

2026 - Vol. 4 - n.º 11 - Artículo 1

Trust, Heterogeneity and Fairness in the EU: a contemporary examination

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F13; Z13; O52; D63

KEYWORDS:

Generalized trust; Fairness; Heterogeneity; FINO index rates

Abstract: High levels of generalized trust are usually associated with economic growth and lower transaction costs, while heterogeneous populations have been linked to lower levels of trust. As societies are rapidly diversifying on many fronts, it is important to investigate the relationship between heterogeneity and trust so that policymakers can respond appropriately. Research on this topic commonly uses fractionalization indices. In this paper, we develop a new Fractionalization Index of National Origin (FINO) to capture contemporary heterogeneity. We then conduct a two-step hierarchical logit regression analysis on contemporary data, including over 40,000 observations from 23 EU countries. Our results indicate that both fairness and heterogeneity are significant predictors of generalized trust in the EU. We theorize that the relationship between heterogeneity and generalized trust may be context-dependent, becoming relevant only once countries have established a certain level of fairness.

CÓDIGOS JEL:

Z13; O52; D63

PALABRAS CLAVE:

Confianza generalizada; Equidad; Heterogeneidad; Índice FINO

Resumen: Los altos niveles de confianza generalizada suelen asociarse con el crecimiento económico y menores costes de transacción, mientras que las poblaciones heterogéneas se han vinculado a niveles más bajos de confianza. A medida que el mundo se diversifica en prácticamente todos los ámbitos, es importante analizar la relación entre heterogeneidad y confianza generalizada. En este trabajo desarrollamos un nuevo Índice de Fraccionamiento de Origen Nacional (FINO) para captar la heterogeneidad contemporánea. A continuación, realizamos un análisis de regresión logística jerárquica en dos pasos con datos contemporáneos, que incluye más de 40.000 observaciones de 23 países de la UE. Nuestros resultados indican que tanto la equidad como la heterogeneidad son predictores significativos de la confianza generalizada en la UE. Teorizamos que la importancia de la heterogeneidad para la confianza generalizada puede depender del contexto y hacerse relevante solo cuando los países han establecido un cierto nivel de equidad.

1. Introduction

Trust is a central component of social capital. More specifically, generalized trust, the general proclivity of individuals to trust others, can be aggregated at the country level to estimate how trusting a society is overall. Empirical studies widely show that high levels of generalized trust are beneficial, as they are positively correlated with factors such as economic growth (see Knack & Keefer, 1997). Trust also reduces transaction costs. By contrast, heterogeneity has been found to correlate negatively with trust (Alesina & La Ferrara, 2002; Putnam, 2007). Heterogeneity can be defined in many ways, but it usually refers to the diversity of a society's groups in terms of ethnicity, language, culture, religion, or other relevant characteristics. As societies diversify, it is important to investigate the relationship between heterogeneity and trust so that policymakers can respond appropriately (Kumlin & Rothstein, 2010). You (2012) argue that fairness is also an important determinant of generalized trust, and potentially more important than heterogeneity. Using proxies for these variables in an econometric regression, You (2012) found that heterogeneity lost its significance once fairness was accounted for.

This paper builds largely on You (2012), employs a similar method, and maintains the hypothesis that fairness is a more important predictor of generalized trust than heterogeneity. The motivation for conducting a similar study is twofold. First, it updates You's study by using recent EU data rather than worldwide data. To our knowledge, this application has not been conducted before, despite the EU's substantial inflow of migrants over the past two decades and the resulting increase in heterogeneity described by the International Organization for Migration (2022). Second, we develop a new fractionalization index (FINO) that is easier to use and less ambiguous than indices employed in previous studies.

This research is guided by three hypotheses: (1) fairness is a significant predictor of generalized trust; (2) heterogeneity loses significance when fairness variables are accounted for; and (3) the coefficient of heterogeneity is reduced in magnitude when fairness variables are accounted for. We find that heterogeneity does not lose significance after fairness is included, although its coefficient decreases in magnitude. Whether heterogeneity or fairness is more important for generalized trust cannot be clearly inferred from our results, because the relationship between the proxy for procedural and formal justice and generalized trust is non-linear and therefore not directly comparable to the relationship between heterogeneity and generalized trust. Heterogeneity is thus a significant predictor of generalized trust in the EU context even after accounting for fairness, which contradicts You (2012). This may be because EU countries generally have high levels of fairness, whereas the global context includes many countries with lower levels. Consequently, heterogeneity may become significant only once a certain level of fairness has been established.

2. Generalized Trust

Putnam is widely credited with making social capital a central concept in economics and political science. He defines social capital as "[...] features of social organization, such

as trust, norms, and networks that facilitate coordination, that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993). The positive effects of social capital, and trust in particular, are theorized to include reduced transaction costs. In societies with high levels of trust, less time and fewer resources are required for transactions because contracts and detailed safeguards are less necessary; trust itself helps uphold promises associated with exchange.

Several specific forms of trust should be distinguished. Uslaner distinguishes between moralistic and strategic trust. Strategic trust depends on experience between individuals, where the risk of trusting others is actively considered (Uslaner, 2002). This view was more common among earlier scholars, such as Coleman (1990), whose theory of trust is largely based on classical assumptions of rationality. In contrast, moralistic trust addresses why strangers trust each other before any information about their behavior or habits has been exchanged, a question strategic trust fails to answer. However, Uslaner (2002) does not clearly explain the source of moralistic trust beyond stating that it has roots in an optimistic worldview and forms during the developmental years (Uslaner, 2002, 2006).

A further distinction is generalized trust, which has become a central component of social capital. Generalized trust is the perception that others share one's own moral values regarding trust in society (Uslaner, 2002). In other words, it is a general evaluation of others' moral trustworthiness. A similar notion of trust was proposed by Fukuyama (1995), who conceptualized trust as the expectation that other members of society who share cooperative norms will behave accordingly. Large-scale surveys such as the World Values Survey (WVS) and the European Values Study (EVS) include the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?", which corresponds to generalized trust and allows it to be studied empirically on a large scale.

3. Heterogeneity

Heterogeneity refers to diversity, specifically the composition of a society's groups in terms of ethnicity, shared language, religion, culture, or other relevant characteristics. Two theoretical standpoints have generally dominated the social-science literature on the relationship between heterogeneity and trust: the contact hypothesis and conflict theory (Putnam, 2007). The former holds that greater exposure between ethnic groups leads over time to greater tolerance and trust, while the latter holds the opposite: contact between ethnic groups reduces trust between them while strengthening trust within groups. Because conflict theory is more consistent with empirical evidence from the late 1990s and early 2000s, it has become the dominant theory. However, the relationship is more complex than it may first appear. Putnam (2007) conducted a survey study in the United States and found that diversity was correlated with lower interethnic and intra-ethnic trust, leading him to propose a third theory: constrict theory. According to this theory, diversity is negatively related to generalized trust both within and between ethnic groups. Putnam further speculates that this relationship may hold only in the short run and may

dissipate in the medium to long run as a new, unified identity emerges across different ethnic groups.

Alesina and La Ferrara (2002) also investigate this relationship and find that individuals belonging to racial minorities exhibit lower levels of generalized trust and that areas with greater racial diversity also exhibit lower levels of generalized trust. They provide two possible explanations. The first is a theory of familiarity, according to which individuals trust those who are similar to themselves, a mechanism analogous to conflict theory. The second is that being surrounded by individuals with low generalized trust can reduce one's own generalized trust; minorities' general distrust may therefore partly explain why diverse areas exhibit lower levels of trust.

Critics of conflict theory offer a more nuanced view of the relationship. Uslaner (2006) argues that diversity itself does not undermine generalized trust; rather, what matters is how diversity is distributed, especially when large minority groups are segregated from the rest of the population, for example geographically. Uslaner also claims that inequality is the strongest predictor of generalized trust. Because inequality and ethnic segregation may be related, this may explain a large part of the negative correlation between diversity and generalized trust (Uslaner, 2006). Kumlin and Rothstein (2010) similarly argue that the negative relationship between generalized trust and immigration may be driven by immigrants' and refugees' experiences of oppression and discrimination in their countries of origin, as well as by hardships in the host country, such as unemployment and exposure to high-crime areas. Second-generation immigrants may also be affected by these conditions. Like Uslaner (2002), Kumlin and Rothstein emphasize that fairness and equality may be strongly and positively related to generalized trust, and that this relationship arises through evaluations of the fairness of formal institutions.

Kumlin and Rothstein (2010) also conducted an OLS regression on Swedish data, with generalized trust as the dependent variable and non-Nordic citizenship, equal treatment, organizational memberships, informal neighbor contacts, and socioeconomic controls as independent variables. Equal treatment is a measure of perceived fairness, assessed using a survey question from the Swedish SOM Institute. They found a significant negative relationship between generalized trust and non-Nordic citizenship, which persisted after other variables and perceived fairness were included. This runs counter to the claim that fairness accounts for most of the effect on generalized trust among minority groups. However, they also observed a positive relationship between perceived fairness and generalized trust in both groups, with a steeper relationship among non-Nordic respondents.

Bergh and Öhrvall (2018) also investigate the relationship between generalized trust, migration, and fairness. They find that generalized trust among Swedish expatriates decreased when they moved to countries with higher corruption and weaker rule of law than Sweden, and that the decline increased with the number of years spent in countries with lower fairness measures. However, generalized trust remained stable among expatriates aged 30 and older, whereas those under 30 showed a decline. This finding is consistent with Uslaner's (2002, 2006) theory of moralistic

trust as an intrinsic and stable trait formed primarily during the developmental years.

4. Fractionalization Indices

4.1. Background

Fractionalization indices are frequently used as measures of a country's heterogeneity. The first widely employed index was the so-called ethno-linguistic fractionalization index (henceforth ELF), which is calculated as follows:

$$ELF = 1 - \sum_{i=1}^n p_i^2 \quad (1)$$

Where p is the percentage of the total population corresponding to a particular group k . The index indicates the probability that two randomly selected individuals belong to different groups, and its structure serves as the foundation for subsequent fractionalization indices (Alesina et al., 2003; Bossert et al., 2011; Fearon, 2003). Using this index begs the question of how these groups should be defined. In the 1960s, ethnologists from the Soviet Union created the Atlas Narodov Mira (1964), which contained a list of so-called "ethno-linguistic" groups derived mainly from spoken language, but also included some racial definitions of ethnic groups. This was used to construct the ELF-index using Equation 1, which has been applied across fields such as sociology, ethnology, political science, and economics (Alesina et al., 2003; Fearon, 2003).

Constructing a fractionalization index is difficult because the concept of ethnic groups is inherently vague, and most indices differ precisely in how they define such groups. There is no clear answer to how ethnic groups should be identified, and different parameters are relevant in different countries. In some cases, the predominant groups are identified by spoken language; in others, racial distinctions, tribal affiliations, or religious identities are more relevant (Fearon, 2003). There is also the problem of decomposition, as some groups belong to larger shared categories (Fearon, 2003). Hispanics in the United States, for example, can be decomposed into Cubans, Mexicans, Puerto Ricans, and other groups.

Two fractionalization indices widely used during the last 20 years are those developed by Alesina et al. (2003) and Fearon (2003). Alesina et al. (2003) constructed three indices measuring ethnic, linguistic, and religious fractionalization, each intended to capture a distinct aspect of heterogeneity and to decompose the original ethno-linguistic fractionalization index. The ethnic fractionalization index was not entirely distinct from the linguistic fractionalization index because many ethnic groups are identified on linguistic rather than racial grounds. In Switzerland, for example, the predominant groups were German-, French-, and Italian-speaking; in Bolivia, by contrast, racial distinctions were used because the majority speaks Spanish, with the main groups identified as Blancos, Aymara, Quechua, and Mestizos (Alesina et al., 2003). The ethnic and linguistic indices were therefore significantly correlated, raising questions about the validity of the distinction, although it remains useful for capturing ethnic diversity in specific cases. Religious fractionalization, by contrast, was not significantly correlated with the other indices and was constructed by identifying relevant religious groups in each country.

Fearon (2003) created two indices: one ethnic and one cultural. The ethnic fractionalization index was constructed using seven features that characterize what he calls "prototypical ethnic groups", and it included only groups that make up at least 1% of a country's population. Through this process, 822 ethnic groups were identified across 160 countries. The cultural fractionalization index was constructed by weighting the ethnic fractionalization index by the linguistic distance between languages spoken by the ethnic groups. This approach is attractive because the ethnic fractionalization index does not account for how culturally similar or dissimilar two ethnic groups are, an issue that can be partially addressed by considering linguistic similarity. The weight was constructed by comparing each pair of ethnic groups to determine how closely related their linguistic roots are in their language-family trees. If all ethnic groups in a country spoke the same language, the cultural index would be identical to the ethnic fractionalization index. You (2012) used Fearon's fractionalization indices as independent variables to measure heterogeneity. Both Alesina et al. (2003) and Fearon (2003) used data from the Encyclopedia Britannica (2001) and the CIA World Factbook (2000) to construct their linguistic fractionalization indices, with data collected between the 1990s and the early 2000s.

4.2. FINO

In this study, we propose a simple fractionalization index based on individuals' countries of birth within a given country: the Fractionalization Index of National Origin (FINO). FINO measures the probability that two randomly selected individuals from a country were born in different countries. Defining groups by country of birth distinguishes this index from other fractionalization indices. Its main advantage is that it permits the construction of a fractionalization index based on more recent data. By contrast, constructing indices such as those of Alesina et al. (2003) and Fearon (2003) requires substantial effort because identifying relevant groups in each country is difficult. FINO is therefore a simpler index based on publicly available, recently collected data. In this paper, the data used to construct FINO were obtained from Eurostat, which provides country-of-birth data for residents of many European countries.

A key strength of FINO is its transparency and interpretability. The approach provides a clear and intuitive definition of groups and allows the same type of heterogeneity to be measured consistently across countries, facilitating cross-country comparisons. The main drawback is that FINO does not capture group differences within the native-born population, which may lead to underestimation. For example, second-generation migrants are not included in the index, even though relevant cultural differences may persist. At the same time, many of the predominant groups relevant to heterogeneity in EU countries have arisen through migration, as many of these countries were previously relatively homogeneous and did not experience the same effects of colonization.

4.3. PITO

Only a subset of the 23 EU countries analyzed in this study has detailed country-of-birth information for the full population. To include all EU countries that responded to the WVS/EVS, we therefore use a simpler fractionalization index that groups residents into two categories: national-born and foreign-born. The Population Index of

Transnational Origin (PITO) is based on the same premise as FINO and uses Eurostat data on country of birth, but it differs by grouping all foreign-born residents into a single category. The equation used for PITO is:

$$PITO = 1 - \sum_{i=1}^2 p_{ij}^2 \quad (2)$$

Where i denotes the groups (which in this case are only two: national and foreign-born residents), j denotes each respective country, p is the percentage of the population of country j which group i constitutes. PITO is the probability of two randomly drawn individuals being part of different groups. That is to say, the probability that one of them is born within the country j , while the other is born outside of the country j .

This approach also has drawbacks. PITO captures fewer inherent group differences than FINO because all foreign-born residents are treated as one group. Neither foreign-born nor national-born residents are homogeneous categories. In our case, however, the advantage of PITO is that it allows us to run regression analyses across all EU countries included in the WVS/EVS. Because our main independent variables are measured at the country level, including as many countries as possible is important for the robustness of the regression. The simplified index is also defensible because PITO is strongly correlated with FINO. This strong correlation is mainly due to the national-born group being persistent and comprising the largest share of the population. For example, the FINO for Sweden was 0.35, while the PITO for Sweden was 0.32. In some countries, FINO and PITO were the same, for example in Bulgaria (0.06), Slovakia (0.07), and Hungary (0.12). The largest differences between FINO and PITO were observed in countries with relatively high FINO values.

5. Fairness

To assess fairness, a clear normative framework is required. Rawls (2001) defines "justice as fairness" and divides justice into three main components: formal, procedural, and distributive justice. For a society to be considered fair, there must be a system of cooperation among citizens regarded as free and equal. According to Rawls (1999), formal justice requires the fair and equal application of laws and institutions. Procedural justice requires equal civil and political rights. Distributive justice refers to a distribution that arises from a fair procedural system. You (2012) uses three proxies corresponding to these components: freedom from corruption for formal justice, political rights for procedural justice, and income distribution and skewness for distributive justice.

Empirical evidence supports the use of these proxies, though the findings are not uniform. Starting with distributive justice, a body of literature has found a significant relationship between income-distribution variables, such as the GINI coefficient, and levels of generalized trust, strengthening the claim that distributive justice is important for generalized trust. For example, Delhey and Newton (2005) found that income inequality (GINI) was significantly and negatively correlated with generalized trust, with a correlation of -0.466. This result supports Putnam (2007), who found a significant correlation between individuals' trust in their neighbors and the GINI coefficient. However, not all studies find significant correlations

between trust and GINI. Alesina and La Ferrara (2002) found a significant correlation between GINI and generalized trust only before controlling for racial and ethnic fractionalization; once these indices were controlled for, the effect of GINI lost significance. Zak and Knack (2001) also examined the relationship between egalitarian income distribution and generalized trust but did not find evidence of such a correlation. Uslaner (2002), by contrast, finds a negative correlation between GINI and generalized trust.

Regarding the proxy for formal justice, Zak and Knack (2001) used an index of perceived corruption as a proxy for formal institutions and found a significant negative correlation between perceived corruption and generalized trust. Uslaner (2002) did not find a significant correlation in one of his earlier studies, but later argued for reciprocal causality: freedom from corruption affects generalized trust, and generalized trust affects corruption. However, he argues that when inequality is involved, causality runs only from corruption to trust, while the reverse causality from trust to corruption is stronger in other cases. He also produced results supporting this claim using a two-stage cross-sectional regression with 62 countries (Uslaner, 2004).

There is a strong correlation between the proxy for procedural justice - how democratic a country is - and generalized trust. However, the legitimacy of this relationship is debated: some studies find a correlation, while others find that it loses significance after controlling for variables such as income per capita (You, 2012). You found a significant correlation between generalized trust and political rights only when including a quadratic term, suggesting that partial democratization can negatively affect generalized trust and that democratization begins to have a positive effect only after reaching a certain level. Tsai et al. (2011) support this argument and find a non-linear relationship between trust and democratization. Earlier studies, however, have found different results. For example, using a partly overlapping dataset, Anderson and Paskeviciute (2006) found a significant negative correlation between democracy and generalized trust, although the effect was negligible.

6. Analysis

6.1. Data and variables

We use a two-step hierarchical logit regression with individual-level data from WVS/EVS Wave 7 (2017-2022) and country-level data from the World Bank, Eurostat, and the World Justice Project. The dependent variable is dichotomous, coded 1 when respondents answered that "most people can be trusted" and 0 otherwise. Because individual characteristics are nested within countries, the model separates individual-level controls from country-level measures of heterogeneity and fairness. Where possible, country-level variables are measured in 2021 to match WVS/EVS Wave 7; when 2021 values were unavailable, the closest preceding value was used. Continuous variables are standardized before estimation. Table 1 summarizes the variables used in the analysis

Table 1: Variables used in the analysis

Variable	Level and role	Operationalization, coding, and source
Generalized trust	Individual; dependent variable	WVS/EVS item coded 1 for "Most people can be trusted" and 0 for "Need to be very careful" or "Don't know".
FINO	Country; heterogeneity proxy	Fractionalization Index of National Origin; probability that two randomly selected residents were born in different countries. Constructed from Eurostat country-of-birth data and used for the subset with detailed data.
PITO	Country; alternative heterogeneity proxy	Population Index of Transnational Origin; two-group fractionalization index distinguishing national-born from foreign-born residents. Constructed from Eurostat data and used for all 23 EU countries in the sample.
Rule of law (ROL)	Country; formal/procedural fairness proxy	World Justice Project index ranging from 0 to 1, where higher values indicate stronger rule of law. Used to capture formal and procedural justice.
Rule of law squared (ROL2)	Country; non-linear fairness term	Quadratic term for rule of law, included because prior research suggests a non-linear relationship between democratization-related measures and generalized trust.
GINI	Country; distributive fairness proxy	World Bank income-inequality index, where higher values indicate greater inequality. Used as a proxy for distributive justice.
Log GDP per capita	Country; economic control	Natural logarithm of GDP per capita from the World Bank.
Perceived corruption	Individual; institutional-perception control	WVS/EVS item "Votes are counted fairly", used as a proxy because the EVS does not include a direct perceived-corruption question.
Subjective income	Individual; socioeconomic control	Ordinal 10-step scale indicating the respondent's household income position relative to other households in the country.
Education	Individual; socioeconomic control	Ordinal scale from 0 to 8, ranging from less than primary education to doctoral degree or equivalent.
Religion	Individual; religious-affiliation controls	Self-reported religious affiliation coded as dummy variables; no religious affiliation is the baseline category.
Birth year	Individual; demographic control	Respondent's year of birth, used as a proxy for age because exact age at interview was unavailable.
Female	Individual; demographic control	Dummy variable indicating whether the respondent is female; male is the baseline category.

6.2. Regression analysis

Because generalized trust is dichotomous, we estimate logit models. The basic logit model is:

$$Pr(Y = 1|X_1, X_2, \dots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) \quad (3)$$

The model estimates the expected log odds that a respondent is trusting, given the observed individual- and country-level covariates.

Equation 4 states the same model with the cumulative standard logistic distribution written explicitly:

$$Pr(Y = 1|X_1, X_2, \dots, X_k) = 1/[1 + \exp(-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k))] \quad (4)$$

A hierarchical specification is required because respondents are nested within countries. Treating country-level

variables as if they varied across individuals would violate the independence assumption, while aggregating individual traits to the country level would discard substantial within-country variation (Leeuw & Meijer, 2008).

Accordingly, the model is estimated in two steps. The first step models individual-level variation in generalized trust; the second explains country-level differences in the intercept using heterogeneity, fairness, and economic controls. A simplified version is:

$$Y = \beta_0 + \beta_1 Education + \beta_2 Income + \beta_3 Female + \beta_4 Per. Corruption \quad (5)$$

$$\beta_0 = \lambda_0 + \lambda_1 PITO + \lambda_2 GINI + \lambda_3 ROL + \lambda_4 ROL^2 \quad (6)$$

Equation 5 represents the individual-level model, while Equation 6 models the country-level intercept.

6.3. Missing values

Missing values were handled using multiple imputation rather than listwise deletion, since omitting respondents with incomplete answers would have reduced the sample and could have biased the results if non-response was systematic (Schafer & Graham, 2002). Subjective income had the highest non-response rate, around 15%, while the average non-response rate across variables was about 1.5%.

All individual-level non-responses, including "don't know" and "no answer", were treated as missing and imputed. Although You (2012) warns against imputing the dependent variable, Gomer (2019) shows that modern imputation methods can perform acceptably with up to 20% missing values, including for the dependent variable. Since no variable exceeded that threshold, all missing values were imputed.

6.4. Method discussion

A limitation of comparing logit models is that coefficients can be affected by unobserved heteroskedasticity and are therefore not directly comparable across models (Mood, 2009). Ideally, mean marginal effects would be calculated for each variable across all observations. Since this was not possible, marginal effects at the mean are reported only for interpretation. As a robustness check, we also estimated corresponding two-step hierarchical linear models; they produced no major differences in coefficient direction or significance. These models are reported in Appendix 3.

The GINI coefficient is used as a proxy for distributive justice, although it does not fully match You's (2012) argument that dispersion and skewness in income distribution are the relevant mechanisms. Because previous research links income inequality to generalized trust, GINI remains a defensible proxy, but the absence of dispersion and skewness measures is a limitation.

The FINO models include only the countries for which detailed country-of-birth data were available, whereas the PITO models include all 23 EU countries in the WVS/EVS sample. The smaller number of country-level observations is therefore a central limitation, particularly because the fractionalization measures are country-level variables.

Finally, FINO and PITO capture only one form of heterogeneity: differences based on country of birth. They do not identify country-specific ethnic, linguistic, or religious groups, and they do not capture post-first-generation migrants. The results should therefore be interpreted as evidence about this specific form of heterogeneity.

7. Results

Tables 2 and 3 present the hierarchical logit regressions. Table 2 uses FINO as the measure of heterogeneity, while Table 3 uses PITO. Because the variable definitions are summarized in Table 1, this section focuses on the estimated relationships and marginal effects. All continuous variables were standardized before estimation.

The coefficients represent expected changes in the log odds of being trusting for a one-unit change in the relevant variable. Because logit coefficients are difficult to interpret directly, Tables 2 and 3 also report marginal effects. For continuous variables, a one-unit change corresponds to

one standard deviation; for dummy variables, marginal effects are interpreted relative to the baseline category.

The intercept represents the log odds of being trusting for an individual in an average country (average FINO/PITO, GINI, ROL, ROL2, and GDP per capita), who is male, has no religious affiliation, has average perceived income, perceived corruption, and education, and was born in the average birth year. Descriptive statistics are presented in Appendix Table A1. The intercepts correspond to a 43% probability of being trusting in the FINO models (Table 2) and a 35% probability in the PITO models (Table 3). These probabilities are slightly above the intercept in You's (2012) regression, most likely because this study focuses on the EU, where countries are generally more trusting.

Model 1 in Table 2 uses FINO as the measure of heterogeneity and excludes the fairness variables (GINI, ROL, and ROL2). The variables significant at the 0.05 level or lower are education, perceived income, individual-level perceived corruption, Protestant, Orthodox, Hindu, FINO, and log GDP per capita. FINO has a negative relationship with generalized trust, with a marginal effect of -0.050. This means that a one-standard-deviation increase in FINO (0.09) decreases the probability that an average male is trusting by 5%.

Model 2 in Table 2 adds the fairness variables. The variables significant in Model 1 remain significant, and both rule of law and GINI are also significant. The main difference is that the coefficient for FINO decreases in magnitude, from -0.211 to -0.133. In marginal-effect terms, a one-standard-deviation increase in FINO now corresponds to a 3.20% decrease in the probability of being trusting, holding all else at the mean or baseline. Thus, the predicted negative effect of heterogeneity decreases by 1.8 percentage points when fairness is included. This aligns with our theory that ethnic fractionalization becomes a less important explanatory variable once fairness is accounted for. The GINI coefficient is positive, contrary to our theoretical prediction that higher income inequality should reduce trust. The model predicts that a one-standard-deviation increase in GINI (4.210) corresponds to a 2.30% increase in the probability of being trusting. Rule of law is convexly related to generalized trust: the coefficient is negative while the squared term is positive, indicating a negative relationship up to a certain point and a positive relationship thereafter.

Model 1 in Table 3 uses PITO as the measure of heterogeneity and excludes the fairness variables. Using PITO allows all 23 observed EU countries to be included in the regression. Compared with Model 1 in Table 2, the same variables are significant except for Hindu. The coefficient for PITO is larger than that for FINO when fairness is excluded. A one-standard-deviation change in PITO (0.090) corresponds to a 7.60% decrease in the probability of being trusting, compared with 5.00% for FINO. This change may be explained by the additional countries included in the PITO regression. Because PITO and FINO are highly correlated, the PITO regressions are likely closer to the EU-wide relationship.

Model 2 in Table 3 includes the fairness variables. The variables that were previously significant remain significant. Compared with Model 2 in Table 2, the only fairness variable that remains significant is rule of law; GINI is not significant. The PITO coefficient changes from -0.390 to -0.284 across the models. A one-standard-deviation increase in

PITO now corresponds to a 5.80% decrease in the probability of being trusting, with all else held at the mean or baseline. As in the FINO models, the marginal effect of

heterogeneity decreases by 1.8 percentage points when fairness is included.

Table 2: Hierarchical Logit Regression Model Results Using FINO.

Dependent Variable is Generalised Trust						
Variables	Coef.	Std. Err	Variables	Coef.	Std. Err	Variables
<i>Individual level</i>						
(Intercept)	-0.267***	0.080		-0.289***	0.026	
Education	0.275***	0.015	0.069	0.277***	0.015	0.069
Income	0.190***	0.015	0.047	0.190***	0.015	0.047
Birth Year	-0.002	0.015	0.000	-0.003	0.015	-0.001
Female	0.016	0.014	0.004	0.015	0.014	0.004
Per. Corruption	-0.350***	0.016	-0.080	-0.351***	0.016	-0.079
Catholic	-0.061	0.039	-0.015	-0.040	0.037	-0.010
Protestant	0.185***	0.048	0.046	0.135**	0.049	0.034
Orthodox	-0.241*	0.094	-0.056	-0.253**	0.089	-0.059
Jew	-0.629.	0.360	-0.130	-0.613.	0.361	-0.126
Muslim	0.157	0.117	0.039	0.163	0.115	0.041
Hindu	-0.526*	0.250	-0.113	-0.500*	0.250	-0.107
Buddhist	-0.367	0.259	0.113	-0.341	0.259	-0.077
Other Christian	0.036	0.101	0.009	0.061	0.098	0.015
Other Religion	-0.108	0.120	-0.026	-0.111	0.120	-0.027
<i>Country level</i>						
FINO	-0.211*	0.106	-0.050	-0.133***	0.033	-0.032
Log GDP	0.772***	0.111	0.181	0.522***	0.065	0.129
GINI				0.092***	0.023	0.023
ROL				-2.759***	0.265	-0.119
ROL2				3.043***	0.285	0.171

Significance shown in coefficient column: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; . $p < 0.1$.

Observations: 26967; Countries: 14; AIC model 1: 30675; AIC model 2: 30646

The coefficient for log GDP per capita is halved, from 0.852 to 0.426, when fairness is accounted for. In marginal-effect terms, a one-standard-deviation increase in log GDP per capita is associated with a 21.00% increase in the probability of being trusting when fairness is excluded, and a 10.50% increase when fairness is included.

The individual-level variables education, perceived income, and perceived corruption are significant in all models. Their coefficients change little when the fairness variables are included and are similar across the FINO and PITO regressions. In the FINO models, a one-standard-deviation increase corresponds to a 6.90% increase in the probability of being trusting for education, a 4.70% increase for perceived income, and an 8.00% decrease for perceived corruption. In the PITO models, the corresponding marginal effects are a 7.50% increase for education, a 4.40% increase for perceived income, and a 7.00% decrease for perceived corruption. These relationships are consistent with previous theory and empirical work: generalized trust is expected to increase with education and perceived income and to decrease as perceived corruption increases.

Regarding our hypotheses, the results are mixed. Rule of law is the fairness variable that remains significant in both models. As discussed above, it appears to have a convex relationship with generalized trust: negative up to a certain point and positive thereafter. This is consistent with You's (2012) theory that partial democratization can reduce generalized trust, whereas more established democracies can increase it. Procedural and formal justice therefore seem to be significant predictors of generalized trust in the EU context. The GINI coefficient, by contrast, is insignificant in the PITO model, contrary to our prediction. Meanwhile, perceived income is significant in all models and has substantial coefficients. This may indicate that individual perceived income matters more for generalized trust than national income distribution, because people compare themselves with their immediate surroundings rather than with the full income distribution of a country. Another possible explanation is You's (2012) argument that what matters is not income distribution per se, but the dispersion and skewness of that distribution.

Heterogeneity remains significant across all models, even after accounting for fairness. These results differ from You (2012), who found that heterogeneity lost significance after the fairness variables were included. We suspect that the difference may reflect contextual differences: You's regression was conducted globally and included 80 countries, whereas our analysis is limited to 23 EU countries. The key difference is the overall level of fairness. The global sample includes many countries with much lower levels of fairness, while EU countries generally score higher on the three components of fairness used in this study. We therefore theorize that heterogeneity matters only above a certain level of fairness. In lower-

fairness contexts, individuals may be more concerned with their unfair institutional environment than with between-group differences. Once a certain level of fairness is established, those between-group differences may become more important for generalized trust. Because this study focuses on high-fairness countries, it may capture only the part of the relationship where heterogeneity matters. Another explanation is the time gap between the studies: You (2012) used data from the late 1990s and early 2000s, whereas this study uses contemporary data. A contemporary worldwide study may therefore yield different results.

Table 3: Hierarchical Logit Regression Model Results Using PITO.

Dependent Variable is Generalised Trust						
Variables	Coef.	Std. Err	df/dX	Coef.	Std. Err	df/dX
<i>Individual level</i>						
(Intercept)	-0.615***	0.094		-0.615***	0.070	
Education	0.308***	0.012	0.075	0.308***	0.012	0.075
Income	0.183***	0.012	0.044	0.183***	0.012	0.044
Birth Year	-0.005	0.012	-0.001	-0.004	0.012	-0.001
Female	0.009	0.023	0.002	0.008	0.023	0.002
Per. Corruption	-0.348***	0.013	-0.070	-0.348***	0.013	-0.070
Catholic	-0.053.	0.031	-0.012	-0.048	0.031	-0.011
Protestant	0.171***	0.040	0.041	0.162***	0.040	0.039
Orthodox	-0.327***	0.067	-0.066	-0.350***	0.068	-0.070
Jew	-0.289	0.316	-0.059	-0.285	0.316	-0.059
Muslim	-0.016	0.085	-0.004	-0.032	0.085	-0.007
Hindu	-0.464.	0.243	-0.088	-0.461.	0.243	-0.087
Buddhist	-0.261	0.245	-0.054	-0.256	0.245	-0.053
Other Christian	0.134	0.093	0.032	0.138	0.093	0.033
Other Religion	-0.123	0.084	-0.027	-0.118	0.084	-0.026
<i>Country level</i>						
FINO	-0.390**	0.119	-0.076	-0.284**	0.096	-0.058
Log GDP	0.852***	0.128	0.210	0.426*	0.186	0.105
GINI				0.055	0.076	0.013
ROL				-2.917***	0.884	-0.081
ROL2				3.347***	0.916	0.192

Significance shown in coefficient column: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; . $p < 0.1$.

Observations: 44172; Countries: 23; AIC model 1: 48020; AIC model 2: 48013

Regarding our hypothesis that the heterogeneity coefficient decreases in magnitude when fairness is accounted for, the results are clearer. Both FINO and PITO lose coefficient weight once fairness is included, which means that part of the relationship between heterogeneity and generalized trust is better explained by fairness. This finding is in line with You (2012), who argues that the importance of heterogeneity for trust has been overstated because its effect is reduced when fairness is included in the regression.

Whether fairness matters more than heterogeneity for generalized trust in the EU context cannot be determined

conclusively. A one-standard-deviation increase in PITO corresponds to a 5.80% decrease in the probability of being trusting when fairness is included. However, because rule of law has a non-linear relationship with generalized trust, a directly comparable marginal effect cannot be extracted from its coefficient. We can therefore conclude only that both procedural/formal justice and heterogeneity are significant predictors of generalized trust in the EU context.

Our study does not investigate the mechanisms underlying the negative relationship between heterogeneity and generalized trust in the EU. The results indicate only that

such a relationship exists. Nonetheless, several theoretical explanations are possible. As Uslaner (2006) argues, foreign-born groups as captured by FINO and PITO may be segregated geographically or otherwise, which can lower generalized trust. These immigrant groups may also, as Kumlin and Rothstein (2010) suggest, have experienced oppression and discrimination in their countries of origin, which can reduce generalized trust. This may be particularly relevant in the EU context, where a large share of immigrants are refugees (International Organization for Migration, 2022). Bergh and Öhrvall (2018) further suggest that generalized trust among people over 30 remains relatively stable even after moving to a country with lower generalized trust. The same may hold in the opposite direction: those who migrated after age 30 may carry lower and more rigid levels of trust shaped by past experiences. These theoretical mechanisms call for further research on the composition of heterogeneity in the EU and on why it is negatively related to generalized trust. Because this study examines only one point in time, future studies should also examine how the relationship changes over time, both in the short and long term.

8. Conclusion

Our results indicate that fairness, understood as procedural and formal justice, matters for generalized trust in the EU, while we find no clear evidence that distributive justice is significant. Whether fairness matters more than heterogeneity cannot be answered conclusively, because the coefficient for rule of law cannot be directly compared with those for the fractionalization indices due to its non-linear relationship with generalized trust. Heterogeneity is significant across all models. Since our results differ from You (2012), the most important finding is that the relationship among generalized trust, heterogeneity, and fairness appears to be context-dependent. We study the EU context, while You studies the worldwide context. We theorize that heterogeneity becomes significant only beyond a certain level of established fairness: in lower-fairness contexts, individuals may be primarily concerned with unfair environments that shape generalized trust, while group differences become more relevant once fairness reaches a certain level. The fact that the worldwide context includes many countries with lower levels of fairness, while the EU generally exhibits higher levels, may explain why heterogeneity is significant across all our models. The difference may also reflect the time gap between our study and You's (2012). Heterogeneity may be significant in the global context when contemporary data are analyzed. This calls for further research on how the relationship between generalized trust, fairness, and heterogeneity depends on context and evolves over time.

Although our study does not support strong causal policy recommendations, several cautious implications can be drawn. Since heterogeneity matters for trust in the EU, this relationship should be acknowledged rather than ignored. Policymakers should focus on identifying and addressing the conditions under which heterogeneity may be associated with lower trust, such as weak labor-market integration or perceived institutional unfairness. Moreover, because procedural and formal justice are significant predictors of generalized trust, maintaining and strengthening fair, impartial, and inclusive institutions may be particularly important in increasingly heterogeneous societies. The fact that the heterogeneity coefficient decreases when fairness variables are included suggests that institutional fairness may partly mitigate the negative association between heterogeneity and trust. Future research should therefore investigate the channels through which this relationship operates so that more targeted and evidence-based policies can be developed.

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9. Appendix

Table A1: Descriptive statistics

Variable	Obs.	Mean	SD	Median	Min	Max	Skew	Kurtosis
<i>Individual-level</i>								
Generalised trust	44172	0.37	0.48	0	0	1	0.53	-1.72
Education	44172	3.81	1.92	3.00	0.00	8.00	0.48	-0.86
Income	44172	5.20	2.63	5.00	1.00	10.00	0.13	-0.96
Birth Year	44172	1966.75	17.64	1966.00	1918	2008	0.11	-1.05
Female	44172	0.44	0.50	0	0	1	0.23	-1.95
Per. Corruption	44172	1.75	0.89	2.00	1.00	4.00	0.99	0.04
Catholic	44172	0.30	0.46	0	0	1	0.86	-1.26
Protestant	44172	0.16	0.36	0	0	1	1.88	1.55
Orthodox	44172	0.13	0.33	0	0	1	2.24	3.02
Jew	44172	0.00	0.03	0	0	1	30.29	915.21
Muslim	44172	0.03	0.17	0	0	1	5.70	30.48
Hindu	44172	0.00	0.04	0	0	1	23.58	554.12
Buddhist	44172	0.00	0.04	0	0	1	24.05	576.19
Other Christian	44172	0.01	0.12	0	0	1	8.23	65.80
Other	44172	0.02	0.13	0	0	1	7.37	52.38
No denomination	44172	0.35	0.48	0	0	1	0.62	-1.61
<i>Country-level</i>								
FINO	14	0.19	0.09	0.20	0.06	0.36	0.16	-1.06
PITO	23	0.20	0.09	0.22	0.04	0.36	-0.13	-1.11
GINI	23	30.31	4.21	29.80	23.20	40.50	0.30	-0.55
ROL	23	0.73	0.10	0.73	0.52	0.90	-0.13	-0.95
ROL2	23	0.55	0.15	0.53	0.27	0.81	0.08	-1.09
Log GDP	23	10.49	0.52	10.50	9.41	11.15	-0.30	-1.15

Note: The variable No denomination is omitted from the regression to avoid perfect collinearity.

Table A2: Hierarchical Linear Regression Model Results Using FINO.

Dependent Variable is Generalised Trust						
Variables	Coef.	Model 1 Std. Err	t-value	Coef.	Model 2 Std. Err	t-value
<i>Individual level</i>						
(Intercept)	0.446***	0.021	21.372	0.439***	0.007	61.979
Education	0.056***	0.003	18.764	0.056***	0.003	18.810
Income	0.037***	0.003	12.508	0.037***	0.003	12.517
Birth Year	-0.001	0.003	-0.456	-0.001	0.003	-0.493
Female	0.003	0.003	1.292	0.003	0.003	1.274
Per. Corruption	-0.066***	0.003	-22.248	-0.066***	0.003	-22.220
Catholic	-0.011	0.008	-1.501	-0.010	0.007	-1.287
Protestant	0.036***	0.009	3.797	0.031***	0.009	3.336
Orthodox	-0.039*	0.017	-2.374	-0.039*	0.016	-2.417
Jew	-0.137.	0.074	-1.841	-0.135.	0.074	-1.815
Muslim	0.030	0.022	1.336	0.031	0.022	1.413
Hindu	-0.126*	0.052	-2.424	-0.123*	0.052	-2.370
Buddhist	-0.078	0.054	-1.446	-0.075	0.054	-1.397
Other Christian	0.008	0.021	0.371	0.011	0.021	0.517
Other Religion	-0.022	0.024	-0.914	-0.022	0.024	-0.940
<i>Country level</i>						
FINO	-0.042	0.028	-1.511	-0.023*	0.010	-2.367
Log GDP	0.168***	0.029	5.781	0.102***	0.020	5.140
GINI				0.018*	0.007	2.507
ROL				-0.633***	0.077	-8.189
ROL2				0.702***	0.083	8.461

Signif. codes: *** p < 0.001; ** p < 0.01; * p < 0.05; . p < 0.1. Stars are based on two-sided t-values.

Observations: 26967; Countries: 14

Table A3: Hierarchical Linear Regression Model Results Using PITO.

Dependent Variable is Generalised Trust						
Variables	Coef.	Model 1 Std. Err	t-value	Coef.	Model 2 Std. Err	t-value
<i>Individual level</i>						
(Intercept)	0.378***	0.019	20.049	0.377***	0.014	27.636
Education	0.060***	0.002	26.263	0.060***	0.002	26.222
Income	0.036***	0.002	15.754	0.036***	0.002	15.747
Birth Year	-0.003	0.002	-1.358	-0.003	0.002	-1.328
Female	0.002	0.004	0.555	0.002	0.004	0.553
Per. Corruption	-0.059***	0.002	-25.925	-0.059***	0.002	-25.931
Catholic	-0.011.	0.006	-1.851	-0.010.	0.006	-1.687
Protestant	0.035***	0.008	4.518	0.033***	0.008	4.333
Orthodox	-0.044***	0.011	-3.985	-0.047***	0.011	-4.251
Jew	-0.059	0.062	-0.946	-0.058	0.062	-0.935
Muslim	-0.014	0.015	-0.918	-0.016	0.015	-1.058
Hindu	-0.108*	0.048	-2.244	-0.108*	0.048	-2.233
Buddhist	-0.054	0.049	-1.09	-0.053	0.049	-1.068
Other Christian	0.029	0.019	1.544	0.030	0.019	1.588
Other Religion	-0.026	0.016	-1.617	-0.025	0.016	-1.558
<i>Country level</i>						
PITO	-0.065**	0.024	-2.766	-0.043*	0.019	-2.327
Log GDP	0.170***	0.026	6.667	0.083*	0.036	2.282
GINI				0.010	0.015	0.653
ROL				-0.643***	0.172	-3.75
ROL2				0.731***	0.178	4.109

Signif. codes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; . $p < 0.1$. Stars are based on two-sided t-values.

Observations: 44172; Countries: 23