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# Delivering Schools and Clinics in Rural Senegal

Local elites across rural Senegal paint starkly different pictures of their experiences with local governance, but these narratives may reflect perceived but not actual bias. My theory, supported by the original survey data introduced in the preceding chapter, suggests that precolonial political legacies shape the nature of local governance by virtue of the social institutions these states left behind. This generates the predication that areas home to precolonial states, where I expect institutional congruence, should exhibit broader redistributive tendencies across the population than areas that were historically stateless.

In this chapter, I test this proposition by looking at the actual placement of two of the most consequential public goods for individual well-being under local government authority: the construction of new clinics and new primary schools. I find that common expectations from the literature, which has disproportionately focused on questions of ethnic favoritism and electoral politics, cannot explain patterns in the delivery of these public goods. Rather, the evidence provides support for the central argument of this book: the contemporary politics of public goods delivery in rural Senegal vary subnationally following the contours of precolonial political geography. In areas that were home to centralized polities in 1880, I find consistent evidence that local governments are delivering core investments to more villages than their counterparts in areas that were acephalous, or which lacked hierarchical governance on the eve of colonization.

This finding contributes to a growing body of evidence that regions home to Africa's precolonial states have, on average, better development outcomes.[1] Here, I shift focus to examine how different historical experiences create distinct forms of distributive politics at the local level today. I argue that the key empirical

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[1] For example, Michalopoulos and Papaioannou (2015).

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question is not about overall levels of access or how many services are built, but rather how local governments allocate public goods across the population. In order to test my expectation that local governments defined by institutional congruence are delivering public goods *differently* than other parts of the country, this chapter employs an original, georeferenced dataset of village-level basic primary education infrastructure between 2002 and 2012 and of basic health infrastructure between 2009 and 2012. The dataset covers all of Senegal's approximately 14,300 rural villages allowing me to measure which villages gain access to these new public services in the 2000s and which do not, while controlling for a range of local and structural factors. The dataset was assembled by combining multiple sources, including ministry-level data on school and clinic locations and original coding of the location of precolonial states, first introduced in Chapter 2. This process is discussed in detail below.

I begin by reviewing dominant theoretical expectations of redistributive politics in developing countries before moving on to detail the nature of local public goods delivery in rural Senegal. A series of empirical tests demonstrate that historical patterns of precolonial statehood offer the most leverage in explaining patterns of local public goods placement at the village level in Senegal between 2002 and 2012. I then turn to location-allocation models to evaluate the comparative efficiency of school and clinic placement and to create a metric for assessing a development-maximizing ideal point in potential social service locations. Finally, placebo tests demonstrate that this pattern does not hold for services delivered by the central government. Cumulatively, these findings suggest that in an era of rapid expansion of basic public services, the political distribution of public goods by Senegal's rural councils is spatially contingent on deeply embedded historical structures, even when taking into account similar objective needs. Cumulatively, the chapter provides further evidence for my claim that the effect of precolonial centralization is driven by decidedly ongoing political dynamics.

## EXPLAINING ACCESS TO BASIC SERVICES IN SENEGAL'S COUNTRYSIDE

This chapter tests the central empirical predication of my theory: redistributive politics are a function of the relative degree of overlap between informal social institutions and the formal institutional boundaries of the local state. I look to the construction of primary school and basic health infrastructure in the 2000s to evaluate this claim. These sectors are critical for long-run socioeconomic development, but they function in the shorter term as an unparalleled source of patronage for local politicians. As in much of sub-Saharan Africa, governments still struggle to deliver a set of basic social services to citizens, meaning that community-targeted and community-specific physical infrastructure of this nature represents the most significant and often the most visible local

government activity in rural areas. These services are both highly valued by local populations and feasible for local governments to deliver, making the ability to target a village with a school or clinic invaluable for those seeking to build political support in their communities.

Although experiences vary greatly, all local government decisions are in principle made in open, public meetings. Citizen input is intended to inform local development strategies via elected representatives attending these meetings as well as through local government planning documents (*plans locals de development* or PLDs) which lay out a local government's development objectives for a five-year period and which are made in consultation with the local population. In reality, however, PLDs are produced inconsistently and read like a "wish list" of all of a local government's needs instead of offering an implementable strategy with technical guidance.[2] As a result, it is common for local actors to report that PLDs are not enacted "as they should be"; they only rarely lay out a sequential plan for making investments or for weighing needs against each other and, as a consequence, their catch-all nature grants substantial leeway to local actors wishing to pursue their own individual agenda.

It is no secret on the ground that local preferences – both those articulated in planning documents and those working their way in via political pressure – inform choices about local investments. Recent years have seen scholars turn their attention to these dynamics in recognition of the fact that who benefits from state largess reveals a lot about the state's political intentions and loyalties. The growing interest in the politics of public goods delivery in Africa and the Global South more broadly has tended to take one of two approaches to explain how and when citizens gain access to new social services: it is either driven by the top-down strategies of elites or, conversely, it results from a more bottom-up process, with some communities or individuals theorized to be better or worse positioned to petition for or coproduce services.

I introduce the most prominent versions of these arguments below, going on to test their ability to explain rural public goods delivery in Senegal in the remainder of the chapter. Although I do not dispute that these dynamics matter in *some* communities, I show that they do not explain distributional politics writ large. In contrast, I find that falling within the territory of a precolonial state offers more leverage on the patterns of spatial distributions adopted by Senegal's decentralized local governments.

## Top-Down Theories of Public Goods Delivery

### Electoral Motivations

The most prominent top-down lens into public goods delivery takes as its guiding assumption that the expansion of access to public goods generates

[2] See Williams (2010).

electoral payoffs. A clear example is found in Harding and Stasavage (2013), who find that African governments that abolish primary school fees gain an electoral payoff in large part because it is an easy distributive policy for citizens to verify. More broadly, work building on debates over core versus swing voters has found that politicians target goods to incumbent strongholds – or core voters – as a means to reinforce patron–client ties with voters.[3] Arguments that politicians target swing voters are rarer, though Masaki (2018) documents how Zambian politicians are limited in their ability to precisely identify swing voters, leading them to target aid projects to opposition strongholds in an effort to lure opposition votes. In turn, studies of African electorates suggest that these strategies are not misplaced: African voters weigh government performance heavily when deciding between candidates and parties, making their vote choices more mutable than is commonly assumed, far from "captured" by narrow clientelist relations.[4]

Though we have seen a rise in work on partisanship on the continent following the growing regularization of multiparty elections, these dynamics are also frequently understood as following the contours of ethnic cleavages. In this variant of Cox and McCubbin's (1986) core voter theory, co-ethnics constitute a "core" constituency for leaders and empirical research has shown that being a co-ethnic of the executive can improve one's access to a range of government programs across the continent.[5] The power of ethnic identities as conduits of patronage has been granted a particular prestige in the study of African politics, but as I show below, these factors do not appear to explain the actual distribution of public goods, nuancing the assumption that ethnicity is always the most important political cleavage in African political life. Of course, this null effect is in part driven by the relative lack of ethnic politicization in Senegal and other Sahelian states. Franck and Rainer (2012) find ethnicity to be a weaker predictor of favoritism in public goods delivery in Francophone West Africa and, while ethnicity remains a relevant social category for Senegalese, it has never become a national-level political cleavage.[6]

### Central Government Relations

Alternatively, public goods delivery may be driven by more relational top-down factors. If some local communities have better connections to the central government, for example, they may find themselves better able to gain favors from the state. This is the argument articulated by Boone (2003b), who contends that subnational differences in the ability of the central state to locate rural allies endogenously determines power relations between the center and periphery in West Africa. A systematic difference in the propensity of local elites to have ties to the central state could explain subnational differences in local public goods

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[3] For example, Burgess et al. (2015); Briggs (2014); and Jablonski (2014).
[4] Bratton (2012); Weghorst and Lindberg (2013); and Harding (2015).
[5] For example, Kramon and Posner (2013); Burgess et al. (2015); and Ejdemyr et al. (2017).
[6] Diouf (1994) and Koter (2013).

delivery. Elites who spend more time in Dakar or have other ties to those in power might have an easier time pulling in other, unmeasured resources, such as advice from development agents or favors from friends, for example.

I am unable to test this specific version of an argument that central government ties shape local redistribution systematically in the large-N dataset introduced in the next section, but we can gain some insight by returning to the 2013 survey of local elites. Among my survey respondents, only respondents in Thies Region, which lies immediately outside of Dakar, were significantly more likely to travel regularly to Dakar or to live part-time in the capital. Elsewhere, mayors reported traveling to Dakar three to four times a year on average and there was likewise no difference in a respondent's likelihood of having been educated in Dakar, Saint-Louis, or Europe, another possible source of valuable contacts.[7] Nor, as was shown in Figure 4.2, are elites interviewed in 2013 more likely to have a family or friendship relation to their Deputy in the National Assembly or a central government bureaucrat.[8]

A more tractable manifestation of central government favoritism is found in central government transfers, which comprise the bulk of local government budgets. The most important is the *Fonds de Dotation de la Decentralisation* (FDD), which in principle is informed by population size and need. Though the FDD is at times clearly political (state ministers who serve a dual mandate as mayor, for example, often receive greatly inflated transfers), most local governments receive one of four or five set amounts according to their population size. As noted in Chapter 4, these transfers are actually biased *away* from historically centralized areas in per capita numbers, with the mean amount transferred per capita at \$1.86 in historically uncentralized areas compared to \$1.50 for centralized zones.

## Bottom-Up Theories of Public Goods Delivery

### Ethnicity Homogeneity

Co-ethnicity may serve as a proxy for core voters, but it is also argued to have bottom-up properties that are consequential for local goods delivery. More homogenous communities may find it easier to overcome local collective action

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[7] Of course, another manifestation of this could be through one's allegiance to the national ruling coalition. Of those surveyed in 2013, roughly 45 percent of those claiming a partisan affiliation reported having been in contact with their party hierarchy over the past year but note that 2012 was an election year and over 90 percent of those who reported contact said it was to discuss the elections. Approximately half of the elected officials interviewed had received help developing an electoral platform or some form of training from their party. These numbers are consistent across the country.

[8] To the contrary, most local elites are quite skeptical of their deputies' commitment to their community's well-being. Deputies were dismissed as not listening to the population, for being absent from the local political terrain or, as one councilor smirked, because "when they are chosen, it is not for their competency" (Interview, Saint-Louis Region, July 29, 2013).

dilemmas to either petition the state for or coproduce public goods.[9] This would suggest that it is not identities bestowed by the precolonial past but rather ascriptive identities of ethnicity that enable or impede the resolution of local collective actions on the part of community members. The predominant role of ethnic identities often remains as our default expectation for African politics, but my own discussions with local elites suggest that these identities are less durable than are often assumed. In many communities, local political cleavages actually emerge *within* ethnic groups, such as between different castes or between long-time residents and newcomer co-ethnics. In parts of Kolda Region, for example, the "Peulh Fulani" were repeatedly claimed to be favored over the "Peulh Firdu," reflecting sub-ethnic disagreements based on putative regions of origins of different clans.[10]

Though I test the ability of ethnic homogeneity to explain patterns of public goods delivery as well as co-ethnicity with the executive, I present findings consistent with my expectation that far older identities offer more explanatory leverage following decentralization. Still, I recognize that my argument that a shared identity enables cooperative behavior will remind many of Habyarimana et al.'s (2007) finding that co-ethnics may be better able to coordinate around public goods provisions because they share strategies, such as social sanctioning or the presence of shared norms, to overcome collective action dilemmas. Are precolonial identities simply doing the same work here? I argue that identities inherited from the precolonial past are distinct for two reasons. First, though not predicated on face-to-face recognition of all community members, social institutions work because they are tied to dense social networks that enable individuals to circulate reputations and reputational sanctions more immediately than the diffuse networks that define many ethnic groups, suggesting that a more immediate social proximity drives action than that tested by Habyarimana et al. Second, although we might imagine that shared ethnic identification generates social institutions, the possession of a shared identity alone is insufficient to engender institutional congruence. What is key is not a collective identity, but the social institutions that they carry with them develop over a longer term.

In this way, my argument speaks to a broader challenge to the reigning hegemony of ethnicity in African political life. Taking seriously the identities that actors on the ground ascribe to themselves suggests that the availability of alternative collective identities, such as descent from a precolonial state, is equally, if not more, motivating for local actors. This means that the most consequential political identities in local African political life may be those that are hard to observe from on high and may be uniquely distinct from national political dynamics.

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[9] Miguel and Gugerty (2005) and Habyarimana et al. (2007).

[10] For example, when asked whether he knew any councilors, one Peulh Firdu chief in this area shook his head before saying it was the "Peulh Fulani that rule here, not us" (Interview, village chief, Kolda Region, April 10, 2013).

### Associational Life

A final bottom-up explanation explains local government performance by looking at horizontal networks of social capital. This approach, classically articulated by Putnam (1993), shifts gears away from identity categories like ethnicity toward associational life, which is argued to build trust and increase the capacity for collective action in a community. In line with this logic, we may expect that local governments home to more dense networks of civic associations will see better distributional outcomes by virtue of the social capital these associations produce. The distribution of public goods, in other words, is less the result of politicians' own strategies than it is endogenous to the ability of communities with high social capital to demand and coproduce services. This argument informed one of the core tenets of democratic decentralization reforms which sought to create local governments that were responsive to local needs and would be monitored by local populations and civic groups. I test two observable implications of the social capital approach in this chapter, looking first to the density of civic associations in Senegal's rural villages and, second, the question of social trust, which for many theorists of social capital, is a key mechanism by which associational life influences local governance. As my models show below, however, there is no evidence that either bottom-up explanation offers systematic leverage in explaining which villages receive new investments from their local government.

### DATA AND MEASUREMENT

The rest of this chapter tests my theory's ability to explain actual village-level public goods delivery in decentralized rural Senegal by examining the placement of basic social services between 2002 and 2012 using an original dataset of the approximately 14,300 rural villages in Senegal. In the process, I examine the relative explanatory power of the prominent alternative hypotheses introduced above.

The dataset measures two infrastructure investments made by local Senegalese governments: new primary schools and new health clinics (*postes* or *cases*). By looking across different types of public goods, I mitigate concerns that different public goods would be driven by distinct logics and, because all rural communities build some mix of this infrastructure in the period under study, it allows me to focus on the most comparable and visible investments made by Senegal's local councils.[11] The dataset was built upon GIS data

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[11] For example, Kramon and Posner (2013). As noted earlier, local governments do make other, smaller investments, such as financing yearly youth football tournaments, for which complete data is unavailable. A more complete assessment of this nature is found in the case studies presented in Chapter 6.

provided by the *Centre de Suivi Ecologique* in Dakar. Data on school placement were provided by the Senegalese Ministry of Education, and clinic data by the Senegalese Ministry of Health. This is complemented with data from the 2000 and 2009 rounds of the *Enquête villages sur l'accès aux services sociaux de base*, conducted by the Senegalese National Agency for Statistics and Demography (ANSD). To merge across datasets, I georeference basic infrastructure and control variables to their villages using Blasnik's (2010) method for matching fuzzy text: village names are matched within each local government and all non-exact matches were reviewed by hand. The sources for each variable are noted in Table 5.1.

### Dependent Variables

I employ three dependent variables to assess my theory's ability to explain patterns of public goods delivery. These binary measures – *Primary Schools* (observed in two time periods) and *Health Clinics* – take the value of one if a village receives new access during the period under analysis and zero if not. In total, my dataset counts 2,331 primary schools as having been built in rural Senegal between 2002 and 2012. This number reflects a substantial push to improve primary education in the country, driven in part by renewed donor attention and the Millennium Development Goals, which, initiated in 2000, aimed to achieve universal primary education under Goal 2 by 2015. Similarly, between 2009 and 2014, 417 health huts (*case de santé*) and 173 health posts (*poste de santé*) were constructed in the 292 local governments for which data are available.

Because many local public goods are built with the intention that they will serve a set of villages, I use the Senegalese national standards for "access" to construct dependent variables of goods delivery. These are set at 3 kilometers for primary schools and 5 kilometers for basic health, meaning that anyone within that distance is considered "covered" by the state. This does not prohibit construction within these norms – a village whose nearest primary school is 2.5 kilometers away may certainly merit their own – but it does offer a guideline for estimating who has reasonable access to services in rural areas. Consequently, distance measures are constructed by calculating the distance each village in a local government must travel to reach the nearest primary school or clinic. Villages that had no access in the baseline year are coded as having been delivered a good if a new service is built in the access radius. Villages that were already within these standards are only coded as receiving a new investment when a facility is built *closer* than their previous point of access, meaning that a village within 1 kilometer of a school in the baseline year receiving a new school 3 kilometers away would not capture a meaningful investment and hence would be coded as having no change in access.

TABLE 5.1 *Descriptive statistics of large-N dataset*

| | Variable | N | Mean | Range | Source |
|---|---|---|---|---|---|
| **Independent Variables** | Institutional Congruence, 2002 | 14,504 | 0.591 | 0–1 | Author Coded |
| | Institutional Congruence, 2009 | 14,504 | 0.591 | 0–1 | Author Coded |
| **Dependent Variables** | New School Access, 2002–2009 | 14,504 | 0.212 | 0–1 | Senegalese Ministry of Education |
| | New School Access, 2009–2012 | 14,504 | 0.172 | 0–1 | Senegalese Ministry of Education |
| | New Clinic Access, 2009–2012 | 11,409 | 0.157 | 0–1 | Senegalese Ministry of Health |
| **Controls: Local Need** | Ln Village Pop | 14,497 | 5.498 | 0.693–12.676 | *Repetoire officiale du villages* 2011, Gouv. du Senegal |
| | Population Density, 3 km | 14,398 | 1,395.7 | 2–342,315 | Author Coded |
| | Population Density, 5 km | 14,398 | 2,620 | 2–349,155 | Author Coded |
| | D School 2002, sqrt | 14,411 | 35.83 | 0–275.3 | Author Coded from Ministry of Education data |
| | D School 2009, sqrt | 14,414 | 28.71 | 0–273.3 | Author Coded from Ministry of Education data |
| | D Clinic 2009, sqrt | 14,488 | 49.95 | 0–203.8 | Author Coded from Ministry of Health data |

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|---|---|---|---|---|---|
| **Controls: Local Demand** | Local economic activity, 2000 | 14,489 | 1.872 | 0–8 | ANSD *Enquête Villages* 2002, 2009 |
| | Local economic activity, 2009 | 14,490 | 2.615 | 0–8 | ANSD *Enquête Villages* 2002, 2009 |
| | % Villages Schools, 2002 | 14,365 | 30.273 | 4.48–100 | Author Coded from Ministry of Education data |
| | % Villages Schools, 2009 | 14,322 | 38.79 | 0–100 | Author Coded from Ministry of Education data |
| | % Villages Clinics, 2009 | 14,499 | 13.1 | 0–100 | Author Coded from Ministry of Education data |
| | Regional Wealth | 14,459 | −0.043 | −1.49 to 2.41 | Author Coded from DHS data |
| | % Villages Mouride, 2002 | 14,459 | 4.6 | 0–83.3 | Author Coded |
| | % Villages Mouride, 2009 | 14,459 | 4.5 | 0–73.3 | Author Coded |
| **Controls: Ease of Access** | LG Capital 2002 | 14,459 | 0.022 | 0–1 | Author Coded |
| | LG Capital 2009 | 14,459 | 0.026 | 0–1 | Author Coded |
| | Ln D Road | 14,366 | 0.581 | −2.30 to 3.58 | Author Coded |
| | Ln D Admin Center/Market | 14,488 | 1.80 | −1.79 to 4.10 | Author Coded |
| **Controls: Geographic** | Ln D Waterway | 14,488 | 10.16 | 0–12.51 | Author Coded |
| | Village Elevation | 14,363 | 39.94 | 0–461 | USGS Global Elevation Grids (75 arc seconds) |
| | Soil Suitability | 14,494 | 7.23 | 0–42 | Hengl et al. 2017 |
| | Latitude | 14,488 | 14.33 | 12.34–16.66 | Centre de Suivi Ecologique |
| | Longitude | 14,488 | −15.42 | −17.44 to 11.37 | Centre de Suivi Ecologique |

## Independent Variables

As introduced in Chapter 2, I define a precolonial state as a political entity that meets four criteria: (a) a limited organizational form, notably a political hierarchy built around patron–client relationships; (b) a system for taxing trade; (c) regularized tribute systems from clients; and (d) some form of localized representation to regulate social and economic life, such as judges or tax collectors.[12]

While this generates a universe of eligible states, identifying their spatial extent is a separate empirical question. Although approximate borders of precolonial states can be found in early European maps, these maps offer unreliable estimates across sources and are heavily biased toward states located along the coastline, which were subject to more frequent exploratory missions. Importantly, they also reflect the efforts of Europeans to map precolonial Africa into European conceptualizations of political space, with states defined as neat polygons.[13] These concerns lead me to opt to measure precolonial statehood as emanating outward from precolonial power centers, following Herbst's (2000) argument that precolonial power was projected concentrically outward from nodes of power.[14] Adopting this logic, I consult historical studies of each precolonial state to assemble a list of capitals and other important sites for each precolonial polity that meets my criteria for statehood.[15] This includes major market villages, the seats of provincial titleholders, important religious centers, and other sites of historical note. Given the rotating nature of power among families in Senegambian precolonial states, for example, I georeference any village that was headed by a family that was eligible to produce kings or that were electors to this system. This allows me to be sensitive to what were often spatially diffuse concentrations of power in the subregion before the onset of colonial rule.

This produces a set of core nodes of power for each state, which in turn I georeference using the same GIS database of Senegalese villages upon which my social service data are based. I cross-validated these locations using maps produced in the first two decades of colonial rule in case villages have changed names or moved. I then construct 20-kilometer buffers around each of these villages to identify all contemporary villages that fall within this range of a

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[12] North et al. (2009, 5–9) and Hawthorne (2013, 77).     [13] Branch (2014).

[14] While many studies measure precolonial centralization following Murdock (1981) as a property of ethnic groups, Murdock's measure does not capture *political* institutions, but rather *cultural* attributes that do not inherently equate with polities. This is particularly relevant in the Senegambian context because many ethnic groups fall within both centralized and uncentralized zones. Coding centralization as an ethnic attribute would overly inflate or deflate the extent of exposure to a precolonial polity. Moreover, all of the precolonial states that fell within the boundaries of contemporary Senegal had explicit provisions for minority ethnic subjects (see discussion in Chapter 2).

[15] Coding details can be found at http://marthawilfahrt.weebly.com/senegals-precolonial-states .html

precolonial center of power. Twenty-kilometer buffers best approximate the boundaries in early colonial maps, but increasing the buffer size to a more generous 25- or 30-kilometer radius generates comparable results.[16] Because I am interested in the relative congruence between a precolonial state and villages within any given local government, villages receive a score of one if they fall within the buffer of a precolonial state that covers the majority of villages in their local government. Villages that are not congruent with the dominant precolonial state or which fall in local governments with acephalous histories are coded as zero.

To account for the rise and fall of states over time, coding is done for eight points in time between the first and second half of each century between 1500 and 1880, when the French begin fully moving into the interior of the country. I penalize more distant experiences with centralization under the assumption that longer intervals between the onset of colonial rule and precolonial statehood are more likely to have eroded the strength of precolonial identities and/or networks rooted in these histories. Accordingly, I apply a discount rate to any given village's centralization score, thus that the full score is taken for 1880, the score for 1820 is divided by half, 1780 by a third, and so forth. I then standardize the average score of the eight periods of assessment to range from zero to one to generate the central independent variable, *Institutional Congruence 20 km*. This measurement process is displayed in Figure 5.1.

### Control Variables

I include four series of control variables in my analyses of new school or clinic placement. The first set captures local needs. Logged village population and population density, calculated as the total population falling within 3 (schools) and 5 (clinics) kilometer grid squares around a village, measure the number of potential beneficiaries of a new facility.[17] Because some villages had better access to social services in the baseline year, the square root of the distance to the nearest school or clinic as well as the percent of villages in a local government that had their own school/clinic in the baseline year are also included. Together, these variables capture initial levels of access under the assumption that worse access indicates greater need for new services.

A key assumption of this project is that rural Senegalese have similar preferences for public goods across space. I include a count measure of the number of facilities built by each local government during each time period as this might reflect local preference. Local demand may also be higher in wealthier areas of the country, who could be better positioned to demand or coproduce services.

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[16] See Table A5.4 in Appendix.
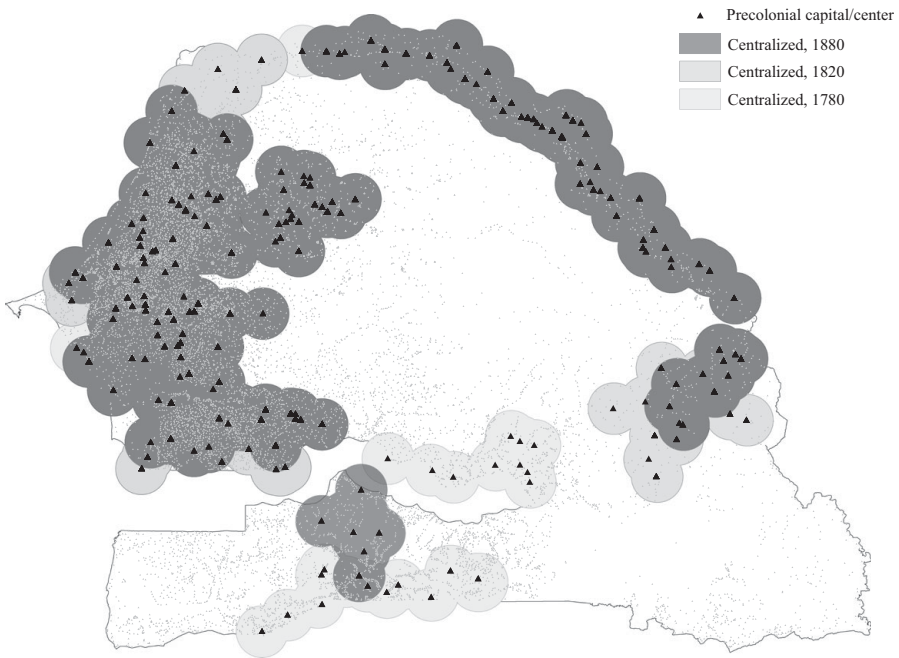[17] Results are robust to using the local government population density.

FIGURE 5.1 Precolonial capitals and discount rate illustration

At the village level, I include a measure of local economic activity in the baseline year, an additive measure of the presence of a boutique, market, artisanal workshop (i.e. metalworking), or facilities for transforming raw products (i.e. charcoal).[18] It is also possible that public goods construction is endogenous to an area's relative wealth, but given the absence of subnational income data, I proxy this by drawing on data from the 2010 and 1997 Demographic and Health Surveys to construct average *arrondissement*-level indices of household belongings to account for relative differences in wealth.[19] Of course, some families may prefer to send their children to Islamic schools in lieu of a secular education. I lastly control for the percent of villages in a local government whose names include common markers of affiliation with Senegal's Islamic brotherhoods, for instance, "Touba," "Darou," or "Mbacke," as a proxy for

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[18] Unfortunately, data from the ANSD do not cover all official villages. Because the approximately 1,200 villages missing in the first period and 2,100 in the second are disproportionately small, dropping them from models could potentially bias results. Consequently, I assign the local government average to villages with missing data. Results are consistent using the arrondissement-level average or when villages with missing data are dropped.

[19] This measure is comparable to the DHS surveys own "rural wealth index," but it removes any possessions that are dependent on social services, notably electricity. The resulting index is composed of house material quality and a basket of possessions, such as a bike, cell phone, etc.

spatial variation in preferences for Islamic education.[20] Fixed effects models further indicate that any such local government-specific unobservables do not appear to drive the results.

In an additional set of models, I control for structural factors that may shape distributional strategies in the short term, such as the ease of access or proximity to decision-makers. This third set of controls includes a measure of a village's logged distance to the nearest road as well as its logged distance to the nearest administrative center or weekly market. This follows Herbst's argument that the African state has faced a reoccurring dilemma from the precolonial era to the present of how to project power over space. We may expect that villages farther from local centers of power and arteries of communication are harder to reach and service. These models additionally include a dummy variable that takes a value of one if the village is the local government capital or *chef-lieu* where local state power should be strongest.

Finally, a fourth set of geographic controls account for the possibility that longer-run geographic conditions favored both the formation of precolonial states and contemporary economic development. These include a village's elevation, its logged distance to the nearest navigable waterway (river or coastline), and its soil suitability (measured by its captation rate at 15 cm).[21] I also include a village's latitude, longitude, as well as their interaction term.

Descriptive statistics can be found in Table 5.1. Descriptive data for alternative explanations and robustness checks introduced below can be found in Table A.1 in the Appendix.

## Alternative Explanations

The large-N dataset simultaneously allows me to test a number of the alternative explanations introduced above. As documented qualitatively in Chapter 4, evidence for many of these factors emerge in local governments in historically acephalous areas, hence I do not deny that these dynamics may explain the distributional strategy of some local governments, though I remain agnostic as to what dynamics emerge where. I do not expect them to explain outcomes as a whole nor to be more consequential than institutional congruence, however.

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[20] Accordingly, I assume that Touba's role as the seat of the Mouride religious brotherhood merits its exclusion from the analysis. With 530,000 residents, Touba's population is closer to Senegal's secondary cities than other rural communities, but given the political status of Mouride leaders, the locality remains "rural." The area's piety means that only 9 percent of primary school-aged children were enrolled in public schools in 2012, far below the national average (50.6 percent). Results hold if included, but given improvement in model fit, I exclude Touba from the sample given its exceptionalism.

[21] Soil suitability data are from Hengl et al. (2017).

I begin with "top-down" explanations that focus on the strategic interests of politicians, parties, and the central state. To account for the possibility that the relative competitiveness of any given village might shape who is more or less likely to receive an investment, I match each village to the nearest voting booth in their local government for both the 2002 and 2009 local elections.[22] I use the percent of votes for the winning party at the nearest voting booth as well as a measure of the gap between the first and second place parties as a measure of swing votes. Because each village is assigned the results of its nearest voting booth, I interact a voting booth's vote gap with the logged population of the villages assigned to that location (*Vote GapxPop*); two neighboring villages sharing a polling location might both be home to swing voters, for example, but the attractiveness of targeting them with a public good is conditional on their population size. To measure core voters, I similarly interact the percent of votes for the winning party with village-level logged population (% *WinningxPop*). Since we might think of the effects of political competition accruing at the local government level rather than between 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 (*PDS*).

Of course, focusing on local governments as the key actors in providing services risks ignoring the possibility that the central government is shaping differential outcomes through the unequal targeting of resources. To account for this risk, I include three measures of favoritism from the center. The first two capture unequal transfers. A measure of the percent change in the teacher/student ratio between the baseline and outcome years for each region (*Teachers/Students*) proxies for unequal transfer of resources from the central state because the allocation of teachers remains the purview of the Ministry of Education. For the second period, models include the average dollar per capita transfer from the central to local state between 2009 and 2012 via the FDD. Average FDD transfers ($ *Transfers*) thus directly captures any inequalities in central government transfers. On its own, these transfers do not appear to be biased toward formally centralized areas, as discussed in the section "Top-Down Theories of Public Goods Delivery." In view of arguments that the executive favors co-ethnics, I test whether President Wade was more favorable to dominantly *Wolof* communities.[23]

Finally, I address the two bottom-up mechanisms introduced earlier. Given the prevalence of claims about ethnic heterogeneity's dampening effect on public goods provision, I examine the effect of ethnolinguistic fractionalization (*ELF*).

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[22] A similar matching procedure for voting booths was done as with social service infrastructure – matching villages to their GIS coordinates and then to the nearest voting booth within their local government, assigning the value of that bureau's results. Note that in 2002, thirty-eight villages from five rural communities are dropped due to missing electoral data. In 2009, this number is approximately 600 villages in 11 rural communities.

[23] I was unable to obtain village-level ethnicity data.

Given significant gaps in data on local ethnic composition, I measure this by averaging the ethnic fractionalization of local governments for which data are available across the next highest administrative level, the arrondissement. Once again, there is no effect, reflecting the relatively low level of ethnic politicization in Senegal.[24] Because horizontal social capital has been shown to improve subnational governance outcomes, improving the organizational capacity of villages to petition the local state, I similarly examine whether the differences between centralized and acephalous areas of Senegal can be explained by differential stocks of local social capital. I estimate whether a count measure of the number of civic associations in each village offers any leverage on local public goods delivery (*Civic Assns*). This is coded from the ANSD's *Enquête village* and includes the presence of village development associations, women's groups, local sports or youth groups, village political party branches, and economic interest groups.[25]

One variation of the social capital argument is that it is not civic associations but rather stocks of social trust that improve development outcomes. As a final test, I turn to recent arguments by Nunn and Wantchekon (2011) who find that precolonial exposure to the slave trade inhibits local community performance today because it eroded social trust. The impact of the Atlantic slave trade on West Africa is widely debated. Certainly, the slave trade at times strengthened existing states and weakened segmentary societies, increasing insecurity by undermining the "social glue" that had held communities together.[26] If areas that were acephalous prior to colonization were more likely to be raided for slaves and if this systematically reduces trust within communities today, it could explain poor performance as well as the weaker social ties observed in earlier chapters.

## Estimation Strategy

I analyze the data with multilevel logit models that cluster at the local government level. Multilevel modeling allows me to capture variation in infrastructure provision between villages as well as variation between local governments. Since placement decisions are made at the local government level, hierarchical models offer efficiency gains in the standard errors because village-level observations within any given community are not independent of one another – a local government that has the resources to build two health clinics, for example, faces a choice between villages that violate assumptions of conditional independence. Additionally, significant variation in the number of villages

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[24] Franck and Rainer (2012).

[25] The measure thus excludes associations dependent on a preexisting public good, that is, school associations. Given data gaps, this variable uses the same procedure as with local economic activity (see Footnote 22).

[26] Fage (1969); Whatley (2014); and Hubbell (2001, 38).

within local governments, ranging from 3 to 195 problematizes the common approach of clustering standard errors by local government. To capture potential unobserved heterogeneity within administrative units, I rerun the hierarchical models with local government fixed effects to estimate whether institutional congruence can explain within-unit variation. Because of Senegal's 2009 administrative redistricting (see discussion in Chapter 3), models are run for two electoral cycles: 2002–2009 and 2009–2012 with all relevant variables calculated to the adjusted boundaries.

Following Bell and Jones (2015) and Gelman and Hill (2008), all multilevel models include a centered mean score of precolonial centralization at the local government level. This is done in order to remove unobservable characteristics at higher levels that may correlate with level one predictors and the dependent variable, thereby violating the assumption that the random intercept is uncorrelated with other variables. This approach directly models this potential source of bias as a response.[27]

## THE DELIVERY OF PRIMARY SCHOOLS AND BASIC HEALTH, 2002–2012

### Main Results

My core statistical analyses are presented in Figure 5.2.[28] Together, the results suggest a robust effect of institutional congruence on the likelihood a village gains access to a new primary school or a new health post or hut during the 2000s. Panel (a) shows that the results of models include controls for local need and local demand. They suggest that villages that fall within the boundaries of a precolonial state are more likely to receive schools in both time periods. Depending on model specification, the marginal effect of centralization on new schools suggests that villages in areas that were always centralized in the 500 years prior to colonization are 11–12 percent more likely to receive a school, holding other variables at their means in the first time period and approximately 8 percent in the second. Across models, the odds of a village within a centralized area receiving access to a new primary school are over twice more likely than areas that were always acephalous. Finally, the last reported model estimate in Panel (a) indicates that villages in congruent areas are also more likely to receive access to new health facilities. Specifically, villages in congruent local governments are approximately 11 percent more likely to receive access to a health facility.

The addition of a host of geographic controls in Panel (b) does not fundamentally alter the results. Fixed effects models, displayed in Panel (c) further indicate that institutional congruence is important even within local governments: when the majority, but not all, of a local government's territory was covered by a

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[27] All results are consistent with the exclusion of the centered mean as well.
[28] Full model results are available in Table A.2 in the Appendix.

(a)

(b)

(c)

| Schools | Schools | Clinics |
| 2002–2009 | 2009–2012 | 2009–2012 |
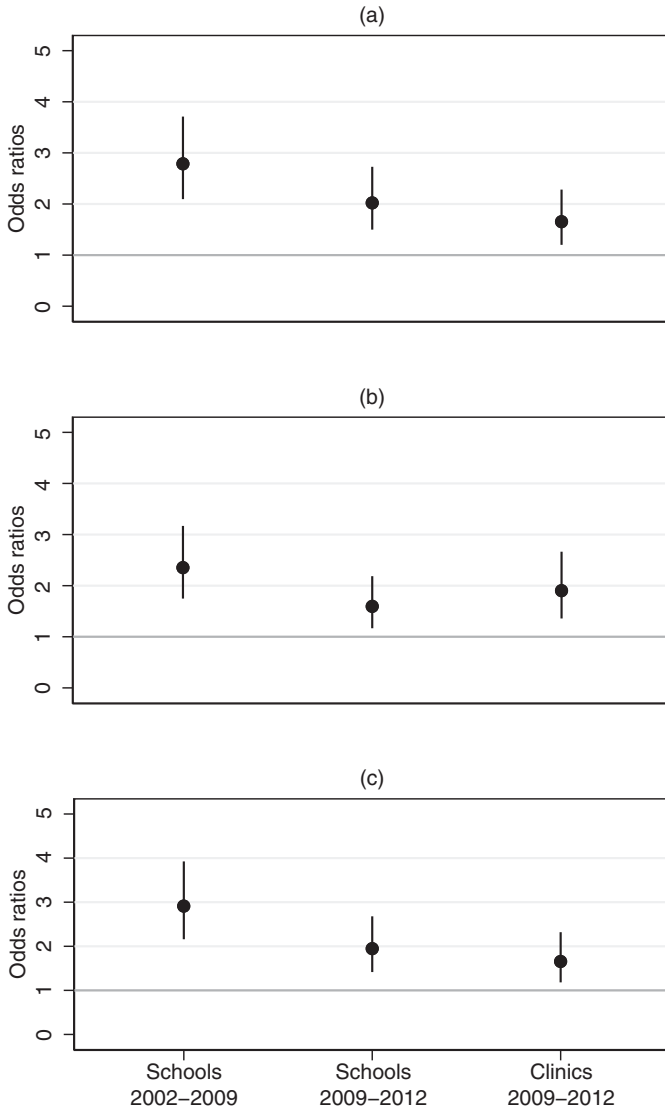
Note: Panel (a) includes controls for local need and local demand. Panel (b) adds a set of controls measuring ease of social service access in the baseline year as well as a set of geographic controls. Panel (c) presents results from models with local government fixed effects that omit all local government-level controls.

FIGURE 5.2 Effect of institutional congruence on village access to new social services: (a) main results, (b) with geographic controls, and (c) fixed effects models

precolonial state, villages that fall within the boundary of a precolonial state are more likely to receive public goods access than those that fall outside of the estimated boundaries. Together the results in Figure 5.2 suggest that local governments in centralized areas are improving access to basic public goods for

their villages more than in areas of the country that were never centralized, or which had mixed histories with precolonial rule. Expanding my measure of precolonial statehood outward to 25- and 30-kilometer buffers or reducing the definition of access for new public goods to more conservative values produces consistent results, as seen in Tables A.3 and A.4 in the Appendix.

   Most importantly, this is despite the fact that local governments who have a largely acephalous history were building more schools per capita in both time periods. Difference of means tests show that acephalous local governments built an average of 2.8 schools per 10,000 residents versus 2 in centralized areas between 2002 and 2009 (significantly different at $p < 0.001$) and 2 versus 1.9 between 2009 and 2012 (insignificant). In absolute numbers, there is only a significant difference in the first time period (5.7 versus 4.5 schools on average per local government) with a reverse finding in the second (2.5 versus 3.3 schools). Similar figures exist for clinic delivery: acephalous areas provided an average of 2 new health facilities per 10,000 residents between 2009 and 2012 compared to 1.9 in historically centralized areas, again an insignificant difference.[29] This suggests that this is not a question of volition or ability to provide social services, but rather of placement and distributional choice.

**Alternative Explanations**

How does the seemingly robust effect of precolonial centralization compare to preexisting explanations of public goods delivery? Figure 5.3 presents the results of an additional set of models that test whether common alternative hypotheses explain the patterns identified in Figure 5.2. Results are displayed by public good and time period. Across the board, these models suggest little systematic influence of common hypotheses derived from the literature. Thus while local political party activity is quite robust, with 76.5 percent of rural elites surveyed (and 97 percent of elected officials) for this project reporting feeling close to a political party and local councils have an average of 2.4 parties seated, I find little systematic evidence that electoral dynamics drive redistribution.[30] Although the interaction between village population and the gap between the first and second place parties does appear to be positively correlated with a village's access to a new school in the first time period – indicating favoritism to core voters – there is no similar effect in the second time period or

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[29] In absolute numbers, this is an average of 1.6 versus 1.65 facilities.

[30] Competition declined nationally in 2009, when nearly 66 percent of local councils were aligned with the government in Dakar, up from 57.5 percent in 2002. This should not obscure however one of the most pervasive features of Senegalese politics: the tendency for elites to switch political parties frequently. Of those with a reported party identification in 2013, only 31 percent reported having always belonging to that party and approximately 65 percent of those who had switched parties had done so most recently right before, during, or after the 2012 Presidential and Legislative elections.
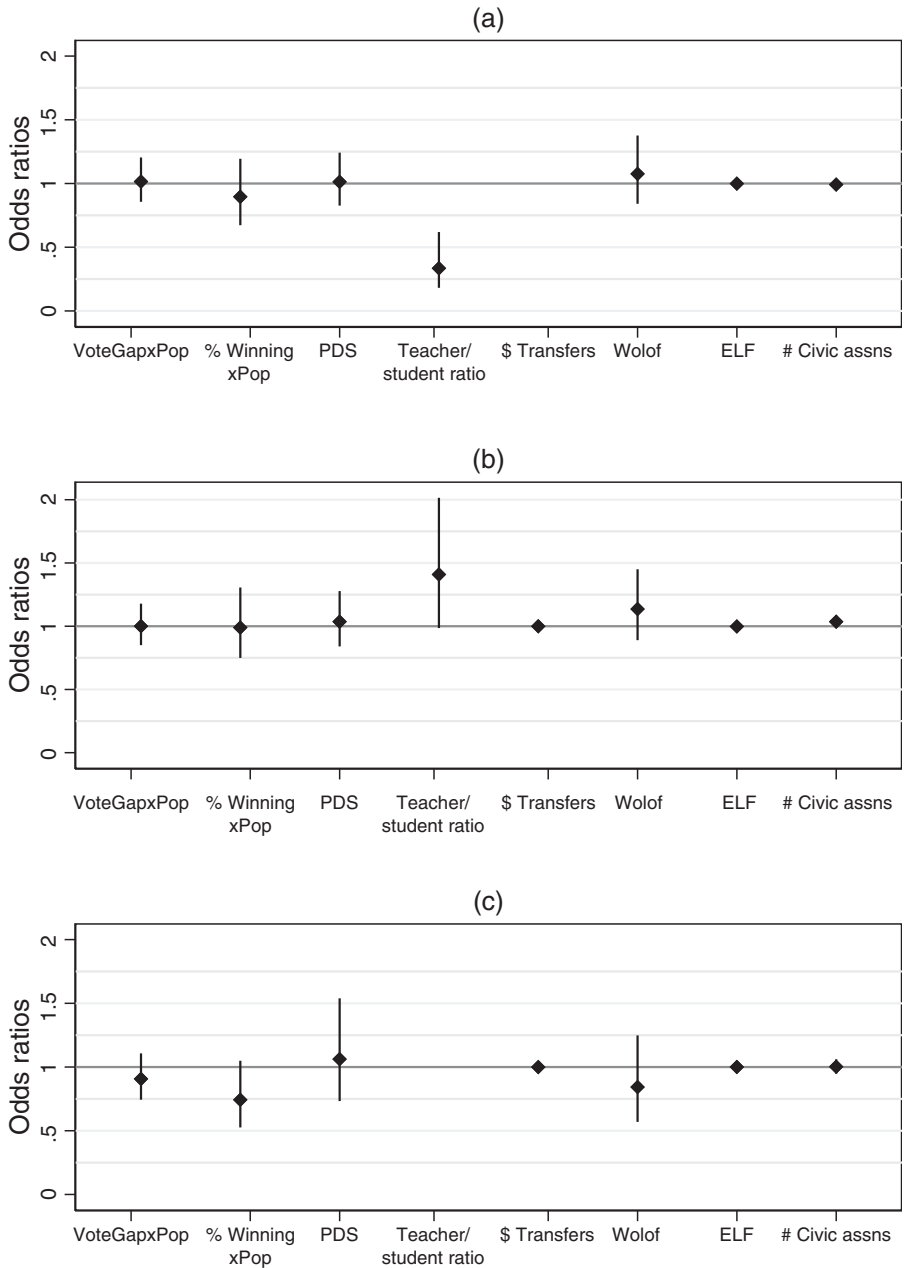
FIGURE 5.3 Effect of alternative explanations on village access to new social services: (a) new schools 2002–2009, (b) new schools 2009–2012, and (c) new clinics 2009–2012

in relation to other basic services. Moreover, a corresponding effect is not found when looking at the percent of votes going to the winning party, another measure of core voters.

At no point does the role of the central state appear to influence village-level redistribution, as measured by central state alignment or the favorable distribution of resources. There is no apparent benefit of residing in a local government that is predominantly Wolof, suggesting little favoritism toward co-ethnics of President Abdoulaye Wade who was in power during the years under study. Finally, theorized bottom-up drivers, an area's ethnic homogeneity, and the number of village civic associations do not appear to enable villages to obtain more access. Neither finding is entirely surprising. As noted above, though ethnicity is a salient social identity for Senegalese, it is not the only one and may obscure other relevant social divisions, such as caste or migration patterns.

Civil society organizations are active throughout rural Senegal, but remain weak democracy promoters, often quickly imbricated in local social hierarchies and power relations.[31] Despite a push to create social capital via civil society, the evidence presented here does not indicate that it systematically improves the ability of any given community or group to extract goods from their local governments. Critically, as reported in the full model results in Tables A.5a and A.5b in the Appendix, institutional congruence retains a positive and significant effect throughout.

Of course, we can imagine factors beyond associational life that might allow communities in areas that were home to precolonial states to be better able to monitor their local governments and hold them accountable. Additional evidence for this is found in data from Rounds 4 and 5 of the Afrobarometer. Forty-eight percent of respondents in acephalous areas versus 45 percent in centralized areas correctly identify "voters" as being responsible for making sure the local council does their job, an insignificant difference. Among respondents of my own survey, what does appear to differ – in line with the network mechanism – is that respondents are significantly more likely to report being able to monitor (50 versus 35 percent) or to sanction or reprimand elected officials when they disagreed with them (62 versus 51 percent) when they have family ties to elected officials. Similarly, friends and family members are significantly more likely to think that they can persuade the mayor to help them with something or see things their way than those with no affective ties.

One variation of the social capital argument is that it is not civic associations but rather stocks of social trust that improve development outcomes. Articulated most famously by Putnam (1993), a most recent prominent version of this argument comes from Nunn and Wantchekon (2011), who find that historical exposure to the slave trade results in lower levels of social trust today. Figure 5.4 presents three empirical tests to evaluate whether there are
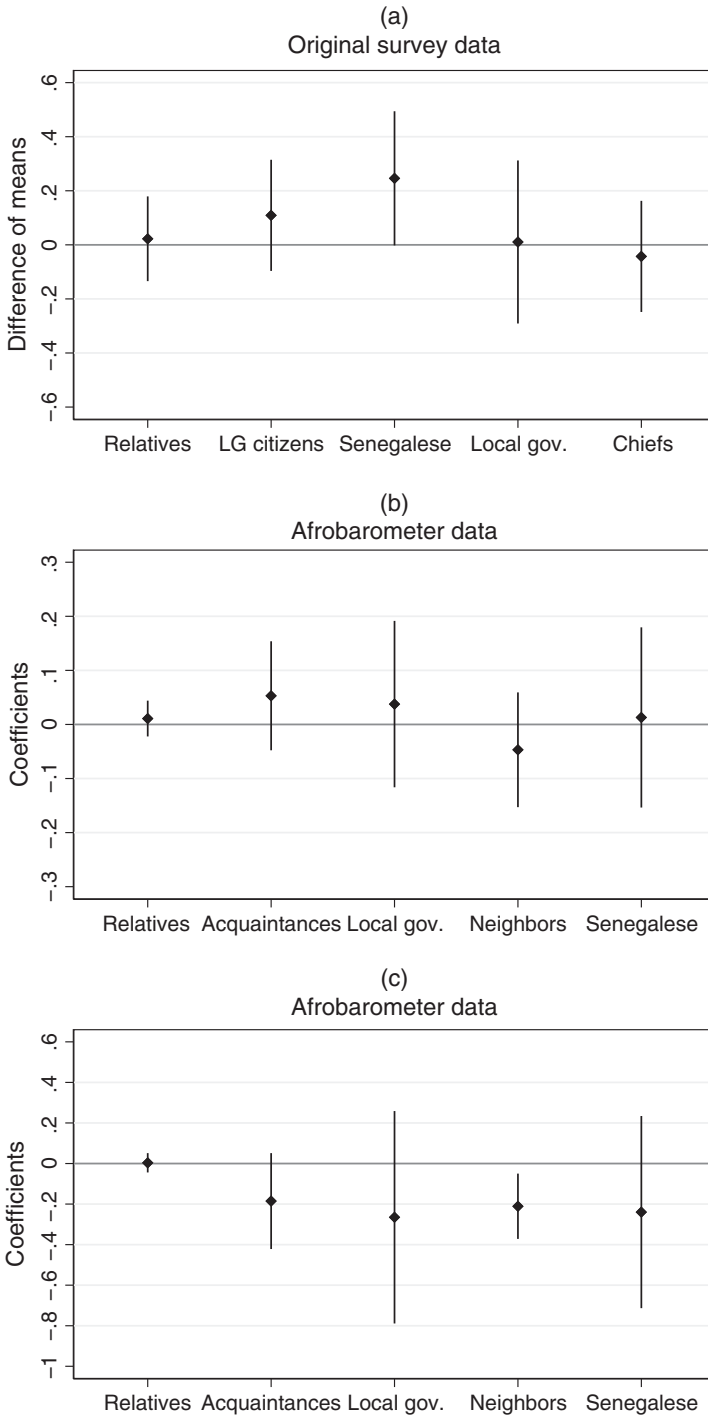
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[31]  Patterson (1998).

FIGURE 5.4 Trust estimates: (a) difference of means by institutional congruence, (b) slave exports per area (Nunn & Wantchenkon replication), and (c) institutional congruence

differential stocks of intra-community trust within congruent and incongruent local governments.[32] First, Panel (a) reports the differences in means of reported trust in a number of local figures among those I surveyed in 2013. Precolonial centralization does not appear to systematically explain these differences. Panel (b) replicates the models of Nunn and Wantchekon (2011) using Rounds 4 and 5 of the Afrobarometer. If Nunn and Wantchekon are correct, then the positive effects of areas that were home to precolonial states could be driven by higher levels of intra-community trust because they were less exposed to the slave trade. I find no evidence for this using Nunn and Wantchekon's preferred measure of exposure to the slave trade, measured as ln(1 + ethnic group exports/area of ethnic group). Nor does trust meaningfully vary among Afrobarometer respondents using my own measure of institutional congruence, presented in Panel (c). In fact, the only statistically significant difference appears to be that respondents in areas home to precolonial states are actually less trusting of neighbors, the inverse of the expected finding. Together, Figure 5.4 suggests that we do not see systematically lower levels of trust in historically acephalous areas, suggesting that differences in local stocks of trust are unlikely to be driving the variation I observe in Figure 5.2.

### Relative Placement Efficiency

Central to my argument is the claim that local governments in historically centralized areas engage in spatially distinct patterns of redistribution. I have already established that the results of Figure 5.2 are not driven by historically centralized areas simply delivering more new facilities. This raises the question: do local government councils engage in spatially different patterns of distribution? Expectations of government favoritism abound, but despite growing interest in how public goods delivery is politically targeted, empirical research relies on the idea of an ideal allocative decision that is never actually modeled.[33] To get around this problem and to develop a metric for the relative efficiency of placement, I make use of location-allocation models, often employed by businesses and public agencies to help identify the most efficient location for public services, warehouses, stores, etc., taking into account the locations of existing facilities, potential new sites, and the spatial spread of demand.

   The central empirical strategy behind location-allocation models is to compare between the model predicted, efficiency-maximizing location(s), and the location(s) actually chosen by any given local government. I run two forms of these models. First, local governments may seek to *maximize coverage*, calculating an ideal location for building a school/clinic thus that the percent of the local government's population that lives within 3/5 kilometers of a school or

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[32] Full results can be found in Table A.6 in the Appendix.     [33] Golden and Min (2013).

clinic is maximized, taking into account existing facilities. Second, they may prefer to *maximize attendance*, calculating the capacity of existing schools (measured with students per classroom) and the locations of existing clinics. These models predict the best location if the goal is to increase the total number of residents "attending" a facility, discounting attendance by distance under the assumption that individuals prefer and hence are more likely to use public goods closer to their homes. For each local government, the models are run so as to identify as many locations as were actually built during the time period. The total number of students or villagers that would have been covered by the "ideal" location is then compared to the actual number covered by the built facilities by a local government.

I illustrate the logic behind these models visually using the example of Ndoyene, a local government in Louga Region, in Figure 5.5.

Figure 5.6 presents the results of these analyses, using the difference in students who could have been covered by new schools/clinics if a local government always chose the "ideal" location and those actually covered by the facility as built.[34] I construct the dependent variable by aggregating the difference at the local government level; a value of zero on the dependent variable indicates that a local government built at the ideal location(s). Negative coefficients therefore reflect more efficient choices as the number of students who *could* have been covered, but were not, decreases. Figure 5.6a reveals no significant relationship between precolonial centralization and building social services that maximize attendance. Precolonial centralization is however associated across the board with building schools and clinics in locations that increase the number of covered citizens. These areas are providing services to ensure that more villages gain access, building closer to the "ideal" locations. This is evidenced by the coefficient moving toward zero, which again represents the ideal choice. In other words, local governments in areas that were home to precolonial states on average improve coverage for 160 to more than 600 more citizens than their acephalous counterparts even controlling for baseline levels of access. These models offer a novel test of the argument that there are subnational differences in the politics of local public goods delivery in rural Senegal while confirming the argument that precolonial centralization is associated with broader spatial distribution today.

**Placebo Tests**

To further demonstrate that these patterns are explained by local-level rather than central state dynamics, Figure 5.7 shows the results of a series of placebo tests, using the placement of secondary schools in both time periods and the delivery of electrification and improved roads in the first.[35] These investments

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[34] Model results can be found in Table A.7 in the Appendix.
[35] See Table A.8 in the Appendix for full results.
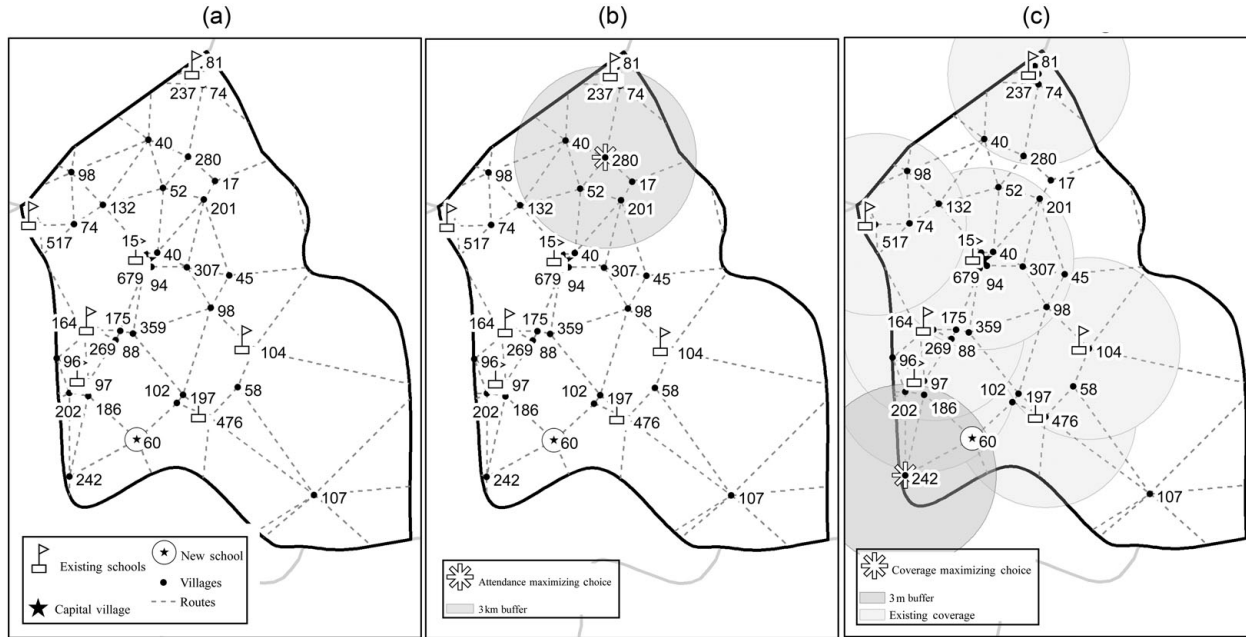
FIGURE 5.5 Illustration of location-allocation models: (a) Ndoyene (Louga Region), (b) Maximize Attendance Model, and (c) Maximize Coverage Model
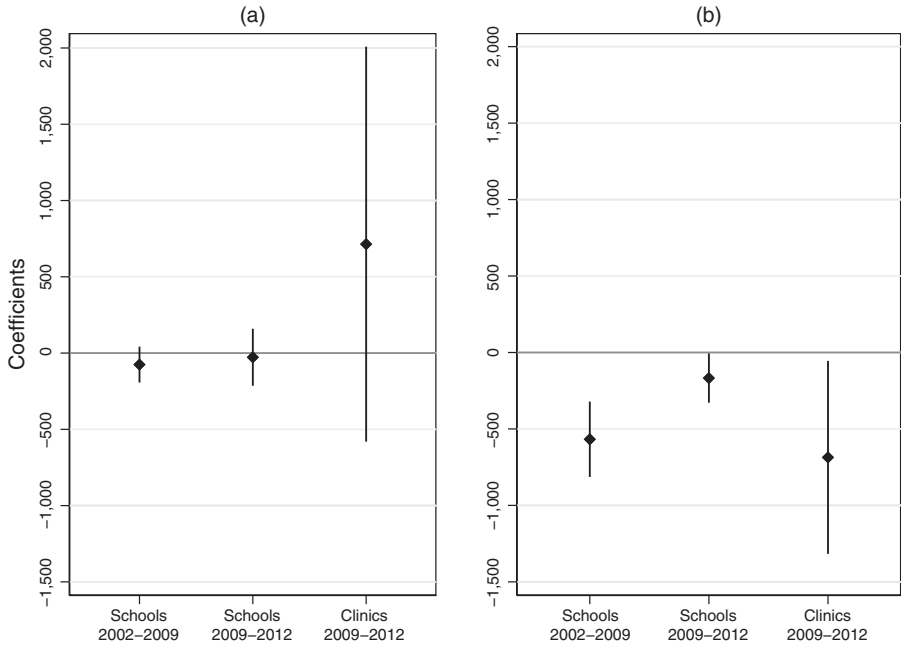
FIGURE 5.6 Effect of institutional congruence on location-allocation choices:
(a) Maximize Attendance Models and (b) Maximize Coverage Models
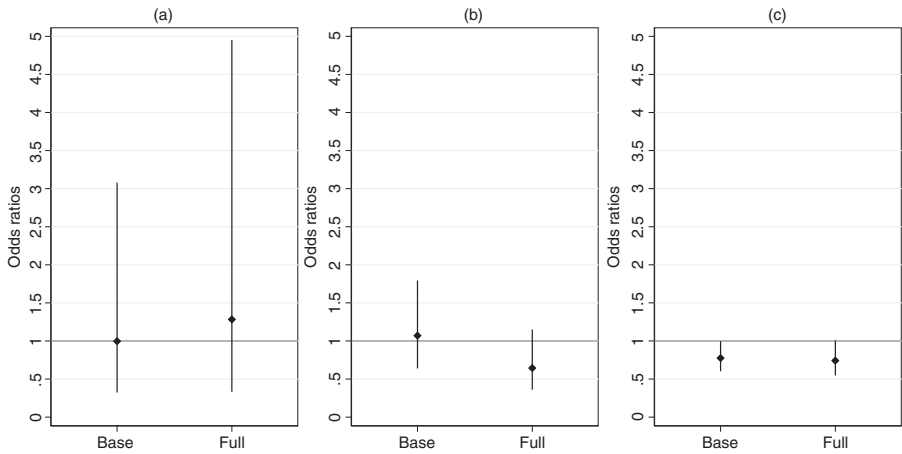


FIGURE 5.7 Placebo models – effect of institutional congruence on central-state-allocated goods: (a) new high schools, (b) electrification, and (c) new roads

are all exclusively provided by the central state and are far beyond the means – financial or technical – of local governments. Secondary schools make for a particularly useful placebo test because many unmeasurable factors that we may think drive placement – such as local demand and interest in Western education – should be similar for both primary and secondary schools. At the same time, electrification and improved roads are two of the most high-demand goods in rural Africa. The results indicate that precolonial centralization has no significant explanatory power over a village's likelihood of receiving any of these investments. If anything, historically acephalous areas appear to be more likely to receive investments in local road networks. This confirms the insights from the above analysis that precolonial centralization only influences public goods placement at the local level and is not a factor in decisions made in Dakar.

## CONCLUSION

The findings presented in this chapter suggest that local governments that are congruent with the boundaries of a precolonial state engage in spatially distinct patterns of public goods delivery. Congruent local governments are more likely to ensure that more villages gain access to new services. Conversely, I find acephalous areas serve fewer villages than they could otherwise be doing. This difference is all the more puzzling given that there is not a great difference in the absolute number or per capita rate of schools or health centers being constructed in one area versus another during the same time period.

By locating the precise site of investments, this chapter has tested numerous theories of public goods delivery at a much more fine-grained level than has previously been done in the literature, allowing me to show that what differs is how local governments distribute public goods spatially within their borders. This lends support to the key observable implication of my theory: where I expect institutional congruence, for example, in areas that fall in the boundaries of a precolonial polity, local governments appear to deliver public goods in a spatially distinct manner. In contrast, dominant explanations in the study of redistributive politics offer little to no traction in explaining the investment patterns of Senegal's decentralized governments. This accords with the insights of my own original survey data presented in Chapter 4. More consequentially, it suggests not only that there are emerging differences in how public goods are delivered, but that subnational inequalities in access to services in rural Senegal are actually increasing under decentralization.

To address the concern that the results identified in this chapter may be the result of long-run, accumulating inequalities, I trace the evolution of public goods delivery from the onset of colonial rule to the present in Chapter 7, finding that the effects identified here only emerged following the 1996 decentralization reforms that devolved meaningful authority over local public goods delivery to the local level. The next chapter, however, presents three in-depth case studies of local governance to explore the mechanisms behind the theory.