

MEASURING ETHNIC STRATIFICATION AND ITS EFFECT ON TRUST IN AFRICA

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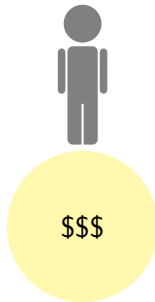
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ECONOMIC DIFFERENCES



BETWEEN-GROUP INEQUALITY

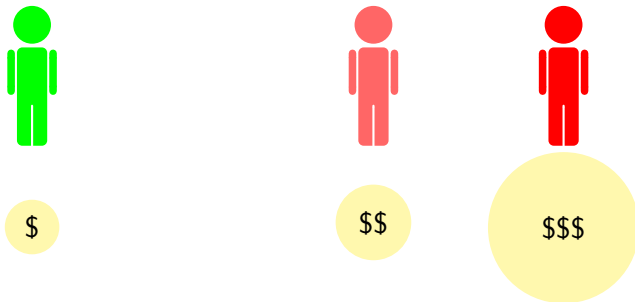


ETHNOLINGUISTIC DISTANCES



ETHNIC STRATIFICATION

COMBINING ECONOMIC AND ETHNOLINGUISTIC DISTANCES



THIS PAPER

- THEORETICAL PART

- ▶ Index of ethnic stratification
- ▶ Decomposition into average wealth, Gini coefficient, ethnic fractionalization and co-directionality
- ▶ Axiomatic approach

- EMPIRICAL PART

- ▶ Measure ethnic stratification on town and village level in 26 African countries
- ▶ Combine data from Afrobarometer with Ethnologue
- ▶ Ethnic stratification is related to lower trust towards individuals (from other ethnic groups) and institutions

LITERATURE

● THEORETICAL: INEQUALITY AND DIVERSITY MEASUREMENT

- ▶ Review: Chakravarty (2015)
- ▶ Gini (e.g., Shorrocks 1980), multivariate Gini (e.g., Banerjee 2010)
- ▶ Univariate fractionalization (Bossert et al. 2011)
- ▶ Polarization (e.g., Esteban and Ray 1994; Reynal-Querol and Motalvo 2005; Permanyer 2012)

● EMPIRICAL: BETWEEN-GROUP INEQUALITY AND TRUST

- ▶ CONSEQUENCES OF BETWEEN-GROUP INEQUALITY: e.g., low GDP per capita (Alesina et al. 2016), low public good provision (Baldwin and Huber 2010), civil conflict (Gubler and Selway 2012, Cederman et al. 2011, Guariso and Rogall 2016, Huber and Mayoral 2014)
- ▶ DETERMINANTS OF TRUST: e.g., between-group inequality (Tesei 2015), historical experiences (Nunn and Wantchekon 2011), conflict (Rohner et al. 2013), protests (Sangnier and Zylberberg 2017), ethnic diversity (Robinson 2017)

THEORETICAL PART: INDEX OF ETHNIC STRATIFICATION

INDEX OF ETHNIC STRATIFICATION

- Population P of size $m > 0$
- Distance between wealth levels w_i and w_j : $|w_i - w_j|$
- Distance between ethnicities e_i and e_j : $\lambda(e_i, e_j)$

INDEX OF ETHNIC STRATIFICATION

$$S(f, \lambda) := \frac{1}{m^2} \int_{i \in P} \int_{j \in P} \lambda(e_i, e_j) |w_i - w_j| dj di$$

DECOMPOSITION OF ETHNIC STRATIFICATION

- AVERAGE WEALTH:

$$\mu(w) := \frac{1}{m} \int_{i \in P} w_i di$$

- GINI COEFFICIENT OF INEQUALITY:

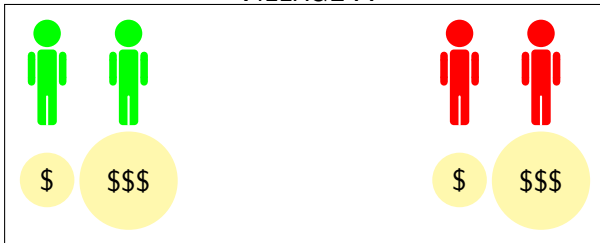
$$G(w) := \frac{1}{2\mu(w)m^2} \int_{i \in P} \int_{j \in P} |w_i - w_j| dj di$$

- ETHNIC FRACTIONALIZATION:

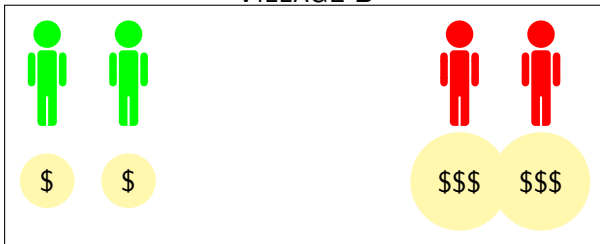
$$F(e) := \frac{1}{m^2} \int_{i \in P} \int_{j \in P} \lambda(e_i, e_j) dj di$$

CO-DIRECTIONALITY

VILLAGE A



VILLAGE B



EMPIRICAL PART: LOCAL ETHNIC STRATIFICATION AND TRUST IN AFRICA

Geocoded data from Afrobarometer survey (BenYishay et al. 2017), rounds 5 (2011-2013) and 3 (2005-2006)

- Assets: Radio, television, mobile phone, motorcycle/car, types of water source, toilet, house and roof

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- Language, ethnicity: Match to Ethnologue (Gordon Jr., 2005)

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- Language, ethnicity: Match to Ethnologue (Gordon Jr., 2005) $\Rightarrow$ ethnolinguistic distances

Largest groups in Nigeria

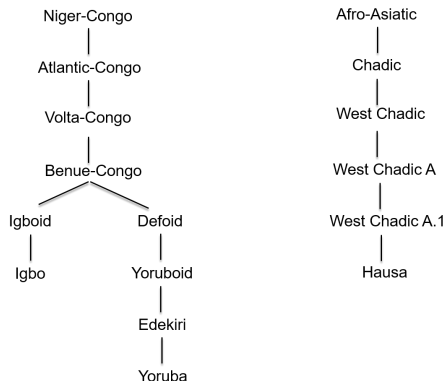


FIGURE 1: Language trees

Largest groups in Nigeria

Ethnolinguistic
distance: Distance measure
by Putterman and Weil (2010)

$$\lambda_{i,j} = 1 - \sqrt{\frac{2t_{ij}}{T_i + T_j}}$$

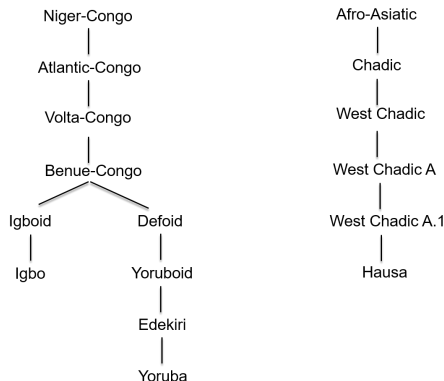


FIGURE 1: Language trees

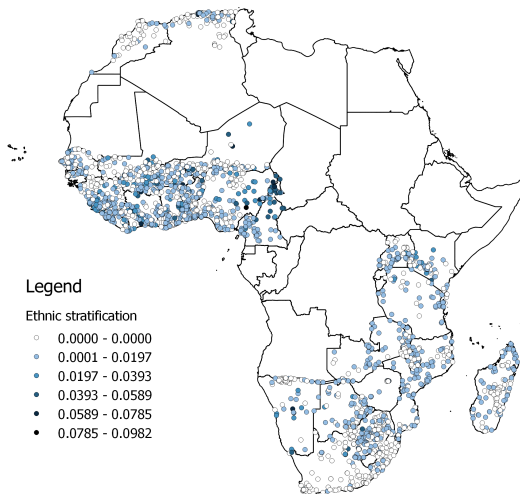
Geocoded data from Afrobarometer survey (AidData), rounds 5 (2011-2013) and 3 (2005-2006)

- Assets: radio, television, mobile phone, motorcycle/car, types of water source, toilet, house and roof $\Rightarrow$ wealth index (PCA) $\Rightarrow$ wealth distances
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- Assets: radio, television, mobile phone, motorcycle/car, types of water source, toilet, house and roof $\Rightarrow$ wealth index (PCA) $\Rightarrow$ wealth distances
- Language, ethnicity: match to Ethnologue $\Rightarrow$ ethnolinguistic distances
- Trust: indicator variables for trust in relatives, neighbors, other people, local assembly (round 5), people from own and other ethnic groups (round 3)

FINAL SAMPLE ROUND 5



SPECIFICATIONS

Linear probability model:

$$Trust_{ivce} = \beta S_{vc} + \theta X_{ivce} + FE_c + FE_e + \epsilon_{ivce}$$

- $Trust_{ivce}$: trust indicator for respondent i living in town / village v of country c and belonging to ethnolinguistic group e
- S_{vc} : ethnic stratification in town / village v
- X_{ivce} : control variables (wealth, age, age squared, religion, education, urban/rural)
- FE_c : country fixed effects
- FE_e : ethnolinguistic group fixed effects

Also control for:

- F_{vc} : local ethnic fractionalization
- G_{vc} : local wealth inequality (Gini)
- μ_{vc} : local average wealth

Two-way clustered standard errors at the level of ADM1 regions and ethnolinguistic groups

ETHNIC STRATIFICATION AND TRUST IN INDIVIDUALS AND INSTITUTIONS (ROUND 5)

	(1)	(2)	(3)	(4)
Dep. variable:	Trust in relatives	Trust in neighbors	Trust in other acquaintances	Trust in local assembly
Stratification	-1.30** (0.52)	-2.19*** (0.44)	-1.73*** (0.34)	-1.31** (0.55)
R^2	0.16	0.18	0.12	0.13

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Stratification	-1.64* (0.94)	-2.09*** (0.78)	-2.02*** (0.69)	-1.94*** (0.70)
Fractionalization	0.07 (0.07)	0.03 (0.07)	0.06 (0.07)	0.09 (0.07)
Gini	-0.09 (0.09)	-0.09 (0.11)	-0.03 (0.12)	0.01 (0.17)
Average wealth	-0.24*** (0.08)	-0.51*** (0.14)	-0.40*** (0.14)	-0.36** (0.15)
R^2	0.16	0.19	0.12	0.13
Observations	21,544	21,521	21,475	19,236

Notes: ***, **, * indicate significance at the 1, 5 and 10%-level, respectively.

ETHNIC STRATIFICATION AND TRUST IN OWN/OTHER ETHNIC GROUPS (ROUND 3)

	(1)	(2)	(3)
Dep. variable:	Trust in own ethnic group	Trust in other ethnic group	Higher trust in own ethnic group
Stratification	0.23 (0.43)	-0.01 (0.43)	-0.14 (0.28)
R^2	0.14	0.13	0.07
Stratification	0.28 (0.57)	-0.16 (0.72)	0.99* (0.51)
Fractionalization	0.00 (0.10)	0.05 (0.12)	-0.18** (0.08)
Gini	0.00 (0.07)	-0.02 (0.07)	-0.07 (0.07)
Average wealth	-0.15 (0.15)	-0.19 (0.17)	-0.07 (0.14)
R^2	0.14	0.13	0.07
Observations	11,833	11,710	11,683

Notes: ***, **, * indicate significance at the 1, 5 and 10%-level, respectively.

CONCLUSION

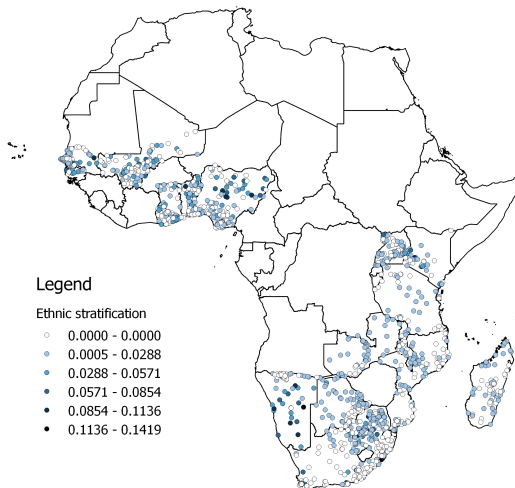
- New index of ethnic stratification: based on economic and ethnic distances between pairs of individuals
- Calculate ethnic stratification on the town and village level in 26 African countries
- Findings: Higher local ethnic stratification...
 - ▶ decreases trust in people an individual knows and in local political institutions
 - ▶ makes it more likely that respondents trust people from their own ethnic group more than people from other ethnic groups

THANK YOU!

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APPENDIX

FINAL SAMPLE ROUND 3



SUMMARY STATISTICS [back](#)

Variable	Obs.	Mean	Std.Dev.	Min.	Max.
<u>Round 5:</u>					
Trust in relatives	21,544	0.826	0.379	0	1
Trust in neighbors	21,521	0.607	0.488	0	1
Trust in other acquaintances	21,475	0.416	0.493	0	1
Trust in local assembly	19,236	0.493	0.500	0	1
Ethnic stratification (S)	21,579	0.007	0.013	0	0.098
Fractionalization (F)	21,579	0.103	0.147	0	0.696
Wealth inequality (G)	21,579	0.083	0.047	0	0.390
Average wealth (μ)	21,579	0.341	0.069	0.094	0.738
<u>Round 3:</u>					
Trust in own ethnic group	11,833	0.550	0.498	0	1
Trust in other ethnic group	11,710	0.420	0.494	0	1
Higher trust in own group	11,683	0.263	0.440	0	1
Ethnic stratification (S)	11,860	0.013	0.022	0	0.142
Fractionalization (F)	11,860	0.101	0.149	0	0.639
Wealth inequality (G)	11,860	0.252	0.103	0	0.750
Average wealth (μ)	11,860	0.202	0.058	0	0.551

ROBUSTNESS TESTS

- Using index based primarily on ethnicity instead of language
- Compute ethnolinguistic distances using the formula by Fearon (2003) instead of Putterman and Weil (2010)
- Measure economic distances using the perception-based lived poverty index instead of wealth index
- Controlling for respondent's generalized trust and for cluster-level average of generalized trust
- Controlling for trustworthiness of people and local political institutions
- Use categorical answers to trust questions to build variables that can take values 0 ("not at all"), 1 ("just a little"), 2 ("somewhat"), or 3 ("a lot")
- Estimate Probit maximum likelihood models instead of linear probability models
- Round 5: sample restricted to countries from round 3

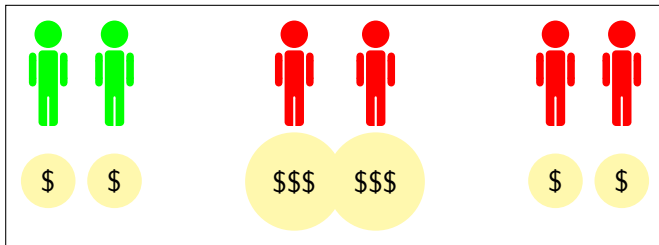
MOST ROBUSTNESS TESTS SUPPORT THE GENERAL PATTERN OF OUR RESULTS.

AXIOMATIC CHARACTERIZATION OF ETHNIC STRATIFICATION

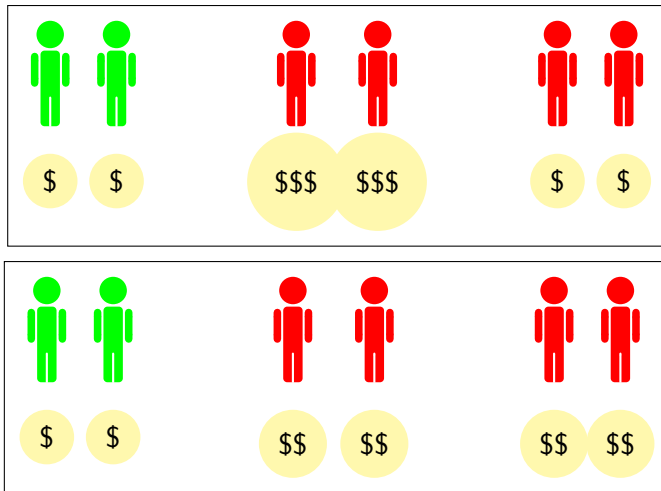
We can show that our index of ethnic stratification satisfies the following axioms:

- Co-directionality by wealth creation or transfer
- Bi-polarization by wealth transfer
- Co-directionality by linguistic change

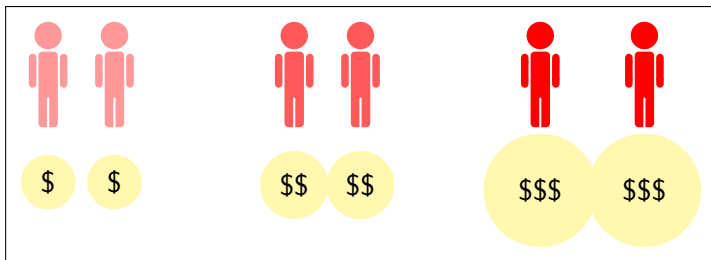
CO-DIRECTIONALITY BY WEALTH CREATION OR TRANSFER



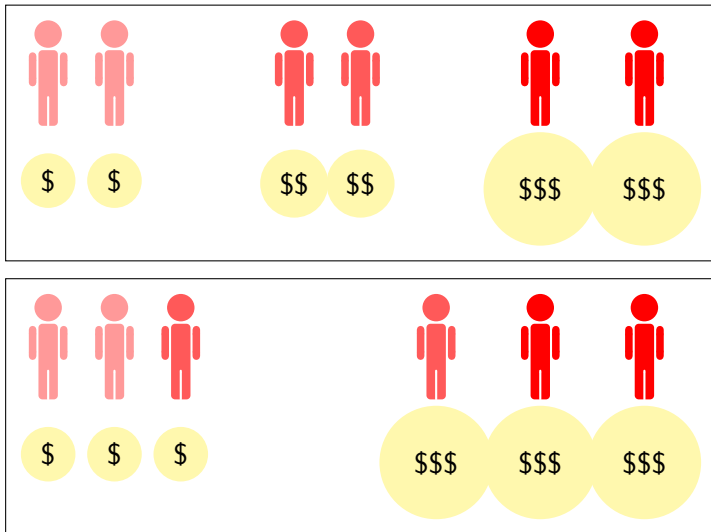
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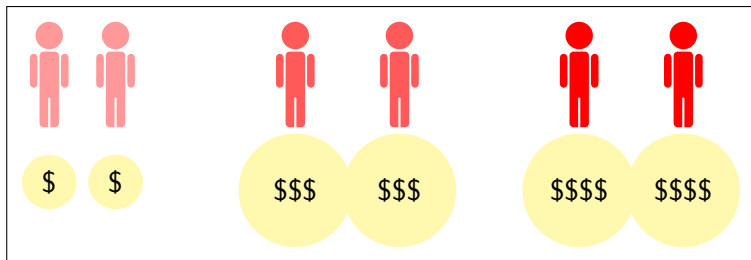
BI-POLARIZATION BY WEALTH TRANSFER



BI-POLARIZATION BY WEALTH TRANSFER



CO-DIRECTIONALITY BY LINGUISTIC CHANGE



CO-DIRECTIONALITY BY LINGUISTIC CHANGE

