"Supplementary Materials"

Precolonial Legacies and Institutional Congruence in Public Goods Delivery: Evidence from Decentralized West Africa

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1. Coding of Pre-Colonial States

Discussion: Inclusion/Exclusion Criteria

This project measures statehood at fifty year intervals from 1500-1880 as the fulfillment of four criteria, the first two of which follow North et al.'s definition of a natural state[1]:

1) a limited organizational form, notably an elite tied together through personal relations and a political hierarchy built around patron-client relationships. Political rule in the Djoloff, in central Senegal, for example, was assured by a well-defined set of elites elected out of provinces, who together formed an advisory council to the King, while maintaining clients within their provinces;[2]
2) a system for taxing trade. Many of West Africa's states profited off of the slave trade, taxing caravans as well as European traders (e.g. Gomez on Boundou).[3]

The last two criteria are those identified by Hawthorne as features of Africa's precolonial states:[4]

3) regularized tribute systems from clients. In West Africa, tributes often a yearly tribute and took specific forms in each state, such as a payment for the right to farm land which, though administered locally, was claimed by the royal court in Boundou.[5] In Saloum, the Buur (king) received the following: each village farmed a field for the royal household, with one animal per herd and one-tenth of the millet crop going to the Buur as well. The royal family had a monopoly on the area's lucrative salt works, customs officials collected trade taxes and criminal activities required offenders to pay indemnities that supported local judges and the Buur;[6] and
4) some form of local representation to regulate social and economic life. This often took the form of direct appointments from the royal court or, more commonly, a system whereby a local chief or religious figure was delegated to enforce the king's orders and laws.

The Sahelian West African state system formed in the wake of the collapse of the Malian Empire in the 1300s. Naturally, some states were stronger than others and in the half-millennium preceding French colonization the fates of states waxed and waned. The sub-region of Senegambia formed a relatively cohesive historical entity, bordered on the west by the Atlantic, the north by the sharp cultural and livelihood differences between the populations south of the Senegal River and the Maure and Berber pastoralists to the north, and the east by

[1] North, Wallis, and Weingast 2009, 5-9.
[2] Monteil 1966, 603-4.
[3] Gomez 1992, 64.
[4] Hawthorne 2013, 77.
[5] Clark 1996, 8.

the current boundary of the Senegalese State. The easternmost states that fall within modern-day Senegal, Gajaaga and Boundou were largely oriented to the Senegambian West, while states slightly further to the East, such as Khasso and Kaarta, were more culturally similar and historically oriented to the Mandingue state system in present-day Mali.[7] Large parts of the region had been incorporated in the kingdoms of Ancient Ghana (~300-1200) and Mali (~1200-1400s), but Curtin highlights bottom-up pressures to centralize as well as this historical legacy. States that formed along the Senegal River, for example, were based on fertile floodplains, in close proximity to the Saharan trade and were early adapters of Islam.[8] States were capable of enforcing property rights, adapting to the changing whims of capitalist markets and constructed around central governments with national identities.[9] On the eve of the final French push to conquer Senegal, slightly under half of Senegal's territory was under the control of a centralized political organization.

Details on each precolonial state can be found at http://marthawilfahrt.weebly.com/senegals-precolonial-states.html. A map of Senegal's precolonial political geography, over time, can be seen in Figure A1.

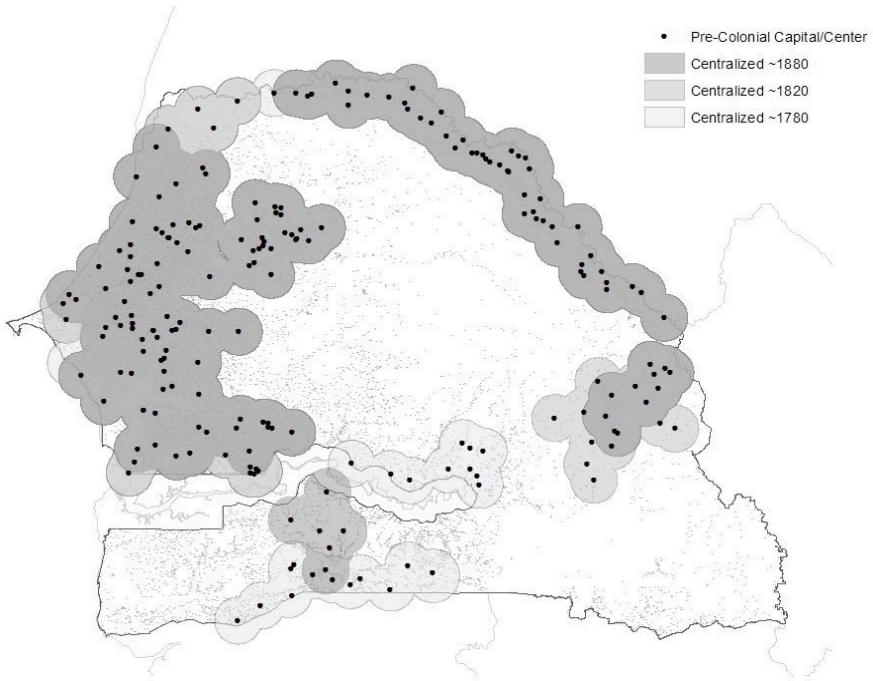
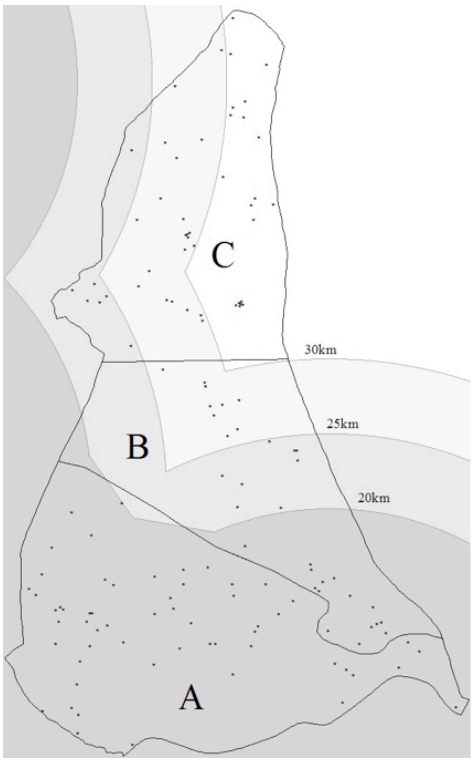


FIGURE A1: Precolonial Capitals and Discount Rate Illustration

[6] Klein 1968, 20.
[7] Curtin 1975, 7.
[8] Curtin 1975, 7-8.
[9] Warner 1999.



20, 25 and 30km centralization buffers and three rural communities (A, B, and C) are shown with their villages.

A: All villages fall within the 20km buffer, hence all villages score a 1 for all three size estimates.

B: At the 20km buffer, only 15 of 32 villages are centralized. All villages score a 0. At the 25km buffer, the majority (71%) of villages are centralized, hence all villages that fall within the 25km buffers receive a score of 1 and all others a 0. At the 30km buffer all villages receive a 1.

C: All villages fall outside of the 20km buffer and hence score a 0. Only 7 villages fall within the 25km buffer, all villages receive a 0. 28 out of 41 villages fall within the 30km buffer, hence these 28 receive a 1 while the remaining 19, never covered by a buffer, receive a 0.

FIGURE A2: Illustration of Congruence Measure

2. A Note on Administrative Boundaries

It is possible that the results are driven by the process of administrative delineation. If local government boundaries were created via a bottom-up, consultative process, such as the case in Mali, then contemporary government performance could be the product of the capacity of some communities to organize and demand their own local government. Interviews in Dakar reveal no clear motivation in how the original administrative divisions took place in the 1970s. The most frequent explanation is simply that the government divided up existing *arrondissements* in a way that made sense to the local subprefect (see Figure A3 for an overlay of these two units).

Arrondissements were created at independence. While early French delimitation of the colonial *canton* sometimes resembled the boundaries of precolonial provinces in areas that had been home to kingdoms, in acephalous areas colonial administrative units often had no geographic or political significance.[10] As the colonial state bureaucratized, the French desire to create uniform administrative divisions resulted in less historically-meaningful administrative divisions throughout the country.[11] At independence, this meant that the average *arrondissement* aggregated parts of slightly over four colonial *cantons* with most *cantons* being split into 2.5 *arrondissements*.[12] These numbers suggest significant rupture from the colonial-era borders as the Socialist post-colonial regime attempted to consolidate power in the rural countryside.

To the extent that the 1972 decentralization reform was designed to meet the central state's political objectives, there is little evidence that local political cleavages generated boundaries delimitation.[13] Rather, the state's strategy was to form an administrative structure wherein each region was divided into three departments, each department into three arrondissements and each *arrondissement* into three local governments. *Arrondissements* themselves were the product of a late colonial bureaucratic desire for uniform administrative divisions while local governments were created according to a 'principle of centrality.'[14] This referred to the government's effort to meet a technical criteria of identifying villages capable of serving as economic poles, such as weekly markets, peasant cooperatives or health centers, for local

[10] Boone 2003, 106

[11] Crowder 1968, 191

[12] For the former, this is 3.91 and 3.58 (centralized and uncentralized areas respectively). Note that these maps were digitized and geo-referenced by the author and likely contain some margin of error.

[13] This was verified in interviews conducted in 2016. One councilor explained that his local government borders, as drawn by the central state in 1976, were the same created by the French. The 1976 reforms did shift the local government seat to a more central location along a main road; the colonial canton seat had been in a historically prominent village that had declined significantly in size. The precolonial canton, he continued, had no clear meaning that he was aware of, though he felt that the boundaries made sense, as the villages it included were "homogenous, solidary" (Interview, Louga Region, 19 February 2016).

[14] Interview, History Professor, Dakar, 25 February 2016. Here, locally influential figures were at times able to divert the pole to their home village, this is particularly true for influential religious figures.

government capitals.[15] How the remainder of the territory was divided, however, was then done to ensure demographic balance and, more ambiguously, 'economic potential.'[16]

More recently, Senegal undertook significant administrative redistricting in 2009. Numerous explanations have been put forward for these changes. The government claimed it was designed to bring the administration closer to the citizenry by creating smaller administrative units, but the general consensus is that the regime of President Wade was acting with a direct eye on the 2009 local elections. In reality, rural communities that were divided had, on average, more villages (73 versus 57) and larger surface areas (124,067 hectares versus 61,673), though political motives were clearly at play as well. Although uncentralized areas were more likely to have an administrative division, with only 10.4% of rural communities in formerly centralized regions having a boundary change as opposed to 20.1% in uncentralized regions (significant at $p < 0.05$), this was driven by political motives of the central state, with little to no reference to local political objectives. Indeed, numerous individuals working in rural areas interviewed for this project noted the sloppiness with which the divisions had been conducted in Dakar. In one community in southeastern Senegal, for example, a village was officially listed as belonging to a neighboring rural community even though it was over ten kilometers from the border. This meant that citizens of the village had to travel to their 'official' local government for all paperwork for over a year as the local administration attempted to remedy the situation.[17]

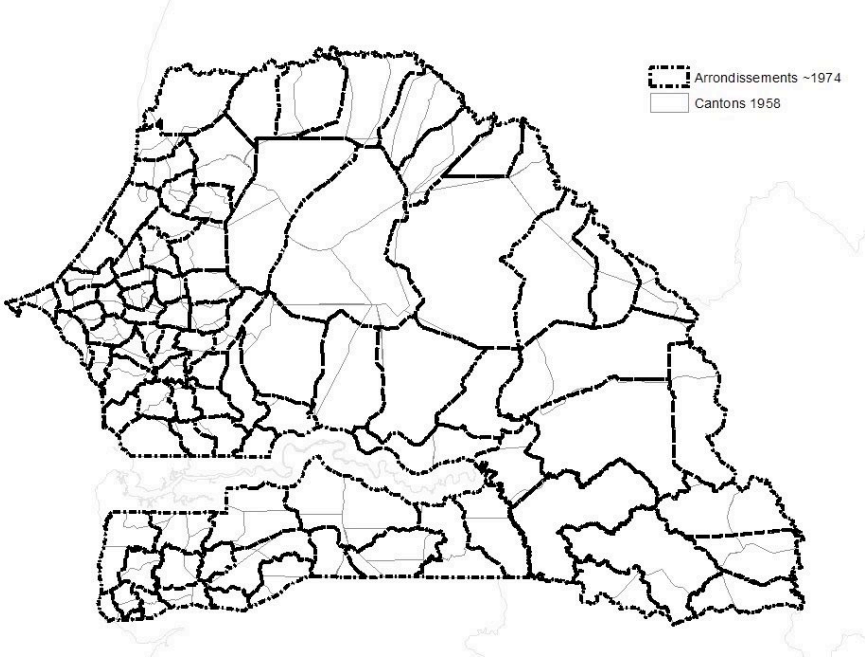


FIGURE A3: Colonial *Cantons* and post-independence *Arrondissements*
Source for 1970s Arrondissements: Atlas National du Senegal.

[15] Interview, Dakar, 6 February 2016.
[16] Interview, Development Planner, Dakar, 3 February 2016. If a river system went through an arrondissement, for example, the government sought to facilitate each local government's access to it.

Figures A4 and A5 illustrate villages that are listed in historic censuses.[18] While village growth has taken place over time, census data suggests that over seventy-six percent of existing Senegalese villages today were founded by 1958. By contrast, in regions where data exists, only twenty-six percent of villages existing today were listed in the first French censuses. Though certainly due, to a degree, to poor information, this still suggests a notable growth in population during the colonial era. Because most internal migration has been rural to urban, village growth almost exclusively represents villages created due to population growth or, alternatively, in-migration from other countries. The exception to this is population movements that took place under the *Terres Neuves*, wherein pilgrims followed religious guides to settle new communities and farm peanuts. All results are robust to excluding local governments that can be characterized as falling within this zone as represented by Pelissier.[19]

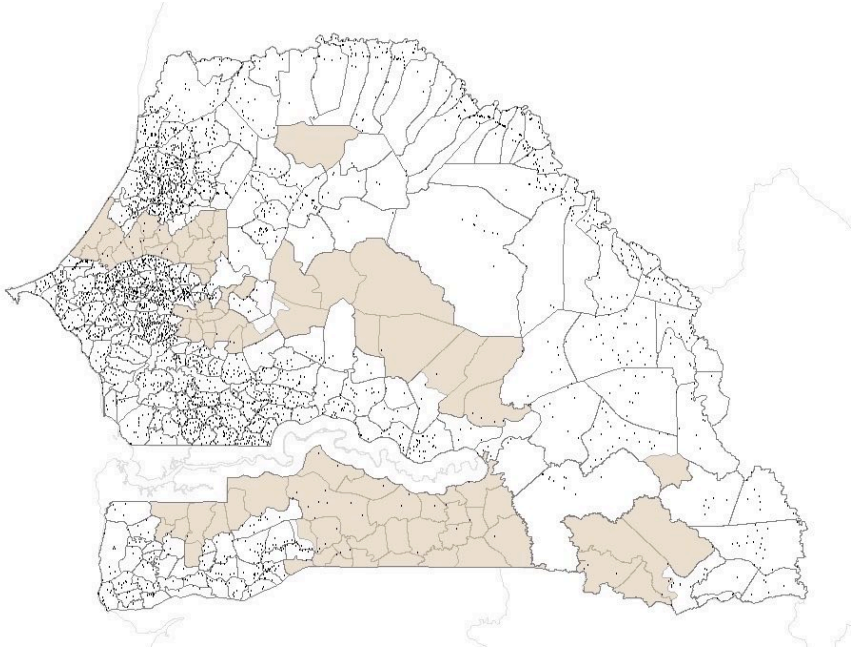


FIGURE A4: Villages, circa 1900 (shaded areas indicate insufficient data)
Source for 1900 villages: AOF (1903-04), Becker 1983.

[17] Author Interview, Kedougou Region, 2 April 2013
[18] AOF 1903-5; Becker 1983; Sénégal 1958.
[19] Pélissier 1966.

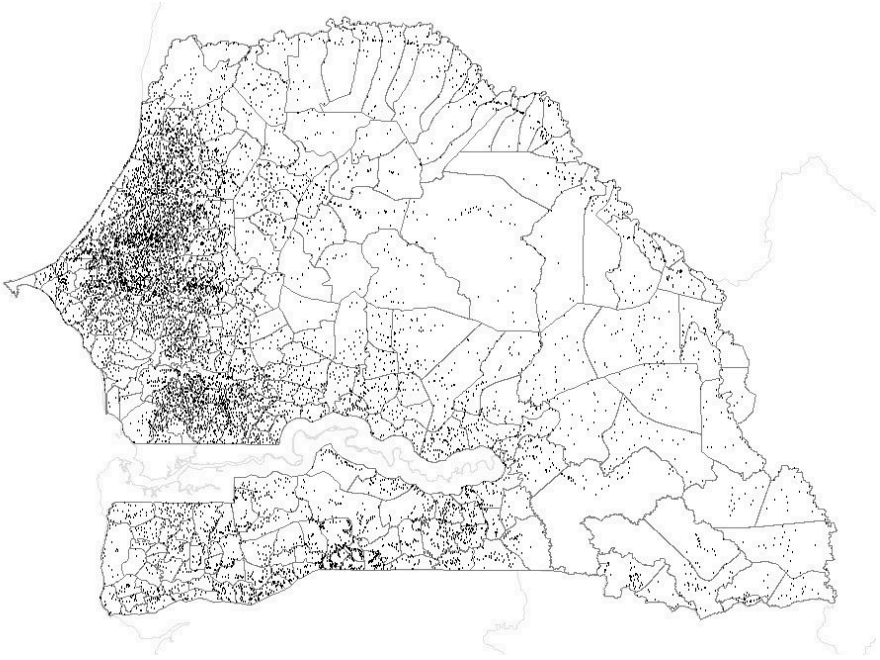


FIGURE A5: Villages, circa 1958
Source for 1958 villages: Sénégal 1958.

3. Alternative Model Specifications; Independent Variables

Table A1.

Table A1 shows the results of modeling the data with hierarchical models. Following Bell and Jones, all multi-level models include a centered mean score of institutional congruence at the rural community level.[20]

TABLE A1. Table 1 Replication; Hierarchical Models

	New Primary School Access						New Health Access		
	2002-09			2009-12					
	(1)	(2)	(3)	(5)	(6)	(7)	(9)	(10)	(11)
Institutional	2.673***	2.748***	2.784***	2.200***	2.173***	2.104***	3.626***	3.572***	3.645***
Congruence 20km	(0.421)	(0.433)	(0.449)	(0.445)	(0.436)	(0.438)	(0.651)	(0.637)	(0.664)
Local Need	Y	Y	Y	Y	Y	Y	Y	Y	Y
Local Demand	N	Y	Y	N	Y	Y	N	Y	Y
Geographic	N	N	Y	N	N	Y	N	N	Y
N	14264	14264	14168	14221	14221	14125	10850	10850	10850
Level-2	318	318	318	368	368	368	276	276	276

*** $p < 0.001$, ** $p < 0.05$. Odds ratios and standard errors, in parantheses, from two-tailed, mixed-level logit models. All hierarchical models include a centered mean of pre-colonial centralization at the local government level (level 2).

Table A2.

Table A2 tests a number of alternative specifications of the independent variable. First, models one, seven and thirteen use the local government average of the *Institutional Congruence 20km* measure used in the main text (*Institutional Congruence 20km, LG Average*). A second set of specifications test the effect of just having been congruent in 1880, the year of French colonization. This is a dummy variable (*Institutional Congruence, 1880 Dummy*). Third, the main independent variable is recoded to follow Bockstette, Chandra and Putterman's (2002) measure of state antiquity, which constructs a measure of an area's 'statehood' by looking at three attributes: a) whether a form of government existed beyond a tribal level; b) whether the government was locally based or whether a region was a colony of another state; and c) the amount of territory controlled by the state as a percent of the current state area.[21] This measure

[20] Bell and Jones 2015.

[21] In their original conceptualization, Bockstette, Chandra and Putterman (2002) have cut-off points for territorial coverage that are all too large for the amount of territory covered by any of Senegal's precolonial states. Because following their original measurements this would artificially compress what is otherwise meaningful variation, here their original cut-off points are scaled down to whether or not a state controlled over five percent, two to five percent or under two percent of the current state's territory.

is similarly subject to a discount decay function in order to weigh more heavily the scores of a respective area in 1880 - the eve of French arrival (*Institutional Congruence, Index 20km*). Fourth, *Precolonial Centralization 20km*, is a zero to one continuous measure that simply captures whether or not a village falls within the twenty-kilometer buffer of any state for each of the time points measured. This does not test the role played by congruence, but looks more simply whether the village was in a centralized zone, yes or no.

The final two alternative specifications, *% CR 1900* and *% CR 1958*, draw on colonial census data (described in Appendix 2) to examine whether the percent of villages in a rural community today that existed during either of these census years is correlated with public goods delivery. Because the theory argues that precolonial centralization impacts contemporary patterns of public goods delivery via on-average higher congruence between elite networks and local government boundaries, higher rates of villages dating to the precolonial era may likewise capture the presence of cohesive and durable local identities. Because only incomplete data exists from the first French censuses, this measure is best understood as an approximation of any give village's existence at the turn of the last century; areas of the country for which there is no or clearly incomplete data are omitted. This is supplemented with data from 1958, a less ideal measure, but for which a complete inventory of villages exists. Precolonial centralization has relatively strong correlations with the percent of villages founded by 1900 (0.43) and 1958 (0.52). The results of Table A2 are consistent with the centralization measure, though *% CR 1900* is insignificant for health data.

Table A3.

Table A3 tests whether or not the results are sensitive to a 20km buffer size by raising the distance of the buffer to 25 and 30km.

TABLE A2: Table 1 Replication; Alternative Measures of Independent Variable

	New Primary School Access												New Health Access					
	2002-09						2009-12											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Institutional Congruence 20km, CR Average	2.382*** (0.389)						1.513** (0.294)						2.089** (0.527)					
Institutional Congruence, 1880 Dummy		1.822*** (0.317)						1.565** (0.222)						1.769*** (0.308)				
Institutional Congruence, Index 20km			2.930*** (0.503)						1.526** (0.274)						2.386*** (0.616)			
Precolonial Centralization 20km				2.725*** (0.416)						1.857*** (0.293)						1.917** (0.394)		
% CR 1900					1.007** (0.003)						1.008** (0.004)						1.006 (0.005)	
% CR 1958						4.919*** (1.730)						1.714 (0.780)						2.464** (0.943)
N	14168	14168	14168	14168	12568	14168	14125	14125	14125	14125	12418	14125	10750	10750	10750	10750	9512	10750
Pseudo-R^2	0.163	0.161	0.165	0.167	0.165	0.162	0.174	0.175	0.174	0.177	0.185	0.173	0.179	0.179	0.18	0.179	0.178	0.177

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with robust standard errors, clustered at the rural communiy, in parantheses. Models include full controls as specified in Table 1.

TABLE A3. Table 1 Replication; Increased Centralization Buffer Size

Panel A: Congruence; Discount Rate

	New Primary School Access				New Health Access	
	2002-09		2009-12			
	25km	*30km*	*25km*	*30km*	*25km*	*30km*
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Congruence	1.869***	2.085***	1.571***	1.719***	2.103***	1.961***
	(0.219)	(0.254)	(0.213)	(0.257)	(0.405)	(0.384)
Local Need	Y	Y	Y	Y	Y	Y
Local Demand	Y	Y	Y	Y	Y	Y
Geographic	N	N	N	N	N	N
N	14264	14264	14221	14221	10850	10850
Pseudo-R^2	0.152	0.154	0.170	0.171	0.169	0.167

PANEL B: Congruence; Bockstette et al. Index

	New Primary School Access				New Health Access	
	2002-09		2009-12			
	25km	*30km*	*25km*	*30km*	*25km*	*30km*
	(7)	(8)	(9)	(10)	(11)	(12)
Institutional Congruence, Index	2.012***	2.004***	1.588**	1.715***	2.172***	2.214***
	(0.251)	(0.256)	(0.243)	(0.278)	(0.470)	(0.480)
Local Need	Y	Y	Y	Y	Y	Y
Local Demand	Y	Y	Y	Y	Y	Y
Geographic	N	N	N	N	N	N
N	14264	14264	14221	14221	10850	10850
Pseudo-R^2	0.152	0.151	0.169	0.169	0.167	0.167

PANEL C: Congruence; 1880 Dummy

	New Primary School Access				New Health Access	
	2002-09		2009-12			
	25km	*30km*	*25km*	*30km*	*25km*	*30km*
	(13)	(14)	(15)	(16)	(17)	(18)
Institutional Congruence, Dummy	1.628***	1.709***	1.519***	1.627***	1.732***	1.686***
	(0.174)	(0.188)	(0.175)	(0.191)	(0.261)	(0.246)
Local Need	Y	Y	Y	Y	Y	Y
Local Demand	Y	Y	Y	Y	Y	Y
Geographic	N	N	N	N	N	N
N	14264	14264	14221	14221	10850	10850
Pseudo-R^2	0.151	0.152	0.170	0.172	0.167	0.166

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with robust standard errors, clustered at the rural communiy, in parantheses.

Table A4.

To ensure that the results are not driven by a single region of Senegal, Table A4 reruns the models with region-by-region deletion.

TABLE A4. Table 1 Replication; Region by Region Deletion

	No Diourbel	No Fatick	No Kaffrine	No Kaolack	No Kedougou	No Kolda	No Louga	No Matam	No Saint-Louis	No Sedhiou	No Tamba-counda	No Thies	No Ziguinchor
						New Primary School Access, 2002-09							
	(1)	(2)		(3)		(4)	(5)	(6)	(7)		(8)	(9)	(10)
Institutional Congruence	2.531***	2.305***		2.768***		2.364***	2.462***	2.407***	2.232***		2.597***	2.460***	2.453***
20km	(0.391)	(0.365)		(0.530)		(0.399)	(0.398)	(0.418)	(0.425)		(0.434)	(0.363)	(0.414)
N	12998	13352		11979		11719	11560	13688	13037		12470	12594	13663
Pseudo-R^2	0.162	0.157		0.167		0.171	0.168	0.176	0.174		0.181	0.168	0.164
						New Primary School Access, 2009-12							
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Institutional Congruence	1.410**	1.665**	1.745***	1.710**	1.584**	1.581**	1.641**	1.622**	1.536**	1.658**	1.781***	1.492**	1.611**
20km	(0.231)	(0.273)	(0.305)	(0.290)	(0.255)	(0.275)	(0.277)	(0.272)	(0.259)	(0.279)	(0.312)	(0.249)	(0.274)
N	12955	13309	13161	12908	13767	12460	11518	13648	13482	13354	12791	12551	13624
Pseudo-R^2	0.173	0.171	0.175	0.176	0.175	0.176	0.169	0.183	0.173	0.177	0.187	0.179	0.172
						New Health Access, 2009-12							
	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
Institutional Congruence	2.202***	2.392***	2.999***	2.775***	2.379***	3.056***	2.181***	2.158***	2.003***	2.502***	2.459***	2.033**	2.341***
20km	(0.453)	(0.515)	(0.687)	(0.589)	(0.519)	(0.747)	(0.508)	(0.463)	(0.428)	(0.551)	(0.529)	(0.485)	(0.533)
N	10201	10244	10009	9702	10471	9111	8809	10299	10162	10463	9746	9746	10353
Pseudo-R^2	0.179	0.183	0.188	0.194	0.191	0.176	0.184	0.184	0.194	0.188	0.206	0.184	0.174

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with robust standard errors, clustered at the rural communiy, in parantheses. All models include all controls. Omitted regions for 2002-09 are those that were created in the 2009 redistricting.

Table A5.

Two models run additional tests of electoral competition. First, as seen in Table A5, there is no effect of measuring local electoral competition by the percent of votes going to the winning party, *Percent Winning Votes*, at the nearest voting bureau. Similar to *Vote Gap* in Table 3, this is run as an interaction term. Secondly, since we might think of the effects of political competition accrue to the rural community rather than villages, models are also run with a dummy variable that takes the value of one if the ruling local council is aligned with the incumbent, national political party (*National Alignment*). Again, this is insignificant.

TABLE A5. Table 3 Replication; Alternative Electoral Variables

	New Primary School Access				New Health Access	
	2002-09		2009-12			
	(1)	(2)	(3)	(4)	(5)	(6)
% Winning Party	0.461		0.647		3.366	
	(0.503)		(0.801)		(4.160)	
% Winning Party x Ln Population	1.086		1.040		0.857	
	(0.190)		(0.222)		(0.174)	
Logged Population	1.151		1.134		1.344**	
	(0.138)		(0.162)		(0.184)	
National Alignment		0.964		1.187		1.144
		(0.094)		(0.159)		(0.211)
Institutional Congruence 20km	2.008***	1.960***	1.532**	1.571***	2.160***	2.179***
	(0.228)	(0.222)	(0.214)	(0.217)	(0.431)	(0.406)
N	13565	14264	13360	14221	10192	10850
Pseudo-R^2	0.152	0.154	0.172	0.171	0.173	0.171

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with robust standard errors clustered at the rural community in parantheses. All models include controls for local need and demand

5. Alternative Model Specifications; Dependent Variables

Table A6.

Since local governments deliver multiple goods in any given electoral cycle, Table A6 replicates Table 1 for whether or not a village receives either new primary school or new health access in the second time period.

TABLE A6. Table 1 Replication; Any New Social Service Access (Health & Primary Combined), 2009-12, Odds Ratios

	(1)	(2)	(3)	(4)
Institutional Congruence 20km	1.558**	1.489**	1.649***	2.109**
	(0.228)	(0.199)	(0.245)	(0.636)
Local Need	Y	Y	Y	Y
Local Demand	N	Y	Y	Y
Geographic	N	N	Y	Y
Local Gov. Fixed Effects	N	N	N	Y
N	10849	10796	10723	10175
Pseudo-R^2	0.056	0.098	0.106	0.078

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logitic regressions with robust standard errors clustered at the rural community in parentheses. Model 4 report sresults from conditional logit models with robust, clustered standard errors.

Table A7.

Table 1 uses the Senegalese State's standards for access to social services. Table A7 reduces this definition of access. Even at more conservative estimates of access, institutional congruence with a precolonial state still appears to increase the probability of a village receiving access to a social service with the exception of receiving a health facility within one kilometer.

TABLE A7. Table 1 Replication; Reduced Radius of 'Access' Definition

	PANEL A: New Primary School Access within 2km						PANEL B: New Primary School Access within 1km						PANEL C: New Health Access					
													3km Access			1km Access		
	2002-09			2009-12			2002-09			2009-12			2002-09			2009-12		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Institutional Congruence	1.328**	1.613***	2.143***	1.931***	1.625**	1.596**	1.284**	1.613***	2.175***	1.531**	1.348**	1.346*	2.063***	2.407***	2.624***	1.873***	2.124***	2.337***
20km	(0.191)	(0.219)	(0.424)	(0.349)	(0.296)	(0.318)	(0.161)	(0.175)	(0.305)	(0.232)	(0.175)	(0.214)	(0.413)	(0.438)	(0.521)	(0.368)	(0.412)	(0.504)
Local Need	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Local Demand	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y
Geographic	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y
N	14264	14264	14168	14221	14221	14125	14264	14264	14168	14221	14221	14125	10733	0733	10660	10730	10730	10657
Pseudo-R^2	0.138	0.169	0.181	0.165	0.213	0.215	0.107	0.146	0.155	0.103	0.153	0.155	0.063	0.138	0.149	0.062	0.117	0.123

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with clustered, robust standard errors at the rural community in parantheses.

Table A8.

Rural communities can also invest in new classrooms for existing schools. Table A8 presents results of models estimating the effect of institutional congruence on new classroom construction. Given the over-dispersed nature of classroom count data, estimations of new classroom placement are done with mixed-level negative binomial models. Results for classrooms are, in general, consistent with those of other local government investments, with the exception of fixed effects models in the first time period.

TABLE A8. Table 1 Replication; New Classroom Construction

	2002-09			2009-12		
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Congruence	1.219***	1.211***	0.974	1.344***	1.292***	1.464**
20km	(0.068)	(0.066)	(0.089)	(0.108)	(0.100)	(0.240)
Local Need	Y	Y	Y	Y	Y	Y
Local Demand	N	Y	N	N	Y	N
Local Gov. Fixed Effects	N	N	Y	N	N	Y
N	4284	4284	4284	5514	5514	5499

*** $p < 0.001$, ** $p < 0.05$. Incident rate ratios from two-tailed negative binomial models. Robust standard errors clustered at the rural community in parentheses.

6. Robustness Checks

Omitted Variable Bias

A central concern is that the results could be driven by an omitted variable. The models presented so far, including fixed effects models, are robust to several structural and geographical features, but could another unmeasured factor be driving these results? Working within the limits of observational data, I run a coefficient sensitivity analysis, which uses observed control variables to estimate the likelihood that unobserved variation is biasing estimates on the independent variable, here precolonial centralization. Coefficient sensitivity models seek to estimate how much stronger the effect of unobserved factors need to be on selection into treatment, relative to observed variables, for the former to nullify the estimated effect of the independent variable.

Table A9 employs Oster's method.[22] Oster argues that estimating omitted variable bias through coefficient sensitivity should be scaled to changes in the R^2 because of assumptions of shared co-

[22] Oster 2016.

variance between the two sets of variables. To do so, Oster recommends bounding estimates by a plausible R_{max}, the idea that any given dependent variable can obtain at a maximum an R^2 of one, thereby explaining all variation on the dependent variable. Coefficient stability analysis estimates an 'identified set' of possible βs on the key independent variable, bounded by potential values of R_{max}.

TABLE A9. Assessment of bias in estimated effect of institutional congruence from unobservables; Oster's coeffecient stability approach

	w/ Geo Controls β^c	w/ Full Controls β^c	Oster, 2014			
			Geo	*Full*	*Geo*	*Full*
Primary Schools, 02-09	0.076*** (0.019)	0.089*** (0.015)	[0.076, 0.356]	[0.089, 0.426]	[0.076, 4.223]	[0.089, 3.290]
R^2	0.108	0.152				
R_{max}			0.237	0.334	1	1
Primary Schools, 12-09	0.023* (0.013)	0.025** (0.010)	[0.023, 0.129]	[0.025, 0.148]	[0.023, 13.97]	[0.025, 1.368]
R^2	0.076	0.112				
R_{max}			0.166	0.247	1	1
Health, 09-12	0.039 (0.027)	0.075*** (0.023)	[0.039, 0.401]	[0.075, 0.245]	[0.039, 8.182]	[0.075, 3.738]
R^2	0.069	0.159				
R_{max}			0.152	0.351	1	1

*** $p < 0.001$, ** $p < 0.05$. Results of models estimating coefficient sensitivity to unobserved variables with robust clustered standard errors by local government. Models in the first two columns report coefficients from OLS models for new schools, and health facilities for the full sample of villages. All other models are calculated using Oster's (2013) *psacalc* command in Stata; binary dependent variables are estimated using an OLS framework given limitations of this command.

Models in the first two columns re-estimate the coefficient of precolonial centralization on the three central outcome variables. Due to restrictions in the estimation techniques, all coefficients represent the outcomes of linear models with region fixed effects. The latter four columns present the results of the coefficient sensitivity analysis.[23] The lower bound (listed first), which is the model-reported coefficient, is compared to the upper bound (listed second) which is the estimated coefficient from Oster's method. Models run with Oster's recommended R_{max} of 2.2 times the R^2 report coefficients that are generally consistent, indicating a positive impact of precolonial centralization on public goods delivery. Although the gap between the upper and lower bounds increases, results still suggest that even if an unobserved variable explains as much variation as the entire fitted model, it would not overturn the positive coefficient of precolonial

[23] Models with geographic controls include: latitude, longitude, their interaction, logged distance to the nearest waterway, elevation and the distance to the nearest facility in the baseline year to capture spatial clustering. Full models add village population and the number of the facility type built by the local government in that period.

centralization. The last two sets of models reflect the unrealistic demands of setting R_{max} at one, where the gap between estimated coefficients increases dramatically.

Placebo Tests

To further demonstrate that these patterns are explained by local-level dynamics, I run a series of placebo tests using the placement of *High Schools* over the full period (2002-12) and a village being *Electrified* or receiving *Improved Roads* in the first (2000-09).[24] These investments are highly valued by local populations and, far beyond the financial or technical means of local governments, are exclusively provided by the central state. The results, found in Table A10, indicate that precolonial centralization offers no leverage on a village's likelihood of receiving central government delivered services. Results for high school construction and electrification are not significantly different from zero and a village's propensity to receive an improved road indicates a bias in the opposite direction; the odds ratios suggest that historically uncentralized areas are more likely to receive access to an improved road between 2002-09. Precolonial statehood influences the placement of locally-provided public goods therefore, but does not those delivered by the central state.

TABLE A10. Placebo Test: Central State Provided Services, Odds Ratios

	High Schools, 2002-12		Electrification, 2002-09		Improved Roads, 2002-09	
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Congruence 20km	0.872 (0.530)	1.893 (1.319)	1.146 (0.273)	1.067 (0.245)	0.689** (0.094)	0.714** (0.096)
Local Need	Y	Y	Y	Y	Y	Y
Local Demand	N	Y	N	Y	N	Y
N	1432	1433	12251	12251	12251	12251
Pseudo-R^2	0.284	0.393	0.096	0.118	0.039	0.043

*** $p < 0.001$, ** $p < 0.05$. Coefficients are odds ratios from logistic regressions with robust standard errors, clustered at the rural community, in parentheses. Sample for high schools restricted to villages with a population of more than 1,000 due to state criteria for construction.

[24] Gaining access to or having an existing road 'improved' refers to a grated or paved road.

6. Location-Allocation Models

Location Allocation Models

Maximize attendance models choose locations so as to maximize the total number of users ('demand weight') who can utilize a facility within an assigned distance. The model chooses locations so as to maximizes the percent of the population that will attend a facility, discounting village population weight as a linear function of the distance from a facility under the assumption that individuals are more likely to use facilities that are closer to them. Figure A6 presents an example from the local government of Aere Lao. The model predicts that the village of Ida as the best location to maximize the total number of students who will attend school. Ida's student population is estimated at approximately 337 students, all of which are assigned to the chosen location. At 2.8 kilometers away, Sylvabe is only estimated to be willing to send roughly ten of its 238 students, for a total weighted population of 347 students at the chosen site.

Maximize coverage models seek to assign schools to locations that will maximize the total percent of the population covered by a given radius - in this case the three kilometer standard set by the Senegalese State for schools and five kilometers for health. The model then gives locations that will maximize the percent of the population falling within the assigned impedance range, taking into account existing facilities. Villages that were covered in the baseline year and which fall inside the radius of a predicted facility are subtracted from the total population covered. Using again the examples of Ida and Sylvabe, here all of Sylvabe's population is added to the demand weight because it was not covered in 2002.

Figure 6: Maximize Attendance Model

Example: Aere Lao (Saint-Louis Region), 2002-09

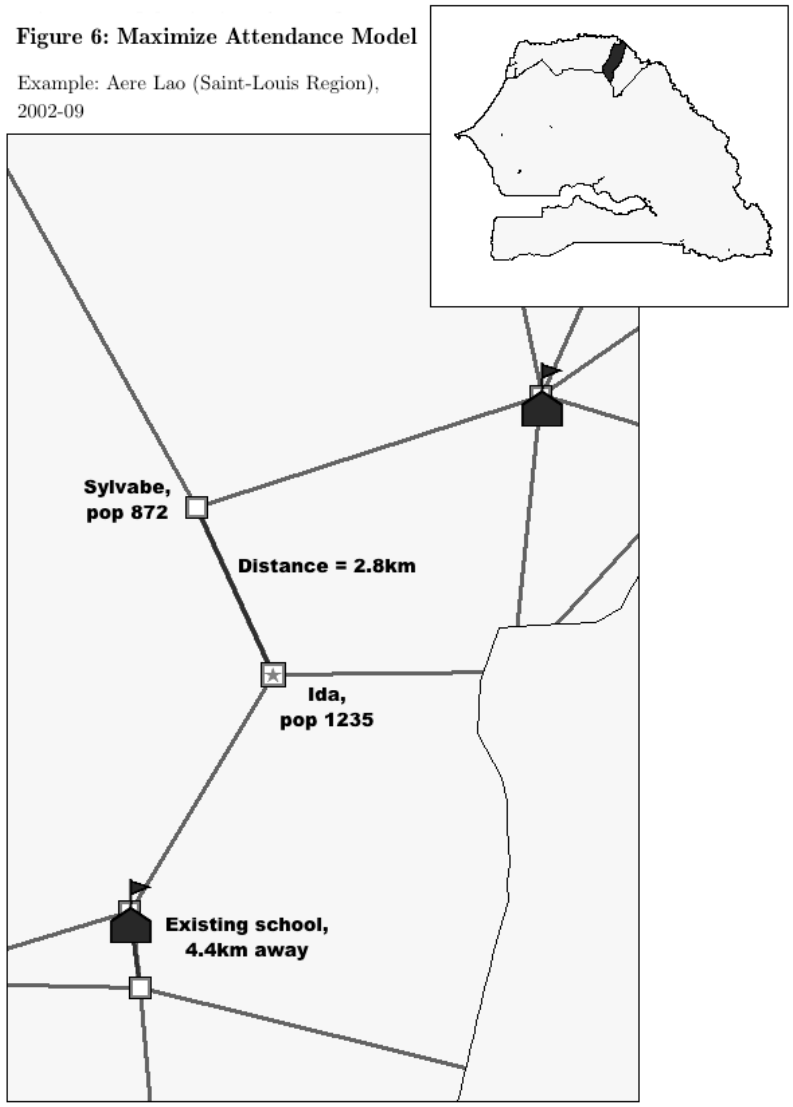


Figure 7: Maximize Coverage Model

Example: Aere Lao (Saint-Louis Region), 2002-09

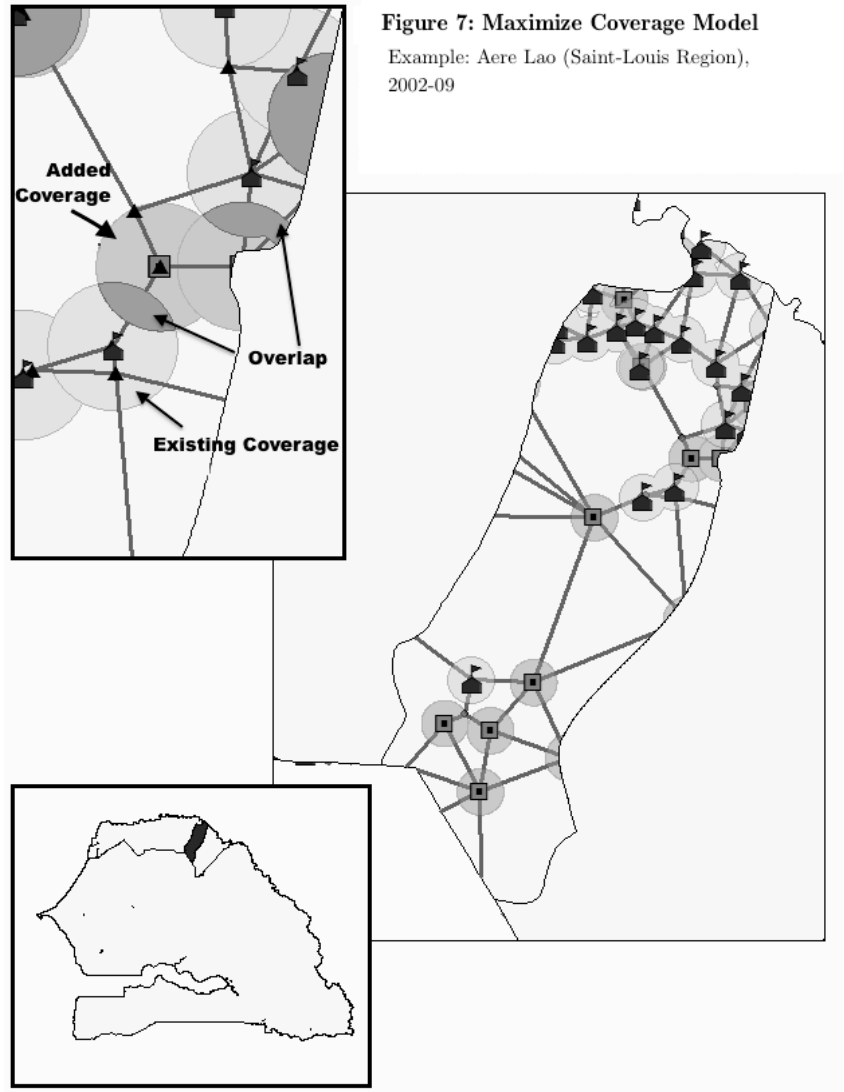


Table A11.

Table A11 evaluates alternative explanations for the outcomes in Table 2, the location allocation models. Results similarly support the effect of the central independent variable, *Institutional Congruence 20km*. These models provide little support for alternative explanations.

TABLE A11. Table 2 Replication; Location-Allocation Modeling, Alternative Explanations

PANEL A: Maximize Attendance Models

	New Primary Schools							New Health Facilities			
	2002-09			2009-12							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Institutional Congruence 20km	-73.63 (55.15)	-74.60 (49.88)	-60.24 (58.15)	-23.87 (87.13)	-2.91 (78.53)	-6.49 (79.27)	-27.49 (87.03)	809.52 (574.80)	728.89 (602.69)	617.37 (559.88)	691.99 (596.39)
% Gap Between Parties (CR)	-75.77 (77.11)			-134.75 (100.19)				-325.87 (592.09)			
National Alignment		-11.29 (42.75)			19.78 (46.31)				370.73 (593.94)		
Ethnic Fractionalization			1.55 (1.31)			-0.54 (1.31)				-14.80 (12.05)	
Average CG Transfer ($)							0.008 (0.008)				0.038 (0.096)
Geographic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.218	0.218	0.223	0.449	0.481	0.488	0.446	0.265	0.303	0.304	0.285
N	279	282	282	306	317	316	318	174	182	181	183

PANEL B: Maximize Coverage Models

	New Primary Schools							New Health Facilities			
	2002-09			2009-12							
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(24)
Institutional Congruence 20km	-562.74*** (115.72)	-559.51*** (119.04)	-566.34*** (104.52)	-130.40* (71.79)	-159.52* (76.18)	-221.59** (76.74)	-167.17** (76.33)	-731.37** (329.96)	-691.75*** (296.05)	-673.26** (287.57)	-665.82** (284.44)
% Gap Between Parties (CR)	-106.11 (214.66)			175.15 (255.83)				-77.55 (322.84)			
National Alignment		-28.02 (133.79)			106.57 (83.66)				89.83 (159.31)		
Ethnic Fractionalization			-1.17 (2.44)			-6.25 (1.83)				3.03 (4.19)	
Average CG Transfer ($)							0.02 (0.02)				-0.03** (0.01)
Geographic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.288	0.296	0.296	0.159	0.161	0.179	0.162	0.222	0.228	0.232	0.233
N	279	282	282	306	317	316	318	174	182	181	183

*** $p < 0.001$, ** $p < 0.05$, *$p < 0.1$. Results of OLS regressions with robust, clustered standard errors by region in parantheses. All models include a control for the number of new facilities built during that time period. Models include population density, logged population, and the percent of villages with the public good in the baseline year. Education models include *Perc Mouride*. Geographic controls include average village elevation, average logged distance to the nearest navigable waterway and a dummy variables that takes the value of one if a local government has more than 25% of its villages falling in the Ferlo Desert.

7. Figure 2 Model Results

Table A12. Effect of Precolonial Centralization on New Social Service Access Over Time, Fixed Effects Models

	1902-12	1912-32	1932-52	1952-72	1972-2002	2002-12
	(1)	(2)	(3)	(4)	(5)	(6)
Precolonial	4.875**	1.173	1.140	0.659**	1.100	1.723***
Centralization 20km	(3.618)	(1.266)	(0.421)	(0.099)	(0.094)	(0.235)
Pseudo-R^2	0.132	0.369	0.409	0.304	0.188	0.035
N	2583	8731	10711	10711	14098	10105

*** $p < 0.001$, ** $p < 0.05$. Results of logit models with fixed effects at the 2002 Region. Standard errors, clustered at the 2002 Region, are in parentheses.

8. Discussion: Qualitative Data

Sampling Strategy

This paper employs qualitative data drawn from original, highly-structured interviews conducted in two phases. First, a survey was conducted between February and July of 2013 with local elected officials, regional government officials and development agents and village chiefs as part of a larger project. In total, the interviews cover fifty-six rural communities, spread out over fourteen departments in ten of Senegal's thirteen regions.[25] Sampling was conducted to balance on a number of characteristics, centrally precolonial statehood, distance from Dakar, economic structure and population density. From this, a set of fourteen zones were purposively chosen so as to obtain variation on these factors as well as geographic spread across the country. Within each of these fourteen zones, one department was randomly selected. Subsequently, two arrondissements were chosen randomly in each department and, in turn, two rural communities in each arrondissement. Within each rural community, I interviewed the Rural Council President (PCR) or, in two cases when the PCR was unavailable his adjoint (the vice-PCR), one, randomly selected rural councilor and four to five randomly selected village chiefs. Random sampling was done by assigning a number to each official village and randomly drawing four numbers (within the range of possible villages). In the event that the chief was unavailable (due to illness, voyage or, at times, age), the next closest village was chosen. An exception this was if a village had a 'delegated' chief, for example, a chief who works in Dakar may delegate a brother or nephew to fulfill duties while he is away. All interviews were conducted by the author or a research assistant in the language of the respondent's choice.

[25] Excluding the region of Dakar. The three local communities in the Region of Dakar were not treated as eligible in the sample because four rural communities were sought in each Department. Senegal's administrative hierarchy is structures as follows, from lowest to highest: rural community, arrondissement, department, region, central state.

The interview questionnaire asked respondents a range of questions about the history of their village and rural community, the level of social service access, their evaluations of the economy and the local and central government and a range of personal demographics. Interviews were highly structured, asking respondents a pre-determined list of questions that were mixed between closed and open-ended formats. Interviews with local development agents and Sous-Prefets were open-ended, allowing me to follow up on various details that emerged out of the structured interviews. A number of questions, such as general inquiries about the relations between elected and traditional authorities, local tax collection, etc. were always asked however. To ensure the anonymity of respondents, they are identified only by their position, department and date of the interview. A map of the department's surveyed can be found in Figure A8 below.

Secondly, I conducted follow-up case studies of a handful of on-the-line cases from the regression results presented in this paper. This data was collected in February-March of 2016. These interviews were more open-ended, so while still asking respondents to describe local political life, I was able to dig deeper into particular controversies that I had learned about or ask more follow-up questions than possible in the more structured first round of data. The fluidity of these interviews also means that there was a less specified system of identifying respondents. As with the previous round, I interviewed the community secretary, PCR, the adjoint-PCR and local development agents. Selection for interviews with village chiefs and councilors was done so as to ensure balance geographically across the community, but in view of a smaller research team, engaged in more convenience sampling. In total, approximately ten in-depth interviews were conducted in each community.

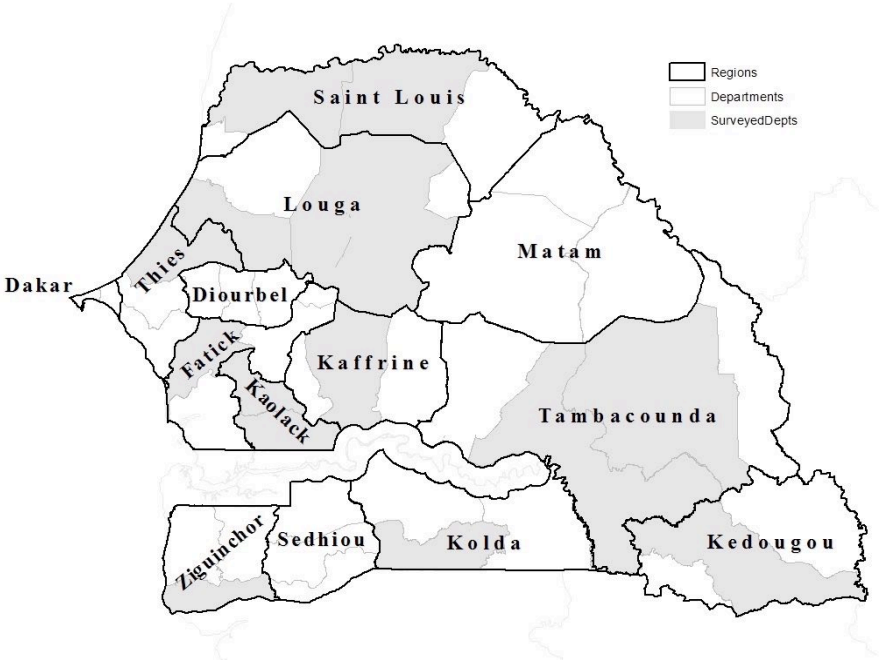
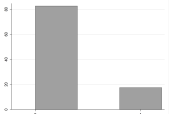
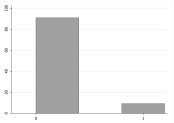
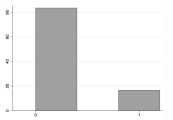
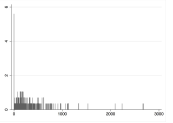
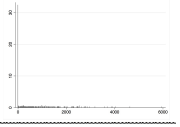
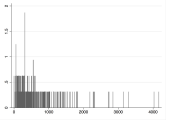
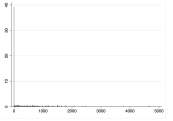
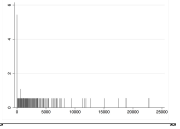
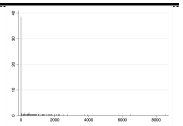
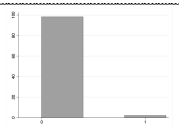
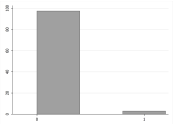
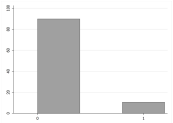
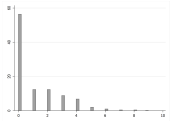
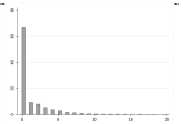
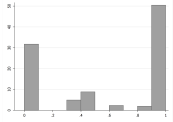
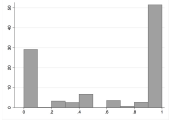
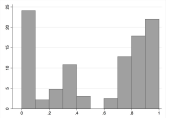
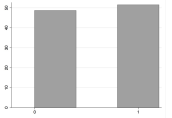
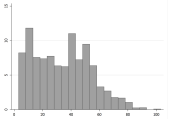
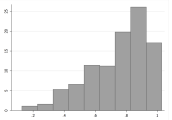
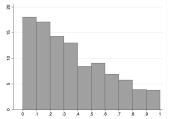
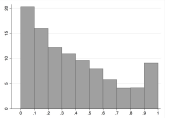
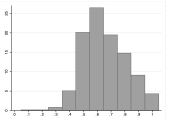
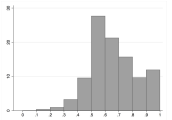


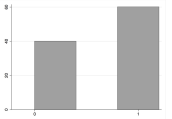
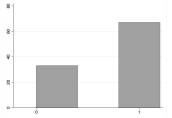
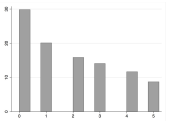
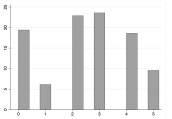
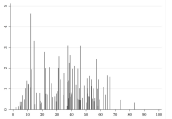
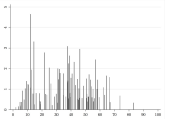
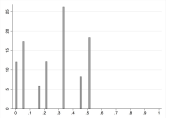
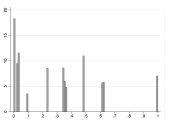
FIGURE A8: Survey Locations

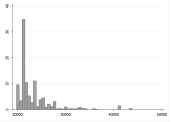
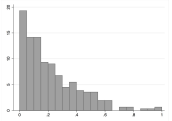
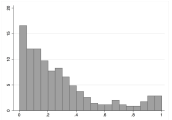
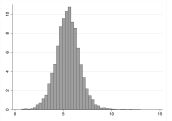
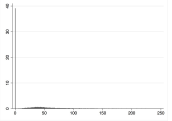
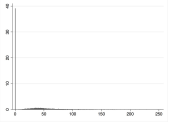
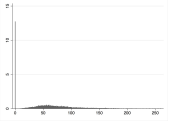
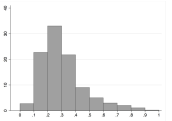
9. Data Appendix

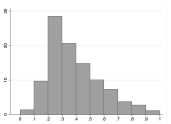
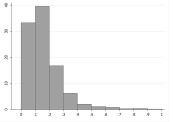
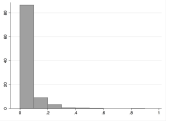
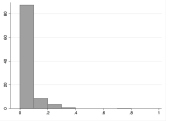
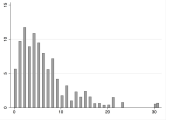
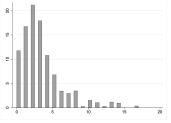
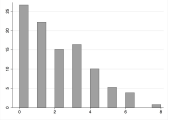
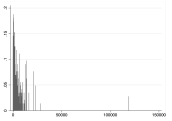
NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
DEPENDENT VARIABLES						
New School Access (3km), 2002-09	A 0-1 measure of whether or not a village received access to a new school in a given time period	Senegalese Ministry of Education	14495	0.17	0.38	
New School Access (3km), 2009-12	A 0-1 measure of whether or not a village received access to a new school in a given time period	Senegalese Ministry of Education	14495	0.09	0.29	
New Health Facilities (5km), 2009-12	A 0-1 measure of whether or not a village received access to a new health post or health hut in a given time period	Senegalese Ministry of Health	10913	0.16	0.37	
Maximize Attendance - Schools, 2002-09	The difference between the number of students who would have been covered under the ideal-point locations for the maximize attendance model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	286	330.2	548.8	
Maximize Coverage - Schools, 2002-09	The difference between the number of students who would have been covered under the ideal-point locations for the maximize coverage model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	286	827.5	1399	
Maximize Attendance - Schools, 2009-12	The difference between the number of students who would have been covered under the ideal-point locations for the maximize attendance model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	319	636.1	1174	
Maximize Coverage - Schools,2009-12	The difference between the number of students who would have been covered under the ideal-point locations for the maximize coverage model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	319	467.9	1180	
Maximize Attendance - Health 2009-12	The difference between the number of citizens who would have been covered under the ideal-point locations for the maximize attendance model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	183	2806	3380	

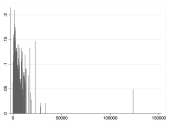
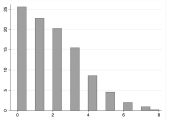
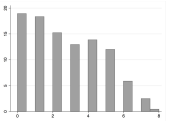
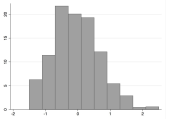
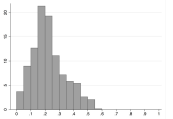
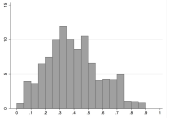
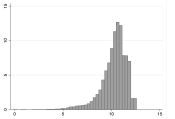
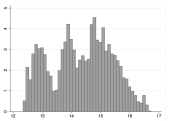
NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Maximize Coverage - Health, 2009-12	The difference between the number of citizens who would have been covered under the ideal-point locations for the maximize coverage model and those that were actually covered by the built facility (zero means the ideal point was chosen)	Author Coded	183	639.6	1049	
New High Schools (5km), 2002-12	A 0-1 measure of whether or not a village (population greater than 1000) received a high school in the given time period	ANSD *Enquete Villages* 2002, 2009	1499	0.01	0.11	
New Electgrificatio n, 2002-09	A 0-1 measure of whether or not a village was electrified during the dime period	ANSD *Enquete Villages* 2002, 2009	12268	0.03	0.17	
Improved Roads, 2002-09	A 0-1 measure of whether or not a village received access to an improved road in the given time period	ANSD *Enquete Villages* 2002, 2009	12268	0.1	0.31	
New Classrooms, 2002-09	A count measure of the number of new classrooms a school received in a given time period	Senegalese Ministry of Education	5716	1.11	1.59	
New Classrooms, 2009-12	A count measure of the number of new classrooms a school received in a given time period	Senegalese Ministry of Education	6359	1.07	2.13	
INDEPENDENT VARIABLES						
Institutional Congruence, 20km	A discount-decay function of a village's congruence with the dominant level of precolonial centralization in the local government, thus that a village receives a 1 if it is 'congruent' and a 0 if not.	Author coded, misc historical sources	14503	0.59	0.45	
Centralizatio n Discount, 20km	A discount-decay function of an area's level of centralization at 8 time periods between 1500-1880 Areas are coded as centralized 0-1 for each time period based on whether or not they fall within a 20km buffer of a pre-colonial capital or key city	Author coded, misc historical sources	14467	0.61	0.44	

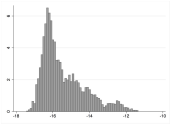
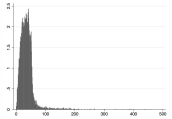
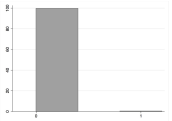
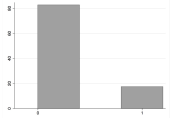
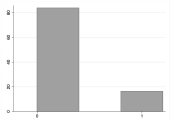
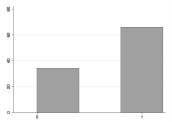
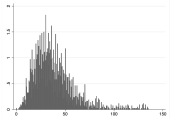
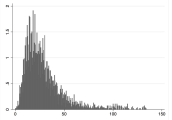
NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Bockstette et al. Discount, 20km	Bockstette, Chanda and Putterman's (2002) state antiquity index with a discount-decay function All variables within 20kms of pre-colonial capitals are assigned the score for the level of 'statehood' of a kingdom at 8 time periods between 1500-1880	Author coded, misc historical sources	14456	0.55	0.39	
1880 Centralizatio n Dummy, 20km	A 0-1 measure where villages take a value of 1 if they fall within the buffer of an area that was centralized in 1880	Author coded, misc historical sources	14458	0.51	0.49	
% Villages 1900	The percent of villages in a rural community that are listed in the first French censuses	Becker, et al (1983) ; Misc Historical Sources (ANS 1G:251; 1G:289-96)	12879	34.3	19.6	
% Villages 1958	The percent of villages in a rural community that are listed in the 1958 village repetoire	1958 *Repetoire des villages*	14496	75	19	
Gap Btw Parties, 2002-09	The % gap between the winning and second place party at a voting booth in the 2002 local elections	Author coded; *Direction Generale des Elections*	13751	0.36	0.26	
Gap Btw Parties, 2009-12	The % gap between the winning and second place party at a voting booth in the 2009 local elections	Author coded; *Direction Generale des Elections*	13593	0.38	0.29	
% Votes Winning Party, 2002-09	% of votes going to the winning party at a voting booth in 2002 local elections	Author coded; *Direction Generale des Elections*	13753	0.66	0.15	
% Votes Winning Party, 2009-12	% of votes going to the winning party at a voting booth in 2009 local elections	Author coded; *Direction Generale des Elections*	13591	0.66	0.17	

NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Nat'l Aligned, 2002-09	A 0-1 measure of whether or not the majority party in the rural council is aligned with the central state	Author coded; *Direction Generale des Elections*	14458	0.6	0.49	
Nat'l Aligned, 2009-12	A 0-1 measure of whether or not the majority party in the rural council is aligned with the central state	Author coded; *Direction Generale des Elections*	14458	0.67	0.47	
Civic Associations, 2002-09	An additive measure of whether or not a village has the following civic associations: a village development association, a women's 'promotion' group, a local sports/cutural group, a village-level political party branch or an economic interest group This creates a 0-5 measure	ANSD *Enquete Villages* 2002	13139	1.83	1.66	
Civic Associations, 2009-12	An additive measure of whether or not a village has the following civic associations: a village development association, a women's 'promotion' group, a local sports/cutural group, a village-level political party branch or an economic interest group This creates a 0-5 measure	ANSD *Enquete Villages* 2009	12268	2.44	1.57	
Ethnic Fractionalizat ion, 2002-09	A Herfondihl Index of Ethnic Fragmention Based on ethnic information of approximately 200 rural communities and averaged at the *arrondissement* level	Author coding based on secondary documents and local planning materials	14454	36.2	16.8	
Ethnic Fractionalizat ion, 2009-12	A Herfondihl Index of Ethnic Fragmention Based on ethnic information of approximately 200 rural communities and averaged at the *arrondissement* level	Author coding based on secondary documents and local planning materials	14454	36.2	16.9	
New Teachers per capita, 2002-09	The number of new, central-state appointed teachers assigned to a region per student-aged capita between 2002-09; measure is standardized to a 0-1 scale	Author coded; Senegalese Ministry of Education	14458	0.27	0.18	
New Teachers per capita, 2009-12	The number of new, central-state appointed teachers assigned to a region per student-aged capita between 2009-12; measure is standardized to a 0-1 scale	Author coded; Senegalese Ministry of Education	14458	0.29	0.29	

NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Avg. FDD ($)	Average yearly fiscal transfers (*Fonds de Dotation de la Décentralisation*) in dollars from the central government to a rural community, 2009-12	*Direction des Collectivities Locales*	14454	23506	5764	
Gap Parties (CR), 2002-09	The % gap between the winning and second place party in the local government during the 2002 local elections	Author coded; *Direction Generale des Elections*	315	0.22	0.19	
Gap Parties (CR), 2009-12	The % gap between the winning and second place party at a voting booth in the 2009 local elections	Author coded; *Direction Generale des Elections*	357	0.28	0.26	
CONTROL VARIABLES						
Ln Village Population, 2012	Log of village population, 2011	*Repetoire officiale du villages* 2011, Gouvernment du Senegal	14496	5.48	1.23	
Sqrt D School, 2002-09	Square root of the minimum distance to the nearest school from a given village in 2002	Author coded; Senegalese Ministry of Education	14403	28.5	28.2	
Sqrt D School, 2009-12	Square root of the minimum distance to the nearest school from a given village in 2009	Author coded; Senegalese Ministry of Education	14441	28.7	28.6	
Sqrt D Health, 2009-12	Square root of the minimum distance to the nearest clinic from a given village in 2009	Author coded; Senegalese Ministry of Education	10982	52.3	37.5	
% Villages School, 2002-09	% villages in a rural community that have a primary school in 2002	Author coded; Senegalese Ministry of Education	14485	0.3	0.16	

NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
% Villages School, 2009-12	% villages in a rural community that have a primary school in 2009	Author coded; Senegalese Ministry of Education	14485	0.39	0.19	
% Villages Health, 2009-12	% villages in a rural community that have a health facility in 2009	Author coded; Senegalese Ministry of Health	10978	0.16	0.12	
% CR Mouride, 2002-09	Percent of villages in the local government (2002-09) whose names take a common marker of Mouride affiliation; "darou", "touba", "mbacke," "serigne," "mouride"	Author Coded	14456	0.05	0.07	
% CR Mouride, 2009-12	Percent of villages in the local government (2009-12) whose names take a common marker of Mouride affiliation; "darou", "touba", "mbacke," "serigne," "mouride"	Author Coded	14456	0.04	0.07	
# New Schools (CR), 2002-09	Count measure of number of schools built by a rural community, 2002-09		14454	6.28	5.53	
# New Schools (CR), 2009-12	Count measure of number of schools built by a rural community, 2009-12		14462	3.2	2.89	
# New Clinics (CR), 2009-12	Count measure of number of new clinics built by a rural community, 2009-12		10985	1.96	1.79	
Pop Density, 3km	Population density in 3km radius of village		14395	1395	9075	

NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Pop Density, 5km	Population density in 5km radius of village	Author Coded	14395	2619	10497	
Economic Activity, 2002	An additive index of economic activity in a village This includes: a boutique/small store, a market, an artistinal workshop, and facilities for the valorization of the following: forest products, seafood, animal husbandry, fruit or agricultural products for a full range of 0-8	ANSD *Enquete Villages* 2002	13139	1.86	1.65	
Economic Activity, 2009	An additive index of economic activity in a village This includes: a boutique/small store, a market, an artistinal workshop, and facilities for the valorization of the following: forest products, seafood, animal husbandry, fruit or agricultural products for a full range of 0-8	ANSD Enquete Villages 2009	12268	2.59	2.02	
Wealth, 2005	An index of average household wealth, calculated at the *arrondissement* level in 2010	*Demographic and Health Survey*, 2010	14456	-0.04	0.7	
% Student Attendance, 2002	Percent of school aged children attending school in a rural community in 2002	Author coded; Senegalese Ministry of Education	14458	0.23	0.12	
% Student Attendance, 2009	Percent of school aged children attending school in a rural community in 2009	Author coded; Senegalese Ministry of Education	14456	0.4	0.18	
Ln D Waterway	Logged distance between a village and the nearest navigable waterway	Author Coded, GIS Shapefiles	14485	10.2	1.73	
Latitude	A village's latitude	GIS Shapefiles	14485	-15.4	1.17	

NAME	DESC	SOURCE	N	$\bar{X}$	SD	DISTRIBUTION
Longitude	A village's longitude	GIS Shapefiles	14485	14.3	1.04	
Village Elevation	Village elevation in meters	USGS Global Elevation Grids (Systematic Subsample 75 arc-seconds)	14362	35.9	27.5	
Mangrove	A 0-1 measure that takes a 1 when a village falls within a Mangrove	White (1983)	14460	0.004	0.06	
Sahel Grassland	A 0-1 measure that takes a 1 when a village falls within Sahel Grassland	White (1983)	14460	0.17	0.38	
Rainforest/Grassland	A 0-1 measure that takes a 1 when a village falls within Lowland Rainforest/Grassland	White (1983)	14460	0.16	0.37	
Sudanian Forest	A 0-1 measure that takes a 1 when a village falls within Sudanian Forest	White (1983)	14460	0.66	0.47	
Students per Classroom, 2002	Number of students per classroom in 2002	Author coded; Senegalese Ministry of Education	4332	37.1	19.7	
Students per Classroom, 2009	Number of students per classroom in 2009	Author coded; Senegalese Ministry of Education	5592	28.4	19.5	

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