Institut d'Etudes Politiques de Paris
Sciences Po

**Were Administrators the Rulers of the Empire?**

**An Empirical Investigation of the Determinants of Colonial
Public Investments in French West Africa**

# Master's Thesis

To obtain a Master's degree in Economics

Sacha Dray

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*Supervisor*:       Elise Huillery       Sciences Po and J-PAL
*Advisor*:          Quoc-Anh Do          Sciences Po and LIEPP

# Were Administrators the Rulers of the Empire?
# An Empirical Investigation of the Determinants of Colonial Public Investments in French West Africa

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*Abstract*

I use the administrative organization of the colonies in French West Africa to study the effect of administrators on colonial public investments relying on archival data I collected. The colonial administrators were in charge of the districts and detained most of the political power inside this extractive federation of colonies. They could decide the level of investment at the local level with very little constraint. I exploit the heterogeneity in administrator types to show that districts with a higher share of ethnographer administrators – involved in the scientific study of African societies – have a larger amount of investment in health measured by a higher number of medical staff per 100,000 inhabitants. This effect is substantial and enduring over the colonial period. Together with Huillery (2009), I provide evidence that administrators could be responsible for the observed historical persistence in public investments and the "reversal of fortune" in the region.

# I.    Introduction

Institutions and historical factors have proved to be major determinants of the current differences in economic prosperity between countries (Acemoglu et al., 2014; Nunn, 2009). However, what leads to particular institutions remains an area of research, specifically the influence of political factors. Economics has long given little attention to the role of political leaders in development. A rapidly growing area of literature has however evidenced the importance of leaders in explaining growth (Jones and Olken, 2005) but the characteristics of, and types of public policies associated with good leaders remain mostly unexplained. Explaining the channels through which leaders influence development would greatly contribute to the understanding of the differences in development between countries and shed light on the persistence of political power over time.

While the standard Downsian framework of voting theory states that the median voter rather than policymakers determines policies, recent evidence has shown the importance of leaders. In a seminal paper, Jones and Olken (2005) use exogenous leaders' death due to natural causes or accidents to prove that leaders have an impact on the growth rate of the GDP. They also show that this effect is driven by leaders in autocratic regimes as opposed to democracies. What's more, the impact of leaders seems to be particularly important on specific policies. Bertrand and Schoar (2003) exploited panel data tracking CEOs across firms to show that policy decisions related to investment, dividend or financial practices are particularly sensitive to the identity of the top manager. Recent studies have suggested that leader characteristics such as dynastic selection, age, education or gender matter for development (Besley and Reynal-Querol, 2015; Alesina et al., 2015; Besley et al. 2015; Gagliarducci and Nannicini, 2013). However, the literature has not yet compared the relative importance of leader characteristics with further details, related their impact to specific policy decisions nor measured the persistence of the impact of leaders over time.

In this paper, I use the administrative organization of the colonies in French West Africa to study the impact of administrator types on colonial public investments in education, health and infrastructure. In 1895 was created the French West Africa, a federation of 8 colonies ruled under the same administration. Officially centralized, the locus of the power was effectively located in districts where the colonial administrators were the "*real rulers of the empire*" (Delavignette, 1939). These administrators concentrated most of the political and judiciary power and had few control from their hierarchy.

Historical evidence and previous work (Cohen, 1973; Cai, 2015; Aubourg, 2015) seem to suggest that administrators were instrumental in setting long-term investments at the beginning of the colonial period because of their relatively long period of stay and influence on future investments (Huillery, 2009). Assignments of administrators in districts are said to be idiosyncratic due to the rapidly evolving colonial conquest and needs of the administration (Cohen 1973). Administrators were particularly heterogeneous in their profile , and I focus on three types of administrators. First, the former pupils of the Colonial School– the first French *grande école* (thereinafter ENFOM)-   who were specifically trained in all aspects of the administrator duties to become high-level civil servants in the Colonies and were introduced to the social sciences related to African societies. Second, ethnographer administrators who combined their role in the administration with involvement in scientific work on African cultures and traditions and were regarded as scholars. Third, military administrators who integrated the body of colonial administrators with a military status.

I hypothesized that the higher the share of ENFOM administrators or ethnographer administrators at the beginning of the colonial period, the higher the level of colonial public investments. On the contrary, a higher share of military administrators should lead to less investments locally. I further hypothesized that the effects of administrators on colonial public investments have persisted over time and are responsible for the observed historical persistence, therefore influencing the current outcomes in education, health and infrastructure locally.

Clearly, there can still be a concern that the allocation of administrators may be correlated with attributes of a district influencing its development potential. I alleviate this concern following several strategies. First, I study historical sources documenting the colonial organization of the AOF to evidence that administrator assignment was close to random. Second, I investigate whether the shares of administrator types in a district are correlated with a measures of pre-colonial development at the district level. Third, I test the robustness of the analysis to the inclusion of geographical control variables possibly influencing development potential such as access to the sea, distance to the nearest port and the access to a navigable river. Fourth, I control for variables related to the colonial conquest by including a measure of the length of the resistance to the colonial conquest and the year of the first observed civil administration of the district that may explain the geographical distribution of administrators. Though some of the indicators are correlated with the share of administrator types in a district– surface area for ENFOM administrators, latitude for ethnographers – most of the explained

allocations relate to the share of military administrators compared than other types of administrators and the magnitude of the correlations are generally small which make them unlikely to significantly affect my results. Nonetheless I include the full set of control variables in all the specifications to allay concerns that my results are driven by unobserved determinants of administrators' allocation.

To measure the share of administrator types, I collected data on the transitions of colonial administrators from the Official Journals (*Journaux Officiels*) of French West Africa and their subsequent colonies giving the identity of the administrators in each district between 1885 and 1932. To the best of my knowledge, this is the first administrator-district matched panel dataset on the colonial organization in French West Africa. I supplemented this dataset with information based on archive extraction from the Overseas Territories Archives Department (*Archives nationales de l'Outre-mer*, thereinafter ANOM) to further identify administrators and spell periods, along with data from the Bibliographic Dictionary of ENFOM, archival data from the colonial journal *Renseignements Coloniaux* and data from Sibeud (1999) and Suremain (2001) on ethnographer administrators.

Using historical data from French West Africa comes a number of advantages. First, this research focuses on one particular historical institution rather than a cross-country comparison usually used in the literature. I compare regions rather homogenous in their institutions, culture, and colonizer's identity. The source of variation is therefore limited to the difference in administrators which allows me to draw insightful conclusions. The presence of pre-colonial kingdoms in French West Africa will also enable me to control for unobserved heterogeneity in pre-colonial development and to investigate a possible correlation between administrator types and a measure of development potential. Second, studying the impact of political leaders such as administrators during the colonization can inform on the importance of such historical experience in the long-term. Most studies on leaders rely on short-term effects on growth, but do not account for persistent changes resulting in a different development path. To the best of my knowledge, this is the first project to measure how historically persistent the impact of leaders is.

My empirical results suggest that the first years of the colonial period had significant and long lasting effects on public investment decisions. However, contrary to what was hypothesized, the share of ENFOM administrators or military administrators did not matter much in affecting district-level public investments. If anything, the effect of ENFOM administrators was found negative on

educational investments – as measured by the number of teachers per 100,000 inhabitants – and vanished when testing alternative specifications. On the contrary, ethnographer administrators did matter in deciding the amount of health investment as measured by the number of medical staff per 100,000 inhabitants. Their effect is positive, significant, large in magnitude and enduring throughout the colonial period. I discuss several hypotheses to explain the underlying mechanism behind this effect. This impact could be coming from their influence in attracting European doctors due to their connections with the scientific world. Ethnographers could also be more able to communicate effectively with indigenous population and convince them of the benefits of modern medicine, making health investments more profitable. Another hypothesis is that ethnographers had a different approach of colonization and were more interested in the living conditions of indigenous populations than other administrators, inclined to look for an obedient and productive district by the central administration. Armed with this result, I am able to measure the historical persistence of ethnographers using Huillery (2009) who measured the effect of colonial investment levels on current performance outcomes. Moving from the bottom to the top quartile distribution of ethnographers share in a district reduces by 2 percentage point the percentage of 0-5-years old children suffering from stunting as observed in 1995.

The paper is organized as follows. Section II describes the historical background. Section III presents the data and archive extraction efforts carried out. Section IV discusses summary statistics on the data sets. Section V introduces the empirical investigations. Section VI presents the main results. Section VII discusses robustness checks. Section VIII presents the analysis of historical persistence. Section IX concludes.

## II. Background

In this section I present the historical background of the colonization in French West Africa and describe the administrative organization of the federation as well as the role of the colonial administrators and their different types.

## II.1    Historical background

French West Africa was a federation of 8 former French colonies (Senegal, Ivory Coast, Guinea, Niger, French Sudan, Dahomey, Upper Volta) established in a vast, diverse territory – more than 4,800,000 km2– characterized by low population densities. The region was mostly rural and inhabited by 12,000,000 people in 1910 (Huillery, 2009).

French West Africa lasted from 1895 to 1960. However, colonization started as early as 1854 from the Senegalese coasts and progressively extended along with several military interventions from South to North and West to East. The main colonial expansion occurred around 1880s, and in the 1890s the last military expansion occurred in current Mali.

Although French West Africa (*Afrique Occidentale Française*) was officially created in 1895, its legal existence actually started in 1904 when the Federal Government became effective. The period of civil administration varies by colony and district depending on the year of the conquest and duration of military operations, as presented in the summary statistics. Civil administration progressively took place in the different districts from 1885 to 1920.

## II.2    Administrative organization

The structure of the colonial administration was pyramidal: the general governor (*gouverneur général,* later called *haut-commissaire*) was at the head of the federation, followed by lieutenant governors in each colony (*lieutenant-gouverneurs*). Administrators (*administrateurs* or *commandants de cercles*) were placed at the head of the districts (*cercles*). The preexisting structure of power was not completely abolished. Pre-colonial African chiefs were at the head of villages, acting as intermediaries between the indigenous population and the French administrators.

In 1925, the federation of French West Africa has 120 districts, the largest being divided into subdivisions and were also ruled by administrators.

Even if officially (and highly) centralized, the colonial administration was effectively decentralized. Administrators were considered as *"the real rulers of the French empire"* (Delavignette, 1939). Before WWI, *"[the colonial district administrator] is alone, he is everything, in charge of and responsible for everything [...]"* (Deschamps, 1975); he is *"omnipresent and omnipotent"* (El Mechat, 2009). Administrators detained most of the effective power. They oversaw tax collection, organized census, were in charge of judging and

arresting criminals according to the "Indigenous code[1]", planning and supervising building and road construction, steering elementary schools, controlling Koranic schools, increasing means of production in their territory and managing local budget (Cohen, 1973, p.102).

Even though administrators' massive power was controlled by lieutenant-governors, effectively administrators were free to decide in almost every aspect of local policy decision. Because of physical distance (due to the size of French West Africa) and lack of proper communication means, administrators could make decisions with little check and balances from lieutenant governor or general governor regarding local policies (Cohen, 1973, p.98).

## II.3     District policy

French administrators could invest in three public goods: education, health and infrastructure. Each year, they had to define in their local budget how many teachers, schools, health workers and hospitals were needed in their district and how much of the public money was to be allocated to public works (which mostly consisted of public works materials given the availability of forced labor from the indigenous population).

Even though administrators were responsible for collecting taxes, the annual local budget was decided centrally at the colony level. After receiving contributions from all the districts, each colony had to finance its own central administration expenses and reallocated funding for public investment locally with little concern for the initial contribution of each district. As described by Huillery (2009), the correlation between tax revenue and public investment was positive but small (around 0.2). No explicit investment strategy was presented in local budgets. It should be also noted that colonization's costs were endured entirely by taxes raised on local population and were not subsidized by the metropole (except in Mauritania which benefited from federal subsidies). All the budget from the French Ministry of Colonies was devoted to military expenses (Huillery, 2014).

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[1] This code allowed for specific punishment such as forced labor, and lasted until 1946. It applied to all indigenous population in the colonies except for the inhabitants of the four Senegalese communes of Saint-Louis, Gorée, Dakar, and Rufisque, who benefited from the status of French citizenship due to the early experiments in assimilation in that colony (Andereggen, 1994).

## II.4　French administrators

The body of French administrators was a heterogeneous group of civil servants whose composition and role evolved significantly during the colonial period.

Prior to 1887, the administrators were recruited directly by the governors of the colonies (Cohen 1973, p.27), and most were hired among military officers. In 1887, a central administration body in Paris was appointed to be in charge of the recruitment process and made it uniform across colonies, a task later devoted to the Ministry of the Colonies from its creation as an independent ministry in 1894. However, the recruitment process was subject to many experimentations and became fixed only in 1914 (Cohen, 1973, p.17).

The profile of the administrators was extremely heterogeneous, even much later during the colonial period. Several reasons can explain it. First, because being colonial administrators was unpopular among civil servants. This career was less prestigious compared to others, they tended to receive less distinctions (such as *Legion d'honneur*) than other administrative bodies and most of them were reserved for those with a military background. Life conditions were also extremely difficult. Colonial had to frequently come back to France for hospitalization as reported by their personnel records, and sanitary conditions made their mission dangerous. It has been reported that 16% of the administrators died during their duty (Cohen, 1973, p.41) notably from malaria or other diseases. Despite higher salary, this career remained relatively unpopular in the administration. Second, rapid and somewhat unprepared colonial expansion made colonial administrator highly unsupplied and standard of acceptance in this body was therefore surprisingly low. Between 1887 and 1913, the number of colonial administrators was multiplied by 20. Despite a lack of qualification from many of these administrators or their brutality, they could not be let go. The fact that administrators were under the authority of the lieutenant-governors but effectively fired by the central administration only increased this phenomenon (Cohen, 1973, p.40). Third, the administrative body that made the recruitment of these administrators uniform started its first class only in 1890. The Colonial School (*Ecole Coloniale*) later called ENFOM- the first school of its kind – was in charge of recruiting and training young individuals for the career of high-level civil service in the Colonies but had its authority contested. Even though a decree in 1889 reserved three-quarter of the positions to its former pupils, it was not applied and most of the administrators were coming from a different background. The Paris Institute of Political Sciences (today's *Sciences Po*) and its director Emile Boutmy opened a rival training program in 1881 which lasted until 1892.

The body of colonial administrators was therefore very heterogeneous in its composition. William Cohen identified five different profiles: (a) colonial officers, who were usually violent and brutal towards local people, (b) metropolitan civil servants, who in general did not choose to serve in the overseas colonial administration and were lacking of qualification, (c) members from the administration office of the colonial canton capitals, who already had at least two years of overseas experience but were not prepared to be administrators, (d) agents or *commis*, who despite their lack of instruction had the advantage of already being familiar with the position of administrators thanks to their past overseas experience, and (e) pupils of the colonial school10, who were recognized as the elite of the body and were the best administrators.

Another type of administrator discussed by Emmanuelle Sibeud is ethnographer administrators. Those administrators were related to the Africanist movement. Africanism is a scientific movement starting in the 1880s whose subject is the study of the study of African lifestyle and traditions using the tools of anthropology, linguistic and other social sciences. It evolved due to a renewed interest in anthropology marked by the creation of a School of Anthropology in Paris in 1876 and the opening of the Ethnography museum in the site of Trocadéro, Paris in 1878. The study of the African continent was particularly dynamic at the end of the nineteenth century and continued afterward in parallel with the evolution of the colonial expansion.

The role of ethnographers was at the frontier between practitioners and scientists. Ethnography is defined by Claude Levi-Strauss as the field analysis of how a society function, and analysis of its traditions. It consists in a practical record of a primitive society which require field description or even the direct participation of the fieldworker. Many of those ethnographer administrators fluently spoke one to several indigenous languages, and published their work in scientific journals such as the *Journal de la Société des Africaniste*. Ethnography thus differs from ethnology and a fortiori anthropology which draws analysis from ethnographical record to establish structures of societies.

Ethnographer administrators were key elements of this dynamic movements created in parallel of the coloniasm. They had direct contact with the indigenous populations and many anthropological studies depended on their observations. Given the communication tools of the time they often were the only Europeans in direct contact with these populations. The distinction between ENFOM pupils and

ethnographers is not mutually exclusive as the training taught at the Colonial was given by the most prominent Africanists of the time, including Maurice Delafosse who played a major role as administrator and ENFOM teacher in organizing this Africanist movement in academia and in the French administration.

## III. Data

In this section I list the different data sources used, summarize the archive extraction efforts I have carried out, and define the major variables in the analysis.

### III.1    District-administrator panel dataset

I collected a detailed matched district-administrator data set over the 1885 – 1932 period[2]. I have used the Official Journals of the colonies (*Journaux Officiels*) to record the transitions between administrators and identify the ruling periods for each. Official Journals were consulted at several libraries in Paris: BNF, BDIC, Cujas and the National Academy of Science in Overseas Territories (*Académie nationale des Sciences d'Outre-mer)*. Military administrators were identified based on the military status associated with their mention in the Official Journals. Data was collected for the colonies of Senegal, Guinea, Ivory Coast, Niger, Dahomey, Upper Volta and Sudan. No data was collected on the districts of Mauritania as there was no information about their district administrators in the Official Journals.

I enriched this dataset with several other sources. First, I was able to complete the identification of administrators thanks to the ongoing data collection of administrators' personnel records from the Overseas Territories Archives Department (*Archives Nationales d'Outre-Mer*) on which I am currently involved in. This source gives detailed and precise information about the career of the administrators and significantly decreased the uncertainty in the initial database of district-administrator. This was an invaluable source of information given two common weaknesses in the information extracted from the Official Journals: i) the administrator's first name was not systematically reported causing (many) identification issues; ii) interim transitions were not systematically mentioned which occasioned several

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[2] Data collection was initially performed by Christine Cai and Alexandre Aubourg for their respective masters' thesis in 2015 for the period 1906 – 1932. I have improved upon their data set and collected data for the period 1885 – 1905.

cases were the temporary administrator's start date and his predecessor's end date had to be otherwise retrieved or extrapolated (see below for the extrapolation procedure).

Second, I identified administrators involved in ethnography using Sibeud (1999) and Suremain (2001) who listed major actors involved in Africanism over 1870 – 1960. I then completed their list by a semantic search from the *Renseignements Coloniaux* – a monthly supplement to the journal *Bulletin du Comité de l'Afrique française* – which contained from 1909 a systematic review of all the publications in the field of ethnography in France or abroad (Sibeud, 1994). I used all the available supplements from 1906 – 1922. I identified in total 44 such ethnographers defined as administrators in AOF with at least one publication in the field of ethnography.

Finally, I consulted the *Bibliographic Dictionary of the ENFOM pupils* to identify all the administrators in my dataset who graduated from the Colonial School. I found 153 such administrators.

The major variables from this data set are the following:
- Share of ENFOM administrators in a district over a given period: ratio of total ruling periods of former ENFOM pupils in all the districts composing the reference district of 1925.
- Share of military administrators in a district over a given period: ratio of total ruling periods of administrators with a military status (as reported in the Official Journals) in all the districts composing the reference district of 1925.
- Share of Ethnographer administrators over a given period: ratio of total ruling periods of ethnographer administrators in all the districts composing the reference district of 1925.

### III.2   Data cleaning decisions

I came across several issues during the data cleaning and construction phase of this database which are summarized here. This discussion is continued in the Robustness check where I test the robustness of my results to different data cleaning choices.

First, I decided to excluded some spells from the base when:
- The district was considered military as evidenced by the local budgets collected by Huillery (2009). Those administrators were purely military and their task was therefore not to allocate budget resources for public investment but to manage the military interventions, deal with the

population's hostility towards Europeans. The first collected budget is in 1904 for Senegal and around 1906 for other colonies. For districts created before a local budget is available, I relied on the status of the administrator in place (civilian vs military) and on historical evidence to assess the civil status of the district at that time.

- There were severe uncertainties regarding the status of the district. This relates to only 2 spells in the district of Baoule during a severe rebellion in 1902 – 1911 from the Nanafoue population. The administrators at the time were military and had to lead military charges against the indigenous population, which lead to several casualities on both sides. Given this context and also the fact that the duration of those spells could not be established, I decided to exclude them.

- The person in charge was a temporary administrator ("interim"). This happened while the previous administrator was leaving to go back to mainland France due to vacation or for a cure. In the case where this interim lasted more than 18 months, I have decided to keep the spell as the administrator was effectively in charge.

Second, I performed a matching to merge all the observed district into my reference 1925 delimitation of the districts. This was made difficult due to the many minor changes of delimitations and names over the period. To do this, I used the 1925 map of the AOF available on Gallica which unfortunately does not give accurate delimitations of the districts. I completed it with the very detailed colonial maps found at IGN in Saint-Mandé for the available years of 1911, 1922, 1928 and 1935. Those maps detail the limits of all the districts, list their major towns, surface area and census population. I also used the evolution of districts as documented by Huillery (personal communication). All districts could be matched to 1925 districts, but a limited number of them were small compared to the size of the 1925 districts, were military bases or had a very short number of spells. As discussed in the robustness check section, I test the validity of my results to alternative matching procedures regarding those districts.

Finally, information regarding a spell's start or end date was sometime missing but could be extrapolated based on the administrator's personnel records extracted at the ANOM or based on other spells. I performed the following procedure for extrapolation:

- When available, I consulted the administrator's personnel record or information from the bibliographic dictionary of ENFOM to find or at least reduce the uncertainty around the

missing start/end date. It frequently happened that I could identify the missing year but that the precise month was not specified.

- On remaining uncertainties, I look at other spells in the district (with the same name or other districts in the 1925 district delimitation) to further reduce the period of uncertainty. If the successor was identified, I used the successor's start date as an extrapolated end date.

- I will still be left with uncertainties (e.g. if in the Official Journals that an administrator A was nominated at time t, but at time t+1 administrator B was replaced by administrator C then the transition date between administrators A and B is missing). I then looked at other transitions of the administrator with missing start/end date to reduce the length of the uncertainty. If the uncertainty was only of a few months, I used this administrator's date in the new assignment as the missing start/end date. If the successor/predecessor of this administrator was a temporary administrator, I assigned to the interim a length of spell of 0 month.

- If the uncertainty could not be resolved, I split the uncertain period between the two administrators.

Table 3 summarizes the extrapolation efforts. Most of them are "benign extrapolation" as described in step 2, i.e. using the successor's start date as end date for his predecessor or vice versa. Serious and potentially biasing extrapolation are only for less than 5% of the sample size, and important uncertainties (when no successor/predecessor was present for more than 2 years and the period of uncertainty could not be reduced) is only for 0.35% of the spells.

Overall, 3,183 spells have been used for the analysis. After using the 1925 district delimitations, I have 3,861 spells as some large districts early in the colonization were further divided into smaller 1925 districts.

## III.3  Colonial public investments

Data on colonial investment was collected by Huillery (2009) and comes from the annual local budgets of the district from 1910 to 1956. The data include information for 1910 -1920 and then from the local budgets of 1923, 1925, 1928, 1930, 1933, 1936, 1939, 1943, 1946, 1949, 1953, and 1956 (years randomly chosen). Given the structure of the data set, all variables used from this dataset are averages over a several-year period.

I am using three different measures of public investment for health, education and infrastructures investments: Average number of teachers per 100,000 inhabitants over 1915 – 1930 as a proxy for colonial local investment in education; Average number of medical staff per 100,000 inhabitants over 1915 – 1930 as a proxy for colonial local investment in health; Average total amount of public works expenses - which includes construction and maintenance costs[3] - over 1915 – 1930 as a proxy for colonial local investment in infrastructure.

The choice of the period 1915 – 1930 for my core specification was made so as to i) have a measure of public investment in all three sectors for as many districts as possible. Data is notably scarce for investments in infrastructure after 1930 which were nonetheless an essential part in the choice of public investment by administrators (Delavignette, 1939, p.205) ii) have a measure of colonial investment that does not overlap with the first 10 years of a district so as to avoid time inconsistency. Using data on colonial investment from 1910 would either reduce my sample size by half (nearly half of the districts were created between 1900 and 1906).

## III.3    Other district characteristics

I used other data from Huillery (2009) to control for district characteristics plausibly correlated with investment decisions.

I used geographical data on latitude, longitude, altitude, average annual rainfall over 1915 – 1975, indicators for access to sea, to a navigable ("important") river, distance from the coast and surface area as control variables.

I also tried to control for differences in level of pre-colonial development. For this reason I used an indicator for the existence of a pre-colonial kingdom as a proxy for pre-colonial development differences across districts.

Regarding the colonial conquest characteristics, I used the year of the last military intervention and duration of local resistance to colonial conquest to control for effective periods of possible colonial investment. Military interventions arguably reduced public investments in those districts, if any.

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[3] I could also have used the total expenditure on infrastructure, excluding maintenance costs. This does not change my results (not shown).

## IV.   Summary Statistics

In this section I briefly summarize the spells, administrators and districts characteristics. Colonial conquest, pre-colonial development and geographical characteristics of districts are described with greater details in Huillery (2009).

Table 1 presents summary information on administrators. The number of administrators more than doubled between 1885 – 1906 and 1906 – 1932 from 283 to 776. The share of ENFOM pupils went from 6% to nearly 15% of the cohort which is a major increase but does not constitute the majority of administrators or a fortiori three-quarter of the administrators as was expected by the 1889 decree. I indicated separately among the ENFOM administrators those who were admitted through a external procedure and spent two years at the Colonial School as opposed to the colonial agents who were promoted as administrators from 1913 and only had to spend a 6 month internship at the School. There is no difference between those two measures before 1913. Ethnographers were an even smaller minority of around 5% of administrators overall, who are present throughout my dataset until 1932. Military administrators constituted the most important identified administrator type of nearly a quarter of administrators, and were more present at the beginning of the period.

Table 1b looks at the share of the administrator types in a district measure by the ratio of the length of all spells of ENFOM (resp. Ethnographer and Military) administrators during the first 10 years of a district. The share of military in a district is roughly similar to the share of military overall. However, ENFOM administrators tended to be less present in district in terms of duration than what the count of ENFOM administrators suggested. Interestingly, ethnographers represented only 5% of administrators but were present on average 10% of the time in a district during its early years, which is an argument for including them in the analysis.

Let us now look at the district dataset, which consists of the dataset of spells collapsed at the district level. It appears that the length of a district in my base varies quite substantially from 14 to 48 years. For most of the analysis I decided to restrict my sample to the district who became civil districts before 1907, de facto excluding Macenta, Gueckedou, and N'Zerekore (all in Guinea, who became civil district in 1914, 1915 and 1919 respectively). The total number of transitions in a district overall is large, accounting for the important number of interim in the base. An average spell, without counting

interim, lasted around one year and 2 months but the non-consecutive presence of an administrator in a district was slightly less than 2 years.

# V. Empirical Investigation

## V.1    Model

The argument behind this investigation is that administrators had a say in deciding local policy decisions within the broader colonial institution of French West Africa. The hypothesis is that some administrator types (being former ENFOM pupil or being ethnographer) would positively affect the level of public investment in either education, health or infrastructure, while other (having a military status) would be negatively correlated with the level of public investments. The second hypothesis to be tested is the historical persistence of the administrator effect during the colonial period.

The empirical model for the core model in the analysis is the following:

$$Y_{i,t+1} \ = \ \alpha + \ \beta * TYPE_{i,t} \ + \ c * X_i \ + \ \varepsilon_{it}$$

where $Y_{i,t+1}$ is a set of public investment outcomes in a district over 1915 – 1930 and can take three forms: the average number of teachers per 100,000 people over 1915 – 1930 (*Education*) ; the average number of medical staff per 100,000 people over 1915 – 1930 (*Health*) and the average total public works expenses over 1915 – 1930 (*Infrastructure*). I further test alternative specifications as described in the robustness check section using different periods and other available proxies for the public investments in health.

$TYPE_{i,t}$ denotes the share of administrator type during the first 10 years of a district (before the realized outcomes in public investment is realized in time t+1). It can be of three forms: the share of ethnographer administrators during the first 10 years, the share of administrators who are former pupils of the ENFOM during the first 10 years and the share of administrators with a military status (without regard to their rank) during the first 10 years.

$X_i$ is a set of 9 geographical controls and 4 pre-colonial and colonial conquest controls. The geographical controls are: Altitude in feet; Longitude; Latitude; Average annual rainfalls in the district's main city over 1900-1960 in mm; Indicator of access to the coast; Indicator for access to a navigable river; Indicator for access to the sea; Distance of the main city from the nearest port in km; Distance of the main city from the coast in km; Surface area in km$^2$. These controls are aimed at capturing differences in district's economic potential which correlates with the level of public investment. The controls related to the colonial conquest and the pre-colonial development are: Indicator of pre-colonial state which indicates if the district had a kingdom or centralized political power at the end of the nineteenth century before the colonial period; Duration of the resistances to colonial conquest; Year of the last military intervention before final pacification; Year of the first civil existence of a district defined as the first year under a civil administrator or the year preceding the first observed local budget. The pre-colonial state dummy is a proxy for pre-colonial differences in development across districts. Variables related to the colonial conquest capture discrepancies in length of effective civil period between districts. Some districts had a very long period of resistance (notably in Upper Volta where the district of Gaoua resisted more than 40 years before submitting to colonial power) which arguably impacted the amount of public investments.

$\varepsilon_{it}$ is the vector of error terms for a district i at time t.


Out of the 112 districts for which I have data on administrators, I kept 94 districts. I decided to exclude the former European trade counters of the analysis. As one can see in Figure 2-4, their level of public investment was much higher than in any other district in either type of investment. They most likely had different determinants in terms of colonial investment and development than simply local decisions. This is particularly true of Dakar and Saint-Louis, both French-founded cities. Saint-Louis was the first city founded by the Europeans in West Africa in 1659, and was the capital of the French West Africa until 1902 before being the capital of two colonies, Mauritania and Senegal. Dakar was then capital of the French West Africa from 1902 to 1960. These districts, along with the other trade counters, had therefore a special status and could not be compared to other districts. Anecdotally, I could observe that they were governed by lower-rank administrators and were likely to be more directly ruled by the lieutenant-governor of the colony or other higher-level administrator of the federation. I therefore decided to exclude them from the analysis. I also excluded the districts of Niger as of 1925 as the transitions mentioned in the Official Journals were only for the 1902-1912 period and there was no mention of those administrator in either Official Journals of the eight AOF colonies.

However, some districts from Haut-Senegal-Niger which later formed Sudan or Upper Volta are included in the analysis. Finally, the Guinean districts of Macenta, Gueckedou and N'Zerekore were excluded from my core specification as their first civil year was in 1914, 1915 and 1919 respectively which prevented me from computing the share of administrator type for a sufficiently long period of time. I performed robustness checks which include some of the excluded districts to prevent my results from being driven by those exclusion decisions.

## V.2    Administrator type and correlates with district characteristics

My first exercise is to see what determines the type of administrators in each district. As mentioned in the introduction, a major challenge for the interpretation of my results is to overcome suspicion of endogeneity in the allocations of administrators.

Table 5 presents regressions of the form:

$$Y_i \; = \; \delta_i \; + \; \partial_1 * GEO_i \; + \; \partial_2 * COL_i \; + \; \partial_3 * PRE_i \; + \; \varepsilon_i$$

The dependent variable $Y_i$ is the share of administrator type in a given district during its first 10 years. I constructed this ratio using the total duration of spells for ENFOM versus non-ENFOM administrators (Ethnographer vs non-Ethnographer; military vs non-military respectively). $GEO_i$, $COL_i$ and $PRE_i$ are the geographic, colonial and pre-colonial district variables discussed above. All these variables are time-invariant.

Table 5, column 1 indicates the correlation between the share of ENFOM administrators and the set of control variables. In line with historical evidence, nearly none of the control variables are correlated with the share of ENFOM administrators. The only significant estimate is the coefficient for the surface area of the district, negatively correlated with the share of ENFOM. However, the magnitude of the coefficient (of order $10^{-7}$) is unlikely to be economically important or affect my analysis.

Column 2 turns to the share of ethnographer administrators. Latitude and altitude are both significantly correlated with the share of ethnographer in a district, suggesting that districts further south and with a higher altitude were more likely to be ruled by ethnographer (though the magnitude

of the altitude effect makes its effect unimportant). The coefficient associated with the year of the first civil administrator in place is negatively correlated with variable of interest, suggesting that districts who turned civil earlier on (such as those in Senegal and Guinea) are associated with more ethnographer administrators. The effect of a district turning civil one year earlier increases the share of ethnographers by 1.31% which represents only 0.1 standard deviation, and further is only significant at the 10% level. Though arguably not large (the R squared of the regression including all the control variables is only of 0.26 compared to 0.56 for the share of military administrators), this effect may still explain part of the allocation of ethnographers in districts.

Column 3 looks at the share of military administrators. Longitude, surface area and distance to nearest port are all positively correlated with this share, suggesting that military administrators tended to be serving more in eastern districts, which is in line with the fact that military interventions occurred later and lasted longer in Eastern colonies (Sudan, Upper Volta) compared to Western colonies (Senegal, Guinea). Importantly, the year of the last military intervention is positively correlated with the share of military administrators and significant. This is in line empirically by the fact that, for instance, both Bobo-Dioulasso and Gaoua had only military administrators during their first 10 civil years. The goodness of the fit for this regression (R-squared of 0.56) is also much higher compared to other administrator types, leading to the possibility of nonrandom allocation of military administrators across the federation.

Overall, these results show that the allocation of ENFOM pupils and ethnographers was mostly unrelated to district characteristics, indicators of pre-colonial development or specificities of the colonial conquest. They do however suggest that military acting as administrators were not allocated randomly, and was partly explained by some geographical indicators and elements of the colonial conquest. To avoid any endogeneity concern with my result, I further account for all the control variables in the next regressions both for ethnographers and other administrator types for consistency.

## VI. Results

I will now turn to the description of the core results, i.e. the impact of the share of administrator types on public investments in districts.

Table 6, 7 and 8 show the effect of the share of ENFOM administrator on public investments in education, health and infrastructure respectively. I have included several regression models for each investment type with varying number of control variables.

Table 6, Column 1 shows the simplest regression of educational investment on the share of ENFOM administrators with no control. Surprisingly, the coefficient is negative and significant, suggesting prima facie that increasing the share of ENFOM administrators would *reduce* investments in education in the district, opposed to the view that more educated and trained administrators would favor development in their administrated territory. When adding a first set of geographical control variables and controlling for the first civil year in the district (see column 2) this effect is reduced in magnitude but remains significant. Adding the full set of control variables and country fixed effects in column 3 still exhibits a negative effect of smaller absolute value but the estimated point becomes non significant (p-value=0.366). However, a concern with this specification is of small degrees of freedom when adding country fixed-effect, considering the six countries in my sample and only 82 districts available. My preferred specification will therefore not include those fixed-effects. Excluding the country fixed-effects as shown in column 4 makes the effect become more negative and significant at the 10% level only. Overall the effect of ENFOM administrator on educational investments seems to be somewhat negative, but significant with a 90% confidence level.

Table 7 presents the effect of share of ENFOM administrators on health investments. Here, one cannot reject the null-hypothesis that there is no effect of ENFOM administrators. Controlling for geographical and colonial determinants does reduce the confidence intervals between this estimated coefficient but it remains strongly non significant.

Table 8 looks at the effect of ENFOM administrators on infrastructure investments, precisely the average total public works expenses on construction and maintenance such as those of roads, buildings or bridges over 1915 – 1930. Column 1 shows that the effect is at first negative and significant but vanishes as we control for district characteristics. Interestingly with the full set of control variables but no country fixed effects, (column 4) none of the regressors has a significant associated coefficient. The only exception (however significant at the 10% level only) relates to the first civil year of the

district which is negatively correlated with investment decisions, suggesting that districts colonized earlier benefited more than other from investment decisions in infrastructure.

Let's now turn to other administrator types. Table 9 looks at the effects of ethnographers and military administrators. It appears that the only significant impact is the effect of the share of ethnographers on public investments in health, with a positive associated coefficient (b=15.3; p-value=0.026). Interestingly, the share of military administrators does not explain any investment decisions after controlling for geographical and colonial variables, with a p-value associated to these coefficients close to 70% for health and education decisions. Regarding infrastructure investments, their effect is negative and closer to reject the null but not significant at the 5% level. This suggests that, if anything, military administrators were less likely to embark on construction projects or road creation compared to other administrators. Smaller sample size due to missing observations on public works expenses may contribute to less significant results on infrastructure investments.

Let's go back to ethnographer to further analyze their effect on health investment decisions as proxied by the number of medical staff per 100,000 inhabitants over 1915 – 1930. Table 10 presents different specifications with varying number of control variables, as was done in Table 7 for the share of ENFOM administrators. One can see that, without control, the effect is non significant but negative suggesting that endogeneity with unobserved characteristics may be at play. Controlling for the geographical indicators which correlated with the share of ethnographers found in Table 5 and for the first year of civil district, this effect turns positive, significant and large in magnitude. Adding the full set of control variables as shown in column 4 even increases the significance and magnitude of this effect. Going from the lowest quartile to the top (20% of ethnographer administrators) is associated with an additional 3 medical staff per 100,000 habitants, which is more than the total number of medical staff per 100,00 for a quarter of the districts over 1915-1930 annually.

Summarizing the results found so far, it appears that the type of district administrators had no strong impact on local infrastructure decisions based on the three tested administrator types. We could find two types of significant effects: a positive effect of ethnographer administrators on health investments and a somewhat negative effect of ENFOM administrators on education investments.

# VII. Robustness checks

I now consider alternative specification to test the robustness of my results. Unless otherwise specified, the model used in the robustness checks is the same as in Table 10, column 4 which includes all control variables but no country fixed-effects. My preferred specification – the one I will be comparing results in robustness checks against – is using the measure of investment over 1915 – 1930 and computing the share of administrator types during the first 10 years.

## VII.1    Varying investments periods and first years of districts

Table 11 shows the results of the analysis measuring investments over 1910 – 1930. Since half of the districts in the sample have a first civil year (first administrator or first civil budget) after 1900, I also decided to compute the share of administrator types using only the first 5 years. The results show that all previous non-significant effects remain so, but more importantly both the impact of ethnographers on health investments and of ENFOM pupils on education investments are now non-significant. I however look at these results with caution since i) two parameters were changed simultaneously (period of investments and duration of first years) ii) looking at the first 5 years only may not be a long enough timeframe to measure impact on significant investment decisions. As discussed in the data section, ENFOM, ethnographer and military administrators tended to have longer spells (more than the average 12 months) which would mean that only a few administrators are measured using this alternative indicator.

To circumvent this limitation, I turned to another specification keeping the choice of the first 10 years, but looking at measures of investments over another period of time: years 1920 – 1930 only. The results found with the core specification are robust to this change of measure as exhibited in Table 12, suggesting that looking at the first 5 years of a district may not be an appropriate measure.

To investigate further on the length of significant first years, I used another measure looking at the period between the first civil year and a fixed year (in Table 13, I used 1920 which means from the first civil year of a district until 1920). This allows for a comparison of administrator shares during similar years for all districts but introduces differences with districts that were colonized earlier. However, I control for the first civil year which accounts for that difference. Results in Table 13 confirms that the impact of ethnographer administrators on health investment is robust to the change

of measure with both the point estimate and standard errors in the same order of magnitude as with the core specification. However, the effect of ENFOM administrators on education investments is now non significant. Running the regression under the same specification but using the first 20 years for computing the share of administrator types yield similar results (see Table 14).

## VII.2    Accounting for missing spells

Another robustness check consists in accounting for the fact that some spells could not be recovered during data collection. As presented in the Data section, this represents only 2% of the total durations of all districts but these uncertainties could be distributed in a non random manner. To control for this potential bias, I decided to compute the share of administrator types during the first 10 years plus the total length of any missing spell occurring during these first 10 years. The measure is therefore identical for districts that do not have missing spells during the first 10 years, but other districts will have their share of administrator types computed over a longer period of time. As shown in Table 15, this does reduce the R-squared for the regressions with significant coefficients of interest but does not change the significance of the coefficients compared to the preferred specification nor the magnitude and sign of the effects.

## VII.3    Using major administrators only and major districts only

Another concern relates to identifying administrators that played a role in deciding investment decisions. As discussed before, the average duration of a spell is around only 14 months (without interim), and the total period of time an administrator stayed in a district is on average of 22 months, which is shorter than what was described in historical evidence where it is generally assumed an average period of two to three years. This suggests that there may be more temporary administrators who did not have an influence over investment decisions.

To control for this – further than excluding temporary administrators which is assumed throughout the analysis – I decided to look at the same specification but computing the shares of administrator types using only the administrators who stayed in a district more than 12 (non necessarily consecutive) months. The choice of 12 months is motivated by the fact that budgets were decided on an annual basis and that administrators with less than one year of ruling in a district over the total period of my analysis were unlikely to influence those decisions. Results are shown in Table 16. Interestingly, the

effect of ENFOM administrators is more likely to be non significant over all types of public investments. On the contrary, the impact of ethnographer administrators on health investments is robust to this change, shows an even stronger effect and rejects the null hypothesis at the 2% level (b=15.4; p-value= 0.0019). This result reinforces the claim that the only robust effect is the impact of ethnographer administrators on health investment decisions.

Following the same approach, I attempted to exclude for minor districts from the analysis as a robustness check. During the period districts changed of size and name several times. Some were real places of colonial development but other turned out to be only minor bases which later were incorporated into larger districts. To account for this fact, I decided to perform the matching procedure another time keeping only major districts. This means excluding small districts (not mentioned in maps), military bases and districts that had only a few spells. I am left with 3,592 spells compared to the original 3,861 ones.

The results of this specification is as follow. The estimated impact of ENFOM administrators on education investment is turned non significant, however I find a positive but barely significant (at the 10% level) impact of ENFOM administrators on health investments. The impact of the share of ethnographers on health is robust to this alternative model. See Table 17 for full results.

### VII.4  Without extrapolation and uncertain dates

Further, I test the robustness of my results to my extrapolation decisions. Some of the spell start or end dates could not be recovered by archive extraction or precisely identified (24% of extrapolations including 4% of non-minor uncertainties). It should be noted that most of the extrapolations are due to the structure of the data extracted from the Official Journals which did not systematically specify the end of the ruling periods. I therefore assumed that the nomination of a successor indicated the end date for the ruling administrator. More serious uncertainties (and therefore potential source of bias) came from from other types of extrapolation in the spell periods which only occurred for 4% of the spells.

Removing spells with major extrapolations ("uncertainties") does not affect the significance nor the order of magnitude of the estimated coefficient effect of ethnographers on health investments (see

Table 18). I find however that excluding all spells with at least one extrapolated date makes this effect non significant, as shown in Table 19. In a sense this is non surprising since it means removing nearly 25% of the spells in my sample. Other effects from ethnographers or other administrator's types are non significant throughout both specifications, including the effect of ENFOM pupils on education.

Other robustness checks performed but not shown relates to the status of ENFOM administrators. As discussed in the data section, from 1913 some of them were recruited internally in the administration and only had to spend a 6 month-internship at the ENFOM – transformed into a military internship in 1918-1920. I have performed the analysis indicating ENFOM administrator as only those who were recruited externally. This does not change any result and can be explained as those internal recruitments occurred after the first 10 years on most of the districts.

### VII.5   Further analysis of the effect of Ethnographers on health investments.

To further investigate the effect of the share of ethnographer administrators on health investments, I performed additional robustness checks on this result as shown in Table 20.

First, I have excluded the two districts potentially driving my results, Satadougou and Sassandra, as shown in Figure 6**.** The results are remarkably robust to these exclusions. Second, I look at my results including the trade counters which were so far left out of the analysis. The estimated coefficient shown in Column 3 is larger in magnitude but is now non significant, which could be explained by the different nature of these districts as discussed before.

Finally, I look at alternative health indicators which could proxy health investment decisions. I use the average number of medical staff over 1915 – 1930 from two medical institutions: *Services de l'Hygiène* (Hygiene Services) and *Assistance Médicale* (Medical Assistance). The Medical Assistance was offering medical assistance to indigenous population (for free for the poorest) from European doctors using modern medical techniques. This service was growing in parallel with the evolution of the colonial conquest but needed funding and was therefore not identical across the French territories. Further, both the indigenous population had to be convinced to accept scientific methods of treatments and European doctors had to accept to come in remote locations (cf ASNOM). This service was also in charge of campaigns against some epidemic such as the anti-plague campaign in 1931 (cf 1931 budget

for Senegal[4]). The Hygien Service was only set up in major colonial cities. His role was not curing diseases but preventing epidemic. It is said that their task was much limited in remote areas (cf ASNOM).

Consistent with these historical descriptions, I find that ethnographers had a non-significant impact on the number of staff from the Hygiene Services, but a positive and significant (at the 11% level) effect on the number of staff from the Medical Assistance. Although caution is necessary given the limited significance it could suggest that, being themselves scientists, ethnographers were better equipped to convince European doctors from operating in their districts or to provide much needed health services to the indigenous population.

Summarizing the analysis from the robustness checks so far, these results confirm the effect of ethnographer administrators on health investments which is remarkably robust to almost all the alternative specifications I tested. On the contrary, the impact of ENFOM administrators on education investments does not resist to many of these changes, which confirm early suspicions raised regarding the direction of the effect and its limited significance.

## VII.6 OLS standard errors

I used in my preferred specification Huber-White "sandwich" standard errors robust to heteroscedasticity. Indeed, for all 9 regressions the Breusch-Pagan / Cook-Weisberg test for heteroscedasticity does not reject the null hypothesis of constant variance of the error term at the 1% level (not shown). I thus decided to use standard errors robust to heteroscedasticity as is common in the literature, even in the case of small sample size (e.g. Acemoglu, Reed and Robinson, 2013 used robust standard error for their analysis in Sierra Leone using historical data at the district level, smaller N=117).

A legitimate concern is that my results can be significant due only to this specification, as robust standard errors are smaller than usual OLS standard errors in this empirical context. I show in Table 21 that the effect of the share of ethnographers on the proxy for health investments is still significant but at the 10% level using OLS standard errors.

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[4] http://gallica.bnf.fr/ark:/12148/bpt6k5673245k/

### VII.7  Placebo test of permutation-based p-values

I now turn to the robustness checks regarding the large-sample asymptotic hypothesis. Given the modest size of the sample of districts in my datasets (94 overall, 68 with measures of health investments), it is also helpful to assess whether my results are still statistically significant under permutation-based p-values which do not rely on large sample asymptotics.

To do this, I implemented a Monte Carlo exercise in which I allocated placebo share of administrator types to districts. Placebos values are drawn randomly from the empirical distribution of the share of administrator types. For each investment outcome, I calculate a p-value by comparing the estimated effect of the placebo share of administrator type to the estimate calculated using the true data.

Formally, I undertake the following procedure K times. For each district, I draw randomly with replacement from the empirical distribution of the share of administrator type to obtain a placebo share of administrator type for each administrator type. I do this for each district for each of the k simulation, $k \in \{1, K\}$. Next, for each k and for each investment type, I regress the true investment outcome on the placebo share of administrator types to obtain a placebo effect. The regression is identical to my core specification using geographical controls, colonial indicators and the dummy for pre-colonial state. The position of the true estimate of the effect in the distribution of placebo effects provides us with a p-value indicating the likelihood that my results are consistent with the null hypothesis.

Figure 7 presents the histograms of these distributions for $K = 1,000$ for the three investment outcomes and three administrator types. P-values are reported below each plot. Focusing on the health investments and ethnographer share, the placebo effects are centered around zero as expected, approximating well the null hypothesis. The distribution of placebo shares fairly replicates a normal distribution. In this case, I can reject the null hypothesis that the effect of the ethnographer share is zero in a two-sided test with a significance level of 95%.

# VIII. Historical Persistence

I now empirically investigate the persistence of the effect of the share of ethnographer administrators on health investments over time. To do this, I first use as independent variable a measure of the average number of Medical Staff per 100,000 inhabitants over varying periods of time to see whether the effect ethnographer administrators during the first 10 years can still be captured later in the colonial period.

Results are shown in Table 22. I reproduced the previous results on the 1915-1930 period on column 1 (b=15.3; p-value=0.026) and kept observations which had a measure of health outcome in 1915-1930 and another measure during 1933 - 1956 for comparability.  Column 2 uses the 1910- 1928 period as in Huillery (2009) and shows that my results hold using this specification. Next, I break down the 1910 – 1930 period into smaller periods. Columns 3 – 5 show results for 1910-1915, 1915-1920 and 1920-1930 respectively, and then for 1933-1956 in column 6. All the coefficients of interest are significant with a level of confidence of 95% over 1910 - 1930. The surprisingly low estimated coefficient using the 1910-1915 measure compared to my baseline specification (5.81 vs 15.3 in baseline) could be partly explained by the 14 districts out of 68 who reported 0 medical staff in 1911 which is the only measure reported over the period for these districts. The effect is notably strong during the 1915 – 1920 period (b=18.3; p-value= 0.048), then slightly decreases in 1920-1930 (b=14.1; p-value=0.024) and further decreases in 1933-1956 where it becomes significant at the 12% level (b=11.0; p-value=0.119). This shows the gradual decrease of the effect of ethnographers as we move further away from the beginning of a district but exhibits an enduring effect several decades after these administrators left office.

Combining results from Huillery (2009), I am then able to measure historical persistence of this effect on current health outcomes using measures of 1995 national household surveys. Using coefficient from column 2 and the point estimate found by Huillery (2009) in the regression of health investment on 1995 health performance, this suggests that moving from the lowest quartile to the top quartile distribution of ethnographer share during the first 10 years of a district (0 to 22% of ethnographer administrators) reduces by about 2 percentage points the % of 0-5 years old children suffering from stunting.

## IX. Concluding remarks and directions for future work

In this paper I investigated the determinants of the colonial public investments in districts of French West Africa, and showed that scholar administrators involved in Africanism as ethnographers were positively affecting the number of medical staff present in the district under their command, a proxy for the level of public investments in health. I did not find a significant effect of military administrators nor of ENFOM administrators which were expected to be most able administrators during the period. Given the contribution of Huillery (2009) showing historical persistence of these investment decisions on current performance outcomes, understanding how these decisions were made was of importance. Together with my results, it suggests that colonial leaders did matter in setting different development paths even within a broader context of extractive colonies as in French West Africa.

Several hypotheses can be advanced to explain the specific effect of ethnographer administrators on health investment decisions. First, those administrators may have had a different view of their mission and of the colonial conquest in general. While some administrators had a purely military or extractive vision of their duty, ethnographers were likely to be more humanist or more thoughtful of the wellbeing of the indigenous populations they had the charge of. Second, given their desire to understand indigenous cultures, ethnographers may better understand the indigenous inhabitants and more effectively communicate with them. In particular, ethnographers may have been better at convincing them to rely on modern medicine, making health investments more sensible. Third, despite the official message of bringing medical advances from Europe into the African continent, evidence suggests that this process was not similar in all localities. Ethnographers may have been better equipped for convincing European doctors to come into their districts.

An important direction for future work would be to examine other types of administrators that could affect investment decisions, further examine the determinants of colonial health investments locally and further investigate their long term effect on the current development outcomes.

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Figure 1: Map of the French West African districts in 1925
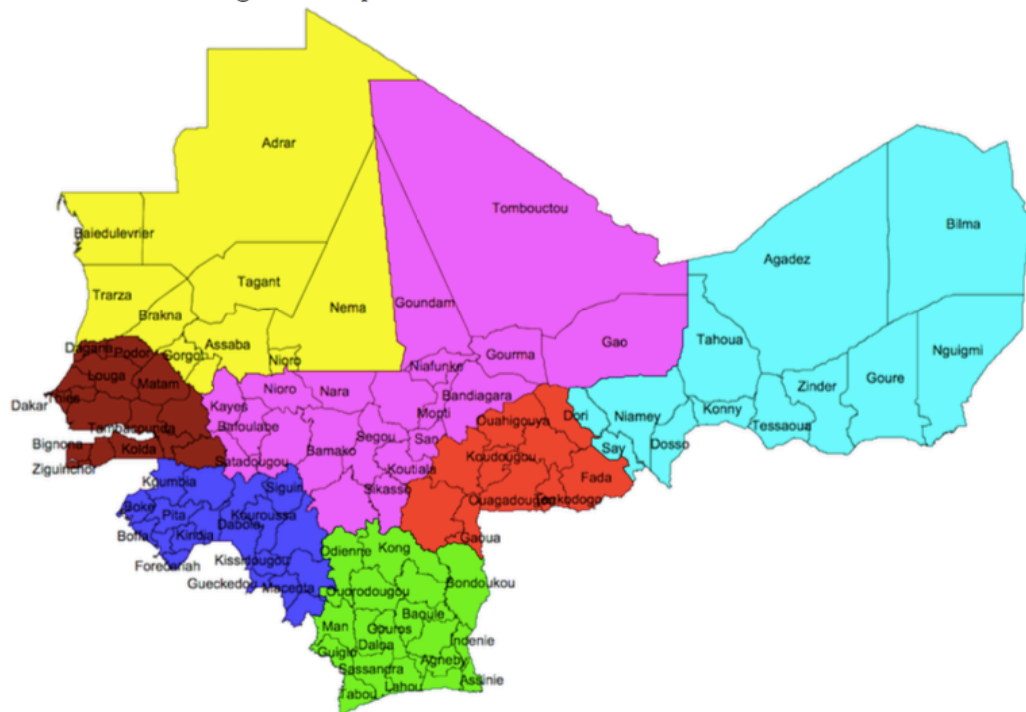


Note: Senegal is colored in brown, Mauritania in yellow, French Guinea in dark blue, French Sudan in fuschia, Ivory Coast in green, Upper Volta in red, and Niger in cyan. Source: Huillery (2006)
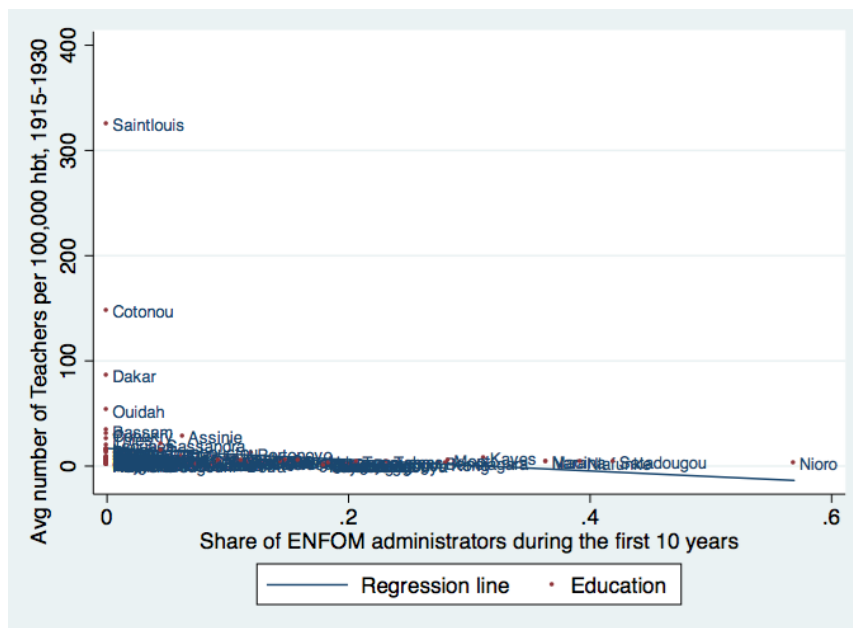
Figure 2: Plot of the share of ENFOM administrators and Educational Investment, including former Trade counters (Saint-Louis, Dakar, Casamance, Conakry, Ouidah, Assinie, Bassam, Cotonou, Porto-Novo)
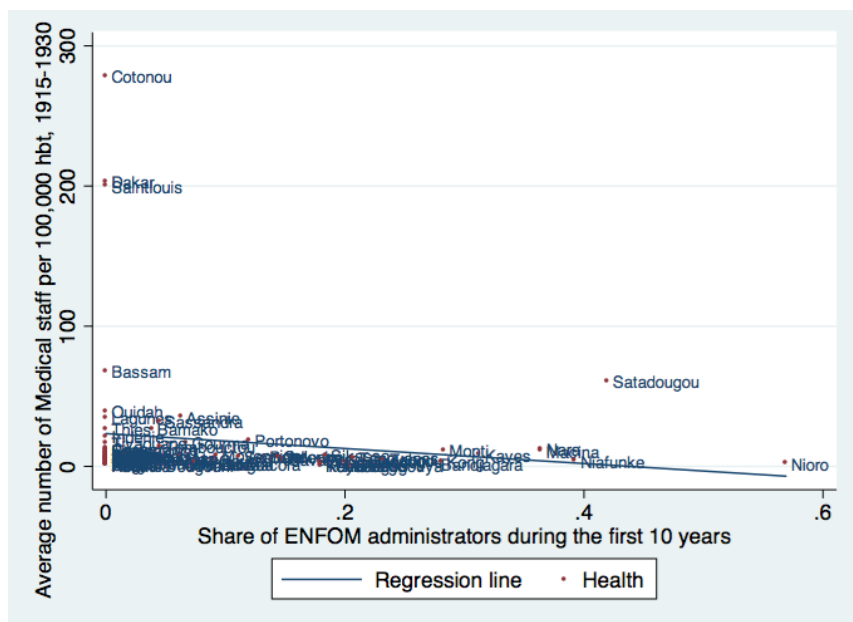


Figure 3: Plot of the share of ENFOM administrators and Health Investment, including former Trade counters (Saint-Louis, Dakar, Casamance, Conakry, Ouidah, Assinie, Bassam, Cotonou, Porto-Novo)
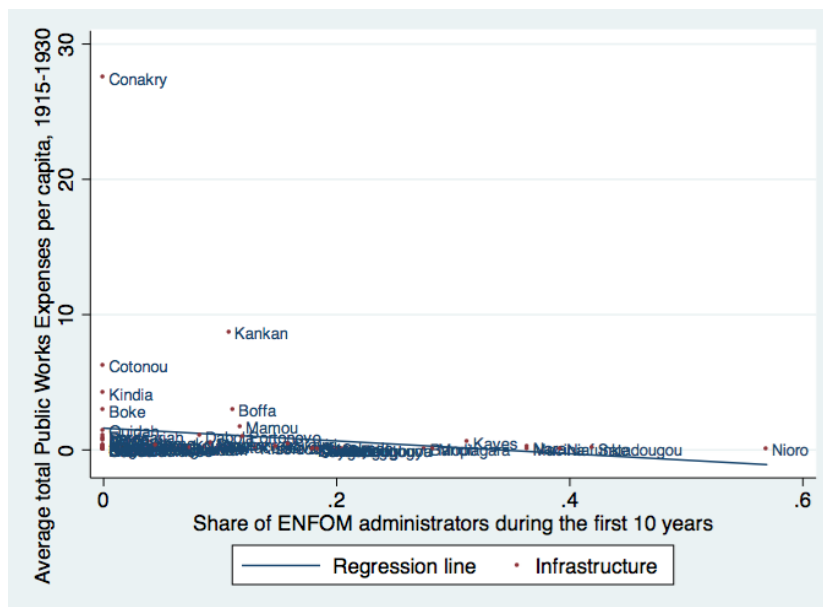
Figure 4: Plot of the share of ENFOM administrators and Infrastructure Investment, including former Trade counters (Saint-Louis, Dakar, Casamance, Conakry, Ouidah, Assinie, Bassam, Cotonou, Porto-Novo)
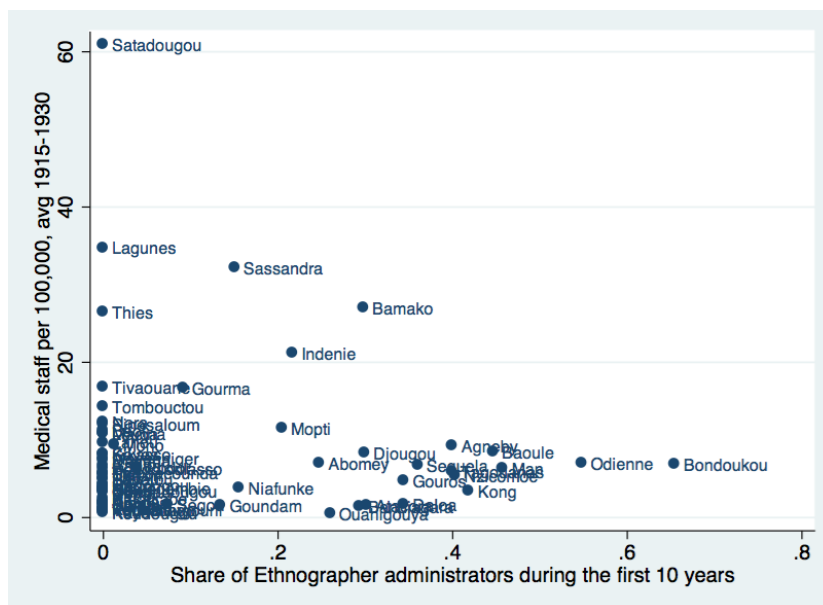


Figure 5: Plot of the share of Ethnographer administrators and Health Investment
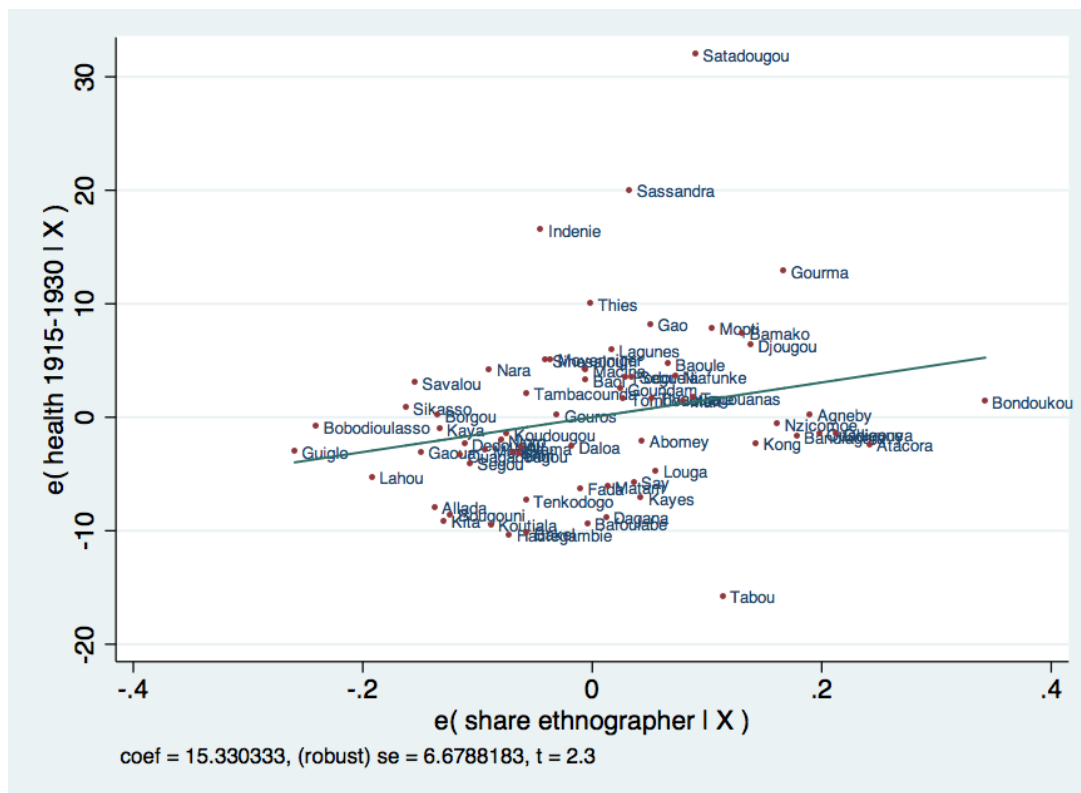
Figure 6: Fitted values from the linear regression of Health investment on the share of Ethnographer administrators with full set of controls.

*Notes:* Huber-White standard errors robust to heteroscedasticity. An observation is a district as of 1925 delimitation. Former trade counters excluded. Dependent variable: Average number of Medical staff per 100,000 hbt, 1915-1930. Regressor of interest: Share of ethnographer administrator during the first 10 year. Geographical, pre-colonial and colonial conquest control variables included
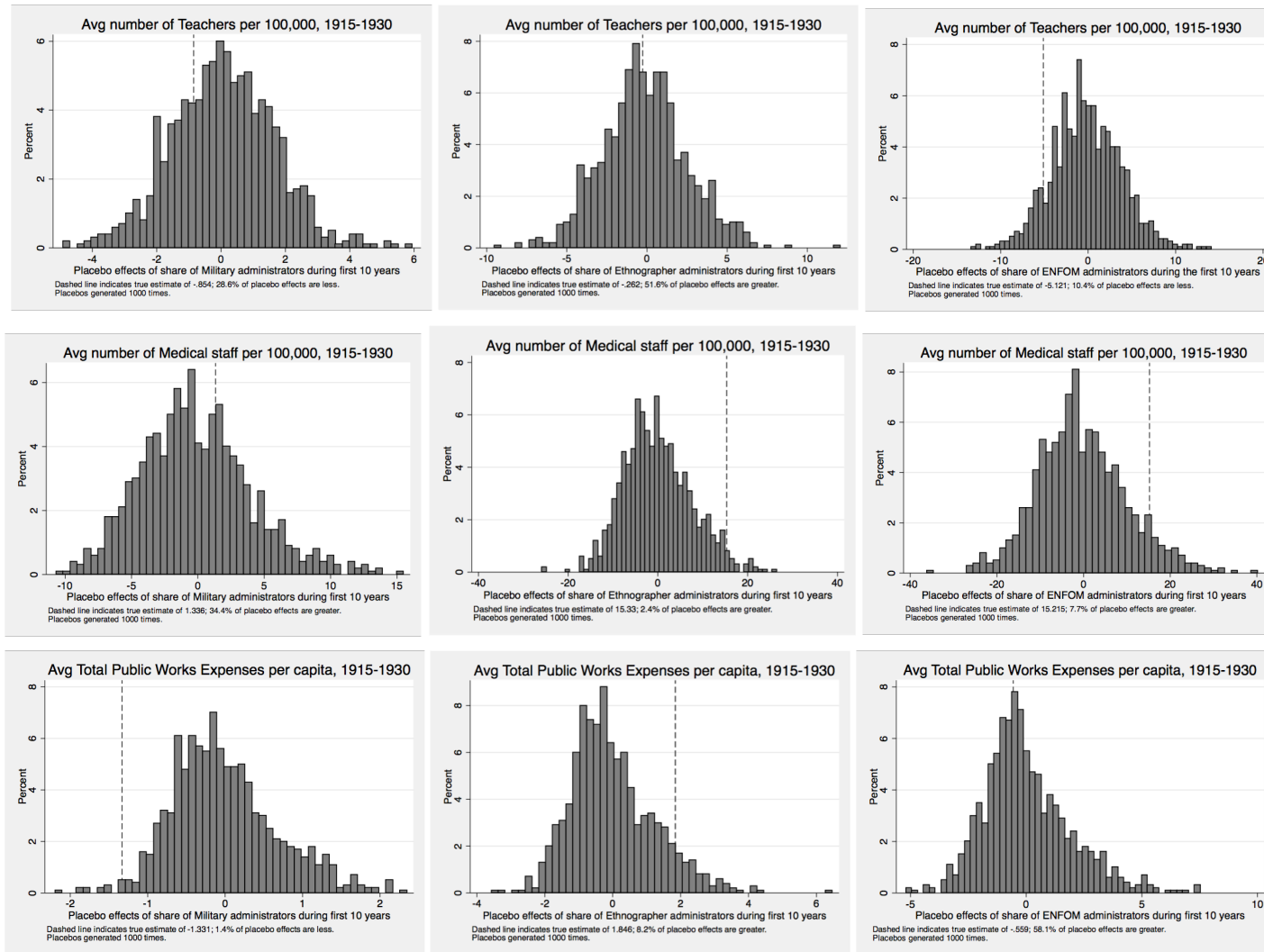
Figure 7: Placebo test of permutation based p-values

Table 1: Summary statistics: Share of administrator type

|  | mean | se | min | p25 | p75 | max |
|---|---|---|---|---|---|---|
| ENFOM | .0917735 |  | 0 | 0 | .1484375 | .5688623 |
| Ethnographer | .1112572 |  | 0 | 0 | .204918 | .6544118 |
| Military | .2219479 |  | 0 | 0 | .3577982 | 1 |
| Observations |  |  | 82 |  |  |  |

*Notes:* An observation is a district.

Former trade counters and districts starting after 1906 excluded.

Variables are the share of administrator type during the first 10 years of a district.

Table 1b : Summary statistics: Distribution of administrator types

|  | (1) Baseline | | (2) With interim | | (3) 1885 - 1905 | | (4) 1906 - 1932 | |
|---|---|---|---|---|---|---|---|---|
|  | Count | Freq | Count | Freq | Count | Freq | Count | Freq |
| Interim |  |  | 154 | .143 |  |  |  |  |
| Military | 213 | .230 | 235 | .218 | 70 | .247 | 159 | .205 |
| Ethnographer | 42 | .045 | 44 | .041 | 21 | .074 | 35 | .045 |
| ENFOM, all | 117 | .126 | 153 | .142 | 17 | .060 | 115 | .148 |
| ENFOM, external only | 75 | .081 | 81 | .075 | 17 | .060 | 73 | .094 |
| Observations | 925 |  | 1079 |  | 283 |  | 776 |  |

Table 2: Summary statistics: District

|  | mean | min | p25 | p75 | max |
|---|---|---|---|---|---|
| Length district (year) | 34.7 | 14 | 31 | 38 | 48 |
| # transitions in district | 41 | 11 | 30 | 47 | 128 |
| Duration spell (month) | 12.4 | 0 | 4 | 18 | 113 |
| Duration spell w/o interim | 14.4 | 1 | 6 | 21 | 113 |
| Month admin in district w/o interim | 22.12 | 1 | 8 | 30 | 121 |
| # Admin in district w/o interim | 27.1 | 8 | 20 | 31 | 79 |
| N district 1925 | 94 |  |  |  |  |

Table 3: Summary statistics: Extrapolation

|  | Baseline | | With interim | |
|---|---|---|---|---|
|  | Count | % | Count | % |
| Benign extrapolation | 761 | 24.0% | 916 | 23.7% |
| Uncertain month | 65 | 2.05% | 78 | 2.02% |
| Uncertain year | 44 | 1.39% | 46 | 1.19% |
| Interim extrapolated | 20 | 0.632% | 89 | 2.31% |
| Serious uncertainties | 11 | 0.347% | 15 | 0.389% |
| Duration missing spell (months) | 818 | 2.09% | 876 | 2.24% |
| N transitions | 3167 | | 3861 | |

Table 4: Summary statistics: District

|  | mean | se | min | max |
|---|---|---|---|---|
| Baseline | 14.4 | 10.9 | 1 | 113 |
| With interim | 12.4 | 10.9 | 0 | 113 |
| Military | 14.4 | 10.9 | 1 | 113 |
| Ethnographer | 14.9 | 11.3 | 1 | 55 |
| ENFOM | 15.9 | 11.6 | 1 | 72 |
| ENFOM, ext. only | 16.7 | 12.1 | 1 | 72 |
| 1885 - 1905 | 14.2 | 11.8 | 1 | 113 |
| 1906 - 1932 | 14.4 | 10.6 | 1 | 72 |

Table 5: Share of administrator types and correlates with district characteristics

|  | (1) ENFOM | (2) Ethnographer | (3) Military |
|---|---|---|---|
| Latitude | -0.0122 | -0.0373* | 0.0186 |
|  | (0.184) | (0.015) | (0.258) |
| Longitude | -0.00392 | -0.00297 | 0.0139* |
|  | (0.335) | (0.670) | (0.048) |
| Altitude (ft) | -0.0000635 | 0.0000891+ | 0.0000950 |
|  | (0.137) | (0.051) | (0.157) |
| Annual rainfalls, avg. 1915-1975 (mm) | -0.00000488 | -0.0000264 | 0.0000186 |
|  | (0.849) | (0.712) | (0.702) |
| Indicator of access to sea | 0.0100 | -0.0834 | -0.0920 |
|  | (0.743) | (0.160) | (0.192) |
| Surface area (km2) | -0.000000298* | 5.24e-09 | 0.000000847* |
|  | (0.050) | (0.972) | (0.030) |
| Indicator of pre-colonial state | 0.0279 | 0.000164 | -0.0662 |
|  | (0.369) | (0.997) | (0.182) |
| Year first administrator | 0.00633 | -0.0131+ | -0.0270** |
|  | (0.170) | (0.076) | (0.002) |
| Indicator of navigable river | -0.0351 | 0.0195 | 0.0976+ |
|  | (0.316) | (0.609) | (0.099) |
| Distance to coast (km) | 0.000170 | 0.000123 | -0.000176 |
|  | (0.392) | (0.651) | (0.577) |
| Distance to nearest port (km) | 0.0000574 | 0.0000585 | 0.000519+ |
|  | (0.772) | (0.842) | (0.082) |
| Years of resistances to colonial conquest | 0.000390 | 0.000650 | 0.00129 |
|  | (0.859) | (0.797) | (0.644) |
| Year of last military intervention | -0.00108 | -0.000773 | 0.00518* |
|  | (0.548) | (0.721) | (0.021) |
| Observations | 85 | 82 | 82 |
| $R^2$ | 0.277 | 0.260 | 0.563 |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are the share of administrator types during the first 10 years using duration of spells.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Share of ENFOM administrators and Educational investments

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| ENFOM | -11.1** | -6.48* | -2.82 | -5.12$^+$ |
| | (0.002) | (0.027) | (0.366) | (0.066) |
| Latitude | | -0.97*** | -1.20** | -0.93** |
| | | (0.000) | (0.002) | (0.003) |
| Longitude | | -0.33* | -0.050 | -0.24$^+$ |
| | | (0.011) | (0.867) | (0.094) |
| Altitude (ft) | | -0.0015$^+$ | -0.00098 | -0.00087 |
| | | (0.067) | (0.311) | (0.347) |
| Annual rainfalls, avg. 1915-1975 (mm) | | -0.0050*** | -0.0044** | -0.0054*** |
| | | (0.000) | (0.008) | (0.001) |
| Indicator of access to sea | | 7.06** | 8.08** | 7.12* |
| | | (0.008) | (0.006) | (0.014) |
| Surface area (km2) | | 0.000016$^+$ | 0.000021*** | 0.000022*** |
| | | (0.058) | (0.000) | (0.001) |
| Indicator of pre-colonial state | | 0.56 | 0.32 | 0.10 |
| | | (0.498) | (0.683) | (0.894) |
| First civil year | | 0.18 | 0.34$^+$ | 0.27$^+$ |
| | | (0.214) | (0.065) | (0.092) |
| Indicator of navigable river | | | 0.83 | 0.60 |
| | | | (0.413) | (0.536) |
| Distance to coast (km) | | | 0.0083 | 0.0021 |
| | | | (0.267) | (0.761) |
| Distance to nearest port (km) | | | -0.0083 | -0.0051 |
| | | | (0.292) | (0.508) |
| Length resistances to colonial conquest | | | 0.041 | 0.032 |
| | | | (0.553) | (0.627) |
| Year of last military intervention | | | -0.070 | -0.087 |
| | | | (0.296) | (0.197) |
| Observations | 82 | 82 | 82 | 82 |
| $R^2$ | 0.076 | 0.493 | 0.584 | 0.540 |
| Country FE | No | No | Yes | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variable: Average number of Teacher per 100,000 people, 1915-1930

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Share of ENFOM administrators and Health investments

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Share ENFOM administrators first 10 years | 5.22 | 11.8 | 10.6 | 15.2 |
| | (0.746) | (0.435) | (0.400) | (0.251) |
| Latitude | | 1.06 | 2.13 | -0.081 |
| | | (0.385) | (0.141) | (0.933) |
| Longitude | | -0.059 | 0.63 | -0.0038 |
| | | (0.852) | (0.365) | (0.992) |
| Altitude (ft) | | -0.0050 | -0.0039 | -0.0035 |
| | | (0.306) | (0.367) | (0.357) |
| Annual rainfalls, avg. 1915-1975 (mm) | | 0.012 | $0.020^+$ | 0.015 |
| | | (0.306) | (0.054) | (0.141) |
| Indicator of access to sea | | 6.99 | $9.91^*$ | $10.6^*$ |
| | | (0.117) | (0.038) | (0.014) |
| Surface area (km2) | | 0.000017 | 0.000021 | $0.000030^*$ |
| | | (0.207) | (0.103) | (0.032) |
| Indicator of pre-colonial state | | -0.52 | -0.54 | -1.52 |
| | | (0.784) | (0.808) | (0.527) |
| Year first administrator | | -0.067 | -0.60 | -0.37 |
| | | (0.824) | (0.179) | (0.382) |
| Indicator of navigable river | | | -0.56 | -0.72 |
| | | | (0.851) | (0.784) |
| Distance to coast (km) | | | $0.052^*$ | $0.053^*$ |
| | | | (0.038) | (0.036) |
| Distance to nearest port (km) | | | $-0.053^*$ | $-0.045^+$ |
| | | | (0.039) | (0.083) |
| Years of resistances to colonial conquest | | | $0.40^+$ | $0.38^+$ |
| | | | (0.096) | (0.090) |
| Year of last military intervention | | | -0.30 | -0.29 |
| | | | (0.183) | (0.162) |
| Observations | 68 | 68 | 68 | 68 |
| $R^2$ | 0.005 | 0.256 | 0.496 | 0.430 |
| Country FE | No | No | Yes | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

 Dependent variable is the average number of Medical staff per 100,000 people over 1915-1930.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 8: Share of ENFOM administrators and Infrastructure investments

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Share ENFOM administrators first 10 years | -1.35* | -0.037 | -0.32 | -0.56 |
| | (0.033) | (0.962) | (0.725) | (0.520) |
| Latitude | | -0.066 | -0.057 | -0.049 |
| | | (0.434) | (0.799) | (0.803) |
| Longitude | | -0.031 | 0.042 | -0.0084 |
| | | (0.333) | (0.656) | (0.847) |
| Altitude (ft) | | -0.00014 | -0.00074 | -0.00045 |
| | | (0.620) | (0.256) | (0.349) |
| Annual rainfalls, avg. 1915-1975 (mm) | | 0.00062 | 0.000072 | 0.00051 |
| | | (0.118) | (0.900) | (0.236) |
| Indicator of access to sea | | -0.60 | -2.10 | -2.20 |
| | | (0.511) | (0.185) | (0.200) |
| Surface area (km2) | | 0.0000026+ | 0.000000098 | 0.00000094 |
| | | (0.095) | (0.915) | (0.254) |
| Indicator of pre-colonial state | | 0.36 | 0.21 | 0.36 |
| | | (0.293) | (0.483) | (0.301) |
| Year first administrator | | -0.078 | -0.15+ | -0.16+ |
| | | (0.237) | (0.060) | (0.073) |
| Indicator of navigable river | | | -0.68 | -0.41 |
| | | | (0.245) | (0.327) |
| Distance to coast (km) | | | -0.0065 | -0.0091 |
| | | | (0.246) | (0.152) |
| Distance to nearest port (km) | | | 0.0077 | 0.0097 |
| | | | (0.228) | (0.184) |
| Years of resistances to colonial conquest | | | 0.0059 | -0.010 |
| | | | (0.725) | (0.549) |
| Year of last military intervention | | | -0.00027 | 0.0058 |
| | | | (0.990) | (0.753) |
| Observations | 54 | 54 | 54 | 54 |
| $R^2$ | 0.017 | 0.245 | 0.465 | 0.414 |
| Country FE | No | No | Yes | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

 Dependent variable is the Total public works expenses per hbt over 1915-1930.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: Effect of other administrator characteristics: Ethnographer and Military

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure |
|---|---|---|---|---|---|---|
| Ethnographer | -0.26 | 15.3* | 1.85 | | | |
| | (0.899) | (0.026) | (0.226) | | | |
| Military | | | | -0.85 | 1.34 | -1.33 |
| | | | | (0.641) | (0.761) | (0.114) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.529 | 0.440 | 0.435 | 0.530 | 0.406 | 0.443 |
| Control | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1915-1930.

Health: average number of Medical staff per 100,000 people over 1915-1930.

Infrastructure: Total public works expenses per hbt over 1915-1930.

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: Share of Ethnographer administrators and Health investments

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Share of Ethnographer-Administrator during first 10 years | -2.46 | 13.4* | 7.20 | 15.3* |
| | (0.604) | (0.046) | (0.425) | (0.026) |
| Latitude | | 1.94 | 2.36 | 0.81 |
| | | (0.205) | (0.120) | (0.494) |
| Longitude | | 0.054 | 0.42 | 0.16 |
| | | (0.869) | (0.475) | (0.710) |
| Altitude (ft) | | -0.0090 | -0.0066 | -0.0083 |
| | | (0.188) | (0.252) | (0.112) |
| Annual rainfalls, avg. 1915-1975 (mm) | | 0.016 | $0.022^{+}$ | $0.019^{+}$ |
| | | (0.220) | (0.057) | (0.096) |
| Indicator of access to sea | | $8.68^{+}$ | 10.5* | 12.2** |
| | | (0.052) | (0.030) | (0.004) |
| Surface area (km2) | | 0.000015 | $0.000020^{+}$ | 0.000027* |
| | | (0.223) | (0.060) | (0.012) |
| Indicator of pre-colonial state | | 0.12 | 0.069 | -0.75 |
| | | (0.944) | (0.970) | (0.712) |
| Year first administrator | | 0.22 | -0.50 | -0.082 |
| | | (0.591) | (0.217) | (0.823) |
| Indicator of navigable river | | | -0.83 | -1.52 |
| | | | (0.803) | (0.598) |
| Distance to coast (km) | | | $0.050^{+}$ | 0.051* |
| | | | (0.063) | (0.038) |
| Distance to nearest port (km) | | | $-0.049^{+}$ | $-0.041^{+}$ |
| | | | (0.064) | (0.099) |
| Years of resistances to colonial conquest | | | 0.38 | $0.40^{+}$ |
| | | | (0.125) | (0.088) |
| Year of last military intervention | | | -0.29 | -0.30 |
| | | | (0.218) | (0.158) |
| Observations | 68 | 68 | 68 | 68 |
| $R^2$ | 0.002 | 0.268 | 0.490 | 0.440 |
| Country FE | No | No | Yes | No |

*p*-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Independent variables: share of Ethnographer-administrator during the first 10 years.

Dependent variable: average number of Medical staff per 100,000 people over 1915-1930.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: Robustness check: Investment Period 1910 - 1930 and administrator share during first 5 years

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -1.54 | 15.1 | 0.48 | | | | | | |
| | (0.563) | (0.209) | (0.629) | | | | | | |
| Ethnographer | | | | 1.24 | 2.78 | -0.13 | | | |
| | | | | (0.398) | (0.280) | (0.715) | | | |
| Military | | | | | | | -0.26 | -1.24 | -0.37 |
| | | | | | | | (0.818) | (0.560) | (0.209) |
| Observations | 82 | 82 | 71 | 82 | 82 | 71 | 82 | 82 | 71 |
| $R^2$ | 0.509 | 0.356 | 0.278 | 0.511 | 0.323 | 0.277 | 0.508 | 0.320 | 0.282 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1910-1930.

Health: average number of Medical staff per 100,000 people over 1910-1930.

Infrastructure: Total public works expenses per hbt over 1910-1930.

Independent variables: share of administrator types during the first 5 years.

[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$

Table 12: Robustness check: Period 1920 - 1930 and first 10 years

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -5.20[+] | 10.5 | -7.83 | | | | | | |
| | (0.085) | (0.301) | (0.458) | | | | | | |
| Ethnographer | | | | -0.59 | 14.1* | -1.10 | | | |
| | | | | (0.805) | (0.024) | (0.740) | | | |
| Military | | | | | | | -1.54 | -1.11 | -4.22 |
| | | | | | | | (0.417) | (0.793) | (0.605) |
| Observations | 82 | 68 | 22 | 82 | 68 | 22 | 82 | 68 | 22 |
| $R^2$ | 0.532 | 0.452 | 0.704 | 0.523 | 0.473 | 0.688 | 0.525 | 0.439 | 0.698 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1920-1930.

Health: average number of Medical staff per 100,000 people over 1920-1930.

Infrastructure: Total public works expenses per hbt over 1920-1930.

Independent variables: share of administrator types during the first 10 years.

[+] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13: Robustness check: Period 1920 - 1930 and share until 1920

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -1.44 | 4.18 | 5.89 | | | | | | |
| | (0.601) | (0.523) | (0.335) | | | | | | |
| Ethnographer | | | | 1.93 | 16.5* | 3.71 | | | |
| | | | | (0.566) | (0.027) | (0.620) | | | |
| Military | | | | | | | -3.74 | -0.26 | -4.51 |
| | | | | | | | (0.176) | (0.964) | (0.682) |
| Observations | 82 | 68 | 22 | 82 | 68 | 22 | 82 | 68 | 22 |
| $R^2$ | 0.524 | 0.441 | 0.722 | 0.524 | 0.466 | 0.693 | 0.535 | 0.438 | 0.692 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1920-1930.

Health: average number of Medical staff per 100,000 people over 1920-1930.

Infrastructure: Total public works expenses per hbt over 1920-1930.

Independent variables: share of administrator types from the first spell until 1920.

[+] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Robustness check: Period 1920 - 1930 and first 20 years

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| (first) fenfom3 | -1.53 | 4.23 | 6.28 | | | | | | |
| | (0.580) | (0.551) | (0.299) | | | | | | |
| (first) fethno3 | | | | -0.64 | 15.9$^*$ | 2.83 | | | |
| | | | | (0.847) | (0.036) | (0.724) | | | |
| (first) fmil3 | | | | | | | -3.70 | 0.27 | -2.44 |
| | | | | | | | (0.185) | (0.962) | (0.754) |
| Observations | 82 | 68 | 22 | 82 | 68 | 22 | 82 | 68 | 22 |
| $R^2$ | 0.524 | 0.441 | 0.730 | 0.523 | 0.462 | 0.688 | 0.533 | 0.438 | 0.687 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Independent variables: share of dministrator types during the first 20 years.

Education: average number of Teachers per 100,000 people over 1920-1930.

Health: average number of Medical staff per 100,000 people over 1920-1930.

Infrastructure: average total public works expenses per capita over 1920-1930.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 15: Robustness check: Accounting for missing spells in computation of independent variables

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -4.58$^+$ | 14.4 | -0.67 | | | | | | |
| | (0.063) | (0.255) | (0.370) | | | | | | |
| Ethnographer | | | | -0.27 | 15.1$^*$ | 1.85 | | | |
| | | | | (0.897) | (0.032) | (0.208) | | | |
| Military | | | | | | | -0.63 | 1.93 | -1.35 |
| | | | | | | | (0.734) | (0.674) | (0.116) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.538 | 0.430 | 0.415 | 0.529 | 0.439 | 0.434 | 0.529 | 0.406 | 0.443 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1915-1930.

Health: average number of Medical staff per 100,000 people over 1915-1930.

Infrastructure: Total public works expenses per hbt over 1915-1930.

Dependent variable: share of administrator type during the first 10 years plus the duration of any missing spells during this period.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 16: Robustness check: Using major administrators in districts only

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Education | Health | Infrastructure | Education | Health | Infrastructure | Education | Health | Infrastructure |
| ENFOM s | -4.24$^+$ | 9.23 | -0.22 | | | | | | |
| | (0.090) | (0.411) | (0.788) | | | | | | |
| Ethnographer | | | | 0.0053 | 15.4$^*$ | 0.86 | | | |
| | | | | (0.998) | (0.019) | (0.271) | | | |
| Military | | | | | | | -0.26 | 1.30 | -1.21 |
| | | | | | | | (0.888) | (0.773) | (0.125) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.538 | 0.417 | 0.412 | 0.528 | 0.446 | 0.421 | 0.529 | 0.406 | 0.438 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

*Robustness check:* keeping only administrators whose total duration in a 1925 district is at least equal to(non-consecutive) 12 months.

Dependent variables are Education: average number of Teachers per 100,000 people over 1915-1930.

Health: average number of Medical staff per 100,000 people over 1915-1930.

Infrastructure: Total public works expenses per hbt over 1915-1930.

Dependent variable: share of administrator type during the first 10 years.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 17: Robustness check: Excluding minor districts in district 1925 during matching procedure

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -2.61 | 18.6$^+$ | -0.41 | | | | | | |
| | (0.266) | (0.097) | (0.590) | | | | | | |
| Ethnographer | | | | -0.72 | 14.1$^*$ | 1.73 | | | |
| | | | | (0.713) | (0.031) | (0.261) | | | |
| Military | | | | | | | -1.36 | 3.29 | -1.38 |
| | | | | | | | (0.473) | (0.433) | (0.101) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.533 | 0.454 | 0.405 | 0.530 | 0.440 | 0.425 | 0.532 | 0.411 | 0.440 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

*Robustness check:* excluding minor district in district 1925 during matching procedure (military bases, small districts or with few spells).3,592 spells kept out of 3,861.

Dependent variables are Education: average number of Teachers per 100,000 people over 1915-1930.

Health: average number of Medical staff per 100,000 people over 1915-1930.

Infrastructure: Total public works expenses per hbt over 1915-1930.

Dependent variable: share of administrator type during the first 10 years.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 18: Robustness check: Without uncertain dates

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Education | Health | Infrastructure | Education | Health | Infrastructure | Education | Health | Infrastructure |
| ENFOM | -4.91 | 10.3 | -0.025 | | | | | | |
| | (0.160) | (0.237) | (0.985) | | | | | | |
| Ethnographer | | | | -0.15 | $15.0^+$ | 1.65 | | | |
| | | | | (0.956) | (0.078) | (0.259) | | | |
| Military | | | | | | | -0.89 | 1.19 | -1.14 |
| | | | | | | | (0.661) | (0.807) | (0.157) |
| $N$ | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.543 | 0.421 | 0.412 | 0.530 | 0.440 | 0.431 | 0.531 | 0.406 | 0.442 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

*Robustness Check* spells with uncertain start or end dates excluded.

228 spells dropped out of 3861 observations (185 and 3183 resp. before extended database and matching procedure for district 1925.

$^+$ $p < 0.10$, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Table 19: Robustness check: Without all extrapolation

| | (1) Education | (2) Health | (3) Infrastructure | (4) Education | (5) Health | (6) Infrastructure | (7) Education | (8) Health | (9) Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -4.97 | 11.1 | -0.64 | | | | | | |
| | (0.144) | (0.185) | (0.607) | | | | | | |
| Ethnographer | | | | -1.32 | 10.7 | 1.64 | | | |
| | | | | (0.649) | (0.171) | (0.315) | | | |
| Military | | | | | | | -0.23 | 0.68 | -0.98 |
| | | | | | | | (0.905) | (0.882) | (0.195) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.536 | 0.425 | 0.436 | 0.522 | 0.426 | 0.447 | 0.521 | 0.406 | 0.456 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

*Robustness Check:* spells with any extrapolated dates excluded.

916 spells dropped out of 3861 observations (729 and 3183 resp. before extended database and matching procedure for district 1925.

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 20: Further analysis on health investments and share of Ethnographer administrators.

| | (1)<br>Baseline | (2)<br>W/o Satadougou and Sassandra | (3)<br>With trade counters | (4)<br>Service Hygiene | (5)<br>Assistance Medicale |
|---|---|---|---|---|---|
| Ethnographer | 15.3* | 10.2* | 23.8 | 5.04 | 9.24 |
| | (0.026) | (0.041) | (0.362) | (0.318) | (0.109) |
| Observations | 68 | 66 | 76 | 47 | 60 |
| $R^2$ | 0.440 | 0.531 | 0.471 | 0.559 | 0.391 |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No |

*p*-values in parentheses

*Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district.

Independent variables: share of Ethnographer-administrator during the first 10 years.

Columns 1-3 have Dependent variable: average number of Medical staff per 100,000 people over 1915-1930.

Column 4 has Dependent variable: average number of Medical staff from Services de l'Hygiene per 100,000 people over 1915-1930.

Column 5 has Dependent variable: average number of Medical staff from Assistance Medicale per 100,000 people over 1915-1930.

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 21: Robustness check: OLS Standard Errors

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| | Education | Health | Infrastructure | Education | Health | Infrastructure | Education | Health | Infrastructure |
|---|---|---|---|---|---|---|---|---|---|
| ENFOM | -5.12 | 15.2 | -0.56 | | | | | | |
| | (0.207) | (0.131) | (0.729) | | | | | | |
| Ethnographer | | | | -0.26 | $15.3^+$ | 1.85 | | | |
| | | | | (0.925) | (0.074) | (0.213) | | | |
| Military | | | | | | | -0.85 | 1.34 | -1.33 |
| | | | | | | | (0.702) | (0.808) | (0.151) |
| Observations | 82 | 68 | 54 | 82 | 68 | 54 | 82 | 68 | 54 |
| $R^2$ | 0.540 | 0.430 | 0.414 | 0.529 | 0.440 | 0.435 | 0.530 | 0.406 | 0.443 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No | No | No |

$p$-values in parentheses

*Notes:* OLS standard errors non-robust to heteroskedasticity. An observation is a district. Former trade counters excluded.

Dependent variables are Education: average number of Teachers per 100,000 people over 1915-1930.

Health: average number of Medical staff per 100,000 people over 1915-1930.

Infrastructure: Total public works expenses per hbt over 1915-1930.

Dependent variable: share of administrator type during the first 10 years.

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 22: Persistence of the effect of the share of Ethnographers on Health investments

| | (1) 1915-1930 | (2) 1910-1928 | (3) 1910-1915 | (4) 1915-1920 | (5) 1920-1930 | (6) 1933-1956 |
|---|---|---|---|---|---|---|
| Share of Ethnographers | 15.3* | 14.6* | 5.81* | 18.3* | 14.1* | 11.0 |
| | (0.026) | (0.020) | (0.031) | (0.048) | (0.024) | (0.119) |
| Latitude | 0.81 | 0.66 | 0.23 | 2.28 | 0.64 | 1.87 |
| | (0.494) | (0.520) | (0.674) | (0.411) | (0.574) | (0.155) |
| Longitude | 0.16 | 0.16 | 0.039 | 0.33 | 0.27 | -0.059 |
| | (0.710) | (0.668) | (0.828) | (0.569) | (0.502) | (0.885) |
| Altitude (ft) | -0.0083 | -0.0079 | -0.0014 | -0.0090 | -0.0078$^+$ | -0.019** |
| | (0.112) | (0.107) | (0.535) | (0.201) | (0.094) | (0.006) |
| Annual rainfalls, avg. 1915-1975 (mm) | 0.019$^+$ | 0.018$^+$ | 0.0010 | 0.030$^+$ | 0.017 | 0.030* |
| | (0.096) | (0.097) | (0.810) | (0.074) | (0.102) | (0.023) |
| Indicator of access to sea | 12.2** | 10.7** | 8.44** | 11.7$^+$ | 12.2** | 23.5* |
| | (0.004) | (0.002) | (0.007) | (0.075) | (0.008) | (0.021) |
| Superficy (km2) | 0.000027* | 0.000021* | 0.0000079$^+$ | 0.000013 | 0.000037*** | 0.000043* |
| | (0.012) | (0.027) | (0.051) | (0.382) | (0.000) | (0.016) |
| Indicator of pre-colonial state | -0.75 | -1.25 | -1.26 | 0.57 | -1.44 | -1.91 |
| | (0.712) | (0.482) | (0.155) | (0.828) | (0.422) | (0.408) |
| Year first administrator | -0.082 | -0.098 | -0.098 | -0.81 | -0.072 | 0.14 |
| | (0.823) | (0.760) | (0.527) | (0.237) | (0.820) | (0.760) |
| Indicator of navigable river | -1.52 | -1.24 | 1.05 | -0.42 | -1.88 | 5.76* |
| | (0.598) | (0.645) | (0.233) | (0.926) | (0.449) | (0.046) |
| Distance to coast (km) | 0.051* | 0.049* | 0.0010 | 0.069* | 0.047* | 0.051 |
| | (0.038) | (0.028) | (0.920) | (0.046) | (0.034) | (0.193) |
| Distance to nearest port (km) | -0.041$^+$ | -0.038$^+$ | -0.0045 | -0.056$^+$ | -0.041$^+$ | -0.051 |
| | (0.099) | (0.087) | (0.712) | (0.064) | (0.082) | (0.192) |
| Years of resistances to colonial conquest | 0.40$^+$ | 0.38 | -0.084 | 0.63 | 0.33$^+$ | -0.067 |
| | (0.088) | (0.102) | (0.181) | (0.132) | (0.062) | (0.717) |
| Year of last military intervention | -0.30 | -0.30 | 0.038 | -0.48 | -0.28 | 0.25 |
| | (0.158) | (0.154) | (0.593) | (0.214) | (0.102) | (0.244) |
| Observations | 68 | 68 | 68 | 57 | 68 | 68 |
| $R^2$ | 0.440 | 0.432 | 0.566 | 0.437 | 0.473 | 0.640 |
| Country FE | No | No | No | No | No | No |

$p$-values in parentheses. *Notes:* Huber-White standard errors robust to heteroskedasticity. An observation is a district.

Former trade counters excluded. Sample size includes only districts with at least one value of number of medical staff over 1915-1930 and 1933-1956.

Independent variable: Share of Ethnographer-administrator during the first 10 years.

Dependent variable: Avg number of Medical staff per 100,000 hbt, see header for period.$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$