Continuity or Change?
(In)direct Rule in British and French Colonial Africa

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Abstract

Low levels of development and state capacity in Africa are thought to originate in colonialism in general and indirect colonial rule in particular. But despite a century of debate about the nature, causes, and consequences of direct and indirect colonial rule on the continent, data and evidence about its application are scarce. Based on newly collected historical data, this paper provides systematic empirical evidence on two claims that have marked the debate since its inception. First, British administrations have ruled more indirectly than French ones. French colonization led to demise of 7 out of 10 precolonial polities while under British rule 3 out of 10 polities disappeared as measured by the discontinuation of their lines of succession. Second, precolonial centralization was a crucial prerequisite for indirect rule. Local administrative data from 8 British colonies shows that British colonizers employed less administrative effort and devolved more power to native authorities where centralized institutions existed. Such a pattern did not exist in French colonies. Together, these findings improve our understanding of the long-term effects of precolonial institutions, the roots of regional and ethnic inequalities, and the origins of currently observed customary institutions in Africa.

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Introduction

As in most instances of imperial conquest, the question of how to rule indigenous populations and how to treat their elites was a paramount preoccupation of colonial officials in Africa. Debates about the benefits and disadvantages of direct and indirect rule dominated much of the general discussion on colonialism after the 'Scramble for Africa' in the late 19th century. This did not change much after the establishment of colonial rule, and the topic marks scholarly debates and research until this very day. It is thus remarkable that we lack systematic data and evidence on where and to what extent indirect colonial rule was actually applied.

This paper confronts this issue head-on and inquires the indirectness of local British and French rule in non-settler colonies in Africa. I first test the long-standing argument that the French empire was comparatively hostile towards pre-colonial polities while the British oftentimes chose a path of cooptation. Data on the (dis-)continuation of the lines of succession of precolonial polities in the two empires support this argument. Second, I test the claim that indirect rule worked best where it could build on centralized precolonial institutions. Data on local administrations in British colonies conforms to this hypothesis.

Just as strategies of direct and indirect rule marked European state building at home (Hechter, 1975; Tilly, 1975; Weber, 1977), they shaped the nature of colonial conquest and governance. Arguments about variation in the application of direct and indirect rule in colonial Africa roughly follow two lines. The first is concerned with differences between, in particular, the French and British empires. While some argue that both relied on local intermediaries to the same extend (Gerring et al., 2011; Herbst, 2000; Mamdani, 1996), others claim to see marked differences in their treatment of pre-existing institutions (Asiwaju, 1970; Crowder, 1968; Miles, 1994). Second, a historical literature has explored within-colony variation of indirect rule and stresses the role of precolonial institutions. These were either sufficiently centralized or too fragmented for integration into schemes of indirect rule (Fortes and Evans-Pritchard, 1940; Gerring et al., 2011). Despite focusing on the very center of variation in colonial governance and notwithstanding past data collections by Herbst (2000); Lange (2009), the debate on indirect rule so far lacks comprehensive data

on variation in its application within and between French and British colonies.

Testing the arguments around these two axes of variation in the indirectness of colonial rule is important for better understanding British and French colonialism in Africa. It also relates to research on the origins of current socio-economic and political development. In particular, indirect colonial rule is considered one of the prime historical pathways through which precolonial factors persistently affect outcomes until this day (e.g. Gennaioli and Rainer, 2007; Michalopoulos and Papaioannou, 2013). Similarly, local variation in the character of colonial rule likely determines the effect of colonialism as a whole (Bruhn and Gallego, 2012; Iyer, 2010; Lange, 2009; Lankina and Getachew, 2012; Mamdani, 1996). And because indirect rule has a strong ethnic basis, local variation in its application might shed light on the historical (trans)formation of ethnic inequalities (Wucherpfennig, Hunziker and Cederman, 2016), identities (Ali et al., 2018; Ranger, 1997), customary institutions (Baldwin, 2016), and land rights (Boone, 2003; Firmin-Sellers, 2000).

For the empirical analysis, I draw on a variety of systematic historical data sources. To examine differences in the indirectness of rule in the French and British empires, I collect encyclopedial data from Stewart (2006) on the lines of succession of 124 colonized polities in Africa. Taking the end of a polity's line of succession as a proxy for its demise, the data show that only 30% of the polities colonized by the French but 70% of those colonized by the British survived colonial rule. This large difference holds across plausibly exogenous French-British borders that run perpendicular to the West African coastline.

I then assess the effect of precolonial institutions on the indirectness of rule by analyzing newly collected data on local administrations in 8 British colonies. These archival data from official reports shed light on the colonial and indigenous dimensions of local governance. The colonial dimension concerns the administrative effort exerted by the British. Proxied by the size of districts and the number of European administrators, the data show that the British exerted less effort where they could rule through precolonially centralized institutions. Data on indigenous governance in British colonies demonstrate that chiefs in precolonially centralized regions presided over bigger budgets and enjoyed a higher status. These patterns are absent or even reversed in comparable data from French West Africa.

Literature

A crucial dimension of local governance arrangements in territories under alien dominance is the degree to which the imperial power cedes authority to the subordinate units it rules (Gerring et al., 2011). Not surprisingly, the struggle for effective local rule was no less of an issue for early modern state-builders in Europe (Hechter, 1975; Tilly, 1975; Weber, 1977) than for the European imperialists in Africa (Hailey, 1945; Lugard, 1965). Colonial powers aimed to secure their hegemony over the conquered populations with minimal effort constrained by "the thin white line" (Kirk-Greene, 1980), the small number of European officers available to administer the vast territories colonized through the 'Scramble for Africa' that followed the Berlin Conference in 1884-1885.

To bridge the social, organizational, and geographical distance between the colonial centers and local populations, all colonial powers relied to a significant degree on local intermediaries (Gerring et al., 2011). These middlemen provided the crucial link between the European rulers and the indigenous population. They thus became "decentralized despots" in a bifurcated colonial state that revered the "customary" to uphold its rule (Mamdani, 1996). Extrapolating the precolonial basis on which these intermediaries were at times appointed, Herbst (2000) claims that colonial empires relied on the great variety of existing institutions to keep the costs of occupation at a minimum. For Herbst (2000, p. 84), "[t]he Africans were unimpressed with the extent of the administrative reforms made by the white man." This perspective of ubiquitous continuity of precolonial governance arrangements stands against one of wide-spread disruption and change. It is apparent in Young's (1994) description of the Belgian "Crusher of Rocks" in the Congo, or Achebe's (1958) novelist depiction of British colonialism in Southeastern Nigeria where 'things fell apart.' These accounts suggest that colonialism did indeed rattle governance arrangements at the local level.

The divergent views on the continuity and change of local governance arrangements can be reconciled through a lens focused on the nature of local institutions during the colonial period. In most general terms and at the heart of the definition of indirect rule, we can distinguish between traditional, precolonial institutions in-

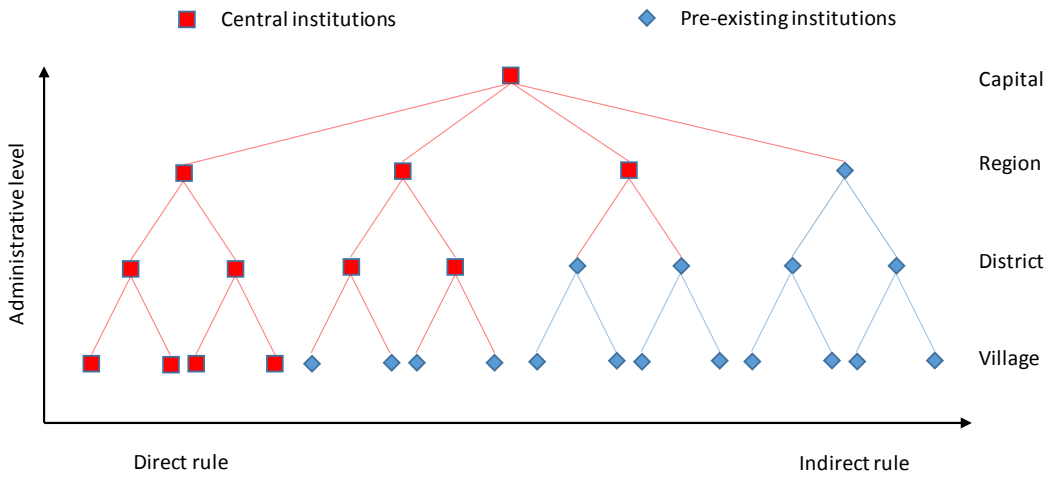


Figure 1: Conceptualization of indirect rule.

tegrated into the colonial state, and new institutions created by the colonial state (Figure 1). Full indirect rule defines a case in which the state integrates pre-existing institutions at all administrative levels below the central government. The more levels of hierarchy between the state center and its subjects consist of institutions created by the state itself, the more direct the mode of rule becomes (Gerring et al., 2011). Full direct rule is a scheme of governance in which the colonial government creates all institutions that reach down to its subjects. This conceptual framework thus focuses less on whether a local ruler or middleman is European or indigenous. Rather, it puts the institutional basis of local rule upfront: Whether a ruler is dependent solely on the colonial government or has ties to the local population. With this perspective, the approach to indirect rule allows for distinguishing those colonial intermediaries that were embedded in precolonial institutions from those that were not.

The literature on local colonial governance has explored two main axes of variation in the degree to which it integrated pre-existing institutions. The first centers around the identity of the colonizer. The second relates to variation explained by the strength of precolonial institutions themselves.

First, a comparative literature analyzes whether differences between colonizing empires affected their dealings with pre-existing institutions. In particular, dis-

cussions of the difference between the French and the British styles of local rule permeate officials' and researchers'[1] discussions on colonial rule since the colonial days. Marking his stance, the Governor of the Côte d'Ivoire, Deschamps, claimed that "one can scarcely detect the French administrative policy previous to 1945; it differed from [Britain's] [...] only in its more familiar style and less clearly defined goals" (cited in Herbst, 2000, p. 82). Many have followed Deschamps' claim and hence argued that every colonial state ruled through local intermediaries and thus indirectly (e.g. Gerring et al., 2011; Herbst, 2000; Mamdani, 1996). In contrast stand scholars who maintain that, although both empires relied on local intermediaries, the French approach to local rule was more direct than the British (Asiwaju, 1970; Crowder, 1968; Hailey, 1945; Miles, 1994). In this dichotomy the British are described as co-opting pre-existing institutions where they existed. The French in turn were comparatively hostile towards them, oftentimes replacing them with their own institutions.

Second, a substantive body of historical case studies suggests that precolonial factors affected the feasibility of indirect rule. In particular, many argue that traditional, precolonial institutions could best be used as tools for indirect rule where they proved sufficiently centralized as to be integrated into the colonial administration (e.g. Gerring et al., 2011; Hicks, 1961; Tignor, 1971). In areas where acephalous, stateless societies prevailed, colonizers had to make up for the absence of readily available hierarchical political structures and establish institutions foreign to the local population. Here, "[t]he colonial government cannot administer through [...] political segments, but has to employ administrative agents" (Fortes and Evans-Pritchard, 1940, p. 15). This is when the traditional organization of small-scale societies fell apart in Southeastern Nigeria, where British administrations struggled to impose institutions effective at ruling the population from above.

Although there has been much debate about the heterogeneity of local governance arrangements within and across colonial empires, no systematic and disaggregated evidence exists on where colonizers ruled indirectly. The most extensive data collection of indirect rule has been conducted by Lange (2009), who uses the

[1]Note that the two communities overlap during the colonial period, reasons for which accounts may be impregnated by a biased perception of the 'own' system.

proportion of court-cases handled by native courts to proxy for differences in the indirectness of rule between British colonies. Unfortunately, because the data is coded at the colony-level it can only be used for within-empire comparisons. Earlier, Herbst (2000) has proxied the directness of colonial rule via the density of colonial road networks. This use of aggregate road network data may produce misleading conclusions because it focuses only on roads' density and not their spatial structure. Furthermore, even local road densities or network structures might not capture the indirectness of rule. It is, for example, not obvious why a cash crop exporting region such as Buganda in Uganda should not feature a combination of dense roads and indirect rule.

The best cross-empire proxy for indirect rule so far employs the number of European administrators employed by colonial states. On this metric, in 1938, French colonial governance employed 250 Administrators per million inhabitants in French West and Equatorial Africa that compare to a pale 29 administrators per million employed in British colonies in 1939 (Herbst, 2000; Kirk-Greene, 1980). Though supporting the argument of more direct French rule, these aggregate figures do not capture variation in indirect rule between and within colonies of the same empire.

If data on the directness of colonial rule is scarce across colonies and empires, no systematic data exists at sub-colony level for several colonies.[2] Although case-studies on the difficulties of British administrators to govern acephalous societies across the continent abound, no quantitative evidence on the link between precolonial and colonial institutions exists. It is however at this local level that one has to investigate the effect of precolonial institutions on colonial indirect rule to avoid the fallacy of ecological inferences.

Scarce data and evidence also constitute an important obstacle to research on the historical roots of postcolonial politics and development in Africa that builds on assumptions about the incidence of indirect rule. For example, Blanton, Mason and Athow (2001) argue that British indirect rule increased the risk of ethnic competition and civil war as compared to French direct rule (see also Ali et al., 2018). Similarly, the research design of Wucherpfennig, Hunziker and Cederman (2016) relies on the

[2]But see, for studies of single colonies, McNamee (2019) who studies the effects of variation in indirect rule at an internal border in Namibia and Nathan (2019) for data on Northern Ghana. For India, see Iyer's (2010) work on princely states.

assumption that French rule led to concentrated political power of ethnic groups settled along the coast, while British indirect rule caused more variation in who rose to power after independence. Examining the origins of postcolonial development, Gennaioli and Rainer (2007) as well as Michalopoulos and Papaioannou (2013) argue that one main reason for an enduring positive effect of centralized precolonial institutions consists in colonial indirect rule. Such arguments, while consistent with the respective empirical results, have so far lacked systematic evidence to sustain their assumptions about patterns of direct and indirect colonial rule.

In sum, the existing research on indirect colonial rule and its consequences is underspecified in two important ways. First, no systematic evidence on the difference between the indirectness of rule in French and British colonies exists. Second, no systematic and spatially disaggregated evidence sheds light on the effect of precolonial institutions on indirect rule. This limits our understanding on how colonial rulers built their states in collaboration with or at the expense of their predecessors. After laying out the respective theoretical and historical arguments, I provide both types of evidence.

Local Colonial Rule: French and British Style

[...] institutions and methods, in order to command success
and promote the happiness and welfare of the people,
must be deep-rooted in their traditions and prejudices.
Lord Lugard (1965, 211), Governor-General of Nigeria

[...] suppress the great native polities
which are nearly always a barrier between us and our subject.
William Ponty (1910), Governor-General of French West Africa[3]

As the two quotes of French and British Governor-Generals in West Africa illustrate, the official stance towards indigenous authorities differed substantially between the two colonizing powers. In particular in the formative years of non-settler colonies,[4] the French strove to establish a rather uniform system of direct rule, a

[3] Suret-Canale (1988, 150).
[4] Note that colonial rule in areas with large settler communities did not necessarily follow the

system based on French, rather than pre-existing institutions.[5] In comparison, the British approach to colonial rule was, at least in theory but constrained by local conditions, based on the ideal of regional and local self-government (Crowder, 1968).[6] These differences can be traced back to diverging French and British governance ideologies, as well as to a lower number of metropolitan personnel available to British colonial governments that ruled over a much bigger empire.

In the Republican spirit of the French revolution (Cohen, 1971*a*), the French colonial administration strove to mold their colonial subjects into a body of '100 million Frenchmen' (Lewis, 1962, also Crowder, 1968; Crowder and Ikime, 1970). Wherever possible, the power of precolonial elites was crushed (Conklin, 1997; Weiskel, 1980), leading to widespread resistance by the most powerful polities (Huillery, 2010). Notwithstanding this hostility, the French colonial administration depended on native intermediaries to collect taxes, enlist forced labor, recruit soldiers, and maintain the local infrastructure. The responsible local chiefs were oftentimes appointed based on their loyalty to the French Empire rather than their precolonial status (Crowder, 1968). Stripped of their traditional authority, they were converted into colonial agents under the supervision of the *commandants de cercle* (Cohen, 1971*a*,*b*; Suret-Canale, 1988; Roberts, 1929). This supervising French administrative staff had to change position often enough to be agnostic of local languages and customs (Cohen, 1971*b*; Crowder, 1968). Instead, becoming a chief required the knowledge of French, a policy that inhibited the continuous functioning of indigenous institutions (Crowder, 1971) and furthered the standardization of local governance.

The British choice of local governance institutions was different. Aiming to use the legitimacy of local rulers for their own purposes, the British collaborated with indigenous institutions, left them with much of their accustomed executive, legisla-

logic presented below. Large European settler communities came necessarily at the expense of indigenous polities and thus with much more direct forms of colonial rule. However, causation might have run the other way around: areas without strong and surviving precolonial institutions might have attracted larger number of settlers, a pattern that Huillery (2010) finds in French West Africa.

[5] At least until the end of WWI. Conklin (1997) suggests that the later "politique d'association" was more attentive towards local institutional conditions, which where, by the time of that change, however largely destroyed (see e.g. on the Baule Weiskel, 1980).

[6] Beyond the literature cited below, a number of single and comparative case-studies support this account (e.g. Crowder and Ikime, 1970; Hailey, 1945), including well-designed accounts of French direct and British indirect rule over the same ethnic group living on both sides of a colonial border (Miles, 1994; Asiwaju, 1970).

tive, and judiciary powers, and integrated their structure and personnel into the colonial state (Hailey, 1945; Lange, 2009). British district officers had a primarily consultative role vis-à-vis indigenous rulers, encouraged self-government, and provided technical assistance (Crowder, 1968; Lugard, 1965).

However, not all precolonial polities could be ruled indirectly. The degree to which British administrations could integrate traditional institutions was primarily a function of their degree of precolonial centralization and pre-existing hierarchies (Fortes and Evans-Pritchard, 1940; Gerring et al., 2011; Hicks, 1961). The idea of local self-government proved practicable where the British could co-opt centralized political institutions. Where political power was too decentralized and in the hands of fragmented institutions foreign to the British, they pragmatically set up new governance schemes under the direct control of the administration that connected precolonial village-level elites to the center (Crowder, 1968; Hicks, 1961; Tignor, 1971).

Centralized precolonial institutions with multiple layers of administrative and political hierarchies characterized the Kingdom of Buganda in Uganda (Reid, 2002), the Fulani Emirates in Northern Nigeria (Miles, 1994), or the Ashanti confederation in the Gold Coast (Wilks, 1975). The colonial administration was able to make cheap use of these institutions by letting their rulers choose between collaboration and death or exile (Gerring et al., 2011). As a result of such bargaining under the threat of violence, prior elites shared their rent from ruling with and implemented policies for the British. At the same time, they were able to preserve much of their accustomed power and autonomy. The resulting indirect governance schemes featured two main characteristics. First, the British deployed only a minimal amount of administrative resources to the indirectly ruled regions – just enough to monitor the actions of local elites and collect the rents of the colonial state. Second, the local elites continued to enjoy many of their accustomed powers and presided over local governance entities that encompassed much of the institutions, hierarchies, and the territory of 'their' pre-existing polity (Crowder, 1968; Perham, 1937).

Other regions lacked centralized political structures. Before the colonial conquest, they were instead ruled in a decentralized manner, for example by village councils prevalent in the acephalous parts of Southeastern Nigeria or the Northern

parts of Kenya and Uganda (Mair, 1977). Administering such areas posed substantial problems to British administrators who tried to implement a system of indirect rule. Due to the lack of institutions above the village level, it was not possible to simply coerce one powerful ruler to gain control over a large population and territory. Because ruling each village directly from the colonial capital would have been costly and inefficient, the colonial state had to build its own administrative system to link the colonial capital, via the region- and district-level with each village (Crowder, 1968; Fortes and Evans-Pritchard, 1940; Hicks, 1961; Tignor, 1971).[7] Whether staffed with colonial administrators or neo-"traditional" authorities such as the "Warrant Chiefs" lifted to power in Southeastern Nigeria (Afigbo, 1972; Perham, 1937), the new system amounted to direct rule. The newly installed state agents were largely independent and partly agnostic of the populations they ruled over. They came to power at the whims of the British colonial government and did not depend on institutionalized ties to the population they ruled (Hicks, 1961; Tignor, 1971).[8] In effect, this led to governance constellations that were similar to those observed in the French colonies. Two main characteristics describe the resulting mode of direct local rule. First, the British colonial government employed a substantial amount of personnel and resources in order to run the administrative infrastructure that linked the colonial center with local populations. Second, the low-level indigenous elites presided over native governance entities that were much smaller in territorial and substantive scope than the indigenous governance units under indirect rule.

Of course, exceptions to the French and the British approach to local colonial rule exist. The French, for example, were never successful in fully submitting the Mossi Empire in Upper Volta, today's Burkina Faso. They finally settled on a

[7] Even more difficulties arose in areas inhabited by pastoralist groups without centralized institutions such as the the Turkana and Karimojong in Kenya and Uganda, because of the need of the colonial state to have territorial stability in the location of capitals and borders of districts (Mair, 1977, ch. 11).

[8] A certain tendency to confound traditional and non-traditional authorities as actors in schemes of indirect rule permeates the literature on indirect rule in Europe and Africa (e.g. Hechter, 2000; Mamdani, 1996). From a theoretical standpoint, it is unclear how indirect rule can build upon non-traditional institutions that lack the means of (violent) coercion to govern a local population and instead rely on the central state for the provision of these means. The provision of such resources, e.g. police forces, administrators, etc., amounts to direct rule. If the center loosens the control over these resources, such rule can over time become embedded into the local community and take on an ever more indirect character.

cooperative relationship but reserved substantive administrative and judicial powers for themselves (Skinner, 1970). Similar deviations from the 'pure' British model marked the colonization of the Ashanti kingdom in Ghana. The kingdom was, after its violent submission in 1896 and the exile of the Asantehene, first put under direct rule. However, continuous nationalist mobilization of the Ashanti population convinced the British of the downsides of that model. Between 1919 and 1935, the traditional authorities were gradually allowed to resume their positions (Crowder, 1968, 230-233; Tordoff, 1968), thus establishing indirect rule over Ashanti.

There are two main reasons for the difference between the French and the British style of local colonial rule. First and most prominent in the literature, the administrative architecture of the colonizing power shaped the one implemented in its colonies. Here, the French were greatly influenced by the centralized governance and Republican spirit of the Île-de-France (Cohen, 1971*a*; Conklin, 1997). Already the military officers that conquered the French colonies established a strictly hierarchical system of military administration. Assuming their role, the later civil administrators brought with them the centralizing tendencies of the French government and, as Republicans, despised the remaining hereditary aristocrats (Crowder, 1968, p. 188). In contrast to the French metropolitan blueprint, Great Britain's approach to governance was more diverse, including self-rule in the settler colonies of Canada and South Africa, and solving the 19$^{\text{th}}$ century conflict over Irish 'Home Rule' through Southern Irish autonomy and the creation of the Parliament of Northern Ireland (Bogdanor, 2001). This diversity and the earlier experience with indirect rule in India made its application in the British colonies in Africa less costly.

The second difference between the empires that can be related to their preferences for direct and indirect rule concerns the administrative resources at their disposal. We have already seen that French governments employed nine times as many European officers than their British counterparts (Herbst, 2000; Kirk-Greene, 1980). One important reason for this difference consists in the overall size of the British colonial empire, which exceeded that of the French by an order of magnitude. While France with its 40 million inhabitants ruled over 55 million colonial subjects across the globe in 1921, 44 million British citizens ruled over approximately 400 million colonized subjects (Roberts, 1929, xvi). If both empires could draw on a similarly big pool of

Table 1: Expected type of colonial rule

Precolonial institutions	Colonizer	
	British	French
Centralized	Indirect	Direct
Acephalous	Direct	Direct

well-educated potential colonial administrators in their metropolitan population, it comes as no surprise that French colonial administrations employed nine times more administrators per African subject than British colonial governments. This made indirect rule a pragmatic response to the lack of resources needed to establish and maintain direct control everywhere (see also Lugard, 1965, p. 141).

The summary of historical evidence on the mode of local rule in British and French non-settler colonies in Africa suggests two main axes of variation in the indirectness of colonial rule summarized in Table 1. First, the accounts suggests that French colonial governments were comparatively hostile towards precolonial institutions and aimed at replacing them with institutions that resembled the blueprint of the Île-de-France. The less Republican and more resource constrained British colonialists in turn championed local self-governance through pre-existing institutions to complement the central colonial government in a Lugardian scheme of 'dual rule.' The resulting higher survival of precolonial political institutions under British than French rule is subject of the first empirical part of this article. Second, the British were not able to establish schemes indirect rule where they confronted decentralized and fragmented precolonial institutions. In such regions, they set up more direct forms of colonial rule, employing more administrative effort and devolving less power to local indigenous authorities. This dynamic is studied in the second empirical part below.

The survival of precolonial institutions

To test whether French colonial rulers crushed and replaced more precolonial political institutions than British colonial governments, I exploit data on the continuation

of the lines of succession in 124 colonized African polities in the 19th and 20th century. A survival analysis of the lines of succession shows that in each year, lines of succession of precolonial polities under French rule had a four times higher risk of being terminated than those of polities under British rule. This difference persists in comparisons of polities across arguably arbitrary colonial borders.

Panel data on precolonial polities

To analyze the survival of precolonial institutions under colonial rule, we need panel data on colonized polities. Currently used data on precolonial institutions in Africa, most prominently Murdock's *Ethnographic Atlas* (1959; 1967), are valuable for its detailed cross-sectional and geographical information, but lack the dimension of time. To fill this void, I digitize historical data on 124 African states before and during French and British colonial rule, collected by Stewart (2006) in his encyclopedia of *African States and Rulers*. First published in 1989 and updated since then, the encyclopedia enlists indigenous, colonial, and postcolonial states in Africa. Each entry comes with a short account of a state's history and date of colonization as well as a detailed enumeration of its rulers and capitals.[9] These data originate from a comprehensive list of sources, among them historical case studies, the Journal of African History, as well as other encyclopediae such as the Cambridge History of Africa.

The main information used in the empirical analysis is the continuation of a polity's line of succession in each year of the colonial occupation by either the British or the French empire. This data is available because Stewart continues to enlist polities' rulers – so they existed – throughout the colonial and postcolonial period (Figure 2). I take advantage of this coding and take the continuing line of succession in a precolonial state as a proxy for its institutional survival under colonial rule. In particular, I code the end of the line of succession in the year after which Stewart enlists no further rulers for the respective polity.[10] While the survival of institutions is not always equivalent to the survival of its personnel, the *dissolution* of a political

[9] In each year, a state has only one capital, but some capitals are relocated over time. I geocode all capitals via the `geonames.org` and `maps.google.com` APIs.

[10] This particular coding ensures that polities do not 'die' if there is an interregnum without a ruler, as there sometimes was.

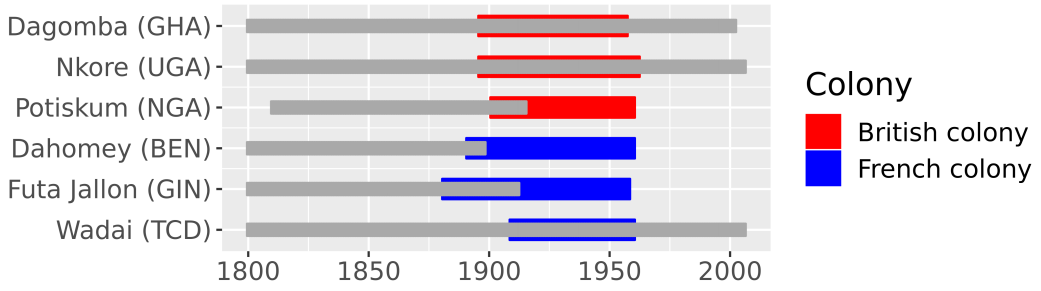


Figure 2: Lines of succession in six precolonial states 1800–2000.
Note: Censored before 1800. Grey rectangles denote the observed lifespan of each line of succession. Red and blue recatangles denote the colonial period. Abbreviations of colonies' postcolonial name in parentheses.

dynasty is a prominent indicator for the dismantling of the institutions they presided over. This is particularly relevant for precolonial polities in Africa, most of which were traditional regimes that derived authority and legitimacy from hereditary rule and the line of succession (Weber, 1958).

The states covered by Stewart (2006) overwhelmingly belong to the class of centralized precolonial polities. As Appendix A1.1 demonstrates, settlement areas of ethnic groups that were coded as precolonial states (acephalous societies) by Murdock (1959), feature a polity in Stewart's data in 60% (4%) of all cases. This is not surprising, given that Stewart was primarily interested in collecting polities' rulers, which are hardly identifiable in acephalous societies. Furthermore, acephalous societies lack the institutions to produce traces that could be uncovered by the historians that Stewart relied on (see e.g. Scott, 2017).

This type of bias makes the data unsuitable for providing a representative description of all precolonial polities in Africa. However, valid inferences about differences in polities' survival rates under British and French colonial rule are possible if the coding is not biased by the type of colonial rule. Stewart's data show few signs of such bias. A set of analyses in Appendix A1.1 suggests that areas and ethnic groups colonized by the British do not have a significantly different probability of comprising a state coded by Stewart, and do not feature a significantly different history of such states. If anything, *less* information on precolonial polities seems to be available from French colonies. Information likely got lost from those polities that did not survive colonization. If at all, this biases the analysis against the hypothesis,

that is towards a higher probability of survival under French rule.

Analysis

Figures 3 and 4 provide first descriptive evidence for a large difference in the survival rates of polities under French and British rule. Zooming in on West Africa, the map in Figures 3 suggests that in French West Africa only a few polities reached independence unbeheaded. Those that did where mostly located in the the far-away regions of Niger (Zinder) and Chad (e.g. Wadai), or were too strong to be submissed, like the Mossi kingdoms mentioned above. The picture looks different for the British colonies in the same area. In the Gold Coast, all coded polities survived, albeit not always unscathed as the Ashanti kingdom illustrates. In Nigeria, where the 19th Fulani Jihad created a large number of emirates, less polities withstood colonial conquest and rule, but proportionally many more than under French rule. A simple comparison of the proportions of colonized polities that reached independence supports this impression: 26% of polities colonized by the French and 60% colonized by the British survived colonial rule, the difference being highly statistically significant (see Figure 4).

This difference remains stable once I model the end of lines of succession of all colonized polities during the the colonial period in a Cox Proportional Hazard Model.[11] The Cox model includes a set of covariates geographically attributed to polities via the location of their capital. In particular, I first include a vector of (1) baseline controls comprising the local population density, the polity's age, its distance to the coast and nearest navigable river,[12] and a simple linear time trend. To control for observable differences between the regions colonized by the French and the British, I add a vector of natural characteristics around the area of a polity's capital,[13] and finally a vector of characteristics of the ethnic group[14] in

[11] Each polity enters the dataset at the point of coloniztion by either the British or the French and leaves the dataset either once its line of succession ends or in the year of its colony's independence.

[12] Data on rivers come from Jedwab and Moradi (2016).

[13] In particular, its altitude, ruggedness, temperature, average precipitation, evapotranspiration, the ratio of its evapotranspiration and its precipitation, as well as its suitability for cash crop production (all from FAO, 2015) and agriculture in general (Ramankutty et al., 2002). See also discussion in the second empirical part below.

[14] These are the reliance of local ethnic groups on agriculture and pastoralism, as well as the intensity of their agricultural activities (Murdock, 1959).

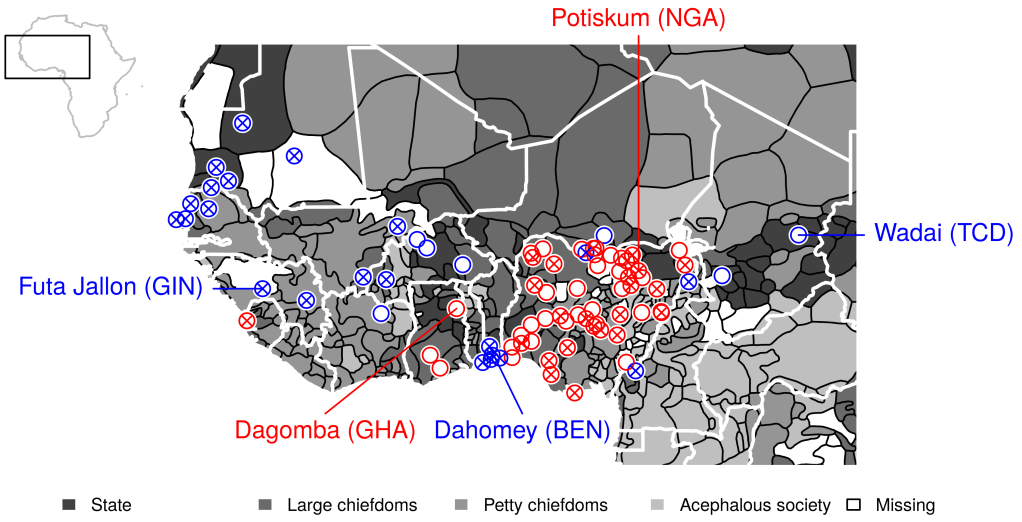


Figure 3: Map of all colonized polities in West Africa. Polities marked by a cross saw their line of succession terminated before their countries gained independence. For a full map of Africa, see Appendix A2.

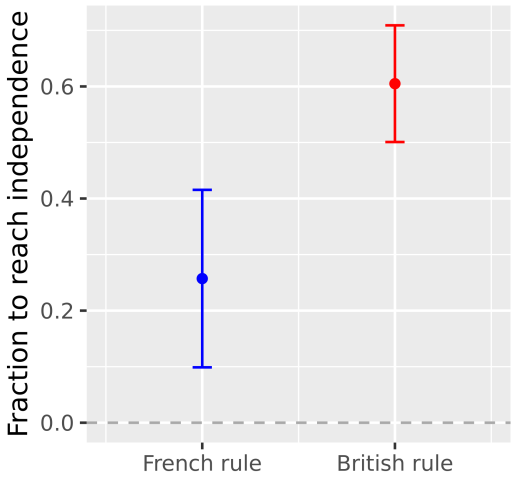


Figure 4: Fraction of colonized lines of succession to survive until the year of independence from colonial rule. Error bars denote 95% confidence intervals from a linear regression without controls. For a full set of cross-sectional analyses, see Appendix A2.2.

the settlement area of which a polity's capital is located.

Table 2: British vs. French rule and the demise of precolonial polities: Cox Proportional Hazards

	End of line of succession		
	(1)	(2)	(3)
British rule	-1.461^{***}	-1.519^{***}	-1.785^{***}
	(0.352)	(0.385)	(0.600)
Population/km^2 (1880, log)	-0.016^{**}	-0.031^{***}	-0.012
	(0.008)	(0.010)	(0.015)
Distance to coast (log)	-0.228^{**}	-0.215^{**}	-0.102
	(0.089)	(0.095)	(0.134)
Distance to river (log)	-0.134^{*}	0.035	0.202
	(0.077)	(0.143)	(0.239)
Polity age (log)	0.062	0.028	0.121
	(0.091)	(0.115)	(0.157)
Year	-0.424^{**}	-0.681^{***}	-0.764^{***}
	(0.188)	(0.175)	(0.281)
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Observations	5,208	4,902	4,581
R^2	0.009	0.011	0.009
Max. Possible R^2	0.073	0.068	0.055
Log Likelihood	-174.720	-146.030	-108.440

Notes: Cox Proportional Hazard models. Standard errors are clustered on the polity-level. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

Table 2 reports the results. The transformation of the coefficients of British rule into hazard ratios shows that the lines of succession under British rule had, in every year, a probability of ending that was about a quarter of that of a polity under French rule. The gap between the empires increases in Models 2 and 3 with additional controls. This suggests that, if at all, the British settled in areas with a disposition for more frequent extinctions of precolonial polities. The differential yearly hazard rate between the two empires translates into a large and increasing toll precolonial polities took from French colonization, visualized by the survival curves in Figure 5. As the imperial domination of the continent ended after approximately 80 years, the model predicts only 1 out of 3 polities under French rule to have

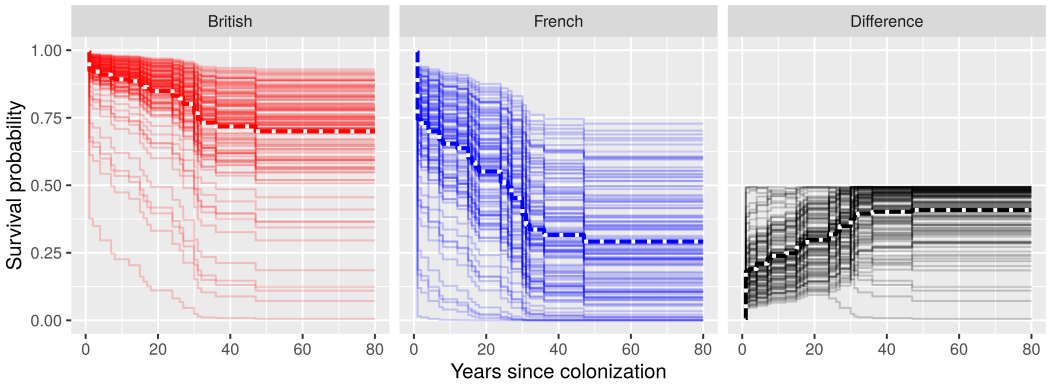


Figure 5: Survival curves as predicted for all polities under either British or French rule.
Based on Model 1 in Table 2, the Figure plots the predicted survival of every polity under British and French colonial rule. The third panel plots the polity-level difference between these two predictions. Thin lines plot the polity-level predictions, bold lines plot the average across all predictions.

survived. Under British rule the toll is also substantive but much lower with a 70% chance of survival, largely equivalent to the raw comparison discussed initially.

To test the robustness of these findings, I conduct a series of sensitivity analyses in Appendix A2.1. In particular, I test whether the results are driven by (1) a potentially overwhelming weight of some colonies (e.g. Nigeria with its many Fulani emirates) by giving each colony equal weight, (2) by differential temporal dynamics of the French and British colonization by stratifying the regressions by year, (3) the local disease environment, (4) by miss-specified clustering of standard errors, clustering instead not at all, on the colony, and ethnic group level, and (5) by the chosen functional form of the models, instead using a simple linear hazard model. All these variations lead only to small deviations from the estimates reported above. A final analysis (6) focuses on the effect of British and French colonial rule on the average tenure time of rulers as compared to tenure times before colonization in the same polity. The effect associated with French colonization on the yearly risk of a ruler's deposition or death is 1.5 times the effect associated with British colonization (see Appendix A2.3).

So far, the main identifying assumption of the model is that colonization by either the French or the British was as-if random. This assumption may be difficult to uphold in the face of the geographic patterns of colonization. A series of further analyses in Appendix A2.4 therefore successively limits the sample of compared poli-

ties to ever-smaller regions, first polities in West Africa and second to those in the coastal colonies in West Africa only. Finally, I exploit arguably arbitrary borders in West Africa that run perpendicular to the coast line as a result of the quick scrambling for territory after 1885 (Cogneau and Moradi, 2014; Wesseling, 1996). By estimating a Cox Proportional Hazard Model stratified by polities' closest perpendicular empire-border, the model compares polities only across these borders.[15] These three sets of analysis yield estimates of the hazard ratio that are generally larger than the one reported at baseline and statistically significant.[16] This suggests that the baseline results are, if at all, downward biased.

The unique data from Stewart's (2006) encyclopedia of African states and rulers show that precolonial polities' demise was much more frequent under French than under British colonial rule. This result supports the argument that the French ruled more directly and against pre-existing institutions than the British, who favored local self-government through traditional institutions. However, the focus on the survival of centralized polities masks variation in the schemes of colonial governance set up in regions with and those without such pre-existing institutions. This variation is the subject of the following empirical analysis.

Precolonial Institutions and Indirect Rule

As outlined in the theoretical discussion, there are two observable facets to indirect rule, the colonial power's administrative effort and local traditional institutions' power. To provide evidence on indirect rule as complete and systematic as the available data allows, I shed light on both dimensions. All data (see Table 3) comes from archival administrative reports from eight British colonies, chosen as a function of the availability of the respective data and excluding the settler colonies in Southern Africa, and from Huillery (2009) for French West Africa. Appendix A1.2 lists additional details on the sources and coverage of the data.

The first dimension of indirect rule concerns the local administrative effort em-

[15] Note that the sparseness and clustering of the data in space does not allow for estimating a clean discontinuity in survival rates at the border.

[16] P-values of the cross-border analysis drop to $p < .1$ and the size of the coefficient increases substantively as I add the vectors of control variables.

Table 3: Data on the indirectness of colonial rule: Overview

	Gold Coast	Kenya	Nigeria	Northern Rhodesia	Nyasaland	Sierra Leone	Tanzania	Uganda	French West Africa
District size	yes	yes	yes	yes	yes	yes	yes	yes	yes
European administrators	–	–	yes	–	–	–	–	yes	–
Local budgets	yes	–	yes	–	yes	–	–	yes	yes
Class of chiefs	–	–	yes	–	–	–	–	–	–

ployed by the colonizing government. More indirect rule comes with less administrative effort, measured in two ways:

1. *Size of districts:* This is the simple area of districts, net of water surface ($N_{GB} = 294; N_F = 114$). Each district needs a minimal level of administrative resources, most importantly a district officer or commandant de cercle. Thus, dividing a region into more and thus smaller districts requires more administrative resources. Furthermore, smaller districts come with a lower distance between headquarters and the population (e.g. Grossman and Lewis, 2014; Grossman, Pierskalla and Dean, 2017). Given the importance of administrative tours (Herbst, 2000), this implies more frequent visits of any village and more direct rule.

2. *European administrators:* This measure draws on data on the number of British administrators employed at the local level. Unfortunately, such district-level officer lists are scarce, so the sample is reduced to Nigerian provinces and districts in Uganda (N=35).

Two measures cover the flipside of indirect rule, the power of the traditional institutions through which schemes of indirect rule were carried out:

1. *Native treasury budgets:* As argued above, British colonial governments co-opted strong and hierarchical institutions because they generated rents in a centralized manner and allowed for relatively cheap top-down implementation of policies. Thus, indirectly ruled areas should feature native treasuries with larger budgets. The respective data comes from the British "Annual Departmental Reports" for the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi),

Table 4: Summary of native treasury data

Colony	Districts	Start	End	No. of years	Avg. revenue	Avg. expenditure
Gold Coast	29	1949	1951	3	9.92	9.18
Nigeria	86	1931	1939	9	3.12	3.04
Nyasaland	19	1934	1955	17	1.29	
Uganda	13	1934	1956	22	8.86	10.60

Notes: Note that the number of observations in the data might be smaller than the number of existing districts, because some budget reports report numbers above the district level (e.g. Buganda, Uganda).

and Uganda (1931–1956).[17] The reports include budget totals as well as detailed breakdowns of revenues and expenditures into subcategories (see Appendix A4.1).

In total, the collected data cover native treasuries in 148 districts across the four colonies and a varying number of years. To avoid biases emerging from an unbalanced panel,[18] I match native treasuries to the colonial districts introduced above and average the budget data for each district across all years (see Figure 6).[19] If a budget in one year covers more than one district (e.g. the budget of the Kabaka of Buganda, which covered an entire region), I aggregate the data to the highest spatial 'denominator' in all years, again for reasons of spatio-temporal consistency.

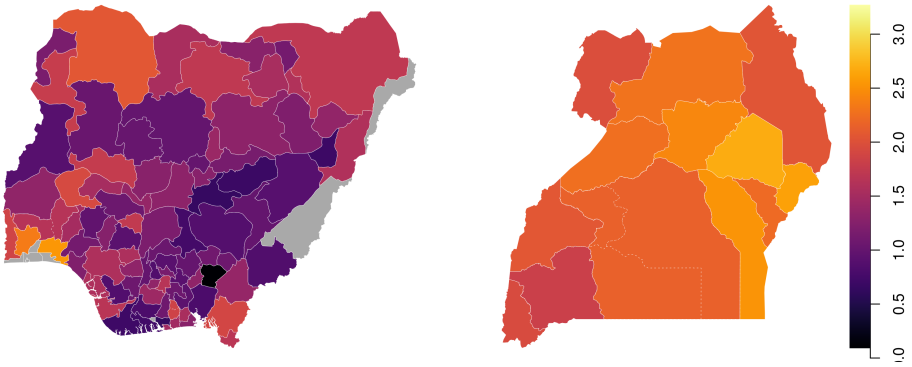
2. *The power of Nigerian chiefs:* The second indicator of the power in the hands of local authorities consists in the rights and recognition received by chiefs in Nigeria, measured through their official 'class'. "First Class" chiefs possessed of the greatest powers and authority over subsidiary chiefs. "Third Class" chiefs had a limited realm in terms of the population they ruled and the rights they enjoyed (Lugard, 1965, p. 212 and Appendix A1.4). Based on a list compiled by the British War Office in 1929 (pp. 95-96),[20] the class of the highest-ranking

[17] Note that the data collection proceeded in two stages. I first processed the scans of the tables to extract their content automatically. I then cleaned each entry in every table to ensure that no errors affect the results. See Appendix A1.3.1 for details.

[18] Because reporting standards of the British Administrations varied across colonies and over time, the length of the time series available for each colony varies considerably (see Figure A6). Furthermore, native treasuries were at times newly created or merged, leading to a variation in spatial units that is difficult to track over the years, since no time-varying information on native administrations' boundaries is available.

[19] I also explore two alternative ways to deal with this caveat, (1) weighted panel regressions, and (2) hierarchical modeling. See below and Appendix A3.1.

[20] The list covers Northern Nigeria for the year 1928 and Southern Nigeria in the year 1924.



(a) Nigeria 1931-1939 (b) Uganda 1934-1956

Figure 6: Per-capita revenues of native treasuries (logged; 2016 £). Aggregated to the district level and averaged over all observed years. Dotted lines indicate borders along which I aggregate districts for the analysis of local budgets (see discussion in text).

chief per district serves as an indicator for the power of indigenous institutions.

While the data encode diverse aspects of local colonial governance, the four outcomes correlate with each other (correlation coefficient of between .38 and .65; see Appendix A1.4). For example, larger districts feature fewer European administrators per capita, more revenues by native treasuries and have chiefs with more power. These patterns suggest that the indicators indeed conjointly capture the concept of indirect rule.

Precolonial institutions: To test the argument that the local level of precolonial political centralization determined the degree of indirect colonial rule, detailed cross-sectional data of local institutions at the time of colonial conquest are needed. The best source for such data still consists in the Ethnographic Atlas compiled by Murdock (1967). Based on early ethnographic research, the Atlas classifies the levels of administrative hierarchies of ethnic groups' precolonial political institutions. The coding ranges from 0 to 4 levels, from *no political authority beyond the community*, via *petty chiefdoms* and *larger chiefdoms*, to *states* and *large states*. Using the spatial information from Murdock's ethnic map (1959, Nunn and Wantchekon, 2011),[21] the average precolonial centralization of each districts' area measures the number of

[21] The matched data is available here: http://worldmap.harvard.edu. Michalopoulos and Papaioannou (2013) provide a slightly different match between the two data sources. Using their mapping does not changes the results (see Appendix A3 and A4).

administrative levels that could be used for indirect rule by the colonial power.

With this coding of hierarchical levels, the data is better able to capture the ease with which different political systems could be ruled indirectly than other data sets, such as maps of state histories (e.g. Depetris-Chauvin, 2014) or Stewart's (2006) encyclopedial data of precolonial polities and their rulers. The latter come with the additional disadvantage that only the coordinates of polities' capitals but not their borders are known. This makes their attribution to relatively small spatial units such as districts subject to large errors where precolonial states were carved up into multiple districts subject to an overarching native authority. Furthermore and as discussed above, Stewart's (2006) data are likely incomplete, shown by the fact that only 60% of groups coded by Murdock (1967) as a large precolonial state feature a polity in Stewart's data. I do however check the consistency of the results with Steward's data below.

Empirical strategy

With this data on district-level colonial and traditional rule at hand, I estimate the effect of precolonial centralization on the various indicators of indirect rule in a simple linear modeling framework:

$$\mathsf{y}_{i,p,c} = \alpha_c + \beta_1 \mathsf{precol.\ centralization}_i + \boldsymbol{X}_1\boldsymbol{\Lambda}_i + \boldsymbol{X}_2\boldsymbol{\Omega}_i + \boldsymbol{X}_3\boldsymbol{\Psi}_i + \epsilon_{i,p} \qquad (1)$$

In particular, I reduce the variation in $\mathsf{precol.\ centralization}_i$ exploited by each model to within-colony variation by using colony-fixed effects α_c. In specifications in which patterns of indirect rule in British and French colonies are compared, the models include the interaction term $\mathsf{French}_c \times \mathsf{precol.\ centralization}_i$. Since precolonial centralization is not randomly assigned to districts i, I successively include three vectors of control. First, vector $\boldsymbol{\Lambda}_i$ captures only the baseline characteristics of a district: the average spatial density of the population of the district and the ethnic groups that inhabit it (Goldewijk, Beusen and Janssen, 2010),[22] as well as a district's' distance from the coast and closest navigable river, all logged.[23] Second, $\boldsymbol{\Omega}_i$ controls

[22] This is the mean population density in the settlement areas of the ethnic groups whose settlement areas overlap with a district. The mean is weighted by the area of overlap.

[23] All may directly relate to indirect rule and the level of precolonial centralization: for example, in densely populated areas, we would expect more centralization and smaller districts that keep the size of the population constant. In areas farther away from the coast, colonization came later and less forceful, causing more indirect rule. Data on navigable rivers comes from Jedwab and Moradi

for what is subsequently called the 'natural' attributes of a district: its altitude, ruggedness, temperature, average precipitation, evapotranspiration, the ratio of its evapotranspiration and its precipitation, as well as its suitability for cash-crop production[24] (all from FAO, 2015) and agriculture in general (Ramankutty et al., 2002). Third, I add a vector of controls $\mathbf{\Psi}_i$ for the socio-economic characteristics of districts that might cause strong local governments and precolonial centralization. These are the reliance of local ethnic groups on agriculture and on pastoralism as well as the intensity of their agricultural activities (Murdock, 1967). I project these variables onto a spatial grid and then aggregate them to the district level by taking their means. French-British models include interactions of all controls with a French dummy. Lastly, standard errors are clustered on the provincial, thus first-level administrative unit level p to account for potential dependencies among neighboring districts subject to the same regional authority.

Results

The presentation of the results follows the structure of the data. A first set of analyses finds that administrative effort, measured through the size of districts and the local number of British administrators, decreases in the centralization of precolonial institutions. A second set of analyses completes the picture and shows that the power of indigenous, that is "native", administrations increases in the level of precolonial centralization. While these relationships are overall robust for British colonies, the data from French colonies exhibit no significant or even opposite associations. Together, the results support the argument that precolonial centralization was a strong determinant of British indirect rule.

Evidence on administrative effort

The size of districts Districts were larger in areas with strong precolonial institutions in British but not in French colonies. The estimated effect of precolonial centralization on the size of British districts is substantial: a move from an

(2016).

[24] I create the index of cash crop suitability by taking the local maximum of soils' suitability for the eight most important cash crops: cocoa, coffee, cotton, groundnut, oil palm, sugarcane, tea, and tobacco.

acephalous society to a precolonial state, that is, an increase in the value of precol. centralization by 3, is associated with an increase in the size of districts by between 35 and 54 percent (Table 5). The reverse relationship appears in French West Africa, where the data suggests that an increase in the level of precolonial centralization by the same three levels *decreased* districts' size by about 45 percent (Figure 7).[25] If larger districts correspond to lower levels of administrative effort exerted by the colonizers, the evidence thus supports the argument that pre-existing institutions facilitated British indirect rule.

Table 5: Precolonial centralization and the size of districts

	log(District Area)		
	(1)	(2)	(3)
Precol. centralization	0.143**	0.098**	0.131***
	(0.065)	(0.048)	(0.049)
Precol. centralization × French	−0.304**	−0.294***	−0.334***
	(0.120)	(0.108)	(0.106)
Colony FE:	yes	yes	yes
Baseline controls:	yes	yes	yes
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Mean DV	9.11	9.14	9.14
Observations	404	400	400
Adjusted R^2	0.673	0.717	0.721

Notes: OLS models. Standard errors are clustered on the province-level. Baseline controls include the local population density, ethnic groups' population density, and the distance to the coast as well as the closest navigable river. Nature controls consist of the local altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls are the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Additionally, all covariates are interacted with 'French rule'. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

This relationship between indirect colonial rule and the size of local governance units remains robust to a number of permutations of the model. A set of sensitivity analyses yields that the results are (1) not driven by very big or very small districts, (2) not due to a potential over-weighting of colonies with many districts such as Nigeria, and (3) robust to including a vector of co-variates that control for the disease environment of a district, which might relate to precolonial statehood and colonial

[25] Because district sizes are logged, these percentage changes result from calculating $(exp(\beta * 3) - 1) * 100$.

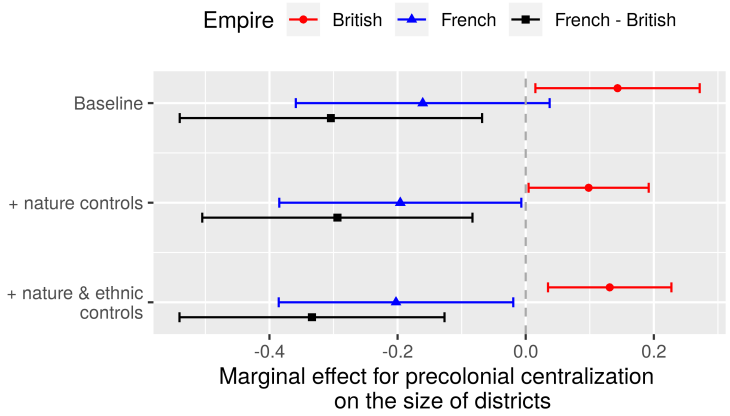


Figure 7: Marginal effect of precolonial centralization on district size. Based on Models 1-3 in Table 5.

administrative difficulties. Lastly, the results are consistent if I use the coding of precolonial centralization from Michalopoulos and Papaioannou (2013) or the newly collected data on precolonial polities as a measure of precolonial centralization: Districts that featured a capital city in 1885 were approximately 65 percent bigger in British colonies, but of average size in French colonies.

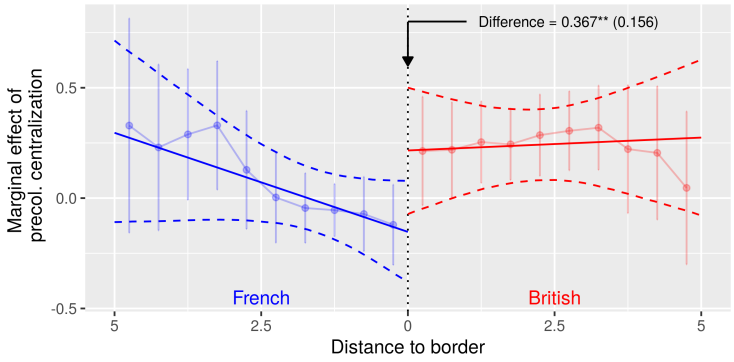


Figure 8: Regression discontinuity plot of the effect of precolonial centralization on districts' size at French-British borders perpendicular to the West African coastline. Solid lines illustrate the results from a linear trend-model with a bandwidth of 5 decimal degrees. Transparent point estimates plot the effect of precolonial centralization in .5 decimal degree bins of the distance towards the French and British sides of the borders. See Appendix A3.2 for all details.

Imbalances in covariates suggest that the divergence of the effects of precolonial centralization in British and French colonies might be driven by endogenous colonization choices of both empires. To address this caveat, I exploit the arguably arbi-

trary borders between the two empires that run perpendicular to the West African coastline. Fully presented in Appendix A3.2, the regression discontinuity design identifies the difference in the effect of pre-existing institutions on districts' sizes at the French-British borders. Using grid cells as the unit of analysis[26] and improving but not fully securing balance on pre-treatment covariates (see Table A17),[27] the analysis supports the conclusion drawn from the baseline model. As Figure 8 illustrates, the estimated difference is statistically significant ($p < .05$) and shows that precolonial centralization had an effect on district sizes .37 log-points smaller in French than in British colonies.[28] Combined with additional regression discontinuity specifications,[29] this suggests that the differential patterns observed in the French and British colonies are not the result of spatial sorting of the colonizers.

European administrators In addition to district sizes, I draw on data on the spatial distribution of British administrators to measure the extent of indirect rule. Because such data is less abundant, I have only access to the number of British administrators in the 22 Nigerian provinces and 12 Ugandan districts. The data supports the argument. For example, the large Kano Province in Northern Nigeria, a well-institutionalized precolonial emirate with 2.3 million inhabitants, was ruled by only 14 British administrators in 1927. In comparison, Ogoja's .6 million inhabitants in the acephalous Southeastern part of the colony were governed by 21 administrators. A simple linear model yields a very similar association (Appendix A3.3, Table A19). An increase in the political centralization of a province/district by one level is associated with a decrease of about 3 British administrators per million inhabitants ($p < .05$). While adding only the vector of ethnic co-variates does not change this result, adding the vector of eight 'nature' controls decreases the size

[26] I use grid cells as the unit of analysis here as the number of districts in an area by definition decreases with their size. In the RD-design, this would lead to a jump in the number of observations at the border, which may bias the results. Grid cells have a size of .0833 decimal degrees in the baseline RDD-analysis, and a varied in a robustness check.

[27] At a bandwidth of 5 decimal degrees around the borders balance is best with imbalances affecting grid cells' distance to the coast, altitude, and suitability for agriculture.

[28] The regression discontinuity design identifies only this difference but not the baseline effect of centralization on districts' size in British colonies.

[29] In particular, I test the robustness of the result under varying distance-to-border cutoffs, with additional control variables to counter the remaining imbalances in the data, and using various grid-cell sizes. The latter two variations do not significantly affect the results. Across all possible bandwidths, the baseline results become statistically insignificant below a cutoff of 1.5 decimal degrees to the border and are stable at larger cutoffs.

of the coefficient and turns it insignificant. Although this is reason for concern, this might well be due to the very small sample size. None of the additional covariates is associated with a statistically significant effect or increases the fit of the model.

Evidence on the devolution of power

After highlighting the negative relationship between precolonial centralization and local administrative effort by British but not French colonial governments, the next set of analyses focuses on the second facet of indirect rule: the power of indigenous authorities. In line with the above discusses historical evidence, I expect that indirect British rule came with more devolution of power to local authorities where these rested on centralized precolonial institutions. To probe this argument, I analyze the size of budgets of native treasuries in four British colonies as well as data on local administrative finances in French West Africa from (Huillery, 2010) and the status of chiefs in Nigeria.

Native treasuries' budgets I estimate the effect of precolonial centralization on the amount of revenues and expenditures of native treasuries under British rule in a cross-sectional manner. Because the previous analysis suggests that large districts are a consequence of precolonial centralization, the following considers the absolute and per-capita size of native treasuries separately. To that intent, the first set of regressions includes the full set of controls and takes absolute budget values as outcomes. The second set uses per capita budget values as outcomes and additionally controls for districts' logged population and size.

In line with the expectation of greater powers devolved to precolonial states, they are associated with much larger native treasuries, in absolute and per-capita terms. An increase in the precolonial level of political hierarchy by one level – moving from an acephalous society to petty chiefdoms, or from a large chiefdom to a state – is associated with an increase of total budgets by between 65 and 73 percent and of per-capita revenues and expenditures by around 28 percent (Table 6).[30] The respective coefficients are precisely estimated and consistent across the revenue and expenditure sides of local budgets. In sum, the results show that native

[30] Again, because of the logged outcomes, I calculate these percentage changes as $(exp(\beta)-1)*100$.

authorities in British colonies presided over larger, more powerful, and more effective local governments where they could build on pre-existing, centralized institutions.

Table 6: Native treasuries under British rule: per-capita revenues and expenditures (logged 2016 £)

	Revenues		Expenditures	
	total	per capita	total	per capita
	(1)	(2)	(3)	(4)
Precol. centralization	0.503***	0.242***	0.546***	0.257***
	(0.125)	(0.078)	(0.127)	(0.088)
Pop. density 1880 (log)	0.246	−1.958***	0.202	−2.009***
	(0.178)	(0.469)	(0.242)	(0.665)
Ethnic pop. density 1880 (log)	0.357	0.494**	0.493	0.594**
	(0.305)	(0.205)	(0.379)	(0.257)
Distance to coast (log)	0.053	−0.139*	0.113	−0.071
	(0.105)	(0.077)	(0.107)	(0.078)
Distance to river (log)	0.057	−0.050	0.081	0.035
	(0.122)	(0.088)	(0.139)	(0.097)
Population (log)		1.600***		1.641***
		(0.402)		(0.597)
Area (log)		−1.674***		−1.672***
		(0.423)		(0.596)
Colony FE:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Mean DV:	13	1.1	14	1.2
Observations	146	146	126	126
Adjusted R^2	0.550	0.624	0.452	0.569

Notes: OLS models. Standard errors are clustered on the province-level. The sample includes the colonies of the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi), and Uganda. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

I conduct a series of robustness checks, fully reported in Appendix A4.1. Following the previous analysis, I test whether the disease environment, the unequal weight of colonies, or outliers bias the results. Furthermore, I report alternative specifications of the model that do more justice to the panel character of the original budget-data, moving from the cross-sectional analysis to a district-weighted panel and hierarchical models. The estimated association between revenues per capita and

precolonial centralization remains stable in size and statistical significance. I also re-estimate the main model using the alternative measures of precolonial centralization from Michalopoulos and Papaioannou (2013) and a dummy for districts that feature a capital of a precolonial polity in 1885. Districts with a capital in 1885 exhibit larger budgets, but not on a per-capita basis. Although speculatively, this might be indicative of differential effectiveness of indirect rule in rural and urban(izing) areas that developed around the old centers of society. Lastly, I disaggregate the analysis into the main revenue and expenditure lines of the budgets. The above findings are prevalent across almost all budget items.

To explore whether similar or opposite dynamics marked district finances in French colonies, I make use of Huillery's (2010) data on tax collection, public investments, and service provision in 109 French West African cercles. The results in Appendix A4.2 suggest that precolonial centralization had no significant effect on tax collections in French West Africa, but a negative effect on investments and spending on teachers and doctors. In per-capita terms, only the number of doctors is significantly lower in centralized districts than elsewhere; all other indicators yield statistically insignificant results. Although in itself not fully conclusive, these insignificant but negative associations provide a foil to compare the results from the British colonies against. This comparison increases the confidence that the positive association between precolonial institutions and native treasuries' resources in British colonies are indeed due to indirect rule of precolonially centralized polities.

The power of chiefs The analysis of British native treasuries consistently shows that native administrations had more financial resources at their disposal if located in areas with high degrees of precolonial centralization. However, chiefs in centralized and decentralized areas might have enjoyed the same status, with the former being able to more effectively use their powers. An analysis of the highest class of chiefs in Nigerian districts shows that this doubt is unfounded (Table A26). Precolonial centralization correlates strongly with the class of chiefs: Districts in the territory of precolonial kingdoms featured many more "First Class" chiefs than acephalous areas. They were most often headed by "Third Class" chiefs. Adding the additional controls, this association becomes somewhat smaller but remains statistically

significant.

This pattern of greater powers remaining in the hands of chiefs that could build on precolonial institutions in Nigeria completes the picture of the second analytical part of this study. Drawing on data on districts' sizes, British administrators, native treasuries, and the power of local chiefs, the analyses provide consistent evidence that the British devolved more power to indigenous elites where centralized precolonial institutions offered readily usable structures for indirect rule. This dynamic is not apparent in data from the French colonies, in which, as we have seen, precolonial polities faced frequent demise and downfall.

Conclusion

Following up on the decades-old debate on indirect rule, this article has brought forward systematic empirical evidence on variation in the application of indirect rule between the French and the British empire and within British and French colonies in Africa. Drawing on the literature on the topic, I argue that the French have ruled more directly and against rather than trough precolonial institutions. In comparison, British colonial rule built to a large extent on the idea of local self-government. This ideal could be most effectively realized in areas that featured established and well centralized precolonial institutions. Elsewhere, in particular in acephalous societies, the British established more direct rule to bridge the gap between the colonizers and the population.

The systematic evidence presented here supports both arguments. First, French rule was hostile towards precolonial polities to a degree that about 70% of all colonized polities experienced their demise before independence. In British colonies, this figure amounts to about 30%. Second, where strong precolonial institutions prevailed and the British ruled, districts were 35-54 percent larger than in areas settled by acephalous societies. They were by the same amount smaller where the French ruled. Within British colonies, equivalently substantive differences are apparent in the size of native administrations' budgets, both in absolute and per capita terms. In combination, these patterns strongly support the argument that indirect rule was best realizable and most effective where pre-existing institutions could be co-opted

by the colonial state.

These findings have important implications for theories about the historical pathways on which African local communities evolved since the Scramble after 1885. Contrary to a deterministic view that "there is often nothing new out of Africa" (Herbst, 2000, 30), the evidence shows that local institutions were shaped by colonialism, but not in a uniform manner. The diversity of colonial experiences[31] interacted with the local precolonial past in shaping colonial and postcolonial socio-political development. Arguments that neglect this heterogeneity by positing direct links between the (pre-)colonial past and the present might thus, in some cases, overly compress history (Austin, 2008).

The above presented evidence has implications for important features of postcolonial states in Africa. Variation in indirect rule between and within the colonial empires affects states' treatment of traditional authorities until today. The array of questions raised by these patterns is long. What effects does colonial indirect rule have, for example, on postcolonial local governance (Acemoglu, Reed and Robinson, 2014; Lange, 2009), ethnic politics and conflict (Cederman, Gleditsch and Buhaug, 2013; Paine, 2019; Wig, 2016), traditional institutions (Acemoglu et al., 2014; Baldwin, 2016), and land rights (Boone, 2003; Firmin-Sellers, 2000; Honig, 2017)? Since indirect rule belongs to the repertoires of states still today and chiefs oftentimes maintain important roles as brokers (Baldwin, 2014; Kadt and Larreguy, 2018; Nathan, 2019) and auxiliaries (Baldwin, 2013; Henn, 2018) of politicians and the state, better evidence on its short- and long-term effects on local and national politics is of considerable value.

Lastly, while this article shows that European imperialism came with a variety of local governance arrangements, I do not analyze the effects they had on the local population. What was the impact of direct and indirect rule on the lives and livelihoods of the millions colonized and ruled by either district officers, traditional rulers, or warrant chiefs? How did the style of local rule affect the level of violence, destruction, and extraction committed by the European empires? The present characterization and measurement of indirect colonial rule may offer a useful starting

[31] These go of course well beyond the dimension of indirect rule, as the impacts of cash crop agriculture (Hopkins, 1973; Roessler et al., 2018) or Christianity (Lankina and Getachew, 2012) suggest.

point for answering such questions.

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Supporting Information

Continuity or Change?
(In)direct Rule in British and French Colonial Africa

Table of Contents

A1 Data

This appendix provides an overview over the data collected for the analyses of indirect rule in British and French colonies presented in the main text. Subsection A1.1 presents the data on precolonial polities and their lines of succession digitized from the encyclopedia of 'African States and Rulers' compiled by Stewart (2006). Subsection A1.2 presents the newly collected data on districts in British and French colonies and Subsection A1.3 presents data on the budgets of native treasuries in four British colonies. Finally, Subsection A1.4 briefly summarizes the correlations between the four main proxies of indirect rule in British colonies: the size of districts, the number of British administrators, the size of native treasuries, and the class of chiefs in Nigeria.

A1.1 Precolonial polities

Table A1: Summary of data on lines of succesion

Statistic	N	Mean	St. Dev.	Min	Max
British rule	5237	0.787	0.409	0	1
French rule	5237	0.213	0.409	0	1
Year	5237	1923.307	22.528	1830	2006
Population (log)	5208	3.721	1.488	0.000	7.769
Distance to coast (log)	5208	5.505	1.827	0.355	7.397
Distance to nav. river (log)	5208	4.634	1.449	−0.223	7.724
Polity age (log)	5237	5.573	0.752	2.197	7.096
Dependence on agriculture	5016	1.902	1.371	0	8
Dependence on husbandry	5016	5.632	2.376	0	9
Intensity of agriculture	4792	2.109	0.984	0	4
Precol. centralization	4790	1.870	1.099	0	4
Altitude (median)	5208	503.906	437.447	5	1745
Slope (median)	5208	3.987	1.613	1	9
Temperature (mean)	5208	25.056	3.702	14.590	29.860
Evapotranspiration	5208	1730.642	333.677	1133	2347
Precipitation	5208	975.664	490.950	16	3006
Evapotransp. / precipitation	5208	3.869	1.334	1	7
Suitability for agr.	4902	0.333	0.210	0.001	0.785
Cash crop suitability	5208	0.351	0.161	0.000	0.863

Table A1 summarizes the data on precolonial polities digitized from the encyclopedia on 'African States and Rulers' compiled by Stewart (2006) and the covariates attributed to them. The map in Figure A1 shows the spatial distribution of the polities' capitals.

In addition to providing these summaries, this section aims to test the possibility that the *observation* of polities by Stewart (2006) is biased, in particular by potential effects of precolonial centralization and the colonizing power on the probability of observing more (or less) polities in a certain area. As throughout the paper, the

analysis is limited towards polities that were colonized by either the French or the British empire. I analyze the quality of information on precolonial polities in three ways:

First, since Stewart (2006) gives a short account of the history of polities, we can systematically assess the information available for each state. For each polity that was ever colonized, I thus code the simple length of the historical account in characters. Table A2 reports the results of simple linear models of the logged number of characters on a 'British' rule dummy, the level of precolonial centralization of the (last) capital of a polity, and additional controls. The results show that Stewart does not give more detailed accounts of polities that were colonized by the British than by the French. Not surprisingly, the grand kingdoms, those polities located in highly centralized areas, are described in more detail.

The second approach is based on Murdock's (1967) ethnic settlement areas and takes the colony-ethnic polygon as the unit of analysis. For each polygon, I count the number of years that polygon has featured a polity in all year before 1885. This count comes in three flavors: the first counts every unique polity-year. The second counts every year only once, even if there are multiple polities in the same settlement

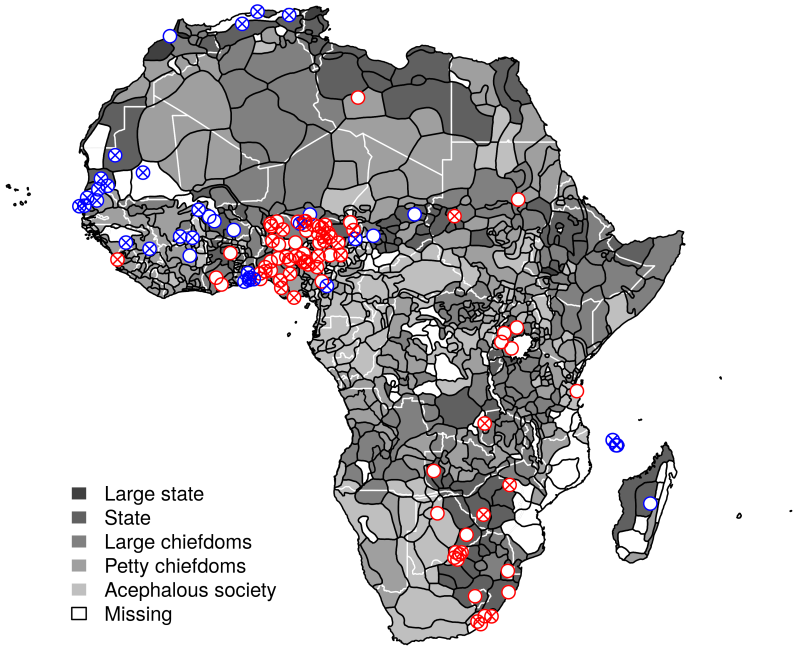


Figure A1: Polities colonized by the French or British empire in Africa.
The capitals of polities colonized by the French (British) are drawn in blue (red). Precolonial polities with lines of succession that ended before the end of the colonial period are marked with a cross.

Table A2: Information per polity

	log(Characters of historical account)		
	(1)	(2)	(3)
British colony	0.208	−0.056	0.079
	(0.172)	(0.213)	(0.223)
Precol. centralization	0.296***	0.250***	0.230**
	(0.076)	(0.079)	(0.099)
Population/km^2 (1880; log)	0.050	0.055	0.017
	(0.047)	(0.114)	(0.115)
Distance to coast (log)	0.015	−0.030	
	(0.054)	(0.063)	
Distance to river (log)			−0.053
			(0.068)
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Mean DV	6.28	6.28	6.28
F-Stat:	8.7	4	3.57
Observations	101	97	97
Adjusted R^2	0.278	0.289	0.300

Notes: OLS models. Robust standard errors in parenthesis. Nature controls. consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01

area. The third adds to that a simple discount rate of 5 percent per year, so as to not overweight long-lasting empires such as Bornu in Northern Nigeria. Lastly, a simple dummy encodes whether there has ever been a polity observed by Stewart in a particular polygon.

None these four variables is significantly related to British colonization (see Table A3). Highlighting the overlap between the polity data and Murdock's Ethnographic Atlas, the degree of precolonial centralization is highly correlated with the number of years an ethnic group is associated with a precolonial polity – no matter how the latter value is constructed. For example, Model 3 suggests that moving from an acephalous ethnic group to a centralized one (precolonial centralization = 3) adds 85 more 'state-years.' Figure A2 furthermore shows, that this relationship is non-linear and strongest for the highest degrees of precolonial statehood as coded by Murdock. This underlines the quality of the data.

The third analysis (Table A4) builds on this approach, only exchanging the ethnic polygons with a simple raster of a resolution of 0.417 by 0.417 decimal degrees.

Table A3: Observed polity-history per ethnic group: Difference between French and British colonizers

	Years of precolonial data:			
	P(any year)	discounted	unique	all
	(1)	(2)	(3)	(4)
British colony	0.019	4.159	13.871	26.461
	(0.024)	(3.245)	(21.802)	(37.744)
Precol. centralization	0.057***	8.625***	28.415***	32.133**
	(0.011)	(1.396)	(9.377)	(16.234)
Population/km^2 (1880; log)	0.098***	12.757***	68.290***	105.552***
	(0.012)	(1.619)	(10.877)	(18.830)
Distance to coast (log)	0.012	0.589	15.354	26.373
	(0.014)	(1.845)	(12.397)	(21.463)
Distance to river (log)	−0.004	−1.144	−14.607*	−24.384*
	(0.009)	(1.204)	(8.088)	(14.003)
Area (km^2, log)	0.062***	7.420***	33.462***	47.721***
	(0.006)	(0.860)	(5.780)	(10.006)
Ethnic controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Mean DV	0.12	13.19	48.9	64.11
F-Stat:	13.94	12.67	7.78	5.98
Observations	893	893	893	893
Adjusted R^2	0.198	0.182	0.114	0.087

Notes: OLS models. Robust standard errors in parenthesis. Nature controls consist of median. altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01

The results underline the weak relationship between British rule and information on precolonial polities provided by Stewart: none of the counts of polity-years is significantly correlated with the British rule dummy. In contrast, the pattern that the Murdock coding of precolonial centralization is a significant correlate of Stewart's polity data is also prevalent when using raster cells as the units of analysis.

Table A4: Observed polity-history per raster cell

	Years of precolonial data:			
	P(any year)	discounted	unique	all
	(1)	(2)	(3)	(4)
British colony	0.003	0.199	−0.639	−0.156
	(0.003)	(0.374)	(1.700)	(2.017)
Precol. centralization	0.007***	0.754***	1.707**	1.792**
	(0.002)	(0.165)	(0.752)	(0.892)
Population/km^2 (1880; log)	0.040***	3.178***	15.295***	17.836***
	(0.002)	(0.191)	(0.868)	(1.030)
Distance to coast (log)	0.004**	0.083	0.260	0.393
	(0.002)	(0.196)	(0.890)	(1.055)
Distance to river (log)	−0.001	0.116	−1.312**	−1.749**
	(0.001)	(0.135)	(0.614)	(0.728)
Ethnic controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Mean DV	0.02	1.41	5.16	5.64
F-Stat:	50.88	29.66	29.76	28.88
Observations	9,692	9,692	9,692	9,692
Adjusted R^2	0.076	0.045	0.045	0.044

Notes: OLS models. Robust standard errors in parenthesis. Nature controls consist of median. altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01

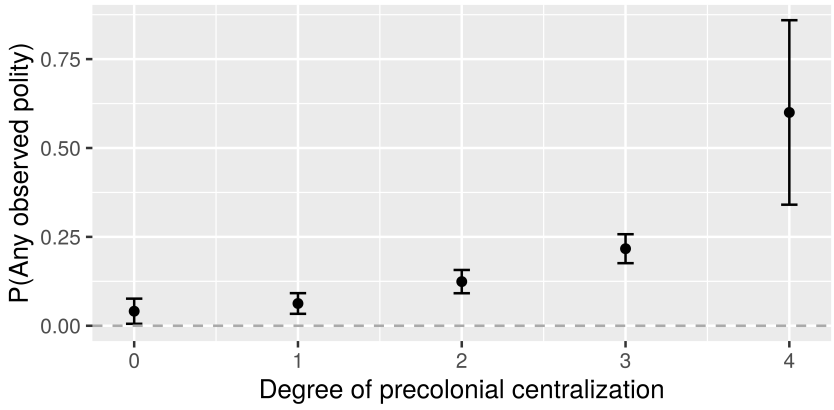


Figure A2: Probability of an ethnic group featuring a precolonial state as coded by Stewart (2006) by level of precolonial centralization.

A1.2 Districts and regions in British and French colonies

Table A5: Summary of sources of district maps

colony	Observations	year	source
Côte d'Ivoire	19	1925	Huillery (2009)
Dahomey	13		
Gold Coast	35	1927	British War Office
Guinée	18	1925	Huillery (2009)
Haute Volta	11	1925	Huillery (2009)
Kenya	34	1962	George Philip and Son
Mauretanie	9	1925	Huillery (2009)
Niger	10	1925	Huillery (2009)
Nigeria	96	1962	Central Intelligence Agency
Northern Rhodesia	22	1948	British War Office
Nyasaland	21	1936	Annual Report
Senegal	14	1925	Huillery (2009)
Sierra Leone	13	1932	British War Office
Soudan	20	1925	Huillery (2009)
Tanganyika	58	1962	George Philip and Son
Uganda	15	1957	Annual Departmental Reports

Table A5 enlists the sources for the district maps used in all analyses. Please note that I have only been able to locate precise and labeled maps on the district-boundaries in Nigeria, Kenya, and Tanganyika for the year 1962, that is shortly after these countries' independence. It seems however unlikely that the results of the analysis are purely driven by quick territorial reforms directly after independence, in particular also because the names of districts can be matched with those of local colonial administrations without problems (see below). To digitize the available maps, I use current districts obtained form the FAO (2014) GAUL Database. Since the number of districts has sharply increased over the past 60 years, I can use current units and align them to the units observed in the past, recoding boundaries only when they significantly deviate from a modern boundary. This facilitates the tracing of boundaries over time and makes up for some lack of detail in the colonial maps. Districts are then clustered into regions, according to the historical map material. To each district and region, I then attribute a capital by recurring to a number of sources, first the maps from the colonial period, the statoids.org data base, and where the two sources do not provide the name of district or regional capitals, a Google search. The names of capitals are then geocoded trough the geonames.org gazetteer. Table A6 provides the summary statistics of the district-size data, and Figures A3 and A4 map all district boundaries used for the analysis.

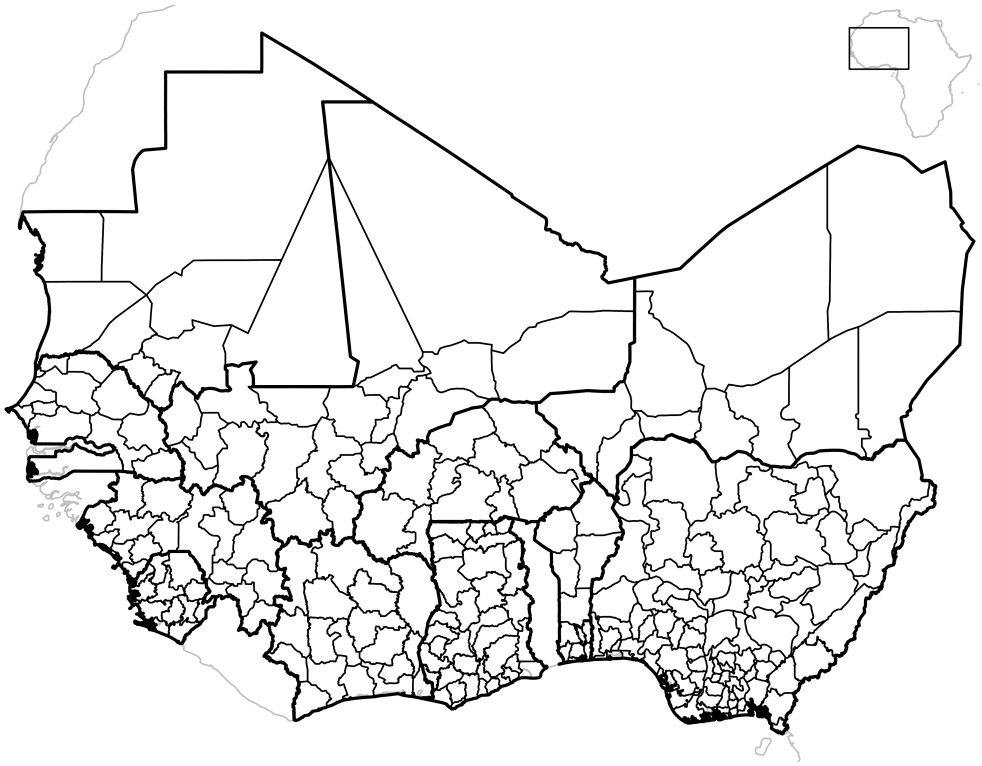


Figure A3: Districts in West Africa.

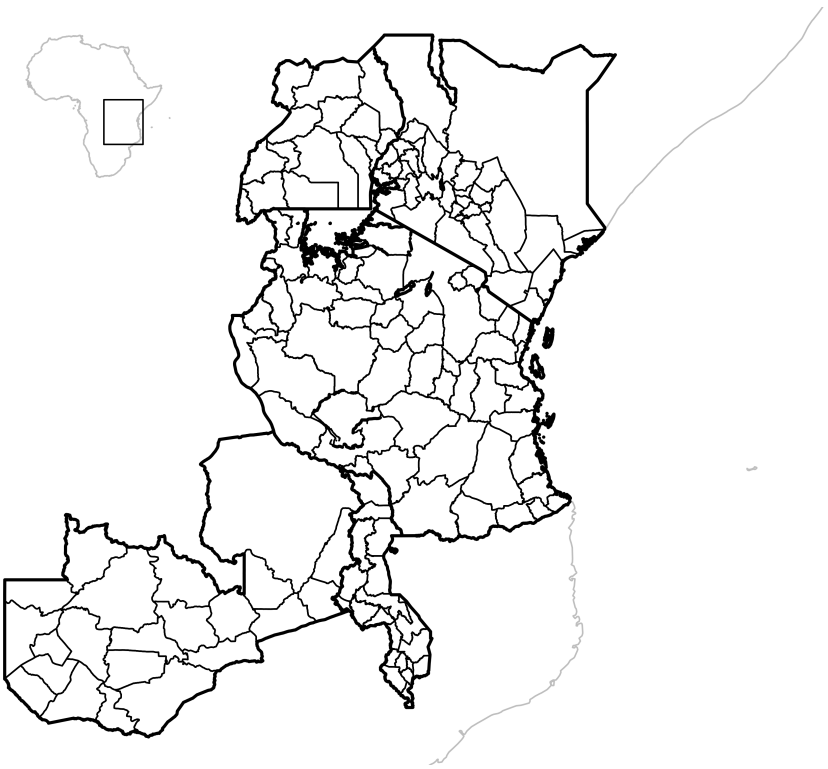


Figure A4: Districts in Southern and East Africa.

Table A6: Summary of district-area data

Statistic	N	Mean	St. Dev.	Min	Max
French	408	0.279	0.449	0	1
Area	408	20533.900	47162.950	42.942	520937.400
Precolonial centralization	405	1.521	0.772	0.000	3.000
Population density (log)	408	1.980	1.619	−5.029	7.475
Ethnic groups' population density (log)	406	1.973	1.449	−2.958	5.970
Distance to coast	408	4.190	3.155	−2.303	7.021
Distance to nav. river	407	4.824	0.962	2.394	6.748
Median altitude	408	529.020	526.416	3.000	2256.611
Median slope	408	3.815	1.160	1.000	9.000
Evapotranspiration	408	25.184	3.068	14.504	29.920
Precipitation	408	1652.711	253.904	1195.292	2414.136
Evapotranspiration/Precipitation	408	1258.852	598.442	56.293	3187.805
Mean temperature	408	4.535	1.462	1.000	8.000
Agricultural suitability	403	0.414	0.213	0.000	0.938
Cash crop suitability	407	0.371	0.130	0.000	0.721
Reliance on agriculture	406	2.012	1.509	0.000	8.507
Reliance on pastoralism	406	6.055	1.460	0.200	9.000
Intensity of agriculture	405	2.245	0.561	0.000	4.000

A1.3 Data on native treasuries in British colonies

The digitization of reports on native treasuries' budgets proceeds in two stages. I first process the scanned images of the respective pages in the colonial reports automatically to extract structured data from the tables they enclose. I then postprocess the results to correct errors. Subsection A1.3.1 provides details on this procedure, and Subsection A1.3.2 enlists the sources and provides an overview over the resulting data set.

A1.3.1 Digitizing tables from British colonial reports

I automatically extract structured information from tables in the scanned pages of the British Blue Books and Annual Departmental reports, information which is cleaned by hand in a second step. To this end, I developed an algorithm that transforms an image of a printed table[32] into a machine readable matrix of strings which is then stored in a relational database. The algorithm proceeds as follows:

1. *Image pre-processing:* Transforming the images into binary black and white pixels and turning to maximize the horizontal alignment of rows.[33]

2. *Table cell detection:* Segmenting the image into rows and columns based on (1) vertical lines that delimit columns, and (2) clustering of the x- and y-

[32] It must be born in mind that conventional OCR programs fail at digitizing table from such deprecated scans as dealt with in the context of historical archives.

[33] Doing so is achieved by maximizing the standard deviation of the row-wise sum of black pixels in the image.

coordinates of connected image components retrieved by a horizontal blurring filter that produces probable text blocks. Warps in the image that stem from the physical wave of the pages of an open book are corrected by using horizontal (waved) lines as reverence lines to straighten the entire image.

3. *Optical character recognition (OCR):* Extracting text from the cell-images using the open source program Ocropy (Breuel, 2014). Ocropy is based on a recurrent neural network which is trained on 8000 cell images from the colonial Blue Books.

Although the automatic extraction of information from the scanned image is efficient, and the OCR attains an error rate of only about 3%, each page is post-processed by hand to correct remaining inaccuracies. Such errors are highly clustered, since they mostly stem from low-quality printing and scanning on certain pages or regions of a page. Where I extract numbers, such errors are in particular worrying, since they oftentimes introduce errors in the number of digits, thus altering a number's order of magnitude. Errors also emerge if pages are printed in a font for which the neural network used for the OCR is not trained.

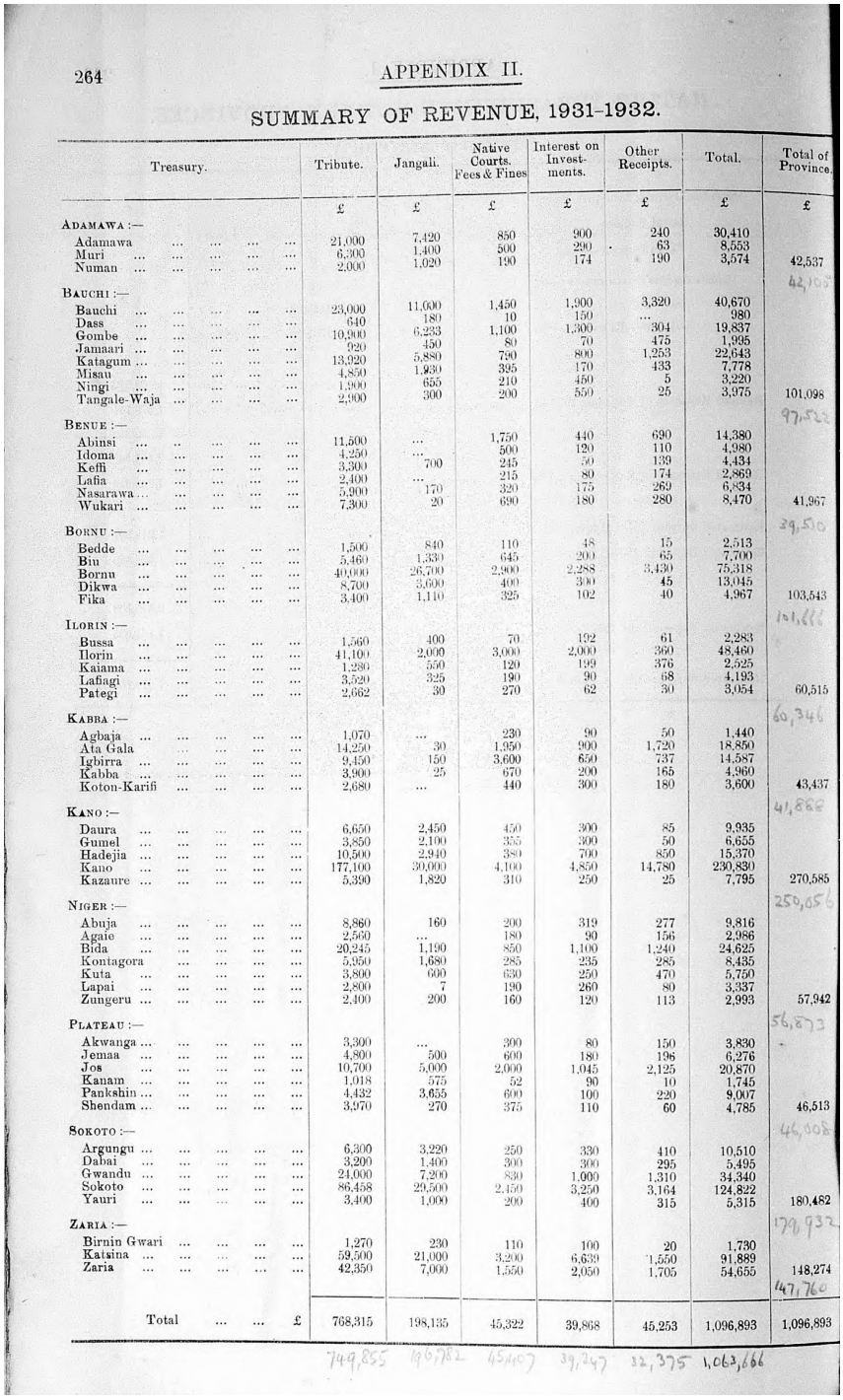
A1.3.2 Budget data: sources and resulting data set

Table A8 enlists all Annual Colonial Reports from which I digitize financial information on the budgets of native administrations, with Figure A5 showing an exemplary report page. Table A8 provides the summary statistics of the digitized data, averaged by district and over all years in which a district is observed. Figure A6 provides and overview over the development of per-capita revenues of the native treasuries in each district in the sample. As apparent in the plots, most districts developed very much in parallel without much variance in their rank. This strengthens the validity of the approach of using the average revenue and expenditure within a district as the main dependent variable in the respective analysis. Lastly, Figure A7 maps the average revenue by district in each colony in the sample.

Table A7: Sources of native treasury data

Colony	Title	Pages	Microform ID
Gold Coast	Local Government Revenue and Expenditure, 1948-1951	6; 7; 11; 14; 15; 35; 36; 41; 42; 45; 46; 71; 73; 77; 78; 82; 83	73211B-13
Nigeria	Native Authority Estimates, North, 1929-1937	150; 160; 301; 302	73242B-22
Nigeria	Native Authority Estimates, North, 1934-1938	4; 147; 290; 435	73242B-23
Nigeria	Native Authority Estimates, North, 1938-1941	4; 266; 267	73242B-24
Nigeria	Native Authority Estimates, North, 1944-1946	135; 136; 425; 426	73242B-25
Nigeria	Native Authority Estimates, North, 1948-1950	345; 346; 675; 676	73242B-26
Nigeria	Native Authority Estimates, North, 1950-1952	334; 335; 336; 337; 340	73242B-27
Nigeria	Memoranda on Estimates, North, 1948-1960	43; 61; 80; 98; 113; 114; 115; 136; 156	73242B-35
Nigeria	Native Financial Statements, South, 1929-1937	98; 192; 193; 298; 299; 416; 417; 556; 557	73242B-36
Nigeria	Native Financial Statements, South, 1937-1939	143; 144; 342	73242B-37
Nigeria	Native Financial Statements, East, 1939-1943	157; 158	73242B-38
Nigeria	Native Financial Statements, West, 1939-1940	81; 82	73242B-40
Nyasaland	Native Affairs and Administration 1931-1945	214; 301; 334; 378; 414; 445; 484; 518; 548; 575; 613; 624; 637	73105A-01
Nyasaland	Native affairs and Administration 1946-1959	14; 31; 44; 61; 75; 91; 101; 114; 132; 150; 166; 189; 209; 225; 243; 262; 274; 285; 299; 309; 320; 335; 348; 360; 379; 391; 402; 417; 428; 441	73105A-02
Uganda	Provincial Commissioners, 1935-1938	7; 9; 10; 11; 12; 17; 18; 19; 20; 21; 22; 23; 24; 25; 26; 27; 28; 36; 55; 56; 57; 58; 59; 70; 71; 72; 73; 74; 75; 85; 98; 100; 101; 102; 103; 104; 116; 119; 120; 121; 133; 155; 157; 158; 159; 160; 161; 162; 173; 174; 185	73143A-01
Uganda	Provincial Commissioners, 1939-1946	30; 33; 34; 57; 58; 59; 60; 61; 62; 119; 120; 122	73143A-02
Uganda	Provincial Commissioners, 1947-1952	63; 97; 98; 116; 117; 142; 143; 181; 216; 233; 255; 256; 305; 368; 401; 453; 454; 487; 488; 511; 556; 557; 615; 616; 644; 676; 677; 715; 716; 762; 763; 804; 864	73143A-03
Uganda	Provincial Commissioners, 1953-1956	58; 59; 105; 106; 170; 223; 224; 270; 271; 316; 380; 433; 434; 484; 517; 518; 575; 576; 632; 696; 697	73143A-04

Microform ID denotes the 'Reference ID' used on www.britishonlinearchives.co.uk.



264 APPENDIX II.

SUMMARY OF REVENUE, 1931-1932.

Treasury.	Tribute.	Jangali.	Native Courts. Fees & Fines	Interest on Investments.	Other Receipts.	Total.	Total of Province.
	£	£	£	£	£	£	£
ADAMAWA :—							
Adamawa	21,000	7,420	850	900	240	30,410	
Muri	6,300	1,400	500	290	63	8,553	
Numan	2,000	1,020	190	174	190	3,574	42,537
BAUCHI :—							42,103
Bauchi	23,000	11,000	1,450	1,900	3,320	40,670	
Dass	640	180	10	150	...	980	
Gombe	10,900	6,233	1,100	1,300	304	19,837	
Jamaari	920	450	80	70	475	1,995	
Katagum	13,920	5,880	790	800	1,253	22,643	
Misau	4,850	1,930	395	170	433	7,778	
Ningi	1,900	655	210	450	5	3,220	
Tangale-Waja	2,900	300	200	550	25	3,975	101,098
BENUE :—							97,522
Abinsi	11,500	...	1,750	440	690	14,380	
Idoma	4,250	...	500	120	110	4,980	
Keffi	3,300	700	245	50	139	4,434	
Lafia	2,400	...	215	80	174	2,869	
Nasarawa...	5,900	170	320	175	269	6,834	
Wukari	7,300	20	690	180	280	8,470	41,967
BORNU :—							39,510
Bedde	1,500	840	110	48	15	2,513	
Biu	5,460	1,330	645	200	65	7,700	
Bornu	40,000	26,700	2,900	2,288	3,430	75,318	
Dikwa	8,700	3,600	400	300	45	13,045	
Fika	3,400	1,110	325	102	40	4,967	103,543
ILORIN :—							101,666
Bussa	1,560	400	70	192	61	2,283	
Ilorin	41,100	2,000	3,000	2,000	360	48,460	
Kaiama	1,280	550	120	199	376	2,525	
Lafiagi	3,520	325	190	90	68	4,193	
Pategi	2,662	30	270	62	30	3,054	60,515
KABBA :—							60,346
Agbaja	1,070	...	230	90	50	1,440	
Ata Gala	14,250	30	1,950	900	1,720	18,850	
Igbirra	9,450	150	3,600	650	737	14,587	
Kabba	3,900	25	670	200	165	4,960	
Koton-Karifi	2,680	...	440	300	180	3,600	43,437
KANO :—							41,888
Daura	6,650	2,450	450	300	85	9,935	
Gumel	3,850	2,100	355	300	50	6,655	
Hadejia	10,500	2,940	380	700	850	15,370	
Kano	177,100	30,000	4,100	4,850	14,780	230,830	
Kazaure	5,390	1,820	310	250	25	7,795	270,585
NIGER :—							250,056
Abuja	8,860	160	200	319	277	9,816	
Agaie	2,560	...	180	90	156	2,986	
Bida	20,245	1,190	850	1,100	1,240	24,625	
Kontagora	5,950	1,680	285	235	285	8,435	
Kuta	3,800	600	630	250	470	5,750	
Lapai	2,800	7	190	260	80	3,337	
Zungeru	2,400	200	160	120	113	2,993	57,942
PLATEAU :—							56,873
Akwanga	3,300	...	300	80	150	3,830	
Jemaa	4,800	500	600	180	196	6,276	
Jos	10,700	5,000	2,000	1,045	2,125	20,870	
Kanam	1,018	575	52	90	10	1,745	
Pankshin	4,432	3,655	600	100	220	9,007	
Shendam	3,970	270	375	110	60	4,785	46,513
SOKOTO :—							46,008
Argungu	6,300	3,220	250	330	410	10,510	
Dabai	3,200	1,400	300	300	295	5,495	
Gwandu	24,000	7,200	830	1,000	1,310	34,340	
Sokoto	86,458	29,500	2,450	3,250	3,164	124,822	
Yauri	3,400	1,000	200	400	315	5,315	180,482
ZARIA :—							179,932
Birnin Gwari	1,270	230	110	100	20	1,730	
Katsina	59,500	21,000	3,200	6,639	1,550	91,889	
Zaria	42,350	7,000	1,550	2,050	1,705	54,655	148,274
							147,760
Total ... ... £	768,315	198,135	45,322	39,868	45,253	1,096,893	1,096,893
	749,855	190,782	45,407	39,247	32,375	1,063,666	

Figure A5: Detail of native treasuries' summary of revenues: Northern Nigeria, 1931-1932, Microform ID: 73242B-22, page 151.

Table A8: Summary of British budget data

Statistic	N	Mean	St. Dev.	Min	Max
Total revenue (log)	147	13.38	1.22	9.01	16.42
Revenue from: Taxes (log)	147	12.78	1.22	8.56	16.26
... Fees & fines (log)	147	11.48	1.35	7.88	15.22
... Transfers (log)	147	6.76	5.65	0.00	15.18
... Other (log)	128	10.99	1.49	4.94	14.37
Total expenitures (log)	127	13.60	1.12	8.85	16.47
Expenditures on: Administration (log)	127	12.25	1.20	6.92	15.54
... Order (log)	127	11.77	0.89	8.25	14.34
... Education & health (log)	127	11.42	1.66	0.00	14.44
... Agriculture (log)	127	9.13	2.19	0.00	13.99
... Public works (log)	127	12.13	1.31	7.47	15.49
... Other (log)	127	10.93	1.57	5.81	15.65
Precolonial centralization	146	1.55	0.71	0.00	3.00
Population (log)	146	12.25	0.77	9.71	14.89
Area (log)	146	2.16	0.11	1.89	2.43
Population density (log, 1880)	146	3.00	0.96	0.84	5.25
Ethnic groups' pop. density (log, 1880)	146	3.03	0.87	1.02	4.52
Distance to coast (log)	146	5.31	1.28	0.14	7.07
Distance to nav. river (log)	146	4.41	0.84	2.48	5.99
Median altitude	146	383.91	386.85	8.77	1756.29
Median slope	146	3.78	1.18	1.67	7.49
Mean temperature	146	25.77	2.20	18.58	28.97
Evapotranspiration	146	1572.15	257.01	1195.29	2318.16
Precipitation	146	1444.26	530.15	485.48	2835.08
Evapotranspiration/Precipitation	146	5.08	1.30	2.04	8.00
Agricultural suitability	146	0.45	0.19	0.01	0.89
Cash crop suitability	146	0.40	0.11	0.08	0.72
Reliance on agriculture	146	1.37	0.72	0.00	3.78
Reliance on pastoralism	146	6.71	1.13	3.12	9.00
Intensity of agriculture	146	2.14	0.29	2.00	3.00

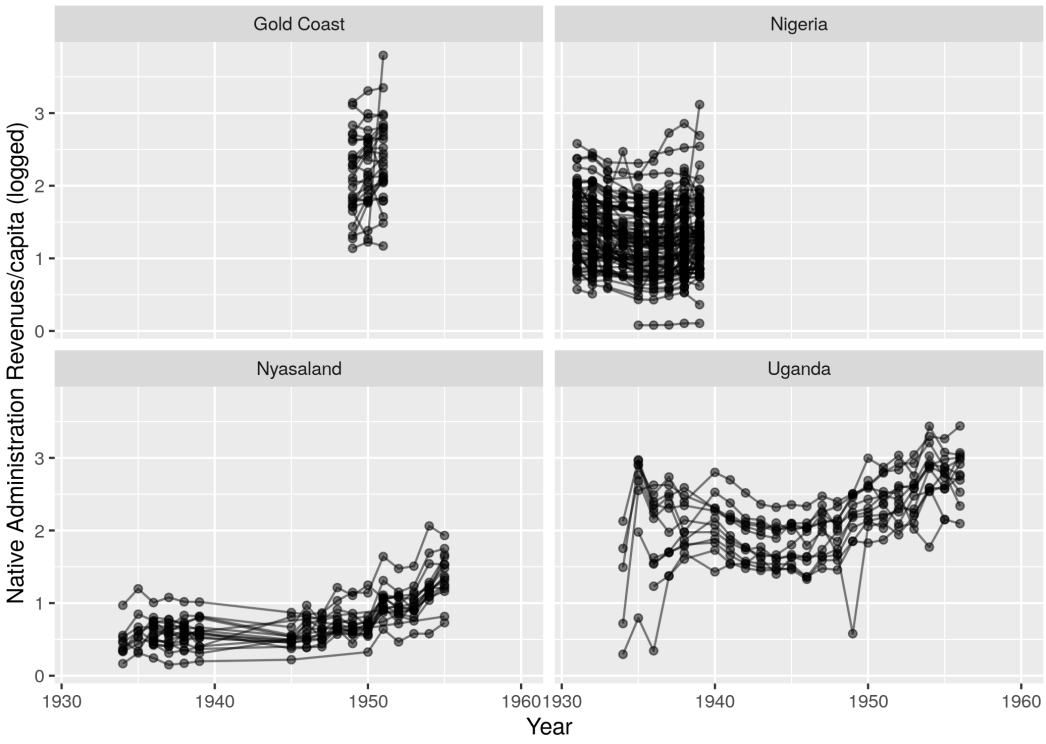
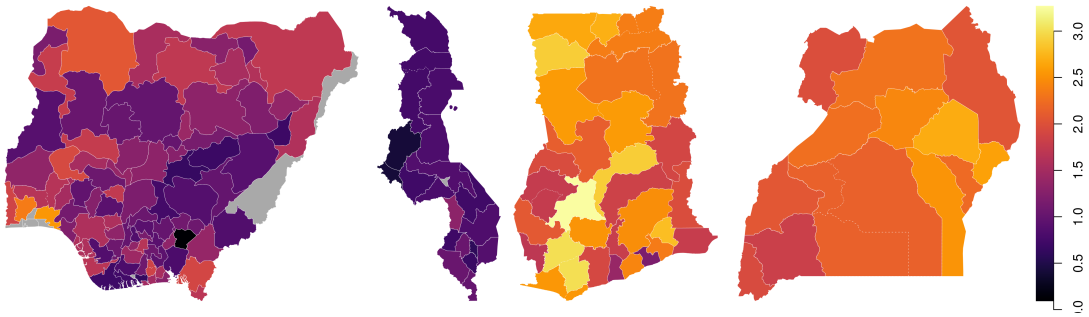


Figure A6: Per-capita revenues of native treasuries over time (logged; 2016 £). Aggregated to the district level.



(a) Nigeria 1931-1939 (b) Nyasaland, 1934-1955 (c) Gold Coast, 1949-1951 (d) Uganda 1934-1956

Figure A7: Per-capita revenues of native treasuries (logged; 2016 £). Aggregated to the district level and averaged over all observed years.

A1.4 Correlations between indicators of British indirect rule

In order to gauge in how far the various measures of indirect rule used as dependent variables in the main analysis correlate with each other and thus consistently capture "indirect rule," Figure A8 displays the correlation matrix of all four measures. All outcomes are correlated with each other, but not perfectly. This supports the view that they capture varying aspects of indirect rule.

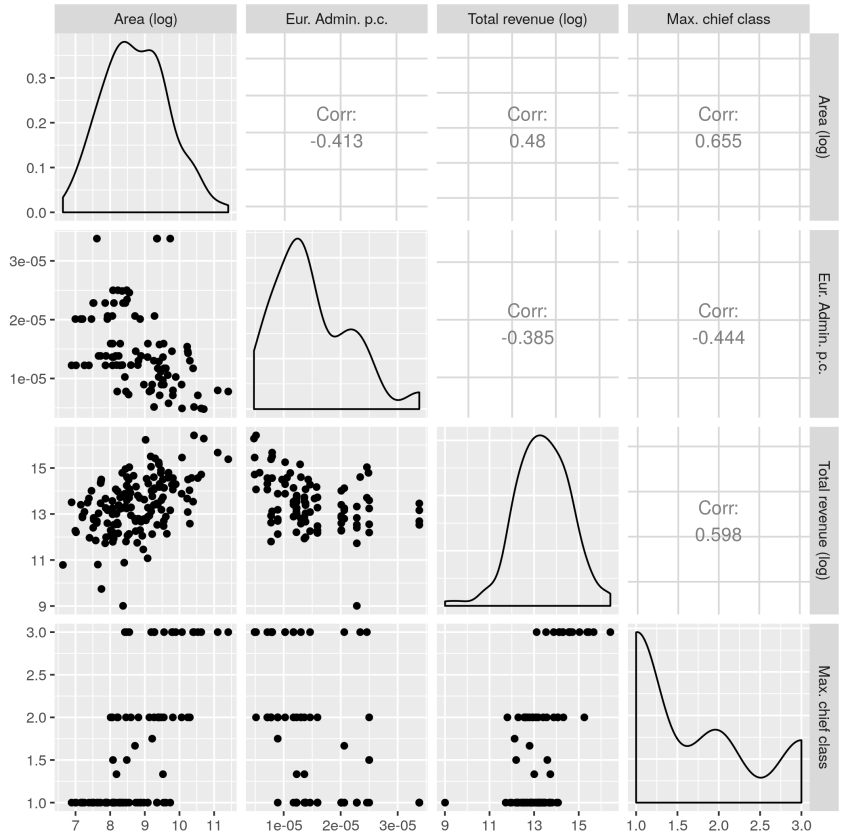


Figure A8: Correlations between four main measures of British indirect rule.

A2 Evidence from the survival of lines of succession

This section presents a set of supplementary analyses of the effect of French and British rule on the demise of precolonial polities in Africa. Subsection A2.1 discusses the robustness checks to the baseline models mentioned in the main text. In Subsection A2.4, I exploit variation within West Africa and along its coast to increase the internal validity of the research design. Lastly, Subsection A2.1 shows how British and French colonization led to the death and deposition of individual rulers, mainly right after colonization.

A2.1 Main robustness checks

Three types of robustness checks are applied to the baseline model including all control variables in Table 2 of the main text. First, Models 1 and 2 in Table A9 address the imbalance in the sample with regards to the number of polities from the French and British empires as well as from the various colonies therein. Weighting observations such that each empire (Model 1) and colony (Model 2) receives equal weight substantially increases the coefficient associated with British rule from 1.8 to 2.4 and 2.9, respectively. This suggests that giving the British empire and the colony of Nigeria more weight in the baseline specification leads to more conservative estimates.

Model 3 stratifies the data by year[34] in order to avoid that different timings of the French and British colonization bias the results. Doing so does not change the the baseline coefficient but increases its standard error ($p < .1$). Thus, variation in the timing of colonization does not explain the difference between the French and British style of colonial conquest. Lastly, Model 4 adds additional control variables for the local disease environment measured through the local suitability for the transmission of the malaria vector between mosquitoes (Gething et al., 2011) and an estimate of the local suitability for the Tsetse fly (Programme Against African Trypanosomosis, 1999). Including the two additional controls slightly increases the estimated effect of British colonial rule.

Table A9: British vs. French rule and the demise of precolonial polities: Robustness checks

	End of line of succession			
	(1)	(2)	(3)	(4)
British rule	-2.397^{***}	-2.914^{**}	-1.814^{*}	-2.357^{***}
	(0.847)	(1.265)	(1.036)	(0.712)
Robustness check:	empire weights	colony weights	stratified by year	desease controls
Baseline controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Observations	4,581	4,581	4,581	4,581
R^2	0.00001	0.001	0.006	0.010
Max. Possible R^2	-0.00003	0.002	0.014	0.055
Log Likelihood	0.091	-2.248	-19.909	-105.331

Notes: Cox Proportional Hazard models. Standard errors are clustered on the polity-level. Baseline controls consist of the 1880 population density (logged), the distance to the coast (logged), the age of a polity (loged), and a linear time trend. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

[34] This is equivalent to adding year fixed effects.

Lastly, the uncertainty associated with the results might vary with the level on which standard errors are clustered – so far on the level of individual polities. To gauge the effect of such clustering, Table A10 clusters standard errors (1) not at all, (2) the level of polities (the baseline specification), (3) on the level of colonies, and (4) ethnic groups (from Murdock's Atlas, 1959). The results show that the baseline clustering on the level of polities produces the most conservative standard errors.

Table A10: British vs. French rule and the demise of precolonial polities: Standard error clustering

	End of line of succession			
	(1)	(2)	(3)	(4)
British rule	-1.785^{***}	-1.785^{***}	-1.785^{***}	-1.785^{***}
	(0.544)	(0.600)	(0.507)	(0.599)
SE clusters:	none	polity	colony	ethnic group
Baseline controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Observations	4,581	4,581	4,581	4,581
R^2	0.009	0.009	0.009	0.009
Max. Possible R^2	0.055	0.055	0.055	0.055
Log Likelihood	-108.440	-108.440	-108.440	-108.440

Notes: Cox Proportional Hazard models. Standard errors are clustered on the polity-level. Baseline controls consist of the 1880 population density (logged), the distance to the coast (logged), the age of a polity (loged), and a linear time trend. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A2.2 Linear models

Table A11 presents the results of a linear probability model of the rate of survival of colonized polities until their respective countries' independence. The table substantiates the insights from the raw correlation of British rule with a higher survival rate plotted in Figure 4 in the main text. The coefficient British rule in Models 1-3 shows that polities under British rule had a 25–32 percentage points higher chance of surviving colonial rule than those under French rule.

In a similar vein and to check whether the choice of estimating Cox Proportional Hazard Models drives the results, Table A12 presents the results of liner hazard models. The models take the following specification:

$$\mathsf{h}_{i,t} = \alpha_t + \beta_1 \mathsf{British}_i + \boldsymbol{X}_1\boldsymbol{\Lambda}_i + \boldsymbol{X}_2\boldsymbol{\Omega}_i + \boldsymbol{X}_3\boldsymbol{\Psi}_i + \epsilon_i,$$

where the hazard h of polity i to experience the end of its line of succession is

Table A11: British vs. French rule and the demise of precolonial polities: OLS

	Reaches independence		
	(1)	(2)	(3)
British rule	0.319***	0.310**	0.251*
	(0.097)	(0.123)	(0.134)
Baseline controls:	yes	yes	yes
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Observations	116	112	102
R^2	0.128	0.227	0.272
Adjusted R^2	0.080	0.116	0.114

Notes: Linear probability models. Standard errors are clustered on the polity-level. Baseline controls consist of the 1880 population density (logged), the distance to the coast (logged), the age of a polity (loged), and a linear time trend. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

dependent on the baseline hazard in a given year after colonization t, the identity of the colonizer (British), and the series of control variables (see above). Sequentially adding the vectors of control, the results show that, in any given year, polities under British rule had a 1.6 percentage points lower hazard of experiencing the end of their line of succession. Although the uncertainty associated with this estimate increases as more control variables are added to the model, the point estimate does not change. If we aggregate this difference in the yearly hazard up to the total duration of colonial rule (≈ 80 years), we arrive at almost the same difference in the average probability of surviving colonial rule than estimated above in Table A11: $(1 - .016)^{80} = .275$. Hence, the linear models reaffirm the main insight from the Hazard Models, namely that polities under French rule were 30 percentage points less likely to survive colonial rule than those under British rule.

Table A12: British vs. French rule and the demise of precolonial polities: OLS

	End of line of succession		
	(1)	(2)	(3)
British rule	-0.016^{***}	-0.016^{**}	-0.016^{*}
	(0.006)	(0.007)	(0.009)
Year since conquest FE:	yes	yes	yes
Baseline controls:	yes	yes	yes
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Observations	5,208	4,902	4,581
R^2	0.078	0.086	0.066
Adjusted R^2	0.059	0.065	0.042

Notes: Linear probability models. Standard errors are clustered on the polity-level. Baseline controls consist of the 1880 population density (logged), the distance to the coast (logged), the age of a polity (loged), and a linear time trend. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A2.3 Survival of rulers before and after colonization

The data gathered from Stewart's (2006) encyclopedia on states and rulers in Africa allows us to further zoom into the demise of polities. Using the tenure time of each individual ruler for which Stewart provides us with data,[35] we can compare the average tenure lengths of rulers of the same polity before and after colonization by either the British, the French, or another colonizer. By restricting the analysis to variation within a polity, I control for all polity-specific attributes that might affect the length of rule of one ruler – in particular its political system and natural (disease) environment.

Figure A9 plots the basic intuition behind the approach. It shows descriptively how up to the point of colonization, the probability of a ruler to be deposed in a given year does not change much. However, it rises sharply with colonization by either the British or the French although substantively more so in the case of the latter. In the first year of colonization by the French almost 50% of all rulers got deposed. In the case of British colonization, that percentage stands at 35%, as compared to a baseline probability of around 10%.

Modeling the data in a Cox Proportional Hazard Models stratified by each polity's capital[36] in Table A13 shows that the difference between the effect of British

[35] 10 % of all rulers are associated with missing start or end dates.

[36] Stratifying by polity-capital rather than polity has the advantage that doing so holds all environmental variables constant.

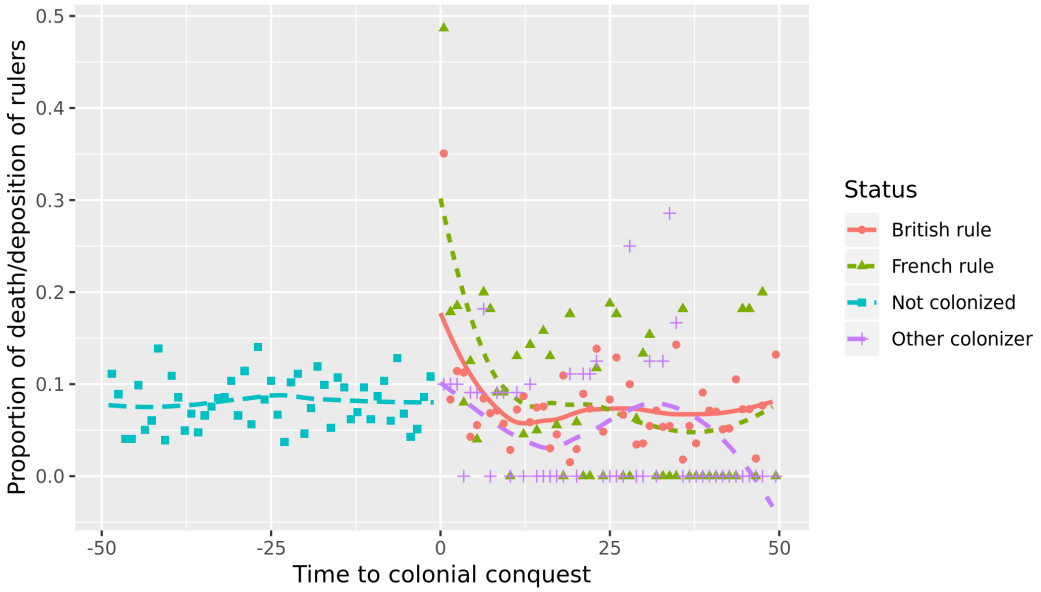


Figure A9: Proportion of deposed rulers before and after colonization by the British, French, and other colonizers.

and French colonization on ruler's deposition is indeed statistically significant and of meaningful size. Model 1 compares the average deposition probabilities within polities before and after colonization, in a sample restricted to observations post-1500. Colonization by the French is treated as the reference category to ease the interpretation of the coefficient of British rule which is statistically significant and of meaningful size: In a given year, rulers under British rule are 73% as likely to get deposed as under French rule. To identify the effect of colonization right when it began, Model 2 then adds linear pre- and post-trends for each of the four states in which polities can be: either not colonized, or colonized by the British, the French, or another colonizer (see Figure A9). Model 3 adds also quadratic terms of these. Because they pick up the non-linear increase in survival rates in the years after colonization (see Figure A9), the models with trends yield larger differences between the French and the British colonization: with quadratic trends, rulers under British rule are only 62% as likely as French rulers to be deposed or killed in the year of colonization. Lastly, by adding a dummy for the demise of a ruler's polity to the estimation, Model 4 shows that these difference are mostly due the comparatively heavy hand of the French towards the colonized polities and not only to their rulers. While the coefficient of the demise of a polity is (naturally) highly significant, the difference between the French and the British is now associated with a smaller coefficient that is statistically insignificant.

Table A13: Death/deposition of rulers before and during colonial rule (1500–): Cox Proportional Hazards

	Death/deposition of ruler			
	(1)	(2)	(3)	(4)
British rule	−0.311**	−0.431**	−0.478**	−0.285
	(0.158)	(0.200)	(0.230)	(0.235)
Other colonizer	0.329	0.056	−0.338	−0.127
	(0.308)	(0.367)	(0.441)	(0.443)
Not (yet) colonized	−0.278**	−0.601***	−0.766***	−0.473**
	(0.139)	(0.164)	(0.188)	(0.192)
Polity age (log)	0.001***	−0.003	−0.005	−0.006**
	(0.0003)	(0.003)	(0.005)	(0.003)
End of line of succession				2.614***
				(0.284)
Strata:	capital	capital	capital	capital
Running linear:	no	yes	yes	yes
Running quadratic:	no	no	yes	yes
Sample:	post-1500	post-1500	post-1500	post-1500
Observations	25,281	25,281	25,281	25,281
R^2	0.001	0.002	0.002	0.005
Max. Possible R^2	0.240	0.240	0.240	0.240
Log Likelihood	-3,454.902	-3,448.180	-3,442.354	-3,415.138

*p<0.1; **p<0.05; ***p<0.01. Standard errors are clustered on the ruler-level.

A2.4 The demise of polities in (coastal) West Africa

One question the previous analyses cannot fully answer is whether the results are driven by endogenous colonization choices of the French and British conquerors. Although the ruler-level analysis above (Subsection A2.3) exploits within polity variation, it might still be that various local (e.g. environmental) factors make a certain area more or less difficult to colonize. If the British systematically colonized areas in which indirect rule was inherently easier to carry out, the results above might be solely due to that choice rather than due to the fact that the *British* rather than the *French* conquered a certain precolonial polity. In order to further zoom in on that relevant counterfactual, I exploit variation in the demise of polities first in West Africa and particularly along its coast, where the regions which where colonized by the British and the French are arguably exogenous. In that regard, Models 1 ad 2 in Table A15 restrict the sample to all French and British colonies in West Africa. Models 3 and 4 only rely on polities observed in colonies along the West African coast.

Finally, Models 5 and 6 exploit only variation across French-British borders that

run perpendicular to the West African coast.[37] Because they resulted from the race of the colonizers towards the inner parts of the continent (Cogneau and Moradi, 2014; Wesseling, 1996), these borders run at an angle of 90° from the coast and come closest to a "natural experiment" that allows us to draw counterfactual inferences. These last two specification thus stratify the Cox Proportional Hazard estimate by the perpendicular border closest to each polity. Stratified baseline hazards are estimated as a conditional logistic regression, avoiding the incidental parameter problem. The models thus compare polities only across these borders, similar to a linear model with border and year-since-colonization fixed effects. Because the relatively few polities around the perpendicular borders are unevenly distributed in space, I cannot estimate a sharp discontinuity at the borders.

Indeed, the balance Table A14 shows that the strategy of sequentially narrowing the range of comparisons to polities in ever closer geographical areas is successful in reducing the imbalance of the sample on pre-treatment covariates of polities. However, significant imbalances of polities' distance to the costs and navigable rivers as well as of their agricultural suitability remain so that even the cross-border sample is not perfectly balanced. This underlines the need to control for observed covariates.

The results of this analysis point towards even greater differences in the probability of polities' demise in the British and French colonies than estimated at baseline. While the size of the estimated hazard ratios ranges significantly – in particular once covariates are added in Models 2, 4, and 6 – but mostly smaller than the one estimated at baseline (.23).[38] Once the model is stratified across borders, the estimates are less precise $p< .1$). In sum, these patterns suggest that the baseline results are not caused by endogenous choices of the French and British which areas of the African continent to colonize.

[37] From West to East: Côte d'Ivoire–Gold Coast–French Togo Mandate–Dahomey–Nigeria–Cameroon.

[38] This means that, in a given year, a polity is a quarter as likely to be demised under British than under French rule.

Table A14: Balance test, standardized coefficients

	All	West Africa	West African Coast	X-Border
Indep. variable Dep. variable	British	British	British	British
Population (log)	0.042	0.773***	0.763*	0.066
	(0.269)	(0.288)	(0.440)	(0.421)
Distance to coast (log)	0.524*	0.161	0.927**	1.067**
	(0.307)	(0.346)	(0.412)	(0.480)
Distance to river (log)	−0.265	0.193	−0.054	−0.363***
	(0.317)	(0.346)	(0.294)	(0.137)
Polity age (log)	−0.453**	−0.358*	−0.114	0.060
	(0.202)	(0.211)	(0.194)	(0.257)
Dependence on agriculture	−0.419*	−0.558*	−0.732	0.387
	(0.229)	(0.331)	(0.594)	(0.345)
Dependence on husbandry	−0.228	0.723**	0.753	0.108
	(0.185)	(0.299)	(0.511)	(0.502)
Intensity of agriculture	−0.825***	−0.457	−1.038*	−0.764
	(0.273)	(0.375)	(0.573)	(0.571)
Precol. centralization	−0.752***	−0.663***	−0.317	0.205
	(0.240)	(0.253)	(0.317)	(0.253)
Altitude (median)	0.483**	0.122	0.430	0.223
	(0.221)	(0.240)	(0.310)	(0.369)
Slope (median)	0.327	0.384	0.705*	0.797
	(0.249)	(0.306)	(0.396)	(0.568)
Temperature (mean)	−0.287	−0.591**	−0.168	0.129
	(0.300)	(0.239)	(0.312)	(0.259)
Evapotranspiration	0.068	0.107	0.487*	0.433
	(0.256)	(0.251)	(0.251)	(0.267)
Precipitation	0.148	0.603**	0.292	−0.215
	(0.249)	(0.258)	(0.362)	(0.283)
Evapotransp. / precipitation	0.182	0.509*	0.160	−0.255
	(0.262)	(0.276)	(0.379)	(0.277)
Suitability for agr.	0.258	0.533**	0.340	−0.798**
	(0.272)	(0.271)	(0.396)	(0.374)
Cash crop suitability	0.395**	0.423*	0.743**	0.193
	(0.194)	(0.251)	(0.306)	(0.407)
X-Border FE	no	no	no	yes
Obs	5208	3424	3026	2845
British	0	0	0	0
French	0	0	0	0

*p<0.1; **p<0.05; ***p<0.01. Standard errors are clustered on the polity-level.

Table A15: British vs. French rule and the demise of precolonial polities in West Africa

	End of line of succession					
	All West Africa		Coastal West Africa		x-Border Coastal W. A.	
	(1)	(2)	(3)	(4)	(5)	(6)
British rule	-1.29^{**}	-2.17^{***}	-1.67^{**}	-2.52^{**}	-1.46^{*}	-5.56^{*}
	(0.54)	(0.83)	(0.74)	(1.21)	(0.86)	(3.07)
Strata:	–	–	–	–	Border	Border
Baseline controls:	yes	yes	yes	yes	yes	yes
Nature controls:	no	yes	no	yes	no	yes
Ethnic controls:	no	yes	no	yes	no	yes
Observations	3,424	3,144	3,026	2,746	2,845	2,611
R^2	0.01	0.01	0.01	0.01	0.003	0.01
Max. Possible R^2	0.06	0.06	0.06	0.06	0.03	0.03
Log Likelihood	-100.95	-82.75	-81.45	-64.52	-34.87	-20.79

Notes: Cox Proportional Hazard models. Standard errors are clustered on the polity-level. Baseline controls consist of the 1880 population density (logged), the distance to the coast (logged), the age of a polity (loged), and a linear time trend. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls consist of the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A3 Evidence from colonial districts

This section presents additional results for the analysis of the first dimension of indirect rule: the administrative effort employed by the colonial governments. This effort is proxied by two main variables: the size of colonial district, and the number of European administrators deployed at the local level. The main focus of the analysis lies on the size of districts for which data is more abundant and comparable across the French and British empires. Subsection A3.1 presents the main robustness checks and Subsection A3.2 discusses the more controlled comparisons of districts' sizes in the French and British colonies along the West African coastline. Lastly, Subsection A3.3 presents the results of the analysis of the association of precolonial centralization and the number of local British administrators.

A3.1 Districts' size: Robustness checks

Table A16 presents the robustness checks to the main analysis of the effect of precolonial centralization on districts' size (main text, Table 5). It addresses a number of issues which might bias the baseline results. First, Model 1 drops all outliers from the sample, some of which might drive the relationship between precolonial centralization and size in British colonies. Outliers are defined as very small and large districts in the upper and lower 2.5 percentiles of the data. Dropping them does not change the positive relation between precolonial centralization and districts' size in

the British colonies. In the French colonies, this relation is slightly less negative than at baseline but significantly different from that in the British sample (see the interaction term). In order to avoid excessive weight for the large colonies – in particular Nigeria – which might bias the results, Model 2 weights each observation by the inverse of the number of observations from the colony it belongs to. Giving each colony equal weight leads to very similar results as at the baseline.

I then proceed as with the analysis of the survival of precolonial polititesand add a districts' disease environment (Malaria and Tsetse suitability), both of which might have reduced the administrative effort of the British. These additional control variables do not change the results (Model 3). Model 4 replaces the measure of precolonial centralization provided by Murdock (1959) with a dummy for whether a district featured a capital in 1885 of one of the polities listed in Stewart's (2006) encyclopedia of African states and rulers (see Appendix A1.1 above) or not. The emerging pattern is consistent with the previous results: Districts in the British empire that featured a capital in 1885 are about 65 percent bigger than those that did not.[39] This pattern is not discernible in French West Africa. This shows that the results are not due to arbitrary codings which might bias Murdock's data. Model 5 replace the the mapping of Murdock's Ethnographic Atlas (1967) to his ethnic map (1959) conducted by Nunn and Wantchekon (2011) with the slightly different coding from Michalopoulos and Papaioannou (2013). While their data lead to five more missing values, the results are very similar to the baseline estimates.

[39] This percent estimate results from the following equation: $(exp(\beta) - 1) * 100$

Table A16: Precolonial centralization and the size of districts: Robustness checks

	log(District Area)				
	No outlier	Col.-weight	Disease	Cap. 1885	Alt. PCC
	(1)	(2)	(3)	(4)	(5)
Precol. centralization	0.14**	0.13***	0.13***		
	(0.05)	(0.05)	(0.05)		
Precol. centr. × French	−0.29***	−0.27***	−0.33***		
	(0.11)	(0.10)	(0.10)		
Capital 1885				0.50***	
				(0.14)	
Capital 1885 × French				−0.36**	
				(0.18)	
Precol. centr. (MP)					0.17***
					(0.05)
Precol. centr. (MP) × French					−0.30***
					(0.11)
Colony FE:	yes	yes	yes	yes	yes
Colony weights:	no	yes	no	no	no
Desease controls:	no	no	yes	no	no
Baseline controls:	yes	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes	yes
Mean DV	9.11	9.14	9.14	9.14	9.15
Observations	383	400	400	400	395
Adjusted R^2	0.69	0.81	0.72	0.73	0.74

Notes: OLS models. Standard errors are clustered on the province-level. Baseline controls include the local population density, ethnic groups' population density, and the distance to the coast as well as the closest navigable river. Nature controls consist of the local altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls are the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Additionally, all covariates are interacted with 'French rule'. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A3.2 Districts' size across French-British borders

In the baseline specification, the identification of differences in districts' sizes within colonies and the difference of these patterns across the two empires rests on the assumption that there are no omitted variables. We can weaken this assumption and focus only on the *difference* of the effect of precolonial centralization on district sizes between the French and British empire. The identification of this difference rests on the assumption that French and British rule resembled a natural experiment, which is clearly not the case when comparing colonies across the entire continent. I therefore turn towards plausibly exogenous variation in the assignment of the ruling

empire, the Nigeria-Benin and Gold Coast-Côte d'Ivoire borders in West Africa. Both borders are perpendicular to the coast line and emerged from a race of both colonizers towards the inner part of the continent (Wesseling, 1996). They can therefore be treated as-if random (Cogneau and Moradi, 2014) to identify the difference in the effect of precolonial institutions on administrative effort under French direct and British indirect rule.

In order to exploit the change in the effect of precolonial centralization on districts' size at the border, I turn towards an approach based on the centroids of grid cells. Using grid cell centroids as the main unit of the regression discontinuity design is warranted by the need to balance the number of observations across the French-British borders. Such balance is not achieved if one compares districts of varying size (which is the dependent variable), because larger districts are observed less often. Grid-cells in the main analysis[40] have a size of .0833 decimal degrees or about 10km at the equator. Each cell centroid is associated with the size of its district, the precolonial centralization of the ethnic group settling in it (from Murdock, 1959), as well as its distance to the next border. Because I am interested not in the pure effect of British or French colonial rule at the border, but its effect on the marginal effect of precolonial centralization, I estimate the following regression discontinuity:

$$\begin{aligned} y_i = \alpha_c + \gamma_b + \beta_1 \mathsf{precol.\ centr.}_i \times \mathsf{French}_i + \tau_1 \mathsf{Empire}_i \times \Delta_i + \\ \tau_2 \mathsf{precol.\ centr.}_i \times \mathsf{Empire}_i \times \Delta_i + \tau_3 \mathsf{precol.\ centr.}_i \times \mathsf{Border}_i + \epsilon_{i,p} \end{aligned} \tag{2}$$

The logic of this RD-design is illustrated in Figures A10a and A10b. The first figure plots the coefficient of precol. centralization on districts' size left and right of French-British borders in intervals of .5 decimal degrees. The second plots the marginal effect of centralization as a linear function of the distance to the border. As in common RDDs, we notice the trends in the effect of centralization on district sizes on both sides of the border. With Δ_i denoting the distance to the border, the absolute trends in district sizes are controlled for by the term $\mathsf{Empire}_i \times \Delta_i$, while the trend in the effect of centralization is captured by the term $\mathsf{precol.\ centr.}_i \times \mathsf{Empire}_i \times \Delta_i$. To account for different levels in the effect of centralization in the two border-regions, I include the fixed slopes $\mathsf{precol.\ centr.}_i \times \mathsf{Border}_i$. Adding colony and border-segment fixed effects[41] α_c and γ_b, the main coefficient of interest, β_1 is driven by the jump in the marginal effect of precolonial centralization right at the border. To account for interdependencies between grid-cells and districts that are part of the same region, standard errors remain clustered on the level of provinces.[42]

[40] See Figure A12 for a robustness check that varies the size of grid cells.

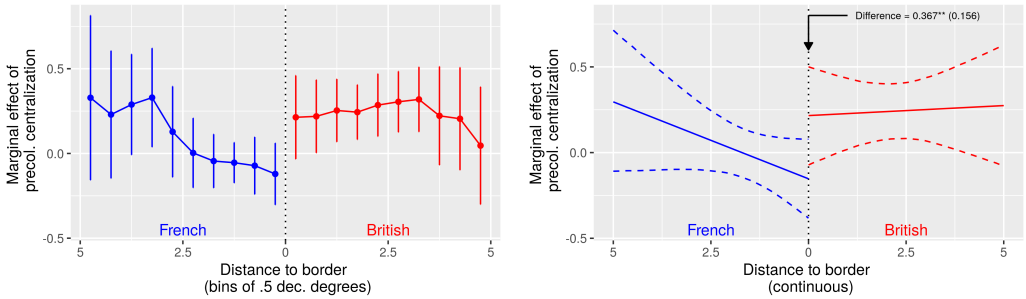
[41] Note that I cut borders into segments according to distance-bins to the coastline of 100 km in order to increase the balance in the sample. This avoids that points in the North of Nigeria are compared with those in the South of Dahomey (Benin).

[42] Note that clustering on the level of districts leads to slightly smaller standard errors.

Table A17: Balance test: Grid-cell level

	All	RDD	RDD
Indep. variable	Centr. × French	Centr. × French	Centr. × French
Dep. variable			
Distance to coast (log)	−0.429***	−0.177*	−0.060
	(0.109)	(0.101)	(0.100)
Distance to nav. river (log)	−0.140	−0.236	−0.350
	(0.116)	(0.302)	(0.214)
Population density (log)	0.345***	0.194	0.147
	(0.100)	(0.167)	(0.120)
Ethnic groups' pop. dens. (log)	0.490***	0.240	0.065
	(0.108)	(0.184)	(0.124)
Dependence on agriculture	−0.257*	0.064	0.331
	(0.150)	(0.361)	(0.327)
Dependence on husbandry	0.113	−0.491	−0.503
	(0.138)	(0.441)	(0.436)
Intensity of agriculture	0.401	0.208	0.368
	(0.261)	(0.350)	(0.338)
Altitude	−0.064	−0.441**	−0.617***
	(0.087)	(0.220)	(0.167)
Slope	0.195*	−0.283	−0.065
	(0.101)	(0.179)	(0.136)
Temperature	0.058	0.149	0.418***
	(0.072)	(0.231)	(0.153)
Evapotranspiration	−0.089	0.059	0.135*
	(0.091)	(0.066)	(0.073)
Precipitation	0.183**	0.087	−0.073
	(0.072)	(0.173)	(0.159)
Evapotransp. / precipitation	0.153**	0.125	−0.098
	(0.071)	(0.125)	(0.144)
Suitability for agr.	0.063	−0.366**	0.021
	(0.074)	(0.152)	(0.164)
Cash crop suitability	0.156**	0.074	−0.461**
	(0.062)	(0.193)	(0.191)
RD-Design	no	yes	yes
Cutoff (dec. degrees)	–	5	2.5
Obs	92954	13455	6456
British	0	0	0
French	0	0	0

*p<0.1; **p<0.05; ***p<0.01. Standard errors are clustered on the province-level.



(a) RDD-plot discrete

(b) RDD-plot continuous

Figure A10: Marginal effect of precolonial centralization left and right of French-British borders.

Point estimates in (a) and liner trends in (b) results from estimating Equation 2. For point estimates in (a), the continuous measure of the distance to the border Δ_i is cut into categorical bins of a size of .5 decimal degrees.

Figure A10a shows that the trend in the effect of centralization on both sides of the border is reasonably smooth and well approximated by a linear term. Also, the plot shows a discrete jump of centralization's marginal effect on districts' size at the border. Lastly, the RD-design requires that precolonial centralization has no such jump in its marginal association with any other pre-treatment variable. If that is the case, these pre-treatment variables, rather than precolonial centralization might drive the results. Table A17 shows few signs of such a jump. Choosing different distance cutoffs for the analysis at 5 and 2.5 decimal degrees (≈500 and 250 km) balance is best for the wider bandwidth. Here, $\mathsf{precol.\ centr.}_i \times \mathsf{French}_i$ is only significantly related to cells altitude and agricultural suitability. Because this imbalance might drive the results, I estimate models with and without all co-variates as well as their interaction with French rule.

Table A18 presents the results. The first two columns show that precolonially centralized cells in the whole sample have become part of larger districts in the British, but not the French colonies. This suggests that the results from the district level analysis carry over to the cell-level analysis. Models 3 and 4 then implement the RDD with a bandwidth of 5 decimal degrees, Models 5 and 6 with one of 2.5 decimal degrees, each time first without and then with all covariates. They all show that, at the border, the effect of precolonial centralization on district sizes decreases by about .35 log-points as one crosses from a British to a French colony. This effect of French rule on the marginal effect of precolonial centralization on district sizes is insignificantly bigger than that estimated at the baseline (.29-.33). The results are robust to the choice of bandwidth and adding the vectors of covariates. The latter suggests that the remaining and observed imbalances do not drive the results and further support the baseline estimates.

Table A18: Precolonial centralization and the size of districts: Grid-cells, RDD at French-British borders

	All cells		Regression Discontinuity Design			
	(1)	(2)	(3)	(4)	(5)	(6)
Precol. centralization	0.266***	0.184***				
	(0.087)	(0.045)				
Precol. centr. × French	−0.472***	−0.154**	−0.367**	−0.351**	−0.370**	−0.331*
	(0.133)	(0.075)	(0.156)	(0.154)	(0.178)	(0.175)
Colony FE:	yes	yes	yes	yes	yes	yes
Border-region FE:	no	no	yes	yes	yes	yes
Dist2border × French:	no	no	yes	yes	yes	yes
Dist2border × French × Precol. centr.:	no	no	yes	yes	yes	yes
Dist. cutoff (dec. degr.):	–	–	5	5	2.5	2.5
Baseline controls:	no	yes	no	yes	no	yes
Nature controls:	no	yes	no	yes	no	yes
Ethnic controls:	no	yes	no	yes	no	yes
Mean DV	1.51	1.52	0.17	0.19	0.17	0.19
Observations	92,954	92,065	13,455	13,141	7,899	7,745
Adjusted R^2	0.574	0.823	0.687	0.767	0.696	0.793

Notes: OLS models. Standard errors are clustered on the province-level. Baseline controls include the local population density, ethnic groups' population density, and the distance to the coast as well as the closest navigable river. Nature controls consist of median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls are the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Additionally, all covariates are interacted with 'French rule'. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

I implement two robustness checks to this analysis. First, I continuously vary the distance-to-border cutoff between .1 and 5 decimal degrees. Figure A11 shows no statistically significant discontinuity in the effect of precolonial centralization on district sizes once when I restrict the sample to units very close to the border. The discontinuity becomes statistically significant with the sample of cells closer to 1.5 (2) decimal degrees in the Model without (with) covariates. The second robustness check tests whether the choice of the size of grid cells affects the analysis. Figure A12 suggests the results to be robust to variation in the size of grid cells. It plots the results from RDD-estimates based on the the centroids of grid cells of a resolution of .083 (the baseline), .17, .25, and .33 decimal degrees. The estimated difference in the effect of precolonial centralization on district sizes at the French-British border hardly varies between the models.

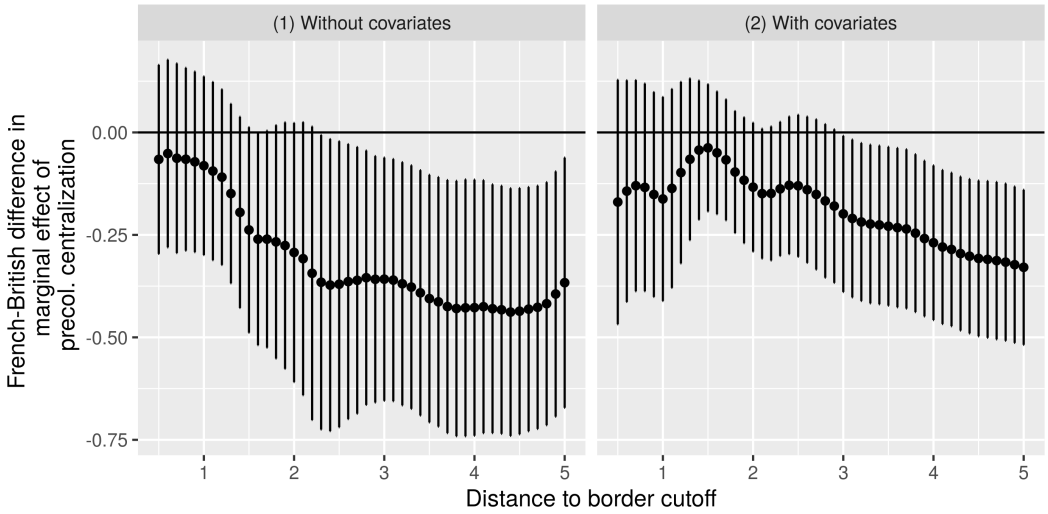


Figure A11: French-British difference in the marginal effect of precolonial centralization with varying cutoffs of the maximum distance to the closest border.
Point estimates with 95% confidence intervals represent β_1 from Equation 2 estimated with varying distance-to-border cutoffs.

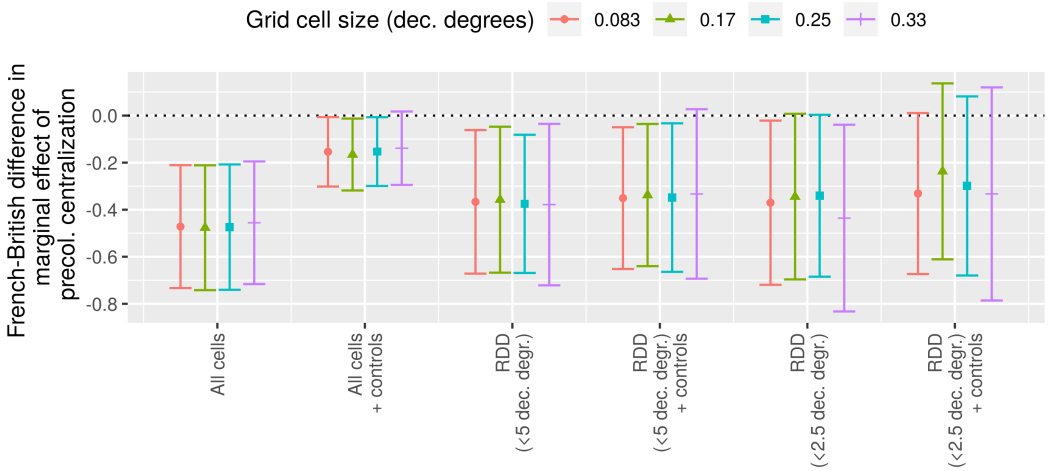


Figure A12: Re-estimating all models in Table A18 with varying sizes of centroids' grid cells.
Point estimates with 95% confidence intervals represent β_1 from Equation 2.

Table A19: Local-level European Administrators: Nigeria and Uganda

	European administrators per million			
	(1)	(2)	(3)	(4)
Precol. centralization	−2.395**	−0.701	−3.597**	−1.330
	(1.157)	(1.760)	(1.551)	(1.929)
Colony FE:	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes
Nature controls:	no	yes	no	yes
Ethnic controls:	no	no	yes	yes
Mean DV:	15	15	15	15
Observations	34	34	34	34
Adjusted R^2	0.495	0.506	0.497	0.446

Notes: OLS models. Standard errors are clustered on the district-level. The sample consists of the colonies of Nigeria and Uganda. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A3.3 British administrators

In order to test whether precolonial centralization affects not only the size of British districts, but also directly the administrative effort exerted by the British colonial government, Table A19 presents models of the association between the centralization of precolonial polities and the number of British administrators per million inhabitants in 34 Nigerian and Ugandan provinces and districts. Although the number of observations is very small, the correlation is substantive. Without the vectors of controls added in Models 2–4, one additional level of centralization is associated with 2.4 administrators per million – a variables with a mean of only 14.8 in the sample. Adding the vector of ethnic control (Model 3) increase the size of the coefficient of precolonial centralization. However, adding the vector of 'nature' controls renders the association smaller and insignificant. While this casts doubt on the stability of the results, cautious interpretation is necessary here. First, none of the additional variables is either significant or improves the fit of the model by much. Furthermore, with 34 observations in the sample, the addition of the rather long vector of eight and later eleven controls in Model 4 likely causes multicolinearities that render the coefficients meaningless.

A4 Evidence from native administrations

The following section presents additional analyses on the effect of precolonial centralization on the indigenous side of local governance, in particular native authorities' budgets. Subsection A4.1 presents all robustness checks highlighted in the main text. Subsection A4.2 discusses the results of an analysis of public finance data from French West Africa. And lastly, Subsection A4.3 presents analysis on the association between precolonial centralization and the status of chiefs in colonial Nigeria.

A4.1 Robustness checks

Following the robustness checks conducted in the analyses of polities' survival and district sizes, I test whether the results are driven by (1) potential omitted variables, specifically the disease environment (Malaria and Tsetse suitability), (2) the unequal weight of colonies, and (3) outliers. Furthermore, I test whether collapsing the original panel data on budgets into a cross-sectional data set biased the results. To that intent, I (4) estimate a district-weighted panel model. Furthermore, I (5) model the data in a hierarchical manner, including colony fixed effects and district random effects. As Table A20 demonstrates, none of these changes the estimated effect of precolonial centralization on native treasuries' revenues. The estimated association between revenues per capita and precolonial centralization remains stable in size and statistical significance.

Noting that the measurement of precolonial centralization might be imperfect, I also reestimate the main model using the alternative proxies for precolonial centralization in Table A21. First, I use the Murdock-mapping of Michalopoulos and Papaioannou (2013) (Models 1–2). This does not affect the estimated effect of precolonial centralization. I then draw on a dummy for whether a district comprises a polity's capital in 1885, based on the data on precolonial polities collected for the first empirical part of this study. Districts with a capital in 1885 exhibit 76 percent larger budgets (Model 3), but not on a per-capita basis (Model 4). This might be indicative of differential effectiveness of indirect rule in rural and urban(izing) areas that developed around the old centers of society. However, it must be noted that a simple "capital in 1885" dummy is not precise enough to mirror variation in the level of centralization of precolonial polities and does not provide information about the spatial extent of its polity. Because of the resulting measurement error, the results might also biased towards zero. Also, in order to gauge the consistency of the budget data with that on the power of chiefs (see Subsection A4.3, Models 5 and 6 finally test whether, in Nigeria, the class of the most powerful chief in a district is indeed associated with the size of native treasuries. It emerges that treasuries were 130 (58) percent bigger in absolute (per-capita) terms in districts with a "first class"

Table A20: Per-capita revenues: Robustness checks

	Revenues p.c. (log)				
	Desease	Col.-weight	No outlier	Wght. panel	HLM
	(1)	(2)	(3)	(4)	(5)
Precol. centralization	0.24***	0.24***	0.19***	0.23***	0.23***
	(0.09)	(0.07)	(0.07)	(0.07)	(0.08)
Fixed effect:	colony	colony	colony	col.-year	col.-year
Baseline controls:	yes	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes	yes
Mean DV:	1.1	1.1	1.2	1	1
Observations	146	146	138	1,315	1,315
Adjusted R^2	0.62	0.79	0.64	0.64	
Log Likelihood					-535.27
Akaike Inf. Crit.					1,214.54
Bayesian Inf. Crit.					1,587.62

Notes: OLS models in 1–4, hierarchical linear model in 5. The sample includes the colonies of the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi), and Uganda. Standard errors are clustered on the province-level. Baseline controls are the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and the logged district area and population. Nature controls include the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls are the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

as compared to those with a "second class" chief.

Lastly, detailed information on budget lines retrieved from the official reports allows me to further explore the implications of precolonial institutions on the financial governance of native treasuries. Although standardizing budget items across many and changing formats adds uncertainty and noise to the data,[43] it is of substantial interest to know whether the above reported patterns are driven by only a few or all budget lines. All respective results are reported in Tables A22 and A23. Disaggregating the revenue side shows that all revenue items are positively related to precolonial institutions, while the largest effects are visible for per capita revenues from 'fees and fines' and a category of 'other' revenues, which, inter alia, includes revenues from interests on savings. Unfortunately, the financial reporting of taxation was such that it is impossible to disentangle the amount of collected taxes from the amount of rebated taxes, which is ultimately reported in the budgets. On the expenditure side reported in Table A23, we see significant and positive effects of precolonial centralization across almost all items, in particular items relating to per capita spending on administration, social services such as education and health,

[43] I standardize the varying items into their smallest common denominator in order to derive the most consistent data set possible.

Table A21: Revenues (2016 £): Alternative specifications

	Revenues (log):					
	Total	Per capita	Total	Per capita	Total	Per capita
	(1)	(2)	(3)	(4)	(5)	(6)
Precol. centr. (M&P)	0.55***	0.21***				
	(0.13)	(0.07)				
Capital 1885			0.57**	0.13		
			(0.22)	(0.15)		
Chief class					0.85***	0.46***
					(0.15)	(0.09)
Colony FE:	yes	yes	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes	yes	yes
Mean DV:	13	1.1	13	1.1	13	0.87
Observations	144	144	146	146	86	86
Adjusted R^2	0.58	0.61	0.52	0.60	0.50	0.24

Notes: OLS models. Standard errors are clustered on the province-level. The sample includes the colonies of the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi), and Uganda. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

as well as expenditure for agricultural development. The one insignificant but also positive coefficient is estimated for lines spent on 'law and order'. This might be of substantive importance, given that a reading of historical accounts suggests that areas under direct control were more prone to violent resistance against British rule (e.g. Martin, 1988).

Table A22: Native treasury revenues per capita by type (2016 £)

	Revenues/capita (log)			
	Taxes	Fees & fines	Transfers	Other
	(1)	(2)	(3)	(4)
Precol. centralization	0.168**	0.272***	0.285	0.382**
	(0.081)	(0.103)	(0.607)	(0.164)
Colony FE:	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Mean DV:	0.53	-0.77	-5.5	-1.4
Observations	146	146	146	127
Adjusted R^2	0.412	0.707	0.680	0.473

Notes: OLS models. Standard errors are clustered on the province-level. The sample includes the colonies of the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi), and Uganda. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

Table A23: Native treasury expenditures per capita by type (2016 £)

	Expenditures/capita (log)					
	Admin.	Order	Educ. & Health	Agric.	Works	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Precol. centralization	0.27**	0.13	0.38**	0.94***	0.29**	0.35***
	(0.10)	(0.09)	(0.17)	(0.26)	(0.11)	(0.12)
Colony FE:	yes	yes	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes	yes	yes
Mean DV:	-0.098	-0.57	-0.94	-3.2	-0.23	-1.4
Observations	126	126	126	126	126	126
Adjusted R^2	0.51	0.27	0.53	0.35	0.41	0.75

Notes: OLS models. Standard errors are clustered on the province-level. The sample includes the colonies of the Gold Coast (Ghana), Nigeria, Nyasaland (Malawi), and Uganda. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A4.2 French West Africa

To explore whether district finances in French colonies were marked by similar or opposite dynamics, I make use of Huillery's (2010) data on tax collection, public investments, and the number of teachers and doctors in 109 French West African cercles. Unfortunately, the data are not of the same format as those collected from the British colonies. They do neither contain total local revenues and expenditures, nor do they allow for a breakdown of local budgets. With that limitation in mind, I proceed in parallel to the analysis of the British budget data, reporting results of analyses of absolute outcomes in Table A24 and of per-capita outcomes in Table A25. The results show that precolonially centralization had, if at all, a negative effect on the size of district budgets in French West Africa. They are thus similar in direction but not precision to those of the analysis of districts' sizes. Centralized districts had no differential tax collection, but featured lower rates of investments and numbers of teachers and doctors employed by the French. This is similar to results previously reported by Huillery (2010). In per-capita terms, only the number of doctors is significantly lower in centralized districts than elsewhere. All other indicators yield statistically insignificant results. The negative or insignificant associations highlight once again the different pattern of local governance by direct and indirect means apparent in the British and French colonies.

Table A24: Precolonial centralization and absolute local revenues & expenditures (logged): French West Africa

	Taxes	Public works	Teachers	Doctors
	(1)	(2)	(3)	(4)
Precol. centralization	0.012	−0.347	−0.200**	−0.343***
	(0.180)	(0.215)	(0.098)	(0.112)
Colony FE:	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Mean DV:	13	13	1.8	2.2
Observations	109	109	109	109
Adjusted R^2	0.682	0.839	0.521	0.325

Notes: OLS models. Standard errors are clustered on the province-level. The sample consists of all French colonies in West Africa. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

Table A25: Precolonial centralization and local revenues & expenditures per-capita (logged): French West Africa

	Taxes	Public works	Teachers	Doctors
	(1)	(2)	(3)	(4)
Precol. centralization	0.153	−0.143	−0.117	−0.274**
	(0.186)	(0.189)	(0.084)	(0.104)
Colony FE:	yes	yes	yes	yes
Baseline controls:	yes	yes	yes	yes
Nature controls:	yes	yes	yes	yes
Ethnic controls:	yes	yes	yes	yes
Mean DV:	1.6	1.4	-9.6	-9.2
Observations	109	109	109	109
Adjusted R^2	0.701	0.901	0.776	0.651

Notes: OLS models. Standard errors are clustered on the province-level. The sample consists of all French colonies in West Africa. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.

A4.3 Chiefs' class in colonial Nigeria

Table A26 summarizes the results from an analysis of the association between the level of precolonial centralization and the highest class of chiefs in Nigerian districts. The results point to a significant correspondence of the two: The most powerful chief in a district has a class (ranging from 1 to three, the highest) that increase between .28 and .48 points with each level of hierarchy featured in the districts' precolonial institutions (0-3). This is further evidence that the British devolved more power to local authorities that could build on pre-existing institutions.

Table A26: Highest class of chief in district: Nigeria (1924/1929)

	Highest class of chief (1-3)		
	(1)	(2)	(3)
Precol. centralization	0.477***	0.288*	0.276*
	(0.088)	(0.146)	(0.139)
Colony FE:	yes	yes	yes
Baseline controls:	yes	yes	yes
Nature controls:	no	yes	yes
Ethnic controls:	no	no	yes
Mean DV:	1.6	1.6	1.6
Observations	86	86	86
Adjusted R^2	0.427	0.454	0.470

Notes: OLS models. Standard errors are clustered on the district-level. The sample consists of the colony of Nigeria. Baseline controls consist of the logged 1880 population density of the district and its ethnic groups, the logged distance to coast and closest navigable river, and, for per-capita outcomes, the logged district area and population. Nature controls are the median altitude and slope, mean annual temperature, precipitation and evapotranspiration, the ratio of the two, agricultural suitability, and soils' suitability for cash crop production. Ethnic controls include the reliance on agriculture and pastoralism, as well as the intensity of agricultural activities. Significance codes: *p<0.1; **p<0.05; ***p<0.01.