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# Culture, Ethnicity and Diversity\*

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## Abstract

We investigate the empirical relationship between ethnicity and culture, defined as a vector of traits reflecting norms, attitudes and preferences. Using surveys of individual values in 76 countries, we find that ethnic identity is a significant predictor of cultural values, yet that within-group variation in culture trumps between-group variation. Thus, in contrast to a commonly held view, ethnic and cultural diversity are unrelated. We explore the correlates of cultural diversity and of the overlap between culture and ethnicity, finding that the level of economic development is positively associated with cultural diversity and negatively associated with the overlap between culture and ethnicity. Finally, although only a small portion of a country's overall cultural heterogeneity occurs between groups, this does not imply that cultural differences between groups are irrelevant. Indeed, we find that civil conflict becomes more likely when there is greater overlap between ethnicity and culture.

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# 1 Introduction

Are ethnic cleavages associated with deep differences in culture between groups? Many people think so. In poor countries, often characterized by a high level of ethnic diversity, concerns arise that groups with heterogeneous values, norms and attitudes - the broad set of traits that we will refer to as "culture" - may be unable to agree on policies, the provision of public goods and the broader goals of society. In rich countries, debates rage over multiculturalism and whether population movements brought about by globalization and modernity will result in cultural divisions and the breakdown of social consensus. Underlying these debates is an assumption that people agree within groups and disagree across groups, so that cultural heterogeneity and ethnic heterogeneity are two sides of the same coin. Yet, there is little quantitative research on the links between ethnicity and culture.

In this paper we conduct a systematic investigation of the links between culture and ethnicity. In doing so, we aim to answer the following questions: Is an individual's ethnolinguistic identity a predictor of his norms, values and preferences? Are ethnolinguistic heterogeneity and cultural heterogeneity highly correlated? What is the degree of overlap between both measures of diversity? Finally, is the relationship between ethnicity and culture important to understand salient political economy outcomes, such as civil conflict?

We start by exploring the relationship between ethnolinguistic identity and culture, using individual-level data from various surveys such as the World Values Survey. We seek to explain answers on norms, values and preferences using a respondent's economic and demographic characteristics, among which are ethnic and linguistic indicators, and to evaluate the joint statistical significance of the latter. We find that ethnicity dummy variables are jointly significant predictors of responses for about half of the questions, although this average masks significant heterogeneity across countries. Thus, ethnic identity appears to be an important determinant of cultural norms, values and preferences.

Although this suggests a strong link between ethnicity and culture, a very different picture emerges when we analyze the relation between cultural fractionalization and ethnic fractionalization. To get a measure of cultural fractionalization, we compute the probability that two randomly drawn individuals answer a randomly drawn question from the World Values Survey differently. In contrast to many observers' priors, we find that heterogeneity in norms, values and preferences is uncorrelated with ethnolinguistic fractionalization across countries. Taken together, these results show that even though culture does differ across ethnolinguistic groups, cultural fractionalization and ethnolinguistic fractionalization are not related. Ethnic fractionalization can therefore not readily be taken as a proxy for overall cultural and preference heterogeneity.

How can these seemingly contradictory results be reconciled? Within-group heterogeneity in culture may account for the low correlation between cultural heterogeneity and ethnolinguistic diversity, without precluding the possibility that ethnic identity has predictive power for cultural attitudes: the degree

of between-ethnic group cultural heterogeneity could be small relative to total heterogeneity, yet have significant predictive power for various political economy outcomes. To explore this possibility, we propose new indices of the degree of overlap between ethnicity and culture, derived from a simple model of social antagonism. The first is a  $\chi^2$  index that captures the average distance between the answers of each ethnic group and the answers in the overall population. A low value of the index indicates that groups reflect the countrywide distribution of answers, while a high value indicates a lot of group-specificity. The second index, developed in the context of population genetics, is known as a *fixation index*, or  $F_{ST}$ . It captures the between-group variance in answers to survey questions as a share of the overall variance. A value of zero indicates that there is no informational content to knowing an individual's ethnic identity, while a value of one indicates that answers can be perfectly predicted based on knowing an individual's ethnic identity.

Using  $\chi^2$  and  $F_{ST}$ , we find that the degree to which cultural and ethnic cleavages overlap is very small. In particular, we find that only on the order of 1 – 2% of the variance in cultural norms is between groups. That is, the vast share of the variance is within groups. This explains the close-to-zero correlation between cultural heterogeneity and ethnic heterogeneity. The low share of between-group variance is not a simple consequence of the type of questions asked in the World Values Survey: when taking countries, rather than ethnicities, as the relevant groups, we find that the between-country share of the variance in cultural values is about five times larger. Furthermore, in spite of the small degree of overlap between culture and ethnicity, there is substantial variation across countries in the  $F_{ST}$  and  $\chi^2$  measures, and this variation is related in meaningful ways to some salient cross-sectional characteristics of countries.

Does cultural diversity between ethnic groups, though of a small magnitude, matter for our understanding of political economy outcomes? To analyze whether the overlap between culture and ethnicity is relevant, we explore the effect of ethnic heterogeneity, cultural heterogeneity and the degree of overlap between the two on the onset and incidence of civil conflict. In principle, civil wars could arise when there is a high degree of cultural heterogeneity, when there is a high degree of ethnic diversity, or when culture and ethnicity reinforce each other. Empirically, we find that both cultural and ethnic diversity have weak effects on civil conflict. If anything, cultural diversity has a pacifying effect. However, the degree of overlap between cultural attitudes and ethnic identity has a strong and robust effect on civil wars: when culture and ethnicity reinforce each other (i.e. for high values of  $F_{ST}$  or  $\chi^2$ ) violent conflict becomes more likely.

This paper is related to various strands of the literature on ethnolinguistic diversity. The first strand studies the relationship between ethnolinguistic diversity and socioeconomic outcomes, using conventional measures of diversity such as fractionalization (for instance, Easterly and Levine, 1997, Alesina, Baqir and Easterly, 1999, Alesina et al., 2003, Alesina and La Ferrara, 2005, among many others). Our paper is related to this literature as we examine the effect of ethnic and cultural fractionalization on a particular outcome, civil conflict. By explicitly considering cultural diversity and its relation with ethnic

heterogeneity, we cast light on the mechanisms that led to the empirical regularities uncovered in the earlier literature.

The second strand seeks to advance the measurement of diversity by considering alternative measures that improve on simple fractionalization. These measures take different forms, accounting for distance between groups (Esteban and Ray, 1994, 2004, Bossert, d’Ambrosio and La Ferrara, 2011), looking at income inequality between ethnic groups (Alesina, Michalopoulos and Papaioannou, 2012) or the historical depth of ethnic cleavages (Desmet, Ortuno-Ortin and Wacziarg, 2012). Our paper is related to this measurement literature because we propose a new measure of heterogeneity in cultural attitudes and new measures of the degree of overlap between culture and ethnicity. These measures shed new light on the complex empirical relationship between culture and ethnicity.

A third strand of the literature examines the relationship between culture and economic outcomes. This literature usually examines the effect of a particular historically-determined trait on current outcomes, rather than the effect of cultural *diversity* as we do. This is, again, a vast literature, but salient examples include Alesina, Giuliano and Nunn (2013) on the historical legacy of the heavy plough on values affecting fertility and female labor force participation; Giuliano (2007) on the effect of culture on living arrangements; Fernandez and Fogli (2009) on culture, fertility and female labor force participation; Luttmer and Singhal (2011) on culture and the taste for redistribution; Tabellini (2010) on cultural traits and economic performance across the regions of Europe; and Guiso, Sapienza and Zingales (2009) on trust and bilateral trade. In contrast to this literature, we study the effect of cultural heterogeneity rather than the effect of a specific cultural trait.

Finally, a recent literature seeks to relate genetic differences - a measure associated with cultural differences - with political and economic outcomes, including conflict. For instance, Spolaore and Wacziarg (2009) look at the effect of genetic distance between countries on the diffusion of the Industrial Revolution and Spolaore and Wacziarg (2013) study the effect of genetic distance between countries on interstate conflict and war. While these two studies also use  $F_{ST}$  as a measure of distance between groups, this  $F_{ST}$  is based on genetic rather than cultural data, and it is used to study interactions between pairs of countries rather than between groups within countries. Ashraf and Galor (2013) investigate the effect of genetic diversity, used as a broader measure of diversity in both cultural and biological traits within countries, on historical and contemporary economic performance. In Arbatli, Ashraf and Galor (2013), the same measure of genetic diversity is found to have a positive effect on the probability of civil conflict. In contrast to these papers, we measure cultural diversity directly using responses to surveys on norms, attitudes and preferences, rather than using genetic data.

The rest of the paper is organized as follows. In Section 2, we use individual level data from surveys of cultural attitudes to explore the relationship between ethnic identity and cultural attitudes. In Section 3, we introduce a simple model of social antagonism leading to three classes of measures of heterogeneity hypothesized to affect socioeconomic outcomes. We show how to operationalize these theoretically derived

measures using data on ethnicity and cultural traits. In Section 4, we introduce our new measures of heterogeneity, compute them using the World Values Survey, and describe their interrelationships and determinants. In Section 5, to illustrate the uses of these new measures, we explore empirically the effect of cultural and ethnic heterogeneity on civil conflict. Section 6 concludes.

## 2 Identity and Culture

### 2.1 Methodology

In this section we use the World Values Survey to examine the relationship between ethnic identity and cultural attitudes. The exercise requires individual level data on answers to questions on norms, values and preferences, and corresponding data on the respondent’s ethnic or linguistic identity. We examine the joint statistical significance of indicators of ethnolinguistic identity as determinants of survey responses, proceeding question by question and country by country and controlling for observable individual characteristics. In principle, 5% of the questions should feature a significant joint effect of ethnic identity if the statistical criterion is 95% confidence and there was in fact no association between cultural attitudes and ethnicity. We ask whether the share of questions for which there is a significant effect of ethnicity is actually higher, and find that it is in fact much higher. We also examine whether the importance of identity for culture varies in systematic ways across question types, countries, continents, etc.

For each question and each country, we estimate the following specification:

$$Q_m = \alpha + \sum_{s=1}^S \beta_s D_m^s + \gamma' \mathbf{X}_m + \varepsilon_m \quad (1)$$

where  $m$  denotes a respondent,  $s = 1, \dots, S$  indexes ethnolinguistic groups,  $Q_m$  is individual  $m$ ’s answer to the question under consideration,  $D_m^s$  is equal to one if respondent  $m$  is part of group  $s$ , zero otherwise, and  $\mathbf{X}_m$  is a vector of controls. Estimation is by least squares.

We test for the joint significance of the  $\beta_s$  parameters using conventional F-tests. We do so for all questions and countries, and then examine the share of questions for which ethnolinguistic identity is a significant predictor of cultural attitudes at the 5% level. We compute these shares over different categories of questions, for each country separately, and for different regions. We also examine how much additional explanatory power ethnicity dummies bring to the regression, by comparing the simple  $R^2$  statistic from running the specification in (1) to the one obtained when running the same regression without ethnicity dummies. This is meant to capture the magnitude of the joint effect of ethnicity on answers to cultural questions.

## 2.2 Data

Our main source is the Integrated World Values Survey-European Values Survey (WVS-EVS) dataset covering 1981 to 2008 and five survey waves. In order to examine the relationship between ethnicity and culture in a systematic way, we choose to focus on the broadest set of available questions without casting judgment on which ones are more representative of attitudes and preferences: we let the dataset largely guide our choice of questions, as opposed to making *ad hoc* choices ourselves. In the WVS-EVS integrated dataset, there is a total of 1,031 fields, or questions. Some of these fields are not survey questions but instead refer to socio-demographic characteristics of the respondent or the interviewer, and some have zero observations. We confine attention to survey questions identified by the survey itself as pertaining to norms, values and attitudes (these come grouped by the survey organization into question categories labelled from A to G), and with a nonzero number of respondents. Among those, in very rare cases some questions were asked in a slightly different manner in some countries (Colombia, Hong Kong, Mexico, Iraq), and those were dropped (19 questions). We also dropped questions that asked about circumstances specific to a given country, i.e. questions that could not conceivably be asked in more than one country (74 questions). In the end we were left with 808 questions.

Among these remaining questions, there were three types: those with a binary response (yes/no, agree/disagree: 252 questions), those with an ordered response (where answers are on a scale of, say, 1 to 10: 496 questions), and those with strictly more than two possible responses that are not naturally ordered (60 questions). The first two categories can be used readily as dependent variables. For the third category, we cannot directly estimate the joint effect of ethnicity on unordered responses, so we transformed each possible response into a series of binary response questions.<sup>1</sup> Thus, the 60 questions with unordered responses resulted in 193 new binary questions, leading to a total of 941 questions. Of course, not every one of these questions was asked in every country, or in every wave. We keep all questions irrespective of where or when they were asked. In the end, out of 941 questions, on average 294 were asked in each country (the number of questions per country varied between 81 and 447 - Appendix Table A1 provides the exact count, country by country). When combined across all waves, the average number of respondents across the countries in the sample, and across all questions, was 1,497. There is some heterogeneity around this number as some questions were asked in more waves than others, and the number of surveyed individuals varies across countries and waves.

An important aspect of our exercise is to correctly code ethnolinguistic identity in order to estimate the joint effect of ethnicity dummies on responses. To do so, we have to define ethnicity. The WVS/EVS asks

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<sup>1</sup>For instance, question C009 asks "Regardless of whether you're actually looking for a job, which one would you, personally, place first if you were looking for a job?" and offers the following choices: "a good income", "a safe job with no risk", "working with people you like", "doing an important job", "do something for community". We define 5 binary response questions, where, for instance, for "a good income", the response value is 1 if the respondent answered "a good income" to question C009, and zero otherwise, and so on for the other answer categories.

respondents to report both their ethnicity and language. In some cases, the reported ethnic categories do not appropriately capture ethnic identity. For many African countries the WVS/EVS integrated survey reports ethnicities as White / Black. For instance in Zambia, 99.47% of respondents are Black, while there are 0.27% Asians and 0.27% Whites. Most ethnographers agree that for Africa, language is a better measure of ethnic identity than race. For Zambia, WVS/EVS respondents speak 18 separate languages, the largest of which (Bemba) represents 36.6% of the respondents. The opposite problem exists in Latin America, where language is not usually used as a measure of ethnic affiliation, and race defines ethnic identity instead. For instance, in Venezuela 100% of respondents report speaking Castilian. However the largest racial group is coded as "Colored (light)", representing 42.7% of respondents.

To correctly characterize ethnic identity in a systematic way, we again rely on existing classifications rather than on our own judgement. We examine the ethnic and linguistic classifications in the integrated WVS/EVS file and see which one is closest to either the Alesina et al. (2003) or the Fearon (2003) classifications, which are widely used in the literature.<sup>2</sup> We choose either ethnic identity or linguistic identity depending on which one gives us a classification and a distribution of individuals across groups that most resembles the Alesina et al. and Fearon classifications. In the above example, ethnic identity in Zambia is coded using the language spoken at home variable, while ethnic identity in Venezuela is coded as the ethnic group to which a respondent belongs. The idea is that a measure of ethnolinguistic fractionalization computed from the resulting group shares in the WVS/EVS dataset should be highly correlated with fractionalization measures derived in Alesina et al. (2003), and Fearon (2003). Indeed our ethnic classification results in fractionalization measures that are 74% correlated with fractionalization in Alesina et al., and 73% correlated with fractionalization according to Fearon - this despite the data coming from very different sources (a survey for WVS/EVS, mostly census for the other two sources). Finally, control variables in the WVS/EVS dataset consist of the respondent's age (question x003), sex (x001), highest educational level attained (x025) and household income (x047).

## 2.3 Results

The results for the WVS/EVS dataset are presented in Tables 1 and 2. Table 1 presents the overall share of regressions where ethnicity dummies are jointly significant at the 5% level and the  $R^2$  with and without ethnicity dummies, breaking down these results by region. Table 2 presents a breakdown by question category (using the classification of questions provided by the WVS/EVS) and by question type (binary, scale, and binary constructed from multiple response questions). Additionally, Appendix Table A1 presents the results country by country.

Interesting findings emerge. First, the average number of questions for which ethnicity dummies are

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<sup>2</sup>The WVS/EVS question on ethnic group is question x051 while the language spoken at home question is g016. These are the two questions we use to code a respondent's ethnic identity.



jointly significant, across all countries, is 43%. Thus, ethnic identity is an important determinant of responses to many questions.

Second, this average masks interesting variation across regions. In South Asia, East Asia and Sub-Saharan Africa, the shares are much higher, respectively 67%, 63% and 62%. In Latin America and Western Europe, the shares are much lower, at 17% and 31% respectively. The small share in Latin America could be due to the fact that, despite racial heterogeneity, linguistic and religious identity in Latin America is much more homogeneous than in places where ethnic identity is a stronger predictor of culture, for instance Africa. The Latin American exception does not extend to the New World as a whole, as North America (defined here as Canada and the US) displays a relatively high share (51%). The results for Latin America and Sub-Saharan Africa are confirmed when analyzing alternative datasets for these regions - Latinobarómetro and Afrobarometer, respectively (these results appear in Appendix 1).

Third, the breakdown by question category shows little variation. We find that ethnic identity matters a bit more for questions pertaining to religion and morals, as well as (predictably) for those pertaining to national identity, and a bit less for questions related to work. Otherwise, there is substantial homogeneity across categories. We conducted the same breakdown by question category continent by continent, finding again little variation in the share of regressions with significant ethnic dummies. These findings suggest that the choice of questions is not very material to the issue of whether ethnic identity affects norms, values and preferences, as regional patterns are stable across question categories.<sup>3</sup>

Fourth, the explanatory power of the regressions is usually quite low. The average  $R^2$  when excluding the ethnicity dummies is only 2.7%, and when including the ethnicity dummies it rises to 4.1%. Thus, it is usually difficult to predict a person's response to WVS/EVS questions using the most obvious observables, yet the addition of ethnic dummies does increase the explanatory power of the regression by about 50%. These averages again mask interesting heterogeneity across regions, which largely mirrors heterogeneity in the share of significant joint F-tests across countries. Moreover, these results suggest that the extent to which ethnic identity can explain cultural attitudes is a small share of the overall cultural variance, a theme to which we will return at length below.

### 3 Measuring Heterogeneity

This section is about measurement. We present a simple model of social antagonism to guide the choice of functional forms for the heterogeneity measures used in the empirical investigation that follows. Starting from various assumptions about the source of heterogeneity giving rise to antagonism, the model yields

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<sup>3</sup>Similarly, we find little variation across types of questions - binary, scale or binary constructed from unordered response questions. Ethnicity predicts answers to scale questions slightly more frequently than for binary questions, but the difference is not large. This again suggests that the specific choice of questions is not very material to our results.

indices of ethnic diversity, cultural diversity and their overlap:  $\chi^2$ . We also propose a closely related index,  $F_{ST}$ . We then show how to operationalize these theoretical indices using data.

In a nutshell, we assume that individuals feel antagonism towards people who are different from them. *Social antagonism* is the sum of all the individual levels of antagonism in society, as in the alienation framework of Esteban and Ray (1994). We adopt a broad interpretation of what antagonism captures. It could represent feelings of alienation felt toward groups with different cultures or different ethnicities. Antagonism could also stem from barriers that prevent fruitful interactions between groups, for instance due to an inability to communicate or trust each other. We consider three distinct types of societies depending on how various dimensions of heterogeneity give rise to antagonism. For each type of society we derive an index measuring the level of social antagonism. Later, we will calculate these indices and relate them to the probability of civil conflict.

It is useful to start with some notation. A country is composed of  $n$  individuals characterized by the ethnic group to which they belong and by their cultural values or preferences. There are  $S$  ethnic groups, indexed by  $s = 1, \dots, S$ . The share of each ethnic group in the population is  $w^s$ . Cultural values (or traits) are the answers to the  $q$  questions in the WVS (or any other survey of cultural attitudes), each indexed by  $i = 1, \dots, q$ . Each question  $i$  has  $r(i)$  different possible answers, indexed by  $j$ . Focusing on a given country,  $w_{ij}$  is the share of the population that gives answer  $j$  to question  $i$ . Finally,  $w_{ij}^s$  is the share of individuals from ethnic group  $s$  that gives answer  $j$  to question  $i$ .

The type of an individual,  $k$ , is given by his ethnic group  $s$  and his answers to the  $q$  questions. We define a vector  $\omega_k$  of dimension  $1 + q$  where the first component is a number from  $\{1, 2, \dots, S\}$  and denotes his ethnic group, and the remaining  $q$  components represent the answers to each of the  $q$  questions. For example, if there are two ethnic groups,  $S = 2$ , and three questions,  $q = 3$ , and each question has two answers,  $r(i) = 2$ , the vector  $\omega_1 = \{1, 2, 1, 1\}$  characterizes the type of an individual (i.e. type 1) who belongs to the first ethnic group and who gives answers 2, 1, 1 to the first, second and third question, respectively. Since we have a finite number of individuals,  $n$ , as well as a finite number of questions and answers, the total number of different types of individuals is finite. We denote by  $K$  the number of different types and by  $n_k$  the number of individuals of type  $k$ , so  $\sum_{k=1}^K n_k = n$ . The population share of individuals of type  $k$  is denoted by  $w_k = n_k/n$ , where of course  $\sum_{k=1}^K w_k = 1$ . We denote as  $\xi(k, i)$  the answer given by an agent of type  $k$  to question  $i$ , and as  $s(k)$  the ethnic group of a type  $k$  agent:  $\omega_k = (s(k), \xi(k, 1), \xi(k, 2), \dots, \xi(k, q))$ .

### 3.1 The Cultural Heterogeneity Channel

We first assume that only cultural values matter for antagonism. Belonging to a different ethnic group  $s$  does not generate any antagonism *per se*. An individual's antagonism is given by the share of individuals in society with preferences different from his. More formally, the antagonism of an agent of type  $k$  depends,

for each of the  $q$  questions, on how many people respond in the same way as him. The population share of individuals that give the same answer to question  $i$  as agent of type  $k$  is  $w_{i,\xi(k,i)}$ .

We give the same weight to all the  $q$  questions. Thus, for an agent of type  $k$  the average share, over the  $q$  traits, of individuals giving the same answer as him is  $\frac{1}{q} \sum_{i=1}^q w_{i,\xi(k,i)}$ . Hence, his level of antagonism,  $v_k$ , is given by:

$$v_k = 1 - \frac{1}{q} \sum_{i=1}^q w_{i,\xi(k,i)} \quad (2)$$

Here, individuals feel antagonism if they live in the same society as other individuals who have different cultural characteristics. Ethnicity does not matter. In this case  $v_k$  measures the average probability, over all questions, that a randomly chosen citizen disagrees with the answers given by an agent of type  $k$ . Social antagonism  $v$  is the summation of all the individual levels of antagonism  $v_k$ , normalized by the population size  $n$ . Appendix 2A shows that  $v$  can be rewritten as the following easy-to-calculate index of cultural fractionalization ( $CF$ ):

$$CF = \frac{1}{q} \sum_{i=1}^q \left( 1 - \sum_{j=1}^{r(i)} w_{ij}^2 \right). \quad (3)$$

The cultural fractionalization ( $CF$ ) index measures the average probability that two randomly drawn individuals from a population give different answers to a randomly drawn question from the WVS/EVS. Thus, if we believe that antagonism is driven exclusively by differences in preferences and cultural values, the index of cultural fractionalization,  $CF$ , should matter for political economy outcomes.

### 3.2 The Ethnic Heterogeneity Channel

Alternatively, we assume that antagonism stems only from ethnic differences, not from cultural differences. This antagonism could come from animosity *vis-à-vis* other ethnic groups (racial hatred and prejudice) or from barriers that impede interactions between groups because of lack of communication or trust. The probability that a randomly chosen individual belongs to the ethnic group  $s(k)$  is  $w^{s(k)}$ . We postulate that in this society the level of antagonism of an individual of type  $k$  is:

$$v_k = 1 - w^{s(k)}. \quad (4)$$

Thus, under this assumption individual antagonism is just the probability that a person meets or is matched with another person from a different ethnic group. Social antagonism,  $v$ , is the average of this probability over all individuals. Appendix 2B shows that  $v$  in this case is just the common  $ELF$  index of ethnic fractionalization:

$$ELF = 1 - \sum_{s=1}^S (w^s)^2. \quad (5)$$

Thus, if we believe that antagonism is driven purely by ethnic animosity or barriers between ethnic groups, without any role for cultural differences, the conventional index of ethnolinguistic fractionalization,  $ELF$ ,

should matter for socioeconomic outcomes. Such is the case in research where antagonism can stem from ethnic differences *per se* rather than any underlying cultural differences.

### 3.3 The Overlap Channel

#### 3.3.1 Deriving a Measure of Overlap Between Ethnicity and Culture

As a third alternative, we assume that an individual's antagonism depends on how culturally different her group is from other ethnic groups. An individual does not experience any antagonism if people from other ethnic groups answer the questions in the WVS in the same way as people in her own ethnic group. Ethnicity only matters if ethnic groups differ in their cultural values. In this society cultural differences between the members of the same ethnic group do not increase the level of antagonism.

Take agent of type  $k$  and question  $i$ . Suppose first that type  $k$  only interacts with agents of her own ethnic group  $s(k)$ . Remember that we denote by  $\xi(k, i)$  the answer that agent of type  $k$  gives to question  $i$ . In this case, by definition the share of people within group  $s(k)$  with the same answer to question  $i$  as agent of type  $k$  is  $w_{i, \xi(k, i)}^{s(k)}$ . In other words, this is the probability that a randomly chosen agent from the ethnic group  $s(k)$  agrees with an agent of type  $k$  on question  $i$ .

Now assume that an agent of type  $k$  is equally likely to interact with anybody in society. In this case the probability an agent of type  $k$  agrees on question  $i$  with a randomly chosen individual in society is  $w_{i, \xi(k, i)}$ . If the probability  $w_{i, \xi(k, i)}$  is equal to  $w_{i, \xi(k, i)}^{s(k)}$ , an agent of type  $k$  does not see any difference between her own ethnic group and society overall.<sup>4</sup> However, if the proportion of people in society overall answering  $\xi(k, i)$  is lower than the corresponding proportion within her own ethnic group, the agent experiences antagonism. In particular we assume that antagonism for question  $i$  and an agent of type  $k$ ,  $v_{ik}$  depends on the (relative) difference between these two shares:

$$v_{ik} = \frac{w_{i, \xi(k, i)}^{s(k)} - w_{i, \xi(k, i)}}{w_{i, \xi(k, i)}} \quad (6)$$

Notice that if  $w_{i, \xi(k, i)}^{s(k)} < w_{i, \xi(k, i)}$  the individual experiences *negative antagonism*, i.e. she is happy to interact with people in society who give the same answer as she does in greater proportion than people in her own group. Suppose that I trust people, and that 50% of those in my ethnic group trust people. I feel antagonism toward the rest of society if the share of people in the rest of society that trust people is 20%, but I am quite happy if the share of people in the rest of society that trust people is 60%.

Averaging  $v_{ik}$  over all the  $q$  questions, giving the same weight to all of them, individual antagonism is:

$$v_k = \frac{1}{q} \sum_{i=1}^q \frac{w_{i, \xi(k, i)}^{s(k)} - w_{i, \xi(k, i)}}{w_{i, \xi(k, i)}} \quad (7)$$

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<sup>4</sup>Here we assume that the agent takes all other ethnic groups as being a unique group.

Notice that if all ethnic groups are identical, i.e., if for each question the distribution of answers is independent of the distribution of ethnic groups, we have that  $v_k = 0$ . We add up the individual levels of antagonism across  $k$ , weighing by the population shares of each type  $k$ , to obtain social antagonism:

$$v = \frac{\sum_{k=1}^K v_k n_k}{n} = \frac{\sum_{k=1}^K \frac{1}{q} \sum_{i=1}^q \frac{w_{i,\xi(k,i)}^{s(k)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} n_k}{n} \quad (8)$$

Again, if the distribution of answers within each group is the same as the distribution of answers in society overall,  $v = 0$ . If, on the contrary, culture and ethnicity overlap strongly, then  $v$  will be large.

To operationalize the  $v$  measure as a measure that can be calculated from data, Appendix 2C shows that it can be rewritten as:

$$\chi^2 = \frac{1}{q} \sum_{i=1}^q \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}} \quad (9)$$

Thus, if we believe that antagonism is driven purely by differences in culture across ethnic groups, we should observe a relationship between the  $\chi^2$  index of overlap and socioeconomic outcomes. Defining and using this index to measure the overlap between culture and ethnicity is an important contribution of this paper.

### 3.3.2 Heuristic Discussion of the $\chi^2$ Index

To complement the discussion above, it is useful to give a heuristic sense of the meaning of the  $\chi^2$  index.  $\chi^2$  is based on comparing the distribution of average answers for a given group to the distribution of answers in the overall population. If the distribution of answers in a given ethnic group is exactly the same as in the entire population, then knowing a person's ethnic identity conveys no information about his cultural attributes. If instead the distributions are distinct, then there is overlap between ethnic identity and cultural attributes.

To measure the overlap between ethnolinguistic diversity and preference diversity we can compare the distribution of answers across groups. This is what the  $\chi^2$  accomplishes.<sup>5</sup> Let  $n_{ij}^s$  be the number of individuals who belong to ethnic group  $s$  and give answer  $j$  to question  $i$ . We write  $n_i^s = \{n_{i1}^s, n_{i2}^s, \dots, n_{ir(i)}^s\}$ . Under independence, the expected number of individuals that belong to ethnic group  $s$  and give answer  $j$  to question  $i$  should be  $w_{ij} n^s$ , while the observed frequency is  $n_{ij}^s$ . The  $\chi^2$  index is based on the difference between the observed number of individuals of an ethnic group  $s$  that give answer  $j$  and the corresponding expected number of individuals under the assumption of independence between ethnicity and answers. So for each question  $i$ :

$$\chi_i^2 = \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{(w_{ij} n^s - n_{ij}^s)^2}{w_{ij} n^s} \quad (10)$$

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<sup>5</sup>For previous uses of this index, see Selway (2010) who examines the overlap between religion and ethnicity and Alesina and Zhuravskaya (2011) who analyze the overlap between geography and ethnicity as a way of measuring segregation.

The value of  $\chi_i^2$  depends on the group sample sizes  $n^s$ . Since different countries have different sample sizes and we want to compare different values of  $\chi_i^2$  across countries, it is better to work from group shares than from the number of individuals in each group. Thus, we can divide the  $\chi_i^2$  index by  $n$  to obtain a normalized index:

$$\phi_i^2 = \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{n^s (w_{ij} - w_{ij}^s)^2}{n w_{ij}} = \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}} \quad (11)$$

where  $w^s = n^s/n$ .

If we combine the  $\phi_i^2$  from the different questions, we obtain the Chi-squared index derived above,  $\chi^2$ .<sup>6</sup>

$$\chi^2 = \frac{1}{q} \sum_{i=1}^q \phi_i^2 = \frac{1}{q} \sum_{i=1}^q \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}} \quad (12)$$

Thus, the  $\chi^2$  index depends on the average difference between the observed shares  $w_{ij}^s$  and the expected shares  $w_{ij}$  that we would observe if the distribution of ethnicity and the distribution of culture were independent. This index has a minimum value of zero when there is no overlap. The maximum value depends on the number of ethnic groups,  $S$ , and the number of answers of each question,  $r(i)$ .<sup>7</sup>

### 3.3.3 An Alternative: The Fixation Index or $F_{ST}$

An alternative to the  $\chi^2$  index is  $F_{ST}$ , an index commonly used in population genetics to measure genetic differentiation or distance between groups (see Wright, 1949, and Nei, 1973).<sup>8</sup> In genetics,  $F_{ST}$  is a measure of relative heterogeneity: it is the ratio of between-group heterogeneity in genetic characteristics to total heterogeneity. Analogously, here we compute a cultural  $F_{ST}$  - the ratio of between-group cultural heterogeneity to total heterogeneity: when  $F_{ST}$  is 0, ethnic identity conveys no information about cultural attitudes, norms and values. In contrast, if  $F_{ST}$  is equal to 1, knowing someone's ethnolinguistic identity allows a perfect prediction of their cultural attributes.  $F_{ST}$  is therefore a measure of overlap between

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<sup>6</sup>Strictly speaking, the index we use is  $\phi^2$  not  $\chi^2$ . However, for simplicity we will use the term  $\chi^2$  in referring to the index based on population shares rather than number of individuals.

<sup>7</sup>An alternative to this index is Cramér's  $V$ , which is defined as  $V = \sqrt{\frac{\chi^2}{n \cdot t}}$ , where  $t$  is the smaller of the number of ethnic groups minus one and the number of answers minus one (Cramér, 1946). The index  $V$  is always between zero and one, and corrects for the different number of ethnic groups or answers. However, this index is hard to interpret as it does not derive from our model. Another alternative to  $\chi^2$  is the Mutual Information Index, originating from the concept of entropy in information theory. In our case this is a measure of the amount of information that ethnicity contains about values, i.e., the reduction in the uncertainty about how an individual answers the questions due to the knowledge of his ethnicity. It can be shown that  $\chi^2$  is up to an order of approximation equal to the Mutual Information Index (Cover and Thomas, 2006, p. 400).

<sup>8</sup>Another alternative is the more conventional index of cross-cuttingness used in the political science literature (Rae and Taylor, 1970, Selway, 2011). Appendix 3 provides a detailed discussion of this index and its relationship with  $\chi^2$  and  $F_{ST}$ .

cultural values and ethnolinguistic identity. An added advantage of  $F_{ST}$  is that it relates neatly to the already described measures of cultural diversity in terms of functional form - namely, it isolates the part of the variation in overall cultural diversity that occurs between groups.

**Definition of  $F_{ST}$ .** To define  $F_{ST}$ , we start from the probability that two randomly drawn individuals from ethnic group  $s$  give a different answer to question  $i$  (the within-group cultural diversity of group  $s$ ):

$$CF_i^s = 1 - \sum_{j=1}^{r(i)} (w_{ij}^s)^2 \quad (13)$$

The population-weighted average of the within-group cultural fractionalization for question  $i$  can be written as:

$$CF_i^W = \sum_{s=1}^S w^s CF_i^s = \sum_{s=1}^S w^s \left( 1 - \sum_{j=1}^{r(i)} (w_{ij}^s)^2 \right) \quad (14)$$

The share of the total population's cultural fractionalization that is not due to within-group fractionalization for each question  $i$  is then:

$$F_{ST_i} = \frac{CF_i - CF_i^W}{CF_i} \quad (15)$$

This is, for each question, the ratio of between-group cultural fractionalization divided by total fractionalization. Averaging over all questions gives us Wright's fixation index,  $F_{ST}$  (Wright, 1949, Nei, 1973):<sup>9</sup>

$$F_{ST} = \frac{1}{q} \sum_{i=1}^q F_{ST_i} \quad (16)$$

The  $F_{ST}$  index measures the share of between-group heterogeneity in total cultural heterogeneity. If all ethnic groups were as heterogeneous as the total population,  $F_{ST}$  would be equal to 0, and there would be no between-group heterogeneity. In that case, cultural cleavages and ethnolinguistic cleavages cross-cut. Knowing someone's ethnolinguistic identity would give no information about his preferences or culture. Instead if all ethnic groups were to be homogeneous ( $CF_i^s = 0$ ),  $F_{ST}$  would be equal to 1, and all heterogeneity would be between groups. In that case, cultural cleavages and ethnolinguistic cleavages would be reinforcing.

The advantage of  $F_{ST}$  is that it is well-known and captures intuitively a simple concept, as it represents how much one can predict answers to questions on norms, attitudes and preferences simply by knowing a respondent's ethnolinguistic identity. In the case of two ethnic groups and one question with only two possible answers this index ranges from 0 to 1. With two groups and more than two possible answers, or more generally when the number of answers exceeds the number of groups, there is always some within-group fractionalization and the index cannot reach 1.

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<sup>9</sup>There are of course many ways to average across questions. For instance, Cavalli-Sforza et al. (1994) separately average the numerator and the denominator of equation (15), and then take the ratio. We adopt the simpler method of averaging the question by question  $F_{ST_i}^i$ .

**Drawbacks of  $F_{ST}$ .** While the  $F_{ST}$  index is very commonly used in population genetics, it does have some drawbacks, as explained for example in Jost (2008), Meirmans and Hedrick (2011) and Jakobsson et al. (2013). The most important drawback, outlined in Jost (2008), relates to the properties of the decomposition of within and between fractionalization in a context where these measures are bounded above by 1. To illustrate this potential problem, let us denote between-group fractionalization by  $D_i$  for question  $i$ . Such between-group fractionalization is defined by subtracting within-group fractionalization  $CF_i^W$  from total fractionalization  $CF_i$ , i.e.,  $D_i \equiv CF_i - CF_i^W$ . Thus, this approach relies upon the additive decomposition of total fractionalization, but  $CF_i^W$  and  $D_i$  are not independent because we always have that  $D_i + CF_i^W \leq 1$ .<sup>10</sup> This constraint implies that  $D_i$  declines with within-group fractionalization  $CF_i^W$  regardless of the degree of cultural differentiation of ethnic groups.

A numerical example is useful to illustrate this drawback. Suppose that there is just one question and two ethnic groups of the same size. The question has four possible answers,  $a, b, c$  and  $d$ . The vector of answers for individuals from the first ethnic group is  $\{0.1, 0.9, 0, 0\}$ , i.e., 10% of them answer  $a$ , and 90% answer  $b$ . For the second ethnic group the vector of answers is  $\{0.9, 0.1, 0, 0\}$ . It is easy to check that in this society,  $F_{ST} = 0.64$ . Suppose a second society where those two vectors of answers are  $\{0.5, 0.5, 0, 0\}$  and  $\{0, 0, 0.5, 0.5\}$ . It is clear that in this society culture and ethnicity overlap more strongly than in the first society. However, in this case we have  $F_{ST} = 0.33$ .<sup>11</sup> The reason is that the second society displays a much higher degree of within-group heterogeneity than the first (a high  $CF^W$ ), which drives down  $F_{ST}$  in spite of the higher degree of overlap between culture and ethnicity.

Our first overlap measure,  $\chi^2$ , is not subject to this drawback, but as we will see empirically, it does not matter which index we use: while the  $\chi^2$  index comes out directly from our model of antagonism, empirically  $\chi^2$  and  $F_{ST}$  are almost perfectly correlated (in our sample the correlation is 97%, a result that also holds in simple simulations).<sup>12</sup>

**Uses of  $F_{ST}$  in the past literature.** We conclude this conceptual section by discussing a few papers that have used  $F_{ST}$  to measure between-group cultural heterogeneity, noting that their goals and methods are very different from ours. Bell et al. (2009) study inter-group competition and analyze whether there is more scope for selection based on cultural traits rather than on genetic traits. They use the WVS to compute a cultural  $F_{ST}$  measure between 150 pairs of neighboring countries. They show that this measure is an order of magnitude larger than an analogous measure of  $F_{ST}$  based on genetic data, suggesting a

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<sup>10</sup>Jost (2008, pp 4018) provides a complete explanation of this constraint and its implication: "Additive partitioning of heterozygosity does not produce pure within-and between-subpopulation components; it is an incomplete partitioning". In our case cultural fractionalization is a parallel concept to heterozygosity in population genetics.

<sup>11</sup>A similar numerical example appears in Wright (1978).

<sup>12</sup>In the case of a question with two possible answers  $F_{ST}$  and  $\chi^2$  coincide exactly (see Workman and Niswander, 1970). Details of our simulations are available upon request.



greater scope for cultural rather than genetic selection. In contrast to our approach, they measure cultural heterogeneity between countries rather than between groups within countries. In another paper, Ross et al. (2013) compute a measure of cultural  $F_{ST}$  based on between-group variation in folktales across different European ethnic groups. Again they are interested in comparing patterns of cultural  $F_{ST}$  to those of genetic  $F_{ST}$ , finding some similarities between the two. In contrast to our work, neither of these papers is interested in using cultural  $F_{ST}$  to measure the degree of overlap between ethnicity and culture, or in understanding how cultural  $F_{ST}$  relates to overall cultural heterogeneity and overall ethnolinguistic diversity. Instead, their focus is on the importance of cultural  $F_{ST}$ , relative to genetic  $F_{ST}$ . Finally, Spolaore and Wacziarg (2009, 2013) use a genetic  $F_{ST}$  as a measure of intergenerational divergence in a wide range of human traits transmitted culturally or biologically, in order to estimate the effects of barriers between populations on political and economic outcomes. In contrast to our approach, their  $F_{ST}$  is based on neutral genes, not cultural attitudes, and it measures distance between countries rather than between ethnic groups within countries.

## 4 Ethnic Heterogeneity and Cultural Diversity

In this section we empirically calculate the measures of heterogeneity derived in Section 3, and describe their properties and correlates. We show that, contrary to the assumption of much of the past literature, measures of ethnic diversity and cultural diversity are uncorrelated with each other. At the same time, we know from Section 2 that ethnic identity does help to predict cultural attitudes. To reconcile these seemingly contradictory results, we show that although between-group heterogeneity in cultural attitudes is small compared to total heterogeneity, the overlap between culture and ethnicity shows considerable variation across countries, variation that mirrors that found in Section 2. We explore the correlates of these new measures, uncovering interesting patterns concerning characteristics of countries with a high degree of cultural diversity as well as those with a relatively high degree of overlap between culture and ethnicity. Finally, we examine the robustness of our results to calculating the various measures for different question categories and types.

### 4.1 Cultural Diversity and Ethnolinguistic Fractionalization

Before describing the indices, some comments on the data are in order. First, we use the same baseline set of questions from the integrated WVS/EVS dataset as in Section 2. Second, not all WVS/EVS questions are asked in all countries. In our benchmark analysis we drop questions that are not asked in at least 50 countries, to ensure cross-country comparability of the indices.<sup>13</sup> Third, since we are interested in

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<sup>13</sup>The list of questions used to compute the heterogeneity measures, as well as their breakdown by question category and type, appears in Appendix Table A6.

relating cultural fractionalization to ethnolinguistic fractionalization, we focus exclusively on countries in the WVS/EVS for which we have ethnolinguistic information.<sup>14</sup> Taken together, this gives us information on 76 countries. Finally, there is no need here to convert questions that admit multiple unordered answers into series of binary questions to calculate our various indices.

Figure 1 shows a world map with the values of cultural heterogeneity in the 76 countries in our sample, and Panel A in Table 3 displays some simple summary statistics.<sup>15</sup> Darker-colored countries are more culturally diverse than lighter-colored ones. The most culturally diverse country is Zambia ( $CF = 0.602$ ), and the least culturally diverse country is Jordan ( $CF = 0.427$ ). Other interesting data points are France and India, with relatively high cultural heterogeneity, and Egypt, Indonesia and China, with relatively low numbers (a high degree of cultural conformism). The average value of  $CF$  across countries is 0.529.

The standard assumption in the literature is that cultural heterogeneity ( $CF$ ) should be highly correlated with ethnolinguistic heterogeneity ( $ELF$ ). Comparing the map of  $ELF$  in Figure 2 with the one of  $CF$  in Figure 1, it becomes immediately obvious that there are important differences. Countries such as Pakistan and Egypt have high levels of ethnolinguistic heterogeneity but low levels of cultural heterogeneity. At the other extreme are countries such as Germany and South Korea, which are ethnolinguistically fairly homogeneous but culturally diverse. The lack of a relationship between both types of heterogeneity is not limited to these few examples. The correlation between  $CF$  and  $ELF$ , displayed in Panel B of Table 3, is essentially zero,  $-0.030$  to be exact. Ethnolinguistic diversity is therefore not associated with cultural diversity.

If cultural heterogeneity is not correlated with ethnolinguistic heterogeneity, what might it be related to? Table 4 shows the correlation between cultural fractionalization and several variables. Five correlates stand out: countries with a higher proportion of Muslims exhibit a lower  $CF$  (the correlation is  $-0.597$ ); partly reflecting the previous correlation, countries located in North Africa and the Middle East show a similar negative correlation ( $-0.529$ ); more religiously diverse countries are also culturally more diverse (correlation of 0.314); more democratic countries (measured by the Polity 4 index) have higher cultural fractionalization (the correlation is 0.586); and countries with a high per capita income exhibit a greater  $CF$  (the correlation is 0.382). The other correlations are mostly small and statistically insignificant. Countries in North America, Europe and Central Asia, and countries farther away from the equator, have, on average, greater cultural fractionalization.

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<sup>14</sup>In principle we could of course use data on ethnolinguistic fractionalization from sources other than the WVS. We refrain from doing here so for two reasons. First, using the same data source makes the two indices, cultural and ethnolinguistic fractionalization, more easily comparable. Second, we later analyze the overlap between culture and ethnicity. For that we need to use ethnolinguistic identity and cultural values at the individual level, from the same source.

<sup>15</sup>Table A5 in the Appendix presents the underlying values country by country.

## 4.2 The Overlap Measures

Figure 3 shows a map of the  $\chi^2$  index for all countries in our database, and Table 3 Panel A reports summary statistics. Several observations are in order. First,  $\chi^2$  takes on low average values, indicating that the relative difference between the within-group heterogeneity and the overall heterogeneity is small (the mean value of  $\chi^2$  in our sample of 76 countries is 0.029). However, there is substantial variation in  $\chi^2$ , with Asia (especially South Asia and Southeast Asia) and Sub-Saharan Africa displaying high values, while Europe, Russia and Latin America display relatively low values. Notable data points with high  $\chi^2$  values include India, Thailand and Zambia. Countries with low values include Japan, Russia, Poland and Italy. These patterns closely mirror those uncovered in Section 2. The regions where ethnicity could significantly predict responses to survey questions about values, norms and preference are the same regions where the overlap measures take on higher values.<sup>16</sup> These patterns help to explain why cultural diversity and ethnic diversity are uncorrelated, even though ethnic identity helps predict a large share of answers to questions on cultural attitudes: most of the heterogeneity is within groups.

Second, the ranking of countries is very similar across both the  $\chi^2$  and  $F_{ST}$  measures (Table 3, Panel B). The correlation between the two is 0.981 (and so is the Spearman rank correlation). This gives us confidence, despite very different functional forms, that these two measures capture common features of the data regarding the overlap between ethnicity and culture. In particular, the drawback of  $F_{ST}$  identified above does not seem very relevant empirically, since  $\chi^2$  and  $F_{ST}$  are very highly correlated, and  $\chi^2$  is not subject to the drawback. As with  $\chi^2$ , the mean value of  $F_{ST}$  is low: the share of between-group variance in cultural attitudes relative to the overall variation is 0.012. A similar result is well-known in population genetics, where within-group variation in genetic characteristics swamps between-group variation (Cavalli-Sforza et al., 1994).

Third, although the overlap values are small, one could ask the question: “small relative to what?”. To compare these values to a benchmark, we recompute  $\chi^2$  and  $F_{ST}$ , but now take the groups to be the different countries, rather than the different ethnicities within countries. We find values for  $\chi^2$  and  $F_{ST}$  of 0.162 and 0.074. These numbers are about six times larger than the ones we found before. Focusing on the  $F_{ST}$  measure, 7.4 percent of the cultural heterogeneity in the world is between countries, whereas only 1.2 percent is between ethnic groups within countries.<sup>17</sup> Even the country with the highest between-ethnic

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<sup>16</sup>In fact, if you consider, for each country in our sample, the share of WVS/EVS questions for which ethnicity dummies are jointly significant predictors of individual responses, and correlate this share across countries with our measures of  $\chi^2$  and  $F_{ST}$ , you obtain correlations of 0.73 and 0.77, respectively. These high correlations exist despite the vastly different methodologies used in Section 2 and Section 4 to capture the degree of overlap between culture and ethnicity.

<sup>17</sup>The results are consistent with the average cultural  $F_{ST}$  across neighboring countries reported by Bell, Richerson and McElreath (2009). In fact, their reported  $F_{ST}$  (0.08) is remarkably close to ours (0.074). Our results are also in line with those in Fischer and Schwartz (2010), where the authors also use surveys of values to analyze the variability of answers both within and across nations using the Interclass Correlation Index, a measure closely related to  $F_{ST}$ .

group  $F_{ST}$ , India, has a lower value than the one observed between countries.

Fourth, reinforcing cleavages have a weak, positive correlation with cultural fractionalization. From Table 3 Panel B, the correlation between  $\chi^2$  and cultural fractionalization is 0.219 (this correlation is statistically significant at the 10% level). The corresponding number for  $F_{ST}$  is 0.179 (this correlation is not statistically significant at the 10% level). An example of this positive correlation is Malaysia, a country that is culturally heterogeneous ( $CF = 0.563$ ) and where knowing someone's identity is relatively informative about that individual's culture ( $\chi^2 = 0.092$ ). But other examples show the lack of a strong relationship. Germany is culturally heterogeneous ( $CF = 0.576$ ), but has a low  $\chi^2$  ( $\chi^2 = 0.009$ ).

Fifth, as expected, reinforcing cleavages are stronger in countries that are more ethnically diverse. The correlation between  $\chi^2$  and ethnolinguistic fractionalization is 0.620 (statistically significant at 1%); and the corresponding figure for  $F_{ST}$  is the same. This positive correlation can also be perceived by comparing Figure 3 with Figure 2. Ethnolinguistically diverse countries such as India, Philippines or Ethiopia also tend to have high levels of  $\chi^2$  or  $F_{ST}$ .

Finally, we investigate the correlates of our overlap measures. Table 4 displays the quantitative magnitudes of the simple correlations of a set of country characteristics and our two overlap measures. We find interesting descriptive patterns. Consistent with results in Section 2,  $\chi^2$  is higher in South Asia, East Asia and Sub-Saharan Africa, and it is lower in Latin America.  $\chi^2$  is also higher in countries with English legal origins, partly reflecting these spatial patterns. Per capita income is negatively associated with  $\chi^2$ , as is latitude, indicating that poorer countries tend to display more overlap between culture and ethnicity. Thus, economic development severs the link between ethnicity and cultural values. Among variables describing the prevalence of various religions, only the percentage of Catholics is significantly (and negatively) correlated with  $\chi^2$ , although it is hard to disentangle this correlation from the fact that  $\chi^2$  is lower in Latin America than elsewhere.<sup>18</sup>

### 4.3 Breakdown of the Measures by Question Category and Type

One concern with our exercise so far is that we are calculating our measures on a broad and diverse set of questions reflecting possibly different facets of culture. This was done to avoid arbitrarily picking questions from which to calculate our measures, instead letting the World Values Survey itself define the universe of values, preferences and norms under consideration. However, some questions may have to do with preferences over public policies, others with attitudes toward family, others with social trust, etc. The patterns identified above could be very different when looking at different categories of questions. For instance, the degree of correlation between  $CF$  and  $ELF$  might be higher for some question categories.

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<sup>18</sup>One might think that our overlap measures may be picking up segregation: countries with higher levels of segregation may have a greater overlap between culture and ethnicity. Using the data on ethnic, linguistic and religious segregation from Alesina and Zhuravskaya (2011), we indeed find positive correlations, but they are not statistically significant.

Similarly, the ratio of between-group heterogeneity to overall heterogeneity could vary. We are also concerned about the degree to which each question category yields measures that are correlated across categories: for instance, is the degree of overlap between ethnicity and answers to questions pertaining to identity highly correlated with overlap measures calculated for other question categories? If this is the case, we can be more certain that results based on the broadest set of questions is representative of a general pattern. If not, we can learn interesting facts about various dimensions of heterogeneity across question categories.

We therefore calculated our measures separately for each of the question categories identified by the WVS/EVS (these are labeled A through G), and across question types (binary, scale, and unordered response questions). The results are reported in Panels C through G of Table 3. In panel C we find, on average, a higher degree of cultural heterogeneity ( $CF$ ) for questions related to public policy such as relating to the environment and on politics and society (categories B and E), and lower heterogeneity for questions relating to perceptions of life (category A). Reflecting results in Section 2, we also find a higher degree of overlap between ethnicity and culture ( $\chi^2$ ) for questions relating to religion and morale (category F) and national identity (category G), relative to other categories. However,  $F_{ST}$  and  $\chi^2$  continue to take on small magnitudes; for instance  $F_{ST}$  is comprised in a tight band between 1% and 1.7% across categories. Despite these differences, there is a remarkable degree of consistency in the magnitudes of our heterogeneity measures across categories. Turning to correlations across categories, in Panel D we find that there is substantial heterogeneity in patterns of  $CF$  obtained from different question categories. The correlations are usually positive, except for question categories with few questions (such as category G) where the measures could be more volatile due to imperfect measurement. On the other hand, there is a much more substantial degree of correlation of  $\chi^2$  across categories, with correlations usually in the 0.7 – 0.9 range. To summarize,  $CF$  displays patterns that differ across categories,  $\chi^2$  less so.

We also examined the correlations between  $CF$ ,  $ELF$ ,  $F_{ST}$  and  $\chi^2$  category by category. The correlation between  $ELF$  and  $CF$ , which was zero when  $CF$  was calculated across all questions, differs across categories. The correlation remains low in magnitude, varying between  $-0.26$  (category F) and  $0.30$  (category A), yet we do find a weak positive correlation between ethnic and cultural heterogeneity measures for categories of questions reflecting perceptions of life and politics and society. All the other correlations are negative, contrary to the view that ethnic heterogeneity "captures" cultural heterogeneity. We also find that  $\chi^2$  and  $F_{ST}$  continue to be highly correlated with each other, category by category.

In addition to looking at different question categories, we also analyzed different question types - i.e. whether a question admits binary answers, answers on an ordered scale, or multiple unordered responses. Panel C reports some level differences in  $CF$  and  $\chi^2$  across these types. Cultural fractionalization is higher for unordered response questions and scale questions, compared to binary questions. This is not surprising: when given more possible answers, measured heterogeneity tends to increase. For the overlap measures, the  $F_{ST}$  are very similar across question types (on the order of 1%), whereas the  $\chi^2$  measures

are higher for scale and unordered response questions. Overall, focusing on binary questions has several advantages. First, when questions have only two answers,  $F_{ST}$  and  $\chi^2$  are identical.<sup>19</sup> Second, with scaled questions one could argue that the distance between possible answers should be taken into account when calculating heterogeneity metrics - no such concern exists for questions that have only two possible answers. Third, there is some advantage in focusing exclusively on a subset of questions with the same number of possible answers, since this avoids heterogeneity varying simply because of differences in the number of answers. Thankfully, our results are robust to focusing only on binary questions. For instance, Panels F and G of Table 3 show that the correlation between  $ELF$  and  $CF$  is close to zero no matter the question type. Moreover, the correlation between  $\chi^2$  and  $F_{ST}$  is above 0.98 for the scale and unordered response questions, so the high correlation between our two overlap measures is not driven simply by the inclusion of binary questions, for which they are identical.

Since we are interested in the general relation between culture and ethnicity, it is sensible not to cherry-pick questions. However, many papers on the cultural determinants of economic outcomes focus on a small set of questions that are deemed meaningful *a priori*, rather than taking a comprehensive approach by focusing on the broad set of questions, as we do. To assess whether our main findings would differ if we were to exclusively focus on a limited number of questions that have commonly been used in the literature, we take nine questions relating to family values, child qualities, trust and beliefs.<sup>20</sup> As can be seen in Panel C and Panel H of Table 3, this does not change any of the main results. In fact, it reinforces the finding that ethnolinguistic diversity is not a good proxy for cultural fractionalization: the correlation between  $ELF$  and  $CF$  is now negative, standing at  $-0.222$ . In addition, the correlation between  $CF$ , when using the limited set of questions, and  $CF$ , when using all questions, is positive and statistically significant at the 1% level. This suggests that our results are not specific to our comprehensive approach.

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<sup>19</sup>When questions have more than two possible answers, the equivalence of  $F_{ST}$  and  $\chi^2$  breaks down (although empirically the two continue to be extremely highly correlated). In addition, when there are more than two possible answers,  $\chi^2$  is no longer bounded by 1. Normalizing  $\chi^2$  so it does not exceed 1 would require dividing it by the minimum of the number of answers and the number of ethnic groups. Since our theory provides no foundation for this normalization, we refrain from it.

<sup>20</sup>To be precise, the nine questions are: 1) Questions on family ties, used in Alesina and Giuliano (2013): a001 (family important in life), a025 (respect and love for parents), a026 (parents' responsibilities to their children). 2) Questions on important child qualities, used in Tabellini (2010): a030, a035, a038, a042 (hard work, tolerance and respect for other people, thrift, obedience). 3) Generalized trust, used in Algan and Cahuc (2010), among many others: a165 (most people can be trusted). 4) Belief in hell, used in Barro and McCleary (2003): f035 (belief in hell).

## 5 Culture, Ethnicity and Civil Conflict

In this section we examine the relationship between our various measures of diversity and civil conflict, to illustrate the possible uses of our measures. There remains a debate on whether ethnolinguistic diversity in fact affects civil conflict. Results seem to depend on which measures of diversity are used: using fractionalization, Fearon and Laitin (2003) find little evidence of an effect on conflict onset. Collier and Hoeffler (2004), using a measure of social fractionalization that combines ethnic and religious dimensions, find evidence that greater diversity reduces the probability of a civil war. In contrast, using a measure of ethnic polarization, Montalvo and Reynal-Querol (2005) find that it has a significantly positive effect on civil war incidence. Esteban, Mayoral and Ray (2012), using different measures of diversity jointly, found that they were significantly associated with civil conflict. Of particular note, a recent paper by Huber and Mayoral (2013) examines the role of income inequality between and within ethnic groups as a determinant of civil conflict, finding that within-group inequality affects conflict positively. Our paper shares with theirs a decomposition of overall differences between and within ethnic groups, and also uses survey data. However, the application is very different as their paper is interested in within- and between-ethnic group income inequality, as opposed to cultural differences.<sup>21</sup>

How might ethnolinguistic diversity affect civil conflict in our framework? First, ethnolinguistically heterogeneous societies may have more diverse preferences and values, leading to increased overall antagonism in society. Second, ethnolinguistic fractionalization may matter *per se* because of direct animosity, hatred or barriers between different ethnolinguistic groups. Third, civil conflict may arise more frequently when ethnic divisions and cultural differences reinforce each other. To evaluate which of these channels operates most strongly, we introduce measures of these three dimensions of heterogeneity simultaneously in regressions explaining civil conflict. If the first explanation is valid, then cultural fractionalization ( $CF$ ) should affect civil conflict. If the second explanation is valid, then ethnolinguistic fractionalization ( $ELF$ ) should matter. Finally, if the third explanation is valid, then the  $\chi^2$  (or  $F_{ST}$ ) should matter.

### 5.1 Data and Specification

In our application, the aforementioned contributions to the study of civil conflict constitute the methodological starting point. Following the literature, we define a dummy variable  $C_{ct}$  equal to 1 if country  $c$  experiences a civil war in year  $t$  (to explore conflict incidence). We also define a separate dummy  $C_{ct}^o$  equal to 1 if in a given year a country experiences the onset of a new civil war (to study onset only). We relate these outcomes to our three sets of measures of diversity,  $CF$ ,  $ELF$  and  $\chi^2$  (or  $F_{ST}$ ):

$$C_{ct} = \beta_0 + \beta_1 CF_c + \beta_2 ELF_c + \beta_3 \chi_c^2 + \beta_4' \mathbf{Z}_{ct} + \varepsilon_{ct} \quad (17)$$

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<sup>21</sup>The functional forms are also different as they use a decomposition of the Gini index, not fractionalization.

where  $\mathbf{Z}_{ct}$  is a vector of control variables commonly used in the literature. In particular, we use an expansive set of controls very close to the ones used in Fearon and Laitin (2003), Esteban, Mayoral and Ray (2012) and Desmet, Ortuño-Ortín and Wacziarg (2012). These include a variety of geographic variables, lagged per capita GDP, as well as lagged conflict, legal origins, and dummy variables for major geographic regions. These controls include most of the variables that were shown to be predictors of  $CF$ ,  $\chi^2$  and  $F_{ST}$ . Hence, any effect of, for example,  $\chi^2$  on the probability of conflict is not proxying for the effects of these correlates.

The data on civil conflict and the control variables come from Fearon and Laitin (2003). In this database, a country is coded as being in a civil conflict when the conflict overall killed over 1,000 people, with an average of at least 100 deaths a year and at least 100 deaths on both sides of the conflict. As an alternative source of data we use a database from the Peace Research Institute Oslo (PRIO), which has been used in recent contributions (for instance, Esteban, Mayoral and Ray, 2012, and Huber and Mayoral, 2013). There, a civil war is defined as "a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths." We also use a more stringent threshold of 1,000 battle related deaths. When looking at conflict incidence, in our sample of countries, the correlation between PRIO25 and the Fearon-Laitin variable is 0.69, while the correlation between PRIO1000 and the Fearon-Laitin variable is 0.47 (the correlation between PRIO25 and PRIO1000 is 0.51).

## 5.2 Results

The results are reported in Tables 5 through 8. In Table 5 we examine the determinants of civil conflict incidence, introducing cultural fractionalization, ethnolinguistic fractionalization and  $\chi^2$ , first individually and then jointly (columns 1 through 4). We find that, when introduced individually,  $\chi^2$  is a significant predictor of conflict incidence (at the 1% level), and this continues to be the case when all three measures are introduced jointly. In fact in that case the logit marginal effect of  $\chi^2$  becomes twice as large (column 4): it is equal to 0.870. That implies that a one standard deviation change in  $\chi^2$  (equal to 0.025) raises the probability of conflict by 2.175 percentage points. The baseline probability of being in a civil conflict is 14.173% in the sample for this regression, so the standardized effect of  $\chi^2$  amounts to about 15% of the probability of conflict. Our interpretation of this result is that ethnic divisions matter for civil conflict, but only when they overlap with cultural cleavages.

Another notable result from Table 5 is that cultural fractionalization ( $CF$ ) tends to reduce the incidence of civil wars (even when controlling for several variables previously found to be correlates of  $CF$ , such as democracy, per capita income and region dummies). In column 4, the marginal effect of  $CF$  is  $-0.391$ . The standard deviation of  $CF$  is 0.037, which means that a one standard deviation increase in  $CF$  is associated with a 10% reduction in the probability of conflict. One interpretation of



this finding is that cultural diversity is the sign of a society that is tolerant of a multiplicity of values and preferences, and this tolerance reduces the incidence of civil conflict. A related interpretation is that cultural diversity is the sign of a society that embraces modernity more generally, and modernity is not fully captured by the included controls that correlate with  $CF$ . Ethnolinguistic fractionalization is insignificant, and has an unstable sign across specifications, although it tends to bear a negative sign when all measures of heterogeneity are entered together (columns 4-6). In columns (5) and (6) of Table 5 we add legal origins and GDP growth and its lag to the baseline specification, with little effect on the estimates on  $\chi^2$  and  $CF$ . None of these results change much when using probit rather than logit.<sup>22</sup>

Table 6 breaks down these results by question category and type. In Panel A we see that the baseline results are quite robust across categories:  $CF$  enters negatively in 6 of the 7 categories, although the overall results appear to have been driven mostly by questions on perceptions of life and religion and morale since  $CF$  based on other categories is not statistically significant. Results for  $\chi^2$  are stronger, with this variable entering with a significantly positive sign for 5 of the 7 categories (for one of the remaining categories, questions on the environment,  $\chi^2$  is based on only 4 questions, and may therefore be a noisy measure). Overall these results suggest considerable robustness in the pattern of coefficients across question category, and also allow us to determine what categories of questions are important to draw the overall inferences. In Panel B we also see robustness with respect to question type. As expected the results are strongest for binary and scale questions, but  $\chi^2$  enters positively and significantly in all three cases.

### 5.3 Endogeneity of $CF$ and $\chi^2$

As in most of the literature on civil conflict, we have so far treated our heterogeneity measures as exogenous to conflict. As long as we limit attention to ethnolinguistic fractionalization, and include a suitably expansive set of controls, this can be justified as ethnolinguistic fractionalization is very time-persistent and is unlikely to change very much as a result of conflict. The same cannot necessarily be said of cultural heterogeneity and the overlap of culture and ethnicity. The experience of civil wars can lead people to change their values and preferences, and respond differently to questions from the World Values Survey. This in turn can lead measures of cultural diversity such as  $CF$  to change as a result of conflict (though it is not clear *a priori* in what direction, hence the sign of the endogeneity bias is

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<sup>22</sup>Moreover, Table A4 looks at the determinants of civil war *onset*. The results are very much in line with those for incidence. Of course, conflict onset is a much rarer event than conflict incidence, with the percentage of country-year observations featuring the onset of a civil war being equal to 1.780%. Given this fact, the marginal effect of  $\chi^2$  on conflict onset is found to be 0.175, implying that a one standard deviation increase in  $\chi^2$  reduces the probability of civil war onset by 25%, a sizeable effect. On the other hand, while it is still negative, the effect of cultural diversity on conflict onset is generally not significant at the 5% level. Finally, the effect of ethnolinguistic fractionalization continues to be insignificant, in line with results on civil war onset in Fearon and Laitin (2003).

not clear). Similarly, civil war, especially when there is an ethnic component, can change the salience of ethnic identity, leading ethnic groups to adopt values and attitudes that differ more than they did prior to the war, or on the contrary can lead the victor to impose their values and preferences on the vanquished, therefore affecting the degree of overlap between ethnicity and culture (again in an ambiguous direction).<sup>23</sup> This could be a problem particularly in our setting as the questions from the World Values Survey used to characterize preferences and values are from survey waves from 1981 to 2008, while our main civil war dataset (from Fearon and Laitin, 2003) covers 1945 to 1999. We already partly address this problem in the regressions shown so far as we adopt a dynamic specification for the incidence of civil wars, i.e., we include a term for lagged civil war on the right-hand side of the specification, in keeping with the usual practice in the literature (see in particular Fearon and Laitin, 2003, p. 84 and Esteban, Mayoral and Ray, 2012, p. 1318). Since civil war incidence is highly autocorrelated, this purges  $CF$  and  $\chi^2$  of much of their variation attributable to past wars.

To deal with any remaining endogeneity, we adopt a three-pronged approach. First, we focus on questions that display a high degree of persistence in cultural fractionalization across waves, and are thus less likely than other questions to respond endogenously to external events such as civil wars. For each question  $i$ , country  $c$  and WVS wave  $w$ , consider cultural fractionalization  $CF_{icw}$ . For each question  $i$  and each country  $c$  we compute the coefficient of variation of  $CF_{icw}$  across waves  $w$ , and average this coefficient of variation across countries for each question  $i$ . This gives a measure of persistence for each question  $i$ . We then remove from consideration every question with a coefficient of variation in excess of 0.1, which leaves us with about 60% of the questions used previously - the ones with the most time persistent value of  $CF_{icw}$ . We reran our baseline specification (the one in column 4 of Table 5) with  $CF$  and  $\chi^2$  computed from this restricted set of questions. The results are presented in column (1) of Table 7. The signs of our main effects remain the same, namely  $CF$  affects conflict negatively (albeit the effect is no longer statistically significant at the 5% level) and  $\chi^2$  affects conflict incidence positively and remains significant at the 5% level. The magnitude of the effect falls slightly in standardized terms, with a one standard deviation increase in  $\chi^2$  associated with a 10% increase in the probability of conflict.

Our second approach is to limit our sample to the post-1970 period. The idea is that if endogeneity were a strong concern, we should find different results in this subsample compared to the full sample. The argument could take various forms. On the one hand, if we limit attention to wars that occur closer to the date when we observe values, there is perhaps greater potential for recent wars to affect values, and then in turn cultural diversity and  $\chi^2$ . On the other hand, if the lag with which war may affect values is substantial, by focusing on a recent sample, values may not yet have had time to change, and therefore  $CF$  and  $\chi^2$  may not yet have changed in response to civil war. In either case, if reverse causality were a concern we would observe different estimates of the effect of  $CF$  and  $\chi^2$  in the post-1970 sample and

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<sup>23</sup>This is a prevalent theme in constructivist approaches to ethnicity.

in the whole sample. Column (3) of Table 7 presents the results, which are almost unchanged compared to the baseline regression of Column 4 of Table 5. Indeed, the standardized effect of  $\chi^2$  stands equal to the one previously calculated, at 15%. The standardized effect of  $CF$  on the probability of civil war also remains equal to  $-10\%$ . These results have the added advantage of showing the stability and robustness of our estimated effects to the sample period under consideration.

Our third approach is a variation on the previous one. Here, we limit attention to respondents born before 1950 *and* to the post-1970 sample. The effects could once again go in a variety of directions, but the argument is again that the estimates would be *different* if endogeneity were a big concern. On the one hand, if respondents' values are formed in early adulthood and change little after that, since every respondent in the sample would be at least 20 years old in the event of a civil war, their cultural values may respond less than younger individuals to the event of a war. On the other hand, if one's view was that these individuals were the most likely to be affected by a civil war because they were most likely to be combatants or to be affected by the war in adult age, their values may be most likely to be affected by the war. Either way, war would affect values, and therefore potentially  $CF$  and  $\chi^2$  also (although, again, in unknown directions). Column (4) of Table 7 presents the results, but once again we find very little evidence of a different effect of cultural diversity and  $\chi^2$  on the probability of war: the standardized effects of these two variables are, respectively,  $-9\%$  and  $13\%$ , close to those in column (4) of Table 5.

While we do not want to place too much weight on any one of these tests in isolation, taken together they do suggest that our main results are remarkably stable when looking only at the post-1970 sample, when looking only at respondents born before 1950, and when including only questions for which question-by-question cultural diversity  $CF_i$  is most stable across survey waves. Under reverse causality, if war had a strong causal effect on  $CF$  or  $\chi^2$ , we would have expected estimates under each of these modifications to differ from the baseline. They do not differ materially.

## 5.4 Robustness Checks

In Table 8, we carry out a series of additional robustness tests. First, we estimate our baseline regression using  $F_{ST}$  rather than  $\chi^2$  as the measure of overlap between culture and ethnicity (column 1). The results do not change in any substantive way, as expected because  $F_{ST}$  is so highly correlated with  $\chi^2$ . The standardized effect of  $F_{ST}$  is  $16\%$  while the effect of  $CF$  is  $-10\%$ . Second, we change our data source for civil wars to data from PRIO. With the 25 battle deaths threshold (column 2), we find a standardized effects of  $\chi^2$  and  $CF$  that are much larger than in our baseline (respectively  $27\%$  and  $-20\%$ ). With the 1,000 battle deaths threshold (not reported here) the corresponding effects stand at  $14\%$  and  $-10\%$ , respectively, very similar to the baseline. We conclude that the signs and significance of the estimated effects are not sensitive to changes in the definition of a civil war.

In an additional robustness check, we focus on different sets of questions. We start by expanding

the number of questions included to calculate our measures of cultural diversity and overlap to those that were asked in at least 30 countries, rather than the more stringent criterion of 50 countries used previously. This expands the set of questions used in our calculations, at the cost of greater heterogeneity across countries in the set of questions. The results appear in column (3) of Table 8. Reassuringly, nothing changes much: the standardized effects of  $\chi^2$  and  $CF$  are largely unchanged at 17% and  $-9\%$ , respectively.<sup>24</sup> We next go the opposite way, and focus on a small set of nine questions often used in the literature on culture and economics (the questions are those listed in footnote 20). Again, the results, reported in column (4), are unchanged. This greatly increases our confidence that our results do not depend on the set of questions used to calculate cultural diversity and overlap.

As a last robustness check, we add linguistic polarization in our baseline regression.<sup>25</sup> Montalvo and Reynal-Querol (2005) have argued that polarization is an important predictor of civil conflict. As can be seen in column (5), polarization is not statistically significant when all other measures of heterogeneity are also included. When comparing the coefficients on our three variables of interest to those of column (4) in Table 5, they are essentially identical. Taken together, the different robustness checks suggest that our main findings continue to stand: neither ethnolinguistic heterogeneity nor cultural heterogeneity increase the probability of conflict, but when culture and ethnicity reinforce each other, then conflict becomes more likely.

## 6 Conclusion

In this paper we studied the complex relationship between ethnicity and culture, defined as a vector of answers to a broad set of questions about norms, values and preferences. We uncovered novel results. First, ethnicity does serve to significantly predict cultural attitudes, to an extent that varies across geographic regions. Second, the share of variation in culture that is explained by ethnicity is very small. As a result, cultural diversity, defined as the average probability that two randomly chosen individuals respond differently to a question from the World Values Survey, is not correlated with ethnic diversity. Thus, ethnic fractionalization cannot readily be taken as a proxy for diversity in values, attitudes and preferences. Third, we derived and calculated several new indices measuring the extent of overlap between culture and ethnicity, stemming from a simple model of social antagonism. These measures display interesting geographic variation, with the degree of overlap being greatest in Sub-Saharan Africa and Asia, and smallest in Latin America. Fourth, as an application we used our new measures of cultural diversity and overlap to study the determinants of civil conflict, finding that ethnic fractionalization has no predictive power for civil conflict, but that cultural diversity has, if anything, a pacifying effect.

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<sup>24</sup>Reassuringly, the correlation in our sample of 76 countries between  $CF$  using the 50-countries threshold and  $CF$  using the 30-countries threshold is very high - at 0.95. Similarly, the two versions of  $\chi^2$  bear a 0.99 correlation with each other.

<sup>25</sup>The linguistic polarization measure comes from Desmet, Ortuño-Ortín and Wacziarg (2012).

Our new measures of overlap between culture and ethnicity,  $\chi^2$  and  $F_{ST}$ , have a positive effect on the probability of civil conflict onset and incidence, indicating that ethnic divisions matter for conflict when they are associated with cultural differences across ethnic groups. Hence, we have identified the degree of overlap between culture and ethnicity as a new and robust determinant of civil conflict.

Our results parallel a famous debate in population genetics on within-group versus between-group genetic differentiation, going back to Lewontin (1972). Lewontin pointed out that between-race genetic variation was a very small part of overall variation, and that within-group diversity accounted for a much larger share of overall genetic variation. This led Lewontin to question the validity of the very concept of race. In a series of rejoinders, Edwards (2003), Dawkins (2005) and others argued that while between-group variation was small, it could still be a relevant part of the variation: humans share up to 99% of their DNA with some animals, yet the 1% that differs matters a lot to set the two groups apart. Lewontin's point on genetics mirrors our finding that between-ethnic group cultural variation is a small part of overall cultural variation, and that most of this variation occurs within-groups. Edwards' and Dawkins' argument also finds an echo in our work, since we argue that between-group variation, while a small share of the overall variation, matters greatly for civil conflict.

The question we posed here is also related to a continuing debate in the social sciences as to whether ethnic, linguistic and religious identities are "constructed" or reflect "primordial" differences between different groups of humans. Each of these traditions reflects a variety of viewpoints on the persistence of ethnic and cultural identities and a wide range of theories on the factors that gave rise to both ethnic and cultural differentiation. However, drawing a stark distinction between these two broad categories of views helps bring into focus a fundamental difference separating them: the primordialist view holds that ethnolinguistic divisions reflect deep differences between humans, the result of historical separation which allowed for cultural drift over centuries and millennia, so that the resulting ethnic divisions are associated with stark and persistent differences in culture, norms, values and preferences.<sup>26</sup> In contrast, constructivists view ethnic identities as the endogenous result of shifting patterns of power, some very recent, so that the association between ethnic identity and cultural differences, if there is one at all, would be context-dependent, malleable, and fleeting.

Our paper provides evidence consistent with a synthesis of both views: ethnicity is indeed associated with fundamental differences in values, attitudes and preferences, in line with a primordialist viewpoint. Moreover, to the extent that ethnic divisions matter for conflict, they only do so when they overlap with cultural cleavages, once again a result with primordialist connotations. However, there are many other sources of variation in culture, not associated with ethnic identity: the magnitude of our  $\chi^2$  and  $F_{ST}$  indices tends to be small, indicating that the extent to which ethnicity is informative for culture

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<sup>26</sup>See the voluminous and growing literature on ethnic heterogeneity in economics, among which the recent paper by Michalopoulos (2012) constitutes an excellent illustration of the primordialist orientation of the economics approach to ethnicity.

is limited, a result that is more in line with the constructivist view. Moreover, some regions like Latin America feature a weak degree of association between culture and ethnicity, while others like Sub-Saharan Africa and Asia feature more overlap. The degree to which ethnic classifications reflect deep differences in cultural attitudes varies across regions, so the extent to which ethnic identities are primordially given or constructed varies across locations. Future work should continue to study the complex relationship between ethnicity and culture, a subject that had so far remained missing from the economics literature on ethnic heterogeneity.

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**Table 1 – Joint Significance of Ethnolinguistic Dummies in Questions from the World Values / European Values Integrated Surveys, by Region**

	# of regressions	Share of regressions w/ jointly significant ethnic dummies	R <sup>2</sup> without ethnic dummies	R <sup>2</sup> with ethnic dummies	ΔR <sup>2</sup>
<b>Whole Sample</b>	<b>21,469</b>	<b>0.430</b>	<b>2.688</b>	<b>4.074</b>	<b>1.386</b>
<b>Africa</b>	<b>3,623</b>	<b>0.548</b>	<b>2.468</b>	<b>4.064</b>	<b>1.597</b>
<i>Of which: Sub-Saharan Africa</i>	2,724	0.616	2.369	4.274	1.905
<i>Of which: North Africa</i>	899	0.344	2.766	3.430	0.663
<b>Europe</b>	<b>7,769</b>	<b>0.373</b>	<b>3.045</b>	<b>4.144</b>	<b>1.099</b>
<i>Of which: Western and Southern Europe</i>	2,369	0.313	3.567	4.399	0.832
<i>Of which: Eastern and Central Europe</i>	5,400	0.399	2.816	4.032	1.215
<b>Asia</b>	<b>5,656</b>	<b>0.571</b>	<b>2.360</b>	<b>4.519</b>	<b>2.159</b>
<i>Of which: East and Southeast Asia</i>	2,090	0.626	2.161	4.614	2.452
<i>Of which: South Asia</i>	852	0.667	2.899	6.363	3.463
<i>Of which: Southwestern and Central Asia</i>	1,511	0.479	2.223	3.391	1.168
<i>Of which: Middle East</i>	1,203	0.525	2.494	4.464	1.971
<b>America</b>	<b>3,749</b>	<b>0.235</b>	<b>2.480</b>	<b>3.188</b>	<b>0.708</b>
<i>Of which: North America</i>	741	0.513	3.157	4.075	0.918
<i>Of which: Latin America and Caribbean</i>	3,008	0.166	2.313	2.970	0.656
<b>Oceania</b>	<b>672</b>	<b>0.342</b>	<b>3.669</b>	<b>4.509</b>	<b>0.840</b>

**Note:** North America is defined here as Canada and the US. Mexico is included with Latin America and the Caribbean. R<sup>2</sup> is expressed in % terms.

**Table 2 - Joint Significance of Ethnolinguistic Dummies in Questions from the World Values / European Values Integrated Surveys, by Question Category and Question Type**

	# of regressions	Share of regressions with jointly significant ethnic dummies	R <sup>2</sup> without ethnic dummies	R <sup>2</sup> with ethnic dummies	ΔR <sup>2</sup>
<b>Breakdown by Question Category</b>					
A: Perceptions of Life	4,382	0.425	3.270	4.618	1.347
B: Environment	971	0.427	2.185	3.640	1.454
C: Work	2,409	0.398	2.404	3.546	1.143
D: Family	1,319	0.445	3.240	4.599	1.359
E: Politics and Society	9,046	0.409	2.407	3.717	1.310
F: Religion and Morals	2,316	0.516	3.268	5.043	1.775
G: National Identity	1,026	0.495	1.801	3.682	1.881
<b>Breakdown by Question Type</b>					
Binary questions	4,551	0.426	2.854	4.248	1.394
Binary from unordered response questions	7,029	0.362	1.616	2.707	1.091
Scale questions	9,889	0.479	3.373	4.965	1.592

**Note:** This result does not change if you break it down by continent: there is little difference in shares of questions with significant ethnolinguistic dummies when the breakdown by category is done continent by continent. R<sup>2</sup> is expressed in % terms.

**Table 3 – Summary Statistics for the Main Indices of Ethnic Heterogeneity, Cultural Diversity, F<sub>ST</sub> and  $\chi^2$ .**

**Panel A: Summary Statistics**

	Mean	Standard Deviation	Minimum	Maximum
<b>Cultural Fractionalization</b>	0.5291	0.0366	0.4273	0.6024
<b>ELF</b>	0.3896	0.2584	0.0000	0.8517
<b>F<sub>ST</sub></b>	0.0116	0.0110	0.0000	0.0588
<b><math>\chi^2</math></b>	0.0291	0.0254	0.0000	0.1281

(Summary statistics based on 76 observations)

**Panel B: Correlations**

	Cultural Fractionalization	ELF	F <sub>ST</sub>	$\chi^2$
<b>Cultural Fractionalization</b>	1			
<b>ELF</b>	-0.0303	1		
<b>F<sub>ST</sub></b>	0.1787	0.6198**	1	
<b><math>\chi^2</math></b>	0.2191	0.6203**	0.9813**	1

(\*\* Significant at the 1% level; correlations based on 76 observations)

**Panel C: Means of CF, F<sub>ST</sub> and  $\chi^2$  by Question Category and Type**

	Cultural Fractionalization	F <sub>ST</sub>	$\chi^2$
<b>Breakdown by Question Category</b>			
SECTION A: PERCEPTIONS OF LIFE	0.4137	0.0117	0.0196
SECTION B: ENVIRONMENT	0.5955	0.0106	0.0261
SECTION C: WORK	0.5493	0.0111	0.0264
SECTION D: FAMILY	0.5156	0.012	0.0275
SECTION E: POLITICS AND SOCIETY	0.6122	0.0106	0.0311
SECTION F: RELIGION AND MORALE	0.5254	0.0143	0.0434
SECTION G: NATIONAL IDENTITY	0.5777	0.0172	0.0468
<b>Breakdown by Question Type</b>			
BINARY	0.3548	0.0125	0.0125
UNORDERED RESPONSE QUESTIONS	0.5740	0.0120	0.0262
SCALE	0.5970	0.0108	0.0368
<b>Restricted Set of 9 Questions Used in Literature</b>			
9 QUESTIONS FROM LITERATURE	0.3454	0.0109	0.0125

**Panel D: Correlations among Cultural Diversity and  $\chi^2$  by Question Category**

	<b>CF Overall</b>	<b>CF A</b>	<b>CF B</b>	<b>CF C</b>	<b>CF D</b>	<b>CF E</b>	<b>CF F</b>
<b>CF Category A</b>	0.4320	1					
<b>CF Category B</b>	0.3858	0.1400	1				
<b>CF Category C</b>	0.7321	0.1847	-0.0397	1			
<b>CF Category D</b>	0.5957	0.1219	0.3717	0.2825	1		
<b>CF Category E</b>	0.7568	0.3015	0.2767	0.5652	0.4767	1	
<b>CF Category F</b>	0.8559	0.0771	0.2535	0.6178	0.4917	0.4817	1
<b>CF Category G</b>	-0.0091	-0.1324	0.2337	-0.3535	0.4105	-0.1039	0.0740

(Based on 76 observations)

	<b><math>\chi^2</math> Overall</b>	<b><math>\chi^2</math> A</b>	<b><math>\chi^2</math> B</b>	<b><math>\chi^2</math> C</b>	<b><math>\chi^2</math> D</b>	<b><math>\chi^2</math> E</b>	<b><math>\chi^2</math> F</b>
<b><math>\chi^2</math> Category A</b>	0.9671	1					
<b><math>\chi^2</math> Category B</b>	0.7654	0.7163	1				
<b><math>\chi^2</math> Category C</b>	0.7978	0.7376	0.9228	1			
<b><math>\chi^2</math> Category D</b>	0.9206	0.9152	0.6849	0.6605	1		
<b><math>\chi^2</math> Category E</b>	0.9775	0.9183	0.7764	0.8075	0.8943	1	
<b><math>\chi^2</math> Category F</b>	0.9413	0.9031	0.6434	0.6812	0.8251	0.8755	1
<b><math>\chi^2</math> Category G</b>	0.6317	0.5552	0.4493	0.4195	0.6637	0.6336	0.5535

(Based on 76 observations)

Question categories are defined as follows: A: Perceptions of Life (42 questions); B: Environment (4 questions); C: Work (25 questions); D: Family (12 questions); E: Politics and Society (59 questions); F: Religion and Morale (30 questions); G: National Identity (3 questions).

**Panel E: Correlations among Cultural Diversity and  $\chi^2$  by Question Type**

	<b>CF All</b>	<b>CF Binary</b>	<b>CF Scale</b>
<b>CF Binary</b>	0.5988	1	
<b>CF Scale</b>	0.9184	0.5588	1
<b>CF Unordered</b>	0.6032	0.4672	0.507

	<b><math>\chi^2</math> All</b>	<b><math>\chi^2</math> Binary</b>	<b><math>\chi^2</math> Scale</b>
<b><math>\chi^2</math> Binary</b>	0.9442	1	
<b><math>\chi^2</math> Scale</b>	0.9958	0.9304	1
<b><math>\chi^2</math> Unordered</b>	0.9535	0.9299	0.9372

Binary: 38 questions; unordered response questions: 26 questions; scale: 100 questions

**Panel F: Correlations between Diversity Measures by Question Category**

	Correlations with		
	Cultural Fractionalization	ELF	F <sub>ST</sub>
<b>Question Category A</b>			
<b>ELF</b>	0.2958	1	
<b>F<sub>ST</sub></b>	0.4646	0.5643	1
<b>χ<sup>2</sup></b>	0.4570	0.5769	0.9859
<b>Question Category B</b>			
<b>ELF</b>	-0.1176	1	
<b>F<sub>ST</sub></b>	-0.2786	0.5561	1
<b>χ<sup>2</sup></b>	-0.2277	0.5611	0.9891
<b>Question Category C</b>			
<b>ELF</b>	-0.0333	1	
<b>F<sub>ST</sub></b>	0.1331	0.6232	1
<b>χ<sup>2</sup></b>	0.3019	0.5557	0.8898
<b>Question Category D</b>			
<b>ELF</b>	-0.0715	1	
<b>F<sub>ST</sub></b>	0.0726	0.6291	1
<b>χ<sup>2</sup></b>	0.0863	0.6429	0.9769
<b>Question Category E</b>			
<b>ELF</b>	0.1650	1	
<b>F<sub>ST</sub></b>	0.1981	0.6196	1
<b>χ<sup>2</sup></b>	0.2308	0.6367	0.9834
<b>Question Category F</b>			
<b>ELF</b>	-0.2552	1	
<b>F<sub>ST</sub></b>	-0.0135	0.4767	1
<b>χ<sup>2</sup></b>	0.1193	0.4764	0.8922
<b>Question Category G</b>			
<b>ELF</b>	-0.2210	1	
<b>F<sub>ST</sub></b>	-0.0126	0.4298	1
<b>χ<sup>2</sup></b>	0.1368	0.3587	0.9126

(Based on 76 observations)

Question categories are defined as follows: A: Perceptions of Life (42 questions); B: Environment (4 questions); C: Work (25 questions); D: Family (12 questions); E: Politics and Society (59 questions); F: Religion and Morale (30 questions); G: National Identity (3 questions).

**Panel G: Correlations between Diversity Measures by Question Type**

	<b>Cultural Fractionalization</b>	<b>ELF</b>	<b>FST</b>
<b>Binary Response Questions</b>			
<b>ELF</b>	0.1345	1	
<b>F<sub>ST</sub></b>	0.2455	0.5506	1
<b><math>\chi^2</math></b>	0.2556	0.5556	1
<b>Unordered Response Questions</b>			
<b>ELF</b>	-0.2816	1	
<b>F<sub>ST</sub></b>	-0.0222	0.5422	1
<b><math>\chi^2</math></b>	-0.0359	0.5671	0.9818
<b>Scale Response Questions</b>			
<b>ELF</b>	0.1107	1	
<b>F<sub>ST</sub></b>	0.2674	0.6313	1
<b><math>\chi^2</math></b>	0.2869	0.6260	0.9860

Binary: 38 questions; unordered response questions: 26 questions; scale: 100 questions

**Panel H: Correlations between Diversity Measures for Restricted Set of 9 Questions**

	<b>Cultural Fractionalization</b>	<b>ELF</b>	<b>FST</b>
<b>Restricted Set of 9 Questions Used in Literature</b>			
<b>ELF</b>	-0.2215	1	
<b>F<sub>ST</sub></b>	0.0222	0.5508	1
<b><math>\chi^2</math></b>	-0.0225	0.5856	0.9688

**Table 4 – Correlations of Different Variables with CF,  $F_{ST}$  and  $\chi^2$**

	<b>Cultural Fractionalization</b>	<b><math>F_{ST}</math></b>	<b><math>\chi^2</math></b>
ELF	-0.0303	0.6198**	0.6203**
Linguistic Diversity (Alesina et al., 2003)	0.0184	0.5609**	0.5785**
Ethnic Diversity (Alesina et al., 2003)	-0.0781	0.3611*	0.3824**
Religious Diversity (Alesina et al., 2003)	0.3143**	0.0815	0.0864
Percentage Protestant	0.2122	-0.0573	-0.0436
Percentage Catholic	0.2578**	-0.2847*	-0.2643*
Percentage Muslim	-0.5968**	0.0997	0.0821
Absolute Latitude	0.1804	-0.3178*	-0.3547**
Area	0.0971	-0.0787	-0.0823
Roughness	0.0254	0.0145	-0.0067
Log Population 1990-2010	-0.1437	0.0581	0.0751
Log GDP per Capita 1990-2010	0.3819**	-0.2644*	-0.2869*
Sub-Saharan Africa	0.0831	0.1664	0.2342*
Middle East & North Africa	-0.5286**	-0.0682	-0.0937
Europe & Central Asia	0.2670*	-0.1577	-0.1880
South Asia	-0.2624*	0.2919*	0.2630*
East Asia & Pacific	-0.0264	0.2022	0.2193*
North America	0.1261	-0.0390	-0.0549
Latin America & Caribbean	0.1118	-0.2363*	-0.2296*
Democracy	0.5862**	-0.1414	-0.1491
UK Legal Origin	0.0796	0.4231*	0.4430**
French Legal Origin	-0.1589	-0.2190	-0.2258
German Legal Origin	0.0592	-0.1351	-0.1582
Scandinavian Legal Origin	0.1005	-0.1245	-0.1050
Ethnic segregation	-0.2503	0.1884	0.2065
Linguistic segregation	-0.2076	0.0668	0.0581
Religious segregation	-0.2137	0.2183	0.1869

\* significant at 5%; \*\* significant at 1%

**Table 5 - Incidence of Civil Conflict and Diversity  
(Dependent Variable: Incidence of Civil Conflict)**

	(1) Incidence	(2) Incidence	(3) Incidence	(4) Incidence	(5) Incidence	(6) Incidence
<b>Cultural Fractionalization</b>	<b>-0.187</b> [-1.60]			<b>-0.391**</b> [-3.33]	<b>-0.472**</b> [-3.49]	<b>-0.417**</b> [-3.65]
<b>Ethnolinguistic Fractionalization</b>		<b>0.019</b> [1.09]		<b>-0.037</b> [-1.77]	<b>-0.041</b> [-1.88]	<b>-0.035</b> [-1.78]
<b>Chi Square</b>			<b>0.472**</b> [2.74]	<b>0.870**</b> [3.82]	<b>0.992**</b> [4.00]	<b>0.840**</b> [3.96]
Lagged War	0.860** [30.66]	0.868** [33.74]	0.864** [33.33]	0.840** [27.88]	0.840** [26.28]	0.833** [25.78]
Log Lagged GDP per capita	-0.005 [-0.90]	-0.008 [-1.74]	-0.007 [-1.47]	0.003 [0.62]	0.005 [0.98]	0.003 [0.78]
Log Lagged Population	0.011** [3.69]	0.012** [3.98]	0.013** [4.33]	0.012** [4.18]	0.015** [4.32]	0.011** [4.32]
% Mountainous Terrain	0.000* [2.53]	0.000* [2.34]	0.000* [2.34]	0.000** [2.60]	0.000 [1.84]	0.000* [2.02]
Non Contiguous	0.025 [1.61]	0.017 [1.27]	0.015 [1.16]	0.026 [1.60]	0.025 [1.61]	0.025 [1.54]
Oil	0.020 [1.56]	0.021 [1.50]	0.025 [1.80]	0.022 [1.62]	0.014 [1.34]	0.015 [1.33]
New State	0.200* [2.14]	0.222* [2.29]	0.240* [2.36]	0.210* [2.14]	0.255* [2.16]	0.143* [2.11]
Instability	-0.009 [-1.00]	-0.009 [-0.94]	-0.009 [-1.00]	-0.009 [-1.08]	-0.010 [-1.03]	-0.010 [-1.34]
Democracy Lagged (Polity 2)	0.001 [0.90]	0.000 [0.56]	0.000 [0.20]	0.000 [0.49]	0.001 [0.75]	0.000 [0.47]
Latin America and Caribbean	0.017 [0.98]	0.007 [0.48]	0.018 [0.99]	0.058 [1.92]	0.042 [1.54]	0.066* [1.99]
Sub-Saharan Africa	0.022 [0.90]	0.001 [0.05]	0.000 [0.02]	0.051 [1.53]	0.064 [1.53]	0.060 [1.65]
East and Southeast Asia	-0.008 [-0.68]	-0.010 [-1.12]	-0.017* [-2.25]	-0.016 [-1.86]	-0.017 [-1.84]	-0.015 [-1.86]
UK Legal Origin					0.009 [0.26]	
French Legal Origin					0.032 [0.97]	
Socialist Legal Origin					0.010 [0.30]	
GDP Growth						-0.119** [-3.50]
GDP Growth Lagged						-0.003 [-0.08]
Observations	2,921	2,921	2,921	2,921	2,705	2,850
Pseudo R-squared	0.752	0.752	0.754	0.758	0.754	0.771

Logit estimation, based on at most 69 countries from 1945 to 1999, standard errors clustered at country level. The columns report marginal effects.

Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%

**Table 6 - Incidence of Civil Conflict and Diversity, by Question Category and Type  
(Dependent Variable: Incidence of Civil Conflict)**

**Panel A – By Question Category**

	<b>A (42q)</b>	<b>B (4q)</b>	<b>C (25q)</b>	<b>D (12q)</b>	<b>E (59q)</b>	<b>F (30q)</b>	<b>G (3q)</b>
Cultural Fractionalization	-0.200 [-1.88]	0.025 [0.40]	-0.062 [-1.06]	-0.123 [-1.11]	-0.135 [-0.91]	-0.119** [-3.35]	-0.035 [-1.38]
Ethnolinguistic Fractionalization	-0.016 [-0.96]	0.021 [1.22]	0.011 [0.49]	-0.034 [-1.60]	-0.028 [-1.38]	-0.007 [-0.44]	-0.000 [-0.01]
Chi Square	0.756** [3.02]	-0.009 [-0.07]	0.075 [0.60]	0.843** [3.29]	0.687** [3.26]	0.394** [3.19]	0.202* [2.47]
Observations	2,971	2,925	2,971	2,921	2,971	2,971	2,916
Pseudo R-squared	0.757	0.760	0.753	0.756	0.756	0.759	0.755

Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%

Logit estimation, based on 68 countries from 1945 to 1999, standard errors clustered at the country level. The columns report marginal effects.

All columns include controls for lagged war, log lagged GDP per capita, log lagged population, % mountainous terrain, non-contiguous country dummy, oil dummy, new state dummy, instability dummy, democracy lagged (Polity 2), Latin America and Caribbean dummy, Sub-Saharan Africa dummy, East and Southeast Asia dummy.

Question categories are defined as follows: A: Perceptions of Life (42 questions); B: Environment (4 questions); C: Work (25 questions); D: Family (12 questions); E: Politics and Society (59 questions); F: Religion and Morale (30 questions); G: National Identity (3 questions).

**Panel B – By Question Type**

	<b>Binary (38q)</b>	<b>Scale (100q)</b>	<b>Unordered (26q)</b>
Cultural Fractionalization	-0.249** [-2.73]	-0.257* [-2.01]	-0.058 [-0.58]
Ethnolinguistic Fractionalization	-0.011 [-0.63]	-0.021 [-1.04]	-0.017 [-0.90]
Chi Square	1.257** [4.59]	0.562** [2.95]	0.585* [2.57]
Observations	2,971	2,971	2,925
Pseudo R-squared	0.759	0.757	0.762

Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%

Logit estimation, based on 68 countries from 1945 to 1999, standard errors clustered at the country level. The columns report marginal effects.

All columns include controls for lagged war, log lagged GDP per capita, log lagged population, % mountainous terrain, non-contiguous territory dummy, oil dummy, new state dummy, instability dummy, democracy lagged (Polity 2), Latin America and Caribbean dummy, Sub-Saharan Africa dummy, East and Southeast Asia dummy.



**Table 7 – Endogeneity of Chi-Square and Cultural Fractionalization  
(Dependent Variable: Incidence of Civil Conflict)**

	(1) Persistent Questions	(2) Non-Persistent Questions	(3) Post-1970	(4) Post-1970 Cohort < 1950
Cultural Fractionalization	-0.222 [-1.49]	-0.241** [-3.87]	-0.504** [-2.64]	-0.358** [-2.74]
Ethnolinguistic Fractionalization	-0.014 [-0.76]	-0.022 [-1.26]	-0.022 [-0.64]	-0.017 [-0.66]
Chi Square	0.458* [2.21]	0.697** [3.65]	1.071** [2.60]	0.370** [2.65]
Observations	2,677	3,078	1,785	1,636
Pseudo R-squared	0.758	0.758	0.793	0.796

Logit estimation, standard errors clustered at country level. The columns report marginal effects.

Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%.

All columns include controls for lagged war, log lagged GDP per capita, log lagged population, % mountainous terrain, non-contiguous territory dummy, oil dummy, new state dummy, instability dummy, democracy lagged (Polity 2), Latin America and Caribbean dummy, Sub-Saharan Africa dummy, East and Southeast Asia dummy.

**Table 8 – Robustness Tests  
(Dependent Variable: Incidence of Civil Conflict)**

	(1) FST	(2) PRIO25	(3) Broader Set Questions	(4) 9 Questions	(5) Polarization
Cultural Fractionalization	-0.361** [-3.20]	-0.894** [-3.27]	-0.323** [-2.80]	-0.217** [-2.79]	-0.387** [-3.13]
Ethnolinguistic Fractionalization	-0.038 [-1.85]	-0.058 [-1.34]	-0.035 [-1.66]	-0.030 [-1.63]	-0.037 [-1.80]
Overlap measure <sup>a</sup>	2.021** [4.34]	1.683** [4.41]	0.855** [3.71]	1.293** [3.45]	0.864** [3.61]
Polarization					0.003 [0.13]
Observations	2,921	2,834	2,921	3,078	2,921
Pseudo R-squared	0.758	0.591	0.757	0.756	0.758

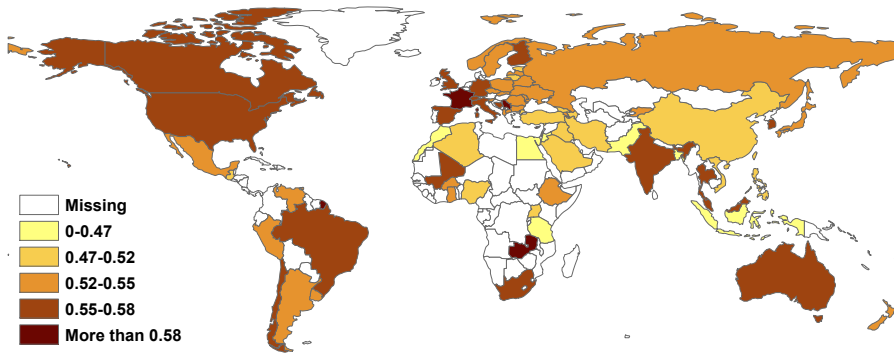
Logit estimation, based on at most 69 countries from 1945 to 1999, standard errors clustered at country level.

The columns report marginal effects. Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%

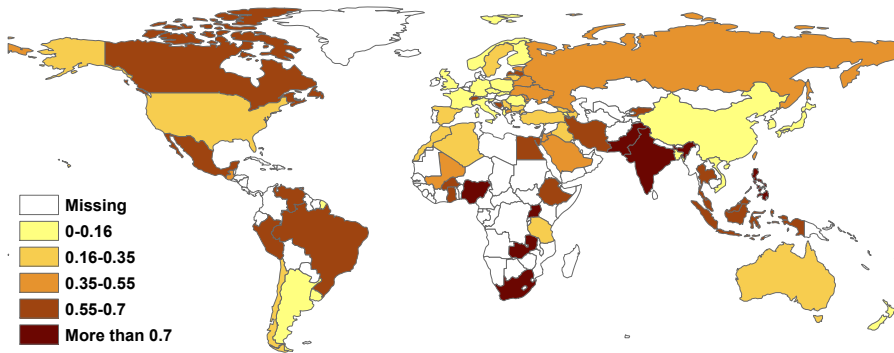
a: FST in column (1), Chi-square in all other columns.

All columns include controls for lagged war, log lagged GDP per capita, log lagged population, % mountainous terrain, non-contiguous territory dummy, oil dummy, new state dummy, instability dummy, democracy lagged (Polity 2), Latin America and Caribbean dummy, Sub-Saharan Africa dummy, East and Southeast Asia dummy.

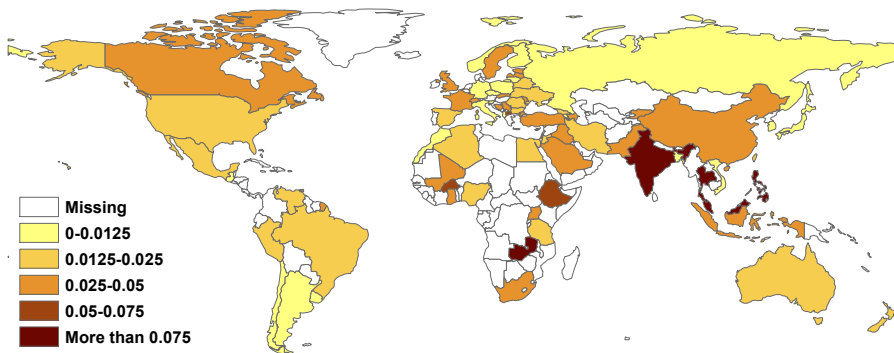
**Figure 1: Cultural Fractionalization (CF)**



**Figure 2: ELF**



**Figure 3: Chi-Square**



Appendix to Culture, Ethnicity and Diversity  
by Klaus Desmet, Ignacio Ortuño-Ortín and Romain Wacziarg

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Appendix 1 - Ethnicity and Culture in Other Surveys

**1. Afrobarometer.**

We conduct an analysis similar to that in Section 2 using the 4<sup>th</sup> wave of Afrobarometer (2008). The wave covers 20 Sub-Saharan African countries. There are 182 questions on values, norms and preferences in this survey, 7 admitting a binary response, 155 where the response is on an ordered scale and 20 which admit more than two unordered responses. These 20 questions were converted into a set of 117 binary questions in the same way as was done for the WVS/EVS, resulting in a total of 279 available questions for us to analyze. A specificity of Afrobarometer is that most questions were asked in every country, so there is little heterogeneity in the set of questions used (the mean number of questions asked in each of the 20 surveyed countries is 271, with a standard deviation of 5).

For ethnic identity, we relied entirely on the classification provided by Afrobarometer (variable Q79: "What is your tribe or ethnic group?"). The number of ethnic groups varies by country, ranging from 5 to 38. Finally, the regression specification includes as controls the respondent's age (Q1), gender (Q101) and present living conditions (Q4B) as a proxy for income (no measures of human capital or direct measures of income are available).

Results obtained using the Afrobarometer survey are presented in Appendix Table A2. Confirming results for Sub-Saharan Africa from the WVS/EVS, the share of questions for which ethnicity significantly predicts responses is high, on average 57% (versus 62% in the WVS/EVS). This average masks interesting variation across countries. Some countries like South Africa and Nigeria display very high shares (88% and 91%, respectively), while some small countries such as Lesotho and Cape Verde display much smaller shares (respectively 10% and 20%).<sup>1</sup> Interestingly, the results for

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<sup>1</sup>For Lesotho, the ethnic nomenclature provided by Afrobarometer is at the level of clans. Lesotho is considered by ethnographers to be a very ethnically homogeneous country (99.7% of the population belongs to the Sotho ethnic group, according to the CIA World Factbook, 2009). This homogeneity is reflected in the fact that different clans do not seem to differ much in terms of values, norms and preferences. Despite the questionable ethnic classification

South Africa and Nigeria mirror those from the WVS/EVS, where the corresponding shares were 88% and 84%, despite different survey questions, ethnic nomenclature, methods and samples.

## 2. Latinobarómetro.

We also use the Latinobarómetro, which covers Latin American countries. The survey asks a question on ethnic identity only since 2007, so we are constrained to using waves for 2007, 2008, 2009 and 2010, covering 18 countries. The survey classifies questions into categories, and we focus on the categories that refer to values, opinions, and preferences. Among those, however, a few questions about the factual situation of the respondent crept in, and we removed them from consideration. We ended up with 231 binary response questions, 358 questions for which the response is on an ordered scale, and 19 questions with more than two unordered response categories. The latter were transformed into a series of 96 binary response questions, as before. We ended up with a total of 685 usable questions. As was the case for the Afrobarometer, the availability of questions across countries did not vary much. The average country had 678 questions (with a standard deviation of less than 2).

Ethnic identity is as defined by Latinobarómetro, and represents a classification very similar to the one we used for Latin American countries in the WVS/EVS. There are seven ethnic categories, corresponding to the respondent's race (the variable coding ethnicity is named A505206). The categories are Asian, Black, Indigenous, Mestizo, Mulatto, White and other race. The regression specification includes ethnic dummies, sex (S01), age (S02), education (S51) and socioeconomic level (S62) as a proxy for income.

Results obtained using the Latinobarómetro survey are presented in Appendix Table A3. The share of questions for which ethnicity dummies are jointly significant correlates of answers is 32.5%. As in the WVS/EVS survey, this average does not seem to vary much across question categories or question type (although, as before, the share is slightly smaller for binary questions created from underlying unordered multiple response questions). There appears to be only limited variation across countries. Argentina displays the lowest share in this sample (17.8%) while the Dominican Republic displays the largest (60%), but most shares are comprised in a tight band between 20% and 40%. The relatively low share obtained with Latinobarómetro is in line with results obtained previously using the WVS/EVS.

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proposed for Lesotho by the Afrobarometer, we chose to leave this country in our sample. Excluding Lesotho from the Afrobarometer sample raises the average share of regressions where ethnicity significantly predicts culture to 59.4%.

## Appendix 2 - Theoretical Derivations

### A. Proof that $v = CF$ .

We start with the definition of the level of antagonism of an individual of type  $k$  when only cultural differences matter:

$$v_k = 1 - \frac{1}{q} \sum_{i=1}^q w_{i,\xi(k,i)} \quad (1)$$

Summing over types and taking the population-weighted average:

$$v = \sum_{k=1}^K \left( 1 - \frac{1}{q} \sum_{i=1}^q w_{i,\xi(k,i)} \right) \frac{n_k}{n}. \quad (2)$$

To operationalize this measure of cultural antagonism, notice that (2) can be written as:

$$v = \sum_{k=1}^K \left( 1 - \frac{1}{q} \sum_{i=1}^q w_{i,\xi(k,i)} \right) w_k = 1 - \frac{1}{q} \sum_{i=1}^q \sum_{k=1}^K w_{i,\xi(k,i)} w_k.$$

Next, note that:

$$\sum_{k=1}^K w_{i,\xi(k,i)} w_k = \sum_{j=1}^{r(i)} \sum_{k:\xi(k,i)=j} w_{i,\xi(k,i)} w_k = \sum_{j=1}^{r(i)} w_{ij} \sum_{k:\xi(k,i)=j} w_k = \sum_{j=1}^{r(i)} w_{ij}^2.$$

Thus,  $v$  becomes the following easy-to-calculate index of cultural fractionalization ( $CF$ ):

$$CF = \frac{1}{q} \sum_{i=1}^q \left( 1 - \sum_{j=1}^{r(i)} w_{ij}^2 \right). \quad (3)$$

### B. Proof that $v = ELF$ .

We start with the definition of the level of antagonism of an individual of type  $k$  when only ethnic differences matter:

$$v_k = 1 - w^{s(k)}. \quad (4)$$

Social antagonism,  $v$ , is the average of this probability over all individuals:

$$v = \sum_{k=1}^K (1 - w^{s(k)}) w_k. \quad (5)$$

It is easy to see that this is just the traditional index of ethnolinguistic fractionalization. Indeed, we have:

$$v = \sum_{k=1}^K (1 - w^{s(k)}) w_k = 1 - \sum_{s=1}^S \sum_{k:s(k)=s} w^{s(k)} w_k = 1 - \sum_{s=1}^S w^s \sum_{k:s(k)=s} w_k = 1 - \sum_{s=1}^S (w^s)^2. \quad (6)$$

Hence,  $v$  in this case becomes the common *ELF* index of ethnic fractionalization:

$$ELF = 1 - \sum_{s=1}^S (w^s)^2. \quad (7)$$

### C. Proof that $v = \chi^2$ .

Recall that the  $\chi^2$  index is given by:

$$\chi^2 = \frac{1}{q} \sum_{i=1}^q \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}}$$

We also have:

$$v = \sum_{k=1}^K \frac{1}{q} \sum_{i=1}^q \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k = \frac{1}{q} \sum_{i=1}^q \sum_{k=1}^K \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k$$

Thus, it is enough to show that:

$$\sum_{k=1}^K \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k = \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}}, \text{ for all } i = 1, 2, \dots, q \quad (8)$$

For each question  $i = 1, 2, \dots, q$  the right-hand term in (8) can be written as:

$$\sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s)^2}{w_{ij}} = \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s (w_{ij} - w_{ij}^s) (w_{ij} - w_{ij}^s)}{w_{ij}} \quad (9)$$

$$= \sum_{s=1}^S \sum_{j=1}^{r(i)} w^s (w_{ij} - w_{ij}^s) - \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s w_{ij}^s (w_{ij} - w_{ij}^s)}{w_{ij}} \quad (10)$$

$$= \sum_{s=1}^S \sum_{j=1}^{r(i)} w^s w_{ij} - \sum_{s=1}^S \sum_{j=1}^{r(i)} w^s w_{ij}^s - \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s w_{ij}^s (w_{ij} - w_{ij}^s)}{w_{ij}} \quad (11)$$

$$= - \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s w_{ij}^s (w_{ij} - w_{ij}^s)}{w_{ij}}$$

and the left-hand term in (8) can be written as:

$$\begin{aligned} \sum_{k=1}^K \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k &= \sum_{s=1}^S \sum_{k:s(k)=s} \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k \\ &= \sum_{s=1}^S \sum_{j=1}^{r(i)} \sum_{k:s(k)=s, \xi(k,i)=j} \frac{w^{s(k)} w_{i,\xi(k,i)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k \\ &= \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w_{ij}^s - w_{ij}}{w_{ij}} \sum_{k:s(k)=s, \xi(k,i)=j} w_k \end{aligned} \quad (12)$$

Notice that  $\sum_{k:s(k)=s,\xi(k,i)=j} w_k$  is the population share of individuals who belong to ethnic group  $s$  and give answer  $j$ , thus:

$$\sum_{k:s(k)=s,\xi(k,i)=j} w_k = w^s w_{ij}^s \quad (13)$$

and from (12) and (13) we have:

$$\sum_{k=1}^K \frac{w_{i,\xi(k,i)}^{s(k)} - w_{i,\xi(k,i)}}{w_{i,\xi(k,i)}} w_k = \sum_{s=1}^S \sum_{j=1}^{r(i)} \left( \frac{w_{ij}^s - w_{ij}}{w_{ij}} \right) w^s w_{ij}^s = - \sum_{s=1}^S \sum_{j=1}^{r(i)} \frac{w^s w_{ij}^s (w_{ij} - w_{ij}^s)}{w_{ij}}$$

Thus, equality (8) holds for all questions  $i$ .

### Appendix 3 - Relationship Between $\chi^2$ , $F_{ST}$ and Conventional Measures of Cross-Cuttingness.

Our proposed indices of overlap capture how much someone's ethnolinguistic identity reveals about his culture or preferences. High values imply that ethnolinguistic and cultural cleavages are reinforcing, whereas low values imply that they are cross-cutting. Our indices are thus related to an existing literature in political science concerned with the measurement of cross-cutting cleavages, starting with Rae and Taylor (1970, chapter 4). In what follows we start by discussing the Rae and Taylor measure of cross-cuttingness, and we then discuss the similarities and differences with our indices of overlap.

Consider two cleavages. In our terminology the first cleavage could refer to ethnicity and the second to culture (defined on a single dimension for now - say on a generic question  $i$  from the WVS). Assume there are  $S$  ethnic groups and  $r(i)$  cultural groups. Fractionalization on cleavage 1 is  $ELF$  and fractionalization on cleavage 2 is  $CF_i$ , as previously defined. In Rae and Taylor's definition, if all those from a given ethnic group are also in a given cultural group, cleavages are perfectly reinforcing. They define cross-cutting  $XC$  as the "proportion of all pairs of individuals whose two members are in the same group of one cleavage but in a different group of the other cleavage" (p. 92), and show that, for a large enough population, we can write:

$$XC_i = \sum_{j=1}^{r(i)} w_{ij}^2 + \sum_{s=1}^S (w^s)^2 - 2 \sum_{j=1}^{r(i)} \sum_{s=1}^S (w^s w_{ij}^s)^2 = 2F_i^c - CF_i - ELF, \quad (14)$$

where

$$F_i^c = 1 - \sum_{j=1}^{r(i)} \sum_{s=1}^S (w^s w_{ij}^s)^2. \quad (15)$$

Heuristically,  $F_i^c$  is fractionalization computed over all groups defined by both ethnicity and culture (so, for example, if  $S = 3$  and  $r(i) = 4$ , there are 12 distinct groups defined by heterogeneity in both ethnicity and the answer to question  $i$ ):  $F_i^c$  measures the probability that two randomly chosen individuals answer question  $i$  in a different way *or* belong to a different ethnic group. It is a measure of fractionalization where belonging to a different ethnic group or to a different cultural group defines different groups of individuals symmetrically, with the same weight.<sup>2</sup> With the definition above, it can be easily seen that  $XC_i$  is indeed the probability that two randomly chosen individuals in the population belong to the same group on one cleavage but to a different group on the other cleavage.  $XC_i$  can be averaged over questions  $i$  to obtain an overall index  $XC$ .

Intuitively, being a measure of cross-cutting cleavages,  $XC$  should be negatively correlated with the  $\chi^2$  index (as well as  $F_{ST}$ ) which are measures of reinforcing cleavages. However, both types of indices are quite different conceptually. This was already noted by Rae and Taylor (1970) and further discussed in Selway (2010, 2011). To put the distinction in stark focus with a simple example, consider the following distribution of individuals over two ethnicities and three possible answers to a cultural question:

(Entries are # of people)	Answer 1	Answer 2	Answer 3
Ethnic group 1	2	2	2
Ethnic group 2	1	1	1

Here both  $\chi^2$  and  $F_{ST}$  are obviously zero: both groups have the same distribution of answers as the population overall, and the share of between-group variance in total variance is zero (i.e. there is no between-group variance). However,  $F_i^C$  is 0.815,  $ELF$  is 0.444 and  $CF_i$  is 0.667, so that  $XC_i$  equals 0.518. As expected, a low value of  $\chi^2$  (or  $F_{ST}$ ) corresponds to a high value of  $XC$ . When we double the size of ethnic group 1 proportionally for each possible answer, the values of  $\chi^2$  and  $F_{ST}$  are unchanged, as expected: they continue to be zero, since doubling the size of ethnic group 1 does not affect how informative ethnicity is about culture. In contrast,  $XC_i$  increases from 0.518 to 0.560, because the probability of two individuals sharing one cleavage but not the other increases. As this example illustrates,  $XC$  is sensitive to changes in group sizes that are not associated with changes in the degree to which ethnicity is informative about a person's cultural attitudes, the concept we have sought to capture in this paper so far. In fact, the example shows that  $XC$  has different properties from  $\chi^2$ , an index that comes out directly from a simple model

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<sup>2</sup>In contrast  $ELF$  gives no weight to cultural heterogeneity while  $CF_i$  gives no weight to ethnic heterogeneity.



of social antagonism. Nevertheless, for completeness, in the empirical section we also compute the  $XC$  index, and while it will not be the focus of our analysis, we will briefly discuss its empirical properties.

In addition to empirically analyzing  $\chi^2$  and  $F_{ST}$ , we also calculated the  $XC$  index of Rae and Taylor (1970) using our data. The correlations of  $XC$  with  $\chi^2$  and  $F_{ST}$  were, respectively,  $-0.43$  and  $-0.45$ . Moreover, when using  $XC$  in our conflict regressions, instead of  $\chi^2$  or  $F_{ST}$ , we found that  $XC$  has a negative effect on the probability of civil war, as expected, but was not robustly significant across specifications corresponding to those in Table 5. However, as already noted,  $XC$  has very different properties from our proposed indices and does not come out of our model of antagonism. Since we have only micro-founded the  $\chi^2$  index in our theory, in the paper we focus mainly on  $\chi^2$  and  $F_{ST}$  (the latter being perhaps easier to interpret and very highly correlated with  $\chi^2$ ).

**Appendix Table A1 - Joint Significance of Ethnolinguistic Dummies in Questions from the World Values / European Values Integrated Surveys, Country by Country**

<b>Country</b>	<b># of Regressions / Questions</b>	<b>Share of Regressions with Jointly Significant Ethnic Dummies</b>	<b><math>\Delta R^2</math></b>	<b># of Ethnic Groups</b>
Albania	350	0.109	0.209	3
Algeria	287	0.296	0.724	4
Andorra	285	0.379	1.081	5
Armenia	274	0.255	0.368	4
Australia	405	0.437	0.828	7
Azerbaijan	272	0.665	1.748	10
Bangladesh	256	0.141	0.389	4
Belarus	274	0.336	0.581	5
Bosnia and Herzegovina	346	0.676	1.700	4
Brazil	282	0.106	0.438	5
Bulgaria	267	0.352	0.937	4
Burkina Faso	282	0.585	1.844	9
Canada	396	0.639	1.130	3
Chile	349	0.186	0.451	6
Cyprus	277	0.650	3.279	5
Czech Republic	271	0.059	0.304	4
Dominican Republic	271	0.089	1.961	6
Egypt	226	0.624	0.843	5
Estonia	274	0.701	3.148	3
Ethiopia	281	0.712	2.024	8
Finland	403	0.231	0.511	5
France	193	0.233	1.053	6
Georgia	398	0.445	0.819	12
Germany	287	0.206	0.405	5
Ghana	254	0.748	2.014	6
Great Britain	198	0.369	1.432	7
Guatemala	291	0.210	0.241	2
India	398	0.990	6.256	16
Indonesia	365	0.770	2.083	9
Iran	242	0.603	0.929	9
Iraq	160	0.825	3.499	5
Israel	81	0.642	2.431	2
Jordan	235	0.149	0.635	7
Kyrgyzstan	287	0.551	1.731	4
Latvia	273	0.407	2.145	11
Lithuania	273	0.282	0.483	2
Macedonia	345	0.739	3.777	6
Malaysia	276	0.699	3.521	15
Mali	281	0.306	1.381	9
Mexico	406	0.259	0.495	6
Moldova	401	0.546	1.414	6
Morocco	386	0.215	0.513	6
New Zealand	267	0.199	0.858	6
Nigeria	320	0.838	1.410	5
Norway	285	0.225	0.281	2

Country	# of Regressions / Questions	Share of Regressions with Jointly Significant Ethnic Dummies	$\Delta R^2$	# of Ethnic Groups
Pakistan	198	0.697	1.824	8
Peru	245	0.269	0.784	7
Philippines	290	0.617	3.420	20
Poland	277	0.061	0.211	3
Puerto Rico	271	0.089	0.572	6
Romania	266	0.147	0.543	5
Russian Federation	322	0.522	0.611	4
Saudi Arabia	208	0.418	1.594	11
Serbia	276	0.370	1.401	7
Singapore	217	0.705	2.836	6
Slovakia	271	0.421	1.120	5
Slovenia	279	0.090	0.382	4
South Africa	447	0.884	2.004	12
Spain	431	0.548	1.140	5
Sweden	287	0.220	0.988	7
Switzerland	240	0.575	1.743	5
Taiwan	371	0.337	0.723	5
Tanzania	290	0.190	0.392	3
Thailand	287	0.976	5.064	7
Trinidad and Tobago	278	0.237	0.852	6
Turkey	280	0.493	1.306	5
Uganda	289	0.346	2.647	9
Ukraine	395	0.565	0.874	3
United States	345	0.368	0.675	6
Uruguay	398	0.106	0.486	6
Venezuela	217	0.078	0.523	6
Viet Nam	284	0.342	0.226	2
Zambia	280	0.782	3.481	18

**Note:** Using an alternative, more restricted set of questions, we find these shares to be remarkable stable. The correlation between the two series is 98.84%, despite using only half the questions, and leaving out the transformed multinomial questions.

Note that some countries have very small numbers because of a lopsided distribution of respondents across ethnic groups. Examples include Czech Republic, Poland, Slovenia, where there are few groups and a very small number of respondents in some groups.

**Appendix Table A2 - Afrobarometer: Overall Results and Breakdown by Country**

	<b># of Regressions</b>	<b>Share of Jointly Significant Ethnic Dummies</b>	<b># of Ethnic Groups</b>
<b>Overall Sample</b>	<b>5,427</b>	<b>0.569</b>	<b>-</b>
Binary response questions	138	0.522	-
Binary from unordered multiple response questions	2,200	0.441	-
Scale response questions	3,089	0.662	-
Benin	273	0.733	13
Botswana	273	0.505	24
Burkina Faso	273	0.509	22
Cape Verde	252	0.198	11
Ghana	271	0.609	25
Kenya	273	0.700	21
Lesotho	273	0.095	31
Liberia	268	0.463	16
Madagascar	273	0.692	21
Malawi	273	0.429	16
Mali	273	0.645	20
Mozambique	266	0.590	20
Namibia	273	0.546	20
Nigeria	277	0.906	31
Senegal	273	0.374	10
South Africa	272	0.879	14
Tanzania	272	0.647	38
Uganda	273	0.908	26
Zambia	273	0.516	31
Zimbabwe	273	0.403	13

**Notes:** 20 countries. Based on data from the 4<sup>th</sup> Afrobarometer wave only (2008).

Breakdown question category not available for this dataset; Afrobarometer does not break down questions into categories.

Regression specification includes ethnic dummies, age (Q1), present living conditions (Q4B) as a proxy for income, and gender of respondent (Q101).

**Appendix Table A3 - Latinobarometro: Overall Results and Breakdown by Question Category, Question Type and Country**

	<b># of Regressions</b>	<b>Share of Jointly Significant Ethnic Dummies</b>
<b><u>Across All Questions and Countries:</u></b>	<b>12,210</b>	<b>0.325</b>
<b><u>Breakdown by Question Category:</u></b>		
A: Democracy, Participation, Social Values, Trust	6,546	0.327
B: Public Policies, Corruption, Labor	3,497	0.326
C: Economics, Development, Entrepreneurship	1,099	0.354
D: Means of Communication	852	0.285
E: Political Developments	216	0.292
<b><u>Breakdown by Question Type:</u></b>		
Binary	4,132	0.309
Scale	6,350	0.367
Binary from Unordered Multiple Response Questions	1,728	0.213
<b><u>Breakdown by Country</u></b>		
Argentina	679	0.178
Bolivia	682	0.453
Brazil	677	0.236
Colombia	680	0.228
Costa Rica	676	0.249
Chile	677	0.297
Ecuador	680	0.415
El Salvador	679	0.432
Guatemala	680	0.296
Honduras	678	0.355
Mexico	679	0.199
Nicaragua	679	0.247
Panama	678	0.289
Paraguay	676	0.408
Peru	680	0.334
Uruguay	675	0.215
Venezuela	677	0.427
Dominican Republic	678	0.600

**Notes:** 18 countries. This is based on 2007, 2008, 2009, 2010 waves of Latinobarometro, the only available waves where the ethnicity question was asked.

Regression specification includes ethnic dummies, sex (S01), age (S02), respondent education (S51) and socioeconomic level (S62) as a proxy for income.

**Appendix Table A4 - Onset of Civil Conflict and Diversity  
(Dependent Variable: Onset of Civil Conflict)**

	(1) Onset	(2) Onset	(3) Onset	(4) Onset	(5) Onset	(6) Onset
<b>Cultural Fractionalization</b>	<b>-0.024</b> [-0.62]			<b>-0.075</b> [-1.56]	<b>-0.120*</b> [-2.25]	<b>-0.090</b> [-1.91]
<b>Ethnolinguistic Fractionalization</b>		<b>0.005</b> [0.94]		<b>-0.009</b> [-1.11]	<b>-0.008</b> [-0.92]	<b>-0.008</b> [-1.11]
<b>Chi Square</b>			<b>0.088</b> [1.82]	<b>0.175*</b> [2.05]	<b>0.254**</b> [2.95]	<b>0.179*</b> [2.12]
Lagged War	-0.006** [-3.13]	-0.006** [-3.22]	-0.007** [-3.27]	-0.007** [-3.32]	-0.008** [-3.56]	-0.007** [-3.05]
Log Lagged GDP per capita	-0.005* [-2.49]	-0.005** [-3.17]	-0.004** [-2.85]	-0.003 [-1.50]	-0.001 [-0.58]	-0.002 [-1.14]
Log Lagged Population	0.003** [3.55]	0.003** [3.79]	0.003** [4.06]	0.003** [3.69]	0.004** [3.70]	0.003** [3.49]
% Mountainous Terrain	0.000** [2.94]	0.000** [2.74]	0.000** [2.92]	0.000** [2.97]	0.000 [1.73]	0.000** [2.77]
Non Contiguous	0.005 [1.08]	0.004 [0.94]	0.004 [0.92]	0.006 [1.06]	0.006 [1.15]	0.005 [1.01]
Oil	0.021** [2.80]	0.021** [2.73]	0.025** [2.96]	0.024** [2.79]	0.018** [2.65]	0.019* [2.09]
New State	0.075* [1.98]	0.077* [1.99]	0.080* [2.01]	0.074 [1.91]	0.081 [1.88]	0.060 [1.82]
Instability	0.008* [2.00]	0.008* [2.04]	0.008* [2.05]	0.008 [1.93]	0.009* [2.10]	0.006 [1.70]
Democracy Lagged (Polity 2)	0.000 [0.42]	0.000 [0.26]	-0.000 [-0.04]	0.000 [0.02]	0.000 [0.41]	0.000 [0.08]
Latin America and Caribbean	-0.001 [-0.20]	-0.002 [-0.47]	-0.001 [-0.17]	0.004 [0.44]	0.003 [0.36]	0.006 [0.62]
Sub-Saharan Africa	-0.002 [-0.40]	-0.004 [-1.19]	-0.003 [-1.00]	0.002 [0.33]	0.007 [0.77]	0.003 [0.49]
East and Southeast Asia	-0.001 [-0.23]	-0.001 [-0.17]	-0.001 [-0.53]	-0.002 [-0.55]	-0.003 [-1.00]	-0.001 [-0.40]
UK Legal Origin					-0.006 [-0.75]	
French Legal Origin					0.003 [0.26]	
Socialist Legal Origin					0.002 [0.17]	
GDP Growth						-0.027* [-2.30]
GDP Growth Lagged						-0.008 [-0.70]
Observations	2,921	2,921	2,921	2,921	2,705	2,850
Pseudo R-squared	0.147	0.148	0.153	0.158	0.157	0.165

Logit estimation, based on at most 69 countries from 1945 to 1999, standard errors clustered at country level. The columns report marginal effects. Robust z statistics in brackets. \* significant at 5%; \*\* significant at 1%

**Appendix Table A5 – Indices of Cultural Diversity, Ethnic Diversity and Overlap**

<b>Iso Code</b>	<b>Country</b>	<b>Cultural fractionalization (CF)</b>	<b>Ethnolinguistic fractionalization (ELF)</b>	<b>FST</b>	<b>Chi-Square</b>
ALB	Albania	0.5239	0.0269	0.0017	0.0055
DZA	Algeria	0.4856	0.2639	0.0055	0.0175
AND	Andorra	0.5409	0.6166	0.0103	0.0267
ARG	Argentina	0.5381	0.1313	0.0032	0.0090
ARM	Armenia	0.5244	0.0643	0.0038	0.0112
AUS	Australia	0.5524	0.2441	0.0058	0.0150
AZE	Azerbaijan	0.4930	0.2495	0.0152	0.0363
BGD	Bangladesh	0.4356	0.1507	0.0038	0.0100
BLR	Belarus	0.5257	0.3833	0.0064	0.0155
BIH	Bosnia Herzogovina	0.5542	0.6261	0.0151	0.0307
BRA	Brazil	0.5632	0.5820	0.0052	0.0132
BGR	Bulgaria	0.5377	0.2955	0.0104	0.0230
BFA	Burkina Faso	0.5427	0.6674	0.0208	0.0588
CAN	Canada	0.5583	0.6256	0.0119	0.0254
CHL	Chile	0.5650	0.1621	0.0042	0.0118
CHN	China	0.4939	0.1356	0.0126	0.0357
CYP	Cyprus	0.5830	0.5038	0.0306	0.0688
CZE	Czech Republic	0.5374	0.0071	0.0025	0.0071
EGY	Egypt	0.4299	0.6350	0.0070	0.0156
EST	Estonia	0.5174	0.4862	0.0228	0.0462
ETH	Ethiopia	0.5453	0.6940	0.0195	0.0576
FIN	Finland	0.5519	0.0531	0.0040	0.0122
FRA	France	0.5825	0.1352	0.0086	0.0294
GEO	Georgia	0.4947	0.2502	0.0078	0.0191
GER	Germany	0.5760	0.0729	0.0028	0.0093
GHA	Ghana	0.5293	0.5820	0.0162	0.0446
GBR	Great Britain	0.5728	0.1274	0.0090	0.0278
GTM	Guatemala	0.5129	0.4093	0.0023	0.0064
IND	India	0.5655	0.8517	0.0588	0.1281
IDN	Indonesia	0.4616	0.5956	0.0167	0.0379
IRN	Iran	0.4998	0.6136	0.0080	0.0211
IRQ	Iraq	0.4892	0.2960	0.0227	0.0415
ITA	Italy	0.5574	0.0000	0.0000	0.0000
JPN	Japan	0.5273	0.0043	0.0009	0.0028
JOR	Jordan	0.4273	0.4976	0.0066	0.0165
KGZ	Kyrgyzstan	0.5489	0.5860	0.0193	0.0420
LVA	Latvia	0.5302	0.5869	0.0173	0.0469
LTU	Lithuania	0.5031	0.1697	0.0042	0.0098
MKD	Macedonia	0.5428	0.4398	0.0344	0.0674
MYS	Malaysia	0.5632	0.6528	0.0336	0.0919
MLI	Mali	0.5657	0.4331	0.0128	0.0360
MEX	Mexico	0.5476	0.6426	0.0057	0.0148
MDA	Moldova	0.5450	0.3695	0.0108	0.0282
MAR	Morocco	0.4452	0.2235	0.0031	0.0084
NZL	New Zealand	0.5379	0.0408	0.0065	0.0227

<b>Iso Code</b>	<b>Country</b>	<b>Cultural fractionalization (CF)</b>	<b>Ethnolinguistic fractionalization (ELF)</b>	<b>FST</b>	<b>Chi-Square</b>
NGA	Nigeria	0.4987	0.7675	0.0103	0.0231
NOR	Norway	0.5394	0.0661	0.0028	0.0092
PAK	Pakistan	0.4451	0.7562	0.0198	0.0482
PER	Peru	0.5234	0.5767	0.0081	0.0219
PHL	Philippines	0.5168	0.7655	0.0295	0.0765
POL	Poland	0.5443	0.0199	0.0021	0.0060
PRI	Puerto Rico	0.5059	0.6382	0.0054	0.0169
ROM	Romania	0.5229	0.1387	0.0049	0.0145
RUS	Russian Federation	0.5388	0.4837	0.0035	0.0098
SAU	Saudi Arabia	0.5082	0.5148	0.0137	0.0345
SER	Serbia	0.5869	0.1896	0.0102	0.0299
SGP	Singapore	0.5099	0.6778	0.0321	0.0629
SVK	Slovak Republic	0.5418	0.1339	0.0100	0.0305
SVN	Slovenia	0.5469	0.0559	0.0020	0.0062
ZAF	South Africa	0.5552	0.8389	0.0191	0.0445
KOR	South Korea	0.5518	0.0000	0.0000	0.0000
ESP	Spain	0.5522	0.2944	0.0052	0.0125
SWE	Sweden	0.5438	0.2277	0.0086	0.0277
CHE	Switzerland	0.5566	0.6380	0.0139	0.0312
TWN	Taiwan	0.516	0.5394	0.0089	0.0203
TZA	Tanzania	0.4651	0.2744	0.0044	0.0149
THA	Thailand	0.5611	0.6979	0.0495	0.1218
TTO	Trinidad and Tobago	0.5325	0.6209	0.0094	0.0270
TUR	Turkey	0.5186	0.2041	0.0092	0.0253
UGA	Uganda	0.5166	0.8114	0.0185	0.0469
UKR	Ukraine	0.5429	0.5018	0.0062	0.0135
URY	Uruguay	0.5437	0.1126	0.0041	0.0111
USA	USA	0.5512	0.3359	0.0067	0.0169
VEN	Venezuela	0.5454	0.6602	0.0050	0.0156
VNM	Vietnam	0.5039	0.0814	0.0016	0.0043
ZMB	Zambia	0.6024	0.8045	0.0293	0.0834



**Appendix Table A6 – List of Questions Asked in at Least 50 Countries, by Category and Type**

<b>A: Perceptions of Life</b>	
<i>Binary questions</i>	
a025	love and respect parents always/earned
a029	learn children at home: independence
a030	learn children at home: hard work
a032	learn children at home: feeling of responsibility
a034	learn children at home: imagination
a035	learn children at home: tolerance+respect
a038	learn children at home: thrift
a039	learn children at home: determination/perseverance
a040	learn children at home: religious faith
a041	learn children at home: unselfishness
a042	learn children at home: obedience
a124_01	don't like as neighbours: people with criminal record
a124_02	don't like as neighbours: people of different race
a124_03	don't like as neighbours: heavy drinkers
a124_04	don't like as neighbours: emotionally unstable people
a124_06	don't like as neighbours: immigrants/foreign workers
a124_07	don't like as neighbours: people with AIDS
a124_08	don't like as neighbours: drug addicts
a124_09	don't like as neighbours: homosexuals
a124_12	neighbours: people of a different religion
a165	people can be trusted/can't be too careful
<i>Scale questions</i>	
a001	how important in your life: family
a002	how important in your life: friends and acquaintances
a003	how important in your life: leisure time
a004	how important in your life: politics
a005	how important in your life: work
a006	how important in your life: religion
a008	taking all things together how happy are you
a009	describe your state of health these days
a062	how often discuss politics with friends
a098	active/inactive membership of church or religious organization
a099	active/inactive membership of sport or recreation
a100	active/inactive membership of art, music or educational organization
a101	active/inactive membership of labour unions
a102	active/inactive membership of political party
a103	active/inactive membership of environmental organization
a104	active/inactive membership of professional organization
a105	active/inactive membership of charitable/humanitarian organization
a106	active/inactive membership of any other organization
a170	how satisfied are you with your life
a173	how much control over your life
<i>Unordered response questions</i>	
a026	parents responsibilities to their children at expense of/not sacrifice own well-being

<b>B: Environment</b>	
<i>Scale questions</i>	
b001	environment: giving part of income
b002	environment: increase taxes to prevent environmental pollution
b003	environment: government should reduce environmental pollution
<i>Unordered response questions</i>	
b008	protecting environment vs. economic growth

<b>C: Work</b>	
<i>Binary questions</i>	
c011	important in a job: good pay
c012	important in a job: not too much pressure
c013	important in a job: job security
c014	important in a job: respected job
c015	important in a job: good hours
c016	important in a job: use initiative
c017	important in a job: generous holidays
c018	important in a job: achieving something
c019	important in a job: responsible job
c020	important in a job: interesting job
c021	important in a job: meeting abilities
c059	fair/unfair: quicker secretary is paid more
<i>Scale questions</i>	
c006	how satisfied with financial situation
c008	work compared with leisure
c036	job needed to develop talents
c037	humiliating receiving money without working
c038	people turn lazy not working
c039	work is a duty towards society
c041	work always comes first
<i>Unordered response questions</i>	
c001	jobs are scarce: giving men priority
c002	jobs are scarce: giving...(nation) priority
c009	first choice if looking for a job
c010	second choice if looking for a job
c060	how should business and industry be managed
c061	follow instructions at work/must be convinced first

<b>D: Family</b>	
<i>Binary questions</i>	
d018	children need both parents to grow up happily
d019	women need children in order to be fulfilled
d022	marriage is outdated
<i>Scale questions</i>	
d017	ideal size of a family
d054	one of main goals in life has been to make my parents proud
d055	make effort to live up to what my friends expect
d056	working mother warm relationship with children

d057	being housewife as fulfilling as paid job
d058	husband+wife contribute to household income
d059	men make better political leaders than women do
d060	university is more important for a boy than for a girl
<i>Unordered response questions</i>	
d023	woman wants to have child as single parent without stable relationship with a man

<b>E: Politics and Society</b>	
<i>Binary questions</i>	
e128	country is run by big interest vs. for all people's benefit
<i>Scale questions</i>	
e014	good/bad: less emphasis on money
e015	good/bad: decrease work importance
e016	good/bad: more emphasis on technology
e018	good/bad: more respect for authority
e019	good/bad: more emphasis on family life
e023	how interested in politics
e025	political action: signing a petition
e026	political action: joining in boycotts
e027	political action: attending lawful demonstrations
e028	political action: joining unofficial strikes
e029	political action: occupying buildings/factories
e033	political view: left-right
e034	opinion on society
e035	equalize incomes vs. incentives for individual effort
e036	private vs. government ownership business
e037	individual vs. state responsibility for providing
e039	competition good vs. harmful for people
e040	hard work brings better life vs. doesn't bring success
e041	accumulate wealth at expense of others vs. enough for everyone
e069_01	how much confidence in: church
e069_02	how much confidence in: armed forces
e069_04	how much confidence in: the press
e069_05	how much confidence in: trade unions
e069_06	how much confidence in: the police
e069_07	how much confidence in: parliament
e069_08	how much confidence in: civil service
e069_10	confidence: television
e069_11	how much confidence in: government
e069_12	how much confidence in: political parties
e069_13	how much confidence in: major companies
e069_14	how much confidence in: environmental organizations
e069_15	confidence: the women's movement
e069_17	how much confidence in: justice system
e069_20	how much confidence in: United Nations Organisation
e114	political system: strong leader
e115	political system: experts making decisions
e116	political system: the army ruling
e117	political system: democratic

e120	democracy: causes bad economy
e121	democracy: is indecisive
e122	democracy: cannot maintain order
e123	democracy: best political system
e124	how much respect for human rights nowadays
e125	satisfaction with the people in national office
<i>Unordered response questions</i>	
e001	aims of this country: most important
e002	aims of this country: 2nd most important
e003	aims of respondent: first choice
e004	aims of respondent: second choice
e005	aims of respondent II: first choice
e006	aims of respondent II: second choice
e012	are you willing to fight for country
e022	scientific advances help/harm mankind
e135	who should decide: international peacekeeping
e136	who should decide: protection of the environment
e137	who should decide: aid to developing countries
e138	who should decide: refugees
e139	who should decide: human rights
e143	work: people from less developed countries

## **F: Religion and Morale**

### *Binary questions*

f024	do you belong to a religious denomination
f035	church answers to: moral problems
f036	church answers to: family life problems
f037	church answers to: spiritual needs
f038	church answers to: social problems
f050	do you believe in: god
f051	do you believe in: life after death
f052	do you believe in: a soul
f053	do you believe in: hell
f054	do you believe in: heaven
f064	do you get comfort and strength from religion
f065	do you take moments of prayer/meditation

### *Scale questions*

f001	how often: think about meaning of life
f028	how often attend religious services
f063	how important is god in your life
f102	politicians and god
f103	religious leaders and influence voting
f104	religion and public office
f105	religious leaders and influence government decisions
f114	do you justify: claiming state benefits
f115	do you justify: avoiding fare on public transport
f116	do you justify: cheating on tax
f117	do you justify: accepting a bribe
f118	do you justify: homosexuality

f119	do you justify: prostitution
f120	do you justify: abortion
f121	do you justify: divorce
f122	do you justify: euthanasia
f123	do you justify: suicide
<i>Unordered response questions</i>	
f034	are you a religious person

<b>G: Nationality and Identity</b>	
<i>Scale questions</i>	
g006	how proud are you to be a ... (country) citizen
<i>Unordered response questions</i>	
g001	belong to geographic group - most
g002	belong to geographic group: next