Ethnic diversity and growth: revisiting the evidence

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- Introduction
- Literature
- Contribution and methodology
- Data
- Specification and core results
- Mitigating endogeneity concerns
- Robustness analysis
- Interpreting preliminary evidence
- Conclusions and future research

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- Is (ethnic) diversity good or bad for economic development and growth?
- Can ethnic differences generate conflicts and, therefore, retard economic development? Or can ethnic diversity spur creativity and improve economic welfare?
- There are basically two ways of approaching the study of the effect of ethnicity on economic development and growth:
 - Different cultural traditions and their effect on expectations, preferences, decisions, etc.
 - The economic effects of the interaction of the different ethnic groups that belong to a particular society.
- In this paper we deal with this second approach: the effect on economic development of the distribution of ethnic differences among individuals of a society.

- The literature has identified different channels through which ethnic diversity may affect economic outcomes (Alesina and Laferrara, 2005)
 - Ethnic differences enter into individual preferences
 - Ethnic diversity can affect economic outcomes by influencing the strategies of individuals
 - Ethnic diversity may also enter into the production function
- From this theoretical basics we see that ethnic diversity may have costs and benefits. In general the potential benefits of heterogeneity come from variety in production and spur in innovation, and the costs derive from the inability to agree on common public goods and policies.

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- The literature has studied the economic effects of ethnic heterogeneity at country, region and community level
- Early work:
 - The seminal work of Easterly and Levine (1997) shows that ethnic diversity helps explain cross-country differences in public policies and other economic indicators

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• Our paper: Contribution

- We analyze in a systematic way the effect of ethnic diversity on economic growth using the same empirical framework for geographic units of different sizes (from small cells to countries)
- We show that, for small area units, higher fragmentation is associated with higher levels of output
- We will investigate the mechanism that could explain these effects

- Impact of changing the size of the unit of observation:
 - We take the one degree by one degree country-cells as the basic unit of observation
 - half by half
 - one and a half by one and a half
 - two-by-two
 - four-by-four
 - country is the limit of the size of our observations when we increase the size of the grid given our definition of the cells

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Data I

- Outcome variable: Growth of per capita income at local level
- Source: Night light and population data
 - Since good data on income per capita are difficult to find at the grid/cell level, we follow Henderson, Storeygard and Weil (2011) and use luminosity at night as a proxy for development.
 - The satellite night light data are available from the National Oceanic and Atmospheric Administration
 - Chen and Nordhaus (PNAS 2011) find that luminosity has informational value for countries, regions and areas with poor quality or missing data. Several papers have also found a very high correlation between luminosity and GDP at country level
 - These data has been used recently by Rohner, Thoenig and Zilibotti (2011), Michalopoulos and Papaioannou (2012) or Alesina, Michalopoulos and Papaioannou (2014) among others
- Population: Gridded population of the world



0,0000 - 786,0000 786,0001 - 2094,0000 2094,0001 - 4298,0000 4298,0001 - 6796,0000 6796,0001 - 9726,0000 9726,0001 - 13690,0000 13690,0001 - 19438,0000 19438,0001 - 31358,0000 31358,0001 - 55625,0000



- Measures of ethnic diversity at cell level:
 - Data on the geospatial location of Ethnic groups from GREG (Weidman, Rod, and Cederan 2010)
- Relying on maps and data drawn from the classical Soviet Atlas Narodov Mira (AnM), the GREG dataset employs geographic information systems (GIS) to represent group territories as polygons.
- The Full GREG dataset has a global coverage and consists of 929 groups. The information refers to 1960









- For each cell we construct two diversity type of measures:
 - based on the percentage of homeland of the ethnic group
 - based on the population living in the homeland of the ethnic group

Geo-referencing of Ethnic Groups: Maka Land occupation: 38,87% of the OBS Population: 37,80 %

COUNTRY: Cameroon OBS: 9177

Geo-referencing of Ethnic Groups: Fang Land occupation: 37,38% of the OBS Population: 53,71%

> Geo-referencing of Ethnic Groups: Bantu-speaking Pygmy tribes Land occupation: 23,75% of the OBS Population: 8,49%

Geo-referencing of Ethnic Groups: Sudan Arabs Land occupation: 48,51% of the OBS Population: 7,13%

COUNTRY: Central African Republic OBS: 11510

Geo-referencing of Ethnic Groups: Banda Land occupation: 22,29% of the OBS Population: 13,02% Geo-referencing of Ethnic Groups: Bagirmi Land occupation: 29,20% of the OBS Population: 79,85% Geo-referencing of Ethnic Groups: Bechuanas Land occupation: 61,86% of the OBS Population: 61,72%

> COUNTRY: South Africa OBS: 24175

Geo-referencing of Ethnic Groups: Pedi Land occupation: 10,25% of the OBS Population: 5,65%

Geo-referencing of Ethnic Groups: Afrikaners Land occupation: 11,89% of the OBS Population: 37,80%

Geo-referencing of Ethnic Groups: Swazi Land occupation: 16,00% of the OBS Population: 2,27% • We use the traditional fractionalization measure (Herfindhal index) but also other diversity measures: number of groups, etc. The Herfindahl index is

$$FRAC = 1 - \sum_{i=1}^{N} \pi_i^2 = \sum_{i=1}^{N} \pi_i (1 - \pi_i)$$
(1)

where π is the proportion of people who belong to ethnic group i in the area of reference

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- To estimate the effect of grid-cell ethnic diversity on local growth, we relate ethnic fractionalization measure of grid cell j of country i, with the growth of per capita income of this cell between 1992 and 2010
- The basic specification is

$$\mathcal{G}_{ji} = lpha_i + eta \ln(y_{ji}) + eta \mathcal{H}_{ji} + \sum \gamma_k z_{kji} + \epsilon_{ji}$$

where G_{ji} is the growth of per capita night light between 1992 and 2010, y_{ji} is per capita income in 1992. For robustness purposes we also consider averages of different years. Standard errors are clustered at country level

- Spatial correlation: the basic equation could be misspecified if there is spatial correlation, and it changes with the size of the unit of analysis
 - We adjusted for spatial correlation using the GMM method in Conley (1999)

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- To mitigate potential endogeneity issues:
 - Finding correlation between diversity and growth at the country level would not resolve the issue of endogeneity caused by the possibility that other unobserved characteristics can drive the association via, for instance, institutional differences. Using artificially constructed cells mitigates this concern
 - Address the possibility of unobservable country effects: include country fixed effects
 - Controlling for many observable variables
 - The role of population density
 - Adressing the urban agglomeration effect
 - Adressing post-1500 migrations
 - We use different grids generating random coordiantes to check the robustness of the results to the inicial coordinates of the grid

Table 1: Ethnic Diversity and Growth

Dependent Variable: Growth						
	All	All	All	Only	Only	Only
	Sample	Sample	Sample	Popu-	Popu-	Popu-
				lated	lated	lated
				Areas	Areas	Areas
	(1)	(2)	(3)	(4)	(5)	(6)
Log night light 1992	-0.252***	-0.350***	-0.350***	-0.264***	-0.370***	-0.370***
	[0.005]	[0.007]	[0.022]	[0.005]	[0.007]	[0.022]
						(0.014)
Ethnic Fractionalization	0.501***	0.690***	0.690***	0.425***	0.617***	0.617**
	[0.094]	[0.096]	[0.240]	[0.098]	[0.100]	[0.287]
						(0.154)
Country FE	No	Yes	Yes	No	Yes	Yes
Observations	25693	25693	25693	21514	21514	21514
R-squared	0.171	0.287	0.287	0.159	0.294	0.294

Notes - In columns 1,2,4 and 5 we report robust standard error in brackets. In columns 3 and 6, robust standard error in brackets clustered at country level are reported in brackets. In column 6, Conley standard errors in parenthesis (Spatial correlation kernel cutoff = 200km). * Significant at 10%, ** significant at 5%, and *** significant at 11%.

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- We use an extensive set of controls in order to attenuate concerns regarding other omitted characteristics driving the relationship between ethnic diversity and development, which include potentially omitted variables:
 - Geography: distance to the sea, average roughness. We calculate averages at "grid cell" using the raw data from Nunn and Puga (2012)
 - Climate: Precipitation and temperature (calculate averages using data from CRU)
 - Population density or total population and area
 - Share of mines
 - Quality of the soil (percentage of fertile soil)
 - Other controls: distance to rivers, distance to lakes
 - Border areas

Table 2: Ethnic Diversity and Growth: for observables

Dependent Variable: Growth					
	(1)	(2)	(3)	(4)	(5)
Log night light 1992	-0.369***	-0.367***	-0.369***	-0.369***	-0.370***
	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]
					(0.013)
Ethnic Fractionalization	0.720***	0.733***	0.725***	0.700***	0.735***
	[0.258]	[0.243]	[0.239]	[0.247]	[0.244]
					(0.149)
Geographic Variables	Yes	Yes	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes	Yes	Yes
Population Density	No	Yes	Yes	Yes	Yes
Share Mining and Fertile Soil	No	No	Yes	Yes	Yes
Distance to River and Lake	No	No	No	Yes	Yes
Border	No	No	No	No	Yes
Observations	21514	21514	21514	21514	21514
R-squared	0.298	0.298	0.299	0.299	0.301

Notes - Robust standard error clustered at country level are reported in brackets. In column 5, Conley standard errors in parenthesis (Spatial correlation kernel cutoff = 200km). * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Geographic Variables include: distance to coastline and Ruggedness Index. Climate Controls: Average temperature from 1961-1980 and average precipitation from 1961-1980.

- Population density does not have an effect on the impact of ethnic diversity on growth. We are capturing spatial diversity but the borders of ethnic homeland do not concentrate areas with higher/lower proportion of cities or population density than other areas:
 - A graphical illustration
 - Average diversity at different levels of population density
 - Interacting population density and fragmentation

Figure 1: Ethnic Border and Population Density



Table 3: Ethnic Diversity by population decile (ranking)

Ethnic Frac (Mean/std. Deviation)				
0.077				
[0.167]				
0.133				
[0.210]				
0.140				
[0.209]				
0.129				
[0.203]				
0.126				
[0.201]				
0.108				
[0.187]				
0.115				
[0.185]				
0.106				
[0.184]				
0.099				
[0.175]				
0.096				
[0.173]				

- The papers that find a positive impact of ethnic diversity on growth are mostly based on data of cities. Is it possible that the finding of this paper is just a reflexion of that link:
 - Dummies for national capitals, provincial capitals and urban agglomerations of more than 500.000 inhabitants
 - Drop cells with urban centers
 - Drop 10 percent (20 percent) of grid-cells with the highest night light per capita
 - Drop 10 percent (20 percent) of grid-cells with the highest population density

Table 5: Ethnic Diversity and Growth: Robustness to agglomeration effect

Dependent Variable: Growth								
				Drop	Drop	Drop	Drop	Drop
				all-urban	10%	20%	10%	20%
				center	richest	richest	most	most
							densely	densely
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log night light 1992	-0.370***	-0.375***	-0.375***	-0.367***	-0.373***	-0.374***	-0.375***	-0.359***
	[0.021]	[0.021]	[0.021]	[0.022]	[0.015]	[0.016]	[0.022]	[0.023]
Ethnic Fractionaliza-	0.736***	0.697***	0.699***	0.730**	0.710***	0.924***	0.697**	0.561*
tion								
	[0.245]	[0.242]	[0.246]	[0.291]	[0.269]	[0.183]	[0.275]	[0.291]
Nat. Capital (yes=1)	-0.211	-0.516***	-0.504***		-0.545***	-0.589***	-0.644***	-1.409***
	[0.140]	[0.116]	[0.088]		[0.081]	[0.078]	[0.215]	[0.316]
Prov. Capital		0.512***	0.524***		0.545***	0.533***	1.044***	1.416***
(yes=1)								
		[0.130]	[0.127]		[0.122]	[0.122]	[0.179]	[0.212]
Urb. Agglom (yes=1)			-0.043		-0.218	-0.467***		
			[0.180]		[0.163]	[0.125]		
Controls from Table 2	Yes							
Observations	21,514	21,514	21,514	18,174	19,151	17,694	18,674	16,091
R-squared	0.301	0.303	0.303	0.293	0.292	0.307	0.297	0.286

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Controls from C6 Table 2 include: distance to coastline, Ruggedness Index, Average temperature from 1961-1980, average precipitation from 1961-1980, Log Population 1990, Area, Share Mining, % Fertile Soil, Distance to River, Distance to Lake and Border (yes=1).

- Potential endogeneity of ethnic diversity: post-colonial migration to prosperus countries and, subsequent increase on ethnic diversity in those areas.
 - Drop areas of the world that potentially suffered a lot of post-1500 migrations (as in Galor and coauthors): countries that do not belong to the OECD; non-Neo-European countries; non-Latin-American countries; non-Sub-Saharan African countries; all the previous

Table 6: Ethnic diversity and growth: Addressing Post-1500 Migrations

Dependent Variable: Growth						
	Non-oecd countries	Non-Neo- European countries	Non-Latin american countries	Non-African countries	Non all the oecd, Neo- european, latiamerica and Africa countries	
	(1)	(2)	(3)	(4)	(5)	
Log night light 1992	-0.359***	-0.383***	-0.374***	-0.368***	-0.349***	
Ethnic Fractionalization	[0.015] 0.761*** [0.262]	[0.023] 0.779*** [0.250]	[0.024] 0.746** [0.290]	[0.025] 0.650** [0.297]	[0.021] 0.770* [0.435]	
Geographic Variables	Yes	Yes	Yes	Yes	Yes	
Climate Variables	Yes	Yes	Yes	Yes	Yes	
Population Density	Yes	Yes	Yes	Yes	Yes	
Share Mining and Fertile Soil	Yes	Yes	Yes	Yes	Yes	
Distance to River and Lake	Yes	Yes	Yes	Yes	Yes	
Border	Yes	Yes	Yes	Yes	Yes	
Observations	15492	17950	18504	17627	9343	
R-squared	0.259	0.298	0.310	0.315	0.275	

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Geographic Variables include: distance to coastline and Ruggedness Index. Climate Controls: Average temperature from 1961-1980 and average precipitation from 1961-1980.

- Did we get a lucky grid? It is unlikely that any particular coordinates could produce a lucky grid since it generates a large number of cells. However, in this section we consider this possibility and produce 100 grids with random initial coordinates.
- Basically, we take our initial coordinates (longitude -180; latitude -89) and add to both a random number generated by two uniform distributions

Figure 2: Definition of Grid - Simulation



Notes - This graph shows the random initial coordinates generated. Our baseline starting points are: $X_0(longitude) = -180$ and $Y_0(latitude) = -89$. $\epsilon_i, \xi_i \sim Uniform(0, 1), \forall (i = 1, ..., 100)$

Figure 3: Random Initial Coordinates



Notes - This graph shows the point estimate for *Ethnic Fractionalization* and its Confidence Interval for 100 simulated grids. We estimate the specification of Table 2 column 1. Our baseline starting points are: $X_0(longitude) = -180$ and $Y_0(latitude) = -89$. ϵ_i , $\xi_i \sim Uniform(0, 1)$, $\forall (i = 1, ..., 100)$

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- The results are robust to:
 - Diversity based on the population living in the homeland of the ethnic group instead of land
 - Other data sources to measure ethnic diversity: Ethnologue and Murdock
 - Non-linear effects
 - Eliminating outliers
 - Heterogeneity effects: we do not see any heterogenous effect with respec to institutional variables (polity) or level of decentralization

Table 7: Ethnic Diversity and Growth: Robustness to Alternative Data on Ethnicity

Dependent Variable: Growth						
				Without		
				Outliers FRAC		
	(1)	(2)	(3)	(4)		
Log night light 1992	-0.370***	-0.382***	-0.384***	-0.363***		
	[0.021]	[0.022]	[0.033]	[0.023]		
Ethnic Fractionalization POP	0.746***					
	[0.238]					
Ethnic Fractionalization (Ethnologue)		0.686***				
		[0.155]				
Ethnic Fractionalization 1800 (Murdock)			0.886***			
			[0.228]			
Ethnic Fractionalization				0.815**		
				[0.357]		
Geographic Variables	Yes	Yes	Yes	Yes		
Climate Variables	Yes	Yes	Yes	Yes		
Population Density	Yes	Yes	Yes	Yes		
Share Mining and Fertile Soil	Yes	Yes	Yes	Yes		
Distance to River and Lake	Yes	Yes	Yes	Yes		
Border	Yes	Yes	Yes	Yes		
Observations	21481	19822	3654	19148		
R-squared	0.301	0.310	0.270	0.302		

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Geographic Variables include: distance to coastline and Ruggedness Index. Climate Controls: Average temperature from 1961-1980 and average precipitation from 1961-1980. Share Mining and Fertile Soil:Share Mining, % Fertile Soil. Distance to River and Lake: Distance to River (km) and Distance to Lake (km). Border: Border (yes=1)

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- We calculate the same variables at:
 - 0.5 by 0.5,
 - 1 by 1,
 - 1.5 by 1.5,
 - 2 by 2
 - etc.
 - 4 by 4
 - country level







Figure 4: Grid Size Analysis



Notes - This graph shows the point estimate for *Ethnic Fractionalization* and its Confidence Interval for the different Grid Size. We estimate the specification of Table 2 column 1.

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Table 9: Ethnic diversity and growth: country level results

	Dependent Variable: Growth				
	Growth	Growth	Growth PWT7.1	Growth PWT7.1	
	(1)	(2)	(3)	(4)	
Ethnic Fractionalization	-0.117		0.000		
	[0.175]		[0.134]		
Ethnic Fractionalization POP		-0.111			
		[0.182]			
Ethnic Frac. based on Soviet Atlas				0.128	
				[0.113]	
Controls from Table 2 ⁺	Yes	Yes	Yes	Yes	
Observations	233	233	167	139	
R-squared	0.232	0.232	0.138	0.200	

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. We include initial level of growth and GDP in columns 1-2 and 3-4, respectively. Controls from C6 Table 2 *** include: average distance to coastline, average Ruggedness Index, Distance to Average temperature from 1961-1980, average precipitation from 1961-1980, Log Population Density, Share Mining, % Fertile Soil, average Distance to River and average Distance to Lake.

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- A potential story: what we see with these results is areas in which we observe exchange of goods
- Areas where trading activity is concentrated because of ethnic specialization
- Proxy of markets and trade: location of 223 markets in Africa from Porteous (2019)
- Ethnic diversity and growth: the case of Africa

Table 10: Ethnic Diversity and Growth: the case of Africa

Dependent Variable: Growth						
	(1)	(2)	(3)	(4)	(5)	
Log night light 1992	-0.382***	-0.378***	-0.380***	-0.380***	-0.380***	
	[0.034]	[0.033]	[0.033]	[0.032]	[0.033]	
Ethnic Fractionalization	0.912**	0.801**	0.752**	0.961**	0.819**	
	[0.374]	[0.369]	[0.370]	[0.477]	[0.403]	
+/- 10 degree from Equatorial				-0.529		
Line						
				[0.375]		
+/- 10 degree from Equatorial				-0.551		
Line x FRACgregallv2						
				[0.882]		
+/- 5 degree from Equatorial					0.101	
Line						
					[0.345]	
+/- 5 degree from Equatorial					-0.333	
Line x FRACgregallv2						
					[0.957]	
Geographic Variables	Yes	Yes	Yes	Yes	Yes	
Climate Variables	Yes	Yes	Yes	Yes	Yes	
Population Density	No	Yes	Yes	Yes	Yes	
Share Mining and Fertile Soil	No	No	Yes	Yes	Yes	
Distance to River and Lake	No	No	Yes	Yes	Yes	
Border	No	No	Yes	Yes	Yes	
Observations	3713	3713	3713	3713	3713	
R-squared	0.259	0.264	0.268	0.271	0.268	

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Geographic Variables include: distance to coastline and Ruggedness Index. Climate Controls: Average temperature from 1961-1980 and verzege precipitation from 1961-1980.

Figure 5: Market Location and Ethnic Borders



Notes - This graph shows the location of 223 markets in Sub-Saharan Africa identified by Porteous (2015). Markets are defined as: (i) towns and cities which have a population of at least 100,000 people and are at least 200 kilometers apart (if two towns with over 100,000 people are closer than 200 kilometers I include the larger one). (ii) smaller towns that are located at important road junctions or ports. (iii) major towns (some closer than 200 kilometers apart) in countries which still have high population-to-market ratios after my ratios two steps.

Mechanism: ethnic diversity and growth in Africa

- Market definition: grain is bought and sold in thousands of open-air markets across sub-Saharan Africa
- Porteous (2015) identifes the larger, regionally important hub markets that collect grain from surrounding smaller markets for trade with other hub markets
- Three steps.
 - Include the 178 towns and cities in the 42 countries of interest which have a population of at least 100,000 people and are at least 200 kilometers apart (if two towns with over 100,000 people are closer than 200 kilometers he include the larger one).
 - Add smaller towns that are located at important road junctions or ports.
 - Add additional major towns (some closer than 200 kilometers apart) in countries which still have high population-to-market ratios after the first two steps.
- Together these steps produce a list of markets (cities/towns).

- Empirical exercises using distance to the border; buffers around the market; and regression analysis:
 - Distance to the closest ethnic border and simulation
 - Check ethnic divesity in 50 km buffers around markets compared with placebo (random locations)
 - Ocheck growth in the 50 km buffers around markets compared with placebo (random locations)
 - Regression analysis with one-by-one grid: market presence on ethnic fragmentation and the previous battery of control variables
 - Regression analysis with one-by-one grid: growth on ethnic fragmentation, initial level of development and the previous battery of control variables

Figure 6: Market Location - Simulation



Notes - This graph shows the average distance to the GREG border using the actual location and 500 simulated location market in Sub-Saharan Africa. In each simulation, we randomly generated the location of 224 markets, which are the number of actual number markets located in Africa by Porteous (2015). In all cases, we estimate the Harvesine Distance. On average, whereas the actual location of markets are located at 26km to to closest GREG border (located at 1 percentile), the simulated markets are 41 KM.

Figure 7: Market Location and Ethnic Diversity - Simulation



Notes - This graph shows the average Ethnic Diversification Index for the actual location and 500 simulated location market in Sub-Saharan Africa. In each simulation, we randomly generated the location of 224 markets, which are the number of actual number markets located in Africa by Porteous (2015). Then, we create a 50km buffer around each market (or simulated market) and estimate the Ethnic Diversity Index. The overall Ethnic Diversity Index mean is 0.212 (actual market = .237 - located at 100 percentile)

Figure 8: Market Location and Growth - Simulation



Notes - This graph shows the average Growth for the actual location and 500 simulated location markets in Sub-Saharan Africa. In each simulation, we randomly generated the location of 224 markets, which are the number of actual number markets located in Africa by Porteous (2015). Then, we create a 50km buffer around each market (or simulated market) and Growth. The overall Growth mean is 4.59 (actual market = 10.20 - located at 100 percentile)s

Table 11: Ethnic Diversity and Growth: Market Analysis

Dependent Variable: Growth						
	Dep. Var: Presence of Market (yes=1)	Dep. Var: Growth				
	(1)	(2)				
Log night light 1992		-0.459***				
		[0.025]				
Ethnic Fractionalization	0.066***					
	[0.023]					
Presence of Market (yes=1)		1.336***				
		[0.327]				
Controls from Table 2	Yes	Yes				
Observations	3103	3103				
R-squared	0.095	0.307				

Notes - Robust standard error clustered at country level are reported in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%. Country fixed effects are included. Controls from C6 Table 2 include: distance to coastline, Ruggedness Indee, Average temperature from 1961-1980, Log Population Density, Share Mining, % Fertile Soil, Distance to River, Distance to Lake and Border (yes=1).

Mechanism: evidence on inter ethnic trade in Africa

- There are many examples of inter ethnic trade in Africa happening at the border of ethnic homelands
- The evidence draws mainly on work by geographers, antropologist, and historians who have studies the origin of traditional markets in Africa and its evolution
- Examples:
 - Hodder (1965): In Yorubaland, for example, traditional markets were found at the junction of different peoples: Ketu market, for instance, was regarded as an important link between Yoruba and Dahomey peoples; Iperu market was a contact point between Egba and Ijebu groups of the Yoruba; mamu market was a traditionally frontier market between Ijebu and Ibadan Yoruba.
 - Meillassoux (1962) analyzes the case of Central Ivory Coast and shows the tendency of markets to be localized at the contact area between complementary zones. He concludes that markets are primarily induced by external exchanges of complementary products with an alien population. Vansina (1962) reaches the same conclusion after his analysis of Zaire.

- More examples:
 - Gray (1962) emphasizes "that precolonial commerce in the interior of Tanzania was an activity involving different peoples including Nyamwezi Sumbwa Gogo Taturu Sukuma Vinza and Sagara who exchanged complementary products which circulated within and between regional trade networks"
 - Muriuki (1968) explains that, even in times of war, the Kikuyu and Masai had long-established the understanding that women of either group could enter each country freely and unmolested for purposes of trade custom. Gray and Birmingham (Precolonial African Trade, 1970) explain that "Kamba traders relied on women as innocuous agents who could mediate trade between their people and foreign territories"
 - Bohannan and Dalton (1962), Markets in Africa. In the description of the Abyssinian markets: "The market is closely related to the division of labor which is caste-like in its ethnic specialization of occupations, such as smithing, pottery-making and tanning"

- The idea is that that heterogeneity is good for trade and exchange, as suggested by this paper, and homogeneity is good to have better institutions following the litertaure.
- Therefore what we observe indicate that, at the local level, for a given institutional framework, diversity is good for the local development.

- Use the same specification to analyze the effect of diversity at different levels of geographical aggregation
- We find a positive relationship for small geographical areas and no effect for large areas and countries
- We argue that a possible mechanism to explain the positive relationship between diversity and growth is the increase of trade in the boundaries across ethnic groups due to ethnic specialization
- Therefore, heterogeneity is good for trade and exchange. But homogeneity can promote good institutions as found in the literature.Therefore what we observe indicate that, at the local level, for a given institutional framework, diversity is good for local development