European Journal of Political Economy 77 (2023) 102318

Contents lists available at ScienceDirect

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

The effect of ethnic diversity on the participation in social groups: Evidence from trade unions

Nikos Benos [a], Pantelis Kammas [b,*]

[a] Department of Economics, University of Ioannina, Ioannina, Greece
[b] Athens University of Economics and Business, Patission 76, Athens, 10434, Greece

ARTICLE INFO

JEL classification:
J51
J15
C21
C26

Keywords:
Trade unions
Ethnic diversity
Parasite-stress theory

ABSTRACT

This paper advances the hypothesis that individuals in more ethnically fragmented societies, participate less in social groups. More precisely, the empirical analysis places the spotlight on trade unions and investigates whether ethnic diversity affects the decision of workers to participate in them. The analysis takes place along two layers: (a) country-level and (b) individual-level. First, building on a set of innovative instruments derived from the *parasite-stress theory of values and sociality*, our country-level analysis seeks to exploit exogenous sources of variation in ethnic diversity and establish a convincing causal relationship between ethnic diversity and trade union density across countries. In turn, we employ individual-level data from the European Social Survey (ESS) and investigate whether immigrants who come from more ethnically fragmented societies participate less in trade unions in their European countries of residence. Consistent with the prediction of the theory, both layers of the empirical analysis provide robust evidence of a negative, sizeable and highly significant effect of ethnic diversity on the participation in trade unions.

1. Introduction

It is widely accepted that ethnic diversity can have far reaching consequences for economic and political development within countries (see e.g., Alesina and La Ferrara, 2005; Alesina and Glaeser, 2004; Fearon and Laitin, 2003). Focusing on the provision of public goods, a large number of studies suggest that increased diversity reduces the amount of public goods provided both across countries and across communities within a country (see Alesina and La Ferrara, 2005; Stichnoth and Van de Straeten, 2013 for reviews of this literature). The cornerstone of this widely observed fact is that individuals are less willing to contribute towards the provision of a good with public benefits if those benefits are directed to groups that share different racial, ethnic or linguistic characteristics.[1]

Following a similar rationale, Alesina and La Ferrara (2000) investigate whether the participation of individuals in social groups is affected by the fact that a population may be heterogeneous in terms of race or ethnicity. Using survey data on group memberships in

* Corresponding author.
E-mail addresses: nbenos@uoi.gr (N. Benos), kammas@aueb.gr (P. Kammas).

[1] This is because heterogeneous communities have heterogeneous preferences over public goods (see Alesina et al., 1999) or because of racial prejudice as members of one ethnic group may dislike members of other groups. The literature documenting prejudice, discrimination and ethnic hate is vast. Classics include Allport (1954) on the psychology of racial prejudice, Becker (1957) on the economics of discrimination as well as DuBois (1903) and Gilens (1999) on race relations and racial stereotypes in the United States. A slightly more nuanced view is that racial hate is endogenous to the political system and it is often created by politicians in order to serve specific political purposes (see e.g., Glaeser, 2005).

https://doi.org/10.1016/j.ejpoleco.2022.102318
Received 1 March 2022; Received in revised form 6 October 2022; Accepted 9 October 2022
Available online 18 October 2022

US localities, they conclude that participation in civil activities is significantly lower in more ethnically fragmented societies. These findings come as no surprise. According to Olson (1965) collective action presents public good characteristics (i.e., each individual has an incentive to "free ride" on the efforts of the others if the collective action aims to provide non-excludable benefits to everybody). Thus, the effect of increased ethnic diversity on the participation in social groups is expected to be qualitatively similar to the impact of increased ethnic diversity on the provision of any type of public goods.

The paper at hand places the spotlight on a specific type of social group (namely, trade unions) and investigates whether workers participate less in trade unions in ethnically fragmented societies.[2] This hypothesis dates back at least to Marx and Engels who first suggested that increased ethnic and racial diversity undermines class consciousness and weakens the unity of the working class in the United States.[3] More recently, Lipset and Marks (2000) investigated how increased racial antipathies within the US are interrelated with the so-called "American Exceptionalism" and the corresponding low participation of American workers in trade unions. It is worth noting that craft unions in the American Federation of Labor (AFL) were organized along ethnic lines, encompassing native workers and "old" immigrants from Northern Europe and largely excluding "new" immigrants from Southern and Eastern Europe, along with Chinese and African-Americans. Similarly, Davis (1988) reports that conflicts among ethnic groups were particularly intense in the US labor market during the early 19th century. Particularly, from the late 1830s, Irish immigrants entered the US labor market, which was formerly dominated by Germans, British and African-Americans. Irish workers were particularly successful partly because they were willing to work for lower wages than former immigrants (and even former slaves), and partly because the Irish had a strong sense of community that allowed them to exclude competing workers from other ethnic groups. Overall, the case of US labor market during the early 19th century provides striking anecdotal evidence that strong antipathies among workers belonging to different ethnic groups weakened their participation in trade unions.[4]

This research aims to investigate the effect of ethnic diversity on the participation in trade unions using both country-level and individual-level data. More precisely, the analysis takes place in two layers exploiting exogenous variation in ethnic diversity across: (a) countries and (b) migrants of different ancestry within a country. The first part of the analysis relies on cross-country data from 90 developed and developing countries and investigates the effect of ethnic and religious diversity on trade union density. To address the usual concerns that a relationship between ethnic diversity and trade union density may be driven by confounding factors that remain unobserved (such as economic development or specific cultural traits), we instrument ethnic diversity on a set of innovative epidemiological variables that have been linked empirically to ethnic and religious diversity (see e.g., Cashdan, 2001; Fincher and Thornhill, 2008, 2012, 2014). More precisely, we employ as instruments the: (i) *combined parasite-stress*, (ii) *non-zoo parasite-stress* developed by Fincher and Thornhill (2012) and (iii) *pathogen prevalence of infectious diseases* variables developed by Fincher and Thornhill (2008).[5] Epidemiological data are neither economic nor political in nature, thus they ensure a sufficient source of exogenous variation for ethnic diversity. Our empirical findings provide evidence of a negative, statistically significant and quantitatively important effect of ethnic diversity on trade union density, which remains robust across different specifications and estimation techniques.

In the second part, we re-examine the above-mentioned hypothesis by using individual-level data from the European Social Survey (ESS). More precisely, our analysis builds on a set of 6880 –first generation– immigrants from 116 countries of origin who reside in 32 European countries and makes use of the so-called *epidemiological approach* suggested by Fernandez (2008, 2011) and employed by a large number of scholars in order to separate culture from the environment (see e.g., Luttmer and Singhal (2011); Galor and Özak, 2016). This part of the analysis explores the effect of ethnic diversity in the birth country of a –first generation– immigrant on his/her decision to participate in a trade union in the country of residence. Individual data allows us to account for a number of personal characteristics (such as age, gender, education, type of employment etc) but most importantly to introduce residence country fixed effects that are able to account for institutional and cultural characteristics of the country of residence. Empirical findings suggest that the decision of a worker to participate in trade unions is affected negatively by increased ethnic diversity in his/her birth country. Once again, our empirical findings remain robust and qualitatively intact across different specifications and estimation techniques.

The remainder of the paper proceeds along the following lines. Section 2 discusses the economic argument upon which we base our

[2] According to Olson (1965), participation in trade unions constitutes a very standard type of collective action. This is because trade unions provide several non-excludable benefits to every single worker (e.g., improvement in workplace safety and working conditions in general, wage increases etc) independently of whether he/she incurred the related costs.

[3] The view that working-class ethnic and racial diversity undermined class consciousness and weakened the socialist political movements in America was put forward in 1870 by Karl Marx, who emphasized that American socialists should press for a coalition among workers of different ethnic backgrounds (see the letter of Marx to S. Meyer and A. Vogt, April 9, 1870 in Karl Marx (1973) pp. 499–500). Similarly, Engels wrote a letter to Sorge, December 2, 1892, emphasizing that: "[…] the great obstacle in America, it seems to me, lies in the exceptional position of the native workers. […] The ordinary badly paid occupations are left to immigrants, of whom only a small section enters the aristocratic trade unions" (see Marx and Engels (1936)).

[4] In a parallel -albeit related-literature, focusing mainly on fiscal redistribution, Roemer (1998), Lee and Roemer (2006) and Roemer and Van der Straeten (2005), (2006) investigate the effect of adding a second dimension (such as race or religion) to the political conflict for redistribution. Their analysis suggests that the inclusion of a second racial dimension divides the group of agents that are in favor of redistribution (i.e., the relatively poor agents) and leads to a bundling effect that mitigates redistributive policies. This is because a share of the voters that are in favor of redistribution votes for a political party that advocates lower redistribution since they may agree with the party's agenda on ethnic and racial issues.

[5] Although many recent empirical studies employ pathogen prevalence of infectious diseases as an instrument for culture (see e.g., Gorodnichenko and Roland, 2017; Gründler amd Köllner, 2020; Kammas et al., 2017; Kyriacou, 2022; Nikolaev et al., 2017) to the best of our knowledge, there is no study that employs the same set of variables as an instrument for ethnic diversity. This is puzzling since the effect of biogeography on ethnolinguistic diversity is well-established in the relevant literature (see e.g., Michalopoulos, 2012; Cashdan, 2001; Fincher and Thornhill, 2008, 2012, 2014).

empirical analysis. Section 3 discusses the data and the identification strategy. Section 4 presents the empirical findings. Finally, Section 5 concludes.

2. Literature and the economic argument

A number of studies on diversity investigate the relationship between ethnic fractionalization and the amount or distribution of public spending by governments or-more recently-on attitudes towards activities and goods that generate public benefits (see Alesina and La Ferrara, 2005; Stichnoth and Van de Straeten, 2013 for reviews of this literature). The main conclusion from this literature is that ethnically diverse communities spend less on social programs as a share of GDP (Alesina and Glaeser, 2004; Desmet et al., 2009), less on schools (Alesina et al., 2003; Goldin and Katz, 1999) and less on public infrastructure (Alesina et al., 2003; La Porta et al., 1999).

Moreover, the relevant literature suggests that increased ethnic diversity exerts a negative impact on individual attitudes and behavior when public benefits are involved. Specifically, in ethnically heterogeneous communities, individuals express a stronger preference for decreasing social benefits (Dahlberg et al., 2012), contribute less to community organizations (Otken and Osili, 2004), contribute less to schools through voluntary fundraising events (Miguel and Gugerty, 2005), are less likely to fill out census forms (Vigdor, 2004), donate less on private charities (Andreoni et al., 2016) and participate less in social groups (Alesina and La Ferrara, 2000). There are several explanations for this widely observed result. One potential explanation is that different groups have different preferences or agendas for public spending and that this variation makes the provision of public goods more costly in heterogeneous communities (see Alesina et al., 1999). An alternative explanation is that altruism travels less across racial and ethnic lines and members of one racial or ethnic group naturally dislike members of other groups (see e.g., Allport, 1954; Becker 1957). Moreover, there may be mistrust across groups (Alesina and La Ferrara, 2002; Fershtman and Gneezy, 2001) or pro-social group norms that are not easily enforceable across groups (Habyarimana et al., 2007).

Although there is much anecdotal evidence that strong ethnic antipathies among workers weaken their willingness to participate in trade unions (see e.g., Lipset and Marks, 2000; Davis, 1988; Sombart, 1906), to the best of our knowledge the relationship between ethnic diversity and trade union participation has not been investigated by the relevant literature. Since trade unions are also social groups that provide non-excludable benefits to every single worker (e.g., improvement in workplace safety and working conditions in general, wage increases etc) independently of whether he/she contributed to the costs (see Olson, 1965), our analysis seeks to complement the relevant literature by placing the spotlight on this specific type of social group by investigating whether workers participate less in trade unions in ethnically fragmented societies.

3. Data and empirical strategy

The empirical analysis takes place in two layers exploiting exogenous variation in ethnic diversity across: (a) countries and (b) immigrants from different countries within Europe.

3.1. Cross-country analysis

This part of the analysis relies on country-level data from 90 -developed and developing-countries and investigates the effect of ethnic and religious diversity on trade union density. Table A1 in the Appendix provides definitions, detailed descriptive statistics and sources for all variables employed in the empirical analysis. Table A2 in the Appendix provides the full list of countries and information for our core variables.

3.1.1. Data and empirical strategy

Two of the most well-established measures of ethnic fractionalization at the country level are those developed by: (i) Alesina et al. (2003) and (ii) Fearon (2003). The ethnic fractionalization measure developed by Alesina et al. (2003) [denoted as *Ethnic (Alesina)*] is an index reflecting the probability that two randomly selected individuals in a country's population belong to different ethnic groups. In other words, *Ethnic (Alesina)* equals to one minus the Herfindahl index of ethnic groups' shares, where the primary data on ethnic groups' shares are obtained by the *Atlas Narodov Mira,* carried out by a team of Soviet ethnographers in the early 1960s. Similarly, Fearon (2003) compiled an index of ethnic fractionalization [denoted as *Ethnic (Fearon)*] based on 822 different ethnic and "ethno-religious" groups in 160 countries. The primary sources for this measure are the *CIA's World* Factbook, the *Encyclopaedia Britannica* and, when possible, the relevant *Library of Congress Country Study*.[6] The analysis basically relies on these two alternative measures of ethnic fractionalization. However, in a battery of robustness checks we also employ: (i) the ethnic diversity measure developed by Montalvo and Reynal-Querol (2005) [denoted as *Ethnic (Montalvo)*], (ii) the total number of distinct ethnic groups in a country's population, as developed by Fearon (2003) [denoted as *Number of ethnic groups(Fearon)*], (iii) the number of major religions and ethno-religions per country compiled by Barrett et al. (2001) *World Christian Encyclopaedia* [denoted as *Religion Diversity (Barrett)*] and (iv) the religion fractionalization developed by Montalvo and Reynal-Querol (2005) [denoted as *Religion Fractionalization (Montalvo)*].

Concerning the trade union density measures, we also employ two alternative indices. The first one -which ensures the maximum

[6] See Fearon (2003) for additional details on primary data sources and methodological assumptions of what defines a separate ethnic group.

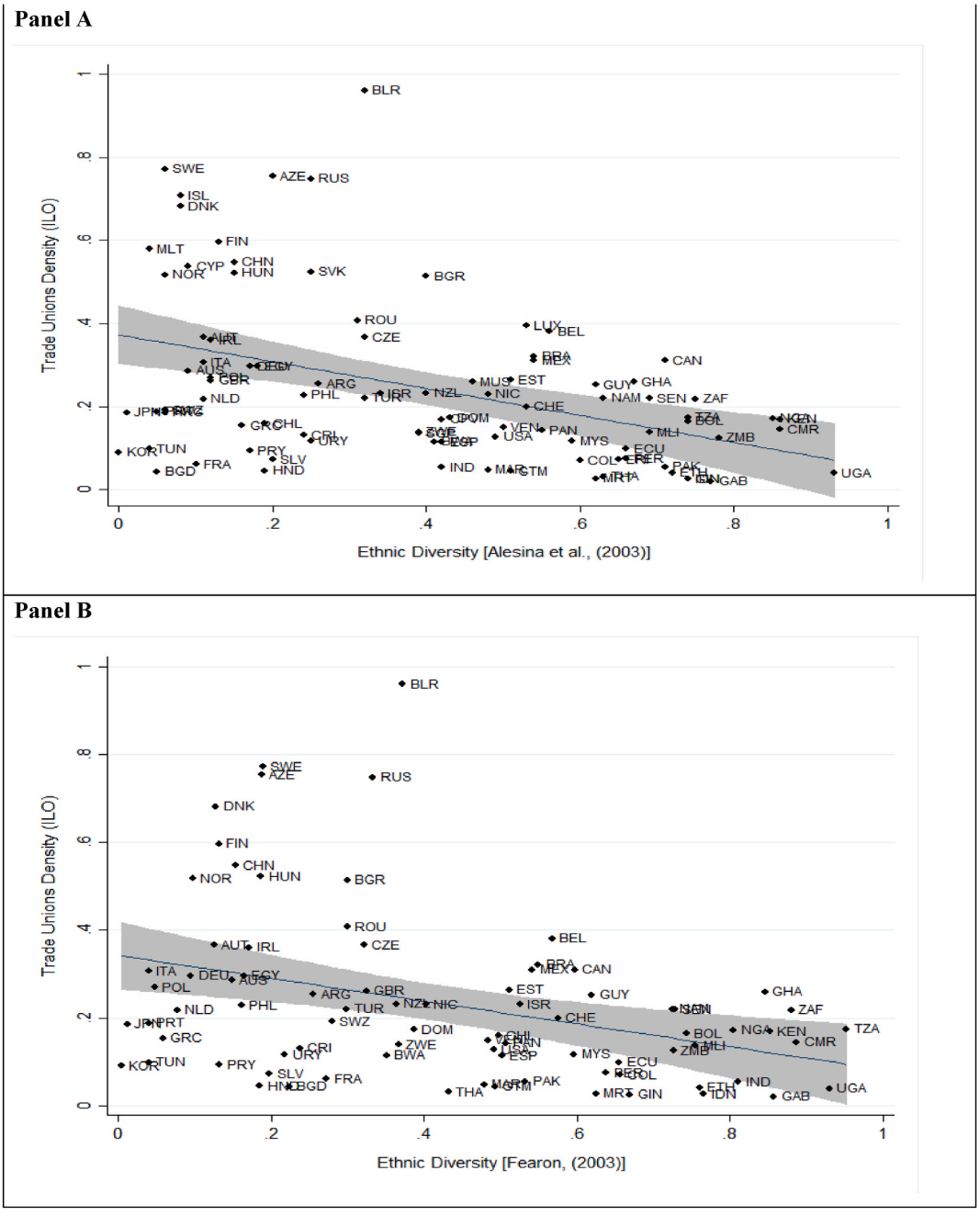

Fig. 1. Ethnic Diversity and Trade Union Density [Fitted trend plot, intervals at 95% confidence level].

number of observations-is the trade union density compiled by the International Labour Organization (ILO) in the *World Labour Report*, whereas the second is the trade union density measure developed by Botero et al. (2004). Both these variables capture union membership as a proportion of the eligible workforce (i.e., non-agricultural labor force) and can be employed as indicators of the degree to which workers are organized in unions.

The analysis relies on contemporary measures of trade union density and ethnic diversity that can be endogenous to a number of confounding factors. To address potential endogeneity and omitted variable concerns, in most empirical specifications, we instrument ethnic diversity on a set of epidemiological variables that have been linked empirically to ethnic and religious diversity (see e.g., Cashdan, 2001; Fincher and Thornhill, 2008). More precisely, we employ as instruments the: (i) *combined parasite-stress;* (ii) *non-zoo parasite-stress* both developed by Fincher and Thornhill (2012); (iii) *pathogen prevalence of infectious diseases* developed by Fincher and Thornhill (2008).

Starting from McNeill (1974, 1980) and Diamond (1997), a large body of literature in social anthropology investigates how infectious diseases affect the structure of human communities and the cultural norms within communities across different times and places. More recently, a number of studies (see e.g., Fincher and Thornhill, 2014 for a review of this literature) place the spotlight on specific aspects of culture and investigate how infectious diseases affect the strength of family ties and religiosity (Fincher and Thornhill, 2012), the individualism/collectivism dimension of culture (Murray and Schaller, 2010; Fincher et al., 2008) or ethnic and religious diversity (Cashdan, 2001; Fincher and Thornhill, 2008).[7]

According to this literature and the so-called "parasite-stress theory of sociality", infectious diseases constitute a major source of morbidity and mortality along human history and hence human communities developed behavioral adaptations to defend against parasites (see Fincher and Thronhill, 2012; 2014). Behavioral adaptations (also described as *behavioral immune system*) basically consist of a number of ancestrally adaptive attitudes, social values and norms towards out-group and in-group members, unwillingness to interact with out-group people and prejudice against people perceived as unhealthy, contaminated or unclean.[8] In other words, human communities developed a set of cultural norms and social values aiming at being protected by infectious diseases (see e.g., Fincher and Thornhill, 2014 for more details on this). Since contemporary cultural values are affected -at least in part-by the *behavioral immune system* developed by local communities over the centuries, we expect regions located in more lethal disease environments to be characterized by more collectivistic norms (i.e., in-group favoritism, stronger family ties etc) even nowadays.

Focusing on issues related to ethnic fragmentation, Cashdan (2001) suggests that ethnic diversity is shaped chiefly by environmental factors and more precisely by: (i) unpredictable climate and (ii) high pathogen prevalence. Concerning the issue of pathogen prevalence, Cashdan (2001) employs a composite index of pathogen stress -that takes into account the worldwide distribution of leishmanias, trypanosomes, malaria, schistosomes, filariae, spirochetes and leprosy- and provides empirical evidence in favor of a positive relationship between pathogen stress (i.e., infectious diseases) and ethnic diversity. Specifically, the empirical analysis suggests that regions characterized by heavier pathogen stress are crowed by relatively more ethnic groups (that is they exhibit stronger ethnic diversity). This is because in these regions, human communities developed closer social relationships between their members (i.e., the so-called "in-group members") and a more defensive or xenophobic behaviour towards the strangers (i.e., the so-called "out-group members"). This strategy initially served as a means of protection against infectious diseases and gradually transformed to ethnic diversity. Similarly, Fincher and Thornhill (2008) provide evidence of a positive and significant relationship between infectious diseases and religion diversity.[9]

3.1.2. Empirical specification

The economic argument presented above, predicts that workers participate less in trade unions in more ethnically fragmented societies. In line with this, Fig. 1 shows a clear-cut negative correlation between ethnic diversity and trade union density across countries, with more ethnically fragmented countries presenting lower levels of trade union density (see e.g., Uganda, Cameroon, and Gabon). Obviously, the converse applies to countries characterized by stronger ethnic homogeneity (such as Sweden, Denmark, Iceland, or Finland).

While these raw correlations are very informative, they cannot be interpreted as causal. This is because the negative relationship presented in Fig. 1 could be driven by a third variable that remains unobserved (such as for example economic development). To alleviate concerns of potential omitted variable bias, we proceed by estimating the following econometric model:

$$Y_i = \alpha_0 + \alpha_1 Ethnic_i + \beta X_i + \varepsilon_i \tag{1}$$

where i indexes for countries, Y_i is trade union density from 2010 to 2012, $Ethnic_i$ is a measure of ethnic diversity, X_i is a vector of control variables and ε_i denotes the error term. The vector X_i is identical to similar empirical studies that investigate the determinants of labor market institutions (see e.g., Potrafke 2010, 2013). More precisely, it includes *Population, Working Age Population, Unemployment, KOF Globalization index, Inequality, Democracy, Public Spending on Health (share of GDP)*) and a set of dummy variables for continents, major religions (see, La Porta et al., 1999) and legal origins (see La Porta et al., 2008).[10]

As we have already mentioned, in our preferred specifications, we instrument $Ethnic_i$ on a set of epidemiological variables that have been linked empirically to ethnic and religious diversity (see e.g., Cashdan, 2001; Fincher and Thornhill, 2008).

3.2. Immigrants from different countries within Europe

The second part of the analysis explores the effect of ethnic diversity on the decision of a worker to participate in a trade union. In

[7] For instance, McNeill (1974) suggested that castes in India initially formed, at least in part as a cultural response to local parasite-stress. In other words, castes formed as a system of social values and behavior toward out-group and in-group members and prejudice against people perceived as unhealthy, contaminated or unclean.

[8] To be more precise, human communities developed chiefly two types of adaptation against parasites stress. The first one is the *classical immune system* that consists of biochemical, cellular and tissue-based adaptation, whereas the second one is the *behavioral immune system,* which is comprised by a set of cultural norms and social values aiming to protect the community from infectious diseases (see e.g., Fincher and Thornhill, 2012, 2014).

[9] Other empirical studies that build upon the insights of biogeography in order to investigate the origins of ethnic and cultural fragmentation in contemporary national populations include Ashraf and Galor (2013), Ahlerup and Olsson (2012) and Michalopoulos (2012).

[10] Most of the socioeconomic variables included in vector X_i are averages over the period 2000–2010. For detailed descriptive statistics and data sources of all variables employed in the empirical analysis, see Table A1 in the Appendix.

particular, our analysis builds on the *epidemiological* empirical strategy suggested by Fernandez (2008, 2011) and employs a set of 6880 immigrants from 116 countries of origin, residing in 32 European countries. It is established that higher levels of ethnic diversity in the country of origin are associated with lower levels of participation in trade unions.

3.2.1. Data and empirical strategy

The main objective of this part of the analysis is to investigate the effect of ethnic diversity on the decision of a worker to participate in a trade union. However, the decision of a worker to participate in a trade union inevitably reflects many country characteristics such as the level of economic development, the economic and political institutions of the country etc. To separate the decision of each individual from the general economic and institutional setting, our analysis follows the empirical strategy suggested by Fernandez (2008, 2011) and places the spotlight on a set of 6880 first-generation immigrants from 116 countries of origin, residing in 32 European countries.

This approach allows us to account for a number of individual characteristics (such as age, gender, education, type of employment etc) but most importantly to introduce residence country fixed effects, which are able to account for a large number of characteristics of the residence country (such as economic and political institutions, culture etc). Specifically, we proceed by estimating the following empirical specification for the immigrants' decision to participate in a trade union:

$$Y_i = \alpha_0 + \alpha_1 Ethnic_b + \beta X_i + \theta_r + \varepsilon_i \tag{2}$$

where i indexes for individuals, Y_i is a dummy variable that equals one whenever an immigrant worker is a member of a trade union in the country of residence and zero otherwise, $Ethnic_b$ is the measure of ethnic diversity in the birth country of the immigrant, X_i is a vector of individual characteristics, θ_r is a fixed effect for residence country r of immigrant i and ε_i denotes the error term. We adjust standard errors to allow for clustering of the error term by birth country. The vector of individual characteristics X_i includes demographic characteristics such as age and gender, education, type of employment, sector of employment, political preferences etc. The residence country fixed effect θ_r captures the effect of economic and political institutions as well as potential cultural influences of the residence country.

We employ individual data from the 5th and 6th rounds of the European Social Survey (ESS), a cross-sectional survey conducted in a number of European countries.[11] The analysis reports attitudes of *N=6880* first-generation immigrants, who originate from 116 countries all over the world and have migrated in 32 European countries. Data on ethnic fractionalization are associated with the country of origin of the migrant and vary solely at the birth country level. Apparently, these data are identical to those employed in the country-level analysis.

Respondents are given the statement "*Are you or have ever been a member of trade union or similar organization?*" and the respondents answer by "*Yes*" or "*No*". The ESS database also provides information about the age of the respondent, the gender, the highest level of education achieved, the type and the sector of employment, the religion denomination in which he/she belongs and the political preferences of the respondent. In order to control for a variety of potentially confounding factors we employ two alternative sets of controls. The first one is identical to the set of explanatory variables employed by Schnabel and Wagner (2007) whereas the second is that used by Kirmanoğlu and Başlevent (2012), both of which investigate the decision to participate in trade unions.

4. Empirical results

In this section, we examine whether the data implies that ethnic diversity influences trade union density. First, we present empirical results using a minimum set of controls [Tables 1 and 2]. Then we inquire into the robustness of our empirical findings by employing extended sets of controls and alternative ethnic diversity measures [Tables 3 and 4]. Finally, we investigate whether the above-mentioned relationship survives when our analysis relies on micro-level data [Tables 5 and 6].

4.1. The effect of ethnic diversity on trade union density: baseline results

Table 1 presents OLS and 2SLS estimates of Equation (1), when we employ the *Trade Union Density* measure developed by ILO as dependent variable and the ethnic diversity measure compiled by Alesina et al. (2003) as the key explanatory variable. More precisely, columns (1)–(3) present the simple OLS estimates and columns (4)–(12) the 2SLS estimates where *Ethnic (Alesina)* is instrumented on the: (i) *combined parasite-stress* measure developed by Fincher and Thornhill (2012) [see columns (4)–(6)], (ii) *pathogen prevalence of infectious diseases* measure developed by Fincher and Thornhill (2008) [see columns (7)–(9)] and (iii) *non-zoo parasite-stress* index compiled by Fincher and Thornhill (2012) [see columns (10)–(12)]. In most empirical specifications we control for continental fixed effects whereas in Columns (3), (6), (9) and (12) we also control for the level of economic development by employing the log *of GDP per capita* from 2000 to 2010 (taken from the *World Bank Development Indicators*).

[11] We choose to employ individual level data solely from the 5th (2010) and the 6th (2012) rounds of European Social Survey (ESS) as to be consistent with the first layer of the analysis [presented in Section 3.1]. More precisely, by relying on these two rounds we develop a dependent variable that captures the decision of workers to participate in trade unions from 2010 to 2012. It must be noted that the dependent variable employed in the country-level analysis (i.e., *Trade Union Density ILO*) has been constructed as an average over the same time period. For more details on this, see Table A1 in the Appendix.

Table 1
The effect of ethnic fractionalization (as measured by *Alesina* et al., *2003*) on trade union density. OLS and IV estimates, baseline results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Second Stage, Dependent variable: Trade Union Density												
		OLS		**2SLS (Combined Parasite-stress)**			**2SLS (Pathogen Prevalence)**			**2SLS (Non-Zoo Parasite-stress)**		
Ethnic (Alesina)	−0.323***	−0.287***	−0.214***	−0.586***	−0.668***	−0.588***	−0.602***	−0.708***	−0.682***	−0.564***	−0.609***	−0.521***
	(0.070)	(0.074)	(0.081)	(0.093)	(0.128)	(0.147)	(0.103)	(0.145)	(0.214)	(0.093)	(0.122)	(0.154)
GDP per capita			0.048			0.016			−0.005			0.020
			(0.019)			(0.024)			(0.031)			(0.028)
First Stage: the instrumented variable is Ethnic (Alesina)												
Combined Parasite-stress				0.062***	0.058***	0.070***						
				(0.005)	(0.007)	(0.009)						
Pathogen Prevalence							0.025***	0.021***	0.022***			
							(0.002)	(0.003)	(0.003)			
Non Zoo Parasite-stress										0.090***	0.078***	0.085***
										(0.008)	(0.009)	(0.011)
Continent dummies		✓	✓		✓	✓		✓	✓		✓	✓
F-stat (1st Stage)				123.6	60.02	51.39	95.19	40.56	28.63	122.62	56.32	47.54
Critical Values of Stock and Yogo (2005)												
10% maximal IV size				16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38
15% maximal IV size				8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96
Observations	90	90	90	89	89	89	90	90	90	90	90	90
R^2	0.18	0.27	0.29									

Notes: The table presents OLS and 2SLS estimates of Equation (1), when we employ the *Trade Union Density* measure developed by ILO as dependent variable and the ethnic diversity measure compiled by Alesina et al. (2003) as key explanatory variable. Columns (1)–(3) present the simple OLS estimates and columns (4)–(12) the 2SLS estimates when *Ethnic (Alesina)* is instrumented on the: (i) *combined parasite-stress* measure developed by Fincher and Thornhill (2012) [columns (4)–(6)], (ii) *pathogen prevalence of infectious diseases* measure developed by Fincher and Thornhill (2008) [see columns (7)–(9)] and (iii) *non-zoo parasite-stress* index compiled by Fincher and Thornhill (2012) [see columns (10)–(12)]. The set of continent dummies includes fixed effects for Sub-Saharan Africa, Middle East and North Africa, South Asia, East Asia and Pacific, North America and Latin America. Columns (3),(6),(9) and (12) also account for the level of economic development by employing the log of *GDP per capita* from 2000 to 2010 (taken from *World Bank Development Indicators*). The F-stat is the F statistic for the explanatory power of the excluded instrument in first-stage regressions. Robust standard errors are in parentheses. *** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

Table 2
The effect of ethnic fractionalization (as measured by *Fearon, 2003*) on trade union density. OLS and IV estimates, baseline results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Second Stage, Dependent variable: Trade Union Density												
	OLS			**2SLS (Combined Parasite-stress)**			**2SLS (Pathogen Prevalence)**			**2SLS (Non-Zoo Parasite-stress)**		
Ethnic (Fearon)	−0.260***	−0.203***	−0.150**	−0.501***	−0.636***	−0.511***	−0.561***	−0.736***	−0.655***	−0.499***	−0.582***	−0.459***
	(0.064)	(0.074)	(0.074)	(0.097)	(0.156)	(0.152)	(0.118)	(0.199)	(0.246)	(0.101)	(0.147)	(0.155)
GDP per capita			0.049			0.025			−0.015			0.028
			(0.020)			(0.025)			(0.032)			(0.024)
First Stage: the instrumented variable is Ethnic (Fearon)												
Combined Parasite-stress				0.064***	0.056***	0.073***						
				(0.006)	(0.009)	(0.010)						
Pathogen Prevalence							0.025***	0.018***	0.020***			
							(0.002)	(0.003)	(0.004)			
Non Zoo Parasite-stress										0.091***	0.074***	0.088***
										(0.009)	(0.011)	(0.012)
Continent dummies		✓	✓		✓	✓		✓	✓		✓	✓
F-stat (1st Stage)				108.2	37.72	48.19	78.49	25.00	20.64	102.3	42.46	51.12
Critical Values of Stock and Yogo (2005)												
10% maximal IV size				16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38
15% maximal IV size				8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96
Observations	81	81	81	81	81	81	81	81	81	81	81	81
R^2	0.13	0.21	0.24									

Notes: The table presents OLS and 2SLS estimates of Equation (1), when we employ the *Trade Union Density* measure developed by ILO as dependent variable and the ethnic diversity measure compiled by Fearon (2003) as key explanatory variable. Columns (1)–(3) present the simple OLS estimates and columns (4)–(12) the 2SLS estimates when *Ethnic (Fearon)* is instrumented on the: (i) *combined parasite-stress* measure developed by Fincher and Thornhill (2012) [columns (4)–(6)], (ii) *pathogen prevalence of infectious diseases* measure developed by Fincher and Thornhill (2008) [see columns (7)–(9)] and (iii) *non-zoo parasite-stress* index compiled by Fincher and Thornhill (2012) [see columns (10)–(12)]. The set of continent dummies includes fixed effects for Sub-Saharan Africa, Middle East and North Africa, South Asia, East Asia and Pacific, North America and Latin America. Columns (3),(6),(9) and (12) also account for the level of economic development by employing the log of *GDP per capita* from 2000 to 2010 (taken from *World Bank Development Indicators*). The F-stat is the F statistic for the explanatory power of the excluded instrument in first stage regressions. Robust standard errors are in parentheses. *** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

Table 3
The effect of ethnic diversity on trade union density: IV estimates, controlling for confounding factors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Second Stage, Dependent variable: Trade Union Density								
				2SLS (Instrument: Combined Parasite-stress)				
Ethnic (Alesina)	−0.336**	−0.444***	−0.460***	−0.437***				
	(0.158)	(0.147)	(0.155)	(0.150)				
Ethnic (Fearon)					−0.266*	−0.429***	−0.408***	−0.367***
					(0.153)	(0.147)	(0.153)	(0.141)
GDP per capita	−0.013	0.001	−0.042	−0.025	0.016	0.015	−0.017	0.001
	(0.055)	(0.051)	(0.048)	(0.048)	(0.057)	(0.058)	(0.053)	(0.053)
Controls								
Vector X_i	✓	✓	✓	✓	✓	✓	✓	✓
Continent dummies		✓	✓	✓		✓	✓	✓
Legal Origins			✓	✓			✓	✓
Religion				✓				✓
F-stat (1st Stage)	35.71	27.23	22.83	21.66	36.64	24.90	21.61	20.90
Critical Values of Stock and Yogo (2005)								
10% maximal IV size	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96
Observations	77	77	77	77	73	73	73	73

Notes: The table presents 2SLS estimates of Equation (1), when we employ the *Trade Union Density* measure developed by ILO as dependent variable and the ethnic diversity measure compiled by Alesina et al. (2003) [columns (1)–(4)] and Fearon (2003) [columns (5)–(8)] as key explanatory variables. More precisely, the Table presents empirical results obtained in the second stage when in the first stage we employ as instrument for ethnic diversity the *combined parasite-stress* measure developed by Fincher and Thornhill (2012). **Vector X_i** includes the standard set of controls employed in relevant studies (see e.g., Potrafke, 2010, 2013). More precisely, it includes *Population, Working Age Population, Unemployment, KOF Globalization index, Inequality, Democracy, Public Spending on Health (%GDP)*). **The set of continent dummies** includes fixed effects for Sub-Saharan Africa, Middle East and North Africa, South Asia, East Asia and Pacific, North America and Latin America. **The set of legal origins dummies** includes fixed effects for British legal origin, German origin, Scandinavian origin and French origin. Finally, **the set of major religions** controls for the share of Protestant, Muslim, Catholic and other religions in the population. The F-stat is the F statistic for the explanatory power of the excluded instrument in first-stage regressions. Robust standard errors are in parentheses. *** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

Ethnic diversity *[Ethnic (Alesina)]* is negatively and significantly related to trade union density in all alternative OLS estimates as well as in the second stage of 2SLS estimates, while the impact is larger when we account for endogeneity of ethnic diversity. So, for instance a one-standard deviation rise in ethnic diversity implies a 0.147 decline in trade union density when we use combined parasite stress as an instrument (column 6). Obtained empirical findings are in accordance with the predictions of the theory (see e.g., Alesina and La Ferrara, 2000; Lipset and Marks, 2000) highlighting the negative influence of ethnic fractionalization on trade union density. Moreover, focusing on the empirical results of the first stage, our analysis is also in line with Cashdan (2001) suggesting that countries characterized by heavier parasite-stress present higher levels of ethnic diversity.

Table 2 replicates the empirical estimations of Table 1, by employing the ethnic diversity measure developed by Fearon (2003) as a key explanatory variable. Following the same rationale, columns (1)–(3) present the OLS estimates, whereas columns (4)–(12) include results from the 2SLS estimates when *Ethnic (Fearon)* is instrumented on parasite-stress and pathogen prevalence data. In all alternative specifications ethnic diversity [*Ethnic (Fearon)*] is negatively and significantly related to trade union density, which is in line with our theoretical priors. Again, the 2SLS estimates are substantially larger than the OLS ones and similar with the effects found using the ethnic diversity measure of Alesina et al. (2003). In addition, by placing the spotlight on the first stage, we observe that obtained empirical findings are also in accordance with the "parasite-stress theory of values and sociality" suggesting that countries located in heavier disease environments present stronger ethnic divisions.

4.2. Robustness

Threats to the validity of our results basically come from the following sources: (i) the IV strategy may be prone to the weak instrument problem and the exclusion restriction may be violated; (ii) the relationship between ethnic diversity and trade union density may be contaminated by confounding factors; (iii) the findings may depend on our measures of ethnic diversity and trade union density.

4.2.1. The IV strategy, the exclusion restriction, and the potential confounding factors

The reliability of the IV results hinges critically on the strength of our epidemiological instrumental variables. Tables 1 and 2 report the results of weak instruments diagnostics. More precisely, they include first-stage results and F-statistics along with the critical values of Stock and Yogo (2005). Reported results of these tests give us confidence that employed epidemiological instruments are remarkably strong. At the same time the exclusion restriction requires that the epidemiological instruments operate solely through the ethnic

diversity channel on trade union density. This assumption cannot be tested directly and there is always a concern that epidemiological variables may be correlated with factors other than ethnic diversity.

However, to address concerns about factors that may undermine the exclusion restriction, in Table 3 we extend our analysis by including a set of confounding factors that is in line with relevant empirical studies (see e.g., Potrafke 2010, 2013). Namely we include, *Population, Working Age Population, Unemployment, KOF Globalization index, Inequality, Democracy, Public Spending on Health (share of GDP)*) and a set of dummy variables for continents, major religions (see, La Porta et al., 1999) and legal origins (see La Porta et al., 2008).[12] Table 3 presents the empirical results obtained in the second stage, when in the first stage we employ as instrument the *Combined parasite-stress* measure developed by Fincher and Thornhill (2012).[13] In all alternative specifications, *Ethnic (Alesina)* and *Ethnic (Fearon)* are negatively and significantly related to trade union density highlighting the negative impact of ethnic diversity on the participation in trade unions. By controlling for a number of factors, which would potentially violate our exclusion restriction, empirical findings presented in Table 3 strengthen our priors that epidemiological instruments operate solely through the ethnic diversity channel on trade union density.[14]

Moreover, since recent empirical studies provide evidence of a direct impact of epidemiological variables on specific cultural values (see e.g., Gorodnichenko and Roland, 2017; Gründler and Köllner, 2020; Kammas et al., 2017; Nikolaev et al., 2017; Olsson and Paik, 2016), in Table A4 (included in the Appendix) we also introduce in our set of controls, alternative proxies of cultural traits (e.g., individualism, positive/negative reciprocity, long-term orientation etc).[15] More precisely, we employ data from Hofstede et al. (2010) and Falk et al. (2018) to investigate whether cultural traits may violate our exclusion restriction. As can be easily verified, employed epidemiological instruments remain remarkably strong even after controlling for culture and our empirical findings remain qualitatively and quantitatively intact in all alternative specifications. Therefore, Table A4 strengthens our priors that parasite-stress instruments operate solely through the ethnic diversity channel on trade union density.

4.2.2. Alternative measures of ethnic diversity and trade union density

In Table 4 we inquire into the robustness of our empirical results by employing alternative ethnic and religion diversity measures. More precisely, Table 4 replicates the empirical estimations of Table 2 when we employ as key explanatory variables: (i) the total number of distinct ethnic groups in a country's population, as developed by Fearon (2003) [denoted as *Number of ethnic groups (Fearon)*] (columns (1)–(3)), (ii) the number of major religions and ethno-religions per country compiled by Barrett et al. (2001) *World Christian Encyclopaedia* [denoted as *Religion Diversity (Barrett)*] (columns (4)–(6)), (iii) ethnic fractionalization measure developed by Montalvo and Reynal-Querol (2005) [denoted as *Ethnic (Montalvo)*] (columns (7)–(9)), and (iv) the religion fractionalization developed by Montalvo and Reynal-Querol (2005) [denoted as *Religion Fractionalization (Montalvo)*] (columns (10)–(12)). As before, Table 4 presents the empirical results obtained in the second stage when in the first stage we employ as instrument for ethnic diversity the *combined parasite-stress* measure developed by Fincher and Thornhill (2012). All four alternative ethnic and religious fractionalization measures are negatively and significantly related to trade union density highlighting the negative influence of ethnic diversity on the participation in trade unions. Findings are also quantitatively similar with previous results. Thus, our empirical results are not sensitive to the ethnic (or religious) diversity measure employed.

Moreover, in Table A3 (included in the Appendix), we replicate the empirical estimations of Table 3 by employing as dependent variable the trade union density measure developed by Botero et al. (2004) [denoted as *Trade Union (Botero)*]. The use of this measure implies a significant drop in our sample size that now equals a maximum of 63 observations. As before, we present empirical findings of the second stage when we employ as instrument for ethnic diversity in the first stage the *Combined parasite-stress* measure compiled by Fincher and Thornhill (2012). As can be verified, in all alternative specifications, *Ethnic (Alesina)* and *Ethnic (Fearon)* are negatively and significantly related to trade union density. Empirical findings presented in Tables 4 and A3 alleviate concerns that our results may depend on specific ethnic diversity and trade union density measures. Thus, they provide further evidence in favor of a negative impact of ethnic fractionalization on trade union density.

4.3. The effect of ethnic diversity in the birth country on the decision to participate in trade unions

In Table 5 we investigate the effect of ethnic diversity on the decision to participate in trade unions. More precisely, we proceed by presenting Probit estimates of Equation (2), using data for a sample of $N=6880$ first-generation immigrants in Europe who originate from 116 different countries. Individual-level data are obtained from the European Social Survey (ESS), whereas the data on ethnic diversity are identical to those employed in the cross-country analysis and vary solely at the birth country (of the immigrant) level. We follow the *epidemiological approach* suggested by Fernandez (2008, 2011) and employed by several scholars (see e.g., Luttmer and

[12] Our decision to build our analysis on a baseline model specification that includes a minimum set of control variables (see Tables 1 and 2) is driven from the risk of introducing "bad controls" in our analysis (see Angrist and Pischke, 2009). However, in Tables 3 and 4 we extend our set of explanatory variables as to control for factors that would potentially violate our exclusion restriction.

[13] We note that obtained empirical findings remain qualitatively intact when we employ as instruments the *pathogen prevalence* as well as the *non-zoo parasite-stress* measures. Results are available upon request.

[14] The empirical results of the first stage remain qualitatively identical to those presented in Tables 1 and 2. All empirical findings are available upon request.

[15] Obviously, the use of these measures implies a significant drop in the size of our sample to a maximum of 56 observations. This is the main reason that we prefer not to include cultural variables in our baseline empirical model.

Table 4
The effect of ethnic diversity on trade union density: IV estimates, alternative ethnic and religion diversity measures.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Second Stage, Dependent variable: Trade Union Density												
	2SLS (Instrument: Combined Parasite-stress)											
Number of Ethnic Groups (Fearon)	−0.371***	−0.267***	−0.229**									
	(0.139)	(0.097)	(0.094)									
Number of Religions (Barrett)				−0.112***	−0.110***	−0.106***						
				(0.034)	(0.040)	(0.038)						
Ethnic Fractionalization (Montalvo)							−0.457***	−0.381**	−0.407**			
							(0.153)	(0.193)	(0.203)			
Religion Fractionalization (Montalvo)										−0.827**	−0.553*	−0.573**
										(0.363)	(0.292)	(0.283)
GDP per capita	0.038	−0.035	−0.036	0.027	0.001	−0.026	0.021	−0.024	−0.064	0.027	0.050	0.010
	(0.027)	(0.070)	(0.068)	(0.023)	(0.062)	(0.059)	(0.026)	(0.054)	(0.054)	(0.030)	(0.067)	(0.068)
Controls												
Continent dummies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vector X_i		✓	✓		✓	✓		✓	✓		✓	✓
Religion			✓			✓			✓			✓
Legal Origins			✓			✓			✓			✓
F-stat (1st Stage)	12.23	14.38	11.16	53.81	32.06	27.26	57.85	11.15	8.72	8.63	7.15	7.68
Critical Values of Stock and Yogo (2005)												
10% maximal IV size	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38
15% maximal IV size	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96
Observations	81	73	73	88	76	76	89	69	69	79	69	69

Notes: The table presents 2SLS estimates of Equation (1), when we employ the *Trade Union Density* measure developed by ILO as dependent variable and the total number of distinct ethnic groups developed by Fearon (2003) [columns (1)–(3)], the number of major religions and ethno-religions per country compiled by Barrett et al. (2001) [columns (4)–(6)], ethnic fractionalization measure developed by Montalvo and Reynal-Querol (2005) [columns (7)–(9)] and the religion fractionalization developed by Montalvo and Reynal-Querol (2005) [columns (10)–(12)] as key explanatory variables. More precisely, the Table presents empirical results obtained in the second stage when in the first stage we employ as instrument for ethnic diversity the *combined parasite-stress* measure developed by Fincher and Thornhill (2012). **Vector X_i** includes the standard set of controls employed in relevant studies (see e.g., Potrafke, 2010, 2013). More precisely, it includes *Population, Working Age Population, Unemployment, KOF Globalization index, Inequality, Democracy, Public Spending on Health (%GDP)*). **The set of continent dummies** includes fixed effects for Sub-Saharan Africa, Middle East and North Africa, South Asia, East Asia and Pacific, North America and Latin America. **The set of legal origins dummies** includes fixed effects for British legal origin, German origin, Scandinavian origin and French origin. Finally, **the set of major religions** controls for the share of Protestant, Muslim, Catholic and other religions in the population. The F-stat is the F statistic for the explanatory power of the excluded instrument in first-stage regressions. Robust standard errors are in parentheses. *** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

Table 5
Factors influencing the probability of union membership [Schnabel and Wagner (2007) set of controls].

	(1)	(2)	(3)	(4)	(5)	(6)
Ethnic Alesina (birth country)	−0.614***	−0.368**	−0.396**			
	(0.157)	(0.167)	(0.194)			
Ethnic Fearon (birth country)				−0.535***	−0.334**	−0.366**
				(0.136)	(0.150)	(0.173)
Gdp per capita (birth country)			−0.001			−0.001
			(0.003)			(0.003)
Age		0.080***	0.081***		0.080***	0.080***
		(0.010)	(0.010)		(0.010)	(0.010)
Age square		−0.057***	−0.057***		−0.056***	−0.056***
		(0.009)	(0.009)		(0.009)	(0.009)
Gender		−0.049	−0.049		−0.028	−0.027
		(0.061)	(0.061)		(0.058)	(0.058)
Education Low		−0.139***	−0.140***		−0.118**	−0.119**
		(0.053)	(0.053)		(0.049)	(0.048)
Education High		0.005	0.006		0.017	0.018
		(0.057)	(0.057)		(0.058)	(0.058)
Part Time worker		−0.037	−0.036		−0.046	−0.046
		(0.059)	(0.059)		(0.059)	(0.060)
Establishment Size (<10)		0.237***	0.236***		0.234***	0.233***
		(0.083)	(0.082)		(0.084)	(0.084)
Establishment Size (25> and <99)		0.437***	0.437***		0.437***	0.437***
		(0.073)	(0.073)		(0.074)	(0.074)
Establishment Size (100> and <499)		0.579***	0.579***		0.577***	0.577***
		(0.074)	(0.074)		(0.073)	(0.073)
Establishment Size (>500)		0.585***	0.585***		0.587***	0.587***
		(0.071)	(0.071)		(0.070)	(0.070)
Left-Right Scale		−0.042***	−0.042***		−0.041***	−0.041***
		(0.014)	(0.014)		(0.014)	(0.014)
Member of Religion		0.032	0.030		0.040	0.037
		(0.059)	(0.061)		(0.060)	(0.062)
Father Education Low		0.041	0.041		0.049	0.050
		(0.053)	(0.053)		(0.054)	(0.054)
Mother Education Low		0.071	0.068		0.053	0.050
		(0.054)	(0.051)		(0.053)	(0.049)
Father Self Employed		−0.107***	−0.107***		−0.106***	−0.106***
		(0.037)	(0.037)		(0.039)	(0.039)
ESS round	0.003	0.027	0.026	0.005	0.030	0.029
	(0.030)	(0.046)	(0.046)	(0.031)	(0.046)	(0.046)
Residence country dummies (32)	✓	✓	✓	✓	✓	✓
Observations	6880	4022	4022	6777	3955	3955

Notes: Robust standard errors adjusted for clustering by birth countries are in parentheses. The dependent variable is ever union membership. Column (1) presents Probit estimates of Equation (2) when the set of covariates include solely the ethnic diversity at the birth country of the immigrant [denoted as *Ethnic Alesina (birth country)*] and residence country fixed effects. In turn, in column (2) the set of controls is extended so as to include a battery of individual characteristics whereas in column (3) we also account for the level of development by introducing gdp *per capita* at the birth country of the immigrant [denoted as *gdp per capita (birth country)*]. In columns (4)–(6) we replicate the empirical estimations of columns (1)–(3) by employing as key explanatory variable the ethnic diversity measure compiled by Fearon (2003) in the birth country of the immigrant [denoted as *Ethnic Fearon (birth country)*]. Individual data are obtained by the 5th and 6th rounds of European Social Survey (ESS).*** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

Singhal (2011); Galor and Özak, 2016), which allows us to introduce residence country fixed effects and hence to control for a battery of confounding factors that vary at the residence country level (such as labor market institutions). Finally, we account for a number of individual characteristics (such as age, gender, level of education, type of employment etc) by employing a set of covariates identical to those employed by Schnabel and Wagner (2007).

Specifically, column (1) presents Probit estimates of Equation (2) when the set of covariates includes solely the ethnic diversity in the birth country of the migrant [denoted as *Ethnic Alesina (birth country)*] and residence country fixed effects. In turn, in column (2) the set of controls is extended so as to include a battery of individual characteristics, whereas in column (3) we also account for the level of development by introducing gdp *per capita* in the birth country of the migrant [denoted as *gdp per capita (birth country)*]. As can be seen in all three alternative specifications, *Ethnic Alesina (birth country)* enters with a negative and highly significant coefficient highlighting the negative effect of increased ethnic diversity in the country of origin on the decision of the immigrant worker to participate in trade unions. In columns (4)–(6) we replicate the empirical estimations of columns (1)–(3) by employing as key explanatory variable the ethnic diversity measure compiled by Fearon (2003) in the birth country of the migrant [denoted as *Ethnic Fearon (birth country)*]. Once again, *Ethnic Fearon (birth country)* bears a negative and significant coefficient providing further evidence of a negative effect of ethnic diversity (in the country of origin) on the decision of a worker to participate in trade unions (in the country of residence). We should also note that the size of the estimates is very similar in the two sets of specifications.

Table 6
Factors influencing the probability of union membership [Kirmanoğlu and Başlevent (2012) set of controls].

	(1)	(2)	(3)	(4)	(5)	(6)
Ethnic Alesina (birth country)	−0.614***	−0.508***	−0.597***			
	(0.157)	(0.154)	(0.162)			
Ethnic Fearon (birth country)				−0.535***	−0.453***	−0.523***
				(0.136)	(0.153)	(0.158)
GDP per capita (birth country)			−0.003			−0.003
			(0.003)			(0.003)
Age		0.084***	0.084***		0.084***	0.084***
		(0.009)	(0.009)		(0.009)	(0.009)
Age square		−0.061***	−0.061***		−0.061***	−0.061***
		(0.008)	(0.008)		(0.009)	(0.009)
Gender		−0.194***	−0.192***		−0.174***	−0.173***
		(0.068)	(0.067)		(0.065)	(0.065)
Education Low		−0.141***	−0.143***		−0.127***	−0.130***
		(0.050)	(0.049)		(0.049)	(0.048)
Education High		−0.064	−0.061		−0.056	−0.053
		(0.059)	(0.059)		(0.060)	(0.060)
Left-Right Scale		−0.034***	−0.033***		−0.031***	−0.031***
		(0.010)	(0.010)		(0.010)	(0.010)
Religiosity		0.008	0.007		0.008	0.007
		(0.009)	(0.008)		(0.009)	(0.009)
Type of Employment						
Central Government		0.366*	0.365*		0.386*	0.385*
		(0.214)	(0.214)		(0.219)	(0.219)
Public Sector		0.476*	0.478*		0.504**	0.506**
		(0.251)	(0.251)		(0.254)	(0.254)
State owned enterprise		0.267	0.267		0.280	0.280
		(0.290)	(0.289)		(0.297)	(0.297)
Private Sector		−0.090	−0.091		−0.061	−0.062
		(0.268)	(0.268)		(0.272)	(0.272)
Self Employed		−0.574**	−0.572**		−0.541*	−0.539*
		(0.277)	(0.277)		(0.276)	(0.276)
Establishment Size (<10)		0.090	0.089		0.090	0.088
		(0.090)	(0.090)		(0.091)	(0.091)
Establishment Size (25> and <99)		0.198**	0.198**		0.193**	0.193**
		(0.081)	(0.081)		(0.082)	(0.082)
Establishment Size (100> and <499)		0.395***	0.394***		0.397***	0.396***
		(0.068)	(0.068)		(0.068)	(0.067)
Establishment Size (>500)		0.337***	0.336***		0.344***	0.345***
		(0.069)	(0.070)		(0.070)	(0.070)
Sector of Employment						
Mining		0.336	0.336		0.277	0.276
		(0.269)	(0.268)		(0.275)	(0.273)
Manufacturing		0.177***	0.178***		0.170***	0.171***
		(0.055)	(0.055)		(0.055)	(0.055)
Energy		−0.166	−0.166		−0.152	−0.150
		(0.174)	(0.173)		(0.174)	(0.174)
Construction		0.184	0.186		0.147	0.148
		(0.127)	(0.127)		(0.125)	(0.124)
Trade		0.060	0.061		0.049	0.050
		(0.074)	(0.074)		(0.074)	(0.074)
Transportation		0.242**	0.246**		0.233**	0.236**
		(0.105)	(0.105)		(0.105)	(0.105)
Communication		−0.299*	−0.294*		−0.319*	−0.315*
		(0.163)	(0.163)		(0.168)	(0.168)
Finance		−0.044	−0.041		−0.036	−0.033
		(0.133)	(0.133)		(0.132)	(0.132)
Public Administration		−0.021	−0.019		−0.005	−0.003
		(0.118)	(0.118)		(0.120)	(0.120)
Education		0.073	0.079		0.081	0.087
		(0.088)	(0.088)		(0.089)	(0.089)
Health		0.212**	0.213**		0.202**	0.202**
		(0.098)	(0.099)		(0.098)	(0.098)
Other		−0.051	−0.048		−0.077	−0.076
		(0.116)	(0.116)		(0.118)	(0.117)
Unlimited duration Contract		0.313***	0.313***		0.317***	0.316***
		(0.096)	(0.096)		(0.097)	(0.097)
Limited duration contract		0.111	0.108		0.103	0.100
		(0.093)	(0.093)		(0.093)	(0.093)

(*continued on next page*)

Table 6 (*continued*)

	(1)	(2)	(3)	(4)	(5)	(6)
ESS round	0.003	−0.008	−0.007	0.005	−0.008	−0.008
	(0.030)	(0.045)	(0.045)	(0.031)	(0.046)	(0.046)
Residence country dummies (32)	✓	✓	✓	✓	✓	✓
Observations	6880	4324	4323	6777	4258	4257

Notes: Robust standard errors adjusted for clustering by birth countries are in parentheses. The dependent variable is ever union membership. Column (1) presents Probit estimates of Equation (2) when the set of covariates include solely the ethnic diversity in the birth country of the migrant [denoted as *Ethnic Alesina (birth country)*] and residence country fixed effects. In turn, in column (2) the set of controls is extended so as to include a battery of individual characteristics whereas in column (3) we also account for the level of development by introducing gdp *per capita* at the birth country of the migrant [denoted as *gdp per capita (birth country)*]. In columns (4)–(6) we replicate the empirical estimations of columns (1)–(3) by employing as key explanatory variable the ethnic diversity measure compiled by Fearon (2003) in the birth country of the migrant [denoted as *Ethnic Fearon (birth country)*]. Individual data are obtained by the 5th and 6th rounds of European Social Survey (ESS).*** (**, *) denotes statistical significance at the 1 (5, 10) percent levels.

As far as the rest of the covariates are concerned, our empirical findings are in line with previous empirical studies (see e.g., Schnabel and Wagner, 2007; Kirmanoğlu and Başlevent, 2012). Specifically, *Age* exerts a non-linear, inverse U-shaped effect on the decision to participate in trade unions, whereas the level of education [denoted as *Education Low/High*], the establishment size of the firm and the political preferences of the worker [denoted in the *Left-Right Scale*] appear to be significant factors, which influence the participation decision.[16] Finally, the type of employment of the father bears a negative and significant coefficient indicating that workers coming from families, in which the father was self-employed tend to participate less in trade unions.

In Table 6 we inquire into the robustness of our obtained empirical results by replicating the empirical estimations of Table 5 using a set of explanatory variables identical to that employed by Kirmanoğlu and Başlevent (2012). We see that once again *Ethnic Alesina (birth country)* and *Ethnic Fearon (birth country)* enter with negative and significant coefficients providing further support for a negative effect of ethnic diversity (in the country of origin) on the decision of a worker to participate in trade unions. The effect sizes are almost identical with those reported in Table 5. Concerning the rest of the controls, our empirical findings remain qualitatively identical to those presented in Table 5 and they are also in line with previous empirical studies examining similar issues (see e.g., Kirmanoğlu and Başlevent, 2012).

5. Concluding remarks

Starting from Olson (1965) and Tullock (1971), the importance of collective-action problems in group formation has always been at the heart of the Public Choice and Political Economics literatures. This is because within the framework of rational choice, it appears to be puzzling why individuals decide to take actions that are costly for themselves but beneficial for a whole group. A more recent strand of this literature places the spotlight on issues related to ethnic diversity and highlights that collective action problems become even more severe in the case of ethnically diverse communities. The paper at hand, seeks to complement this literature by placing the spotlight on a specific type of social group (namely, trade unions) and by investigating whether workers participate less in trade unions in ethnically fragmented societies.

Based on an empirical analysis that takes place along two layers (i.e., across countries and within Europe for immigrants from different countries) we provide evidence that ethnic diversity exerts a highly significant, sizeable and negative impact on the decision of workers to participate in trade unions. To address concerns that a relationship between ethnic diversity and trade union density may be driven by confounding factors which remain unobserved -such as economic development-our analysis: (a) relies on a set of innovative instruments derived from biogeography, which have been linked empirically to ethnic diversity; (b) applies the *epidemiological approach* suggested by Fernandez (2008, 2011). To the best of our understanding, the above-mentioned identification strategy is the only one possible since our main variable of interest (i.e., ethnic diversity) does not present significant time variation and therefore is available solely across countries. We hope that this basic shortcoming-which restricts substantially available identification strategies-will be overcome through an emerging literature that builds on the fact that demographic composition in most countries changes during the decades and seeks to develop historical data on ethnic diversity that will exhibit significant variation over time (see e.g., Drazanova, 2020). By developing new panel data on ethnic diversity, many research questions in this area will be possible to be addressed even more successfully in the future.

Data availability

Data will be made available on request.

[16] It must be noted that *Left-Right Scale* locates the political preferences of each agent on a Left-Right political spectrum, with higher values denoting more extreme right-wing political preferences.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejpoleco.2022.102318.

References

Ahlerup, P., Olsson, O., 2012. The roots of ethnic diversity. J. Econ. Growth 17 (2), 71–102.
Alesina, A., Baqir, R., Easterly, W., 1999. Public goods and ethnic divisions. Q. J. Econ. 114, 1243–1284.
Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., Wacziarg, R., 2003. Fractionalization. J. Econ. Growth 8, 155–194.
Alesina, A., Glaeser, E., 2004. Fighting Poverty in the US and Europe: A World of Difference. Oxford University Press, Oxford, UK.
Alesina, A., La Ferrara, E., 2002. Who trusts others? J. Publ. Econ. 85 (2), 207–234.
Alesina, A., La Ferrara, E., 2000. Participation in heterogeneous communities. Q. J. Econ. 115, 847–904.
Alesina, A., La Ferrara, E., 2005. Ethnic diversity and economic performance. J. Econ. Lit. 43, 721–761.
Allport, G., 1954. The Nature of Prejudice. Addison-Wesley.
Andreoni, J., Payne, A.A., Smith, J., Karp, D., 2016. Diversity and donations: the effect of religious and ethnic diversity on charitable giving. J. Econ. Behav. Organ. 128, 47–58.
Angrist, J.D., Pischke, J.-S., 2009. Mostly Harmless Econometrics. An Empiricist's Companion. Princeton University Press, Princeton.
Ashraf, Q., Galor, O., 2013. Genetic diversity and the origins of cultural fragmentation. Am. Econ. Rev.: Papers and Proceedings 103 (3), 528–533.
Barrett, D.B., Kurian, G.T., Johnson, T.M., 2001. World Christian encyclopaedia: a comparative survey of churches and religions in the modern world. In: The World by Countries: Religionists, Churches, Ministries, second ed., vol. I. Oxford University Press, New York, NY.
Becker, G., 1957. The Economics of Discrimination. University Chicago Press.
Botero, J., Djankov, S., La Porta, R., Lopez-de Silanes, F., 2004. The regulation of labor. Q. J. Econ. 119 (4), 1339–1382.
Cashdan, E., 2001. Ethnic diversity and its environmental determinants: effects on climate, pathogens, and habitat diversity. American Anthropology 103, 968–991.
Dahlberg, M., Edmark, K., Lundqvist, H., 2012. Ethnic diversity and preferences for redistribution. J. Polit. Econ. 120 (1), 41–76.
Davis, M., 1988. Prisoners of the American Dream: Politics and Economy in the History of the US Working Class. Verso.
Desmet, K., Ortuno-Ortin, I., Weber, S., 2009. Linguistic diversity and redistribution. J. Eur. Econ. Assoc. 7, 1291–1318.
Diamond, J., 1997. Guns, Germs, and Steel: the Fates of Human Societies. W. W. Norton & Company.
Drazanova, L., 2020. Introducing the historical index of ethnic fractionalization (HIEF) dataset: accounting for longitudinal changes in ethnic diversity. Journal of Open Humanities Data 6 (1), 6.
DuBois, W.E.B., 1903. The Souls of the Black Folks: Essays and Sketches. A.C.McClurg, Chicago.
Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., Sunde, U., 2018. Global evidence on economic preferences. Q. J. Econ. 133 (4), 1645–1692.
Fearon, J., 2003. Ethnic and cultural diversity by country. J. Econ. Growth 8, 195–222.
Fearon, J., Laitin, D., 2003. Ethnicity, insurgency, and civil war. Am. Polit. Sci. Rev. 97 (1), 75–90.
Fernandez, R., 2008. Culture and economics. In: Durlauf, S., Blume, L. (Eds.), New Palgrave Dictionary of Economics, second ed. Palgrave Macmillan, Basingstoke and New York.
Fernandez, R., 2011. Does culture matters? Handbook of Social Economics ume 1A, 481–510.
Fershtman, C., Gneezy, U., 2001. Discrimination in a segmented society: an experimental approach. Q. J. Econ. 116 (1), 351–377.
Fincher, C.L., Thornhill, R., 2008. Assortative sociality, limited dispersal, infectious disease and the genesis of the global pattern of religion diversity. Proceedings of the Royal Society of London, Biological Sciences 275, 2587–2594.
Fincher, C.L., Thornhill, R., 2012. Parasite-stress promotes in-group assortative sociality: the cases of strong family ties and heightened religiosity. Behav. Brain Sci. 35, 61–79.
Fincher, C.L., Thornhill, R., 2014. The Parasite-Stress Theory of Values and Sociality: Infectious Disease, History and Human Values Worldwide. Springer, New York.
Fincher, C.L., Thornhill, R., Murray, D.R., Schaller, M., 2008. Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. Proceedings - Royal Society. Biological sciences 275, 1279–1285.
Galor, O., Özak, Ö., 2016. The agricultural origins of time preference. Am. Econ. Rev. 106 (10), 3064–3103.
Gilens, M., 1999. Why Americans Hate Welfare: Race, Media and the Politics of Antipoverty Policy. University of Chicago Press, Chicago.
Glaeser, E., 2005. The political economy of hatred. Q. J. Econ. 120, 45–86.
Goldin, C., Katz, L.F., 1999. Human capital and social capital: the rise of secondary schooling in America, 1910 to 1940. J. Interdiscip. Hist. 29 (4), 683–723.
Gorodnichenko, Y., Roland, G., 2017. Culture, institutions and the wealth of nations. Rev. Econ. Stat. 99 (3), 402–416.
Gründler, K., Köllner, S., 2020. Culture, diversity, and the welfare State. J. Comp. Econ. 48, 913–942.
Habyarimana, J., Humphreys, M., Posner, D., Weinstein, J., 2007. Why does ethnic diversity undermine public goods provision? Am. Polit. Sci. Rev. 101 (4), 709–725.
Hofstede, G., Hofstede, J.G., Minkov, M., 2010. Cultures and Organizations: Software of the Mind. McGrawhill USA.
Kammas, P., Kazakis, P., Sarantides, V., 2017. The effect of culture on fiscal redistribution: evidence based on genetic, epidemiological and linguistic data. Econ. Lett. 160, 95–99.
Kirmanoğlu, H., Başlevent, C., 2012. Using basic personal values to test theories of union membership. Soc. Econ. Rev. 10, 683–703.
Kyriacou, A., 2022. Clientelism and Fiscal Redistribution: Evidence across Countries. European Journal of Political Economy, forthcoming.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1999. The quality of government. J. Law Econ. Organ. 15, 222–279.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2008. The Economic consequences of legal origins. J. Econ. Lit. 46, 285–332.
Lee, W., Roemer, J., 2006. Racism and redistribution in the United States: a solution to the problem of American exceptionalism. J. Publ. Econ. 90, 1027–1052.
Lipset, S., Marks, G., 2000. It Didn't Happen Here: Why Socialism Failed in the United States. W.W Norton & Company, New York.
Luttmer, E., Singhal, M., 2011. Culture, context and the taste for redistribution. Am. Econ. J. Econ. Pol. 3, 157–179.
Marx, K., 1973. On the First International. Mc Grew Hill, New York.
Marx, K., Engels, F., 1936. Selected Correspondence:1846-1895. International Publishers, New York.
McNeill, W.H., 1974. Plagues and Peoples. Anchor. Harpswell, ME.
McNeill, W.H., 1980. The Human Condition. An Ecological and Historical View. Princeton University Press, Princeton, New Jersey.
Michalopoulos, S., 2012. The origins of ethnolinguistic diversity. Am. Econ. Rev. 102 (4), 1508–1539.
Miguel, E., Gugerty, M.K., 2005. Ethnic diversity, social sanctions, and public goods in Kenya. J. Publ. Econ. 89, 2325–2368.
Montalvo, J., Reynal-Querol, M., 2005. Ethnic diversity and economic development. J. Dev. Econ. 76, 293–323.
Murray, D.R., Schaller, M., 2010. Historical prevalence of infectious diseases within 230 geopolitical regions: a tool for investigating origins of culture. J. Cross Cult. Psychol. 41, 99–108.
Nikolaev, B., Bourdeaux, C., Salahodjaev, R., 2017. Are individualistic societies less equal? Evidence from parasite stress theory of values. J. Econ. Behav. Organ. 138, 30–49.
Okten, C., Osili, U.O., 2004. Contributions in heterogeneous communities: evidence from Indonesia. J. Popul. Econ. 17 (4), 603–626.
Olson, M., 1965. The Logic of Collective Action. Public Goods and the Theory of Groups. Harvard University Press, Cambridge.
Olsson, O., Paik, C., 2016. Long-run cultural divergence: evidence from the neolithic revolution. J. Dev. Econ. 122, 197–213.

Potrafke, N., 2010. Labor market deregulation and globalization Empirical Evidence from OECD countries. Rev. World Econ. 146, 545–571.
Potrafke, N., 2013. Globalization and labor market institutions: International empirical evidence. J. Comp. Econ. 41, 829–842.
Roemer, J., 1998. Why the poor do not expropriate the rich: an old argument in new garb. J. Publ. Econ. 70, 399–424.
Roemer, J., van der Straeten, K., 2005. Xenophobia and distribution in France: a politico-economic analysis. J. Econ. 86, 95–144.
Roemer, J., van der Straeten, K., 2006. The political economy of xenophobia and distribution: the case of Denmark. Scand. J. Econ. 108, 251–277.
Schnabel, C., Wagner, J., 2007. Union density and determinants of union membership in 18 EU countries: evidence form micro data, 2002/03. Ind. Relat. J. 38, 5–32.
Sombart, W., 1906. Why There Is No Socialism in the United States? White Plains. International Arts & Science Press, , NY.
Stichnoth, H., Van der Straeten, K., 2013. Ethnic diversity, public spending and individual support for the welfare state: a review of the empirical literature. J. Econ. Surv. 27 (2), 364–389.
Stock, J.H., Yogo, M., 2005. Testing for weak instruments in linear IV regression. In: Andrews, D., Stock, J. (Eds.), Identification and Inference for Econometric Models, Essays in Honor of Thomas Rothenberg. Cambridge University Press, New York (US), pp. 80–108.
Tullock, G., 1971. The paradox of revolution. Publ. Choice 1, 89–99.
Vigdor, J.L., 2004. Community composition and collective action: analyzing initial mail response to the 2000 census. Rev. Econ. Stat. 86 (1), 303–312.