Cultural diversity

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Abstract

This paper provides the first systematic attempt to measure cultural diversity at national and subnational levels. Our measure reflects the degree to which values and beliefs are shared in society and captures a dimension of diversity not previously discussed. We assess the importance of cultural diversity for socioeconomic outcomes by focusing on its role in fostering generalized trust within societies. We find that among the many dimensions of diversity previously researched, our cultural diversity measure is the single most important determinant of trust.

1. Introduction

High diversity is often associated with poor socioeconomic outcomes, especially in developing countries. For example, slow growth, poor public goods provision, low quality of institutions, a lack of trust and higher prevalence of civil wars are all outcomes that prior literature has associated with high diversity within societies.[1] Thus, the question arises: Which dimension of diversity is most important in driving poor socioeconomic outcomes?

In this research, we argue that researchers have largely ignored a particular dimension of diversity due to a lack of data: the degree to which societies are culturally diverse, that is, to which members of the same society share common values and have similar attitudes, beliefs and preferences. Existing literature has emphasized ethnic, linguistic, religious and genetic diversity.[2] Although these dimensions can certainly capture some elements of cultural diversity, it is easy to imagine two societies that have similar levels of, for example, genetic or ethnolinguistic diversity but in which the values and attitudes expressed by the groups in one society may be quite similar but very diverse in the other. Thus, cultural diversity can differ from the previously discussed dimensions of diversity, and it is important to account for it.

This research fills this gap by providing data on cultural diversity that explicitly capture the extent to which members of the same society hold shared values. Our measure of diversity in cultural values is based on the polarization index proposed by Esteban and Ray (1994), calculated from the individual responses to various questions regarding values and attitudes from the World Values Survey (WVS) and the European Values Study (EVS). With these data sources, we are able to obtain cultural diversity scores for up to 98 countries and in up to five time periods. Furthermore, for 44 European countries, we can also calculate these scores at the regional level, covering 152 regions in total.

Second, using our index of cultural diversity, we contribute to the literature by revisiting the question of whether diversity reduces cooperation and social cohesion, first discussed more

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[1] For the link between diversity and growth, see Easterly and Levine (1997) and Glaeser, Scheinkman and Shleifer (1995). Examples documenting a relationship between diversity and public goods provision include Alesina, Baqir and Easterly (1999) and Alesina et al. (2003). For diversity and institutional quality, see La Porta et al. (1999), and for the link with trust, see Alesina and La Ferrara (2002) and Glaeser et al. (2000). Finally, Montalvo and Reynal-Querol (2005) document the link between diversity and civil wars.

[2] For data on ethnic, linguistic and religious diversity, see Alesina et al. (2003), and for genetic diversity, Ashraf and Galor (2013).

extensively in the economics literature by Alesina and La Ferrara (2002). We find that among the various dimensions of diversity considered (i.e., cultural, genetic, ethnolinguistic and religious), cultural diversity—measured by the extent to which members of a society hold shared values—is the single most important predictor of social cohesion, which is proxied for by the well-known indicator of generalized trust. High diversity with regard to key cultural values is associated with lower levels of trust, and the association is particularly pronounced for values related to political preferences and ideologies. We show that the link between cultural diversity and trust is robust to the inclusion of an extensive set of control variables and that it holds at various levels of aggregation, namely the country-level, the subnational, and the individual level.

At the country level, we find that with the exception of genetic diversity, none of the commonly used indicators of diversity, such as ethnolinguistic fractionalization and segregation, have explanatory power once we account for the effect of cultural diversity. Furthermore, exploiting the panel nature of our data, we show that countries that experienced a large increase in cultural diversity between 1995 and 2005 also experienced a sharp decline in trust over that same period, thus indicating that time-invariant country-specific factors are not driving the results.

At the subnational (regional) level, we find that within countries, more culturally diverse regions have lower levels of trust on average. This finding holds even when allowing for country-specific fixed effects. Finally, at the individual level, we demonstrate that individuals residing in more culturally diverse regions are less likely to trust strangers than otherwise similar individuals residing in culturally more homogenous regions. This finding is robust to the inclusion of country fixed effects and important regional-level characteristics.

Economics and broader social sciences literature streams have discussed the argument that diversity reduces social cohesion extensively. Most of this discussion revolves around trust, a reliable indicator of social cohesion (Stolle, 2002) and a concept widely recognized in extant literature.[3] Many factors can contribute to trust formation. For example, it may be promoted by

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[3] Societies in which people trust one another have been shown to have better functioning institutions and democracies (Putnam, Leonardo and Nanetti, 1993; La Porta et al., 1997; Tabellini, 2008), are more efficiently organized (Bloom, Sadun and Van Reenen, 2012), are characterized by lower levels of corruption (Uslaner, 2008) and higher levels of financial development (Guiso et al., 2004), trade more (Guiso et al., 2009) and are economically more successful overall (Zak and Knack, 2001; Algan and Cahuc, 2010; Tabellini, 2010).

strong formal institutions (Axelrod, 1984; Alesina and La Ferrara, 2002). Most important though, trust formation has been linked with social identity theory, implying that familiarity breeds trust (Coleman, 1990; Fukuyama, 1995; Putnam, 2000). There are strong cognitive and emotional bases for trust, and familiarity breeds trust precisely because it strengthens both these bases. Familiarity may come from repeated interaction, which fosters a form of trust in a particular person or group of people. It may also come from a perceived similarity and feelings of shared destiny among people. Thus, when people feel closer to their fellow citizens, this generates social trust because people can identify with one another.

In the economics literature, researchers have captured diversity using various forms of fractionalization (Knack and Keefer, 1997; Glaeser et al., 2000), segregation (Alesina and Zhuravskaya, 2011), and, most recently, genetic diversity (Ashraf and Galor, 2013). Though insightful, none of the existing studies has explicitly considered the cultural dimension of diversity—that is, the extent to which key cultural values are shared in society. Ethnolinguistic, religious and genetic diversity may to some extent also reflect the degree of cultural diversity present in a society, but these concepts do not explicitly capture shared values. Indices of ethnolinguistic or religious fractionalization are based on the assumption that all groups are equally different from one another. Therefore, to the extent that some groups are culturally more similar to one another than other groups, these fractionalization indices cannot properly capture the degree of cultural diversity in societies. As for genetic diversity, this concept is generally different from that of cultural diversity, and it is not clear that there is necessarily a close relationship between the two. For example, frequent social interactions between genetically different groups may well contribute to a convergence in cultural values between groups, without changing their genetic characteristics.

To our knowledge, only Fearon (2003) has attempted to account for cultural differences between groups within societies. Fearon augments an index of ethnic fractionalization with information on the cultural difference between each pair of ethnic groups. His measure of cultural difference captures the degree of similarity in the main languages spoken in each group, as reflected in the number of branches in the language tree that two languages share. This measure is a much rougher proxy for cultural difference than our proposed measure. For example, Greek and Turkish are completely unrelated languages, and Turkish is related to

Japanese and Korean (all three are Altaic languages). Therefore, we would expect Turks and Greeks to be culturally different from one another but the Turkish culture to be somewhat similar to the Japanese or Korean cultures, which does not seem very plausible. This example indicates that the link between similarity in language and similarity in culture may be rather weak. Therefore, providing an explicit measure of the degree to which cultural values are shared in society, as the current study does, constitutes an important first step in shedding more light on the role of cultural diversity for socioeconomic outcomes.

The paper is organized as follows: In section 2, we present our measure of cultural diversity and the data we used to construct this measure. In sections 3.1–3.3, we present evidence on the relationship between cultural diversity and trust at the country, the subnational and the individual level, respectively. Section 4 concludes.

2. Construction of cultural diversity scores and data

2.1 Measuring cultural diversity

A proper measure of cultural diversity should reflect the degree to which key cultural values are shared in society or, conversely, the degree to which a society is culturally polarized. As such, this measure should incorporate information on both the relative sizes of different groups in a society and the cultural differences between each pair of groups. Here, we apply the polarization measure Esteban and Ray (1994) propose, which was generalized further by Duclos, Esteban and Ray (2004). As Keefer and Knack (2002) argue, Esteban and Ray provide the most rigorous definition of polarization, and their measure has many advantages over simpler ones that merely reflect inequality or fractionalization. Esteban and Ray's measure satisfies certain axioms that describe desirable features a polarization measure should satisfy, which are related to the Dalton axiom in the measurement of inequality. In a nutshell, these axioms maintain that polarization in a society is greatest if it consists of two equally sized groups that are very different from each other.

In the context of measuring cultural differences within societies, Esteban and Ray's measure has one key advantage over the more commonly used fractionalization index, defined as one minus the Herfindahl index of group shares: It explicitly incorporates information about the difference or "distance" between groups on a given set of characteristics. Because our aim is to

measure the extent to which cultural values are shared in society, it is important that the measure we use not only reflects whether different groups have different values but also how different they are from one another on these expressed values—in other words, their respective cultural distance.

Esteban and Ray's (1994) measure of polarization is formally expressed as follows:

$$P(\mu, p) = \sum_{i=1}^{n} \sum_{j=1}^{n} p_i^{1+\alpha} p_j |\mu_i - \mu_j|, \qquad (1)$$

where μ_i and p_i, respectively, denote the conditional mean of the attribute of interest in group i and the share of the population belonging to it (and correspondingly for group j); n denotes the number of different groups in the population; and α captures the degree of polarization sensitivity, or the extent of deviation from a more standard Gini-type inequality measure, which would imply an α equal to 0.[4] Esteban and Ray (1994) show that for the polarization measure to have certain desirable properties, α must be nonnegative and should not exceed 1.6. In their follow-up study (Duclos, Esteban and Ray 2004), the authors specify a more narrow range for α and argue that a sensible choice of α should not exceed 1. Esteban and Ray do not point to any specific value of α, as long as it is within the previously mentioned range, and therefore, there is no a priori reason to prefer one over the other. Accordingly, we chose the midpoint of the sensible range, 0.5, for our main specifications but also provide results using the extreme values of 0 and 1. As we demonstrate subsequently, our results are not sensitive to the choice of α.

To define cultural groups and quantify the distance between them, we use various value- and attitude-related survey questions. We define the different cultural groups by the possible answers that can be given on a question and the distance between groups by the difference in the corresponding answer codes. Thus, for example, if we encounter a question of the form "To what extent do you agree with … ?" with 10 available response categories (1 = "I don't agree at all," and 10 = "I fully agree"), we have 10 groups, the distance between which, $(|\mu_i - \mu_j|)$, is at most equal to 9. The corresponding relative size of each cultural group, p_i is given by the share of the sampled population that chooses a given answer category. Plugging this information about the size of each cultural group and its cultural attribute μ_i into equation (1), we derive a measure for

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[4] If we let $\alpha = 0$ and assume that all groups have the same underlying characteristic, μ_i, we get the standard fractionalization measure as employed by, among others, Alesina et al. (2003).

the degree of cultural diversity or, more precisely, the degree of polarization on a specific cultural dimension corresponding to the specific survey question considered. The polarization index is 0 when all respondents provide the same answer (perfectly homogeneous values), takes positive values otherwise, and reaches a maximum when a society has two equally sized groups with strongly opposing viewpoints.

Table 1 shows seven hypothetical distributions of answers on a survey question that contains 10 answer categories. The bottom row indicates the corresponding values of the polarization index. Column (1) shows the hypothetical situation in which all respondents choose answer category 5. In this case, this population is homogenous, and its corresponding polarization score is 0. The other extreme scenario is displayed in column (7), in which 50% of the respondents choose answer category 1 and the other 50% choose category 10, resulting in the highest possible polarization score. All columns in between reflect alternative hypothetical distributions of respondents' choices of answer categories with intermediate levels of polarization.[5]

[Table 1 around here]

2.2 Data

To compute the degree of cultural polarization (or cultural diversity, which is a synonymous term for the context of the current study), we need not only country mean scores on different cultural values but also information about the underlying distribution of individual values. Among the many well-known cultural databases, including Hofstede (1980; 2001), GLOBE (House et al., 2001), Schwartz (1994), World Values Survey (WVS) (Inglehart, 1997) and its European equivalent, the European Values Study (EVS), the underlying individual-level data are publicly available only for WVS and EVS. In all other cases, we have access only to the country-level mean scores, making these databases unsuitable for our analysis. Therefore, we use combined WVS and EVS data in our analysis.

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[5] Examples (3) to (5) are somewhat in a gray area, where it is not clearly obvious in which case polarization should be highest. Depending on the level of α chosen, the rankings in terms of polarization may change. For real-world examples of variation in rankings as a consequence of varying α, see Duclos, Esteban and Ray (2004). As we show in Section 4, our results are robust to different choices for α.

Combining WVS and EVS data is possible for two reasons. First, both types of surveys use largely the same survey questions, because the WVS questionnaire was essentially modeled after the EVS questionnaire.[6] Second, the timing of the survey rounds follows largely the same schedule. Furthermore, combining EVS and WVS is important because to date, European countries have been primarily sampled in EVS; therefore, not including EVS data in the analysis would strongly bias our sample. Thus, by combining WVS and EVS data, we achieve the largest database on individual values and attitudes with the broadest country coverage possible.

Because we are interested in the diversity of cultural values within countries, we have to limit the analysis to survey questions that allow for sufficiently high variation in the possible responses and use ordinal response scales. A careful screening of the currently available waves of WVS and EVS revealed that the majority of questions allow for binominal answers and three or four answer categories only, making these questions unsuitable for the purpose of the present analysis.[7] Beyond those questions with two or four answer categories, the WVS and EVS questionnaires only include questions with 10 answer categories; thus, our analysis is essentially limited to questions with 10-point answer scales. In addition, we need to ensure that the questions used were asked in a large number of countries. These limitations resulted in the 17 questions we list in Table 2.[8]

[Table 2 around here]

By combining all the available information from the currently existing waves of WVS and EVS, we were able to assemble individual responses on these 17 questions from approximately 350,000 individuals in 101 countries, with each country being sampled in at least one wave.[9] Table 3 provides an overview of the number of observations available per question and wave. Note that the sample sizes in more recent waves tend to be larger, in terms of both country coverage and the number of individual-level observations available.

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[6] The first EVS survey was carried out in 1981 and initially covered almost exclusively European countries. After the success of the first round of EVS, the survey was extended to include more non-European countries, a project which became known under the name of WVS.

[7] In addition to having overall too little variation on questions with three or four answer categories, many three- and four-point questions use nominal rather than ordinal scales.

[8] Of the in total 21 questions with such 10-point answer scales, 4 were asked in only a limited number of countries and thus were dropped from the analysis.

[9] See Appendix A for details on how the data were combined and Appendix B for a list of countries in our database and their coverage across waves.

[Table 3 around here]

Using the individual-level responses and the share of the sample population falling into each answer category, we calculated the degree of value polarization for all questions with equation (1). We then took averages across the 17 polarization scores for each country (or region) in each wave to generate an overall indicator of cultural diversity.

Our general indicator of cultural diversity is composed of polarization scores from a diverse set of survey questions, which likely capture different dimensions of culture; thus, one might wonder whether this general indicator can be broken down into more meaningful subindices that each capture polarization along a particular dimension of cultural values. To test whether such subdimensions exist, we performed a principal component analysis over the total matrix of 299 country–year polarization scores for the 17 questions. This technique allows us to uncover latent variables based on the correlations across the 17 polarization scores. Table 4 displays the result of this analysis, which shows the rotated factor loadings on the first three factors that indicate the correlation between each variable and the corresponding factor.[10] These three factors together explain 74% of the total variance in the data and are, by construction, orthogonal to one another.

[Table 4 around here]

The principal component analysis indicates that the polarization scores on 16 of the 17 questions can be grouped along three dimensions; only question F121 cannot be clearly associated with any latent factor. The first dimension, which accounts for 34% of the total variance in the data, is formed by the first six variables, which all involve political values. Thus, the first factor can be interpreted as a dimension capturing political ideology. The second factor, which accounts for 23% of the total variance in the data, shows high loadings on questions 7, 12, 13, 14, 16 and 17, which involve matters of life and death or sexual relations. Finally, the third factor, which explains 17% of the total variance, shows high loadings on questions 8–11, relating to the legal-illegal aspects of human behavior as proscribed by law.

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[10] Factors beyond the third have eigenvalues less than 1, indicating that they are not important for understanding the underlying variance in the data and thus can be ignored.

The pattern detected by the principal component analysis is also confirmed by examining reliability scores as reflected in the Cronbach's alpha (Cronbach, 1951), a statistic commonly used in psychology to test whether a proposed set of items measures the same latent variable. A generally accepted rule of thumb is that alpha scores should be above 0.7 to pass the test (Nunnally, 1978). A calculation of the Cronbach's alpha for our three sets of variables, corresponding to the variables loading high on the corresponding three factors, reveals that in each case, the threshold value of 0.7 is clearly passed: The Cronbach's alpha for the first, second and third sets of polarization scores are .95, .89 and .84, respectively. Thus, we have additional evidence that the polarization scores on the questions capture polarization along three distinct, internally consistent value dimensions.

The three dimensions are also in line with key value dimensions discussed in the theoretical literature on culture. The political ideology dimension has a long history in social sciences, going back to Tomkins (1963). In two recent overview articles, Jost and colleagues (Jost, Nosek and Gosling 2008; Jost, Frederico and Napier 2009) assess the history of this dimension, defined as the set of beliefs about the proper order of society and how this order can be achieved;[11] they conclude that "the left–right model of ideological structure has parsimony on its side and has fared surprisingly well in terms of theoretical utility and empirical validity" (Jost et al., 2009: 312). The questions involving the justifiability of certain types of behavior and the importance of God (F163), in contrast, fit the so-called "morally debatable behavior" (MDB) scale, as originally developed by Crissman (1942) and updated by Harding and Phillips (1986). More recently, Katz, Santman and Lonero (1994) revised the scale; nowadays, it encompasses two dimensions. The first dimension relates to legal-illegal aspects of human behavior as proscribed by law. This dimension is commonly measured by questions similar to our questions 8–11, which, as shown in Table 4, reflect the same underlying factor. The second dimension of the MDB scale involves matters of life and death and sexual relations, all of which are covered in the questions loading high on the second factor. Thus, our empirical finding that the overall indicator of cultural diversity consists of three dimensions (political ideology, legal-illegal aspects, and personal-sexual aspects of moral behavior) is in line with existing constructs discussed in the literature.

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[11] For additional discussion on this topic, see Denzau and North (1994).

Given that our overall index of cultural diversity, which is the simple average of the 17 individual polarization scores, reflects polarization along three distinct dimensions, in addition to the overall score, we calculated the corresponding polarization scores for each subdimension by averaging the polarization scores for the survey questions associated with each cultural dimension. Thus, polarization on the political ideology dimension is the average of the scores for questions 1–6; on the personal-sexual behavioral dimension, the scores for questions 7, 12, 13, 14, 16 and 17; and on the legal-illegal behavioral dimension, the scores for questions 8–11. That is, we have four measures of cultural diversity: one overall score and the three subdimensions. Each index of cultural diversity can be calculated for each country in up to five periods, corresponding to the five available survey waves. As we explain in more detail in Section 3.2, for a sample of European countries, the indices of cultural diversity can also be calculated at the subnational level.

3. Empirical analysis

To assess the importance of cultural diversity for trust, we analyze the correlations between our indices of cultural diversity and a standard measure of generalized trust. Specifically, to capture the level of trust in society, we use responses to the WVS/EVS survey question "Generally speaking do you think that most people can be trusted or that you cannot be too careful?" The respective country- or region-level score is the fraction of respondents answering, "Yes, most people can be trusted" in a given country or region. This question has been used widely in the economics and broader social sciences literature since its first economic application by Knack and Keefer (1997). Previous research has shown that the measure is robust to the cultural context in which this question is asked, guaranteeing measurement equivalence across cultures (Freitag and Bauer 2013). Table 5 shows the simple pairwise correlations of our general measure of cultural polarization, its three subdimensions, and trust, all averaged at the country level.

[Table 5 around here]

Note that except for the personal–sexual behavioral dimension, all other indicators of value polarization have the expected negative sign, indicating that higher diversity in cultural values is associated with lower levels of trust. This negative relationship is strongest for political

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ideology—not surprising considering that it measures polarization along values about how society should be organized, which researchers have argued to be particularly important for trust formation (Keefer and Knack, 2002).

Although these simple correlations give some indication of the relationship between trust and cultural diversity, by themselves they are not very meaningful, as they may disguise other factors correlated with both trust and cultural diversity. Moreover, because an increase in value polarization can accompany a change in the average attitudes displayed in a society, the measured level of cultural diversity may be correlated with the average cultural values in a country. Thus, the correlations between trust and cultural diversity shown in Table 5 might reflect a relationship between trust and average cultural values (rather than polarization on these values). Because we are ultimately interested in whether high cultural diversity is associated with low levels of trust, conditional on the level of economic development and other factors argued to be important for trust formation (including cultural values), we assess in the following sections the partial correlation between cultural diversity and trust. We analyze the correlation at three levels of aggregation: the country level, the subnational (regional) level, and the individual level.

3.1 Country-level results

The key variables of interest at the country level are the fraction of people trusting and the level of cultural diversity within each country. To maximize the sample size and reduce potential biases due to measurement error, our main analysis focuses on the cross-wave average levels of trust and cultural diversity in each country, using all the available information from the currently accessible waves from WVS and EVS. In our robustness checks, we also exploit the panel nature of our data.

To assess the link between trust and cultural diversity at the country level, we run simple ordinary least squares (OLS) regressions of the form

$$T_c = \alpha + \beta D_c + \gamma C_c + \delta X_c + \varepsilon_c, \tag{2}$$

where c indexes countries, D stands for cultural diversity, C is the average cultural values displayed in a society (as measured by the average response to the 17 questions or the three

subsets) and *X* is a vector of additional covariates that may be correlated with trust (see below). Finally, ε is an error term.

Table 6 shows the first set of results. We first consider regressions in which the right-hand side includes only our measure of cultural diversity and the average cultural values (for both the overall construct and the three subdimensions), to separate the effect of cultural diversity from the effect of cultural values themselves. These results are presented in columns 1, 3, 5 and 7.[12]

Note that the overall indicator of cultural diversity enters the regressions negatively with the coefficient statistically significant, even when controlling for the effect of cultural values per se. We observe a similar pattern for the first subdimension, political ideology. In contrast, the average political values in a society are not significantly related to its level of trust. This is not surprising, considering that the survey questions included in our political ideology dimension are coded in such a way that higher values do not always reflect a more conservative/right-wing attitude than lower values, or the other way around. Thus, the mean score of political values as calculated here carries little meaning.

With regard to the remaining two cultural dimensions, we find that there is no statistically significant relationship with trust, even though the simple correlations shown in Table 5 indicated otherwise. This finding suggests that part of the observed variation in value polarization along these two "morally debatable" behavioral dimensions captures variation in the average degree of tolerance of immoral behavior. This interpretation is particularly notable in column 7, which shows that a greater level of tolerance is associated with higher levels of trust. Thus, columns 5 and 7 indicate that polarization on attitudes regarding the legal and personal–sexual dimensions of human behavior are not related to trust but that largely, more liberal and tolerant societies have higher levels of trust.

[Table 6 around here]

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[12] Note that the sample size using the overall cultural construct is smaller than those based on the three subdimensions, because there are two countries, Colombia and Egypt, for which not all 17 questions were answered in the same year. Because we constructed our cultural diversity score by first creating a score for each country and wave and then averaging across waves, we could produce scores for the three subdimensions (coming from different waves), but not for the overall cultural diversity index for these two countries.

Columns 2, 4, 6 and 8 then add a set of regressors that are commonly included in the literature and considered to be important determinants of trust. The first covariate is income inequality, as measured by the Gini coefficient, taken from the UNU-Wider database. We included this variable because social distance is partly reflected in income inequality, and this variable has been commonly included in trust regressions (Knack and Keefer, 1997; Zak and Knack, 2001; Uslaner, 2002). Second, given the positive relationship between trust and economic development we allude to in the introduction, we include the level of GDP per capita taken from Penn World Tables (PWT) Version 7.2. Third, because it has been argued that personalized trust is more likely to develop in smaller groups, we control for population size, also taken from PWT. Fourth, given Björnskov's (2006) finding that trust tends to be higher in monarchies, we add a dummy variable indicating if a country is a monarchy. Fifth, we control for the religious composition of the population by including the share of Protestants and Catholics in a country, since Catholicism has been associated with low trust (La Porta et al., 1997; Zak and Knack, 2001) whereas Protestantism has been associated with high trust (Glaeser et al., 2000; Zak and Knack, 2001; Uslaner, 2002; Björnskov 2006). We used data on the shares of Protestant and Catholics from Barro and McCleary (2003). We average the control variables for each country over the period for which the corresponding trust and polarization scores are available. The only exception is the religious shares, which reflect averages over 1980–2000, because we do not have annual data for these variables.

The overall cultural diversity score and its political ideology subdimension continue to be negatively and significantly related to trust after the inclusion of the control variables (columns 2 and 4), while the remaining two dimensions of cultural diversity remain insignificant at conventional levels. Comparing the effect of the overall cultural polarization score with that of polarization along political values, we observe that the level of significance of the political ideology dimension is higher and its coefficient drops by less when we include the other regressors. This finding, together with the insignificance of the two remaining cultural dimensions, suggests that the negative effect of the overall cultural diversity index is driven by the political ideology subdimension.

With regard to the control variables, we find their signs to be mostly in line with what the existing literature has documented. Trust is higher in richer economies, predominantly Protestant

countries, and monarchies. In addition, population size is positively related to trust. Although this finding may seem counterintuitive at a first glance, given that the trust literature has argued that trust may develop more easily in smaller societies, it makes sense, in that our trust variable captures a measure of generalized trust—in other words, trust in strangers. Thus, it is possible that interpersonal trust is more likely to develop in smaller societies, but high levels of interpersonal trust may have the side effect of leading to lower generalized trust (Ermisch and Gambetta, 2010; Delhey, Newton and Welzel, 2011), which our results also indicate.

With regard to the effect of income inequality, while the negative sign is consistent with the theory that inequality impedes the development of trust (Uslaner, 2002), surprisingly, its effect is insignificant in column 4, where the measure of cultural diversity employed captures polarization on political values. Because the survey questions we used to construct the political ideology dimension pertain to, among others, feelings of self-control over one's life, the importance of income differences as an incentive mechanism and the role of the government in supporting the individual, it is possible that polarization on these viewpoints may result in lower support for public income redistribution policies, leading to a higher level of income inequality. Thus, it is possible that income inequality itself is affected by cultural diversity, which would explain the lack of significance of the former variable in column 4. However, despite the possible correlation between polarization on political values and income inequality, we nevertheless observe that value polarization seems to have an independent effect on trust, beyond its impact on income inequality.

Finally, with regard to the magnitude of the estimated effects, we find that cultural diversity has one of the largest effects on trust among all the regressors considered. The point estimates of –32.25 for the overall cultural polarization index (column 2), and the value of –26.60 for polarization on political values (column 4) imply that a one-standard-deviation increase in polarization will reduce trust by 0.27 (overall index) and 0.32 (political values) standard deviations, respectively, controlling for the effects of the other covariates. This difference in trust corresponds approximately to the difference in trust between Spain (low trust) and Great Britain (high trust). This effect size is only comparable to the effect of Protestantism, whose standardized coefficient is between .3 and .35 and which has been shown to be particularly

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important for explaining differences in trust (Björnskov, 2006). The effects of all the remaining regressors are significantly lower.

Because our ultimate goal is to test which dimension of diversity matters most for trust, we need to compare our estimates on the effect of cultural diversity with the effects of other dimensions of diversity. Therefore, in Table 7, we add alternative dimensions to our regression to determine whether our findings are robust to including other dimensions of diversity. Given the insignificance of the legal-illegal and personal–sexual behavioral dimensions and the corresponding implication that the effect of our general cultural polarization score simply reflects the negative effect of polarization in political values, we focus the following discussion on polarization in the context of political values.[13] In addition, we drop the mean score of political values, given that this variable is essentially meaningless (and clearly statistically insignificant), as explained previously.

The first set of variables we include are the ethnic, linguistic and religious fractionalization scores from Alesina et al. (2003), which have been shown to be correlated with various indicators of economic and institutional performance (Easterly and Levine, 1997; La Porta et al., 1999; Alesina et al., 2003). Second, we consider genetic diversity, measured by the probability that two randomly drawn individuals have different genetic characteristics, as predicted by migratory distance from Africa. The data are taken from Ashraf and Galor (2013), who show that genetic diversity within countries relates negatively to trust.[14] Third, we consider the extent of ethnic and linguistic segregation, taken from Alesina and Zhuravskaya (2011), which the authors find to be negatively correlated with trust. Fourth, we include the index of cultural diversity proposed by Fearon (2003), which combines an index of ethnic fractionalization with information on the similarity between the different languages spoken within each country. The calculation of the coefficient of similarity is based on the number of branches two languages share in the language tree. This measure of diversity is probably the closest to our index of cultural diversity, as it is the only one that also takes into account the distance between different groups within countries. In contrast to our index though, the cultural

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[13] The results for the overall cultural polarization score are similar and are available on request.
[14] In addition to the simple diversity index (*pdiv*), Ashraf and Galor (2013) provide an ancestry-adjusted measure of genetic diversity (*pdiv*_aa) that takes into account the level of genetic diversity in the subpopulations of a country. The regression results shown here are based on the simple measure. Results based on the ancestry-adjusted measure are qualitatively similar.

distance between two groups is not measured directly but proxied for with the degree of similarity in the languages spoken by the two groups.

Table 7 presents the results of the analysis, which consist of four sets of regressions: one with ethnic, linguistic and religious fractionalization scores as additional regressors; one based on genetic diversity; one set including the two indices of segregation and one set using the cultural diversity score Fearon (2003) proposes. In column (8) we include all the dimensions of diversity that individually have a significant effect on trust also simultaneously. In addition to the variables shown in Table 7, we always control for the standard set of covariates listed in the bottom half of Table 6.

[Table 7 around here]

As the table shows, our index of polarization on political values remains statistically significant even when controlling for alternative dimensions of diversity. With the exception of language fractionalization (column 2) and genetic diversity (column 4), though, all other indices of diversity are insignificant. With regard to the effect size, with the exception of columns 5 and 6, the coefficients on polarization in political values are similar to the ones shown in Table 6.[15] In addition, its effect size is larger than the effects of the alternative dimensions of diversity throughout all columns. Ignoring the results from columns 5 and 6, the results from Table 7 imply that the standardized coefficient on polarization in political values is approximately 0.3, whereas the one for linguistic fractionalization is only 0.16 and that for genetic diversity is approximately 0.19. This finding indicates that diversity with respect to political values is by far the strongest correlate of trust, together with Protestantism.

The regression results in Tables 6 and 7 indicate that at the country level, polarization in political values has a strong and negative association with trust. In the following, we perform a battery of tests to verify that this finding is not driven by omitted variables or our choice of the parameter α in the polarization function.

In Table 8, we first rerun our baseline regression, this time using alternative values of the parameter α in the calculation of our polarization scores. As mentioned in Section 2.1, according

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[15] This drop in magnitude of the coefficient on diversity in political values is largely due to the smaller sample size in columns 5 and 6.

to Esteban and Ray (1994) and Duclos, Esteban and Ray (2004), a sensible choice for α should be in the range between 0 and 1, with 0 implying a measure comparable to the Gini coefficient. Therefore, we allow the coefficient α to take these extreme values of 0 and 1. For comparison, we also display our previous results based on an α of 0.5 in column 2. As Table 8 shows, our results are not sensitive to the choice of α. Irrespective of the value of α chosen, polarization in political values is negatively and statistically significantly correlated with trust.

[Table 8 around here]

In Table 9, in addition to the basic covariates shown in Table 6, we include various regressors that have been either linked with trust or argued to influence the extent of cultural diversity in societies. Specifically, we include the following variables:

(i) The quality of institutions, measured as the first principal component of the six governance indicators reported in the World Bank's "Worldwide Governance Indicators" (Kaufmann, Kraay and Mastruzzi, 2009), because it has been shown that the quality of institutions is correlated with norms of trust (La Porta et al., 1997; Tabellini, 2010);

(ii) The geographic location of countries, reflected in their degrees of absolute latitude, given the evidence documented by Michalopoulos (2012) that ethnic diversity seems to be linked to geography;

(iii) A dummy variable for sub-Saharan African countries, given the low levels of trust typically observed in these countries and that diversity is particularly high there (Michalopoulos, 2012; Ashraf and Galor, 2013);

(iv) A dummy for postcommunist countries, because of evidence that the collapses of the former socialist regimes were accompanied by a sharp decline in trust (Paldam and Svendsen, 2001);

(v) The share of the population older than 65 years of age, given that older people tend to be more trusting than younger ones (Alesina and La Ferrara 2002);

(vi) The year of state formation, taken from Wimmer and Min (2006). This variable is included because the process of nation−state formation has been argued to be associated with a

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process of trust building (Flora, 1999). Similar to the unifying role of a monarch, it has been argued that a long history of stable state organization is associated with high trust and stronger consensus on how society should be organized; and

(vii) A dummy variable indicating whether a country has been involved in a civil war since 1970, using the information provided by the Correlates of War project in their Intra-State War data set v4.0. [16] We included this variable because civil wars have been documented to happen more frequently in ethnically polarized states (Montalvo and Reynal-Querol, 2005) and also may erode trust.

For each country, we average all these variables over the period for which the corresponding trust and polarization scores are available.

We are interested in not only how including these additional regressors affects the estimated coefficient on our measure of cultural diversity but also how they affect the results obtained for alternative dimensions of diversity. Therefore, in Table 9, we report the results for not only polarization in political values but also linguistic fractionalization and genetic diversity. We omit the other dimensions of diversity listed in Table 7, because none of them had shown a significant relationship with trust even in the simpler regressions without additional controls.

[Table 9 around here]

As Table 9 indicates, with the exception of the year of state formation, none of the variables included have a significant effect on trust.[17] However, the effect of polarization in political values remains significant at the 1% level; moreover, the magnitude of its effect is visually unchanged when compared with the coefficient shown in column 1, which is based on a regression that only includes the basic covariates listed in Table 6. This status remains even when we include all the additional control variables simultaneously, as column 9 shows.

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[16] We chose 1970 to allow for exposure to civil wars in the more distant past to potentially affect the extent of trust in a society. Although we considered also alternative time frames for the civil war dummy (e.g., 1980 to the present, 1990 to the present), the results were virtually identical to those displayed here. The data used to construct the dummy variables are available at http://www.correlatesofwar.org/.

[17] We also tested for the effect of human capital in light of Helliwell and Putnam's (2007) findings but did not find any evidence of a significant role for this variable. This is likely due to the strong correlation between human capital and GDP per capita. The effect of cultural polarization, in contrast, was unaffected by the inclusion of human capital in the regression. Furthermore, we tested whether countries with large populations of migrants have lower levels of trust but found no evidence for this proposition either.

In contrast to Table 7, however, linguistic diversity no longer shows a significant correlation with trust when we account for these additional factors. The results for genetic diversity are somewhat mixed. Its effect is robust to the inclusion of institutional quality, latitude and the year of state formation, but it becomes insignificant when we control for the sub-Saharan African dummy and marginally significant (i.e., significant at the 11% or 12% level) in the remaining cases.[18]

Thus, we conclude that the uncovered negative relationship between cultural diversity and trust is robust to the inclusion of various additional control variables. Furthermore, the significant effect of genetic diversity, when we control for cultural diversity, suggests that the link between genetic diversity and trust that Ashraf and Galor (2013) document reflects the effects of two dimensions of genetic diversity: cultural and biological/somatic. Our cultural diversity measure accounts for the cultural channel directly. Therefore, the remaining variation contained in the genetic diversity measure likely reflects the biological component of genetic diversity. Thus, it seems that people are less trusting when surrounded by people who not only think differently from them (cultural channel) but also simply look different than they do (somatic channel). We therefore have new evidence that the link between trust and genetic diversity that Ashraf and Galor (2013) document likely reflects these two channels, which the authors were not able to separate in their analysis.

Thus far, our empirical analysis has been based on each country's average levels of trust and cultural diversity. However, for some countries in our original data set, we also have polarization scores and trust scores at multiple points in time, allowing us to address two further issues. First, we can assess whether the relationship between cultural diversity and trust holds not only on average but also at various points in time. Second, by focusing on a sample of countries for which we have complete data in more than one period, we can account for possible unobserved time-invariant country-specific factors.

To determine whether the relationship between cultural diversity—or, more precisely, polarization on political values—and trust holds at various points in time, we consider a pooled

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[18] The insignificance of genetic diversity as a consequence of including the sub-Saharan African dummy in the regression is partly by construction: the genetic diversity measure employed is not the actual level of genetic diversity but the one predicted according to the migratory distance from Addis Ababa, Ethiopia. Thus, by construction, genetic diversity is highest in sub-Saharan Africa and correlated with the dummy variable.

OLS regression with wave-fixed effects to account for common time trends. Table 10, column 1, reports this result. To account for the presence of time-invariant country-specific factors, Table 10, column 2, presents a regression in first differences, where the dependent variable is the change in trust between two waves and the dependent variables are the corresponding changes in values polarization and the other standard covariates, provided they are time variant. By studying the changes in trust and the dependent variables rather than analyzing their relationship in levels, any unobservable country-specific factors should drop out from the equation.

With regard to the choice of waves over which this analysis in first differences can be performed, it is imperative that we ensure that we have a sufficiently large country overlap between the two waves and that there is a sufficiently large time gap between the waves, because cultural values tend to be highly persistent over shorter periods of time. Because the sample sizes in waves 1 and 2 are small (see Table 3) and the time intervals between waves 3 and 4 or 4 and 5 are too short, a comparison between waves 3 and 5 is the only available option. Thus, the regression displayed in Table 10, column 2, explores the effect of changes in the variables listed between waves 3 and 5 (1995–2008) on the change in trust over the same time period. We did not include the religious shares and the monarchy dummy here because these variables are time invariant.

[Table 10 around here]

As Table 10 shows, polarization in political values remains significantly and negatively related to trust, a finding that holds true for both the pooled OLS regression and the regression in first differences. This finding indicates, first, that the relationship between cultural diversity and trust is not driven by the averaging of observations across time but holds true at various points in time. Second, the changes regression indicates that, ceteris paribus, countries that became more polarized along political ideological lines over this roughly 10-year period also became less trusting. The effect size in the changes regression is similar to that in the cross-country regressions: A one-standard-deviation decrease in cultural polarization is associated with a 0.27 standard deviation increase in trust. In other words, cultural diversity again is the strongest predictor of trust among all the regressors considered. Given that, as explained previously, the regression in first differences removes any time-invariant country-specific factors, we have

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strong evidence that the link between trust and cultural diversity uncovered in the previous tables is not driven by time-invariant omitted factors.

In addition, we performed two tests not reported here for the sake of brevity (the results are available on request). First, we tested for the presence of response style biases, following the procedure described by Harzing (2006). We found no evidence for such biases. Second, to eliminate the possibility that sampling biases drove the correlation between trust and cultural diversity, because both measures originally were calculated from the same sample population, we determined whether our results changed if we calculated our cultural diversity scores based on a 90% random sample drawn from the total population sampled in WVS and EVS. We found no evidence for such biases, either.

The empirical results presented thus far document a significant negative relationship between trust and polarization in cultural values—in particular, along the political ideology dimension—at the country level. We demonstrated that this relationship is robust to the inclusion of various additional regressors and survived in regressions in first differences, indicating that time-invariant omitted variables are unlikely to have driven the results. In the next section, we assess the link between cultural diversity and trust at the subnational (regional) level, and the following section similarly analyzes the link at the individual level.

The regional-level regressions exploit the variation in trust and cultural diversity within countries while controlling for fixed effects at the country level. This setup allows us to account for the effect of possible omitted variables at the country level. The individual-level analysis allows us to assess to what extent individuals living in areas that are culturally more polarized are less trusting. A single person cannot influence the degree of cultural diversity in the area where he or she resides; thus, our analysis of individual-level data allows us to shed more light on the direction of causality between trust and cultural diversity.

3.2. Regional-level results

The analysis of the link between cultural polarization and trust at the sub-national (regional) level is based on estimating a regression of the following form:

$$T_{jc} = \alpha + \beta D_{jc} + \gamma C_{jc} + \delta X_{jc} + \theta_c + \varepsilon_{jc}, \tag{3}$$

where j indicates regions and c countries, and θ_c is a country fixed effect capturing any sort of heterogeneity between countries. As before, D refers to the degree of cultural diversity (or polarization), C to the mean cultural values and X to other covariates. Thus, the regression is the exact equivalent to equation (2) used in the cross-country analysis, with the addition of the country fixed effect.

To estimate this regression, we need to construct measures of trust and cultural diversity at the regional level comparable to those used in the cross-country analysis. Although only limited information is available at the subnational level in the World Values Survey, the 2008 wave of the European Values Survey provides detailed information on where the respondents reside. Specifically, regional information can be obtained, depending on the size of the country, at either the NUTS1 level (for larger countries) or the NUTS2 level (for smaller countries).[19] Given that the EVS contains the same 17 survey questions we used to construct our measures of cultural diversity at the country level as well as the same trust question, we can generate corresponding indices at the regional level by mapping each respondent interviewed in EVS 2008 into a NUTS region and calculating trust scores and cultural diversity scores at the regional level using the data from the individuals residing in each of the NUTS regions. To ensure representativeness at the regional level, our analysis only includes a region if at least 65 respondents from that region answered the trust question. Furthermore, we included a country only if we have information from at least three regions in this country.

With regard to the variables contained in X, we consider the level of GDP per capita, population size, the Gini coefficient, and the share of Protestants and Catholics in each NUTS region to construct a set of covariates equivalent to the one used in the cross-country regressions shown in Table 6. GDP per capita and population size data for 2008 from Eurostat. Data on income inequality are from a publication by GHK Consultancy (GHK, 2010) that presents information on income inequality across European regions, calculated from individual-level information taken from the 2007 European Union Statistics on Income and Living Conditions

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[19] The acronym NUTS refers to the Nomenclature of Territorial Units for Statistics and is a standard for the subdivision of European countries, developed and maintained by the European Union. Using the NUTS classification system to define the regions greatly facilitates the analysis because other disaggregated information (e.g., GDP, population size, income inequality) is typically also made available at NUTS levels.

(EU-SILC).[20] The share of Catholics and Protestants in each region is the corresponding share of Catholics and Protestants in the sample population of EVS 2008.

Table 11 shows the results from the regional-level regressions, using information from 58 European regions in 10 countries.[21] In column 1, we run a simple regression without country fixed effects. In column 2, we add a dummy variable indicating the regions of Germany previously belonging to the German Democratic Republic, to accommodate the substantial political value differences between East and West Germans and stronger intergenerational differences in East Germany as a consequence of older East Germans' exposure to socialism (Alesina and Fuchs-Schundeln, 2007; Van Hoorn and Maseland, 2010).[22]

The regional level of diversity in political values is significantly negatively correlated with the regional level of trust. As expected, the East Germany dummy variable is positive and significant, indicating that despite high levels of polarization in East German regions, the level of trust there is fairly high as well (and higher than in other areas outside Germany with comparable levels of polarization). The effects of the remaining regional-level variables have the expected signs and are consistent with what we found at the country level. Namely, trust is higher in wealthier regions, regions with low income inequality and regions with a high share of Protestants in the population.

Finally, in column 3, we add country fixed effects to test whether the relationship between values polarization and trust also holds when we take into account unobserved country-level heterogeneity, which could, for example, reflect aspects such as the quality of institutions or differences in public policies related to income distribution. As we can see, that including country fixed effects does not change our previous findings. Even when accounting for such country-specific factors, we still observe a significant negative relationship between regional

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[20] The publication also includes income inequality measures based on other sources, such as the Luxembourg Income Study, and income inequality measures other than the Gini. The regression results using such alternative indicators on income inequality are qualitatively similar to those shown in Table 11.

[21] These countries are Austria, Belgium, Czech Republic, Finland, Germany, Spain, Italy, France, Hungary and Poland.

[22] This finding is also confirmed in the EVS 2008 data. The level of polarization in political values in East Germany is comparable to the level of polarization in the Czech Republic; that is, East German regions are similarly culturally diverse as other former socialist countries. The level of cultural polarization in West Germany, in contrast, is more than 1.5 standard deviations lower and comparable to the overall level in Japan, an example of a very homogenous country.

levels of cultural diversity and regional levels of trust. That is, column 3 indicates that within countries, regions that are characterized by high diversity in political values, ceteris paribus, have lower trust levels than culturally less diverse regions.

[Table 11 around here]

3.3. Individual-level results

At the individual level, we analyze whether polarization in political values affects the level of trust expressed by individuals, to shed more light on the direction of causality in the link between cultural diversity and trust. In our previous examinations, it was not directly possible to test for the direction of causality, even when accounting for country fixed effects, given that both our cultural diversity scores and the level of trust are measured at the same point in time. Thus, it could be that either high polarization is causing low trust, or the other way around. At the individual level, however, we can address this issue because we can rule out that the level of trust exhibited by an individual affects the level of cultural diversity observed in the larger area where the individual resides. That is, by looking at individual-level data, we can test directly whether the level of polarization observed in the region where an individual resides affects the level of trust expressed by the individual. The theory of trust formation indicates that this should be the case, because individuals are less likely to trust strangers if they are likely to encounter people who think very differently from themselves.

To test this hypothesis, we run the following probit regression:

$$T_{ijc} = \alpha + \beta D_{jc} + \gamma C_{jc} + \delta X_{jc} + \delta X_{ijc} + \theta_c + \varepsilon_{ijc}, \tag{4}$$

where T_{ijc} is equal to 1 if an individual i living in region j in country c answers, "Yes, most people can be trusted" and 0 if he or she says, "You can't be too careful." D_{jc} and C_{jc} refer to the level of diversity in political values and the average political values in the region where the individual resides. X_{jc} denotes other regional-level characteristics, namely, GDP per capita, income inequality, population size, religious composition and the East Germany dummy variable, which are all correlated with the regional level of cultural polarization, as Section 3.2 documents. θ_c is a country fixed effect intended to capture country-level differences in institutional quality, policies and so on that may influence whether a person is trusting. Finally,

X_{ijc} denotes individual-level observable characteristics, including gender, age, education, marital status, religious denomination, employment status and household income.

The data for this individual-level analysis are the same as those used for the regional-level analysis in Section 3.2. That is, individual-level trust data and information on other characteristics of each individual are taken from EVS 2008. The regional-level score of diversity with regard to political values is calculated as outlined in the previous section, and the remaining regional-level explanatory variables are also identical. In addition, as in the previous section, we include an observation only if we observe 65 or more individuals in a region and if the country in which the individual resides includes at least 3 such regions.

The results from the individual-level regressions are in Table 12. Column 1 includes only the set of individual-level characteristics, in addition to the variables of interest, namely, the regional level of cultural polarization and the regional average cultural values. Note that individuals living in regions characterized by high diversity in political values are significantly less likely to trust strangers than otherwise identical individuals living in less diverse regions.

With regard to the individual characteristics, compared with the excluded group of individuals with little or no education, educated people are more trusting, and the effect increases with the level of education. Wealthy people and Protestants are also more trusting, while unemployed individuals are less trusting.

In column 2, we add country fixed effects. As is evident, the inclusion of these fixed effects does not affect the estimated coefficient on cultural diversity. Finally, in column 3, we also include the regional-level variables used in Table 11 to ensure that the significant effect of cultural polarization at the regional level is not driven by the omission of these correlates of regional trust and regional cultural polarization. Including these region-specific factors does not affect the estimated effect of cultural diversity. Thus, there is strong evidence that individuals living in regions characterized by cultural diversity, or more specifically, regions with high polarization in political values, are ceteris paribus less trusting than individuals living in culturally more homogenous regions.[23]

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[23] Because cultural polarization tends to be higher in capital cities, we also included a dummy variable indicating the European regions that largely comprise only the capital of the country (e.g., the Prague capital region of the Czech

A single individual cannot influence the level of cultural diversity in his or her region, thus it is unlikely that reverse causality is behind the estimated relationship. Of course, there is one possibility for the estimated relationship between regional cultural diversity and individual trust to not reflect the causal link we have in mind: if individuals self-select themselves into the regions and the selection of regions by individuals is systematically correlated with the level of cultural diversity present in the regions. In other words, if high-trust individuals prefer to live in more culturally homogenous regions and take deliberate actions to move into such regions, the estimated relationship between regional levels of cultural diversity and individual trust would be spurious. Unfortunately, it is not possible to test for this channel, because our data set provides no information on movers; that is, we only know where an individual currently resides but not if he or she moved there from another region. However, given that we found no effect of migration on trust at the country level (see footnote 17) and that regional mobility within Europe is generally low,[24] we believe it is unlikely that strong self-selection forces are present; thus, our regression results thus hint at a causal effect of cultural diversity on trust formation.

[Table 12 around here]

4. Conclusion

High diversity within societies is commonly associated with poor socioeconomic outcomes. To date, researchers have conceptualized diversity as ethnic, religious and linguistic fractionalization and segregation and as genetic diversity. We argue that an important dimension of diversity has been largely ignored in the literature due to a lack of data, namely cultural diversity.

We provide the first systematic attempt to measure cultural diversity at national and subnational levels. This measure reflects the degree to which key cultural values and beliefs are shared within societies. Using these data, we investigate the question of which dimension of

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Republic, the Brussels capital region of Belgium). This dummy variable was insignificant, and its inclusion did not affect the coefficient on regional cultural diversity.

[24] On average, every year approximately 1% of the EU15 population changes their region of residence (Huber, 2004). In Eastern European countries, which are also in our sample, geographic mobility is even lower. For comparison, in the United States, approximately 3% of the population move across state lines every year (Borjas, Bronars and Trejo, 1992)

diversity is most detrimental for cooperation and social cohesion, as reflected by the level of generalized trust in societies.

We find that societies characterized by high levels of cultural diversity—especially with regard to political values—have lower levels of trust and that cultural diversity is the most important predictor of trust. This relationship holds at various levels of aggregation: the country level, the sub-national (regional) level and the individual level. Furthermore, we find that with the exception of genetic diversity, other dimensions of diversity are not significantly related to trust once we account for the effect of cultural diversity.

Our findings shed new light on the policy implications resulting from findings of a negative relationship between diversity and trust. Previous studies documenting an adverse effect of ethnolinguistic diversity on trust imply to some extent the use of more restrictive immigration policies as an instrument to control diversity within countries. This is a delicate issue: not only are such policies complex, but there may also be social costs to restricting international migration. Our finding that the cultural channel trumps other dimensions of diversity, in contrast, suggests that public policy interventions directed toward integrating different ethnicities and language groups and fostering common values in society are of crucial importance for creating trust and promoting economic development in the long run. Thus, international migration and ethnic or linguistic diversity per se are not detrimental for trust; rather, problems arise when different ethnic groups are not well integrated in society. In that sense, our policy implications are less restrictive and discriminatory and allow for more flexibility in the concrete design of immigration policies.

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Appendix A: Details regarding combining WVS and EVS data

The starting point for our data set was the "Official WVS five wave 1981–2008 v20090901," publicly available from the WVS website. However, this database is incomplete, as it excludes many European countries, which are traditionally covered in EVS. A comparison with WVS's online tool, which includes data from both WVS and EVS but only covers the first four waves of WVS, with the downloadable five-wave file indicated that we were missing 14 European countries in wave 1, 25 European countries in wave 2, and 30 European countries in wave 4. We consequently retrieved the corresponding information from these countries from WVS's online tool and added it to our database.

Finally, the latest 2008 EVS survey (which corresponds timewise to WVS's fifth wave) is not accessible via the WVS website; therefore, we added it separately. By including information from the 2008 EVS wave, accessible via the GESIS Data Archive for Social Sciences, we were able to add 47 countries, 20 of which were also covered in WVS's fifth wave. Thus, this integration of EVS 2008 allowed us to add information from 27 more countries for 2007–2008. In those cases, when a question was answered by the respondents of a given country in both types of surveys (20 countries), we kept both observations because the EVS and WVS interviews were never conducted in the same country in the same year. Because for our cross-sectional analysis, we use the across-wave averages of the polarization scores for each country, retaining the alternative scores from EVS 2008 in addition to the ones retrieved from wave 5 of WVS does not affect our results other than that this method provides us with more scores for each country and thus reduces potential measurement error in the calculated across-wave-average scores. For the regression in first differences shown in Table 11, we dropped the polarization scores based on EVS 2008 data whenever such scores were also available for the same country in WVS wave 5. We used this strategy of giving priority to WVS information and deleting the EVS entry whenever both are available because the researchers who assembled the WVS online tool used this method as well.

Table 1: Polarization Example

Answer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0.000	0.000	0.000	0.100	0.250	0.333	0.500
2	0.000	0.000	0.000	0.100	0.000	0.000	0.000
3	0.000	0.000	0.000	0.100	0.000	0.000	0.000
4	0.000	0.500	0.333	0.100	0.250	0.000	0.000
5	1.000	0.500	0.333	0.100	0.000	0.333	0.000
6	0.000	0.000	0.333	0.100	0.000	0.000	0.000
7	0.000	0.000	0.000	0.100	0.250	0.000	0.000
8	0.000	0.000	0.000	0.100	0.000	0.000	0.000
9	0.000	0.000	0.000	0.100	0.000	0.000	0.000
10	0.000	0.000	0.000	0.100	0.250	0.333	0.500
Polarization	**0.000**	**0.354**	**0.513**	**1.044**	**1.875**	**2.309**	**3.182**

Table 2: List of 17 Questions with 10-Point Answer Scales

Question	Official Code	Question text	Answer categories
1	A173	Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please indicate how much freedom of choice and control you feel you have over the way your life turns out.	1 = none at all, […] 10 = a great deal
2	E033	In political matters, people talk of "the left" and "the right." How would you place your views on this scale, generally speaking?	1 = left, […] 10 = right
3	E035	Incomes should be made more equal vs. We need larger income differences as incentives.	1 = more equal, […] 10 =need larger income differences
4	E036	Private ownership of business should be increased vs. Government ownership of business should be increased.	1 = private ownership, […] 10 = government ownership
5	E037	People should take more responsibility to provide for themselves vs. The government should take more responsibility to ensure that everyone is provided for.	1 = people, […] 10 = government
6	E039	Competition is good. It stimulates people to work hard and develop new ideas vs. Competition is harmful. It brings the worst in people.	1 = competition is good, […] 10 = competition is harmful
7	F063	How important is God in your life?	1 = not at all important, […] 10 = very important
8	F114	Justifiable: Claiming government benefits to which you are not entitled	1 = never justifiable, […] 10 = always justifiable
9	F115	Justifiable: Avoiding a fare on public transport	1 = never justifiable, […], 10 = always justifiable
10	F116	Justifiable: Cheating on taxes if you have a chance	1 = never justifiable, […], 10 = always justifiable
11	F117	Justifiable: Someone accepting a bribe in the course of their duties	1 = never justifiable, […], 10 = always justifiable

12	F118	Justifiable: Homosexuality	1 = never justifiable, […], 10 = always justifiable
13	F119	Justifiable: Prostitution	1 = never justifiable, […], 10 = always justifiable
14	F120	Justifiable: Abortion	1 = never justifiable, […], 10 = always justifiable
15	F121	Justifiable: Divorce	1 = never justifiable, […], 10 = always justifiable
16	F122	Justifiable: Euthanasia ending the life of the incurably sick	1 = never justifiable, […], 10 = always justifiable
17	F123	Justifiable: Suicide	1 = never justifiable, […], 10 = always justifiable

Source: World Values Survey, www.worldvaluessurvey.org/.

Table 3: Number of Observations by Wave and Question

Question	Code	Wave 1 1981–1984	Wave 2 1990–1991	Wave 3 1995–1999	Wave 4 1999–2004	Wave 5 2005–2008	Total N
1	A173	28173	56526	68666	99962	146973	400300
2	E033	21841	45107	57793	73480	109102	307323
3	E035	0	56667	73015	89130	143142	361954
4	E036	0	54315	71014	80251	133958	339538
5	E037	0	56719	72692	101237	146609	377257
6	E039	0	55904	68411	74784	141859	340958
7	F063	27463	53380	69740	101600	146572	398755
8	F114	28664	58654	70753	89695	141881	389647
9	F115	28881	54410	69242	75893	140349	368775
10	F116	27345	57595	72836	90721	142867	391364
11	F117	28731	59162	73555	96188	146136	403772
12	F118	27462	57476	70111	88327	133011	376387
13	F119	28365	58554	69040	74116	83079	313154
14	F120	28421	57586	71528	94492	140274	392301
15	F121	28473	58505	70511	95055	144190	396734
16	F122	27992	54190	64663	87179	136240	370264
17	F123	28181	56351	68647	90737	139967	383883
Number of countries		**24**	**46**	**54**	**71**	**84**	**101**

Table 4: Principal Component Analysis of Polarization Scores (Rotated Factor Loadings)

Question	Variable	Factor 1	Factor 2	Factor 3
1	A173	**0.8470**	-0.1146	0.0764
2	E033	**0.7769**	-0.2852	0.0879
3	E035	**0.9154**	-0.016	0.1081
4	E036	**0.9169**	-0.2334	0.0935
5	E037	**0.9188**	-0.1159	0.0664
6	E039	**0.8984**	0.0096	0.1481
7	F063	-0.4119	**0.5656**	-0.0735
8	F114	0.2901	0.1262	**0.7355**
9	F115	0.1897	0.2991	**0.8156**
10	F116	0.0558	0.2056	**0.8066**
11	F117	0.0921	0.083	**0.8264**
12	F118	-0.2271	**0.8138**	0.0481
13	F119	-0.1575	**0.7932**	0.3584
14	F120	0.0021	**0.8478**	0.1302
15	F121	0.7497	0.3681	0.1126
16	F122	0.209	**0.7921**	0.2074
17	F123	-0.3751	**0.7277**	0.2568

Table 5: Pairwise Correlations: Trust and Cultural Diversity (Country-Level Averages)

	Trust	Cultural diversity	Subdimension 1: political ideology	Subdimension 2: legal-illegal
Cultural diversity	-0.19			
Subdimension 1: political ideology	-0.58	0.16		
Subdimension 2: legal-illegal	-0.33	0.79	0.06	
Subdimension 3: personal-sexual	0.36	0.66	-0.54	0.38

Table 6: Trust and Cultural Diversity

	Dependent Variable: Average Trust, 1981–2008							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Polarization (General)	−68.19***	−32.25**						
	[14.12]	[13.19]						
Mean Cultural Values	27.20***	10.98**						
	[4.926]	[4.916]						
Polarization (Polit. Ideol.)			−48.20***	−26.60***				
			[8.356]	[7.984]				
Mean Political Ideology			−2.87	4.395				
			[3.966]	[3.366]				
Polarization (Leg.-Illeg.)					−27.1	−13.24		
					[18.08]	[12.42]		
Mean Score Leg.-Illeg.					1.771	2.69		
					[7.155]	[4.817]		
Polarization (Pers.-Sex.)							−12.8	4.834
							[9.38]	[7.853]
Mean Score Pers.-Sex.							14.93***	−1.17
							[3.92]	[3.922]
Gini		−0.213*		−0.142		−0.208*		−0.213*
		[0.117]		[0.122]		[0.119]		[0.122]
GDP per capita		0.000283**		0.000219*		0.000312***		0.000290**
		[0.000109]		[0.000119]		[0.000110]		[0.000122]
Population		2.66e-05***		2.72e-05***		1.89e-05**		1.70e-05*
		[9.31e-06]		[8.61e-06]		[9.05e-06]		[9.01e-06]
Monarchy		6.247*		7.879**		8.643***		9.887***
		[3.369]		[3.077]		[3.237]		[3.451]
% Protestants		0.183***		0.218***		0.216***		0.220***
		[0.0557]		[0.0501]		[0.0539]		[0.0612]
% Catholics		−0.0484		−0.0493		−0.0523*		−0.0668*
		[0.0342]		[0.0293]		[0.0320]		[0.0340]
Adj R-squared	0.31	0.64	0.34	0.67	0.085	0.61	0.24	0.61
Obs.	75	75	77	77	77	77	77	77

Standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7: Trust and Alternative Dimensions of Diversity

	Dependent Variable: Average Trust, 1981–2008							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Polarization (Pol. Ideology)	−25.02***	−25.67***	−28.71***	−23.39***	−19.39**	−21.13**	−20.30**	−23.37***
	[8.013]	[7.807]	[8.078]	[7.918]	[9.178]	[9.103]	[8.342]	[7.830]
Fractionalization (Ethnic)	−7.046							
	[4.378]							
Fractionalization (Language)		−7.979**						−5.878
		[3.509]						[3.686]
Fractionalization (Religion)			−6.221					
			[4.478]					
Genetic Diversity				−53.45**				−40.28*
				[22.95]				[24.15]
Segregation (Ethnic)					−3.835			
					[9.389]			
Segregation (Language)						−5.582		
						[8.579]		
Cultural Diversity (Fearon)							−3.287	
							[4.833]	
Adj R-squared	0.67	0.68	0.67	0.68	0.73	0.75	0.68	0.69
Obs.	77	77	77	77	61	56	73	77

Note: All regressions displayed control for the variables listed in Table 1. Standard errors in brackets.
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Different Choices for α

	Dependent Variable: Average Trust, 1981-2008		
	(1)	(2)	(3)
Value of α	0	0.5	1
Polarization (Political Ideology)	−17.77***	−26.86***	−26.08**
	[3.917]	[8.022]	[8.079]
Gini	−0.0893	−0.0946	−0.143
	[0.108]	[0.117]	[0.122]
GDP per capita	7.08e−05	0.000162	0.000245**
	[0.000111]	[0.000112]	[0.000111]
Population	2.18e−05***	2.61e−05***	2.39e−05***
	[7.85e−06]	[8.60e−06]	[9.05e−06]
Monarchy	8.238***	8.923***	9.280***
	[2.834]	[2.986]	[3.113]
% Protestants	0.200***	0.210***	0.215***
	[0.0475]	[0.0500]	[0.0522]
% Catholics	−0.0338	−0.0481	−0.0581*
	[0.0290]	[0.0302]	[0.0312]
Adj R-squared	0.70	0.66	0.63
Obs.	77	77	77

Standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: Robustness to Additional Control Variables

	Dependent Variable: Average Trust, 1981–2008								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Polar. (Polit. Ideol.)	−23.37***	−24.15***	−21.90***	−21.43***	−24.17***	−23.66***	−23.87***	−23.48***	−21.68**
	[7.830]	[7.949]	[7.986]	[8.013]	[8.054]	[8.489]	[7.653]	[7.970]	[8.340]
Fract. (Lang.)	−5.878	−6.265*	−4.558	−3.003	−6.11	−6.002	−7.451**	−5.823	−3.226
	[3.686]	[3.745]	[3.942]	[4.511]	[3.739]	[3.937]	[3.672]	[3.754]	[4.706]
Genetic Diversity	−40.28*	−42.59*	−53.61*	−29.6	−38.09	−39.93	−53.14**	−40.12	−64.97*
	[24.15]	[24.49]	[27.96]	[25.99]	[24.72]	[24.63]	[24.05]	[24.39]	[37.15]
Qual. of Institutions		−0.607							−1.269
		[0.904]							[1.000]
Absolute latitude			0.0515						0.0713
			[0.0543]						[0.0668]
Sub-Sahar. Africa				−4.997					−4.846
				[4.535]					[5.886]
Post-Communism					−1.265				−6.159*
					[2.645]				[3.339]
Share pop. age 65+						−0.0316			0.501
						[0.334]			[0.415]
Yr. of state formation							0.0438**		0.0601**
							[0.0212]		[0.0232]
Civil war since 1970								−0.243	−0.946
								[2.462]	[2.576]
Adj R-squared	0.69	0.69	0.73	0.69	0.69	0.69	0.71	0.69	0.71
Obs.	77	77	77	77	77	77	76	77	76

Note: In addition to the regressors listed, all regressions displayed also control for the variables listed in Table 1. Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Pooled OLS and Changes Regressions

	Pooled OLS with wave-FE	Changes Regression (1996-2007)
	(1)	(2)
Polarization (Political Ideology)	–17.38***	–16.91*
	[5.552]	[9.669]
Gini	–0.148*	0.229
	[0.0884]	[0.318]
GDP per capita	0.000262**	0.00023
	[0.000117]	[0.000332]
Population	1.90e–05***	–5.03e–05
	[3.49e–06]	[5.05e–05]
Monarchy	8.487***	
	[2.333]	
% Protestants	0.219***	
	[0.0442]	
% Catholics	–0.0559**	
	[0.0272]	
Adj R-squared	0.68	0.074
Obs.	185	55

Note: Column 1 shows robust standard errors, clustered at the country level. Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Trust and Cultural Diversity at the Regional Level

	Dependent Variable: Regional Trust, 2008		
	(1)	(2)	(3)
Polarization (Political Ideology)	–0.376**	–0.403***	–0.273*
	[0.152]	[0.146]	[0.159]
Mean Political Ideology	0.0771*	0.107***	0.0112
	[0.0395]	[0.0397]	[0.0645]
Gini	–1.016***	–1.213***	–0.554
	[0.352]	[0.346]	[0.458]
GDP per capita	5.79e-06***	7.01e-06***	5.80e-06***
	[1.45e-06]	[1.48e-06]	[1.75e-06]
Population	1.52e-10	2.20e-10	4.65e-09
	[2.98e-09]	[2.84e-09]	[4.13e-09]
% Protestants	0.352***	0.391***	0.271
	[0.0607]	[0.0601]	[0.249]
% Catholics	0.0865	0.159**	0.254
	[0.0554]	[0.0609]	[0.168]
East Germany Dummy		0.105**	0.203
		[0.0435]	[0.138]
Country Fixed Effects	NO	NO	YES
Adj R-squared	0.5703	0.6078	0.684
Obs.	58	58	58
No. of countries	10	10	10

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Individual Trust and Cultural Diversity (Probit Regressions)

	Dependent Variable: Individual Trust,		
	(1)	(2)	(3)
Regional Polarization (Political Ideology)	–1.457***	–1.239***	–1.396***
	[0.471]	[0.574]	[0.475]
Regional Political Ideology	–0.0706	–0.155	–0.123
	[0.0897]	[0.139]	[0.147]
Female	0.00726	0.0113	0.0085
	[0.0269]	[0.0263]	[0.0265]
Age	0.00064	0.000591	0.000409
	[0.00110]	[0.00111]	[0.00110]
Intermediate Education	0.235***	0.243***	0.240***
	[0.0465]	[0.0504]	[0.0496]
High Education	0.618***	0.619***	0.615***
	[0.0517]	[0.0473]	[0.0478]
Protestant	0.232***	–0.0537	–0.0554
	[0.105]	[0.0790]	[0.0815]
Catholic	–0.0594	–0.0233	–0.0411
	[0.0661]	[0.0612]	[0.0602]
Married	–0.0172	0.000749	–0.00697
	[0.0330]	[0.0340]	[0.0345]
Unemployed	–0.222***	–0.197***	–0.186***
	[0.0617]	[0.0663]	[0.0657]
Household Income	0.0822***	0.0627***	0.0600***
	[0.0144]	[0.0130]	[0.0123]
Gini			–2.671***
			[1.249]
GDP per capita			1.98e–05***
			[4.62e–06]
Population			1.70e–08**
			[1.03e–08]
% Protestants			1.496***
			[0.796]
% Catholics			1.196***
			[0.606]
East Germany Dummy			1.083***
			[0.457]
Country Fixed Effects	NO	YES	YES
Adj R-squared	0.055	0.068	0.073
Obs.	7,577	7,577	7,577
No. of regions	58	58	58
No. of countries	10	10	10

Standard errors in brackets and clustered at the region
*** p<0.01, ** p<0.05, * p<0.1

Appendix B: Sample of countries and year of sampling

Country	Year(s)
Albania	1998, 2002, 2008
Algeria	2002
Andorra	2005
Argentina	1984, 1991, 1995, 1999, 2006
Armenia	1997, 2008
Armenia	2008
Australia	1981, 1995, 2005
Austria	1990, 1999, 2008
Azerbaijan	1997, 2008
Bangladesh	1996, 2002
Belarus	1990, 1996, 2000, 2008
Belgium	1981, 1990, 1999, 2008
Bosnia and Herzegovina	1998, 2001, 2008
Brazil	1991, 1997, 2006
Bulgaria	1990, 1997, 1999, 2006, 2008
Burkina Faso	2007
Canada	1982, 1990, 2000, 2006
Chile	1990, 1996, 2000, 2006
China	1990, 1995, 2001, 2007
Colombia	1998, 2005
Croatia	1996, 1999, 2008
Cyprus	2006, 2008
Czech Republic	1990, 1991, 1998, 1999, 2008
Denmark	1981, 1990, 1999, 2008
Dominican Republic	1996
Egypt	2000, 2008
El Salvador	1999
Estonia	1990, 1996, 1999, 2008
Ethiopia	2007
Finland	1981, 1990, 1996, 2000, 20005, 2008
France	1981, 1990, 1999, 2006, 2008
Georgia	1996, 2008
Germany	1990, 1997, 1999, 2006, 2008
Germany (west)	1981
Ghana	2007

Great Britain	1981, 1990, 1998, 1999, 2006, 2008
Greece	1999, 2008
Guatemala	2004
Hongkong	2005
Hungary	1982, 1991, 1998, 1999, 2008
Iceland	1984, 1990, 1999, 2008
India	1990, 1995, 2001, 2006
Indonesia	2001, 2006
Iran	2000, 2005
Iraq	2004, 2006
Ireland	1981, 1990, 1999, 2008
Israel	2001
Italy	1981, 1990, 1999, 2005, 2008
Japan	1981, 1990, 1995, 2000, 2005
Jordan	2001, 2007
Korea (South)	1982, 1990, 1996, 2001, 2005
Kosovo	2008
Kyrgyzstan	2003
Latvia	1990, 1996, 1999, 2008
Lithuania	1990, 1997, 1999, 2008
Luxembourg	1999, 2008
Macedonia	1998, 2001, 2008
Malaysia	2006
Mali	2007
Malta	1983, 1991, 1999, 2008
Mexico	1984, 1990, 1996, 2000, 2005
Moldova	1996, 2002, 2006, 2008
Montenegro	2008
Morocco	2001, 2007
Netherlands	1981, 1990, 1999, 2006, 2008
New Zealand	1998, 2004
Nigeria	1990, 1995, 2000
North Cyprus	2008
Northern Ireland	1981, 1990, 1999, 2008
Norway	1982, 1990, 1996, 2007, 2008
Pakistan	1997, 2001
Peru	1996, 2001, 2006
Philippines	1996, 2001
Poland	1989, 1990, 1997, 1999, 2005, 2008
Portugal	1990, 1999, 2008
Puerto Rico	1995, 2001

Romania	1993, 1998, 1999, 2005, 2008
Russia	1990, 1995, 1999, 2006, 2008
Rwanda	2007
Saudi Arabia	2003
Serbia	2006, 2008
Serbia and Montenegro	1996, 2001
Singapore	2002
Slovakia (Slovak Republic)	1990, 1991, 1998, 1999, 2008
Slovenia	1992, 1995, 1999, 2005, 2008
South Africa	1983, 1990, 1996, 2001, 2007
Spain	1981, 1990, 1995, 1999, 2000, 2007, 2008
Sweden	1982, 1990, 1996, 1999, 2006, 2008
Switzerland	1989, 1996, 2007, 2008
Taiwan	1994, 2006
Tanzania	2001
Thailand	2007
Trinidad and Tobago	2006
Turkey	1990, 1996, 2001, 2007, 2008
Uganda	2001
Ukraine	1996, 1999, 2006, 2008
United States of America	1982, 1990, 1995, 1999, 2006
Uruguay	1996, 2006
Venezuela	1996, 2000
Vietnam	2001, 2006
Zambia	2007
Zimbabwe	2001

Total *N* x *T*= 299; Total *N* unique countries = 101