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# New Evidence on Ethnic Diversity and Social Capital in Indonesia

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**Abstract:** This study analyzes the relationship between the various measures of ethnic diversity and social capital in Indonesia, particularly trust and tolerance (towards other religions and other ethnic groups), using a nationally representative survey. The 2009 National Socioeconomic Survey asked almost 300 thousand individuals on social capital from the 2010 population census data used to construct measures of ethnic and religious diversity. The study's main contribution to the literature is the inclusion of ethnic similarities in the construction of these diversity variables using linguistic tree data taken from Ethnologue. Using the multiple linear regression method, the study found that all measures of diversity are negatively associated with trust but are positively associated with tolerance, even after controlling for individual-, household- and district-level characteristics. Anticipating the possibility of endogeneity in the diversity variables, this study uses geographical variables to instrument these variables. Nevertheless, the use of the instrumental variable regression method does not change the main result.

**Keywords:** Ethnic diversity; Social capital; Trust; Tolerance; Indonesia

**JEL Classification:** D19; O53; Z13



## Introduction

The economics literature on the role of ethnic diversity is vast. Some early studies, such as Easterly and Levine (1997), tried to link ethnic diversity with economic growth in sub-Saharan Africa wherein the two showed an inverse relationship. The following literature on this topic has included additional controls such as interacting the measure of ethnic diversity with democracy (Alesina & La Ferrara, 2005) and controlling for migration (Bove & Elia, 2017), to linking it with other socioeconomic variables such as trust (Algan & Cahuc, 2014) and conflict (Esteban et al., 2012), to find the sources of such diversity (Ahlerup & Olsson, 2012; Ashraf & Galor, 2013; Michalopoulos, 2012; Moslehpour et al., 2021). Some studies linked ethnic diversity with socioeconomic variables in Indonesia, such as how it can affect public goods provision (Alesina et al., 2019; Siburian, 2019), social capital (Mavridis, 2015), and conflict (Bazzi et al., 2019).

Due to the limitations set, this study will only discuss how ethnic diversity is related to social capital such as trust and tolerance. Social capital is an important feature of a society that would help members of different ethnic, religious, and other groups effectively achieve the goals of the community. It is only with the trust towards others and respecting differences that society would function, without the need or minimize the necessity of having formal institutions. Therefore, it is important to understand how the many different members of a society could work together. Indonesia, in particular, is blessed with a sheer amount of ethnocultural diversity due to its unique geographical locations. The 2010 census data shows the country's population speaks 1,204 different languages and there were 964 ethnic groups. Such diversity is a real challenge to not only the government in ensuring that the policies are inclusive but also to grassroots communities that deal with members of different groups daily.

The association between social capital, such as trust, and ethnic diversity are not particularly clear. There are three often cited theories on how social capital may be related. The first theory, often dubbed as constrict or "hunkering down" theory, predicts that diversity makes people trust less towards everyone, which implies lower (within-group) trust and (outgroup) tolerance (Putnam, 2007). The second is "conflict theory" which predicts that the more diverse a community is, the higher the trust and lower tolerance (Blalock, 1967). The reason for such prediction is that the perception of threat (from an outsider) makes people increase the bonding among the same group while, at the same time, increasing their prejudice towards the outsider. Finally, the "contact theory" is more optimistic as diversity is expected to increase both trust and tolerance (Allport, 1954). The rationale behind the theory is that contact with out of the group members would bridge differences and therefore increase the social capital.

Empirically, some studies show how the two seem to have a negative correlation. For example, in a cross-country study, trust was found to be lower in a society that is heterogeneous (Alesina & La Ferrara, 2002). Whereas in another cross-country study, no robust relationship was found for these variables per se (Finseraas & Jakobsson, 2012), but when multidimensional social structures are introduced, the negative association emerges. Other variables are also found to be associated with trusts, such as the positive association between trust and economic performance (Algan & Cahuc, 2013), the negative correlation between trust and income inequality (Bjørnskov, 2008), and that females tend to trust more (Falk et al., 2018). A whole chapter in the handbook of economic growth was also dedicated to research on not only the relationships between social capital and economic performance but also with institutions (Algan & Cahuc, 2014). The importance of the latter is also expounded in a recent review paper that relates culture—which includes generalized trust—with institutions (Alesina & Giuliano, 2015). More recently, a review study shows the prediction from the contact theory seems to have less support than the alternatives as most empirical studies indicate a negative relationship between social trust and ethnic diversity (Dinesen & Sønderskov, 2017).

The literature is also not limited to cross-country but also within-country variations, including those in the context of developing countries such as Indonesia. With hundreds of local languages spoken by 273.5 million people, Indonesia is unique in terms of its large

ethnic diversity resulting in the socio-economic implications of having such diversity. Anecdotal evidence shows the country's experience with ethnic and religious violence, particularly during the transition period of 1998 to 2005, which serves as an indication that diversity matters. Previous studies have shown the conflicting effects of ethnic diversity on conflict: ethnic clustering has some positive correlations with local conflict (Barron et al., 2009), but different measures seem to have opposite effects on conflict (Bazzi et al., 2019). Meanwhile, Gaduh (2012) provides some evidence that trust (tolerance towards members of other religions) is negatively (positively) associated with religious heterogeneity. More recently, using individual-level data from the Indonesian Family Life Survey (IFLS), Mavridis (2015) shows that ethnic diversity is negatively correlated with trust but is positively correlated with ethnic tolerance. It is rather unfortunate that there is no further elaboration on why the result turns out that way, except for the positive outlook that diversity is a good thing to have in a society. The author used data from the fourth wave (2007) of the IFLS that surveyed more than 40 thousand individuals, where trust is elicited through the lost wallet questions (i.e., the likelihood that a lost wallet is returned) and tolerance is simply elicited by asking whether the respondent can trust people of the same ethnicity and whether worship place for people of a different religion is acceptable.

One important aspect of the literature is regarding how ethnic diversity is measured, where most of the literature uses fractionalization and polarisation as proxies. Ethnic fractionalization refers to the probability of two strangers belonging to different ethnic groups, whereas ethnic polarization shows how divided or polarized the society is. In the simplest formulas used to construct these variables, most authors use population data by ethnic group, assuming that one ethnic group is distinct from another group. Consequently, such formulas ignore the possibility of two ethnic groups that are similar, but categorically different. Accordingly, researchers have begun to find a better approximation for ethnic diversity that could accommodate such a possibility and found the answer by using linguistic similarity (Desmet et al., 2009; Esteban & Ray, 2011). The implication of using such measures of ethnic diversity is vast, especially in countries like Indonesia, where, arguably, the different ethnic groups may be similar if they reside nearby.

The literature on social capital can be categorized into two in their construction of the variable that is either using survey or experiment. The latter is often used to establish causality using a small sample (e.g., Chuah et al., 2013; Chen & Sriporn, 2022), and typically utilizes the trust game (Berg et al., 1995). However, due to the cost of conducting proper economic experiments and the relatively low generalizability of the results, most studies on social capital rely on the survey method. Most cross-country studies use survey methods taken from the World Values Survey and the Gallup World Poll, but national surveys are also very common as used in studies on Indonesia cited above.

This study is unique as it extends Mavridis (2015) in three regards. First, instead of using IFLS that only covers around half of the total districts, we use data from a national survey to provide a better representation of Indonesia. Second, this study weighs ethnic diversity with ethnic similarities using an objective measure from Ethnologue. This is important as

there are gradations of ethnic differences: some ethnic groups are ethno-linguistically close to each other (e.g., Minang & Malay), while others are distant (e.g., Javanese & Dani in Papua). Third, this study provides a causal identification using an instrumental variable regression method.

## Research Method

This study uses the 2009 National Socioeconomic Survey (Susenas) to measure trust and tolerance in Indonesia. The 2009 Susenas was gathered by the Statistics Indonesia (*Badan Pusat Statistik*) and is representative of Indonesia as it covers all districts of the country. The social capital module of the survey was not conducted every year and 2009 was the closest year to the 2010 census that provides the data for ethnic diversity. We also use the same survey to obtain individual and household characteristics used as controls in the regressions.

The Susenas survey asked 291,532 individuals whether they trusted their neighbors, village figures, government, and village apparatus. Therefore, the survey reflects respondents' direct, particularized trust with their neighborhood rather than a generalized trust which measures respondents' belief over a stranger. This study calculates trust as the mean response to these questions. Similarly, the tolerance questions were also particularized, i.e., whether they were content with having neighbors of different ethnicity or religion, and their opinion regarding a hypothetical plan of building a worship place of different religions in the neighborhood.

This study uses two distributional measures, fractionalization and polarization, as proxies for ethnic diversity. Specifically, ethnolinguistic grouping is used as an appropriate proxy for ethnicity in Indonesia (Mancini, 2008) which helps estimate linguistic similarities. Ethnolinguistic groupings were based on the language spoken at home from the 2010 census (Minnesota Population Center, 2015), which was matched with linguistic similarities calculated from Ethnologue's website (Simons & Fennig, 2017). IPUMS-International sampled (geographically stratified and systematic) the original census data with an expansion factor of 10. As of the writing of this article, IPUMS-International has only the 2010 population census as the latest available data.

For each district, this study calculates the Greenberg-Gini index (ethnolinguistic fractionalization weighted by inter-group distance  $d_{mn}$ ) (Esteban & Ray, 2011) as:

$$G = \sum_{m=1}^N \sum_{n=1}^N s_m s_n d_{mn}.$$

Here  $s_m$  and  $s_n$  are the share of group  $m$  and  $n$ , respectively. Thus,  $0 < G < 1$  and higher values correspond to a more divided society along with different groups.  $G$  is weighted by linguistic distance  $d_{mn}$ , where  $d_{mn} = 1 - (\text{common}/13)^\delta$ . Here, *common* is the number of common branches between groups  $m$  and  $n$ , while 13 is the maximum number of

branches for Indonesia. Therefore,  $(common/13)^\delta$  measures linguistic similarities. We use  $\delta = 0.05$  as in Desmet (2009) (they found similar results when it was varied between 0.04 and 0.10). Also, Esteban et al. (2012) found the relatively flat pseudo-likelihoods for  $\delta$  between 0.05 and 0.70. When  $d_{mn}$  is dropped,  $G$  becomes the standard fractionalization index  $F$  that measures the probability of two individuals coming from different groups.

Another important measure of cultural diversity is the polarization index  $P$  that is also weighted by  $d_{mn}$  (Esteban & Ray, 2011):

$$P = \sum_{m=1}^N \sum_{n=1}^N s_m^2 s_n d_{mn}.$$

In addition to ethnic diversity, religious fractionalization ( $RF$ ) is included as well that measures the probability of two random strangers having a different religion.

Simple ordinary least squares (OLS) models are used as the baseline, which is then relaxed by assuming the endogeneity of the ethnic diversity variables. In the OLS, this study has separately regressed the three measures of social capital  $sc = \{\text{localized trust, tolerance towards ethnic outgroup members and tolerance towards religious outgroup members}\}$  using this specification (for individual  $i$  living in district  $j$ ):

$$sc_{ij} = \beta diversity_j + \gamma X1_j + \theta X2_{ij} + \epsilon$$

where *diversity*—the main variable of interest—is the four measures of ethnic and religious diversity (we run the regressions separately for these variables).  $X1_j$  is a set of district-level controls that includes log population, log per capita district GDP, urban dummy (=1 if more than half of the district population lives in urban areas and 0 otherwise), and income inequality (percentage difference between the mean and the poorest 20% per capita household expenditure). Whereas  $X2_{ij}$  is a set of individual/household characteristics that include gender, age, square of age, marital status, years of education, and household expenditure.

OLS is preferred as it is still an unbiased and consistent estimator of the true population parameter even though the dependent variable is ordinal. The study also does not concern with interpreting the estimated coefficients on the dependent variable, besides on looking at the signs and significance, which alleviate the potential issue of using OLS to obtain the estimates.

As usual we assumed the error term  $\epsilon$  is uncorrelated with  $sc$  and the explanatory variables. Otherwise, the estimated parameters from the OLS would be biased and alternative identification is needed. Here, instrumental variable regression method is used where  $sc$  is instrumented by geographical variations: latitude/distance from equator, mean elevation, and variance elevation (Ahlerup & Olsson, 2012; Michalopoulos, 2012). Due to the unavailability of the main data from these papers at subnational level, such as duration of human settlement and variations in land quality, we can only use these

geographical variables as our instruments. Standard errors are clustered at the district level and the parameters were estimated using the generalized method of moments (GMM) since the error terms were found to be heteroscedastic following the Pagan and Hall (1983) test.

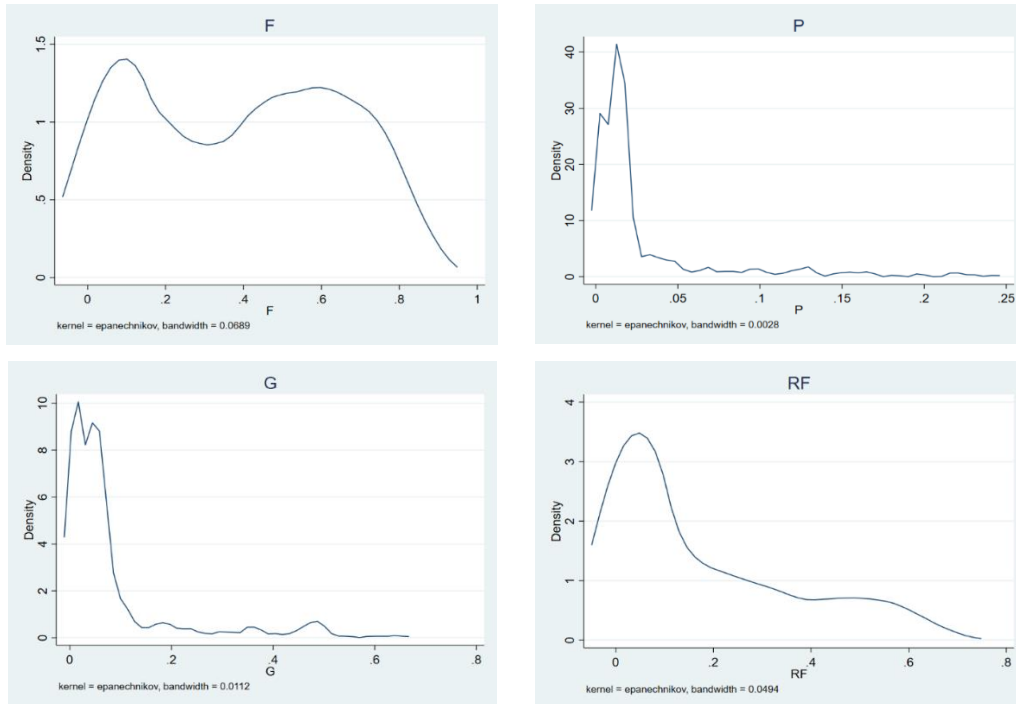
## Result and Discussion

Table 1 summarizes the variables used in this study. Although this study has more than 290 thousand observations for some variables, the actual number of observations that are used in the regression will be slightly lower. On average, people were trusting and tolerating those from different ethnic groups with means of 3.77 and 3.20 respectively. The respondents, however, were less tolerant towards people of different religions. Only 32% of the respondents lived in urban areas with the education until 7<sup>th</sup> grade on average. Very few of the respondents were single (6%) and the average age was quite mature at 43 years. The reason for the latter is due to the respondents who were household heads.

**Table 1** Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Trust	291,240	3.769514	0.415244	1	5
Tolerance towards other religions	289,276	2.639638	0.732391	1	5
Tolerance towards other ethnic groups	286,222	3.203356	0.626467	1	5
Fractionalization ( <i>F</i> )	289,358	0.369451	0.262712	0.0047	0.8800
Polarization ( <i>P</i> )	289,358	0.022995	0.036173	0.0002	0.2433
Greenberg-Gini Index ( <i>G</i> )	289,358	0.068338	0.102863	0.0005	0.6561
Religious Fractionalization ( <i>RF</i> )	289,358	0.161451	0.176444	0.0000	0.6995
Log Population	291,532	12.82605	1.020576	9.63	15.38
Log GRDP per capita	291,532	1.840117	0.719965	-1.02	5.07
Urban District	291,532	0.320963	0.466847	0	1
Years of Education	291,532	7.355759	4.260274	0	18
Single	291,532	0.060268	0.237983	0	1
Age	291,515	42.97709	14.41071	6	98
Square of Age	291,515	2054.698	1372.846	36	9604
Female	291,532	0.530285	0.499083	0	1
Household Expenditure	291,532	1694844	1429445	22595	78300000
Income inequality	291,532	1.094404	0.284242	0.19	2.69

Figure 1 plots the kernel density of the measures of ethnic diversity, and it is apparent that the introduction of ethnic similarities changes the distribution of the variables. For example, the shape of *F* is clearly different from *G* (i.e., *F* that accounts for ethnic similarities). Also, except for *F*, the densities are skewed to the right, indicating that the degree of diversity is not as large as in the case where ethnic similarities are omitted.



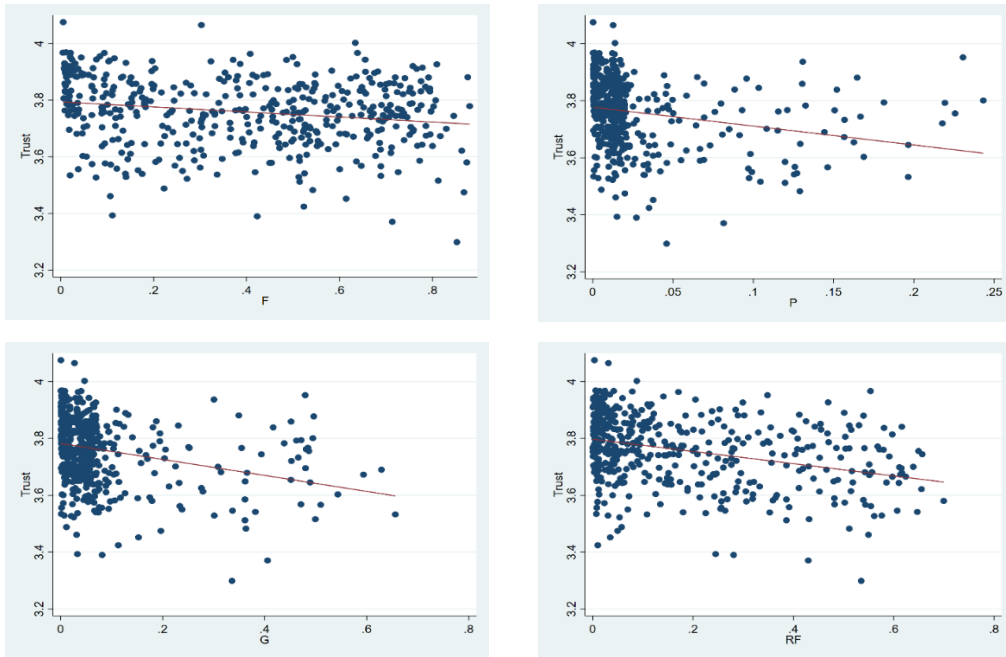
**Figure 1** Densities of ethnic and religious diversity variables

Meanwhile, a visual inspection of the scatterplots between ethnic diversity and trust (Figure 2), ethnic tolerance (Figure 3), and religious tolerance (Figure 4) suggests different patterns that emerged. Trust tends to be negatively correlated with ethnic diversity, but the opposite seems to happen for both ethnic and religious tolerances. Some outlier districts (Dogiyai in Figure 2 and Puncak in Figure 4; both are in Papua) are removed, but even if they are included the results remain the same.

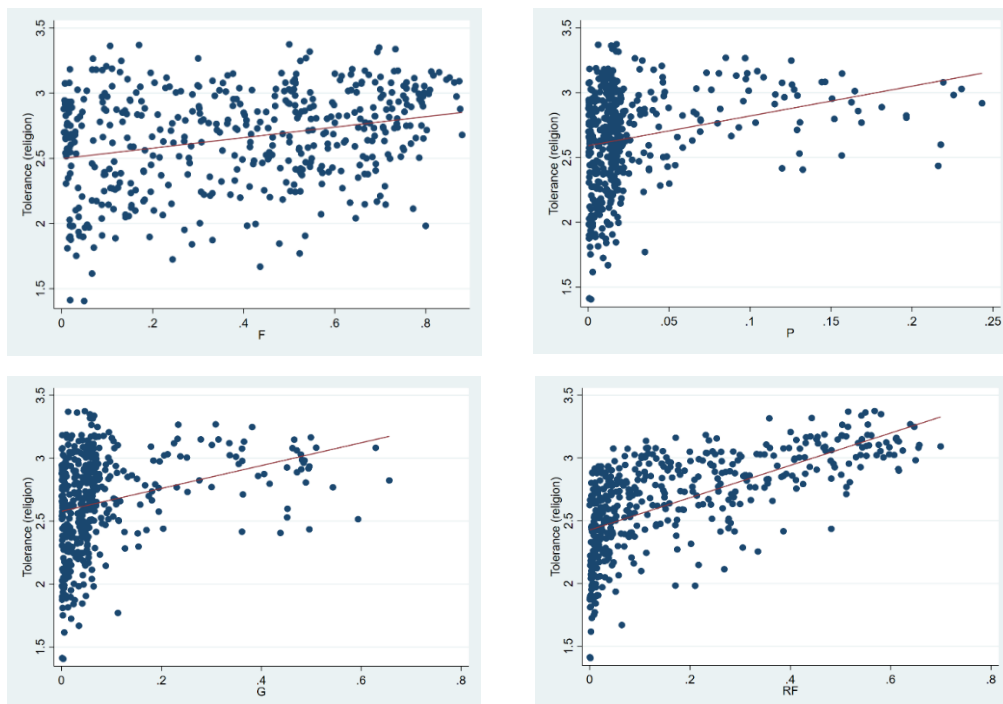
Figure 2 shows the negative correlation between trust and all measures of ethnic diversity (proxied by  $F$ ,  $P$  and  $G$ ) and religious diversity (religious fractionalization,  $RF$ ). When ethnolinguistic similarities are included in the construction of  $P$  and  $G$ , the distributions are more clustered at smaller values (less than 0.05 and 0.2 for  $P$  and  $G$  respectively), which confirms the results from Figure 1. It is noted that the negative correlation between trust and ethnic fractionalization  $F$  is not as strong as the others.

Figure 3 shows the positive correlation between religious tolerance and ethnic and religious diversity. This finding is also observed in Figure 4 which relates to ethnic tolerance and diversity, although visually the slopes are slightly less steep than the ones in Figure 3. This difference suggests that the lower tolerance towards those of different religions, as opposed to those of different ethnicity, found in the descriptive statistics (Table 1) seems to extend to how it is related with ethnic and religious diversity. Findings from the visual inspection will be confirmed using the econometric analysis in the next part of this section.

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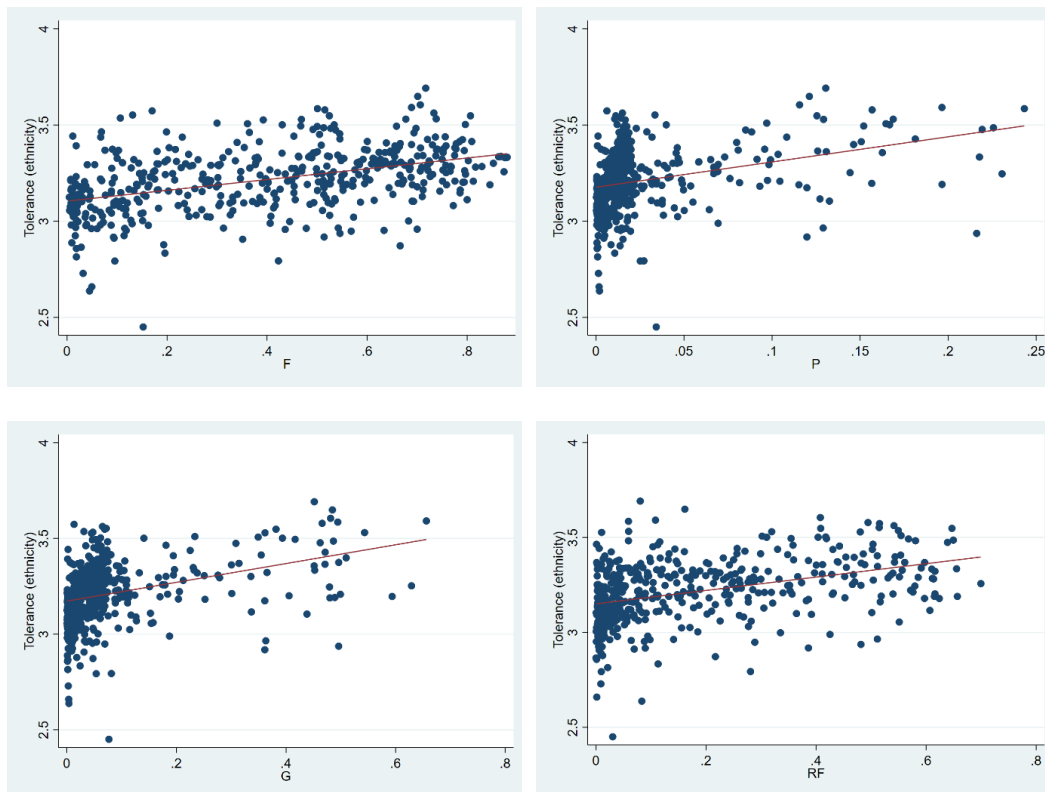


**Figure 2** Trust and ethnic diversity



**Figure 3** Religious tolerance and ethnic diversity





**Figure 4** Ethnic tolerance and ethnic diversity

In the following discussions, this study has observed different results on the effect of ethnic diversity on social capital, where the effect is positive (negative) on the levels of tolerance (trust). This finding is statistically significant and consistent when various measures of ethnic diversity are used. Such systematic differences suggest a different underlying driver of trust and tolerance, at least on our data.

In Table 2, it was found that all measures of social capital are negatively correlated with trust, even after controlling for demographic and district characteristics. As shown in Table 2, the coefficients from *F*, *P* and *G* are all negative and strongly significant. Many of the demographic and district characteristics are also significantly correlated with the dependent variable. For example, households who lived in urban districts and had higher income (proxied by expenditure) tended to be less trusting. Interestingly, having a better (longer) education does not make people more trusting.

The above finding generally holds when the instrumental variable regression method is used. This study excludes *RF* as the instruments used in Table 3 are specific for ethnic variables. First-stage regression results have been reported and have found that only latitudes that are consistently significant in predicting variations of ethnic diversity (we will not report this again in subsequent tables as the regressions are identical to the ones in Table 3 except for the dependent variable).

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**Table 2** OLS Results (dependent variable: trust)

	(1)	(2)	(3)	(4)
Fractionalization	-0.0516*** (0.0183)			
Polarization		-0.508*** (0.194)		
Greenberg-Gini Index			-0.217*** (0.0582)	
Religious Fractionalization				-0.135*** (0.0268)
Log Population	0.0154*** (0.00494)	0.0150*** (0.00477)	0.0136*** (0.00486)	0.0127*** (0.00470)
Log GRDP per capita	-0.0212*** (0.00692)	-0.0249*** (0.00668)	-0.0255*** (0.00668)	-0.0194*** (0.00656)
Urban District	-0.0644*** (0.0122)	-0.0555*** (0.0116)	-0.0576*** (0.0117)	-0.0595*** (0.0119)
Years of Education	-0.00271*** (0.000574)	-0.00252*** (0.000583)	-0.00267*** (0.000561)	-0.00247*** (0.000577)
Single	0.0122** (0.00558)	0.0126** (0.00558)	0.0119** (0.00557)	0.0133** (0.00555)
Age	0.00389*** (0.000416)	0.00402*** (0.000421)	0.00397*** (0.000422)	0.00398*** (0.000416)
Square of Age	-2.32e-05*** (4.17e-06)	-2.37e-05*** (4.17e-06)	-2.37e-05*** (4.18e-06)	-2.34e-05*** (4.18e-06)
Female	0.00339 (0.00360)	0.00463 (0.00368)	0.00356 (0.00357)	0.00292 (0.00358)
Household Expenditure	-1.81e-08*** (1.58e-09)	-1.80e-08*** (1.68e-09)	-1.78e-08*** (1.66e-09)	-1.81e-08*** (1.62e-09)
Income inequality	-0.0448** (0.0187)	-0.0455** (0.0180)	-0.0394** (0.0182)	-0.0313* (0.0175)
Constant	3.629*** (0.0719)	3.624*** (0.0686)	3.643*** (0.0693)	3.640*** (0.0678)
Observations	289,058	289,058	289,058	289,058
Adjusted R-squared	0.032	0.033	0.033	0.033

Notes: Robust cluster (at district level) standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

**Table 3** IV-GMM Results (dependent variable: trust)

	(1)	(2)	(3)
<b>Second stage</b>			
Fractionalization	-0.258*** (0.0461)		
Polarization		-3.925*** (1.005)	
Greenberg-Gini Index			-1.129*** (0.255)
Constant	3.873*** (0.0277)	3.808*** (0.0294)	3.804*** (0.0284)
Observations	289,058	289,058	289,058
Adjusted R-squared	0.017	-0.053	-0.016
<b>First stage</b>			
Latitude	-0.344*** (0.038)	-0.022*** (0.005)	-0.079*** (0.014)
Mean elevation	-0.088* (0.045)	-0.002 (0.006)	-0.013 (0.018)
Variance elevation	0.066 (0.083)	-0.002 (0.011)	0.008 (0.032)
Constant	0.470 (0.055)	0.016 (0.006)	0.053 (0.020)

Notes: Robust cluster (at district level) standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. All controls are included in all regressions (coefficients are not shown to save space).

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**Table 4** OLS Results (dependent variable: tolerance)

	Towards other religions (1-4)				Towards other ethnic groups (5-8)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fractionalization	0.283*** (0.0702)				0.201*** (0.0249)			
Polarization		1.677*** (0.309)				0.984*** (0.174)		
Greenberg-Gini Index			0.690*** (0.128)				0.384*** (0.0652)	
Religious Fractionalization				1.240*** (0.0677)				0.253*** (0.0375)
Log Population	-0.0382** (0.0181)	- 0.0461** (0.0180)	- 0.0424** (0.0183)	0.00186 (0.0148)	- 0.0342*** (0.00655)	- 0.0417*** (0.00615)	- 0.0401*** (0.00623)	- 0.0378*** (0.00615)
Log GRDP per capita	0.0172 (0.0227)	0.0341 (0.0221)	0.0358 (0.0220)	-0.00850 (0.0180)	-0.00270 (0.00904)	0.00875 (0.00884)	0.00958 (0.00869)	-0.00168 (0.00853)
Urban District	0.0144 (0.0386)	-0.0292 (0.0365)	-0.0222 (0.0364)	-0.00620 (0.0308)	-0.0234* (0.0141)	- 0.0535*** (0.0144)	- 0.0494*** (0.0143)	- 0.0461*** (0.0138)
Years of Education	0.0142*** (0.00135)	0.0133** (0.00137)	0.0137** (0.00135)	0.0126** (0.00114)	0.00902** (0.000852)	0.00838** (0.000853)	0.00866** (0.000850)	0.00832** (0.000833)
Single	0.0526*** (0.0120)	0.0485** (0.0121)	0.0507** (0.0121)	0.0470** (0.0105)	0.0123* (0.00707)	0.00901 (0.00710)	0.0102 (0.00713)	0.00776 (0.00693)
Age	0.00217** (0.000798)	0.00149* (0.000794)	0.00165* (0.000793)	0.00175* (0.000757)	0.000567 (0.000566)	9.50e-05 (0.000567)	0.000186 (0.000568)	0.000183 (0.000570)
Square of Age	-6.86e-06 (8.18e-06)	-4.79e-06 (8.20e-06)	-4.96e-06 (8.17e-06)	-5.26e-06 (7.84e-06)	-1.04e-06 (5.60e-06)	2.34e-07 (5.63e-06)	1.09e-07 (5.63e-06)	-4.62e-07 (5.65e-06)
Female	- 0.0460*** (0.00824)	- 0.0535** (0.00888)	- 0.0502** (0.00865)	- 0.0359** (0.00740)	-0.00826* (0.00480)	- 0.0137*** (0.00492)	-0.0119** (0.00489)	-0.0104** (0.00489)
Household Expenditure	2.32e-09 (3.69e-09)	3.17e-09 (3.55e-09)	2.44e-09 (3.56e-09)	1.94e-10 (3.09e-09)	9.57e-09*** (2.03e-09)	1.04e-08*** (2.12e-09)	1.00e-08*** (2.09e-09)	1.04e-08*** (2.11e-09)
Income inequality	0.309*** (0.0646)	0.330*** (0.0642)	0.311*** (0.0646)	0.154*** (0.0524)	0.116*** (0.0254)	0.134*** (0.0248)	0.125*** (0.0250)	0.108*** (0.0243)
Constant	2.482*** (0.248)	2.646*** (0.241)	2.593*** (0.244)	2.121*** (0.194)	3.352*** (0.0979)	3.493*** (0.0913)	3.470*** (0.0921)	3.466*** (0.0903)
Observations	287,099	287,099	287,099	287,099	284,074	284,074	284,074	284,074
Adjusted R-squared	0.049	0.047	0.049	0.113	0.024	0.021	0.022	0.022

Notes: Robust cluster (at district level) standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Table 4 summarizes the results from the OLS regressions on tolerance, both tolerance towards other religions and tolerance towards other ethnic groups. The study confirms the visual inspection as the coefficients are all positive and significant. Like the finding from Table 2, the estimated parameters for the urban variable are negative, but only for tolerance towards other ethnic groups members (Table 4 models 5 to 8). However, unlike in Table 2, education seems to have a positive influence on tolerance as the coefficients are all positive and highly significant. Having higher expenditure is also positively

associated with tolerance towards people of other ethnicities. The correlation between the inequality variable and tolerance in Table 3 is also different from Table 2, where the former is positive (more unequal, more tolerance) whereas the latter is negative (more unequal, less trust).

Again, the model has been re-estimated using the instrumental variable regression method in Table 5 and the results were held (although the significance level drops to just 10% for tolerance towards other religions).

**Table 5** IV-GMM Results (dependent variable: tolerance)

	Towards other religions (1-3)			Towards other ethnic groups (4-6)		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Second stage</i>						
Fractionalization	0.242*			0.354***		
	(0.145)			(0.0579)		
Polarization		4.236*			5.752***	
		(2.341)			(1.266)	
Greenberg-Gini Index			1.094*			1.612***
			(0.645)			(0.321)
Constant	2.020***	2.074***	2.075***	2.859***	2.942***	2.942***
	(0.0826)	(0.0742)	(0.0732)	(0.0372)	(0.0407)	(0.0390)
Observations	287,099	287,099	287,099	284,074	284,074	284,074
Adjusted R-squared	0.046	0.030	0.043	0.019	-0.048	-0.015

Notes: Robust cluster (at district level) standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All controls are included in all regressions (coefficients are hidden to save space).

This study found that diversity is negatively correlated with trust but positively correlated with tolerance which is very similar to Mavridis (2015), in which the author claimed that the result was not found in preceding literature. In the paper, Mavridis also did not explain why such a result occurred. According to "conflict theory", in a diverse environment, the levels of (generalized) interpersonal trust are low but at the same time, the levels of (particularized) intrapersonal trust are high. This trade-off was moderated by interethnic contact where a person with a diverse friendship tended to be more tolerant than those who did not (Rudolph & Popp, 2010). In addition, they also suggest that particularized trust (as used in this study) is a more accurate representation of trust as a function of social capital than generalized trust, in which the latter tends to serve as an indication for a person's level of tolerance. This theory, therefore, suggests that tolerance is expected to be lower in a diverse environment, whereas trust is expected to flourish. Findings in this study, however, show the opposite: tolerance is higher in a diverse environment, while trust is lower. Thus, it is less likely that conflict theory will be relevant in the case of Indonesia.

The findings of this study show some support to the constrict theory (Putnam, 2007) where diversity tends to decrease both within-group trust. However, this theory could not explain why tolerance towards ethnic and religious outgroup members is high in a diverse environment. Hence it seems that the finding regarding the association between tolerance and diversity lends some support to the contact theory (Allport, 1954), where higher intergroup contact is expected to foster tolerance towards outgroup members. In

short, data provides only one support to the constrict theory (regarding trust), but another supports to the contact theory (regarding tolerance).

While this study has no direct policy implication, several important suggestions can be pointed out to improve existing policies further. The first suggestion is the need to support and uphold existing policies that promote inclusivity, as the study shows that tolerance and ethnic and religious diversity go hand in hand. This suggestion is increasingly important as there is still evidence of intolerance against those of different religions or ethnic groups (see e.g., BBC, 2019). Also, local violence in post-conflict (after 2005) Indonesia tends to be small in size but is frequent (Barron, 2019). The second suggestion is the need to promote activities that can increase societal trust in the absence of perceptions of external threats. Another finding of this study shows that diversity tends to decrease with trust but increases with tolerance showing the trade-off between the two measures of social capital. Community and policy leaders should understand this trade-off and must weigh the benefits of policies or activities that may attract migrations.

## Conclusion

The estimation results support Mavridis (2015) where trust and tolerance are negatively and positively associated with ethnic and religious diversity respectively, even after controlling for ethnolinguistic similarities and demographic controls. The novelty of this research is in the inclusion of ethnolinguistic similarities in the construction of the measures of ethnic diversity. By including this variable, this study managed to capture better the degree of diversity that takes place in the region. This is important as many ethnic groups in Indonesia are linguistically very similar to each other, especially those in Kalimantan and Sumatera, which implies that measures of diversity such as fractionalization and polarisation that exclude such features may overestimate the degree of diversity in the region. In addition to the findings from the multiple linear regression method, consistent results were arrived at after removing the possibility of endogenous ethnic diversity variables by conducting instrumental variable regressions.

The implication of this finding is critical for Indonesia and other heterogeneous countries, with communities at the forefront in not only acknowledging the importance of ethnic diversity but also in promoting inclusive activities. Policy-wise, local leaders need to be unafraid of allowing migration, while at the same time expanding government programs that encourage positive inter-community relationships. In communities with experience of ethnic or religious hostility, local governments must actively involve community leaders in the discussion regarding programs that aim to assimilate people of different ethnic or religious backgrounds. Research-wise, this study shows how ethnic diversity is associated with social capital and some may argue (e.g., Algan & Cahuc, 2014) that such association can be extended to other socioeconomic aspects such as economic growth. The current research on how ethnic diversity is associated with economic performance in Indonesia is very limited. For example, a study by Ananta et al. (2021) shows a mixed result on how the two variables are associated, whereas a recent study did not even consider the

importance of ethnic diversity as a possible determinant of regional economic growth (Yuliadi, 2020).

This research is limited in several ways. First, the 2009-2010 data is relatively old, and the latest (2020) population census data is not yet available in the public domain for free (i.e., through the IPUMS-International database). With more than a decade-old data, this study admits that some of our measures might have changed. For example, the large number of social media users today might affect social interaction in a way that affects their perception of others, which may lead to either higher or lower social capital. However, it could also be argued that the distribution of ethnic diversity might be persistent as there were no observed mass migrations within the last decade. Second, other data sources can be used to supplement this research such as the 2014 national survey on social resilience that also includes questions on social capital. While the 2009 data is more appropriate as it is closer to the 2010 census, some insights might be gained if the analysis can be extended to 2014.

There are a couple of directions for future research. First, using 2014 (or more recent) data on social capital might uncover the mechanism or information that can explain the result of this study as the 2014 survey provides richer information on social resilience in general. Second, once the 2020 population census data is available, new findings might come to the surface which will be more relevant for today's situation.

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