Ancestral Lifeways and Individual Economic Outcomes: Evidence from Africa

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September 2015

BCEP Conference, Berkeley

Research Question

- **Why Does Stuff that Happened in the Past Matter so Much for Current Outcomes?**
  - Old approach: inertia in adjustment of physical/human capital a lá Solow
  - Sachs et al.: persistent exogenous forces (i.e., geography)

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New Literature

- **New Economics Literature on Persistence** (e.g., Spolaore and Wacziarg 2013)
  - historical events (interacted with geography) $\Longrightarrow$ culture/institutions $\Longrightarrow$ shaping comparative development
    - persistence of cultural attributes (attitudes towards women - Alesina et al, trust and slave trades - Nunn and Wantchekon, polygyny - Fenske)
    - persistence of political legacies (Michalopoulos and Papaioannou 2013, 2014, Alsan 2014, Dippel 2014)

Contribution

- **Existing literature on persistence looks at**
  - Countries
  - Country of origin groups (Putterman and Weil, Alesina et al,)
  - geographic regions, villages
  - ethnic homelands
- In this paper we look at **individuals belonging to different ethnic groups** within a village

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- **How do descendants of pre-colonial agricultural societies perform compared to descendants of "other subsistence" cultures?**
  - agricultural groups versus pastoral ones within the same country
  - looking at individual-level outcomes
    - to isolate the "portable" component of ethnicity we focus on individuals that no longer reside in their ancestral homelands
- **Large literature in the social sciences** (e.g., Diamond (1997), Boserup (1965), Richerson et al., 2001)
  - poses an evolutionary framework where dependence on agriculture provides a comparative advantage in the transition to the modern economy. Existing evidence is mixed.

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- E*thnic-specific legacies of economic culture have a strong bearing on individual outcomes.*
  - economic culture: the main subsistence activity of your ancestors
- Consistent with the idea that intergenerationally vertically transmitted traits influence economic outcomes
- Ethnic Inequality
  - Alesina, Michalopoulos, and Papaioannou (2014) show that ethnic inequality is a strong correlate of underdevelopment
  - This paper sheds light on the sources of ethnic inequality in Africa

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Pre-colonial Period

- Sub-Saharan Africa provides an attractive setting because several hundreds of relatively self-contained ethnic groups pursued different life-ways as recently as 5 generations ago
- Their life-ways were documented by anthropologists in the Ethnographic Atlas, and we can trace contemporary individuals living beyond their ancestors' original ethnic enclaves to their ancestors' ethnic characteristics thanks to self-report of ethnicity in recent surveys.

Pre-colonial Period

- **Large variation in pre-colonial subsistence patterns**
  - Agricultural Tribes
    - Tetela in Congo DRC; Bisa in Zambia; Mende in Sierra Leone
  - Pastoral Tribes
    - Samburu, Maasai in Kenya; Sokoto in Nigeria; Afar in Ethiopia
  - Societies dependent on fishing, hunting, gathering
    - Itsekiri in Nigeria (mostly fishing); Kung in Namibia (mostly gathering); Kindiga in Tanzania (mostly hunting).

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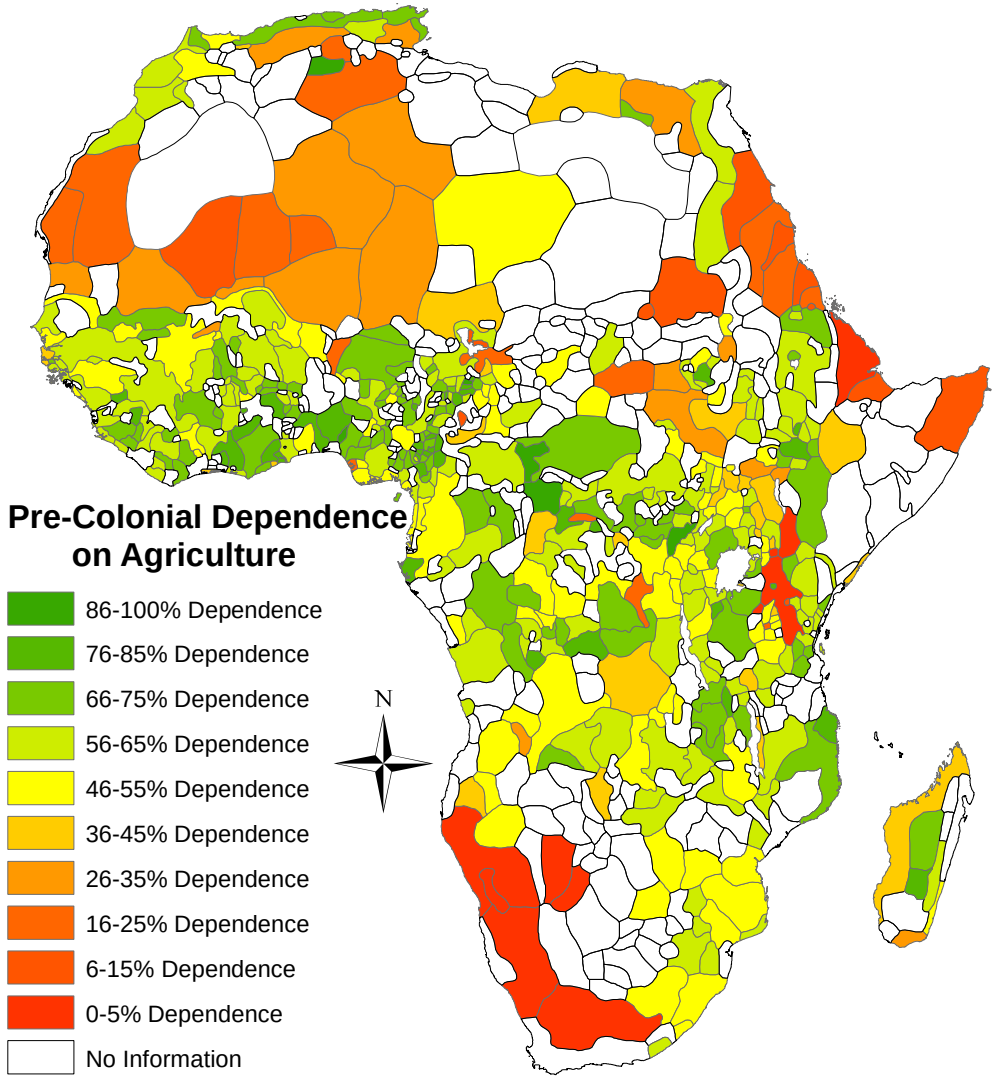
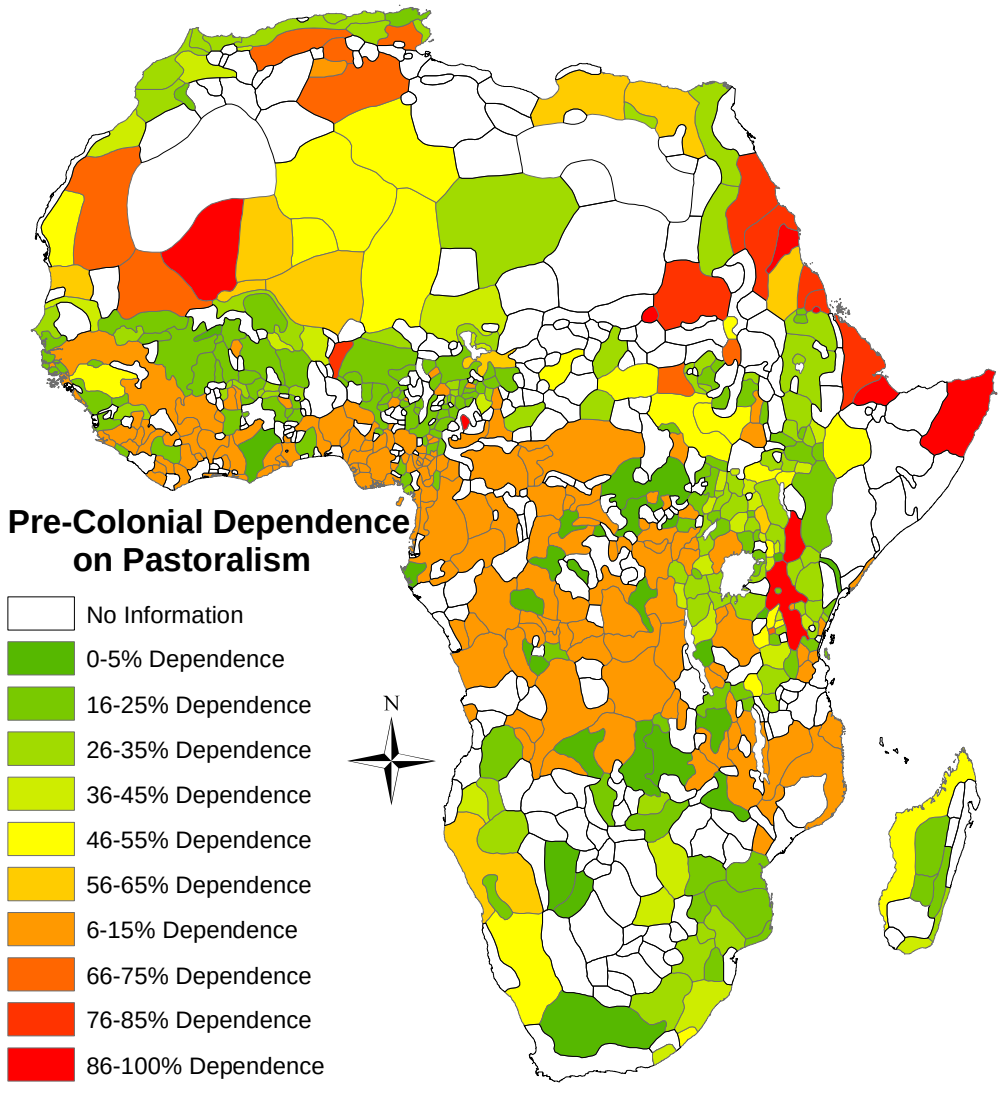
Pre-Colonial Dependence on Agriculture



Pre-Colonial Dependence on Pastoralism



The Argument

- **Diamond/Esther Boserup's argument: => early agriculture => fertile ground for the birth of urban industrial societies**
- Broad patterns consistent with this scheme
  - Europe, China, India, versus Central Asia, versus Papua New Guinea, Congo DRC
  - Cross-Country Evidence
    - Olsson and Hibbs (2004), Putterman (2008), Putterman and Weil (2010)

Main Findings

- Individuals tracing ancestry to agricultural groups are better off compared to those of pastoral descent
- This is not driven by differences in the location of respondents
  - we are exploiting within-village variation in the economic outcomes of individuals of different ethnic backgrounds.

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The Argument/Channels

- Agricultural groups may have better economic outcomes today because of:
  - Higher degree of cooperation with Europeans
  - More concessions from colonizers and post-independence governments
  - the agricultural mode of production leads to more cooperation and/or increased patience (Galor and Özak)
  - more patriarchy, and "culture of violence" idea (Nisbett & Cohen, Grosjean) among pastoralists

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Roadmap

- Present the Data
- Establish the key correlations
  - Sensitivity Checks and Heterogeneity
- Evidence on the possible channels
- Investigate the origins of pre-colonial dependence on agriculture and use an IV strategy
- Conclude

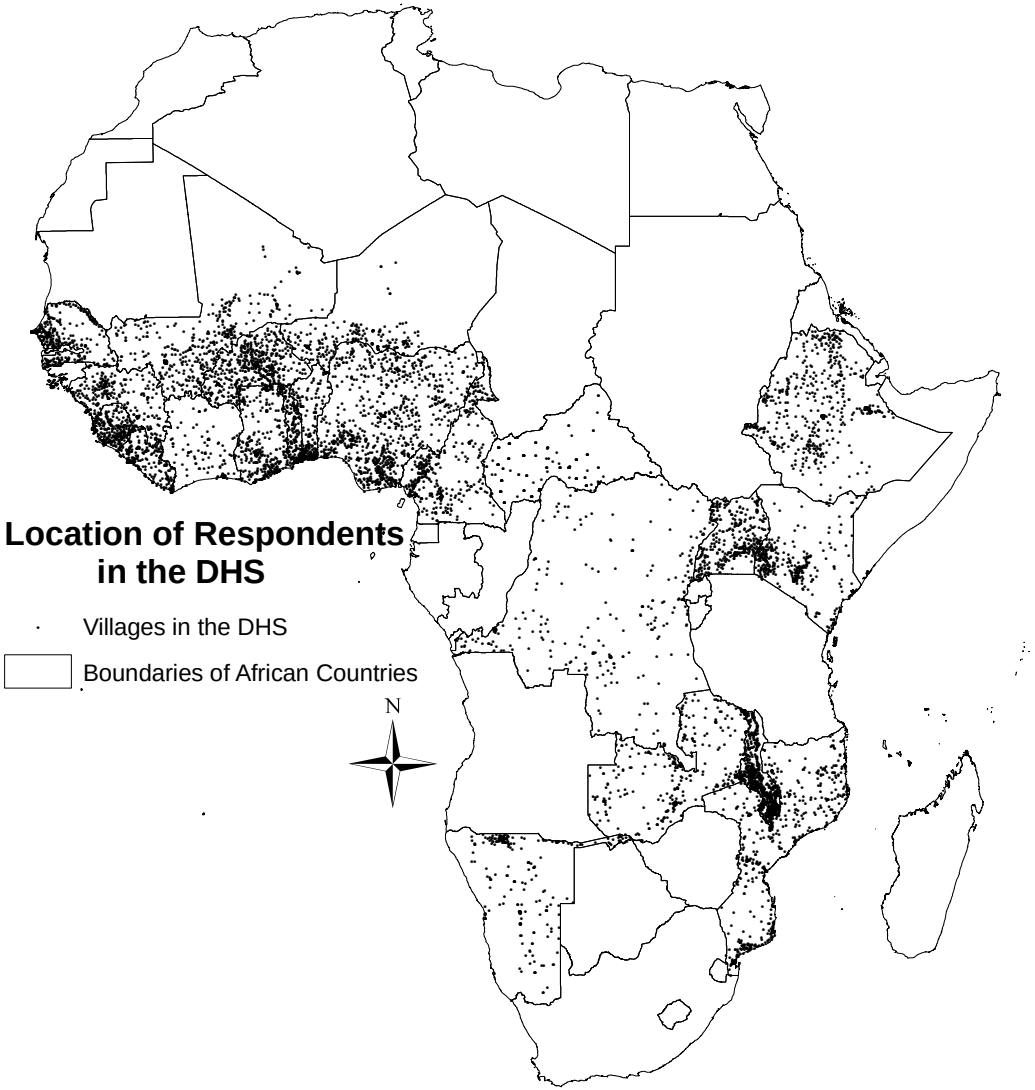
The Data Sources

- **Source: Demographic and Health Surveys in Africa**
  - 21 Sub-Saharan African countries; 382 groups in the DHS
  - 351,427 respondents between 15 and 64 years old with information on current residence.
  - 2,000 to 34,000 respondents in each country: Out of 351,427 males and females 287,433 were matched to 225 pre-colonial groups on Murdock' s (1959) list.
    - these 225 ethnic groups map into 187 groups in Murdock's 1967 Atlas with precolonial traits:
    - information on the ethnic affiliation, current ethnic homeland, religion and occupation of each respondent in the household

The Data Sources

- **Source: Demographic and Health Surveys in Africa**
  - We focus on education and wealth as indicators of individual economic performance
    - information *on the household wealth:* coded on a scale of 1-5 corresponding to the quintiles of wealth distribution for each country.
  - Education is coded on a scale of 0-5, which are labeled "no education", "incomplete primary", "complete primary", "incomplete secondary", "complete secondary", and "higher".

DHS Location of Respondents



Pre-Colonial Ethnic Traits

George Peter Murdock's (1967) Ethnolinguistic Atlas

- information on 534 groups in Africa before colonization
- variables on the economic structure, ethnic cultural traits (monogamy, polygyny), institutions (political centralization, slavery), societal structure (class stratification), etc.
- we focus on:
  - The subsistence type (i.e., dependence on agriculture, pastoralism, hunting/gathering/fishing. etc.

Underlying Data on Subsistence Type

- Main form of subsistence:
  - agriculture (84.1%)
  - pastoralism (7.4%)
  - agriculture and pastoralism equally (7.8%)
  - agriculture and fishing equally (0.9%)
  - *Only 17 individuals for whom hunting, fishing, or gathering was the main activity (Mbuti in Congo DRC)*
- Subsistence shares coded 0-9 correspond to 0-5%, 6-15%, 16-25%, ... 85-100%
- Unweighted means: agriculture 5.9, pastoralism 2.3, gathering 0.32, hunting 0.70, fishing 0.76.
  - Among "mostly agriculture" mean agriculture is 6.27 (S.D. 1.03)
  - Among "mostly pastoralism" mean pastoral is 6.32 (S.D. 1.55)
  - We collapse hunting/fishing/gathering to a single category

How Was the Matching Done?

Method	Percent
same name	48.4
Afrobarometer	4.4
Ethnologue / Joshua Project	19.1
Other	9.4
Not Matched	18.7

- We also match individuals' current residence to the traditional tribal homelands of Murdock's Map in 1959

What do we Look at?

- Agricultural groups reside in regions that are more conducive to agriculture (more on this below).
  - So, exploiting across-individuals across-ethnicity variation picks up both location-specific differences as well as *portable* ethnic-specific traits.
- To uncover the importance of *portable* ethnic-specific traits we exploit within-village across-ethnicity variation in pre-colonial economic traits.
  - Leveraging the presence of respondents outside their ancestral ethnic homelands.

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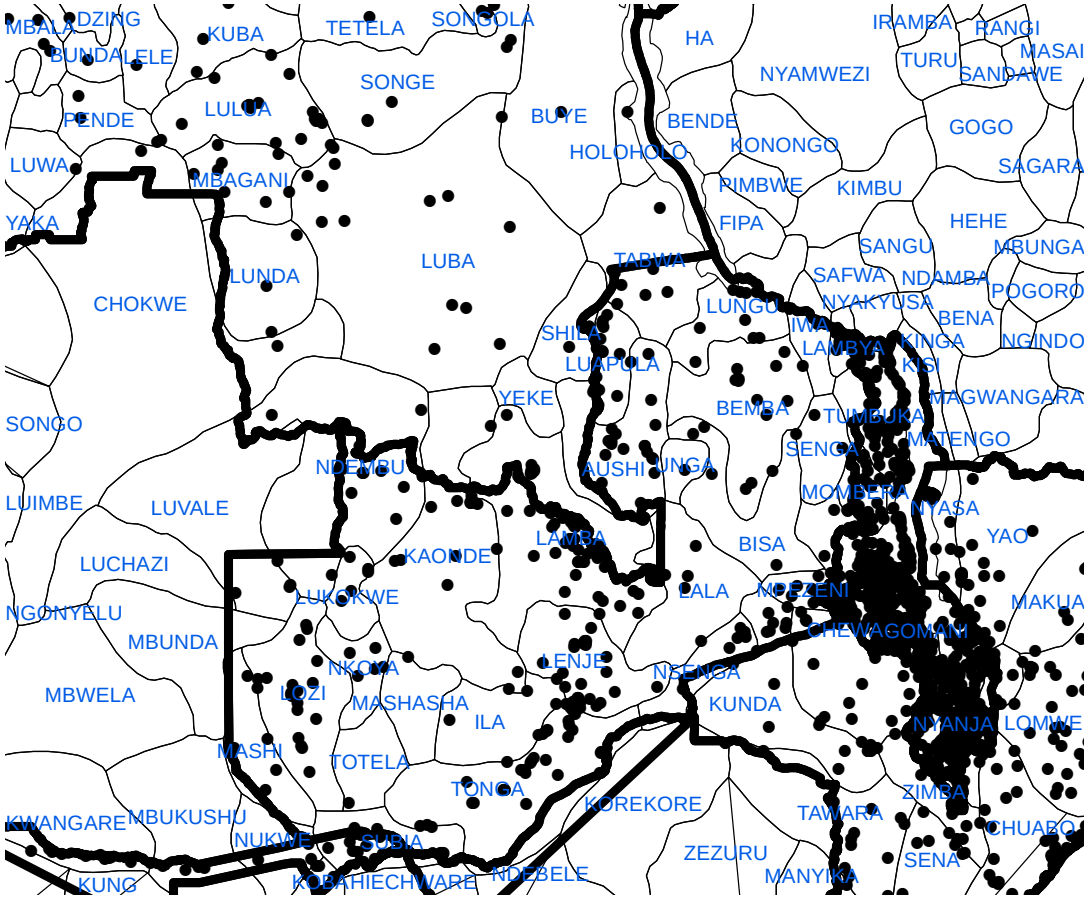
Within-Current Ethnic Homeland Variation



Current Location of Respondents

Boundaries of African Countries

N

- Villages in the DHS

How Many Are Outside their Homelands

- 40% of respondents live within their ancestral homelands.
- 7% live within 10 kilometers of their respective ethnic border.
  - Given the inherent error in the pre-colonial mapping of ethnicities' boundaries (as well as the fact that DHS perturbs the village coordinates by 5-10 kilometers) we consider these guys as "non-movers"
  - 79% of the remaining 61% resides between 10 and 500 kilometers away from the border of their homeland.
- We use the term "mover" to denote those individuals currently residing out of their ancestral homelands

Mover and Urban/Rural Residence

	Rural	Urban	Total
Non-Mover	71,323	27,393	98,716
Row Pct.	0.72	0.28	1.00
Col Pct.	0.43	0.31	0.38
Mover	95,650	62,203	157,853
Row Pct.	0.61	0.39	1.00
Col Pct.	0.57	0.69	0.62
Total	166,973	89,596	256,569
Row Pct.	0.65	0.35	1.00
Col Pct.	1.00	1.00	1.00

Within-Current Ethnic Homeland Variation

- How much of the individual variation in education and wealth may be explained by:
  - living in a given country (country FE regression)
  - residing in a given ethnic homeland (Map FE regression)
  - identifying with a given ethnic group (Murdock Atlas FE regression)
- We are interested in the variation explained by belonging to a given ethnicity over and above the role of the ethnic location (country or ethnic homeland).

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What do Fixed Effects Only Regressions Tell Us?

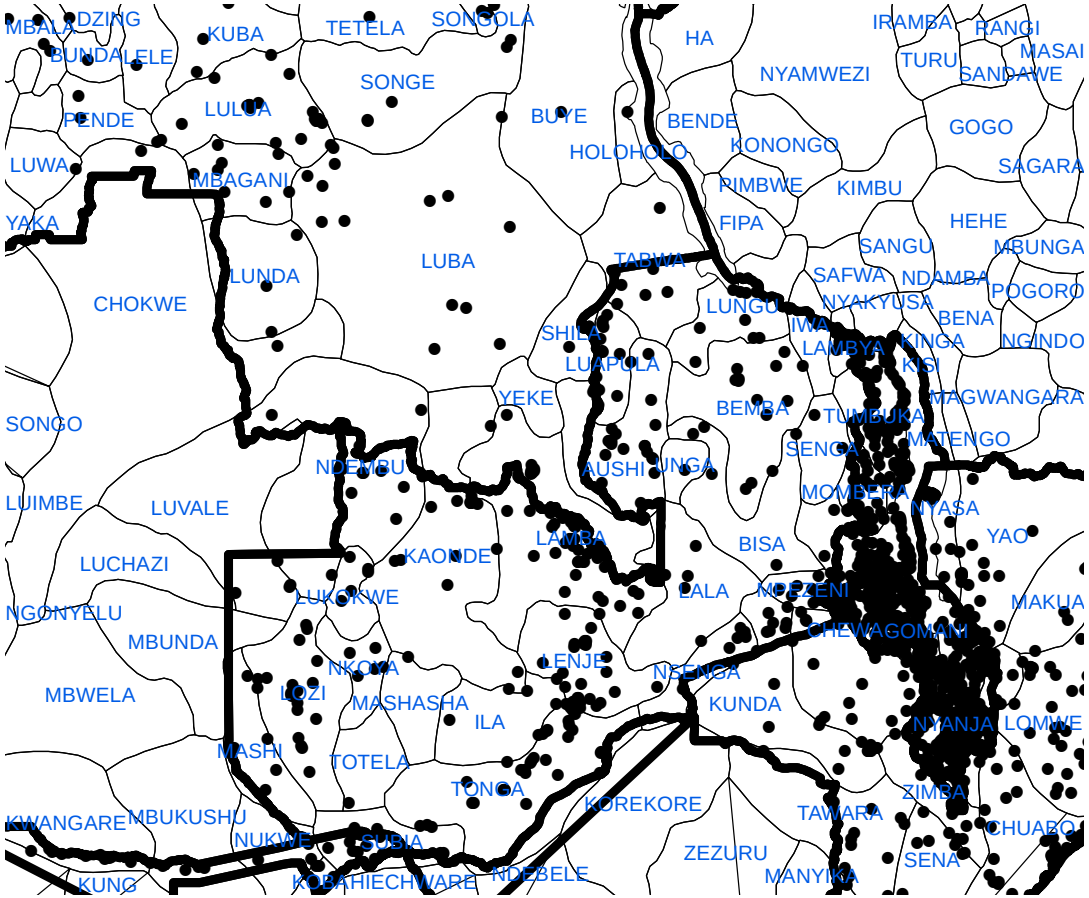
R^2 from FE Regressions	All Education	All Wealth	Movers Education	Movers Wealth
Country FE	0.163	0.013	0.149	0.035
Homeland FE	0.306	0.249	0.308	0.32
Ethnicity FE	0.268	0.152	0.261	0.204
Country-Ethnicity FE	0.286	0.165	0.286	0.219
Country-Homeland FE	0.306	0.249	0.308	0.32
Country-Homeland FE & Country-Ethnicity FE	0.331	0.285	0.343	0.364
Observations	285,218	269,992	154,694	146,158

Empirical Specification

$$y_{i,e,h,c} = a + \beta Ag_e + \gamma hgf_e + \mathbf{a}_{h,c} + \varepsilon_{i,e,h,c}$$

- $y_{i,e,h,c}$: economic outcomes of individual i belonging to ethnicity e living in homeland h in country c.
- Ag_e : pre-colonial dependence on agriculture of ethnicity e.
- hgf : pre-colonial dependence on hunting/gathering/fishing of ethnicity e.
- $\mathbf{a}_{h,c}$: vector of country-ethnic homeland FE.
  - Cluster at the ethnicity dimension

Within-Current Ethnic Homeland Variation



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- Villages in the DHS

Benchmark Results

Table 2. Benchmark - DHS Regressions within Ethnic Homelands (All Individuals)

	1	2	3	4	5	6	7	8
VARIABLES	Education	Education	Education	Education	Wealth	Wealth	Wealth	Wealth
agriculture	0.220**	0.139***	0.0992***	0.0983***	0.205***	0.163***	0.0914***	0.0930***
	(0.0903)	(0.0259)	(0.0245)	(0.0234)	(0.0774)	(0.0253)	(0.0188)	(0.0175)
gather/hunt/fish	0.188**	0.0777**	0.0828***	0.0851***	0.123*	0.0238	0.0327*	0.0396**
	(0.0906)	(0.0302)	(0.0293)	(0.0294)	(0.0645)	(0.0270)	(0.0186)	(0.0196)
urban			0.927***	0.712***			1.640***	1.436***
			(0.0657)	(0.0521)			(0.0846)	(0.0831)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	Yes	No	No	No
Ethnic Homeland-Country FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Occupation FE	No	No	No	Yes	No	No	No	Yes
Observations	285,155	285,155	285,155	285,155	269,929	269,929	269,929	269,929
R-squared	0.236	0.350	0.419	0.495	0.043	0.261	0.489	0.515

Standard errors in parentheses are clustered at the Atlas level; simple controls include age, age squared and a femal

*** p<0.01, ** p<0.05, * p<0.1

Benchmark Results - Movers Only

Table 2. Benchmark - DHS Regressions within Ethnic Homelands (Movers)

	1	2	3	4	5	6	7	8
VARIABLES	Education	Education	Education	Education	Wealth	Wealth	Wealth	Wealth
agriculture	0.248***	0.164***	0.110***	0.105***	0.269***	0.187***	0.0942***	0.0943***
	(0.0826)	(0.0296)	(0.0278)	(0.0265)	(0.0656)	(0.0300)	(0.0214)	(0.0206)
gather/hunt/fish	0.165**	0.111***	0.0983***	0.0916***	0.137**	0.0712*	0.0503**	0.0515**
	(0.0789)	(0.0333)	(0.0336)	(0.0328)	(0.0663)	(0.0367)	(0.0240)	(0.0245)
urban			0.968***	0.746***			1.689***	1.485***
			(0.100)	(0.0751)			(0.0969)	(0.0933)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	Yes	No	No	No
Ethnic Homeland-Country FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Occupation FE	No	No	No	Yes	No	No	No	Yes
Observations	154,694	154,694	154,694	154,694	146,127	146,127	146,127	146,127
R-squared	0.231	0.355	0.423	0.505	0.088	0.335	0.551	0.574

Standard errors in parentheses, clustered at the Atlas level; simple controls include age, age squared and a female dummy; Movers are defined as individuals who reside at least 10 km away from their ancestral homeland.
*** p<0.01, ** p<0.05, * p<0.1

Within-Village Variation

- So far, looking within ethnic homelands we exploit both within-village/town/city as well as cross-village variation.
- Is the pattern similar if we exploit within-village across-individuals variation?

$$y_{i,e,v,c} = a + \beta Ag_e + \gamma hgf_e + \mathbf{a}_{v,c} + \varepsilon_{i,v,c}$$

- $\mathbf{a}_{v,c}$: vector of 8,236 village FE.
- Caveat: the more one zooms in the more pressing become issues of sorting and segregation by income/education

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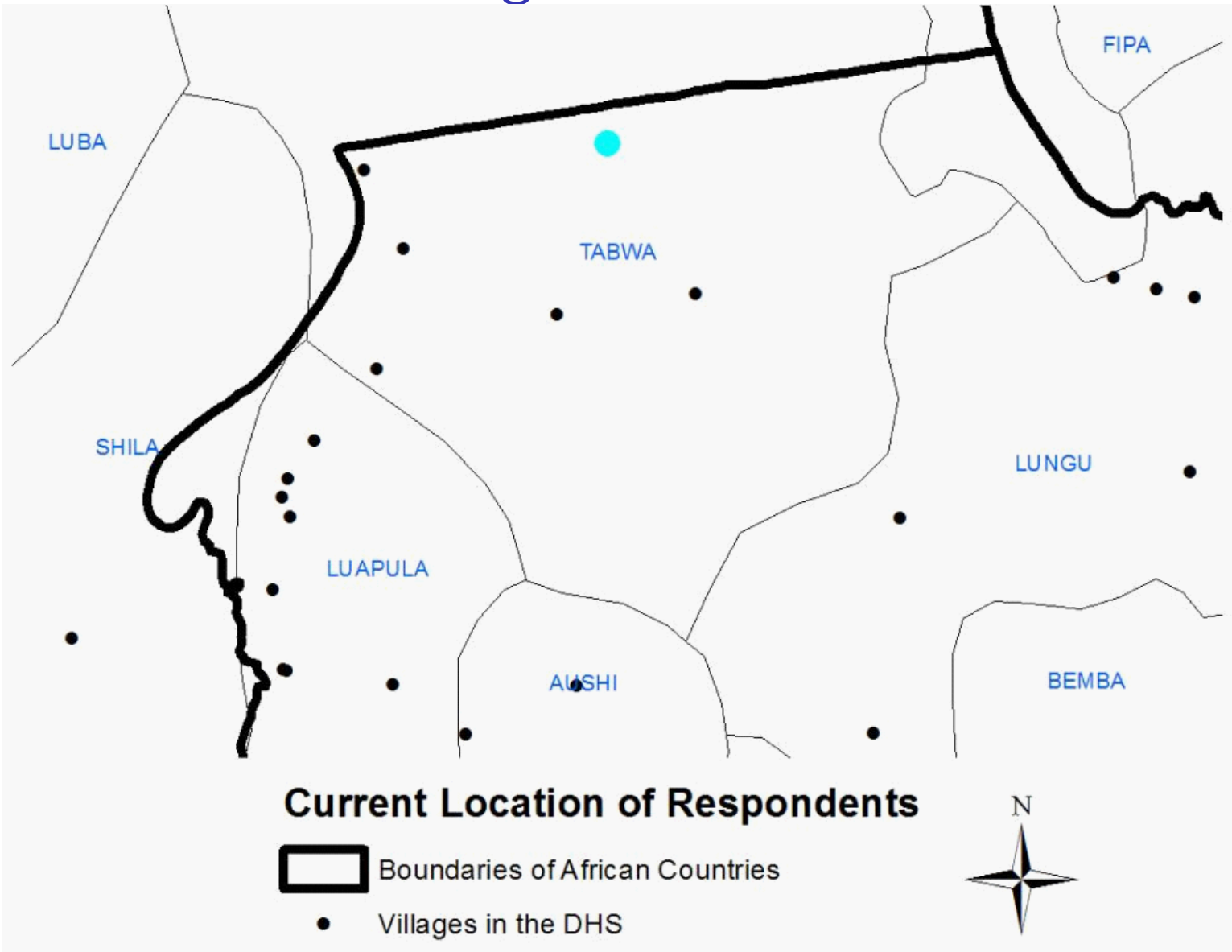
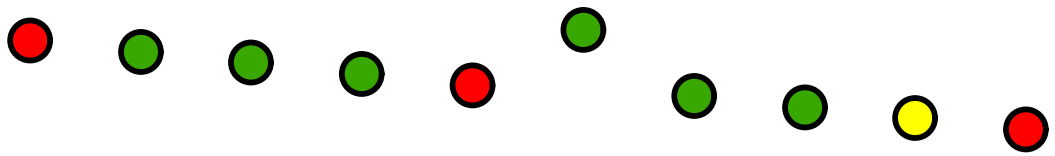
Let's Zoom in on a Vilage in the Tabwa Homeland-Zambia



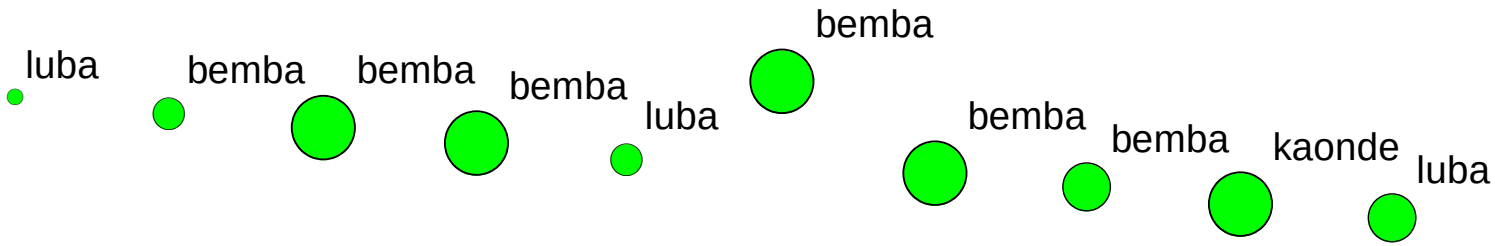
Who Lives in this Village?



Ethnicities of Respondents

- bemba: 70% of ancestral agriculture
- kaonde: 50% of ancestral agriculture
- luba: 40% of ancestral agriculture

What is the Education of the Individuals?



Education of Each Respondent

- No Education
- Incomplete Primary
- Complete Primary
- Incomplete Secondary

Benchmark Specifications with Village FE

Table3. Benchmark: DHS Regressions within Villages/Towns (All Individuals)

	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.0992***	0.0700***	0.0674***	0.0914***	0.0360***	0.0354***
	(0.0245)	(0.0144)	(0.0126)	(0.0188)	(0.00722)	(0.00696)
gather/hunt/fish	0.0828***	0.0630***	0.0629***	0.0327*	0.00922	0.0116*
	(0.0293)	(0.0151)	(0.0138)	(0.0186)	(0.00691)	(0.00659)
urban	0.927***			1.640***		
	(0.0657)			(0.0846)		
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Homeland-Country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,155	285,155	285,155	269,929	269,929	269,929
R-squared	0.42	0.521	0.572	0.49	0.685	0.691

Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared and a female dummy

*** p<0.01, ** p<0.05, * p<0.1

Breaking the Components of HGF

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	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.0993***	0.0731***	0.0704***	0.0916***	0.0372***	0.0367***
	(0.0215)	(0.0152)	(0.0136)	(0.0237)	(0.0077)	(0.0076)
gathering	0.041	0.0085	0.0113	-0.0346	-0.0173	-0.0131
	(0.0324)	(0.0237)	(0.0203)	(0.0286)	(0.0105)	(0.0100)
hunting	0.0952***	0.0866***	0.0864***	0.0519	0.0174	0.0212
	(0.0318)	(0.0249)	(0.0233)	(0.0325)	(0.0153)	(0.0149)
fishing	0.0979***	0.0818***	0.0799***	0.0575**	0.0202**	0.0210**
	(0.0263)	(0.0212)	(0.0191)	(0.0221)	(0.0086)	(0.0081)
urban	0.9265***			1.6394***		
	-0.00367			-0.0473		
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Homeland-Country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,155	285,155	285,155	269,929	269,929	269,929
R-squared	0.42	0.51	0.56	0.49	0.68	0.68

Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared and a female dummy

Using the Mostly Categories

Benchmark DHS Regressions within Villages/Towns with Mostly Categories

	2	3	5	6
VARIABLES	Education	Education	Wealth	Wealth
Mostly Agriculture	0.1540**	0.1492***	0.1151***	0.1099***
	(0.0713)	(0.0569)	(0.0393)	(0.0365)
Mixed Dependence	-0.0022	-0.0089	0.0517	0.0408
	(0.0727)	(0.0592)	(0.0425)	(0.0400)
Mostly Hunting				
Simple Controls	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes
Observations	285,155	285,155	269,929	269,929
R-squared	0.51	0.56	0.68	0.68

Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared and a female dummy. Omitted category mostly pastoralism.
*** p<0.01, ** p<0.05, * p<0.1

Using the Afrobarometer Surveys

Table 14: Ancestral Lifeways and Education in Afrobarometer

	1
VARIABLES	Education
agriculture	0.0471**
	(0.0184)
gather/hunt/fish	0.0227
	(0.0180)
Simple Controls	Yes
Coordinates FE	Yes
R-squared	0.535
Observations	21578

Standard errors in parentheses are clustered at the Atlas level;
*** p<0.01, ** p<0.05, * p<0.1

Influence of Ancestral Traits By Occupation-Location

- Are descendants of pre-colonial farmers better off because of being more productive in farming-related occupations?
- Is the difference between descendants of pre-colonial farmers and other a reflection of differential productivity of farmers in rural versus urban places?
- Is the pattern driven by a specific country?
- Is the pattern driven by individuals that recently migrated?

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- Is the difference between descendants of pre-colonial farmers and other a reflection of differential productivity of farmers in rural versus urban places?
- Is the pattern driven by a specific country?
- Is the pattern driven by individuals that recently migrated?

Results

Table 4: Heterogeneity by Occupation and Location

VARIABLES	1 Education Farming-Related	2 Education Non-Farming	3 Education Urban	4 Education Rural	5 Wealth Farming-Related	6 Wealth Non-Farming	7 Wealth Urban	8 Wealth Rural
agriculture	0.0499***	0.0704***	0.0753***	0.0644***	0.0407***	0.0369***	0.0196***	0.0567***
	(0.0104)	(0.0232)	(0.0195)	(0.0112)	(0.00998)	(0.00771)	(0.00536)	(0.0112)
gather/hunt/fish	0.0394***	0.0702***	0.0797***	0.0445***	0.0186*	0.0136**	0.00455	0.0141
	(0.0115)	(0.0215)	(0.0202)	(0.0113)	(0.0104)	(0.00671)	(0.00605)	(0.00924)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	97,599	101,565	97,702	187,453	92,156	94,685	92,726	177,203
R-squared	0.497	0.504	0.390	0.500	0.483	0.718	0.613	0.476

dummy; Farming-related industries include self-employed agriculture, agricultural employee, forest, breeding, hunting and fishing. Non-farming related industries include professional, technical, managerial positions, clerical positions, sales, household and domestic, services, skilled manual, and unskilled manual.

*** p<0.01, ** p<0.05, * p<0.1

Influence of Ancestral Agriculture by Country

- For 10-14 out of the 20 countries (depending on the specification) the influence of ancestral dependence on agriculture is positive and significant (for only one country it is negative and insignificant).

Recent Migration

- Who is more likely to have moved in life?
  - one may worry that the pattern is driven by those of pastoral background having recently left their homelands.

Who is more likely to have moved in life?

Table 5. Determinants of Migration

	1	2	3	4
VARIABLES	mover	mover	moved_in_life	moved_in_life
agriculture	-0.0559**	-0.0466**	0.00520	0.00485
	(0.0227)	(0.0212)	(0.00520)	(0.00503)
gather/hunt/fish	-0.127***	-0.118***	-0.00624	-0.00608
	(0.0255)	(0.0254)	(0.00531)	(0.00510)
Simple Controls	Yes	Yes	Yes	Yes
Coorrdinates FE	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes
Observations	281,219	281,219	188,237	188,237
R-squared	0.776	0.776	0.229	0.233

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a female dummy.

*** p<0.01, ** p<0.05, * p<0.1

Individuals that Did not Move in Life

- Are differences in economic performance driven by differences in the number of years since people have left their original site of residence?
- Partial Solution
  - Flexibly Account for when Each Individual Moved in Her Current Residence

Accoounting for When one Moved

DHS Regressions within Villages/Towns (All Individuals) Controlling for How Long Each Individual Resides in her Current Location

	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.1274***	0.0880***	0.0876***	0.0719***	0.0184**	0.0180**
	(0.0190)	(0.0158)	(0.0144)	(0.0153)	(0.0083)	(0.0079)
gather/hunt/fish	0.1061***	0.0724***	0.0745***	0.0358**	-0.0024	-0.0005
	(0.0211)	(0.0196)	(0.0186)	(0.0155)	(0.0096)	(0.0088)
urban	0.8441***			1.5912***		
	(0.0321)			(0.0617)		
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Homeland-Country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	192000	192000	192000	177000	177000	177000
R-squared	0.44	0.53	0.57	0.48	0.66	0.67

Standard errors in parentheses are clustered at the ethnicity level, simple controls include

Are Non-Autochthonous Different?

- By exploiting within-ethnic-homeland variation we leverage the presence of movers.
- Of course, movers are a selected sample.
  - Does being a mover co-vary with the ancestral subsistence type?
    - remember is mover is someone that resides outside his ancestral ethnic homeland

Who is More Likely to Live Outside her Homeland?

Table 5. Determinants of Migration

	1	2	3	4
VARIABLES	mover	mover	moved_in_life	moved_in_life
agriculture	-0.0465**	-0.0464**	0.0052	0.0049
	(0.0212)	(0.0211)	(0.0052)	(0.0050)
gather/hunt/fish	-0.1179***	-0.1177***	-0.0062	-0.0061
	(0.0254)	(0.0253)	(0.0053)	(0.0051)
Simple Controls	Yes	Yes	Yes	Yes
Coorrdinates FE	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes
Observations	285163	285163	188268	188268
R-squared	0.768	0.768	0.229	0.233

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a female dummy.

*** p<0.01, ** p<0.05, * p<0.1

Who is More Likely to Live Outside his Ancestral Homeland?

- Concern: Individuals of agricultural ethnic background are more positively selected than individuals of pastoral background.
- Finding that economic performance of movers changes by the ancestral subsistence economy has a dual interpretation
  - Differential Selection into migration
  - Differential portability of ethnic-specific skills outside the ancestral homeland ethnic homeland.

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Results

Table 6. Effect of Differential Selection into Migration

VARIABLES	(1) Education	(2) Education	(3) Wealth	(4) Wealth
agriculture	0.281**	0.0793***	0.241**	0.0364**
	(0.117)	(0.0210)	(0.105)	(0.0163)
gather/hunt/fish	0.282***	0.0663***	0.172**	0.00796
	(0.107)	(0.0202)	(0.0759)	(0.0145)
mover	0.747*	0.102	0.498	0.0346
	(0.402)	(0.148)	(0.483)	(0.112)
mover X agric	-0.0571	-0.00822	-0.0184	0.00238
	(0.0539)	(0.0210)	(0.0604)	(0.0149)
mover X ghf	-0.109**	0.00554	-0.0202	0.0118
	(0.0478)	(0.0175)	(0.0765)	(0.0136)
Simple Controls	Yes	Yes	Yes	Yes
Ethnic Homeland-Country FE	Yes	No	Yes	No
Coordinates FE	No	Yes	No	Yes
Observations	285,155	285,155	269,929	269,929
R-squared	0.522	0.522	0.686	0.686

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a female dummy. Mover is a dummy variable that equals one if an individual is at least 10 kilometers away from her ancestral

What Other Ancestral Ethnic Traits are Portable?

- **using data from Murdock's Ethnolinguistic Atlas explore whether**
  - other (than type of subsistence) ethnic-specific traits correlate with individual economic performance
  - pre-colonial dependence on agriculture continues to correlate significantly with development, conditional on other ethnic traits

- **Ethnic traits**
  - degree of political complexity
  - occupational specialization
  - early development (size and complexity of early settlements)
  - cultural traits (polygyny; class stratification; clans)
  - local features (elections for local headman; indigenous slavery; inheritance rule for property)

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Pre-Colonial Agriculture or Other Ethnic Traits? Education

Panel A. Education (All Individuals)

	1	2	3	4	5	6	7	8	9	10
VARIABLES	Education	Education	Education	Education	Education	Education	Education	Education	Education	Education
agriculture	0.0709***	0.0844***	0.0721***	0.0725***	0.0725***	0.0739***	0.0652***	0.0727***	0.0697***	0.0889**
	(0.0145)	(0.0163)	(0.0152)	(0.0152)	(0.0152)	(0.0141)	(0.0231)	(0.0132)	(0.0153)	(0.0383)
agriculture	0.0794***	0.0835***	0.0762***	0.0739***	0.0723***	0.0740***	0.0609***	0.0656***	0.0721***	0.0846***
	(0.0166)	(0.0162)	(0.0146)	(0.0152)	(0.0151)	(0.0141)	(0.0223)	(0.0124)	(0.0157)	(0.0286)
gather_hunt_fish	0.0710***	0.0524***	0.0607***	0.0716***	0.0654***	0.0577***	0.0606**	0.0581***	0.0548***	0.0476*
	(0.0156)	(0.0154)	(0.0174)	(0.0168)	(0.0161)	(0.0155)	(0.0294)	(0.0139)	(0.0150)	(0.0274)
Polygyny	0.0521									0.0955
	(0.0322)									(0.0731)
Clans		-0.0449								-0.0455
		(0.0449)								(0.0618)
Settlement Pattern			-0.0184*							-0.0167
			(0.0108)							(0.0174)
Local Jurisdictional Hierarchy				0.0518*						0.101**
				(0.0283)						(0.0483)
Political Centralization					0.0115					-0.0254
					(0.0209)					(0.0358)
Class Stratification						0.00866				0.0367
						(0.0406)				(0.0654)
Elections							-0.104			-0.146
							(0.0874)			(0.101)
Slavery								-0.193***		-0.126**
								(0.0357)		(0.0549)
Property									-0.160**	-0.181*
									(0.0706)	(0.0924)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	283,182	262,860	270,786	271,580	271,580	260,276	219,737	272,066	258,524	177,117
R-squared	0.521	0.526	0.524	0.524	0.524	0.526	0.531	0.525	0.521	0.545

Pre-Colonial Agriculture or Other Ethnic Traits? Wealth

Panel B. Wealth (All Individuals)

VARIABLES	1 Wealth	2 Wealth	3 Wealth	4 Wealth	5 Wealth	6 Wealth	7 Wealth	8 Wealth	9 Wealth	10 Wealth
agriculture	0.0360***	0.0371***	0.0373***	0.0374***	0.0374***	0.0387***	0.0205**	0.0354***	0.0312***	0.0204**
	(0.00724)	(0.00767)	(0.00764)	(0.00762)	(0.00762)	(0.00743)	(0.00824)	(0.00726)	(0.00693)	(0.00888)
agriculture	0.0356***	0.0366***	0.0385***	0.0372***	0.0367***	0.0390***	0.0217***	0.0343***	0.0315***	0.0114
	(0.00830)	(0.00784)	(0.00723)	(0.00771)	(0.00741)	(0.00706)	(0.00814)	(0.00699)	(0.00698)	(0.0148)
gather_hunt_fish	0.00887	0.00525	0.00784	0.00781	0.0111	0.0115	-0.00106	0.0102	0.00678	-0.0220
	(0.00821)	(0.00777)	(0.00733)	(0.00749)	(0.00701)	(0.00713)	(0.0116)	(0.00721)	(0.00763)	(0.0175)
Polygyny	-0.00241									-0.0701
	(0.0182)									(0.0440)
Clans		-0.0253								-0.0440
		(0.0260)								(0.0448)
Settlement Pattern			-0.00476							0.000892
			(0.00478)							(0.00772)
Local Jurisdictional Hierarchy				-0.00871						0.00420
				(0.0131)						(0.0242)
Political Centralization					0.0299**					0.0177
					(0.0115)					(0.0188)
Class Stratification						0.0594***				0.0544
						(0.0214)				(0.0376)
Elections							0.0260			-0.0427
							(0.0321)			(0.0475)
Slavery								-0.0286		0.00416
								(0.0228)		(0.0308)
Property									-0.0225	-0.00933
									(0.0403)	(0.0721)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	267,900	247,578	255,504	256,298	256,298	246,489	209,694	256,784	245,494	169,094
R-squared	0.682	0.685	0.688	0.688	0.688	0.680	0.687	0.680	0.683	0.691

Results

- **pre-colonial dependence on agriculture $=>$ robust correlate of individual-level economic performance**
  - reassures that the estimates are not picking up the effect of other ethnic features
- some evidence that **pre-colonial indigenous slavery negatively** impacts education

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Colonization and the Subsistence Pattern

- Is the channel via which pre-colonial subsistence pattern shapes individual economic performance the colonial experience?
  - Account for the number of slaves extracted during the slave raids
  - Account for the number of missions established
  - Account for religious denomination (partially driven by the advent of Europeans)
  - Account for distance to the capital (partially decided by the colonizers)
    - note that all these traits are at the level of your ancestral ethnic group (not current ethnic homeland)

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Pre-Colonial Agriculture or Other Ethnic Traits? Education

Table 8. Colonial Roots

VARIABLES	(1) Education	(2) Education	(3) Education	(4) Education	(5) Education	(6) Wealth	(7) Wealth	(8) Wealth	(9) Wealth	(10) Wealth
agriculture	0.0705***	0.0735***	0.0727***	0.0567***	0.0556***	0.0360***	0.0340***	0.0337***	0.0340***	0.0338***
	(0.0145)	(0.0151)	(0.0149)	(0.0128)	(0.0118)	(0.00723)	(0.00797)	(0.00794)	(0.00798)	(0.00789)
gather/hunt/fish	0.0628***	0.0640***	0.0606***	0.0434***	0.0425***	0.00911	0.00791	0.00679	0.00775	0.00623
	(0.0151)	(0.0152)	(0.0148)	(0.0120)	(0.0120)	(0.00687)	(0.00730)	(0.00743)	(0.00743)	(0.00719)
ln(1+slaves per km2)		-0.00481	-0.00609	-0.00239	-0.00500		0.00283	0.00243	0.00258	0.00117
		(0.00518)	(0.00528)	(0.00416)	(0.00380)		(0.00379)	(0.00375)	(0.00378)	(0.00372)
ln(1+ Christian			0.182*	0.128	0.0851			0.0573*	0.0553*	0.0352
missions per km2)			(0.106)	(0.0914)	(0.0929)			(0.0323)	(0.0326)	(0.0332)
Muslim				-0.412***	-0.404***				0.00303	0.00609
				(0.0267)	(0.0267)				(0.0240)	(0.0239)
Other Religions				-0.394***	-0.390***				-0.170***	-0.171***
				(0.0310)	(0.0309)				(0.0186)	(0.0189)
Distance to the Capital					-0.0641					-0.0602*
					(0.0559)					(0.0312)
Distance to the Coast					-0.000178**					-4.58e-05
					(7.30e-05)					(4.15e-05)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	279,383	278,882	278,882	278,882	277,936	271,629	271,128	271,128	271,128	270,182
R-squared	0.521	0.521	0.521	0.526	0.528	0.686	0.686	0.686	0.686	0.686

Channels - The Narrative

- Physical environments affect ways of wresting a living from nature (lifeway). (E.g.: land suitable for agriculture settled by Bantu-speaking farmers, areas better for herding settled by Nilo-Saharan-speaking herders
- Lifeway plausibly affected attitudes, norms, (psycho-social-cultural adaptations). Examples:
  - farmers acclimate to more sustained repetitive labor than do herders;
  - farmers adapt to living in proximity to neighbors / less mobile;
  - herders acclimate to projecting readiness to defend their movable property from threat of theft.
- Differential inclinations become cultural inheritances that are partly maintained after relocation and engagement in new economic activities.

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- Differential inclinations become cultural inheritances that are partly maintained after relocation and engagement in new economic activities.

Channels - Attitudes and Beliefs

- A natural theory explaining persistent effect of ancestral lifeways on modern outcomes is the cultural transmission of attitudes that impact behavior today.
  - The range of potentially relevant traits is enormous, and measurement of any particular one is difficult.
  - Candidates include proclivity towards violence, non-cooperativeness, impatience, etc.

Attitudes Towards Women

- Is there evidence of proclivity to violence in the DHS?
- DHS offers a set of consistently measured traits regarding the conditions under which it would be acceptable for a man to beat his wife.
  - These are: (i) wife goes out without telling him; (ii) wife neglects the children; (iii) wife argues with him; (iv) wife refuses to have sex with him; (v) wife burns the food.
- As our dependent variable, we use the first principal component of these five measures.
  - The first pca explains on average 60% of the variation of each variable. Standard Deviation of dep. var is 1.73.

Attitudes Towards Women by Males

Table 9. Violence Toward Women

	3	4	5
VARIABLES	First Principal Component of Whether it is Justified to Beat One's Wife		
agriculture	-0.0284**	-0.0284**	-0.0241*
	(0.0135)	(0.0135)	(0.0126)
gather/hunt/fish	-0.015	-0.015	-0.0096
	(0.0122)	(0.0122)	(0.0118)
Muslim			0.1260***
			(0.0221)
Other Religions			0.1576***
			(0.0360)
Simple Controls	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes
Occupation FE	No	Yes	Yes
Observations	61433	61433	61433
R-squared	0.251	0.251	0.252

Proclivity towards Violence

- The question on violence against women captures both proclivity to violence and attitudes towards women.
- Which of these two components is more likely to be reflected in the answers?
  - First, we looked at other questions capturing the women bargaining power in the household. Second, we focused on households that had both sons and daughters and looked at whether daughters have less education than sons within the same household.
- There is no evidence that agricultural households allow for more bargaining power/education to women in the household.
  - Hence, the violence against women more likely reflects an increased proclivity to violence among those of pastoral descent.

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Attitudes and Beliefs - Afrobarometer

- Do descendants from agricultural groups display different attitudes and beliefs compared to pastoral ones?
  - Using survey data from the Afrobarometer Surveys we find that:
- Members of agricultural groups feel their group has more political influence
- Respondents of pastoral ancestry are perceived by the interviewer to have "worse" interpersonal attitudes

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Pre-Colonial Agriculture and Attitudes

Table 13. Political Perceptions and Attitudes

	1	2	3	4	5	6	7
VARIABLES	Group's Political Influence	Respondent is Hostile	Respondent is Bored	Respondent is Non-Cooperative	Respondent is Impatient	Respondent is Suspicious	Respondent is Dishonest
agriculture	-0.0678***	-0.0061	-0.0183***	-0.0134*	-0.0216***	-0.0121*	-0.0153***
	(0.0239)	(0.0040)	(0.0060)	(0.0071)	(0.0079)	(0.0065)	(0.0053)
gather/hunt/fish	-0.0007	-0.0026	-0.0109*	-0.003	-0.0176**	0.0019	-0.0021
	(0.0271)	(0.0036)	(0.0056)	(0.0052)	(0.0072)	(0.0058)	(0.0040)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.343	0.369	0.361	0.346	0.351	0.393	0.427
Observations	20139	21570	21582	21586	21582	21588	21584

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a female dummy; Group's political influence variable captures the respondents perception whether his/her own group has more influence politically compared to otehr groups. Higher values indicate lesser influence.

*** p<0.01, ** p<0.05, * p<0.1

Pre-Colonial Agriculture and Attitudes

- Do differences in political perceptions and attitudes account for some of the influence of ancestral lifeways on economic performance?

Pre-Colonial Agriculture and Attitudes

Table 14: Ancestral Lifeways Education, Political Representation and Attitudes

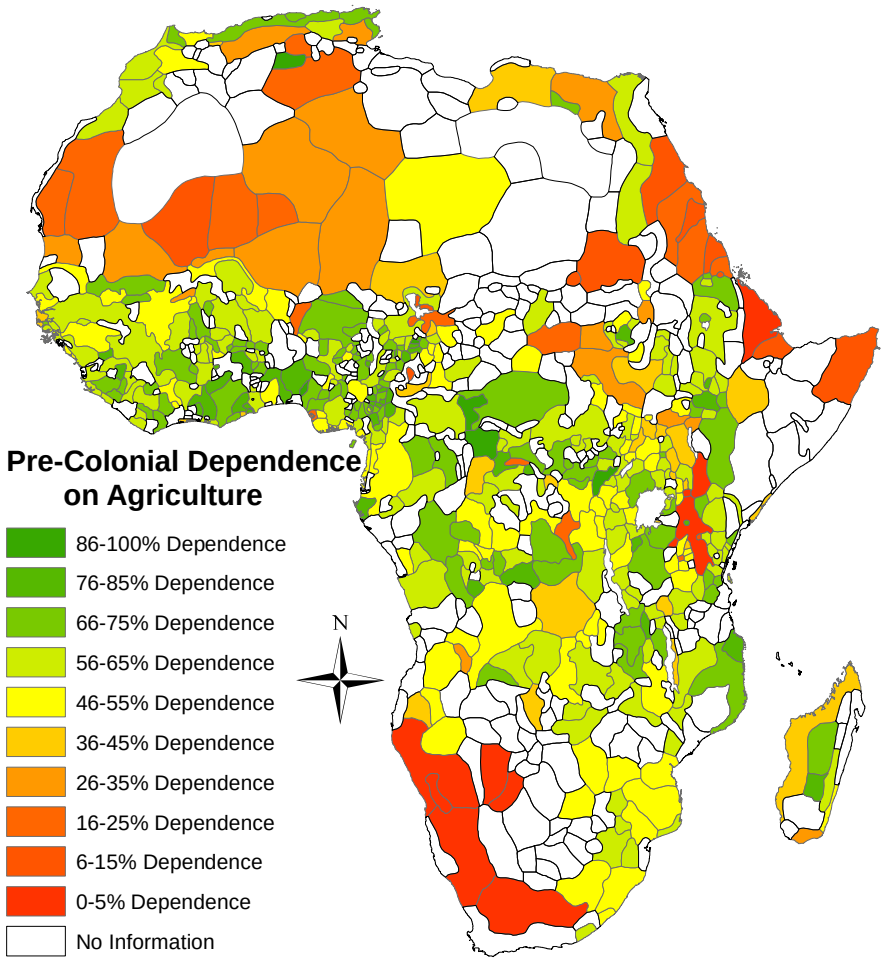
	No Controls	Accounting for Political Influence	Accounting for Political Influence & Attitudes
VARIABLES	Education	Education	Education
agriculture	0.0437**	0.0402**	0.0355*
	(0.0186)	(0.0183)	(0.0181)
gather/hunt/fish	0.0262	0.0264	0.0251
	(0.0178)	(0.0173)	(0.0172)
Simple Controls	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes
R-squared	0.538	0.539	0.545
Observations	20077	20077	20077

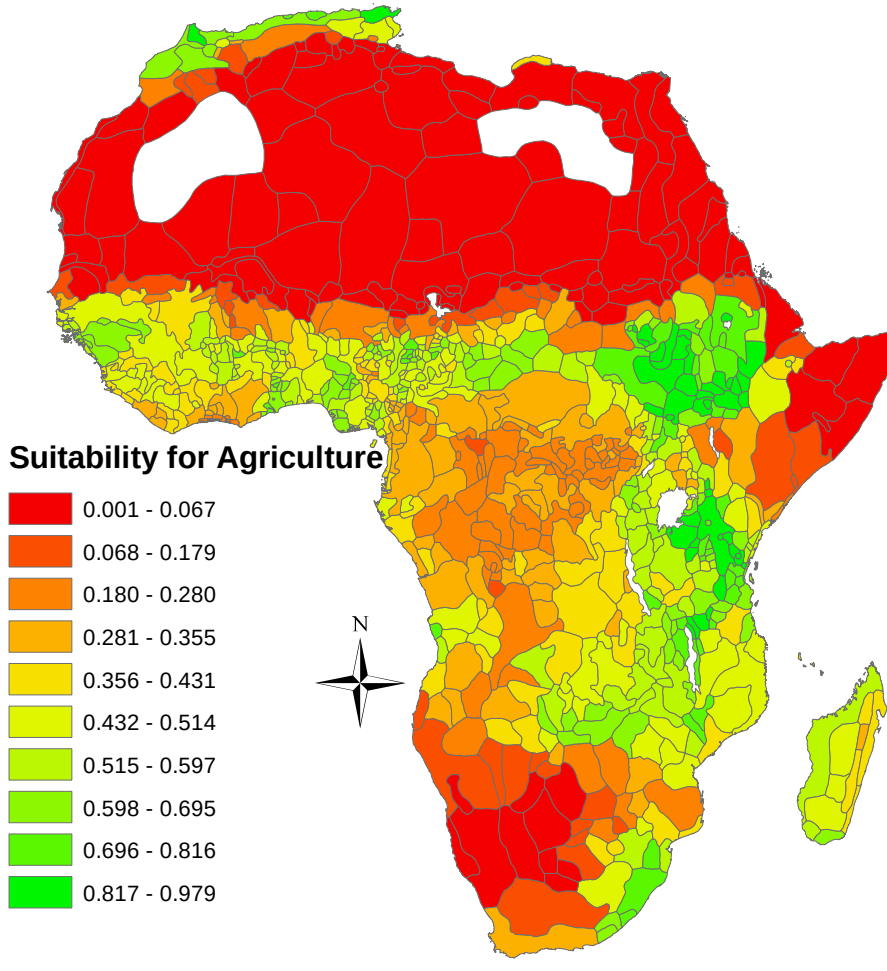
Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a female dummy; In Column 3 we control for the respondent's perception of own ethnic influence in politics. In Column 4 we control for the respondent's perception of own ethnic influence in politics as well as the attitudes of each respondent as recorded by the interviewer regarding whether the respondent is bored, non-cooperative, suspicious, impatient and dishonest. The education variable takes 6 distinct values indicating no formal education, incomplete

Approach

- **Agriculture is more likely among groups that reside historically on more fertile regions**

Pre-Colonial Dependence on Agriculture





Farming Suitability and Agricultural Dependence

Table 10: Log of Average Land Subsistence and Modes of Pre-Colonial Subsistence

VARIABLES	(1) agriculture	(2) pastoralism	(3) gather/hunt/fish
Ln (Land Suitablity for Agriculture)	0.557***	-0.631***	0.0693
	(0.134)	(0.144)	(0.0837)
Observations	201	201	201
R-squared	0.123	0.137	0.002

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

IV Results

- May use ancestral homeland suitability for agriculture to instrument for pre-colonial dependence on farming
  - What does this approach buy us?
    - To the extent that "better" cultures adopt more productive technologies more intensively than others then dependence on agriculture may be a manifestation of these primordial differences.
    - Instrumenting for ancestral land suitability for agriculture deals with this issue.

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IV Results: All Individuals

Table 11. IV for Full Sample

VARIABLES	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
agriculture	0.1191**	0.0549*	0.0494*	0.1178**	0.0255**	0.0221*
	(0.0542)	(0.0326)	(0.0289)	(0.0602)	(0.0118)	(0.0116)
gather/hunt/fish	0.0871***	0.0621***	0.05840***	0.0319	0.0109	0.109
	(0.0343)	(0.0204)	(0.0180)	(0.0353)	(0.0078)	(0.0072)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-Ethnic Homeland FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
First Stage F-Statistic	52.34	22.27	25.14	52.34	22.27	25.14
Observations	285,139	285,139	285,139	269,845	269,845	269,845
R-squared	0.234	0.087	0.325	0.034	0.015	0.394

Standard errors in parentheses are clustered at the Atlas levels. Simple controls include age, age squared and a female dummy;

Endogeneity of Historical Locations of Groups

- The Argument
  - Ethnic homelands may be an outcome of stronger more violent groups taking over the relatively more fertile areas pushing "weaker" groups into marginal zones.
  - Should this be true then the observed correlations are not driven by agricultural dependence conferring developmental advantages to agricultural societies but it is deeply-rooted primordial traits that are driving both a higher dependence on agriculture and improved economic outcomes today.

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Endogeneity of Historical Locations of Groups

- Counterargument(s):
- Culture of violence is a common theme among pastoral societies rather than farming ones.

- Historical migrations in Africa and beyond seem to be driven by groups selecting into territories that are similar to their ancestral homelands (Michalopoulos, 2012):
  - Bantu expansion (farmers spreading into areas suitable for farming)
  - expansion of Semitic Languages (pastoralists spreading into lands suitable for herding)
  - In the specific case of Africa the presence of Tse-Tse fly precluded cultures dependent on camels/horses to conquer such territories.

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Accounting for Cultural Similarities

- An alternative way to partially address this concern is to compare groups that belong to common cultural macro entities.
- Note that cultural affinities are often an outcome of similarities in the production among these groups so the finer the distinction of groupings the more similar are the groups with respect to their subsistence practises.
- To assess the robustness of our results we employ 3 different levels of cultural aggregation starting from:
- linguistic families moving to
- linguistic sub-families and ending with
- ethnic clusters.

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Accounting for Cultural Similarities: Language Families

- The 187 Murdock groups in our dataset belong to 6 Language Families, 13 Language Sub-Families, and 36 ethnic clusters
- Examples of Language families
  - Khoisan or click
  - Niger-Congo (Nc)
  - Chari-Nile or Macro-Sudanic (Cn)
  - Kanuric or Central Saharan etc
  - Koman (Km)
  - Afro-Asiatic or Hamito-Semitic (Aa)

Accounting for Cultural Similarities: Language Families

Table 12A. Exploiting Within Linguistic Family Variation

	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.0706***	0.0742***	0.0717***	0.0360***	0.0350***	0.0345***
	(0.0145)	(0.0159)	(0.0143)	(0.00726)	(0.00756)	(0.00722)
gather/hunt/fish	0.0636***	0.0605***	0.0608***	0.00921	0.00907	0.0115*
	(0.0153)	(0.0141)	(0.0130)	(0.00696)	(0.00669)	(0.00633)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes
Linguistic Family(v98) FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	280,557	280,557	280,557	265,331	265,331	265,331
R-squared	0.522	0.523	0.574	0.681	0.681	0.686

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age
*** p<0.01, ** p<0.05, * p<0.1

Accounting for Cultural Similarities: Linguistic Sub-Families

- Examples of Sub-families for Niger-Congo (Nc):
  - Atlantic or West Atlantic (NcA)
  - Bantoid or Central (NcB)
  - Eastern or Adamawa-Eastern (NcE)
  - Gur or Voltaic (NcG)
  - Ijo or Ijaw (NcI)
  - Kwa (NcK)
  - Mande (NcM)
- Language Sub-family FE explain roughly 20% of the variation in agricultural dependence across groups

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Accounting for Cultural Similarities: Linguistic Sub-Families

Table 12B. Exploiting Within Linguistic Sub-Family Variation

	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.0738***	0.0397*	0.0395**	0.0366***	0.0320***	0.0307***
	(0.0153)	(0.0201)	(0.0172)	(0.00760)	(0.00932)	(0.00855)
gather/hunt/fish	0.0642***	0.0223	0.0228	0.00865	0.0153**	0.0156**
	(0.0162)	(0.0221)	(0.0193)	(0.00734)	(0.00741)	(0.00676)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes
Linguistic Subfamily(v99)	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	271,781	271,781	271,781	256,555	256,555	256,555
R-squared	0.524	0.525	0.576	0.679	0.680	0.685

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age

*** p<0.01, ** p<0.05, * p<0.1

Accounting for Cultural Similarities: Ethnic Clusters

- Examples of Ethnic Clusters (come from Murdock's 1959 book and correspond to the chapters' headings)
  - Southwestern Bantu
  - Central Bantu
  - Northwestern Bantu
  - Northeast Coastal Bantu
  - Kenya Highland Bantu
  - Interlacustrine Bantu
  - Fulani

- Ethnic Cluster FE explain roughly 60% of the variation in agricultural dependence across groups

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  - Fulani
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Accounting for Cultural Similarities: Ethnic Clusters

Table 12C. Exploiting Within Ethnic-Cluster Variation

	1	2	3	4	5	6
VARIABLES	Education	Education	Education	Wealth	Wealth	Wealth
agriculture	0.0700***	0.0690***	0.0634***	0.0358***	0.0324**	0.0330**
	(0.0144)	(0.0133)	(0.0114)	(0.00724)	(0.0130)	(0.0143)
gather/hunt/fish	0.0628***	0.0663***	0.0623***	0.00887	0.0165	0.0195
	(0.0151)	(0.0143)	(0.0126)	(0.00691)	(0.0126)	(0.0141)
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Cluster FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	284,654	284,654	284,654	269,428	269,428	269,428
R-squared	0.521	0.523	0.574	0.685	0.686	0.691

Standard errors in parentheses are clustered at the Atlas level; Simple controls include age, age squared and a f

*** p<0.01, ** p<0.05, * p<0.1

Main Contribution

- There is a long-standing hypothesis in the social sciences that dependence on agriculture offered early farmers a developmental head start compared to other modes of production. Existing evidence is mixed.

- Offer individual-level evidence that descendants of agriculturalists have better economic outcomes compared to descendants of pastoralists.

Results Summary

- Tracing ancestry to a given ethnic group (and less so to a given country) has important implications for individual economic performance

- **In particular, ancestral dependence on agriculture versus pastoralism systematically confers economic benefits to descendants from such groups**
  - within countries.
  - within ethnic homelands
  - within villages
  - within occupational groups, within urban and rural places.
  - result does not reflect observable differences in other ethnic specific traits.

Implications - Future Research

- **Future work**
  - more work on channels
  - study how national policies mitigate or exacerbate these ethnic-specific legacies

Moved in Life and Autochthonous

Mover and Whether Moved in Life (unweighted)

	Moved in life	Haven't moved in life	Total
Mover	16,510	15,319	31,829
Row Pct.	51.87	48.13	100
Col. Pct.	59.79	49.21	54.19
Non-Mover	11,103	15,809	26,912
Row Pct.	41.26	58.74	100
Col. Pct.	40.21	50.79	45.81
Total	27,613	31,128	58,741
Row Pct.	47.01	52.99	100
Col. Pct.	100	100	100

Moved in Life and Autochthonous