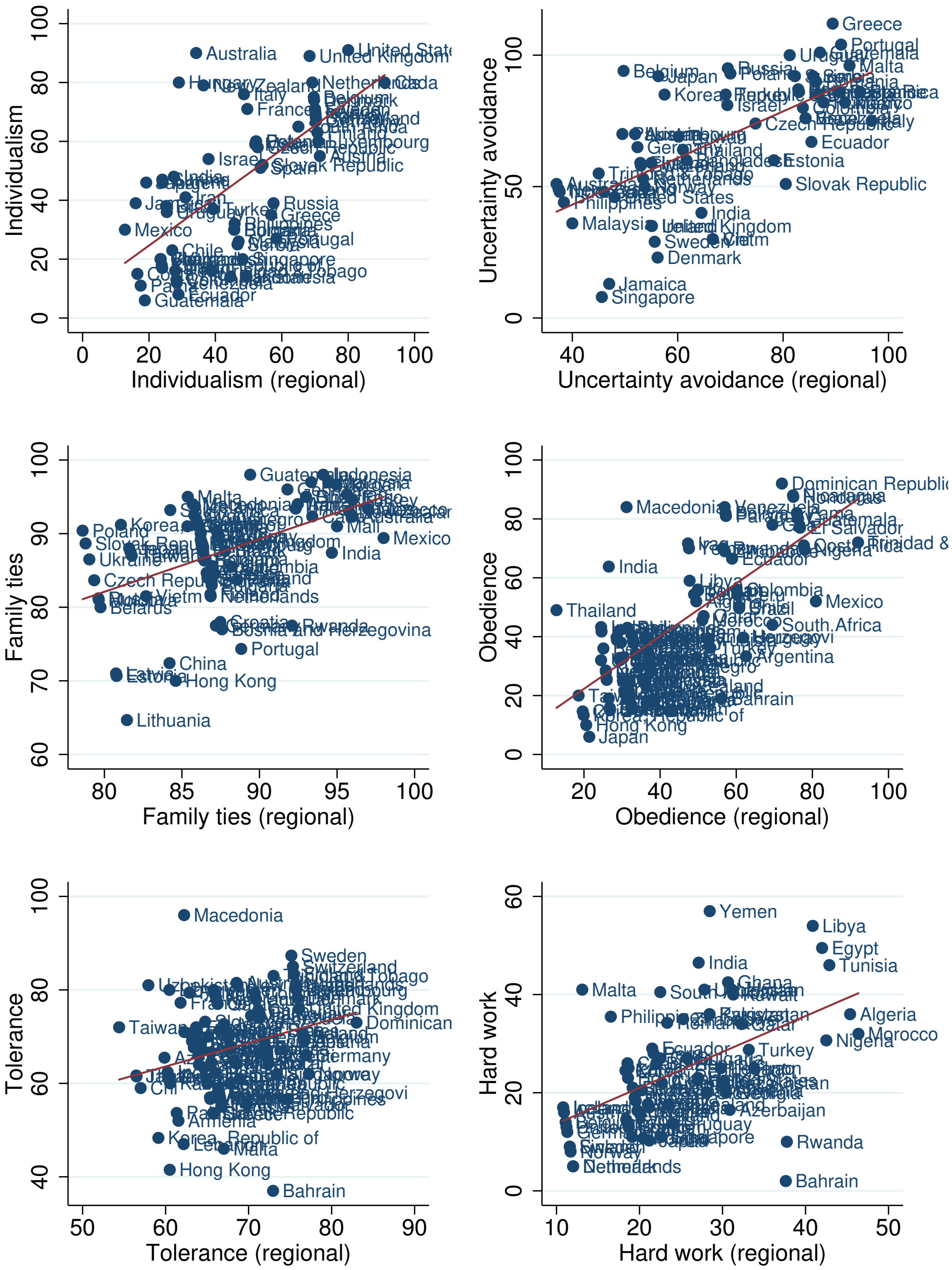

Figure B-1 Relationship between cultural dimensions and their regional instruments. The construction of regional instruments is discussed in Section (4.2).

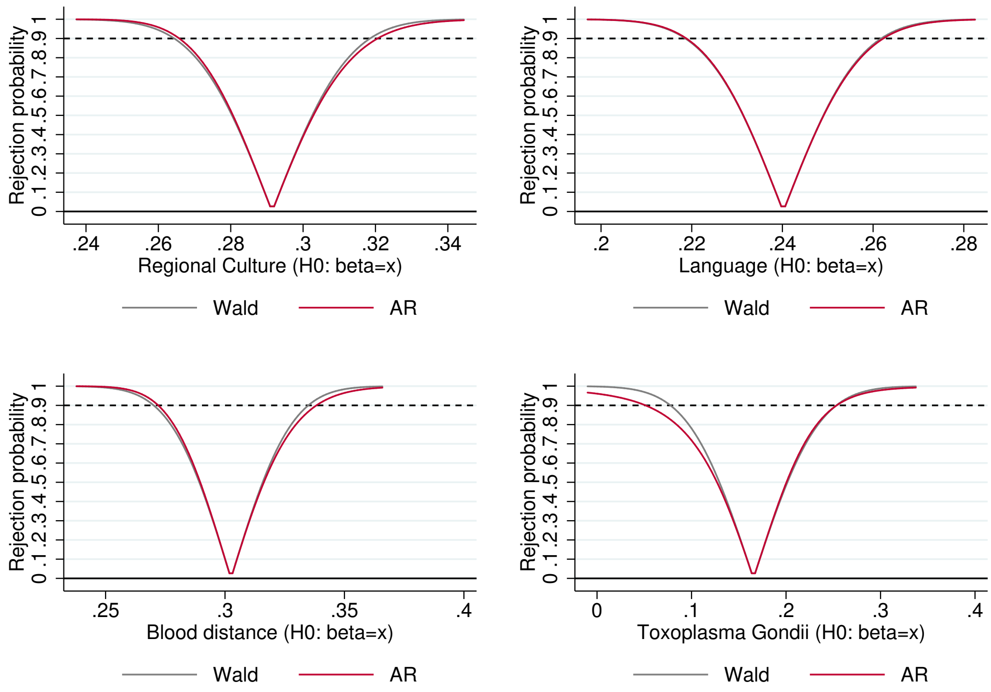

Figure B-2 Rejection probabilities and confidence intervals of the employed instrumental variables. The graph depicts instrumentation of individualism as our main cultural dimension with jack-knifed regional culture, language, blood-distance, and prevalence of Toxoplasma gondii. The patterns are similar with respect to the remaining dimensions of culture and are available upon request.

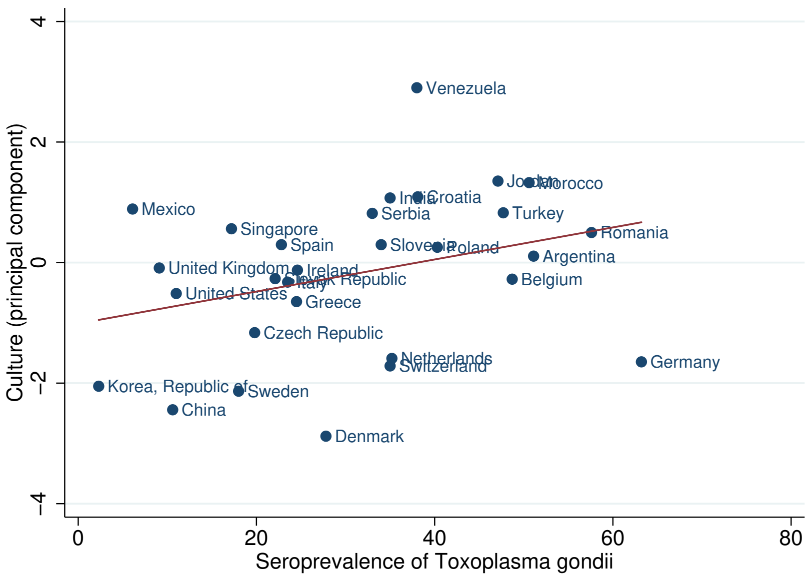

Figure B-3 Relationship between culture and the seroprevalence of Toxoplasma gondii. "Culture" is the principal component of four variables: family ties, trust, obedience, and uncertainty avoidance.

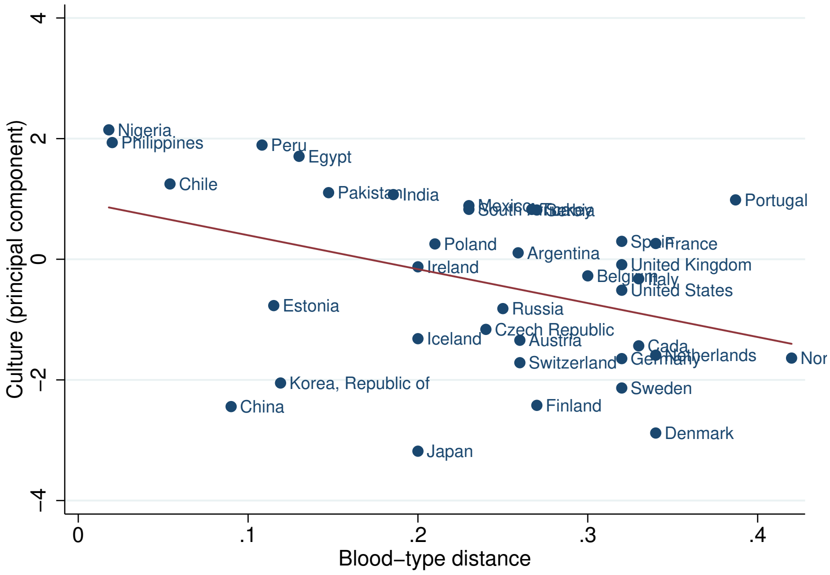

Figure B-4 Relationship between culture and the Euclidean distance between blood types A and B. "Culture" is the principal component of four variables: family ties, trust, obedience, and uncertainty avoidance.

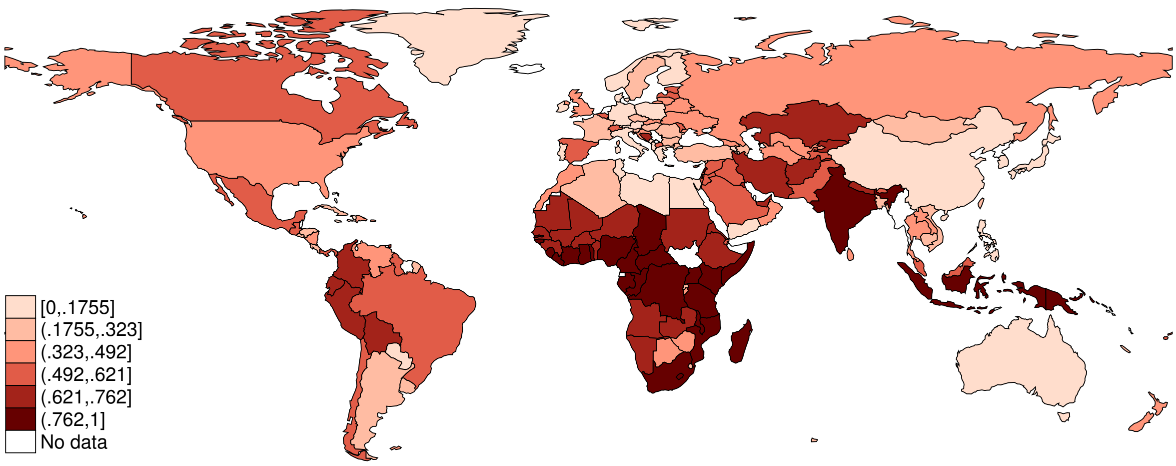

Figure B-5 The degree of ethnic fractionalization in the world. Data is from Fearon (2003). Selection of the classes refers to the distribution of the variable.

Figure B-6 The effect of culture on redistribution based on four different proxies for redistribution. Redist (WIID) replicates our baseline variable using data from the WIID, Redist (rel) measures inequality reduction relative to the initial level of market inequality, SOT is the share of social transfers relative to total expense, and Tax denotes an index of tax progressivity that is computed according to Arnold (2008) and Attinasi et al. (2011). The colors indicate the levels of significance: dark blue ($p < 0.01$), medium blue ($p < 0.05$), light blue ($p < 0.1$), and grey ($p > 0.1$).

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