The Geography of Ethnic Diversity: Origins and Implications in Sub-Saharan Africa

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Santa Fe Institute
Overview

1. Geographic Origins of Ethnic Diversity
   (Geographic Axes and the Persistence of Cultural Diversity)

2. Diversity, Geographic Segregation, and Intergroup Trust
   (Ethnic Diversity, Segregation, and Ethnocentric Trust in Africa)

3. Impact on Economic Development
   (Internal Borders: Ethnic Diversity and Market Segmentation in Malawi)

4. Overcoming Ethnic-Based Trust
   (Nationalism and Interethnic Trust: Evidence from an African Border Region)
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Geographic Determinants of Ethnic Diversity

Cultural diversity, like biodiversity, decreases with latitude.

(Nettle, 1999; Collard & Foley, 2002)

Source: Rick Stepp, Terralingua
Geographic Determinants of Ethnic Diversity

Cultural diversity, like biodiversity, decreases with latitude.
(Nettle, 1999; Collard & Foley, 2002)

Variation in land quality is also correlated with cultural diversity.
(Michalopoulous, 2012)

Continental axis theory.
(Diamond, 1997)
Geographic Determinants of Ethnic Diversity

Test of the continental axis theory using a world-wide sample of contemporary states.

Geographic axes and the persistence of cultural diversity

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Contributed by David D. Laitin, April 3, 2012 (sent for review December 1, 2011)

Jared Diamond's \textit{Guns, Germs, and Steel} [Diamond J, (1997) \textit{Guns, Germs, and Steel} (WW Norton, NY)] has provided a scientific foundation for answering basic questions, such as why Eurasians colonized the global South and not the other way around, and why supporting evidence. Continental axes, therefore, are for Diamond one of the four important factors explaining Eurasian world domination. “Around those axes,” Diamond concludes, “turned the fortunes of history.”

\textbf{Hypothesis:} Ratio of north-south to east-west axes is positively correlated with the persistence of cultural diversity.
Data: Axis Ratio

Democratic Republic Congo binned

Average width: 1184. km and height: 1225.5 km. Ratio: 1.04.

Maximum width: 1928.3 km and height: 1921. km. Ratio: 0.996.
Data: Axis Ratio

China binned

Average width: 2884.6 km and height: 1951.9 km. Ratio: 0.677.
Data: Axis Ratio

Sweden binned

Average width: 318.34 km and height: 739.42 km. Ratio: 2.32.
Data: Cultural persistence

Proportion of historically spoken languages within country that have maintained a self-perpetuating language community to date.

- Number of historically spoken languages: Number of Ethnologue languages.
Results

Table 1. Geographic axes and the persistence of linguistic diversity, ordinary least-squares regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis ratio (natural log)</td>
<td>0.16**</td>
<td>0.15***</td>
</tr>
<tr>
<td></td>
<td>0.11 (0.04)</td>
<td>0.10 (0.03)</td>
</tr>
<tr>
<td>Total no. of languages</td>
<td>0.17***</td>
<td>0.12**</td>
</tr>
<tr>
<td></td>
<td>0.07 (0.02)</td>
<td>0.03 (0.01)</td>
</tr>
<tr>
<td>Distance from equator</td>
<td>−0.17**</td>
<td>−0.25***</td>
</tr>
<tr>
<td></td>
<td>−0.32 (0.15)</td>
<td>−0.47 (0.14)</td>
</tr>
<tr>
<td>Land quality range</td>
<td>−0.12</td>
<td>−0.18**</td>
</tr>
<tr>
<td></td>
<td>−0.13 (0.10)</td>
<td>−0.18 (0.09)</td>
</tr>
<tr>
<td>Area in 1,000s km² (natural log)</td>
<td>−0.09</td>
<td>−0.12</td>
</tr>
<tr>
<td></td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
</tr>
<tr>
<td>Elev. diff. in 1,000s m</td>
<td>−0.19**</td>
<td>−0.04</td>
</tr>
<tr>
<td></td>
<td>−0.03 (0.01)</td>
<td>−0.01 (0.01)</td>
</tr>
<tr>
<td>Age of country in decades</td>
<td>−0.39***</td>
<td>−0.15*</td>
</tr>
<tr>
<td></td>
<td>−0.02 (0.00)</td>
<td>−0.01 (0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.15 (0.06)</td>
<td>1.08 (0.06)</td>
</tr>
<tr>
<td>Continent fixed effects?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>147</td>
<td>147</td>
</tr>
<tr>
<td>Adjusted $r^2$</td>
<td>0.40</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Standardized coefficients, ***$P < 0.01$, **$P < 0.05$, *$P < 0.1$; nonstandardized coefficients (robust SEs).
Endogenous Borders

State-makers determined both the borders of states and policies aimed at cultural homogenization.

- Moderns states are no more likely to run east-west than north-south.
- Bias introduced if state-builders enacted different cultural homogenization policies based on geographic axes.
- Bias could either overestimate or underestimate the geographic impact of axes on cultural persistence.
Endogenous Borders

1. Interact ratio with indicators of border endogeneity (age, colonial origin, and border artificiality).
   - Suggests that the endogeneity of borders produces an underestimation of the true effect of geographic axes on the persistence of diversity.

2. Artificial units (random neighbor pairings).

![Histogram of Estimated Effect Sizes](image)
Geographic Origins of Ethnic Diversity

- The length of a country’s north-south axis, relative to its east-west axis, is positively related to the persistence of cultural diversity.

- Evidence consistent with the intuition of the continental axis theory.

- Geographic constraints to the integration of cultures.

Cultural diversity has both political and economic implications.
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Ethnic Diversity and Interpersonal Trust

Generalized trust is lower, on average, in ethnically diverse states.
(e.g., Zak and Knack, 2001; Delhey and Newton, 2005; Hooghe et. al., 2009)

Low levels of generalized trust have been associated with:

- **Poor economic performance.**
  (Knack and Keefer, 1997; Zak and Knack, 2001)
- **Reduced support for democracy.**
  (Jamal and Nooruddin, 2010)
- **Less political participation.**
  (Benson and Rochon, 2004; Fowler, 2006; Kaase, 1999; Knack, 1992)
- **More prevalent corruption.**
  (Uslaner, 2008)
- **Reduced capacity for collective action.**
  (Levi, 1998)
Possible Mechanisms

Why does diversity undermine trust?

Possibilities:

- Individuals tend to trust coethnics more than non-coethnics, and more non-coethnics with greater diversity.

- Diversity makes ethnic differences more salient, increasing difference in trust toward coethnics and non-coethnics, plus more non-coethnics.

- Diversity reduces trust in everyone.

Requires a measure of group-based trust rather than generalized trust.

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Geography of Ethnic Diversity
Data

Ethnic fractionalization:

\[ F_c = 1 - \sum_{m=1}^{M} P_{cm}^2 \]

Group based trust:

- Level of trust – not at all, just a little, somewhat, or a lot – in “people from your ethnic group” and “[Ghanaians/Kenyans/Malawians] from other ethnic groups.”
- Indicator of trusting coethnics more than non-coethnics (coethnic trust premium).
Ethnic Diversity and Group-Based Trust

Proportion Trusting Coethnics More than Non-Coethnics

Ethnic Fractionalization

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Within-Country Analysis

Is the relationship between ethnic diversity and group-based trust at the country level driven by individuals living in diverse areas within countries?
1. Diversity is associated with more ethnocentric trust across states.

2. Diversity is associated with less ethnocentric trust within states.

Impact of National Diversity on Coethnic Trust Premium

As a Function of District-Level Diversity

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Diversity or Segregation?

National vs. Local Ethnic Diversity

Average District-Level Ethnolinguistic Fractionalization

Ethnolinguistic Fractionalization, Country-Level

BWA    SEN    MLI
MLI    MWI    MDG
MDG    UGA    KEN
UGA    ZAF    TZA
TZA    NAM    GHA
GHA    MOZ    BEN
BEN    NGA

Average District-Level Ethnolinguistic Fractionalization

Ethnolinguistic Fractionalization, Country-Level

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Diversity or Segregation?

**Ethno-regional segregation.**
State-level ethnic diversity belies local-level homogeneity.

Measure of ethnic segregation:

\[
D_c = \sum_{m=1}^{M} \sum_{j=1}^{J} \frac{t_{cj}}{2 T_c F_c} | p_{cj} - P_{cm} |
\]

Reflects the disproportionality in group proportions across districts
Impact of National Diversity on Coethnic Trust Premium
As a Function of National-Level Ethnic Segregation

Marginal Effect of National-Level Ethnic Fractionalization on the Coethnic Trust Premium

Ethnic Segregation, National-Level

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Summary of Findings

- Adverse effects of national diversity on interethnic trust are driven by individuals living in ethnically homogenous regions of diverse states.

- Diversity *per se* does not undermine interethnic trust, but diversity in combination with segregation increases the degree to which trust is ethnically determined.

- Potential mechanism: political mobilization at national-level counteracted by interethnic contact at the local level.
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Segregation, Trust, and Economic Development

1. **Ethno-regional segregation.**
   State-level ethnic diversity belies local-level homogeneity.

2. **Ethnic-based trust.**
   Individuals tend to trust coethnics more than non-coethnics.

3. **Weak formal institutions for contract enforcement.**
   Interpersonal trust is necessary for trade.
   
   (e.g., Fukuyama, 1995; Knack and Keefer, 1997; Whiteley, 2000; Zak and Knack, 2001; Beugelsdijk, de Groot, and van Schaik, 2004; fafchamps04)

**Result:** Many small-scale, ethnically bounded markets.

**Ethnic diversity undermines economic growth when markets are segmented along ethnic lines.**

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Market segmentation undermines economic growth by:

- Increasing the volatility of prices
- Forgoing the gains from trade based on regional comparative advantages
- Reducing the efficiency of moving goods from areas of surplus to areas of deficit.

Thus, barriers to trade, and, as a result, barriers to market integration, are detrimental to development.
Maize Trade in Malawi
Ethnic Segregation in Malawi

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1 Ethno-regional segregation.
   State-level ethnic diversity belies local-level homogeneity.
   ■ Across 13,000 enumeration areas, over 80% have an ethnic majority.

2 Ethnic-based trust.
   Individuals tend to trust coethnics more than non-coethnics.
   ■ Across 16 countries, Malawi is 15th in terms of the rate at which non-coethnics are trust relative to coethnics.

3 Weak formal institutions for contract enforcement.
   Interpersonal trust is necessary for trade.
   ■ Small-scale trade does not operate with formal contract enforcement.

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Maize Trade in Malawi

Grown by 97% of households.

Many sell some portion of their crop each year.

Sell to neighbors, local traders, small-scale mobile traders, agents, or ADMARC.

Maize market segmentation.
(Goletti and Babu, 1994; Zant, 2012)

Trust is a key barrier to trade.
(Fafchamps and Gabre-Madhin, 2006)

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Empirical Approach

Spatial price analysis:
Price dispersion as a measure of market fragmentation.
(see Fackler and Goodwin, 2001, for a review)

Apply the logic of the “border effects” literature to internal “ethnic borders” in Malawi.
(e.g., Engel and Rogers, 1996)

Data:

1. Location of 70 major markets in Malawi.
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Empirical Approach

Market pair-month dataset.

- Measure of maize price dispersion between market pairs.
  \[ PD_{ijt} = |\ln(p_{it}/p_{jt})| \]

- Degree to which markets are ethnically different.
  1. Ethnic border dummy.
  2. \[ EthDiff_{ij} = 1 - \sum_{g=1}^{12} (p_{gi} \times p_{gj}) \]

- Distance (in kms) between markets.

Market-pair regression analysis:

\[ PD_{ijt} = \beta_0 + \beta_1 EthBorder_{ij} + \beta_2 Distance_{ij} + \mu_i + \delta_j + \eta_t + \epsilon_{ijt} \]
\[ PD_{ijt} = \beta_0 + \beta_1 EthDiff_{ij} + \beta_2 Distance_{ij} + \mu_i + \delta_j + \eta_t + \epsilon_{ijt} \]
### Table 1: Ethnic Difference and Market Segmentation, 1998–2011

<table>
<thead>
<tr>
<th>DV=Price Dispersion</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic Border</td>
<td>0.012***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td></td>
</tr>
<tr>
<td>Ethnic Difference</td>
<td>0.022**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td>Ln of Distance (100 kms)</td>
<td>0.008**</td>
<td>0.009***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.159***</td>
<td>0.147***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Observations</td>
<td>31,040</td>
<td>31,040</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.163</td>
<td>0.163</td>
</tr>
</tbody>
</table>

OLS regressions.

Market and month fixed-effects included (coefficient estimates not shown).

Robust standard errors, clustered by market pair, in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Ethnic Politics and Cultural Differences

Top-down political mobilization along ethnic lines.
(Posner, 2004; Eifert, Miguel, and Posner, 2010)

- Ethnic barriers to trade do not increase in the lead up to national elections.
- Ethnic barriers to trade are not larger for political salient ethnic dyads.

Cultural distance reduces intergroup trust.
(Guiso, Sapienza, and Zingales, 2009)

- Greater cultural/linguistic distance between ethnic groups is related to greater ethnic market segmentation.
Ethnic Diversity and Economic Development

Ethnic segregation and low interethnic trust help explain the connection relationship between diversity economic development.

Robust negative relationship between ethnic diversity and economic growth.
(see Alesina and La Ferrara, 2002 for a review)

High levels of ethnic diversity are often blamed for economic underdevelopment in sub-Saharan Africa.
(e.g., Easterly and Levine, 1997)
Conclusions

- Ethnic diversity will be detrimental to growth when trust is concentrated within ethnic groups, trust is crucial for trade, and ethnic groups are spatially segregated.

- Proposes a mechanism relating ethnic diversity to poor economic growth from the bottom-up, based on the economic behavior of regular citizens.

- Cultural differences between groups, and their impact on levels of trust, impede interethnic trade, and, ultimately, national market integration.
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Argument

*Increased identification with the territorially-defined nation should reduce the size of the coethnic trust premium in ethnically diverse African states.*

- **Common Ingroup Identity Model**
  - *Positive* in-group bias rather than *negative* out-group bias.
  - Increased identification with a common identity can extend positive in-group biases (such as greater perceived trustworthiness) to previous out-group members.
Expectations

- Shared national identity is relevant for decisions about whom to trust (necessary condition).

Two types of variation in group identification:

1. Inter-personal differences in strength of identification:
   - Strength of national identification is negatively related to the degree to which one’s trust is conditioned on coethnicity.

2. Inter-temporal differences in the salience of the identity:
   - If the national identity is made salient, individuals will be less likely to condition their trust on coethnicity.

Interaction between stable and situational identification.
Field Site and Sample
Field Site and Sample

Intersection of national (Malawi-Zambia) and ethnic boundaries (Chewa-Tumbuka).

Trust in four types:
- Conational Coethnic
- Conational Non-coethnic
- Non-conational Coethnic
- Non-conational Non-coethnic

16 Malawian villages:
8 Chewa, 8 Tumbuka.

421 participants (Malawian).

Non-random sample of 341 Zambians.

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Geography of Ethnic Diversity
Protocol Overview

1 Identity Survey (Village)
   - Strength of national identification:
     Affective, Behavioral, Cognitive

2 Market Survey (Market)
   - Experimental manipulation of national identity salience
Protocol: Priming Common Nationality

Figure 2: National Identity Prime: Discussion of the symbolism of the 1964 Malawian national flag and the 2010 Malawian national flag.
Protocol: Priming Common Nationality

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Geography of Ethnic Diversity
Protocol Overview

1. **Identity Survey (Village)**
   - Strength of national identification: Affective, Behavioral, Cognitive

2. **Market Survey (Market)**
   - Experimental manipulation of national identity salience

3. **Trust Game (Market) x 4**
   - Player A given money (60 MWK).
   - Player A chooses how much to send anonymous Player B.
   - Money sent is tripled by experimenter, and Player B decides how much of the tripled amount to return to Player A.
Expectations

Increased identification with the territorially-defined nation should reduce the size of the coethnic trust premium in ethnically diverse African states.

1. Shared national identity is relevant for decisions about whom to trust (necessary condition).

2. Strength of national identification is negatively related to the degree to which one’s trust is conditioned on coethnicity.

3. If the national identity is made salient, individuals will be less likely to condition their trust on coethnicity.
Shared Identity and Conditional Trust

<table>
<thead>
<tr>
<th>DV = Trust (3-point Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoEthnic</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>CoNational</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Round Fixed-Effects** Yes

OLS regressions with participant random-effects.
Participant-clustered standard errors in parentheses.
N=1,671 game observations within 421 participants.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Strength of National Identification

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### Salience of National Identity

<table>
<thead>
<tr>
<th></th>
<th>DV = Trust (3-point Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoEthnic</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>(0.04)***</td>
</tr>
<tr>
<td>Flag</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
</tr>
<tr>
<td>CoEth*Flag</td>
<td>−0.10</td>
</tr>
<tr>
<td></td>
<td>(0.05)*</td>
</tr>
<tr>
<td>Constant</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td>(0.05)***</td>
</tr>
</tbody>
</table>

**Round Fixed-Effects** Yes

- OLS regressions with participant random effects.
- N=841 games within 421 participants.
- Participant-clustered standard errors in parentheses.
- * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Marginal Effect of Coethnicity on Trust

As a Function of National Identification and National Identity Salience

* designates statistically significantly treatment effects at the 0.05 level

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Geography of Ethnic Diversity
Summary of Findings

- Conationality is just as important as coethnicity for decisions about whom to trust.

- Strength of national identification is negatively related to how much one conditions his trust on coethnicity.

- Increased salience of the shared national identity reduces the degree to which trust is conditioned on coethnicity.

- Increased salience of the national identity makes weak nationalists similar to the strongest nationalists in the sample in terms of ethnic-based trust.
Conclusions

- Present levels of ethnic diversity are influenced by geographic factors, including axis orientation.

- The geographic distribution of ethnic groups (particularly segregation), rather than ethnic diversity *per se*, undermines interethnic trust and economic development.

- Ethnocentric trust can be ameliorated through:
  - greater intergroup geographic integration
  - increased identification with the overarching national identity.
Outstanding Questions

1. What determinants the degree to which ethnic groups are spatially segregated?
   - Cross-national and cross-group datasets on ethnic segregation in sub-Saharan Africa.

2. How and why does ethnic group segregation influence market segmentation? Is trust the right mechanism?
   - Interviews with traders and observation of maize trading, followed by a field experiment with real traders randomly assigned to maize producing villages during the 2014 harvest (May-July).

3. How important is ethnic trust discrimination (coethnic trust premium) vis-a-vis aggregate levels of trust?
   - Higher levels of trust, but only in-group
   - Lower aggregate levels of trust, but equal trust in coethnics and non-coethnics.
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