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Consequences of Culture and Diversity for Governmental Redistribution

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Abstract

We empirically study the effects of culture and diversity on government redistribution based on a large sample of countries. To disentangle culture from institutions, our analysis employs regional instruments as well as data on the prevalence of the pathogen *Toxoplasma Gondii*, linguistic differences, and the frequency of blood types. Redistribution is higher in countries with (1) loose family ties and individualistic attitudes, (2) high prevalence of trust and tolerance, (3) low acceptance of unequally distributed power and obedience, and (4) a prevalent belief that success is the result of luck and connections. 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 in terms of culture, ethnic groups, and religion stand in a non-linear relationship, where moderate levels of diversity impede redistribution and higher levels offset the generally negative effect.

Keywords: Culture, Redistribution, Diversity

JEL no.: I38, Z1, D72, D31

1. Introduction

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). There is an extensive literature focusing on the benefits and costs of immigration within *preexisting* social security systems (Rowthorn, 2008; Stichnoth and Van der Straeten, 2013). But even more important, the recent development intensifies the significance of a related question economists have only recently begun to address: Does immigration yield *changes* in existing social security systems?

While such changes may have its roots in a number of channels, a prominent line of reasoning argues that differences between the cultural values of the native population and those of immigrants affect the welfare state (Alesina and Glaeser, 2004). The recent literature has shown that culturally-induced changes in the social security system may

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have their origin in two main channels: (1) preferences for redistribution of immigrants that are strongly determined by their country of birth and that may deviate from the preferences of the native population (Luttmer, 2001), and (2) cultural protectionism of the native population that is dependent on the degree of cultural, religious and ethnic fractionalization (Oesch, 2008).

In this paper, we empirically study both effects in a broad panel of countries. Shifting the focus away from an exclusive immigration perspective, our contribution is twofold: First, we examine the extent to which different cultural traits can explain cross-country differences in social security systems. Second, we analyze the effect of ethnic and religious diversity on the extent of redistribution, thereby investigating (racial) 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 latest update of the *Standardized World Income Inequality Database* (SWIID 5.1) from July 2016 includes 174 countries from 1960 to the present and enables 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, 2016), and prevalence of the pathogen *Toxoplasma Gondii* (Maseland, 2013).

We find that culture plays an important role in the formation of redistributive policies. Specifically, countries in which strong family ties are prevalent and those with a high preference for a tightly-knit connection with other members of the society 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 attitude. The results also suggest that redistribution is lower if people are convinced that hard work rather than connections or luck is key to success. Conversely,

we provide strong evidence that societies whose members exhibit a high level of trust and tolerance towards 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 and much weaker for religious multiplicity. Taking a closer look at this relationship, we find 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](#)). Another branch of the literature traces the formation of social security systems back to cultural factors and diversity. [Alesina and Giuliano \(2011b\)](#) show that individual preferences for redistribution are determined by collective attitudes towards other members of the society. In addition, [Luttmer and Singhal \(2011\)](#) find that immigrants from countries with a high average preference for redistribution tend to be more likely to vote for redistributive policies. Yet the examination of effects running from culture to the generosity of national social security systems remains uncharted territory.

2.2. Different dimensions of culture

While it does identify a strong link between collective values and economic outcomes, the recent literature stresses that culture as such does not exert a uniform influence on economic outcomes. Rather, it emphasizes that culture’s various dimensions trigger different—and often opposing—effects ([Alesina and Giuliano, 2015](#)). In this section, we briefly describe the most commonly used cultural traits in empirical research, each of which emphasizes different aspects of collective behavior. In light of the scarcity of studies linking cultural differences to differences in national social security systems, we formulate hypotheses on how collective values may contribute to the amount of redistribution.

Individualism

The individualism-collectivism dimension considers whether a society is shaped more by the individual or the collective, measuring the extent to which individuals are expected to take care of themselves as opposed to being strongly integrated into and loyal to a cohesive group. It is often emphasized that this dimension accounts for the most substantial part of cultural variation ([Gorodnichenko and Roland, 2016](#); [Heine and Ruby, 2010](#)). Individualism has been shown to foster innovation and long-term growth ([Gorodnichenko and Roland, 2011, 2016](#)), as well as the adoption of democracy ([Gorodnichenko and Roland, 2015](#)). More individualistic societies may have more generous social security

systems, since looser ties between individuals reduce the importance of alternative means of social protection (e.g. via the family network).

Power Distance

Power distance refers to the extent to which less powerful individuals are willing to accept an unequal distribution of power. Previous research suggests a negative relationship between power distance and R&D investments (Varsakelis, 2001) and a positive link to corruption (Husted, 1999; Jing and Graham, 2008). Higher power distance may negatively affect demand for redistribution, as large differences in status or income are more likely to be tolerated.

Masculinity

Masculinity describes whether a society is characterized more by masculine or by feminine values. Advancement, assertiveness, and competitiveness are considered masculine values, while cooperation, tolerance, and humility are thought to be more feminine ones. Masculinity has been subject to some conceptual criticism, and most studies do not suggest a robust influence on economic outcomes (Gorodnichenko and Roland, 2011; Licht et al., 2005). These concerns notwithstanding, a stronger prevalence of masculine values may be expected to lower redistribution by reducing cooperation and provision of aid for the indigent.

Uncertainty Avoidance

Uncertainty avoidance expresses an individual's degree of aversion to unpredictable situations. Recent research indicates that uncertainty avoidance is negatively related to investor legal rights (Licht et al., 2005), financial development (Dutta and Mukherjee, 2012), and institutional quality and per capita income (Maseland, 2013), as well as economic creativity and innovation implementation (Williams and McGuire, 2010). A higher degree of uncertainty avoidance may hamper redistributive activities, as individuals may feel uncomfortable in unknown situations, preferring private insurance to social protection by the state.

Long-term Orientation

Long-term orientation describes a society's time horizon and indicates whether people attach more importance to the future or to the present. It is associated with values of thrift and perseverance. The findings of Tang and Koveos (2008) provide some indication that societies with longer time horizons are more prone to economic dynamics. We expect long-term orientation to be negatively related to governmental redistribution since a longer planning horizon makes protection against social risks on the household level more likely.

Family Ties

Strong family ties signify the importance of small family/kin networks, while weak ties enable individuals to identify themselves with a community of unrelated people outside the family network and with abstract institutions. Previous research indicates a negative relationship between family ties and labor market participation of women and young adults, generalized trust, civic engagement (Alesina and Giuliano, 2011a, 2014), and preferences for labor-market flexibility (Alesina et al., 2015). Strong family networks provide insurance to their members, which is particularly relevant in countries where no public social safety net exists (La Ferrara, 2010). Varying family structures also help to explain different types of pension systems (Galasso and Profeta, 2011), as well as the development of corporations as an alternative to social protection provided by family or kinship groups that took place over the past few centuries (Greif, 2006). Thus, stronger family ties are expected to reduce the amount of governmental redistribution.

Generalized Morality

The concept of generalized morality, which originated with Platteau (2000) and was later quantified by Tabellini (2008, 2010), refers to cooperative behavior toward everyone in a society who is not an immediate family member. In societies with a high level of generalized morality, rules of good conduct and honest behavior apply to many social situations, and their observation is not restricted to a small network of friends and relatives. Alesina and Giuliano (2015) argue that morality can be decomposed into societies' attitudes toward obedience, respect/tolerance, and trust.

Trust

Trust comprises mutual confidence between a respondent and people whom they do not know. It has been shown that trust is a moral virtue which is stable over time and is not dependent upon day-to-day experiences (Uslaner, 2008), and also that trust is lower across ethnically diverse groups (Alesina and La Ferrara, 2002) and between individuals of different nationalities (Guiso et al., 2009). As virtually every commercial transaction entails an element of trust (Arrow, 1972), this dimension affects economic performance (Knack and Keefer, 1997), FDIs and trade (Guiso et al., 2009), and firm productivity (Bloom et al., 2012). Serving as the basis for any economic activity which takes place beyond a small network of known individuals, trust may positively affect redistribution via several channels, in particular by enhancing confidence in governmental institutions.

Work-Luck

The work-luck dimension of culture relates to an individual's attitude toward work, typically asking whether hard work or luck is more relevant in determining success in life. Several articles reveal that different beliefs about how personal income is to be generated (Bénabou and Ok, 2001; Alesina et al., 2001; Alesina and Angeletos, 2005) and varying

Table 1 Summary of the cultural traits and their relationship with redistribution as implied by theory.

Cultural trait	Effect	Expected channel from theory
<i>Individualism</i>	positive	Looser ties between individuals reduce the importance of alternative ways of protection against social risks (e.g. family network) and increase the demand for governmental redistribution
<i>Power distance</i>	negative	Higher degrees of power distance reflects societies in which class mentality is pronounced. In these societies, greater differences in status or income increase demand for redistribution to a lesser extent than in societies in which an unequal distribution of power is less tolerated
<i>Masculinity</i>	neutral / negative	Stronger focus on masculine values reduces cooperation and therefore reduces the tendency to provide aid for the indigent
<i>Uncertainty avoidance</i>	negative	Higher uncertainty avoidance decreases demand for redistribution, as individuals may feel uncomfortable in unknown situations, preferring private insurance to public social protection
<i>Long-term orientation</i>	negative	Protection against social risks can be ensured individually (i.e. without governmental intervention) with a long-term planning horizon
<i>Family ties</i>	negative	Family network provides an alternative means of protection against social risks without governmental intervention
<i>Generalized Trust</i>	positive	Trust as a basis for all economic activities outside a small network of known individuals, including trust in governmental institutions and therefore redistributive activities
<i>Generalized Morality</i>	positive	Cooperative behavior toward everyone in a society translates into an affirmative attitude toward societal and governmental institutions
<i>Hard work vs. luck</i>	negative	Societies in which success is considered to be the result of hard work provide less support for correcting mechanisms such as governmental redistribution

individual perceptions of social mobility (Alesina and La Ferrara, 2005) are crucial for the establishment of rules of economic organization and redistribution. Furthermore, different collective beliefs about the fairness of inequality (Alesina et al., 2012) and different experiences of macroeconomic shocks (Giuliano and Spilimbergo, 2014) have been shown to affect the work-luck nexus. We expect a strong belief in hard work to result in less redistribution, as neediness in this case may be understood as primarily self-inflicted.

Table (1) summarizes the various cultural traits and illustrates their impact on redistribution as implied by theory. While this table shows the *direct* effect of cultural values on redistribution, we also expect culture to have an *indirect* effect by influencing the Meltzer-Richard channel. The prominent hypothesis of Meltzer and Richard (1981) stresses that a larger mean-to-median ratio increases political demand for redistribution due to the fact that a rise in inequality makes more people beneficiaries of redistributive policies. However, the extent to which a greater degree of inequality translates to redistribution may well

be affected by the cultural values of a society, particularly with respect to individualism, family ties, trust, and power distance.

3. Cultural Values around the Globe

3.1. Data on Culture and Redistribution

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”.¹ In some cases, the Hofstede data provides cultural classifications for regions rather than countries, particularly for African nations. For instance, Cameroon, the Central African Republic, Chad, Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, and Sudan are all included in the single measure of East Africa. While it is reasonable to define culture based on social groups rather than countries, this classification entails the problem that all control variables are available only at the country-level. Assigning each country the same regional value would thus substantially reduce the variation in our data and yield a bias in the estimation. We therefore refrain from including regional observations in our analysis.

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 FAMILY₁ - FAMILY₃, 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,

¹Note 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.

respectively. In order to avoid arbitrariness in the aggregation strategy and to exploit all information in the data, we use each of these variables separately. The degree to which a society is shaped by trust (denoted with TRUST) refers to question V24 of the WVS, which evaluates the degree to which respondents agree with the statement that “*most people can be trusted*”. Meanwhile, the variables TOLERANCE and OBEDIENCE follow from two questions that ask whether respect/tolerance (V16) and obedience (V21) are qualities that children should be encouraged to learn at home. To increase data availability for African, Asian, and Latin American countries, we merge the WVS data with those of the Afrobarometer, the East Asia Barometer, and the Latinobarometer, all of which ask identical questions with respect to trust.² The Latinobarometer further includes data for the tolerance and the obedience variable. Finally, we use question V100 of the WVS, which assesses the degree to which people agree with the statement “*In the long run, hard work usually brings a better life*” on a scale running from 1 to 10.

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 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.

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

where GINI(M) and GINI(N) denote market and net Ginis, and REDIST is the amount of redistribution in country $i = 1, \dots, N$ at time $t = 1, \dots, T$. 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 Inequa-

²For TRUST, the included questions refer to Q020 of the East Asia Barometer, Question 87 of the Afrobarometer, and Q55ST of the Latinobarometer.

lity 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. Owing to the divergence of the available inequality datasets, it is important to choose and employ data which best fits the underlying research topic ([Solt, 2015](#); [Atkinson and Brandolini, 2009](#)). 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.³

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.⁴ To account for the uncertainty that comes along with the combination of inequality data from different sources, the SWIID provides 100 multiple imputation estimates for each country-year, which can be used to form point estimates of inequality or can be employed in MI regression models. 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 5.1 avoids global fixed adjustments, as [Atkinson and Brandolini \(2001\)](#) highlight that differences between welfare definitions vary across countries and over time. Rather, the adjustments utilized in the SWIID vary over time and space as much as possible given the underlying data. A precise description of the multiple imputation procedure and a detailed documentation of the number of countries for which adjustments vary can be found in [Solt \(2015, 2016\)](#). Nevertheless, the quality of the data included in the SWIID differs across country-year observations, particularly with regard to the time-dimension and across different development levels. To address this issue, the SWIID reports a subsample of redistribution data which only consists of country-years for which micro data on net and gross inequality is available. This sample further discards observations from low-income countries before 1985 and from high-income countries before 1975. 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).

The pre-post approach yields a measurement of *effective* redistribution, emphasizing the

³In 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 \(2016\)](#).

⁴The most recent version, 5.1, from July 2016 utilizes over ten thousand Gini coefficients from national statistical offices, scholarly articles, Eurostat, the OECD, SEDLAC, [Deininger and Squire \(1996\)](#), and [Milanovic \(2014\)](#).

results of redistributive activities by the government rather than the *effort* by which the result has been achieved. Due to the scarcity of net and market Gini in the past, some previous investigations have employed indirect measures to proxy redistribution, such as tax rates or different types of social spending. However, such proxies provide only a rough estimate of the degree of redistribution, as the extent to which such fiscal policy instruments exert redistributive effects remains unclear. For the interpretation of the estimated effects it is, however, crucial to bear in mind the concept that is measured with the help of the pre-post approach. Effective redistribution gauges the degree of direct inequality reduction by the government. It does not include in-kind provision of public goods or public attempts to equalize market inequality. The latter is important, as effective redistribution does not measure feedback effects running from redistributive policies to labor market decisions and thus to market inequality.⁵

3.2. Cultural differences in the world

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, members of 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 (3) displays the distribution of trust, which presents a very heterogeneous picture. While

⁵It has been argued, however, that these feedback effects trigger two opposing consequences, which are—at least to some extent—offsetting (see, e.g., [Ostry et al., 2014](#)): At the upper end, taxes may reduce the labor supply of high-income earners, thus mitigating gross inequality. At the lower end, however, a generous welfare system may provide incentives for the poor to withdraw from the labor market and to live on transfers rather than relying on labor incomes.

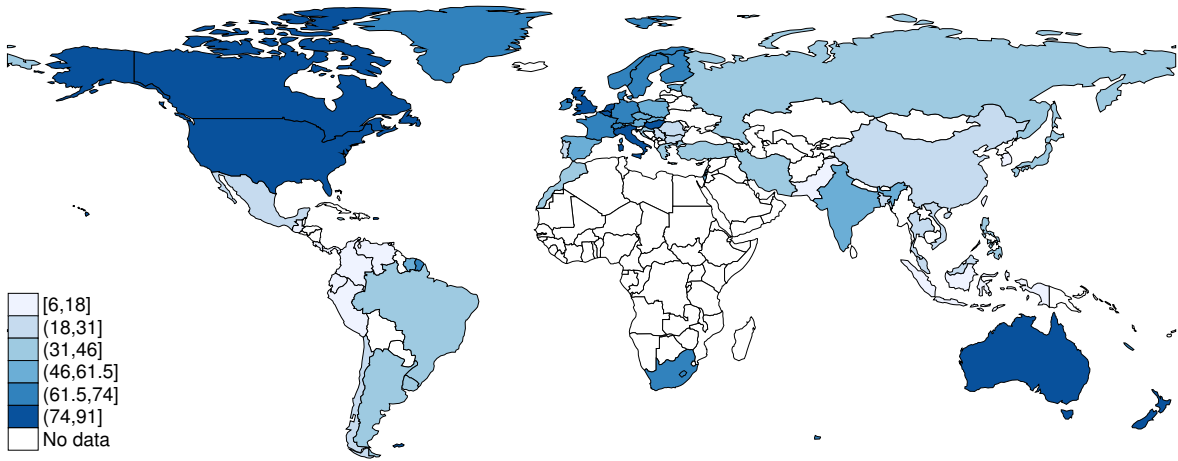


Figure 1 Distribution of individualism (IND) in the world.

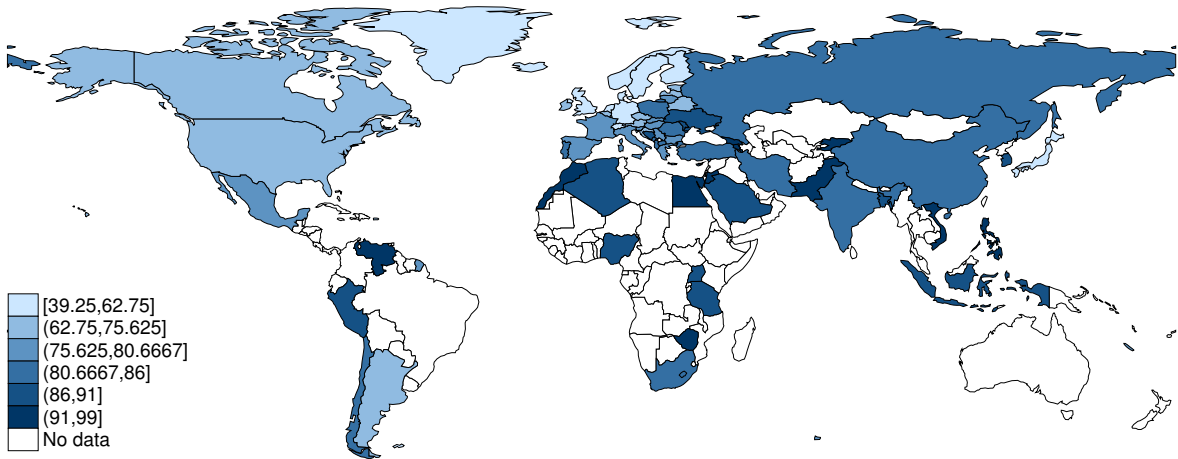


Figure 2 Distribution of family ties (FAMILY₁) in the world.

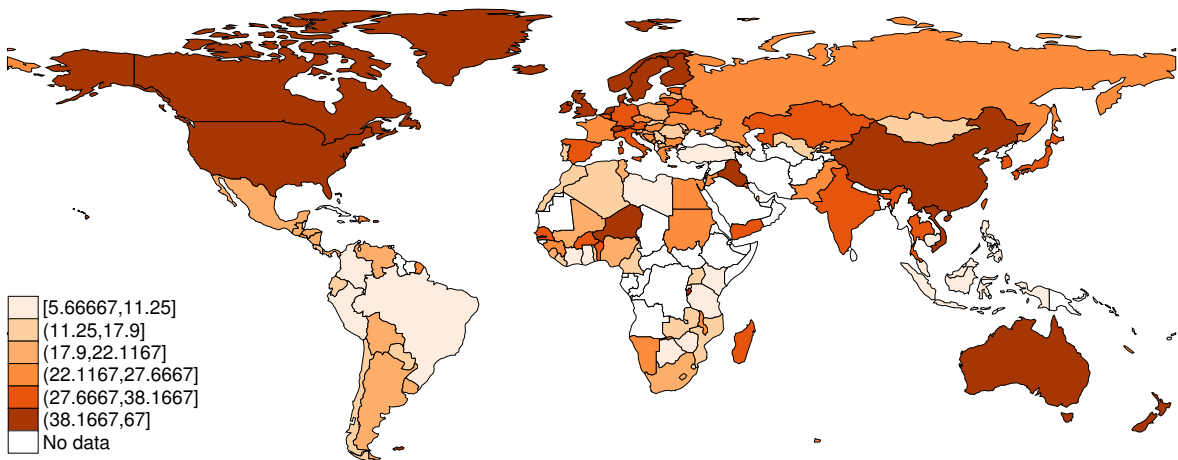


Figure 3 Distribution of trust (TRUST) in the world.

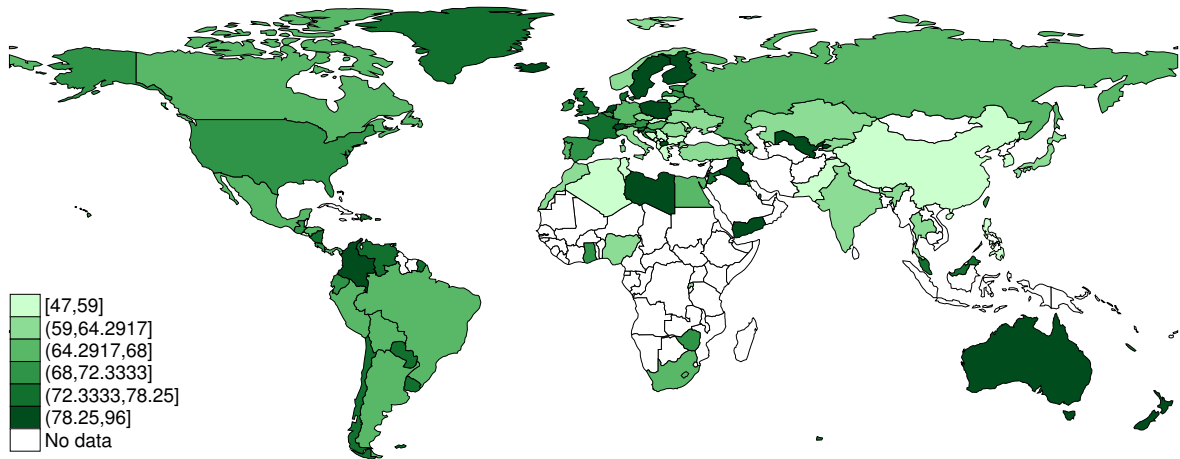


Figure 4 Distribution of the degree to which individuals agree that tolerance is a quality children should be encouraged to learn at home (TOLERANCE).

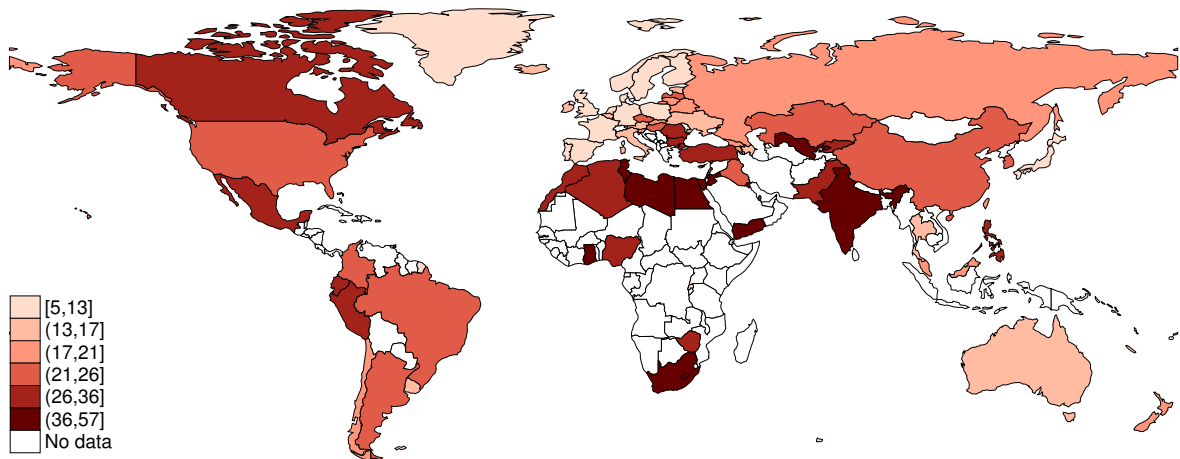


Figure 5 Distribution of individuals that believe that hard work brings success (WORK).

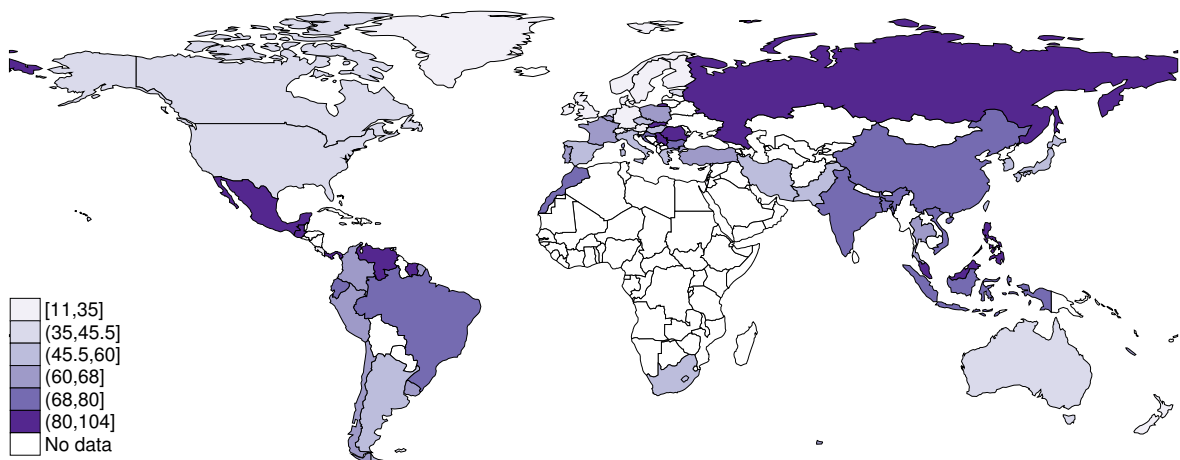


Figure 6 Distribution of power distance (PDI) in the world.

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

Notes: Variables are described in detail in Section (3.1). Due to the strong relationship between our three measures of family ties (FAMILY₁–FAMILY₃), the table focuses on the first variable FAMILY₁.

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.

There are similar regional patterns with respect to the other cultural dimensions pictured in Figures (4)–(6). People living in Latin America and Asia generally share an acceptance of an unequal distribution of power; however, both regions also tend to agree that hard work brings success. In contrast, people of European cultures believe that success is rather a matter of luck and connections. In addition, most societies in Europe consider tolerance an important characteristic and tend to accept power distance to a much lesser extent. The latter also holds for the United States, Canada, Australia, and New Zealand. The countries located in Northern America, however, strongly deviate from European societies in that they believe hard work is the key to success.

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).

3.3. A first glance at the relationship between culture and redistribution

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 relationship between the cultural dimensions documented in Section (3.2) and the pre-post

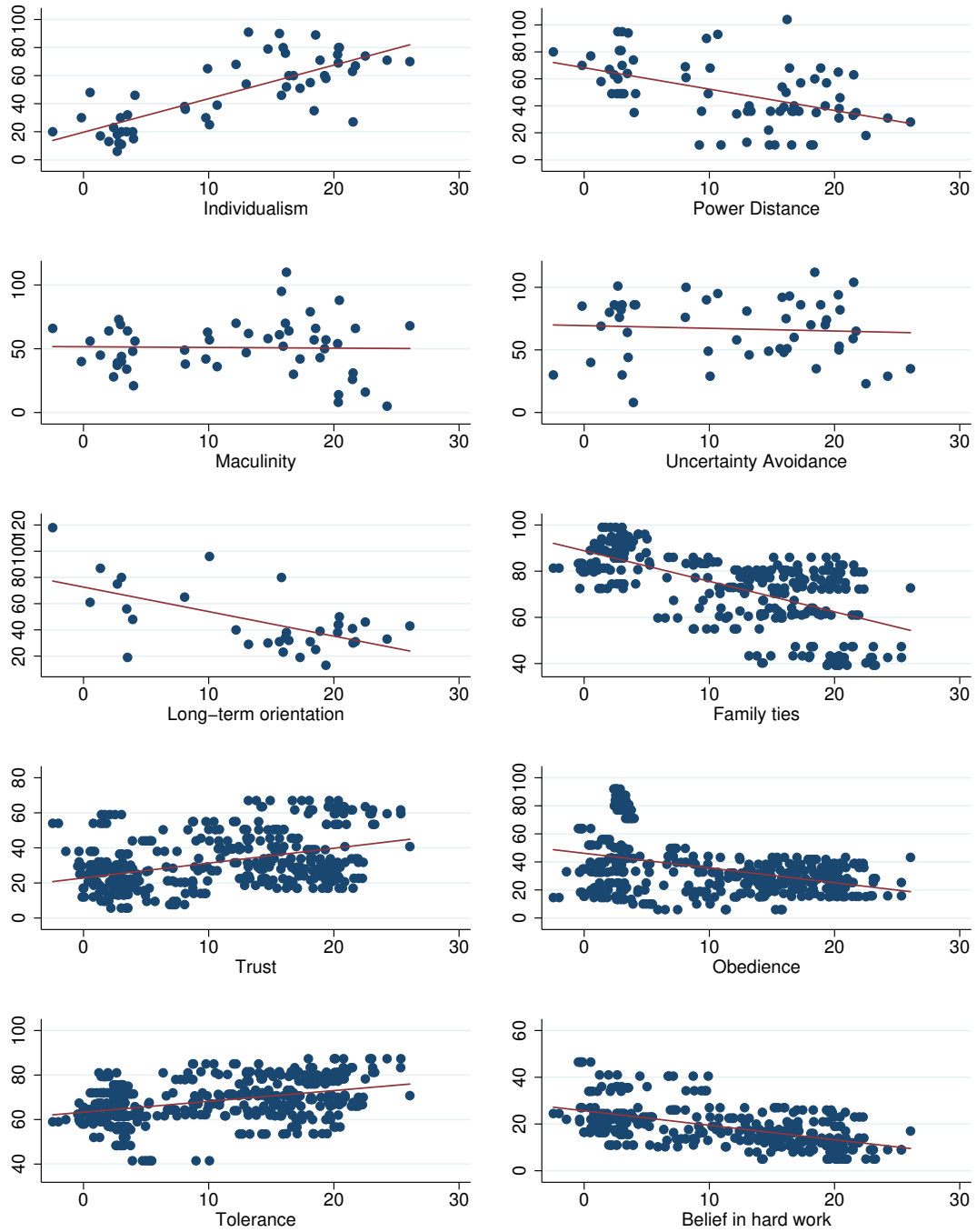


Figure 7 The relationship between cultural values (y-axis) and the generosity of national social security systems (x-axis).

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 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 (-2 percent), uncertainty avoidance (-7 percent), tolerance (33 percent), and obedience (-38 percent).

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, 2016](#)). 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 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 $\text{Log}(\text{FERT})$, as higher fertility rates imply a more binding budget constraint for the household, which may affect redistributive 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 (8) 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, 2016](#); [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 causality. The second strategy therefore uses an instrumental variable approach to rule out reverse causation. The 2SLS version of Equation (2) is given by

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

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

where Ω is the instrumental variable for culture.

⁶Note 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.

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, 2016) 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 extend 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 (3.2) 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}_{it}^r 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 $r = 1, \dots, R$. Then it must hold that

$$E(v_{it} | REDIST_{it-1}, \dots, REDIST_{it_0}, \tilde{C}_{it-1}^r, \dots, \tilde{C}_{it_0}^r, \xi_t) = 0 \quad (5)$$

$$\forall REDIST_{it-1}, \dots, REDIST_{it_0}, \tilde{C}_{it-1}^r, \dots, \tilde{C}_{it_0}^r, \xi_t \text{ and } \forall i, t \geq t_0.$$

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}_{it}^r . In constructing \tilde{C}_{it}^r , we split each continent into four disjoint regions as illustrated in Table (9) in the appendix. Let $\mathcal{R} = \{1, \dots, R\}$ 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}_{it}^r is calculated via

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

Figure (12) 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. This instrument was first introduced by Maseland (2013). While *Toxoplasma gondii* has been shown to alter the behavior of its intermediate hosts (Skalova 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_{it}^r 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 (2016) 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 personal behavior. 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 in a way similar to that of Gorodnichenko and Roland (2011). Data on blood types is gathered from the Red Cross, Mourant et al. (1976), and Tills et al. (1983). Figures (13) and (14) 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

⁷Prevalence 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.

⁸We 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.

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. The influence of culture on redistribution

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 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

⁹For 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.

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
<i>Panel A: Hofstede Dimensions</i>						
IND	0.218*** (23.44)	0.0827*** (5.70)	0.0618*** (4.52)	0.291*** (17.73)	0.140*** (4.82)	0.119*** (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*** (-11.85)	-0.0449*** (-3.80)	-0.0283** (-2.18)	-0.408*** (-9.06)	-0.205*** (-2.92)	-0.267** (-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 (-1.12)	-0.0211** (-2.30)	-0.00898 (-0.92)	0.323*** (4.39)	0.0570* (1.77)	0.0187 (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 (-1.09)	0.00636 (0.52)	-0.0134 (-1.29)	-0.111*** (-4.42)	-0.0389*** (-2.79)	-0.0547*** (-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 (-0.79)	-0.00758 (-0.53)	0.0185 (1.46)	-0.447*** (-4.08)	0.0153 (0.22)	0.0954 (0.55)
$N (R^2)$	352 (0.01)	225 (0.79)	186 (0.83)	338 (0.09)	220 (0.78)	180 (0.79)
<i>Panel B: Alesina and Giuliano Dimensions</i>						
FAMILY ₁	-0.306*** (-21.28)	-0.137*** (-10.83)	-0.101*** (-6.05)	-0.383*** (-15.32)	-0.208*** (-7.85)	-0.200*** (-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*** (-4.37)	-0.0568** (-2.33)	-0.0559*** (-2.71)	-0.201*** (-2.87)	-0.0488 (-0.71)	-0.215*** (-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** (-2.09)	0.0204 (0.52)	-0.0275 (-0.76)	-0.0142 (-0.10)	-0.156 (-1.47)	-0.274** (-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*** (10.49)	0.0431*** (2.76)	0.0456*** (3.16)	0.348*** (12.13)	0.118*** (5.20)	0.116*** (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*** (-12.35)	-0.0291* (-1.82)	-0.0254* (-1.78)	-0.189*** (-11.64)	-0.0149 (-0.44)	-0.0907* (-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*** (9.03)	0.144*** (6.72)	0.120*** (5.01)	0.662*** (7.33)	0.484*** (6.13)	0.469*** (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*** (-15.50)	-0.203*** (-5.69)	-0.136*** (-3.43)	-0.942*** (-11.07)	-0.397*** (-7.47)	-0.332*** (-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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

few decades. While some recent studies (e.g. [Gorodnichenko and Roland, 2016](#); [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. We also find that redistribution is negatively related to uncertainty avoidance. The reason may be that citizens who feel threatened by uncertain or unknown situations tend to be reluctant to support redistribution. Rather than providing aid for the indigent, these individuals prefer that their income be used for private insurance against potential future risks.

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 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

¹⁰Note 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).

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 statistical 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 when employing OLS. Unlike the estimated OLS parameters, the IV estimates suggest a positive relationship between masculine values and redistribution which vanishes once institutional controls are introduced. In addition, the negative effect of uncertainty avoidance on redistributive policies becomes much more pronounced. Finally, while long-term orientation is insignificant in the OLS outcomes, it is negatively associated with redistributive policies when instrumented with regional culture, at least in the reduced model. In fact, this result is highly plausible with respect to theory (see Section 2.2), implying that individuals with a long-term planning horizon tend to privately insure against potential future risks.

Naturally, the IV results hinge critically on the ability to instrument culture with jackknifed regional averages. To investigate the strength of our instruments, Table (10) 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 20 % 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. Table (11) 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 (FAMILY₁), providing strong indication that regional values satisfyingly instrument national culture.

As additional weak instrument diagnostics, Figure (15) 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 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 (15) 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. Sensitivity analysis I: Cross-sectional analyses and multiply-imputed redistribution

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 (12) in the appendix deviates from Table (3) by estimating the effect of the cultural variables based on a cross-section of countries that uses data from the 2005–2009 period. The selection of the period aims at the maximization of available country-years: The most recent period for which redistribution measures can be constructed (2010–2014) allows for inclusion of 105 countries, whereas the 2005–2009 period covers 153 nations. To maximize the sample of country-years, this analysis utilizes REDIST as the dependent variable. In this case, the results strongly support the baseline outcomes by confirming that redistribution is lower in (1) collectivist societies with strong family ties, (2) nations in which power distance and obedience are pronounced, and (3) countries in which citizens believe that hard work is key to success. Meanwhile, the results again highlight that redistribution is higher in countries whose collective values promote trust and tolerance. The cross-sectional analysis, however, yields a reduction in the underlying country-years. As expected, the results are slightly less pronounced with respect to some of the cultural values, particularly in the case of the Hofstede dimensions MAS, UAI and LTO. Apart from these deviations, the findings are strongly comparable to those obtained via panel data methods.

In a further step, we ask how the influence of the cultural values has evolved over time. When comparing the parameter estimates of Tables (3) and (12), a striking feature is that the marginal effects deviate slightly. These deviations may have their origins in differences in the strength of the influence of cultural traits over time. Figure (8) plots the estimated marginal effects at each of the 5-year periods beginning with 1975–1979 and ending with 2010–2014. There seems to be only a weak change over time in the effect of tolerance, power distance, and obedience. In contrast, the figure shows that individualism

Table 4 The effect of culture on redistribution. Regressions based on multiply-imputed redistribution data (Imputations = 100). Dependent variable is REDIST(S)_{MI}.

	POLs estimates			IV estimates		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
<i>Panel A: Hofstede Dimensions</i>						
IND	0.218*** (22.13)	0.0827*** (5.36)	0.0620*** (4.09)	0.291*** (17.12)	0.141*** (4.62)	0.120*** (4.05)
<i>N</i>	352	225	186	352	225	186
PDI	-0.174*** (-11.44)	-0.0447*** (-3.61)	-0.0284** (-2.06)	-0.408*** (-8.90)	-0.205*** (-2.85)	-0.267** (-2.06)
<i>N</i>	352	225	186	352	225	186
MAS	-0.0229 (-1.13)	-0.0212** (-2.21)	-0.00926 (-0.89)	0.318*** (4.30)	0.0561* (1.66)	0.0185 (0.80)
<i>N</i>	352	225	186	352	225	186
UAI	-0.0169 (-1.00)	0.00689 (0.53)	-0.0132 (-1.20)	-0.110*** (-4.28)	-0.0386** (-2.50)	-0.0548** (-2.52)
<i>N</i>	352	225	186	352	225	186
LTO	-0.0124 (-0.84)	-0.00808 (-0.52)	0.0184 (1.35)	-0.442*** (-4.08)	0.0148 (0.21)	0.0951 (0.54)
<i>N</i>	352	225	186	352	225	186
<i>Panel B: Alesina and Giuliano Dimensions</i>						
FAMILY ₁	-0.305*** (-17.52)	-0.137*** (-8.51)	-0.102*** (-5.33)	-0.382*** (-13.75)	-0.208*** (-7.21)	-0.201*** (-5.20)
<i>N</i>	318	220	192	318	220	192
FAMILY ₂	-0.144*** (-4.15)	-0.0562** (-2.11)	-0.0552** (-2.28)	-0.196*** (-2.70)	-0.0458 (-0.61)	-0.213** (-2.43)
<i>N</i>	318	220	192	312	214	187
FAMILY ₃	-0.114* (-1.93)	0.0220 (0.52)	-0.0259 (-0.63)	-0.0151 (-0.10)	-0.156 (-1.28)	-0.273* (-1.73)
<i>N</i>	355	237	204	355	237	204
TRUST	0.204*** (9.77)	0.0426** (2.27)	0.0451*** (2.70)	0.348*** (11.01)	0.118*** (4.49)	0.116*** (4.28)
<i>N</i>	431	298	258	431	298	258
OBEDIENCE	-0.141*** (-11.16)	-0.0291* (-1.71)	-0.0251 (-1.60)	-0.189*** (-10.81)	-0.0147 (-0.39)	-0.0909* (-1.76)
<i>N</i>	422	291	251	422	291	251
TOLERANCE	0.285*** (8.42)	0.144*** (5.65)	0.119*** (4.35)	0.661*** (6.87)	0.484*** (5.39)	0.470*** (3.77)
<i>N</i>	422	291	251	422	291	251
WORK	-0.449*** (-13.55)	-0.203*** (-5.10)	-0.136*** (-3.21)	-0.942*** (-9.95)	-0.397*** (-6.31)	-0.332*** (-4.42)
<i>N</i>	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 5.0. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

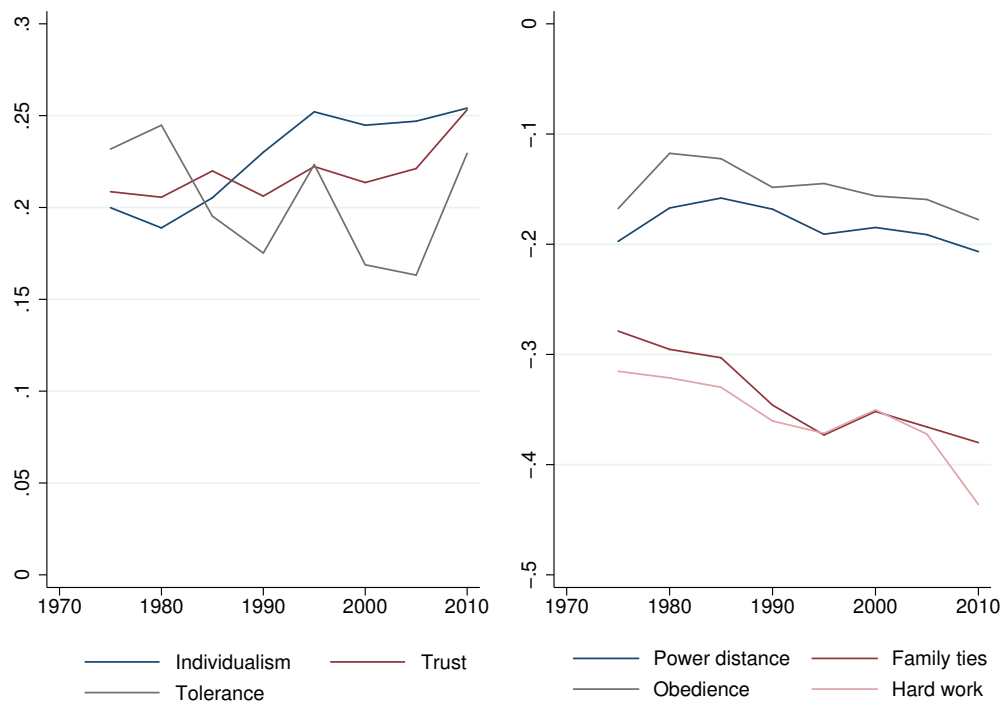


Figure 8 Development of the influence of cultural dimensions over time. The figure illustrates the computed marginal effect of the cross-sectional regressions in the respective 5-year time period, variables with a positive (left panel) and a negative (right panel) effect.

currently tends 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. As a second sensitivity analysis, 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. Specifically, we compute 100 regressions for each country-year in the sample and combine the results with the help of the rules of Rubin (1987). Table (4) displays the result of this approach. Due to the imputation variability, the standard errors in the reported estimations are (slightly) larger, which is reflected in smaller t and z values. The increase in the standard errors, however, has little effect on the significance levels. In addition, the computed marginal effects are virtually identical. In summary, the outcomes highlight a high degree of robustness of the baseline findings in Table (3).

5.3. Sensitivity analysis II: Different dependent variables

In Sensitivity analysis I, we asked how changes in the utilization of our standard redistribution measure affect the implied influence of culture on redistributive policies. In the next step, we pose a different yet related question: Are there deviations in the impact of culture if we employ other proxies for redistribution? To assess the stability 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.

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

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

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

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 (9) 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. The colors of the bars show the levels of significance, where dark blue ($p < 0.01$), medium blue ($p < 0.05$), and light blue ($p < 0.1$) suggest a significant impact, and grey ($p > 0.1$) indicates an insignificant effect. Due 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. For a detailed overview of the descriptive statistics, see Table (8) in the appendix.

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 avoi-

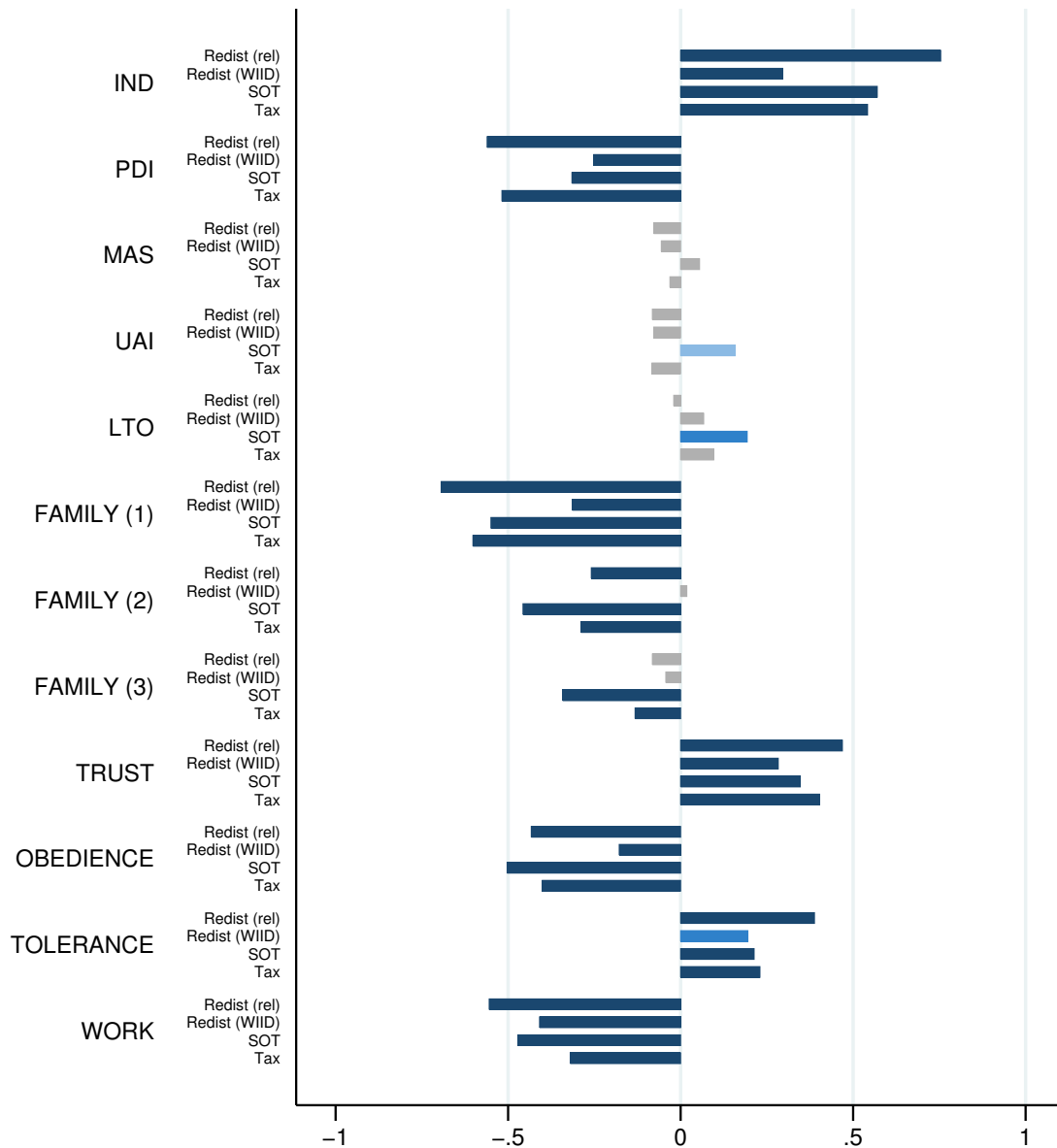


Figure 9 The effect of culture on redistribution based on four different proxies for redistribution. Redist (WIID) replicates our baseline variable using data from the WIID, Redist (rel) measures inequality reduction relative to the initial level of market inequality, SOT is the share of social transfers 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 ($p > 0.1$).

dance, 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. When naively comparing the standardized versions of the estimates based on the SWIID with those obtained via application of the WIID data, we once again observe lower coefficients for the REDIST (WIID) data. 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.¹¹ 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.

5.4. 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 (5) 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 (4) 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.

Tables (10) and (11) 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 (15) in the appendix emphasizes that the weak-instrument-robust

¹¹While the number of included observations in the baseline model ranges from 318 (FAMILY₁) to 431 (TRUST) country-years, it is reduced to 221 (FAMILY₁) and 254 (TRUST) when using REDIST (WIID).

Table 5 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 <i>Toxoplasma Gondii</i>		
	isolated effect	distribution controls	institution controls	isolated effect	distribution controls	institution controls
<i>Panel A: Hofstede Dimensions</i>						
IND	0.273*** (22.53)	0.201*** (8.92)	0.150*** (4.55)	0.198*** (6.14)	0.162*** (3.53)	0.112** (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*** (-12.89)	-0.412*** (-4.14)	-0.347** (-2.33)	-0.354*** (-4.61)	-0.352*** (-2.75)	-0.317 (-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 (-1.58)	-0.572 (-1.33)	-0.339 (-0.96)	0.659 (0.69)	-0.0997 (-1.54)	-0.0790 (-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 (1.23)	1.338 (1.51)	0.764 (1.00)	-0.197*** (-3.62)	-0.150** (-2.57)	-0.0836** (-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 (1.71)	0.388 (1.12)	0.216 (1.54)	0.033 (1.11)	0.0562 (1.16)	-0.0912 (-1.25)
$N (R^2)$	464 (0.01)	216 (0.32)	164 (0.82)	387 (0.58)	187 (0.84)	141 (0.78)
<i>Panel B: Alesina and Giuliano Dimensions</i>						
FAMILY ₁	-0.491*** (-18.02)	-0.312*** (-7.28)	-0.186*** (-3.80)	-0.161 (-0.88)	-0.422*** (-3.77)	-0.688** (-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*** (-3.00)	-1.473** (-2.08)	3.434 (0.41)	-0.121 (-0.77)	-0.641*** (-2.62)	-0.892* (-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** (-2.38)	-14.74 (-0.44)	1.514 (0.92)	-1.653*** (-2.71)	-1.903 (-1.14)	-2.108 (-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*** (10.26)	0.369*** (5.84)	0.253*** (4.03)	0.0468 (1.13)	0.127*** (2.88)	0.121** (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*** (-3.42)	-0.382*** (-4.87)	-0.340*** (-2.63)	-0.249*** (-3.94)	-0.257 (-0.32)	-0.257* (-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*** (6.88)	4.774 (1.38)	-1.855 (-1.20)	-0.191 (-0.81)	0.174 (0.38)	0.696 (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*** (-14.31)	-0.867*** (-4.82)	-12.59 (-0.16)	-0.286*** (-2.80)	-0.0379 (-0.15)	-8.186 (-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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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 (13) 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 FAMILY₃. 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), FAMILY₁ (-66 percent), TRUST (57 percent), and TOLERANCE (40 percent).¹²

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

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

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 (14) in the appendix as UCI (lower) and UCI (upper).¹³ The results emphasize that even if we substantially relax the exclusion restriction, inference based on our instruments would still be informative.

¹²Note that the variable is coded as: 1 – pronoun drop, 2 – no pronoun drop.

¹³Following 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 .

5.5. Cultural values and the Meltzer-Richard effect

Recent empirical research supports the classical [Meltzer and Richard \(1981\)](#) model, suggesting that higher inequality triggers stronger demand for redistributive policies ([Gründler and Köllner, 2016](#)). Along with the strong effect of culture on redistribution identified in the previous sections, it may also be possible that different collective values influence the effect of market inequality on redistribution. For instance, Tables (3)–(5) show that governments of countries whose cultural values promote equality among individuals tend to redistribute more. On top of this, we might also expect that a higher degree of market inequality in these countries results in a stronger redistribution-enhancing effect than in countries with a higher prevalence of power distance. Motivated by this thought experiment, Table (6) 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.¹⁴ In the absence of a plausible exogenous 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

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

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

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

¹⁴For instance, $\text{REDIST}_{it} = \alpha + \beta(\text{IND} \times \text{GINI(M)})_{it} + \varepsilon_{it}$ yields $\beta = 0.0045^{***}$, whereas $(\text{IND} \times \text{GINI(M)})_{it} = \alpha + \beta \text{REDIST}_{it} + \varepsilon_{it}$ gives $\beta = 121.78^{***}$. A similar pattern is observable for most of the interaction terms.

Table 6 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
<i>C</i>	-0.0043 (0.0647)	0.0948 (0.0898)	0.208 (0.140)	0.487*** (0.163)	-0.398* (0.238)	0.996* (0.550)
GINI(M)	-0.1560** (0.070)	0.170 (0.134)	0.167 (0.182)	1.041*** (0.289)	-0.187 (0.156)	0.648** (0.262)
GINI(M) × <i>C</i>	0.0043*** (0.0015)	-0.0033* (0.0018)	-0.0043 (0.0031)	-0.0132*** (0.0037)	0.00933* (0.0053)	-0.0263* (0.0138)
REDIST(<i>t</i> − 1)	0.6049*** (0.0499)	0.799*** (0.0664)	0.956*** (0.0439)	0.769*** (0.0819)	0.885*** (0.0613)	0.645*** (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 [Arel-lano 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

on the initial conditions of the underlying data generating process.¹⁵ 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](#)).¹⁶ In constructing our estimator, we use a collapsed version of our matrix of internal instruments which is based on all available lags. [Roodman \(2009b\)](#) emphasizes the necessity of the collapsing procedure,

¹⁵The assumption on the initial condition is $E(\eta_i \Delta \text{REDIST}_{i2}) = 0$, which holds when the process is mean stationary, i.e. $\text{REDIST}_{i1} = \eta_i / (1 - \alpha) + v_i$ with $E(v_i) = E(v_i \eta_i) = 0$.

¹⁶In addition, removal of time-invariant regressors does not affect the moments upon which the identification is based.

as otherwise the problem of “instrument proliferation” may lead to severe biases.¹⁷ 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 (6). 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 (10) provides a graphical illustration of the results documented in Table (6).

The lower part of Table (6) 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 $\text{GINI}(M) \times C$. 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

¹⁷In 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.

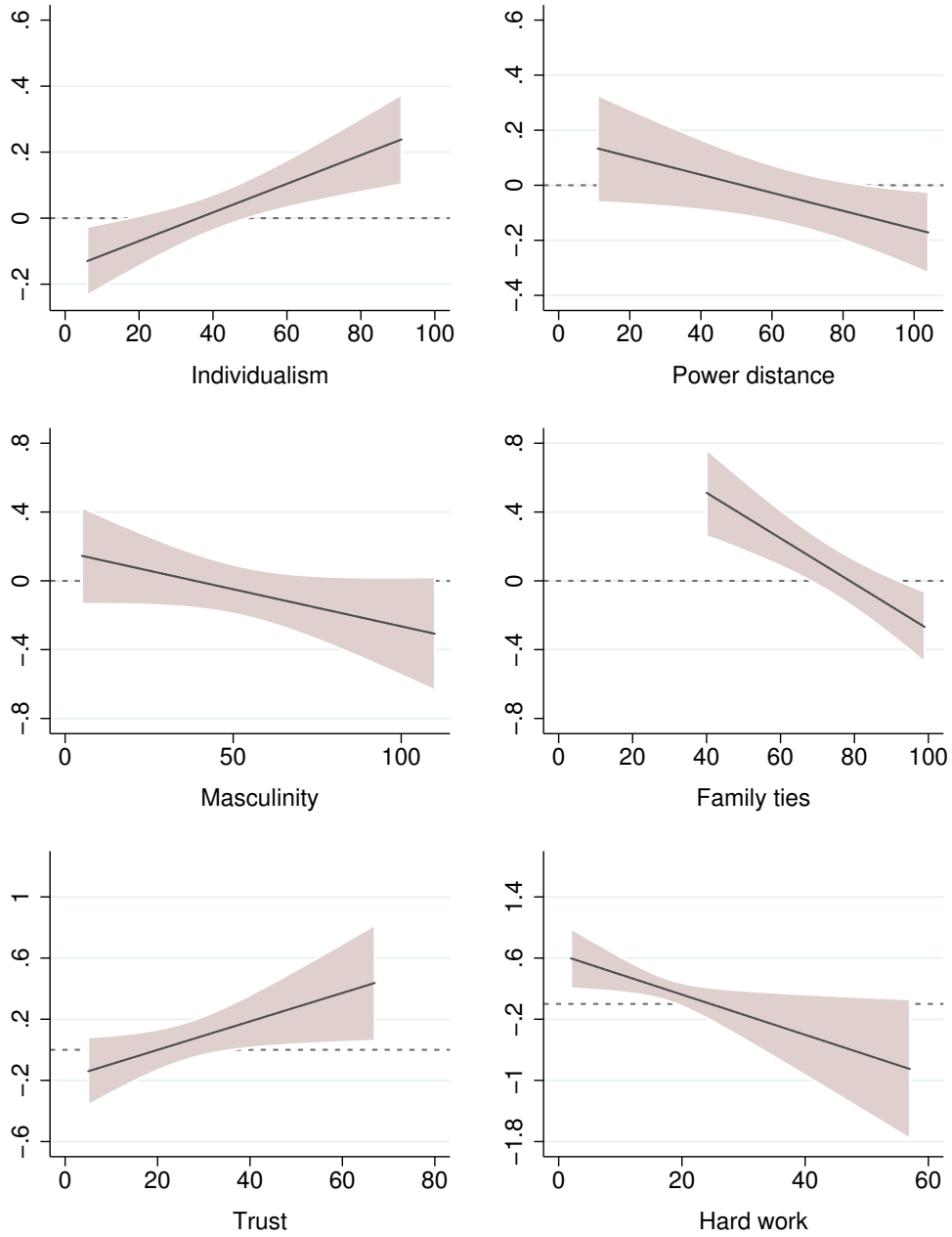


Figure 10 Marginal effect of market inequality on redistribution conditional upon different cultural traits. The area marked in light red shows the 90 % confidence interval, the dashed grey line marks the point at which the effect of market inequality on redistribution is zero. The graphs are generated based on the results of Table (6).

30% 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 redistributive 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 (10) 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 redistribution

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 group. 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

Table 7 The effect of diversity on redistribution. Linear and non-linear effects. Dependent variable is REDIST(S).

	Ethnic (HHI)	Religion (HHI)	Culture (Fearon)	Ethnic (Fearon)
<i>Panel A: Reduced models</i>				
FRAC _{POLS}	-0.0012*** (-7.28)	0.0001 (0.75)	-0.081*** (-4.44)	-0.115*** (-7.80)
FRAC _{IV}	-0.004*** (-6.11)	0.0001 (0.16)	-0.253*** (-5.59)	-0.031*** (-6.91)
<i>Panel B: Distribution controls</i>				
FRAC _{POLS}	-0.0002** (-2.47)	5.2E-05 (0.61)	-4.804*** (-3.31)	-3.489** (-2.56)
FRAC _{IV}	-0.002*** (-2.60)	-3.4E-05 (0.11)	-0.145*** (-3.98)	-0.133*** (-3.73)
<i>Panel C: Institution controls</i>				
FRAC _{POLS}	-0.0002* (-1.75)	0.0001 (1.40)	-2.483* (-1.67)	-1.964 (-1.42)
FRAC _{IV}	-0.0018 (-1.60)	0.0001 (0.36)	-0.066* (-1.85)	-0.091** (-2.54)
<i>Panel D: Non-linear effects</i>				
FRAC _{POLS}	-0.0025*** (-5.29)	-0.001 (-1.26)	0.179*** (3.32)	-0.2018*** (-4.40)
FRAC SQUARED _{POLS}	1.8E-07*** (3.48)	1.3E07 (1.41)	-0.045*** (-5.57)	0.00117** (2.23)
FRAC _{IV}	-0.0248*** (-3.03)	-0.0031 (-0.34)	-3.2534 (-1.53)	-4.8701* (-1.86)
FRAC SQUARED _{IV}	2.8E-06*** (2.93)	3.9E-07 (0.35)	0.05033 (1.49)	0.05756* (1.84)
FRAC _{ALL}	-0.0161*** (-3.81)	-0.0054** (-2.57)	-2.8927*** (-2.22)	-1.4886**** (-4.47)
FRAC SQUARED _{ALL}	1.75E-06*** (3.64)	6.9E-07** (2.54)	0.04114** (2.14)	0.01526*** (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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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).¹⁸ This data shows that the level of diversity differs substantially across countries. While ethnic diversity in the post-2010 period was low in Norway (0.098), South Korea (0.004) and Italy (0.04), differences are much more pronounced in the Democratic Republic of the Congo (0.930), Tanzania (0.953), and Papua New Guinea (1.000). The same also applies for cultural and religious diversity, with particularly high degrees of cultural fractionalization observable in Cameroon (0.733), Afghanistan (0.679), and India (0.667).

Table (7) 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 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 (16) in the appendix.

The results reported in Table (7) 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

¹⁸Fearon (2003) constructs a measure of cultural fractionalization using the structural relationship between languages to proxy cultural distance between groups in a country.

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 (11).

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 in 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.

As a final remark, the effect of diversity on the welfare state may depend upon the particular composition of cultural and ethnic groups. While a certain social group A may well share some attitudes with another group B, cultural differences when compared with C might be much more pronounced. Consequently, members of A may be reluctant to assist members of group C, but may be much more supportive towards members of group B (see [Rushton, 2008](#) for a related argument). While it is difficult to study cultural differences of subnational groups in a broad panel of countries due to the arbitrariness involved in the measurement of ethnic differences between groups that are incomparable across countries, we can approach such a study by assessing the effect of diversity separately for different regions in the world.

Table (15) in the appendix reports the effects of the four diversity indicators on redistribution in Europe, Asia, Africa, South America, Oceania, and North America. The parameter estimates show that diversity has by far the largest negative impact in Europe, followed by Oceania, Latin America, and Asia. In contrast, diversity is positively rela-

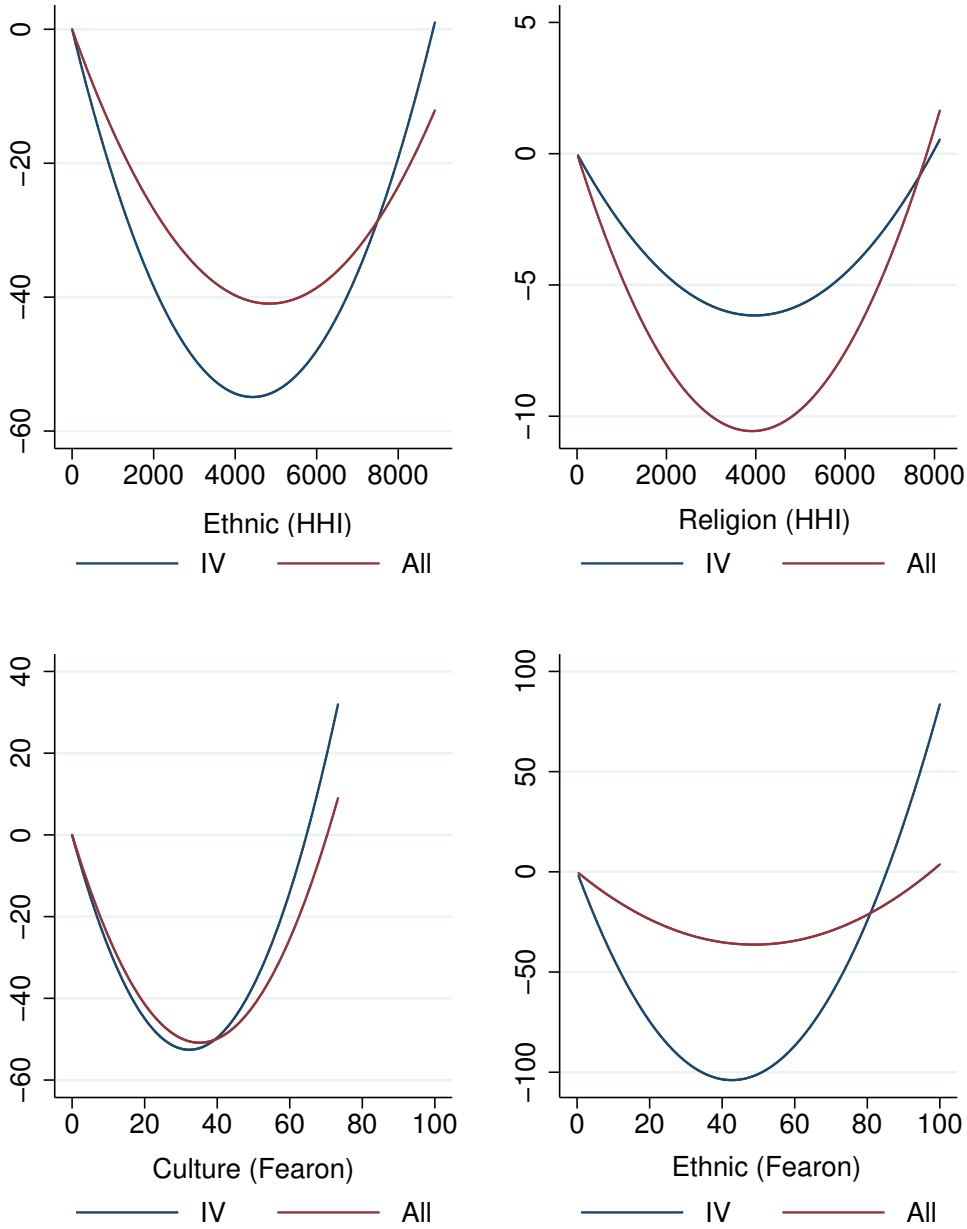


Figure 11 Non-linear effects of ethnic, religious and cultural fractionalization on redistribution. Function labeled “IV” refers to the outcomes of the IV estimations with REDIST(S) as dependent variable, “All” refers to the regression sample that includes all available information (dependent variable: REDIST). The graphs are generated based on the results of Table (7). 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].

ted to redistribution in Africa. These results again underscore the parabolic relationship illustrated in Figure (11). As Europe possesses the lowest degree of cultural and ethnic fractionalization, we expected the effect of diversity to be strongly negative. On the other hand, ethnic fractionalization in Africa is highest in the world, which is why an increase in diversity does not trigger negative effects.

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.

Appendix

Table 8 Descriptive statistics of the variables used in the estimations.

	<i>N</i>	mean	std.	min	max
<i>Panel A: Redistribution variables</i>					
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
<i>Panel B: Control variables</i>					
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
<i>Panel C: Cultural dimensions</i>					
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
<i>Panel D: Instruments</i>					
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 9 Classification of regions in the IV regression.

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

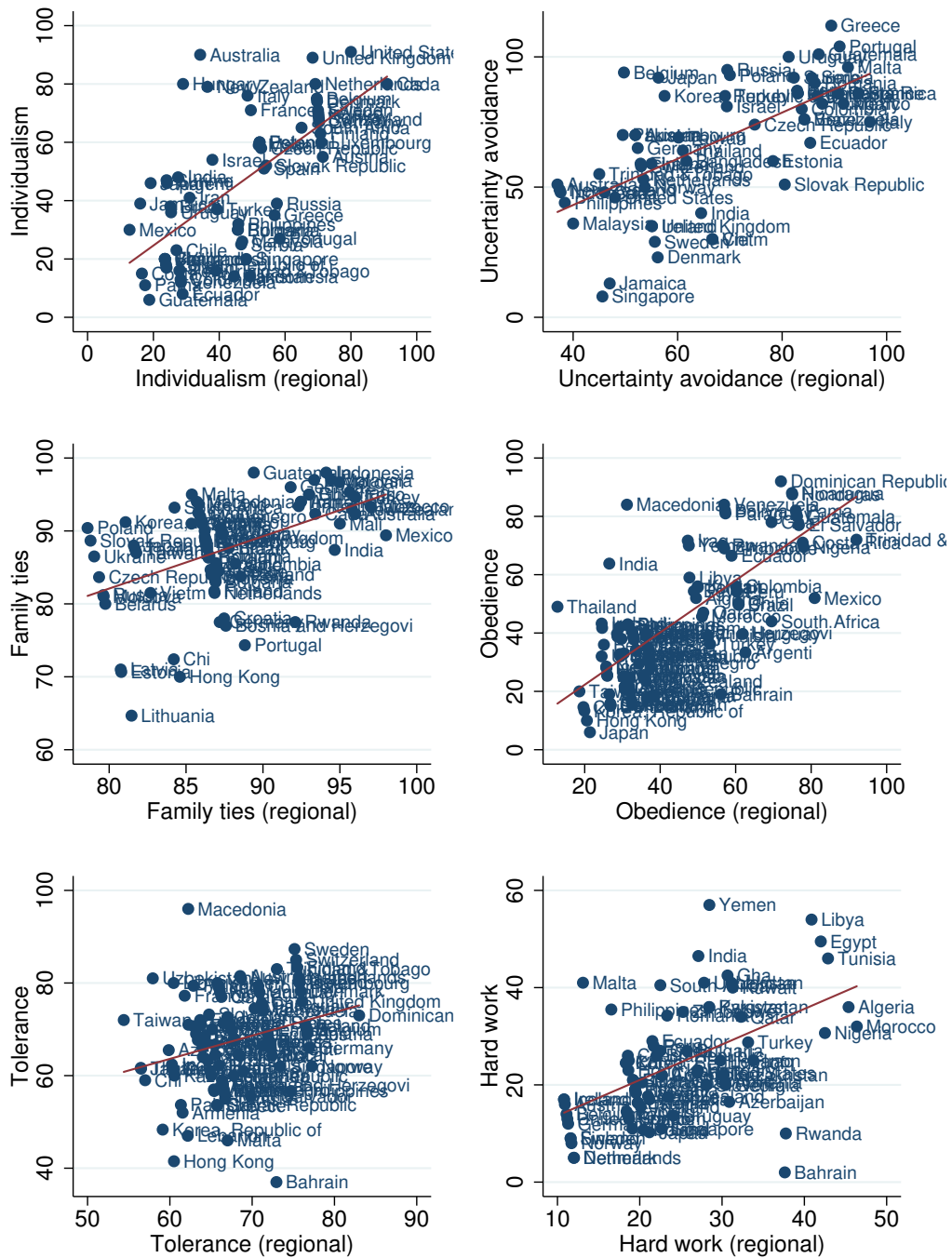


Figure 12 Relationship between cultural dimensions and their regional instruments. The construction of regional instruments is discussed in Section (4.2). Correlations: Individualism (65 percent), uncertainty avoidance (67 percent), family ties (49 percent), obedience (73 percent), tolerance (27 percent), and hard work (53 percent).

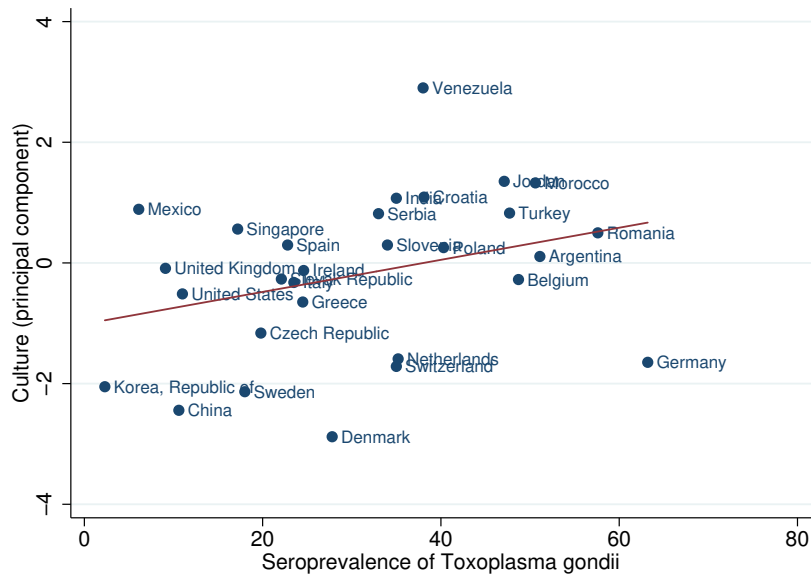


Figure 13 Relationship between culture and the seroprevalence of *Toxoplasma gondii*. “Culture” is the principal component of four variables: family ties, trust, obedience, and uncertainty avoidance.

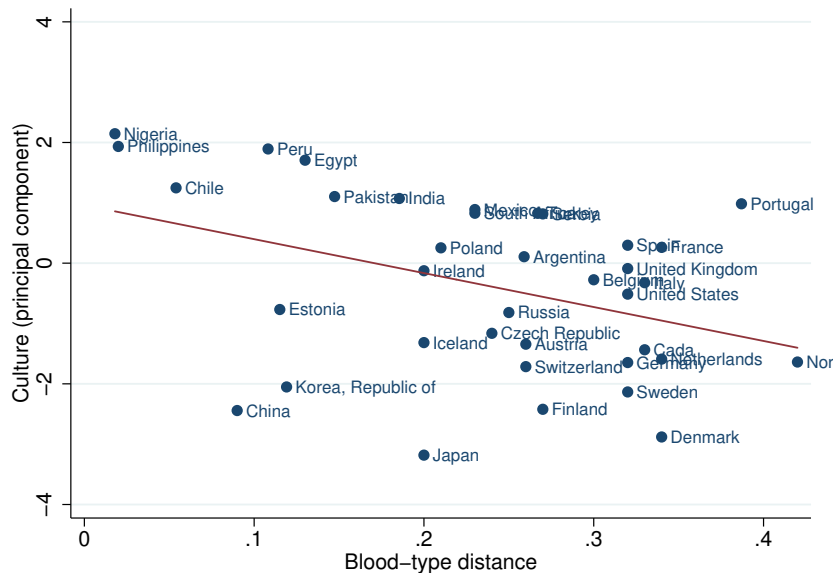


Figure 14 Relationship between culture and the Euclidean distance between blood types A and B. “Culture” is the principal component of four variables: family ties, trust, obedience, and uncertainty avoidance.

Table 10 Weak instrument diagnostic and tests for underidentification of the instruments used in Tables (3), (4), (5), (12).

	First-stage F-statistic			KP rk Wald F-statistic		
	regional	T. gondii	blood	regional	T. gondii	blood
<i>Instrument statistics</i>						
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
<i>Critical values of Stock and Yogo (2005)</i>						
10 % maximal IV size	16.38	16.38	16.38			
15 % maximal IV size	8.96	8.96	8.96			
<i>Critical values of Olea and Pflüger (2013)</i>						
$\tau = 10\%$	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).

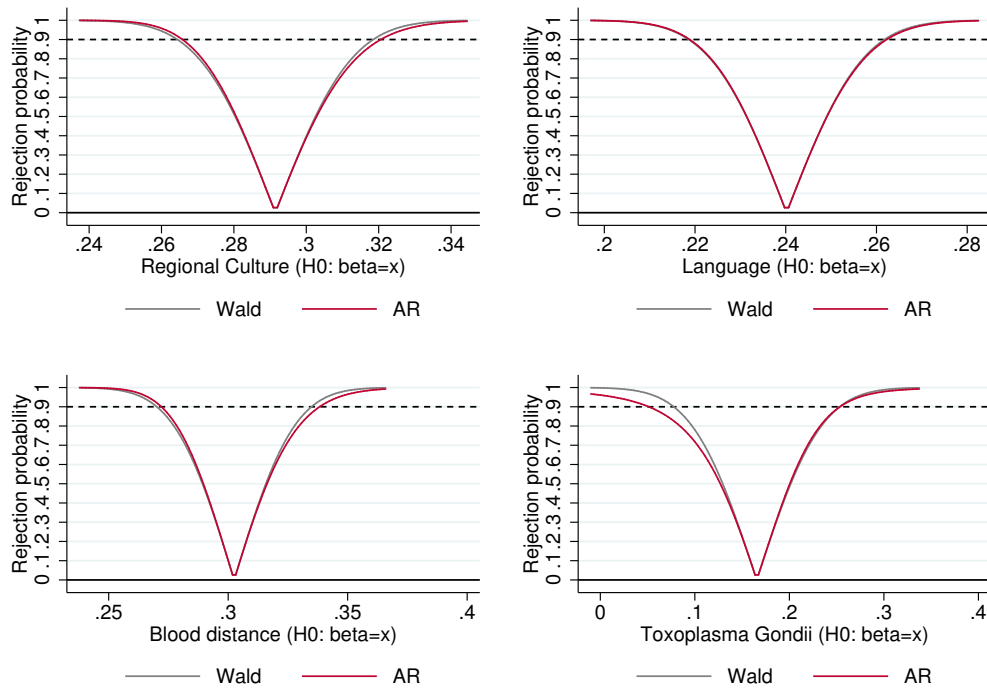


Figure 15 Rejection probabilities and confidence intervals of the employed instrumental variables. The graph depicts instrumentation of individualism as our main cultural dimension with jack-knifed regional culture, language, blood-distance, and prevalence of *Toxoplasma gondii*. The patterns are similar with respect to the remaining dimensions of culture and are available upon request.

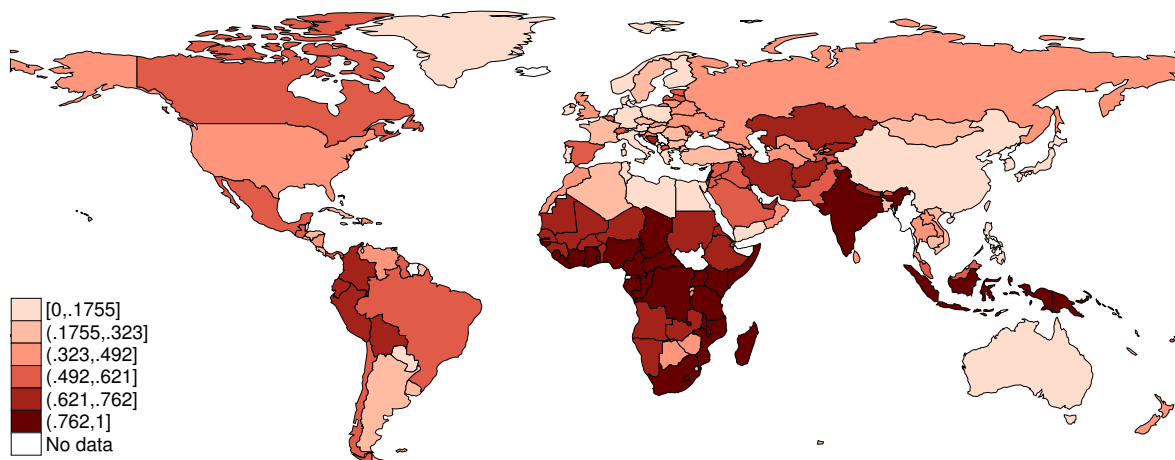


Figure 16 The degree of ethnic fractionalization in the world. Data is from [Fearon \(2003\)](#). Selection of the classes refers to the distribution of the variable.

Table 11 First-stage results of the regressions based on the instruments used in Tables (3), (4), (5), (12).

	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 12 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
<i>Panel A: Hofstede Dimensions</i>						
IND	0.247*** (11.29)	0.0948** (2.36)	0.0639** (2.20)	0.320*** (7.72)	0.199*** (2.62)	0.193** (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*** (-5.55)	-0.0406** (-2.07)	-0.0295 (-1.63)	-0.410*** (-4.14)	-0.185* (-1.82)	-0.311 (-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 (0.05)	-0.0175 (-0.61)	-0.0200 (-0.91)	0.445* (1.76)	0.117 (1.54)	0.0423 (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 (-0.05)	0.0132 (0.46)	-0.0488*** (-2.91)	-0.0538 (-0.82)	-0.00764 (-0.28)	-0.0932** (-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 (0.79)	-0.0448 (-1.28)	-0.0190 (-0.61)	-0.694 (-1.19)	-0.0276 (-0.47)	0.0882 (0.40)
$N (R^2)$	64 (0.01)	51 (0.76)	51 (0.82)	52 (0.00)	40 (0.83)	40 (0.72)
<i>Panel B: Alesina and Giuliano Dimensions</i>						
FAMILY ₁	-0.366*** (-11.46)	-0.156*** (-5.43)	-0.108*** (-2.97)	-0.449*** (-8.75)	-0.205*** (-3.66)	-0.174*** (-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*** (-3.04)	-0.00447 (-0.11)	-0.0247 (-0.65)	-0.376*** (-2.64)	-0.0545 (-0.42)	-0.167 (-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*** (-2.78)	-0.0362 (-0.60)	-0.0400 (-0.68)	-0.593** (-2.44)	-0.223 (-1.22)	-0.296 (-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*** (4.98)	0.0991*** (2.92)	0.0708** (2.21)	0.448*** (6.19)	0.124* (1.88)	0.131** (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*** (-6.26)	-0.0155 (-0.57)	-0.0186 (-0.71)	-0.212*** (-6.15)	-0.120* (-1.72)	-0.193* (-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* (1.86)	0.113** (2.23)	0.0873* (1.90)	0.624** (2.39)	0.519** (2.41)	0.541* (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*** (-5.46)	-0.162** (-2.63)	-0.178** (-2.50)	-0.753*** (-5.31)	-0.207** (-2.33)	-0.199* (-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 13 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)
<i>Panel A: Hofstede Dimensions</i>					
IND	0.238*** (23.50)	0.85*** (7.65)	0.156*** (5.56)	44.342*** (41.89)	1754.82 (16.38)
$N (R^2)$	570 (0.55)	272 (0.77)	207 (0.82)		
PDI	-0.335*** (-18.01)	-0.242*** (-6.43)	-0.22*** (-5.07)	-31.544*** (-23.77)	565.13 (16.38)
$N (R^2)$	570 (0.17)	272 (0.60)	207 (0.70)		
MAS	-25.83 (-0.22)	5.135 (0.71)	1.370** (1.72)	-0.409 (-0.22)	0.05 (16.38)
$N (R^2)$	570 (0.01)	272 (0.01)	207 (0.01)		
UAI	-0.576*** (-8.59)	-0.228*** (-4.85)	-0.135*** (-4.97)	-18.350*** (-10.10)	102.09 (16.38)
$N (R^2)$	570 (0.01)	272 (0.34)	207 (0.74)		
LTO	1.073*** (5.05)	0.477*** (2.83)	0.327*** (3.06)	9.847*** (5.00)	24.98 (16.38)
$N (R^2)$	570 (0.01)	272 (0.07)	207 (0.19)		
<i>Panel B: Alesina and Giuliano Dimensions</i>					
FAMILY ₁	-0.496*** (-17.94)	-0.327*** (-6.58)	-0.304*** (-5.39)	-21.06*** (-17.26)	1297.78 (16.38)
$N (R^2)$	463 (0.38)	219 (0.75)	173 (0.80)		
FAMILY ₂	-2.440*** (-4.57)	-1.415*** (-2.40)	-0.890*** (-2.87)	-4.278*** (-4.38)	19.14 (16.38)
$N (R^2)$	463 (0.01)	219 (0.01)	173 (0.14)		
FAMILY ₃	38.37 (0.53)	-13.43 (-0.97)	-5.953 (-1.45)	0.2677 (0.54)	0.29 (16.38)
$N (R^2)$	530 (0.00)	253 (0.00)	197 (0.00)		
TRUST	0.509*** (16.12)	0.323*** (5.70)	0.253*** (5.17)	20.15*** (17.07)	291.33 (16.38)
$N (R^2)$	619 (0.55)	299 (0.62)	234 (0.76)		
OBEDIENCE	-0.967*** (-7.90)	-2.036 (-1.40)	-0.615*** (-2.73)	-10.42*** (-7.23)	52.24 (16.38)
$N (R^2)$	580 (0.00)	277 (0.01)	214 (0.58)		
TOLERANCE	1.106*** (12.16)	0.925*** (3.57)	1.309*** (2.03)	9.109*** (12.95)	167.66 (16.38)
$N (R^2)$	580 (0.21)	277 (0.23)	214 (0.46)		
WORK	-1.594*** (-8.71)	-2.325** (-2.42)	-4.975 (-0.92)	-6.485*** (-7.21)	52.02 (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 14 Union of confidence intervals (UCI) test of plausibly exogenous instruments (Conley et al., 2012).

		Regional instruments	Toxoplasma gondii	Blood distance
<i>Panel A: Hofstede Dimensions</i>				
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
<i>Panel B: Alesina and Giuliano Dimensions</i>				
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 15 Regional differences in the effect of diversity on redistribution. Dependent variable is REDIST.

	Ethnic (HHI)	Religion (HHI)	Culture (Fearon)	Ethnic (Fearon)
EUROPE	-0.00125*** (-5.83)	0.000177 (0.96)	-0.143*** (-7.16)	-0.142*** (-4.97)
ASIA	-0.000189* (-1.94)	-0.0000588 (-0.49)	-0.0193** (-2.07)	-0.0374*** (-3.59)
AFRICA	0.0000714* (1.88)	0.0000397 (0.99)	0.00706* (1.72)	0.00188 (0.39)
LATIN AMERICA	-0.000368*** (-4.14)	0.000195** (2.09)	-0.0344*** (-3.97)	-0.0440*** (-5.54)
OCEANIA	-0.00125*** (-7.77)	0.000819*** (3.17)	-0.0993*** (-5.19)	-0.121*** (-4.18)
NORTH AMERICA	0.000291 (0.41)	0.00248*** (17.11)	0.156 (0.67)	-0.0723 (-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). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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