TABLE I

SUMMARY STATISTICS[a]

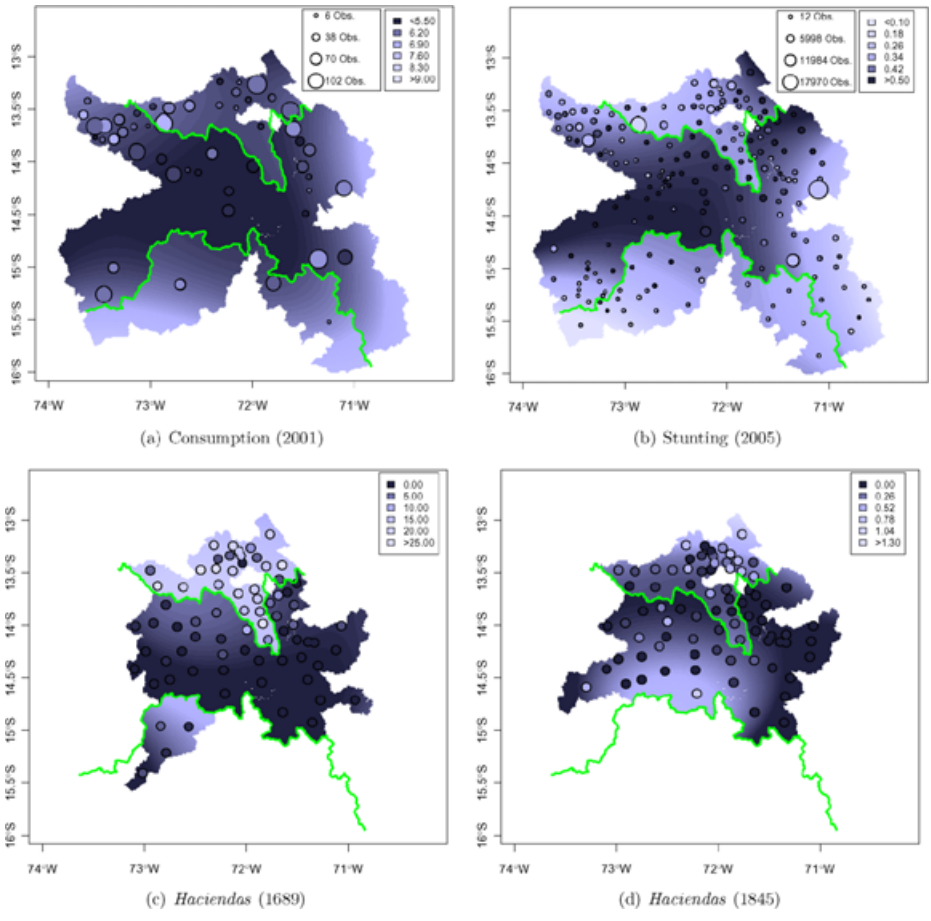
	Sample Falls Within											
	<100 km of *Mita* Boundary			<75 km of *Mita* Boundary			<50 km of *Mita* Boundary			<25 km of *Mita* Boundary		
	Inside	Outside	s.e.	Inside	Outside	s.e.	Inside	Outside	s.e.	Inside	Outside	s.e.
GIS Measures												
Elevation	4042	4018	[188.77] (85.54)	4085	4103	[166.92] (82.75)	4117	4096	[169.45] (89.61)	4135	4060	[146.16] (115.15)
Slope	5.54	7.21	[0.88]* (0.49)***	5.75	7.02	[0.86] (0.52)**	5.87	6.95	[0.95] (0.58)*	5.77	7.21	[0.90] (0.79)*
Observations	177	95		144	86		104	73		48	52	
% Indigenous	63.59	58.84	[11.19] (9.76)	71.00	64.55	[8.04] (8.14)	71.01	64.54	[8.42] (8.43)	74.47	63.35	[10.87] (10.52)
Observations	1112	366		831	330		683	330		329	251	
Log 1572 tribute rate	1.57	1.60	[0.04] (0.03)	1.57	1.60	[0.04] (0.03)	1.58	1.61	[0.05] (0.04)	1.65	1.61	[0.02]* (0.03)

(*Continues*)

TABLE I—*Continued*

	Sample Falls Within											
	<100 km of *Mita* Boundary			<75 km of *Mita* Boundary			<50 km of *Mita* Boundary			<25 km of *Mita* Boundary		
	Inside	Outside	s.e.	Inside	Outside	s.e.	Inside	Outside	s.e.	Inside	Outside	s.e.
% 1572 tribute to												
Spanish Nobility	59.80	63.82	[1.39]*** (1.36)***	59.98	63.69	[1.56]** (1.53)**	62.01	63.07	[1.12] (1.34)	61.01	63.17	[1.58] (2.21)
Spanish Priests	21.05	19.10	[0.90]** (0.94)**	21.90	19.45	[1.02]** (1.02)**	20.59	19.93	[0.76] (0.92)	21.45	19.98	[1.01] (1.33)
Spanish Justices	13.36	12.58	[0.53] (0.48)*	13.31	12.46	[0.65] (0.60)	12.81	12.48	[0.43] (0.55)	13.06	12.37	[0.56] (0.79)
Indigenous Mayors	5.67	4.40	[0.78] (0.85)	4.55	4.29	[0.26] (0.29)	4.42	4.47	[0.34] (0.33)	4.48	4.42	[0.29] (0.39)
Observations	63	41		47	37		35	30		18	24	

[a]The unit of observation is 20×20 km grid cells for the geospatial measures, the household for % indigenous, and the district for the 1572 tribute data. Conley standard errors for the difference in means between *mita* and non-*mita* observations are in brackets. Robust standard errors for the difference in means are in parentheses. For % indigenous, the robust standard errors are corrected for clustering at the district level. The geospatial measures are calculated using elevation data at 30 arc second (1 km) resolution (SRTM (2000)). The unit of measure for elevation is 1000 meters and for slope is degrees. A household is indigenous if its members primarily speak an indigenous language in the home (ENAHO (2001)). The tribute data are taken from Miranda (1583). In the first three columns, the sample includes only observations located less than 100 km from the *mita* boundary, and this threshold is reduced to 75, 50, and finally 25 km in the succeeding columns. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.



(a) Consumption (2001)

(b) Stunting (2005)

(c) *Haciendas* (1689)

(d) *Haciendas* (1845)

FIGURE 2.—Plots of various outcomes against longitude and latitude. See the text for a detailed description.

TABLE III

SPECIFICATION TESTS[a]

	Dependent Variable						
	Log Equiv. Household Consumption (2001)			Stunted Growth, Children 6–9 (2005)			
Sample Within:	<100 km of Bound.	<75 km of Bound.	<50 km of Bound.	<100 km of Bound.	<75 km of Bound.	<50 km of Bound.	Border District
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Alternative Functional Forms for RD Polynomial: Baseline I							
Linear polynomial in latitude and longitude							
Mita	−0.294***	−0.199	−0.143	0.064***	0.054**	0.062**	0.068**
	(0.092)	(0.126)	(0.128)	(0.021)	(0.022)	(0.026)	(0.031)
Quadratic polynomial in latitude and longitude							
Mita	−0.151	−0.247	−0.361	0.073*	0.091**	0.106**	0.087**
	(0.189)	(0.209)	(0.216)	(0.040)	(0.043)	(0.047)	(0.041)
Quartic polynomial in latitude and longitude							
Mita	−0.392*	−0.324	−0.342	0.073	0.072	0.057	0.104**
	(0.225)	(0.231)	(0.260)	(0.056)	(0.050)	(0.048)	(0.042)
Alternative Functional Forms for RD Polynomial: Baseline II							
Linear polynomial in distance to Potosí							
Mita	−0.297***	−0.273***	−0.220**	0.050**	0.048**	0.049**	0.071**
	(0.079)	(0.093)	(0.092)	(0.022)	(0.022)	(0.024)	(0.031)
Quadratic polynomial in distance to Potosí							
Mita	−0.345***	−0.262***	−0.309***	0.072***	0.064***	0.072***	0.060*
	(0.086)	(0.095)	(0.100)	(0.023)	(0.022)	(0.023)	(0.032)
Quartic polynomial in distance to Potosí							
Mita	−0.331***	−0.310***	−0.330***	0.078***	0.075***	0.071***	0.053*
	(0.086)	(0.100)	(0.097)	(0.021)	(0.020)	(0.021)	(0.031)
Interacted linear polynomial in distance to Potosí							
Mita	−0.307***	−0.280***	−0.227**	0.051**	0.048**	0.043*	0.076***
	(0.092)	(0.094)	(0.095)	(0.022)	(0.021)	(0.022)	(0.029)
Interacted quadratic polynomial in distance to Potosí							
Mita	−0.264***	−0.177*	−0.285**	0.033	0.027	0.039*	0.036
	(0.087)	(0.096)	(0.111)	(0.024)	(0.023)	(0.023)	(0.024)

(*Continues*)

TABLE III—*Continued*

	Dependent Variable						
	Log Equiv. Household Consumption (2001)			Stunted Growth, Children 6–9 (2005)			
Sample Within:	<100 km of Bound. (1)	<75 km of Bound. (2)	<50 km of Bound. (3)	<100 km of Bound. (4)	<75 km of Bound. (5)	<50 km of Bound. (6)	Border District (7)
Alternative Functional Forms for RD Polynomial: Baseline III							
Linear polynomial in distance to *mita* boundary							
Mita	−0.299***	−0.227**	−0.223**	0.072***	0.060***	0.058**	0.056*
	(0.082)	(0.089)	(0.091)	(0.024)	(0.022)	(0.023)	(0.032)
Quadratic polynomial in distance to *mita* boundary							
Mita	−0.277***	−0.227**	−0.224**	0.072***	0.060***	0.061***	0.056*
	(0.078)	(0.089)	(0.092)	(0.023)	(0.022)	(0.023)	(0.030)
Quartic polynomial in distance to *mita* boundary							
Mita	−0.251***	−0.229**	−0.246***	0.073***	0.064***	0.063***	0.055*
	(0.078)	(0.089)	(0.088)	(0.023)	(0.022)	(0.023)	(0.030)
Interacted linear polynomial in distance to *mita* boundary							
Mita	−0.301*	−0.277	−0.385*	0.082	0.087	0.095	0.132**
	(0.174)	(0.190)	(0.210)	(0.054)	(0.055)	(0.065)	(0.053)
Interacted quadratic polynomial in distance to *mita* boundary							
Mita	−0.351	−0.505	−0.295	0.140*	0.132	0.136	0.121*
	(0.260)	(0.319)	(0.366)	(0.082)	(0.084)	(0.086)	(0.064)
Ordinary Least Squares							
Mita	−0.294***	−0.288***	−0.227**	0.057**	0.048*	0.049*	0.055*
	(0.083)	(0.089)	(0.090)	(0.025)	(0.024)	(0.026)	(0.031)
Geo. controls	yes	yes	yes	yes	yes	yes	yes
Boundary F.E.s	yes	yes	yes	yes	yes	yes	yes
Clusters	71	60	52	289	239	185	63
Observations	1478	1161	1013	158,848	115,761	100,446	37,421

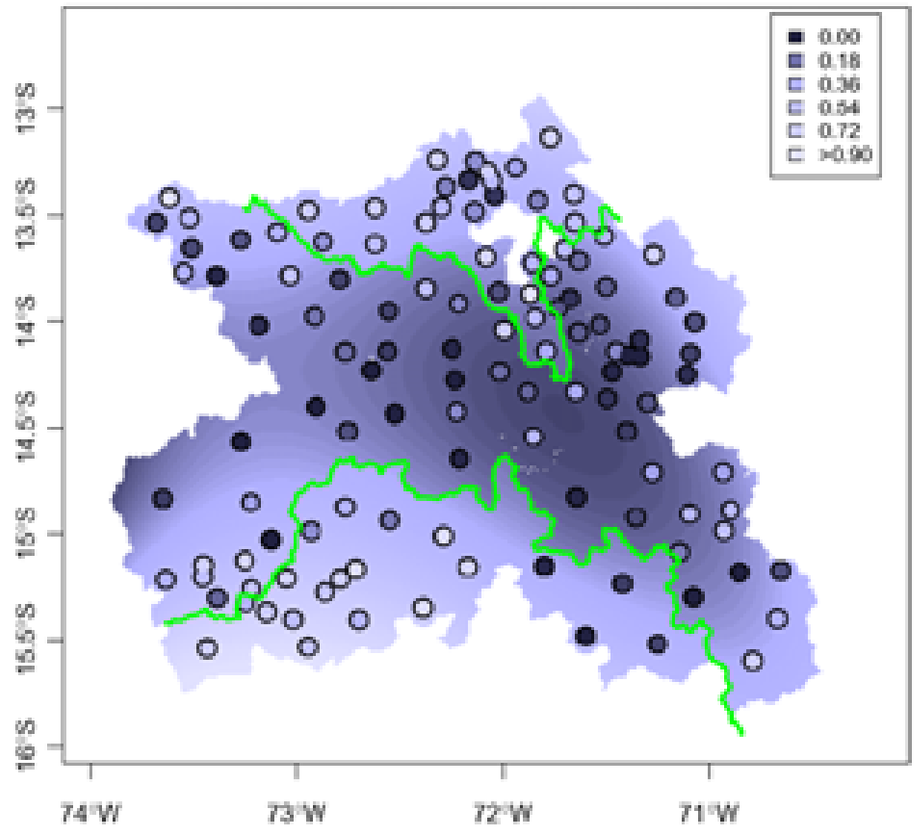
[a]Robust standard errors, adjusted for clustering by district, are in parentheses. All regressions include geographic controls and boundary segment fixed effects (F.E.s). Columns 1–3 include demographic controls for the number of infants, children, and adults in the household. Coefficients significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

TABLE II

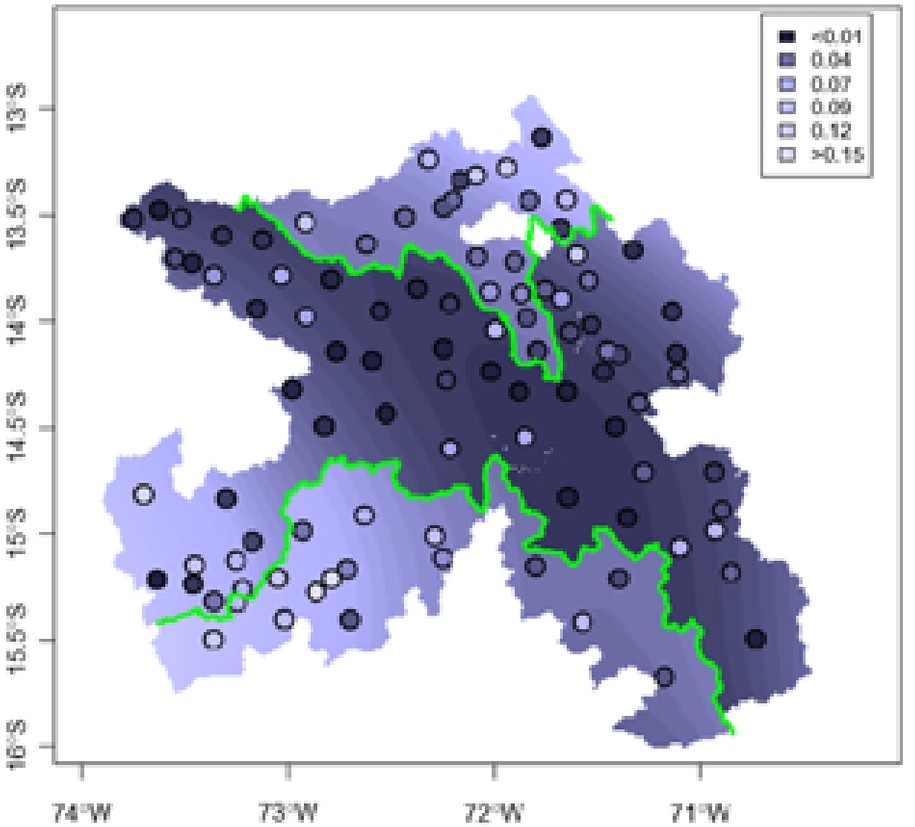
LIVING STANDARDS[a]

	Dependent Variable						
	Log Equiv. Household Consumption (2001)			Stunted Growth, Children 6–9 (2005)			
Sample Within:	<100 km of Bound. (1)	<75 km of Bound. (2)	<50 km of Bound. (3)	<100 km of Bound. (4)	<75 km of Bound. (5)	<50 km of Bound. (6)	Border District (7)
			Panel A. Cubic Polynomial in Latitude and Longitude				
Mita	−0.284	−0.216	−0.331	0.070	0.084*	0.087*	0.114**
	(0.198)	(0.207)	(0.219)	(0.043)	(0.046)	(0.048)	(0.049)
R^2	0.060	0.060	0.069	0.051	0.020	0.017	0.050
			Panel B. Cubic Polynomial in Distance to Potosí				
Mita	−0.337***	−0.307***	−0.329***	0.080***	0.078***	0.078***	0.063*
	(0.087)	(0.101)	(0.096)	(0.021)	(0.022)	(0.024)	(0.032)
R^2	0.046	0.036	0.047	0.049	0.017	0.013	0.047
			Panel C. Cubic Polynomial in Distance to *Mita* Boundary				
Mita	−0.277***	−0.230**	−0.224**	0.073***	0.061***	0.064***	0.055*
	(0.078)	(0.089)	(0.092)	(0.023)	(0.022)	(0.023)	(0.030)
R^2	0.044	0.042	0.040	0.040	0.015	0.013	0.043
Geo. controls	yes	yes	yes	yes	yes	yes	yes
Boundary F.E.s	yes	yes	yes	yes	yes	yes	yes
Clusters	71	60	52	289	239	185	63
Observations	1478	1161	1013	158,848	115,761	100,446	37,421

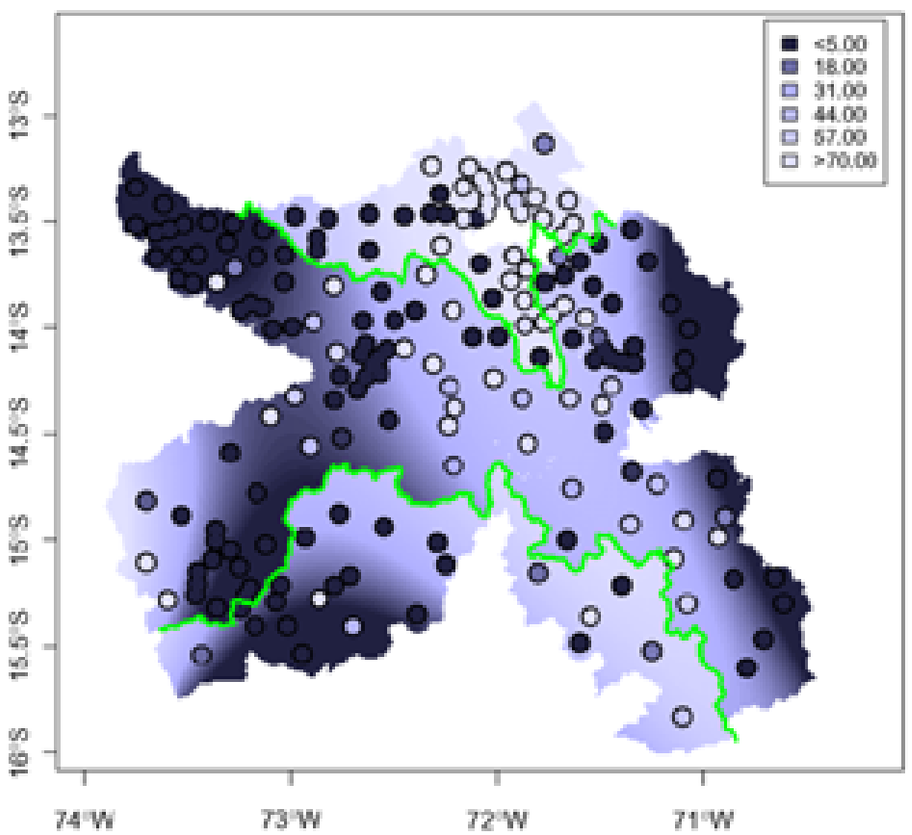
[a]The unit of observation is the household in columns 1–3 and the individual in columns 4–7. Robust standard errors, adjusted for clustering by district, are in parentheses. The dependent variable is log equivalent household consumption (ENAHO (2001)) in columns 1–3, and a dummy equal to 1 if the child has stunted growth and equal to 0 otherwise in columns 4–7 (Ministro de Educación (2005a)). *Mita* is an indicator equal to 1 if the household's district contributed to the *mita* and equal to 0 otherwise (Saignes (1984), Amat y Juniet (1947, pp. 249, 284)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include controls for elevation and slope, as well as boundary segment fixed effects (F.E.s). Columns 1–3 include demographic controls for the number of infants, children, and adults in the household. In columns 1 and 4, the sample includes observations whose district capitals are located within 100 km of the *mita* boundary, and this threshold is reduced to 75 and 50 km in the succeeding columns. Column 7 includes only observations whose districts border the *mita* boundary. 78% of the observations are in *mita* districts in column 1, 71% in column 2, 68% in column 3, 78% in column 4, 71% in column 5, 68% in column 6, and 58% in column 7. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.



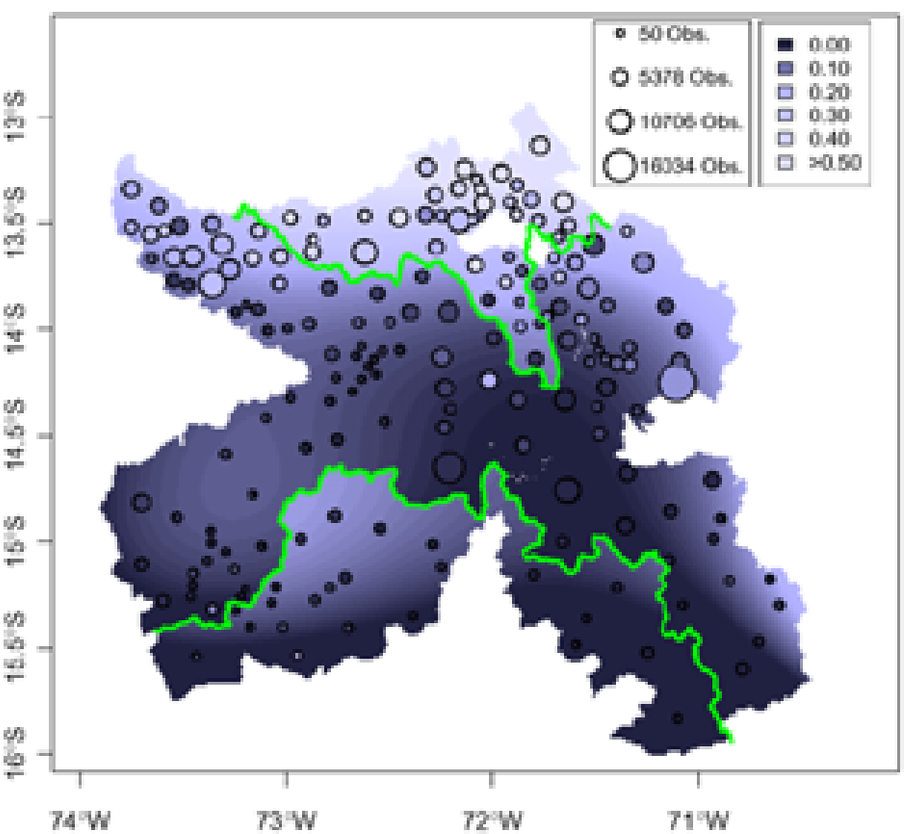
(e) *Haciendas* (1940)



(f) Education (1876)



(g) Road Density (2006)



(h) Ag. Market Participation (1994)

TABLE VI

LAND TENURE AND LABOR SYSTEMS[a]

	Dependent Variable				
	Haciendas per District in 1689 (1)	*Haciendas* per 1000 District Residents in 1689 (2)	Percent of Rural Tributary Population in *Haciendas* in ca. 1845 (3)	Percent of Rural Population in *Haciendas* in 1940 (4)	Land Gini in 1994 (5)
	Panel A. Cubic Polynomial in Latitude and Longitude				
Mita	−12.683***	−6.453**	−0.127*	−0.066	0.078
	(3.221)	(2.490)	(0.067)	(0.086)	(0.053)
R^2	0.538	0.582	0.410	0.421	0.245
	Panel B. Cubic Polynomial in Distance to Potosí				
Mita	−10.316***	−7.570***	−0.204**	−0.143***	0.107***
	(2.057)	(1.478)	(0.082)	(0.051)	(0.036)
R^2	0.494	0.514	0.308	0.346	0.194
	Panel C. Cubic Polynomial in Distance to *Mita* Boundary				
Mita	−11.336***	−8.516***	−0.212***	−0.120***	0.124***
	(2.074)	(1.665)	(0.060)	(0.045)	(0.033)
R^2	0.494	0.497	0.316	0.336	0.226
Geo. controls	yes	yes	yes	yes	yes
Boundary F.E.s	yes	yes	yes	yes	yes
Mean dep. var.	6.500	5.336	0.135	0.263	0.783
Observations	74	74	81	119	181

[a]The unit of observation is the district. Robust standard errors are in parentheses. The dependent variable in column 1 is *haciendas* per district in 1689 and in column 2 is *haciendas* per 1000 district residents in 1689 (Villanueva Urteaga (1982)). In column 3 it is the percentage of the district's tributary population residing in *haciendas* ca. 1845 (Peralta Ruiz (1991)), in column 4 it is the percentage of the district's rural population residing in *haciendas* in 1940 (Dirección de Estadística del Perú (1944)), and in column 5 it is the district land gini (INEI (1994)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. Column 3 is weighted by the square root of the district's rural tributary population and column 4 is weighted by the square root of the district's rural population. 58% of the observations are in *mita* districts in columns 1 and 2, 59% in column 3, 62% in column 4, and 66% in column 5. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

TABLE VII

EDUCATION[a]

	Dependent Variable		
	Literacy 1876 (1)	Mean Years of Schooling 1940 (2)	Mean Years of Schooling 2001 (3)
Panel A. Cubic Polynomial in Latitude and Longitude			
Mita	−0.015	−0.265	−1.479*
	(0.012)	(0.177)	(0.872)
R^2	0.401	0.280	0.020
Panel B. Cubic Polynomial in Distance to Potosí			
Mita	−0.020***	−0.181**	−0.341
	(0.007)	(0.078)	(0.451)
R^2	0.345	0.187	0.007
Panel C. Cubic Polynomial in Distance to *Mita* Boundary			
Mita	−0.022***	−0.209***	−0.111
	(0.006)	(0.076)	(0.429)
R^2	0.301	0.234	0.004
Geo. controls	yes	yes	yes
Boundary F.E.s	yes	yes	yes
Mean dep. var.	0.036	0.470	4.457
Clusters	95	118	52
Observations	95	118	4038

[a]The unit of observation is the district in columns 1 and 2 and the individual in column 3. Robust standard errors, adjusted for clustering by district, are in parentheses. The dependent variable is mean literacy in 1876 in column 1 (Dirección de Estadística del Perú (1878)), mean years of schooling in 1940 in column 2 (Dirección de Estadística del Perú (1944)), and individual years of schooling in 2001 in column 3 (ENAHO (2001)). Panel A includes a cubic polynomial in the latitude and longitude of the observation's district capital, panel B includes a cubic polynomial in Euclidean distance from the observation's district capital to Potosí, and panel C includes a cubic polynomial in Euclidean distance to the nearest point on the *mita* boundary. All regressions include geographic controls and boundary segment fixed effects. The samples include districts whose capitals are less than 50 km from the *mita* boundary. Columns 1 and 2 are weighted by the square root of the district's population. 64% of the observations are in *mita* districts in column 1, 63% in column 2, and 67% in column 3. Coefficients that are significantly different from zero are denoted by the following system: *10%, **5%, and ***1%.

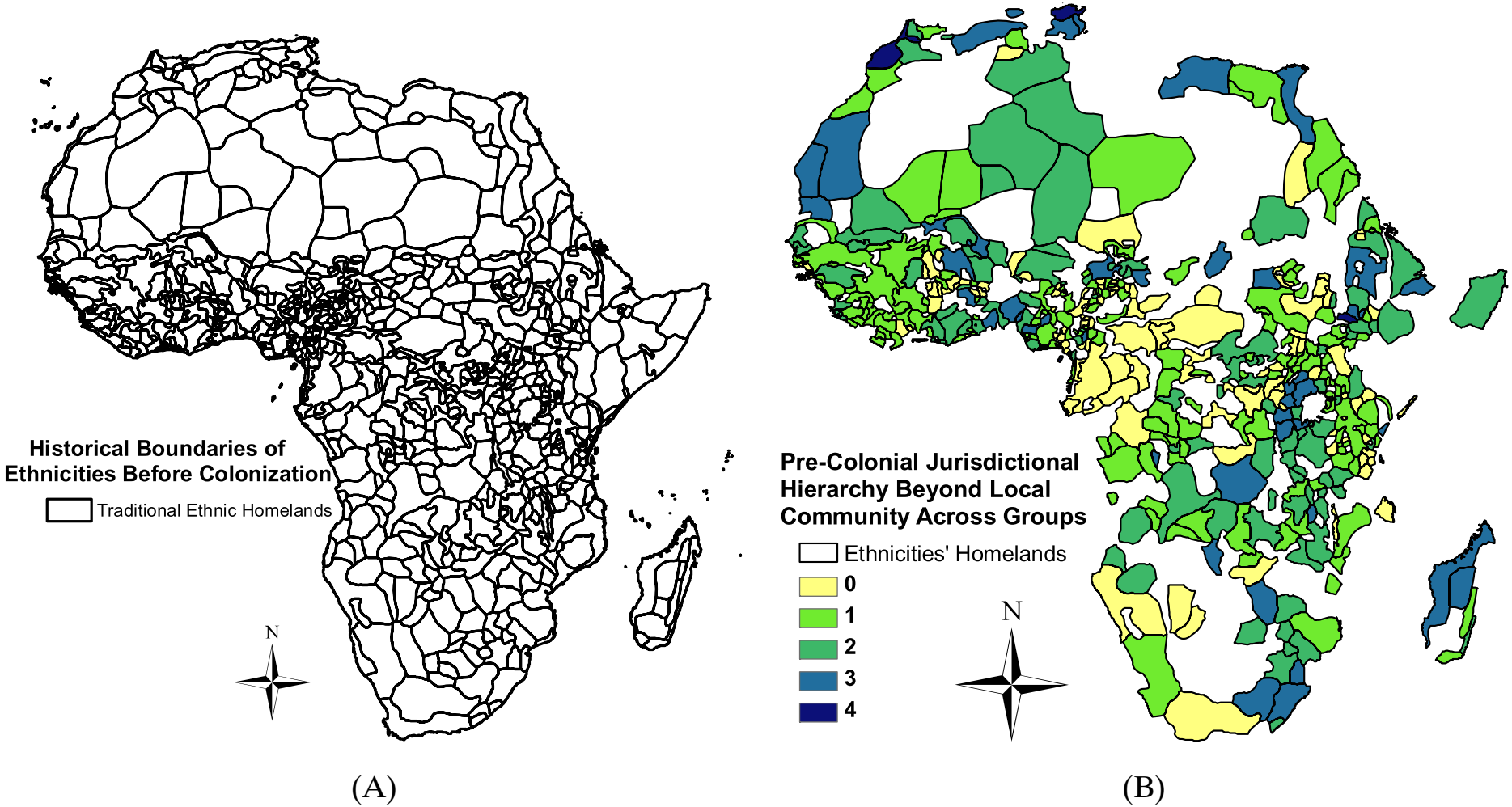


FIGURE 1.—(A) Ethnic boundaries. (B) Ethnic pre-colonial institutions.

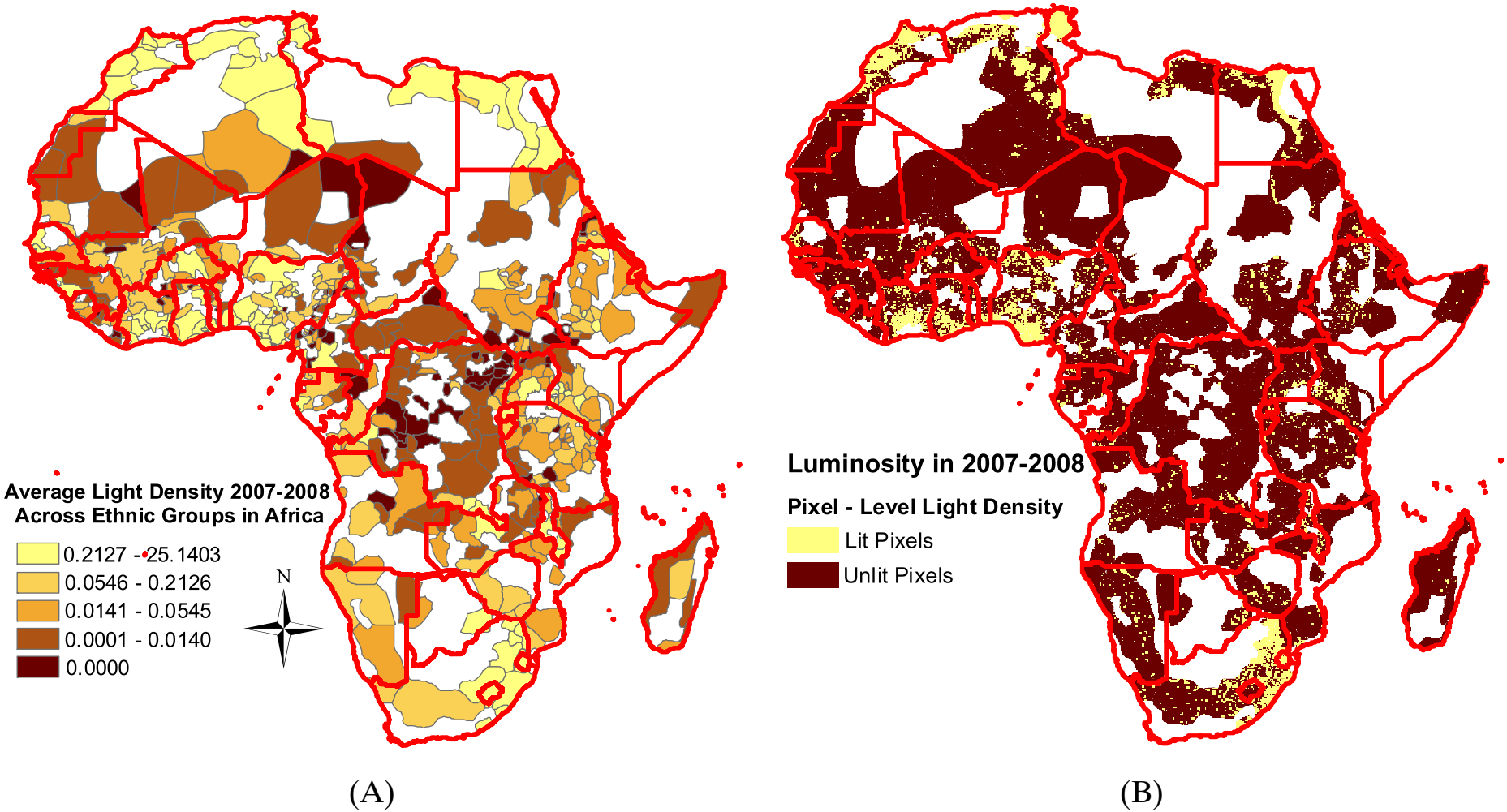


FIGURE 3.—(A) Luminosity at the ethnic homeland. (B) Pixel-level luminosity.

TABLE I

SUMMARY STATISTICS[a]

Variable	Obs.	Mean	St. Dev.	p25	Median	p75	Min	Max
Panel A: All Observations								
Light Density	683	0.368	1.528	0.000	0.022	0.150	0.000	25.140
ln(0.01 + Light Density)	683	−2.946	1.701	−4.575	−3.429	−1.835	−4.605	3.225
Pixel-Level Light Density	66,570	0.560	3.422	0.000	0.000	0.000	0.000	62.978
Lit Pixel	66,570	0.167	0.373	0.000	0.000	0.000	0.000	1.000
Panel B: Stateless Ethnicities								
Light Density	176	0.257	1.914	0.000	0.018	0.082	0.000	25.140
ln(0.01 + Light Density)	176	−3.231	1.433	−4.605	−3.585	−2.381	−4.605	3.225
Pixel-Level Light Density	13,174	0.172	1.556	0.000	0.000	0.000	0.000	55.634
Lit Pixel	13,174	0.100	0.301	0.000	0.000	0.000	0.000	1.000
Panel C: Petty Chiefdoms								
Light Density	264	0.281	1.180	0.000	0.015	0.089	0.000	13.086
ln(0.01 + Light Density)	264	−3.187	1.592	−4.605	−3.684	−2.313	−4.605	2.572
Pixel-Level Light Density	20,259	0.283	2.084	0.000	0.000	0.000	0.000	60.022
Lit Pixel	20,259	0.129	0.335	0.000	0.000	0.000	0.000	1.000
Panel D: Paramount Chiefdoms								
Light Density	167	0.315	0.955	0.002	0.039	0.203	0.000	9.976
ln(0.01 + Light Density)	167	−2.748	1.697	−4.425	−3.017	−1.544	−4.605	2.301
Pixel-Level Light Density	20,972	0.388	2.201	0.000	0.000	0.000	0.000	58.546
Lit Pixel	20,972	0.169	0.375	0.000	0.000	0.000	0.000	1.000
Panel E: Pre-Colonial States								
Light Density	76	1.046	2.293	0.012	0.132	0.851	0.000	14.142
ln(0.01 + Light Density)	76	−1.886	2.155	−3.836	−1.976	−0.150	−4.605	2.650
Pixel-Level Light Density	12,165	1.739	6.644	0.000	0.000	0.160	0.000	62.978
Lit Pixel	12,165	0.302	0.459	0.000	0.000	1.000	0.000	1.000

[a]The table reports descriptive statistics for the luminosity data that we use to proxy economic development at the country-ethnic homeland level and at the pixel level. Panel A gives summary statistics for the full sample. Panel B reports summary statistics for ethnicities that lacked any form of political organization beyond the local level at the time of colonization. Panel C reports summary statistics for ethnicities organized in petty chiefdoms. Panel D reports summary statistics for ethnicities organized in large paramount chiefdoms. Panel E reports summary statistics for ethnicities organized in large centralized states. The classification follows Murdock (1967). The Data Appendix in the Supplemental Material (Michalopoulos and Papaioannou (2013)) gives detailed variable definitions and data sources.

TABLE II

PRE-COLONIAL ETHNIC INSTITUTIONS AND REGIONAL DEVELOPMENT
CROSS-SECTIONAL ESTIMATES[a]

	(1)	(2)	(3)	(4)	(5)	(6)
Jurisdictional Hierarchy	0.4106***	0.3483**	0.3213***	0.1852***	0.1599***	0.1966***
Double-clustered s.e.	(0.1246)	(0.1397)	(0.1026)	(0.0676)	(0.0605)	(0.0539)
Conley's s.e.	[0.1294]	[0.1288]	[0.1014]	[0.0646]	[0.0599]	[0.0545]
Rule of Law (in 2007)					0.4809**	
Double-clustered s.e.					(0.2213)	
Conley's s.e.					[0.1747]	
Log GDP p.c. (in 2007)						0.5522***
Double-clustered s.e.						(0.1232)
Conley's s.e.						[0.1021]
Adjusted R-squared	0.056	0.246	0.361	0.47	0.488	0.536
Population Density	No	Yes	Yes	Yes	Yes	Yes
Location Controls	No	No	Yes	Yes	Yes	Yes
Geographic Controls	No	No	No	Yes	Yes	Yes
Observations	683	683	683	683	680	680

[a]Table II reports OLS estimates associating regional development with pre-colonial ethnic institutions, as reflected in Murdock's (1967) index of jurisdictional hierarchy beyond the local community. The dependent variable is log(0.01 + light density at night from satellite) at the ethnicity–country level. In column (5) we control for national institutions, augmenting the specification with the rule of law index (in 2007). In column (6) we control for the overall level of economic development, augmenting the specification with the log of per capita GDP (in 2007). In columns (2)–(6) we control for log(0.01 + population density). In columns (3)–(6) we control for location, augmenting the specification with distance of the centroid of each ethnicity–country area from the respective capital city, distance from the closest sea coast, and distance from the national border. The set of geographic controls in columns (4)–(6) includes log(1 + area under water(lakes, rivers, and other streams)), log(surface area), land suitability for agriculture, elevation, a malaria stability index, a diamond mine indicator, and an oil field indicator.

The Data Appendix in the Supplemental Material gives detailed variable definitions and data sources. Below the estimates, we report in parentheses double-clustered standard errors at the country and ethnolinguistic family dimensions. We also report in brackets Conley's (1999) standard errors that account for two-dimensional spatial autocorrelation. ***, **, and * indicate statistical significance, with the most conservative standard errors at the 1%, 5%, and 10% level, respectively.

TABLE III

PRE-COLONIAL ETHNIC INSTITUTIONS AND REGIONAL DEVELOPMENT WITHIN AFRICAN COUNTRIES[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Pre-Colonial Ethnic Institutions and Regional Development Within African Countries												
All Observations												
Jurisdictional Hierarchy	0.3260***	0.2794***	0.2105***	0.1766***								
	(0.0851)	(0.0852)	(0.0553)	(0.0501)								
Binary Political Centralization					0.5264***	0.5049***	0.3413***	0.3086***				
					(0.1489)	(0.1573)	(0.0896)	(0.0972)				
Petty Chiefdoms									0.1538	0.1442	0.1815	0.1361
									(0.2105)	(0.1736)	(0.1540)	(0.1216)
Paramount Chiefdoms									0.4258*	0.4914*	0.3700**	0.3384**
									(0.2428)	(0.2537)	(0.1625)	(0.1610)
Pre-Colonial States									1.1443***	0.8637***	0.6809***	0.5410***
									(0.2757)	(0.2441)	(0.1638)	(0.1484)
Adjusted R-squared	0.409	0.540	0.400	0.537	0.597	0.661	0.593	0.659	0.413	0.541	0.597	0.661
Observations	682	682	682	682	682	682	682	682	682	682	682	682
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Geographic Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Population Density	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

(*Continues*)

TABLE III—*Continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel B: Pre-Colonial Ethnic Institutions and Regional Development Within African Countries Focusing on the Intensive Margin of Luminosity												
Jurisdictional Hierarchy	0.3279***	0.3349***	0.1651**	0.1493**								
	(0.1238)	(0.1118)	(0.0703)	(0.0728)								
Binary Political Centralization					0.4819**	0.6594***	0.2649**	0.2949**				
					(0.2381)	(0.2085)	(0.1232)	(0.1391)				
Petty Chiefdoms									0.1065	0.1048	0.0987	0.0135
									(0.2789)	(0.2358)	(0.1787)	(0.1725)
Paramount Chiefdoms									0.2816	0.6253*	0.2255	0.2374
									(0.3683)	(0.3367)	(0.2258)	(0.2388)
Pre-Colonial States									1.2393***	0.9617***	0.5972***	0.4660**
									(0.3382)	(0.3209)	(0.2207)	(0.2198)
Adjusted R-squared	0.424	0.562	0.416	0.562	0.638	0.671	0.636	0.671	0.431	0.564	0.639	0.672
Observations	517	517	517	517	517	517	517	517	517	517	517	517
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Geographic Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Population Density	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes

[a]Table III reports within-country OLS estimates associating regional development with pre-colonial ethnic institutions. In Panel A the dependent variable is the log(0.01 + light density at night from satellite) at the ethnicity-country level. In Panel B the dependent variable is the log(light density at night from satellite) at the ethnicity-country level; as such we exclude areas with zero luminosity. In columns (1)–(4) we measure pre-colonial ethnic institutions using Murdock's (1967) jurisdictional hierarchy beyond the local community index. In columns (5)–(8) we use a binary political centralization index that is based on Murdock's (1967) jurisdictional hierarchy beyond the local community variable. Following Gennaioli and Rainer (2007), this index takes on the value of zero for stateless societies and ethnic groups that were part of petty chiefdoms and 1 otherwise (for ethnicities that were organized as paramount chiefdoms and ethnicities that were part of large states). In columns (9)–(12) we augment the specification with three dummy variables that identify petty chiefdoms, paramount chiefdoms, and large states. The omitted category consists of stateless ethnic groups before colonization. All specifications include a set of country fixed effects (constants not reported).

In even-numbered columns we control for location and geography. The set of control variables includes the distance of the centroid of each ethnicity-country area from the respective capital city, the distance from the sea coast, the distance from the national border, log(1 + area under water (lakes, rivers, and other streams)), log(surface area), land suitability for agriculture, elevation, a malaria stability index, a diamond mine indicator, and an oil field indicator. The Data Appendix in the Supplemental Material gives detailed variable definitions and data sources. Below the estimates, we report in parentheses double-clustered standard errors at the country and the ethnolinguistic family dimensions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE IV

EXAMINING THE ROLE OF OTHER PRE-COLONIAL ETHNIC FEATURES[a]

	Specification *A*		Specification *B*		
	Additional Variable	Obs.	Additional Variable	Jurisdictional Hierarchy	Obs.
	(1)	(2)	(3)	(4)	(5)
Gathering	−0.1034	682	−0.0771	0.2082***	682
	(0.1892)		(0.1842)	(0.0550)	
Hunting	−0.0436	682	−0.0167	0.2099***	682
	(0.1316)		(0.1236)	(0.0562)	
Fishing	0.2414*	682	0.2359*	0.2087***	682
	(0.1271)		(0.1267)	(0.0551)	
Animal Husbandry	0.0549	682	0.0351	0.2008***	682
	(0.0407)		(0.0432)	(0.0617)	
Milking	0.1888	680	0.0872	0.2016***	680
	(0.1463)		(0.1443)	(0.0581)	
Agriculture Dependence	−0.1050**	682	−0.1032**	0.2078***	682
	(0.0468)		(0.0454)	(0.0558)	
Agriculture Type	0.0128	680	−0.0131	0.2092***	680
	(0.1043)		(0.1021)	(0.0549)	
Polygyny	0.0967	677	0.0796	0.2140***	677
	(0.1253)		(0.1288)	(0.0561)	
Polygyny Alternative	−0.0276	682	0.0070	0.2106***	682
	(0.1560)		(0.1479)	(0.0543)	
Clan Communities	−0.1053	567	−0.0079	0.2158***	567
	(0.1439)		(0.1401)	(0.0536)	
Settlement Pattern	−0.0054	679	−0.0057	0.2103***	679
	(0.0361)		(0.0377)	(0.0571)	
Complex Settlements	0.2561	679	0.2154	0.1991***	679
	(0.1604)		(0.1606)	(0.0553)	
Hierarchy of Local Community	0.0224	680	−0.0009	0.2085***	680
	(0.0822)		(0.0867)	(0.0565)	
Patrilineal Descent	−0.1968	671	−0.2011	0.1932***	671
	(0.1329)		(0.1307)	(0.0499)	
Class Stratification	0.1295**	570	0.0672	0.1556**	570
	(0.0526)		(0.0580)	(0.0696)	
Class Stratification Indicator	0.4141**	570	0.2757	0.1441**	570
	(0.1863)		(0.1896)	(0.0562)	
Elections	0.3210	500	0.2764	0.2217***	500
	(0.2682)		(0.2577)	(0.0581)	

(*Continues*)

TABLE IV—*Continued*

	Specification *A*		Specification *B*		
	Additional Variable	Obs.	Additional Variable	Jurisdictional Hierarchy	Obs.
	(1)	(2)	(3)	(4)	(5)
Slavery	0.0191	610	−0.1192	0.2016***	610
	(0.1487)		(0.1580)	(0.0617)	
Inheritance Rules for Property Rights	−0.1186	529	−0.1788	0.2196***	529
	(0.2127)		(0.2283)	(0.0690)	

[a]Table IV reports within-country OLS estimates associating regional development with pre-colonial ethnic features as reflected in Murdock's (1967) Ethnographic Atlas. The dependent variable is the log(0.01 + light density at night from satellite) at the ethnicity-country level. All specifications include a set of country fixed effects (constants not reported). In all specifications we control for log(0.01 + population density at the ethnicity-country level). In specification *A* (in columns (1)–(2)) we regress log(0.01 + light density) on various ethnic traits from Murdock (1967). In specification *B* (columns (3)–(5)) we regress log(0.01 + light density) on each of Murdock's additional variables and the jurisdictional hierarchy beyond the local community index. The Data Appendix in the Supplemental Material gives detailed variable definitions and data sources. Below the estimates, we report in parentheses double-clustered standard errors at the country and the ethnolinguistic family dimensions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE V

PRE-COLONIAL ETHNIC INSTITUTIONS AND REGIONAL DEVELOPMENT: PIXEL-LEVEL ANALYSIS[a]

	Lit/Unlit Pixels					ln(0.01 + Luminosity)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Jurisdictional Hierarchy Beyond the Local Community Level										
Jurisdictional Hierarchy	0.0673**	0.0447**	0.0280***	0.0308***	0.0265***	0.3619**	0.2362**	0.1528***	0.1757***	0.1559***
Double-clustered s.e.	(0.0314)	(0.0176)	(0.0081)	(0.0074)	(0.0071)	(0.1837)	(0.1035)	(0.0542)	(0.0506)	(0.0483)
Adjusted R-squared	0.034	0.272	0.358	0.375	0.379	0.045	0.320	0.418	0.448	0.456
Panel B: Pre-Colonial Institutional Arrangements										
Petty Chiefdoms	0.0285	0.0373	0.0228	0.0161	0.0125	0.1320	0.1520	0.0796	0.0642	0.0531
Double-clustered s.e.	(0.0255)	(0.0339)	(0.0220)	(0.0175)	(0.0141)	(0.1192)	(0.1832)	(0.1271)	(0.0976)	(0.0837)
Paramount Chiefdoms	0.0685**	0.0773	0.0546*	0.0614**	0.0519***	0.3103**	0.3528	0.2389	0.3054**	0.2802***
Double-clustered s.e.	(0.0334)	(0.0489)	(0.0295)	(0.0266)	(0.0178)	(0.1560)	(0.2472)	(0.1498)	(0.1347)	(0.0964)
Pre-Colonial States	0.2013**	0.1310**	0.0765***	0.0798***	0.0688***	1.0949**	0.6819**	0.4089***	0.4544***	0.3994***
Double-clustered s.e.	(0.0956)	(0.0519)	(0.0240)	(0.0216)	(0.0235)	(0.5488)	(0.2881)	(0.1432)	(0.1430)	(0.1493)
Adjusted R-squared	0.033	0.271	0.357	0.375	0.379	0.046	0.319	0.417	0.448	0.456
Country Fixed Effects	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Population Density	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Controls at the Pixel Level	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Controls at the Ethnic-Country Level	No	No	No	No	Yes	No	No	No	No	Yes
Observations	66,570	66,570	66,570	66,173	66,173	66,570	66,570	66,570	66,173	66,173

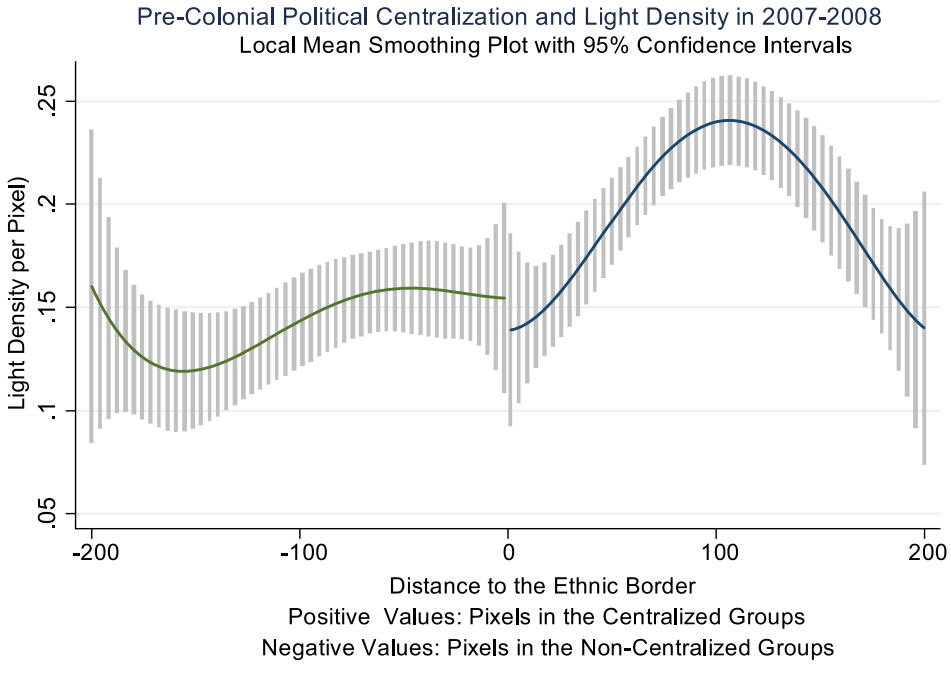
TABLE VII

PRE-COLONIAL ETHNIC INSTITUTIONS AND REGIONAL DEVELOPMENT WITHIN CONTIGUOUS ETHNIC HOMELANDS IN THE SAME COUNTRY[a]

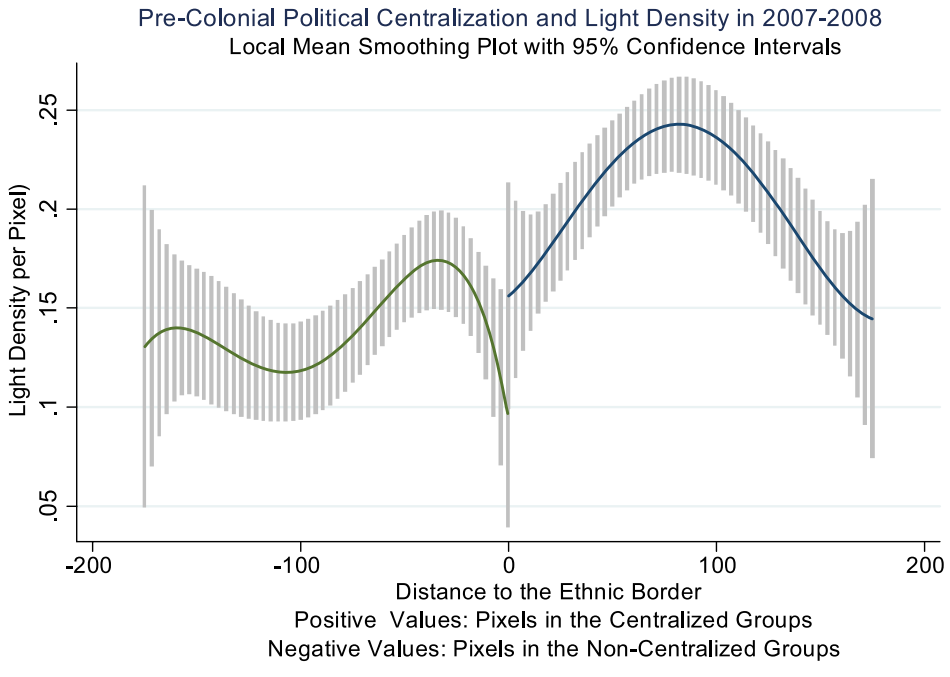
	All Observations			Difference in Jurisdictional Hierarchy Index > |1|			One Ethnic Group was Part of a Pre-Colonial State		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Jurisdictional Hierarchy	0.0253*	0.0152**	0.0137**	0.0280*	0.0170**	0.0151**	0.0419**	0.0242**	0.0178***
Double-clustered s.e.	(0.0134)	(0.0073)	(0.0065)	(0.0159)	(0.0079)	(0.0072)	(0.0213)	(0.0096)	(0.0069)
Adjusted R-squared	0.329	0.391	0.399	0.338	0.416	0.423	0.424	0.501	0.512
Observations	78,139	78,139	77,833	34,180	34,180	34,030	16,570	16,570	16,474
Adjacent-Ethnic-Groups Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population Density	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Controls at the Pixel Level	No	No	Yes	No	No	Yes	No	No	Yes

[a]Table VII reports adjacent-ethnicity (ethnic-pair-country) fixed effects OLS estimates associating regional development, as reflected in satellite light density at night with pre-colonial ethnic institutions, as reflected in Murdock's (1967) jurisdictional hierarchy beyond the local community index within pairs of adjacent ethnicities with a different degree of political centralization in the same country. The unit of analysis is a pixel of 0.125×0.125 decimal degrees (around 12×12 kilometers). Every pixel falls into the historical homeland of ethnicity i in country c that is adjacent to the homeland of another ethnicity j in country c, where the two ethnicities differ in the degree of political centralization. The dependent variable is a dummy variable that takes on the value of 1 if the pixel is lit and zero otherwise.

In columns (4)–(6) we restrict estimation to adjacent ethnic groups with large differences in the 0–4 jurisdictional hierarchy beyond the local level index (greater than one point). In columns (7)–(9) we restrict estimation to adjacent ethnic groups in the same country where one of the two ethnicities was part of a large state before colonization (in this case the jurisdictional hierarchy beyond the local level index equals 3 or 4). In columns (2), (3), (5), (6), (8), and (9) we control for ln(pixel population density). In columns (3), (6), and (9) we control for a set of geographic and location variables at the pixel level. The set of controls includes the distance of the centroid of each pixel from the respective capital, its distance from the sea coast, its distance from the national border, an indicator for pixels that have water (lakes, rivers, and other streams), an indicator for pixels with diamond mines, an indicator for pixels with oil fields, the pixel's land suitability for agriculture, pixel's mean elevation, pixel's average value of a malaria stability index, and the log of the pixel's area. Below the estimates, we report in parentheses double-clustered standard errors at the country and the ethnolinguistic family dimensions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.



(A)



(B)

FIGURE 5.—(A) Border thickness: 0 km. (B) Border thickness: 25 km.

TABLE VIII

PRE-COLONIAL ETHNIC INSTITUTIONS AND REGIONAL DEVELOPMENT WITHIN ADJACENT ETHNIC HOMELANDS IN THE SAME COUNTRY: CLOSE TO THE ETHNIC BORDER[a]

	All Observations Adjacent Ethnicities in the Same Country			Difference in Jurisdictional Hierarchy Index > |1|			One Ethnic Group Was Part of a Pre-Colonial State		
	< 100 km of ethnic border	< 150 km of ethnic border	< 200 km of ethnic border	< 100 km of ethnic border	< 150 km of ethnic border	< 200 km of ethnic border	< 100 km of ethnic border	< 150 km of ethnic border	< 200 km of ethnic border
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Pre-Colonial Ethnic Institutions and Regional Development Within Contiguous Ethnic Homelands in the Same Country									
Pixel-Level Analysis in Areas Close to the Ethnic Border									
Panel 1: Border Thickness—Total 50 km (25 km from each side of the ethnic boundary)									
Jurisdictional Hierarchy	0.0194*	0.0230**	0.0231**	0.0269***	0.0285***	0.0280***	0.0240***	0.0297***	0.0300***
Double-clustered s.e.	(0.0102)	(0.0106)	(0.0102)	(0.0092)	(0.0088)	(0.0084)	(0.0090)	(0.0067)	(0.0069)
Adjusted R-squared	0.463	0.439	0.429	0.421	0.430	0.434	0.485	0.500	0.501
Observations	6830	10,451	13,195	3700	5421	6853	2347	3497	4430
Panel 2: Border Thickness—Total 100 km (50 km from each side of the ethnic boundary)									
Jurisdictional Hierarchy	0.0227**	0.0278**	0.0274**	0.0318***	0.0331***	0.0312***	0.0317***	0.0367***	0.0350***
Double-clustered s.e.	(0.0114)	(0.0117)	(0.0108)	(0.0094)	(0.0083)	(0.0076)	(0.0092)	(0.0057)	(0.0068)
Adjusted R-squared	0.467	0.433	0.423	0.458	0.451	0.452	0.525	0.526	0.521
Observations	4460	8081	10,825	2438	4159	5591	1538	2688	3621

(*Continues*)

TABLE VI

PRE-COLONIAL ETHNIC INSTITUTIONS AND GEOGRAPHIC CHARACTERISTICS WITHIN CONTIGUOUS ETHNIC HOMELANDS IN THE SAME COUNTRY[a]

	Dependent variable is:								
	Diamond Indicator	Oil Indicator	Water Indicator	Distance to the Capital	Distance to the Sea	Distance to the Border	Malaria Stability	Land Suitability	Mean Elevation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Jurisdictional Hierarchy	0.0011	0.0063	−0.0058	−9.1375	9.4628	−3.7848	−0.001	−0.0059	21.3826
Double-clustered s.e.	(0.0008)	(0.0051)	(0.0077)	(20.1494)	(6.3349)	(10.0488)	(0.0181)	(0.0060)	(19.5522)
Adjusted R-squared	0.508	0.019	0.126	0.915	0.944	0.660	0.629	0.835	0.767
Mean of Dependent Variable	0.004	0.036	0.125	521.899	643.984	157.596	0.754	0.377	743.446
Observations	78,139	78,139	78,139	78,139	78,139	78,139	77,985	77,983	78,139
Adjacent-Ethnic-Groups Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[a]Table VI reports OLS estimates associating various geographical, ecological, and other characteristics with pre-colonial ethnic institutions within pairs of adjacent ethnicities. The unit of analysis is a pixel of 0.125×0.125 decimal degrees (around 12×12 kilometers). Every pixel falls into the historical homeland of ethnicity i in country c that is adjacent to the homeland of another ethnicity j in country c, where the two ethnicities differ in the degree of political centralization.

The dependent variable in column (1) is a binary index that takes on the value of 1 if there is a diamond mine in the pixel; in column (2) a binary index that takes on the value of 1 if an oil/petroleum field is in the pixel; in column (3) a binary index that takes on the value of 1 if a water body falls in the pixel. In columns (4)–(6) the dependent variable is the distance of each pixel from the capital city, the sea coast, and the national border, respectively. In column (7) the dependent variable is the average value of a malaria stability index; in column (8) the dependent variable is land's suitability for agriculture; in column (9) the dependent variable is elevation. The Data Appendix in the Supplemental Material gives detailed variable definitions and data sources. Below the estimates, we report in parentheses double-clustered standard errors at the country and the ethnolinguistic family dimensions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.