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▶ **To cite this version:**

Elise Huillery. The Impact of European Settlement within French West Africa. Journal of African Economies, 2010, pp.1-49. hal-01023805

HAL Id: hal-01023805

https://sciencespo.hal.science/hal-01023805

Submitted on 15 Jul 2014

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Journal of African Economies Advance Access published October 27, 2010

Journal of African Economies, pp. 1–49
doi:10.1093/jae/ejq030

The Impact of European Settlement within French West Africa: Did Pre-colonial Prosperous Areas Fall Behind?

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Abstract

Did colonisation change the distribution of prosperity within French-speaking West Africa? Using a new database on both pre-colonial and colonial contexts, this paper gives evidence that Europeans tended to settle in more prosperous pre-colonial areas and that the European settlement had a strong positive impact on current outcomes, even in an extractive colonial context, resulting in a positive relationship between pre- and post-colonial performances. I argue that the African hostility towards colonial power to colonisation provides a random variation in European settlement since it damaged the profitability of colonial activities and dissuaded Europeans from settling, but does not have a direct effect on current outcomes. Rich and hostile areas received less European settlers than they would have received had they not been so hostile, resulting in lower current performances partly due to lower colonial investments. Despite the absence of a 'reversal of fortune' within former French West Africa, some of the most prosperous pre-colonial areas lost their advantage because of their hostility: other areas caught up and became the new leaders in the region.

JEL classification: N37, O11, P16

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1. Introduction

At the worldwide level, the former colonies that were relatively rich in the year 1500 are now relatively poor. This evidence has been documented by Acemoglu *et al.* (2002), who point out what they call a 'reversal of fortune'. They explain this reversal by two separate features. First, Europeans were more likely to settle in regions that were previously poor because poor regions were sparsely populated, enabling Europeans to settle in large numbers. Second, the impact of these European settlements on former colonies' development path has been positive through the introduction of institutions encouraging investments (Acemoglu *et al.*, 2001). In regions that were not suitable for heavy settlement, Europeans set up 'extractive states' with little protection of private property and little checks and balances against government expropriation. At the other extreme, in regions where many Europeans settled, the settlers replicated European institutions with a strong emphasis on private property and checks against government power. The positive impact of colonialism on current growth performance has also been recently documented by Feyrer and Sacerdote (2009). Using a new database of islands throughout the Atlantic, Pacific and Indian Oceans, this paper finds a causal positive relationship between the number of years spent as a European colony and the current GDP per capita among islands that were colonised during the Age of Discovery. They argue that this positive relationship is due in part to the quality of government and rise in human capital. Both of these papers therefore underline the positive role of European settlement: the more settlers during colonial times, the better economic performance today. Yet there is still a debate on where this result comes from. Acemoglu *et al.* (2001, 2002) focus on the positive impact of heavy settlement on formal institutions, whereas Feyrer and Sacerdote (2009) also recognise the potential additional role of settlers on human capital through the introduction of formal schooling and the direct importation of human capital in the form of the settlers themselves. Glaeser *et al.* (2004) revisit the debate over whether political institutions cause economic growth and document that human capital is a more basic source of growth than are the institutions.

The motivation of this paper is to examine whether European settlement exhibited a positive impact and created a change in the distribution of wealth among 'extractive colonies'—where colonisers pursued a strategy of resources extraction. I focus on former French West Africa, a federation of 'extractive' colonies dominated by France from 1895 to 1960. As stated in Acemoglu *et al.* (2001, 2002), Europeans should have settled in more

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prosperous pre-colonial areas, consistently with the extractive policy and the search for large natural resources and labour supply. Besides, under the institutional hypothesis, European settlement should have had a negative impact on long-term development, since colonisers set up poorly functioning institutions in these colonies: relatively prosperous areas made extractive institutions more profitable for the colonisers. For example, forcing the native population to work in mines or plantations limited the benefit of the rent to a small portion of the society. This led to a specific organisation of society where there were poor incentives for investment, insecure property rights, poor administration of justice, etc. Under the institutional hypothesis, the global impact of European settlement on current prosperity should therefore result in a reversal of fortune among extractive colonies. But if the effect of European settlement runs through mechanisms such as human capital, one may expect the regions where more Europeans settled within extractive colonies to outperform those where few Europeans settled, resulting in a reinforcement of initial inequalities. This paper takes advantage of empirical evidence on former French West Africa to test these converse, though non-exclusive, hypotheses.

The paper uses a first-hand district-level data set that matches direct and precise historical data with current data. Colonial and pre-colonial data were collected from historical archives in Paris and Dakar, whereas recent data come from national household surveys from the current former colonies gathered in 1995 (approximately). My main empirical issue though is selection: why did Europeans settle intensely in certain areas? As Europeans were more likely to settle in economically more developed districts, the naïve estimates of the effect of European settlement on economic development might be upwardly biased. I pursue two strategies to better document the causal relationship between European settlement and current outcomes.

First, I focus on a limited geographical area. To date, the macroeconomic literature on institutions and development has largely relied on cross-country regression evidence. Faced with the statistical challenge of isolating causal pathways, the use of cross-country variables tends to derive instruments from persistent features of a country environment and limits their usefulness for studying institutional change (Pande and Udry, 2005). Following Banerjee and Iyer (2005) and Iyer (2005), this paper uses variations between infra-national districts, which is advantageous with regard to the identification of European settlement influence. Former French West Africa is much more homogeneous with respect to its pre-colonial and colonial context than all other former colonies, in particular with respect to geography, anthropology, pre-colonial history, the coloniser

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identity and the period and length of colonial times. The observed controls therefore capture a much larger part of the variation between districts than they usually do between countries all over the world.

Second, I pursue an instrumentation strategy to better understand the causal relationship between European settlement and current performance. The instrument is the hostility towards colonial power expressed in the early colonial period after conquest (1906–20) measured by acts of protest like strikes, riots or religious movements, refusal to apply colonial rules, to pay taxes, to enrol in forced labour or military recruitment, etc. These manifestations of hostility were likely to mitigate most of the profitability of colonial activities and to dissuade Europeans from settling. However, one issue is that hostility may reflect heterogeneity across districts directly correlated with current outcomes. As evidence shows, hostility actually tended to be higher in more prosperous and more socially and politically cohesive areas. But the evidence on hostile areas strongly supports the fact that hostility was also largely accidental. Conditional on the observable characteristics that capture most of the endogenous part of hostility, I therefore argue that hostility is a good instrument for European settlement. Furthermore, one may be reassured on the validity of my basic results by the fact that this strategy is likely to produce downwardly biased estimates of the effect of European settlement on current performance since there is clear evidence that the areas which tended to select into hostility towards colonial power were the most able to advance economically to modern age.

My central findings are, first, that the general European preference was to settle in more prosperous pre-colonial areas, though political factors disturbed this general pattern: the preference towards prosperous areas was sometimes discouraged by the existing hostility towards colonial power. Indeed, when hostility was severe in a prosperous area, Europeans preferred to settle in a calmer neighbouring area, even if it was less prosperous. Second, European settlement had a positive influence on current performances even among extractive colonies: colonised areas that received more European settlers have performed better than colonised areas that received less Europeans settlers. I strongly claim that these results do not mean that colonisation, *per se*, was a positive experience, since I do not compare colonised versus non-colonised areas.[1] Results only show that in the case of being colonised, the more settlers the better, even among extractive

[1] It is worth noting that the positive impact of European settlement on current performance holds within colonial areas only. It is highly plausible that no colonisation whatsoever would have produced better current performance on the whole.

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colonies. Additionally, these findings do not refute the 'institutional hypothesis' *per se* but highlight the positive role of settlers on human and physical capital: the negative impact of settlers on institutions was locally overwhelmed by their positive impact on capital investment.

As a consequence, the distribution of prosperity within former French West Africa did not reverse. Among politically friendly areas, European colonisation indeed reinforced pre-colonial inequalities by settling in more prosperous areas. However, among West African areas that were relatively prosperous at the end of the nineteenth century, some are no longer more developed than the rest of the region today because they expressed more hostility towards colonial power in early colonial times and dissuaded Europeans from settling. As a result, these areas lost their relative advantage in the long run while other areas, less hostile towards colonial power, became the new leaders in the region.

With respect to the existing literature, this paper innovates in four ways. First, it highlights the role of the African attitude towards colonialism in colonisation features. Second, the paper extends the positive role of European settlement within an 'extractive strategy' area. Third, it disentangles the two main channels of the positive effect of European settlement: institutions and capital (human and physical). Fourth, the paper documents the evolution of prosperity distribution within former French West Africa since 1900.

The paper is structured as follows. Section 1 provides a description of the pre-colonial context. Section 2 analyses the determinants of European settlement during colonial times. Section 3 measures the impact of European settlement on current performance. Section 4 explores some explanations of the positive impact of European settlement on current performance. Section 5 documents the change in prosperity distribution within former French West Africa. Section 6 concludes.

2. The European settlement in French West Africa

2.1 Historical introduction

The decade of the 1880s was a major turning point in African history. It brought most of the continent rapidly and brutally into the colonial period. But the colonial conquest was far more slow-acting than often presented: the French military push began in 1854 from the Senegalese coasts to upper Senegal, driven by the famous General Faidherbe. The first military expansion went east from the Senegalese coast and arrived at the west side of current Mali (Kayes, Satadougou) in the late 1850s. Until 1880,

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colonial military campaigns had been limited to coastal incursions in current Senegal, Mauritania, Guinea and South Benin. The process amplified in the 1880s with a west-to-east progress from Senegal to the northern Gold Coast, joined by south-to-north incursions from coastal posts in Cote-d'Ivoire (Ivory Coast). In the 1890s, a last military force progressed west to east from the south-east side of current Mali as far as Lake Tchad, joined by a column progressing south to north from current Benin.

Paper annexation, however, was the only framework for French colonial West Africa. The reality drew far more heavily on the actual process of conquest. French West Africa was officially created in 1895 and abolished in 1960. There were no drastic modifications for local people before 1900–10 except in few coastal localities. Local chiefs' prerogatives in particular were still intact in general; their military obedience was embodied by friendship treaties only.[2] The physical occupation of the whole territory was thus not yet effective when French West Africa, a federation of height colonies, was officially created in 1904. Colonial administrative reports give evidence that the effective direct administration of the large and populous territories began in the first decade of the twentieth century, as civil administrators progressively replaced military forces. The colonial occupation was therefore effectively in control of the major part of the territory from approximately 1910 to 1960.

2.2 The West African context

West Africa is like a peninsula attached to the mass of Sub-Saharan Africa at the Cameroon mountains and stretching westward between the Gulf of Guinea and the Sahara. It is characterised by typical longitudinal layers of climate. Beginning with the Sahara, the sequence is desert, savannah, forest. A physical explanation for differing natural vegetation is the difference in annual rainfall.

At the beginning of the twentieth century, French West Africa was a vast territory of 4,800,000 km^2, scarcely inhabited by a population of around 12,000,000 people.[3] Population density was therefore very low (2.5 people per square kilometre). West Africa was mostly rural and towns

[2] Yet hostile chiefs suffered from French military repression: French military forces defeated and killed Lat Joor of Kajoor in 1886, pursued Mamadu Lamin to his death in 1887, exiled Samori Ture to Gabon in 1898, where he died 2 years later, among others (Ki-Zerbo, 1978).

[3] I calculated the French West African population in 1910 using the censuses made by French districts' administrators between 1906 and 1912. These censuses are available at

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were scarce and small. Colonial censuses of the 1900s report that the five biggest towns were Saint-Louis (about 24,000 people), Dakar (18,400), Rufisque (12,500), Conakry (8,200) and Cotonou (4,400). Most people in West Africa were farmers. As documented in Curtin *et al.* (1995), fishing along the coast and rivers was an intensive and specialised occupation. Dry-season hunting was a major source of meat in the savannah and forest alike. People mined rock salt in the Sahara and evaporated sea salt along the coast. Iron was found almost everywhere in West Africa, but some regions with the best ore became iron centres and sold their iron to other regions that were less well endowed. Other regions concentrated on cotton and cotton textiles or on sheep breeding and woollen cloth.

As a result, regular patterns of internal north–south trade helped in the exchange of surplus from one region to another. Trade, in turn, encouraged the growth of small towns, some near the desert-edge, to profit from the trans-Saharan trade, like Timbuktu, Agadez, Gao and Oualata. Others towns, located well away from the desert, like Jenne, Bobo-Dioulasso, Kankan and Borgou, profited from the transit along commercial routes between the savannah and the forest. Curtin *et al.* (1995, p.325) write that in the nineteenth century 'internal trade was still far more important than trade with the world overseas, as it had been in the period of slave trade'. Islam was the religion of commerce and was highly prevalent in ethnic groups with strong commercial ties like the Juula. The West African political context changed before the colonial period because of what Curtin calls a 'religious revolution'. From 1780 to 1880, preachers and moral leaders often called for jihad, resulting in a substitution of new rulers for old and new large states for the former small states, and a substantial spread of Islam (Sellier, 2003). Many West African states are therefore officially related to Islam.

How were politics organised? At one extreme, full-time rulers claimed authority over every individual within a defined territory. These were clearly states, also called kingdoms or empires. At the other, authority was so dispersed that no rulers could be identified. Stateless societies could work in many different ways, but the key building block was usually the lineage. That is why African anthropologists often call them 'lineage-based societies', or 'decentralised societies', 'segmentary societies'

the Archives Nationales, Paris, Fonds Afrique Occidentale Française, série G, sous-série 22.

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and 'autonomous local systems' (Barrett, 1967; Murdock, 1967; Mitchell and Paden, 1989; Morrison *et al.*, 1989). State and stateless societies have existed side by side for over nearly two millennia 'without stateless people feeling a need to copy the institutions of their more organized neighbours' (Curtin *et al.*, 1995). Between these two extremes cases, these African anthropologists identify a third category which corresponds to chiefdoms and city-states, which were smaller political units than kingdoms. They also claim that political structure should not be associated with the size of society: some African states were very small and some stateless societies were very large.

2.3 The allocation of European settlers over French West Africa

Overall, European settlers were not numerous in French West Africa compared with other settlement colonies like Algeria for France or Australia for the UK. Curtin (1964) documents how early expectations for settlement in West Africa were dashed by very high mortality among early settlers. Thereafter, colonial policy was driven in part by an element of superpower rivalry and by economic motives. Davis and Huttenback (1987, p. 307) write that 'the colonial Empire provides strong evidence for the belief that government was attuned to the interests of business and willing to divert resources to ends that the business community would have found profitable.' Europeans settlers in French West Africa can be categorised in two groups: the civil servants on the one hand, and workers in the private sector on the second hand. The French colonial budgets show that few settlers were involved in the public sector: first French colonial governors, administrators, assistants and secretaries. In the education and health sectors appear French teachers, school inspectors, doctors and nurses. Finally, the public sector also counted French technical staff helping in *mise en valeur* and state-led infrastructure development: agricultural engineers, civil engineers and construction engineers. On the private sector side, Coquery-Vidrovitch (1973) and Marseille (1973), who both study French private investments in colonial Africa, report that most businesses in French West Africa were import–export companies. Most of the European settlers working in the private sector were therefore traders and employees of trade companies. According to the evidence brought by these two historians, there were also some planters and men working in the construction industry, and, though only few, manufacturers.

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What explains the differences in European settlement over French West Africa? This is a key question since the paper aims to document the effect of European settlement on the distribution of wealth within the region. We could expect Europeans to prefer pre-colonial prosperous areas since the region was under an extractive colonial strategy. Export crops like peanuts or cocoa developed rapidly since the end of the nineteenth century. Infrastructures had to be built to move crops to the river ports or to the coast. Profitability of extraction was likely to be higher in prosperous areas because dense populations provided a supply of labour that could produce goods to trade with and also be forced to work in plantations and public works. Curtin *et al.* (1995, p. 447) write that 'European capital was invested where exploitable resources promised the most extractive returns.' Planners were likely to pursue policies to capture production that could be channelled into exports in exchange of metropolitan products—system known as *économie de traite* and typical of French West Africa. Europeans were therefore expected to settle in densely populated areas as well as in trading posts for trade activities.[4]

But initial prosperity was not the only factor influencing European settlement: politics were also key in making extraction profitable. On the one hand, well-structured societies could have attracted European settlers by providing them an existing system of taxation, an administration and also a tribute to rely on. Following the results of Gennaioli and Rainer (2007), the profitability of European investments could be higher in states rather than in stateless societies by increasing the accountability of local chiefs and accelerating the implementation of colonial rule. Resistance could also be high in stateless societies: the French actually had to force the surrender of each individual kinship segment. But on the other hand, existing African authorities in politically well-organised societies were more likely to interfere with colonial extraction. Despite European military superiority, Africans were however able to resist, especially in socially coherent and well-organised societies. Curtin *et al.* (1995, p. 514) say that '(primary resistance) was usually organized by the pre-colonial states.' Acts of protest, like strikes, riots or religious movements, were likely to be stronger in societies that have good characteristics for 'collective action', broadly political, cultural, ethnic or religious homogeneity. Curtin *et al.* (1995, p. 515) write, for instance, that

[4] The situation of Equatorial Africa was a bit different because Europeans developed mining activities in areas that could be sparsely developed, depending on mining resource discovery. But colonial extraction in West Africa focused on agriculture (there was very little mining extraction on the French part of West Africa) and was therefore likely to take place in pre-colonial and densely populated areas.

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'a common religion was one source of unity (. . .) colonial officials therefore paid careful attention to Islam as a potentially unifying force.' Even after conquest and pacification were done, district administrators assigned an important part of their annual reports to problems related to hostility since it had important consequences for the everyday life and management of the districts: popular discontent, riots or opposition from the local chiefs prevented administrators to implement colonial authority and projects. The participation of local people was necessary for many colonial public or private activities like trade, agriculture or public works. Moreover, difficulties in collecting taxes or in recruiting civil servants directly affected the material resources of the colonial administration. Hostility was therefore a crucial issue for European settlers and for the colonial administration.

As a result, because they pursued an extractive strategy in the region, Europeans were likely to prefer prosperous areas unless hostility lessens the profitability of colonisation. That is why I expect hostility to be especially important for settlement in prosperous areas—more than in poor areas where Europeans would not have settled anyway.

3. Data and summary statistics

Lack of data for early times is even more problematic at the district than at the national level. Historical data used in the paper are original. The total number of districts is 110 (Figure 1).[5]

3.1 Data on district initial prosperity and political development

The main variable that I use to capture initial economic prosperity is the density of population. As documented by Malthus (1798) and Bairoch (1988), only prosperous areas could support high population densities. From a Malthusian point of view, more natural resources and agrarian prosperity are necessary to maintain a higher population density. This measure is appropriate in the case of rural societies like late-nineteenth-century West Africa (not in the case of modern industrialised societies). I collected data on local populations from colonial censuses and land area from colonial maps at the district level, and calculated population density by dividing total population by land

[5] I exclude Dakar and Saint-Louis from the sample since there are no data on political climate in these two particular districts.

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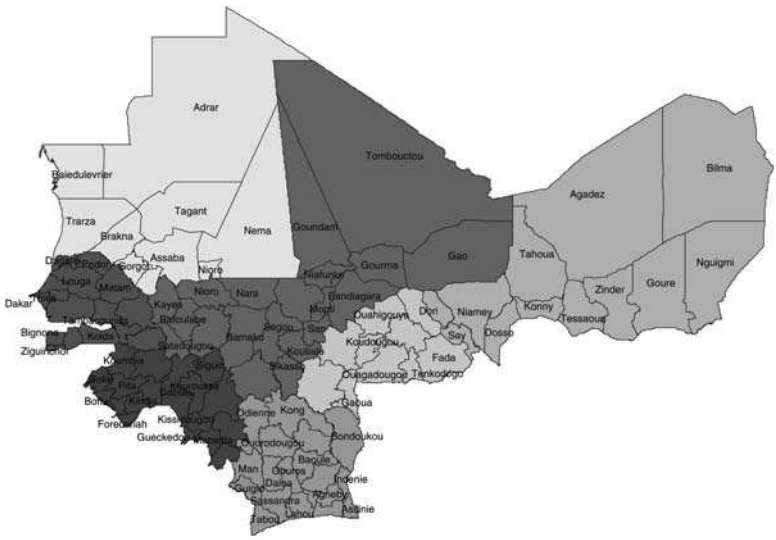


Figure 1: 1925 Territorial Organisation of the French West Africa: Colonies and Districts

area.[6] The earliest measure I can use is the population density in 1910, at the beginning of the effective French colonial occupation. The year 1910 is early enough to ensure that no massive population movements caused by the colonial experience took place yet. Figure 2 reports the distribution of population density in 1910. The most densely populated areas were the southern region of what is currently Benin, the Mossi land in current Upper Volta, the Wolof region in the western region of what is currently Senegal and the Fuuta Jaalo in what is present-day, central-west Guinea. But unfortunately, population density imperfectly captures the level of prosperity of the southern Saharan belt districts which are mainly composed of desert. Their area is therefore disproportionally huge compared with population, resulting in an almost nil population density: average 1910 population density is 0.55 in desert-edge districts and 9.75 in other districts (*t*-statistic of the hypothesis of mean equality: 2.1). However,

[6] It is more usual to divide total population by arable area but there are two reasons as to why I do not use arable area: (i) a methodological reason that some districts are completely in the desert so their arable land is zero and (ii) a pragmatic reason that except for the desert-edge districts, arable land and total land are equal: our measure of land area excludes inland water and FAO data show that the remaining land is arable (the map is available at http://www.fao.org/farmingsystems/FarmingMaps/SSA/12/AL/map/m10000.html). Using total land or arable land therefore does not change anything except for the desert-edge areas.

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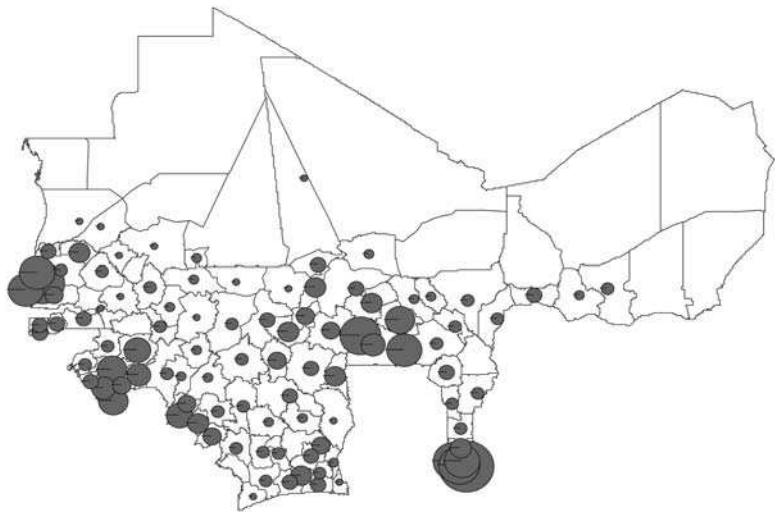


Figure 2: 1910 Population Density. *Source*: Author's computations based on colonial censuses, Archives Nationales, Paris.

some desert-edge cities prospered in the fifteenth and sixteenth centuries from the dynamic trans-Saharan trade[7]. Even if the Fulani jihads of the mid-nineteenth century and the civil wars that followed caused a serious decline of these desert-edge areas, the quasi-nil population density is not a good proximate of prosperity in these areas due to their specific geographical characteristics. I therefore include a dummy for desert-edge areas in my econometric framework in order to take into account this specificity regarding population density.

Another issue is to measure initial political development. In this paper, I follow African anthropologists and economists who have previously worked on this topic (Barrett, 1967; Murdock, 1967; Morrison *et al.*, 1989; Englebert, 2000) and distinguish three pre-colonial political statuses: kingdoms or empires, chiefdoms and completely amorphous areas. I do not use the index of state-like nature of pre-colonial systems used in Englebert (2000) because this index is at the national level. As I need more precise information at the district level, I use evidence from African historians (Ki-Zerbo, 1978; Bouche, 1991; Coquery-Vidrovitch and Moniot, 1993). The time period in which political structure is observed is 1850–80. There is a strong consensus within these historical sources on the location

[7] For a comprehensive and detailed article on the trans-Saharan trade, refer to the historian Pekka Masonen at http://www.hf-fak.uib.no/institutter/smi/paj/Masonen.html.

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of pre-colonial kingdoms, chiefdoms and amorphous areas. Completely amorphous areas,[8] characterised by a total absence of political authority, were located in the forest regions of Guinea (Toma and Guerze), in the south-western Ivorian forest (Krou), in Casamance in south-western Senegal and in Atakora in north-western Benin (Somba). Kingdoms correspond to large areas with political control concentrated in the hands of a few people, with an ability to collect revenue and tribute. Appendix B shows districts affected to the kingdom category, the name of the kingdom and the historical sources that allowed me to construct these data. A district was affected to the 'kingdom' category as soon as a kingdom existed on the main part of the area over 1850–80, based on description and maps of pre-colonial kingdoms (Sellier, 2003). Approximately half of the districts were part of kingdoms from before colonial rule, and 13 districts were part of completely amorphous areas. Pre-colonial, well-structured kingdoms had significantly higher population densities than the rest of the region: average 1910 population density is 11.1 over kingdom districts and 6 over the other districts (t-statistic of the hypothesis of mean equality: 1.8). In other words, political development and economic prosperity were positively correlated, which is consistent with Stevenson's view of higher population densities in traditional states in Sub-Saharan Africa and lower ones in the non-state regions (Stevenson, 1968).[9]

Finally, initial differences in climate can be captured by differences in latitude, longitude and rainfalls. In West Africa, it varies from 160 inches in a few places along the coast to less than 15 inches at the edge of the desert. Another factor explaining differences in natural circumstances is rivers. Certain north-flowing rivers like the Senegal and the Upper Niger provide a kind of safety valve. These rivers overflow their banks and carry both silt and moisture to the surrounding fields. Crops are planted on the wet fields as the water recedes and grown during the early dry season. I therefore constructed a dummy for the presence of navigable

[8] Amorphous areas are also called 'lineage-based societies' in Englebert (2000) or 'segmentary systems' in Murdock (1967).

[9] This can be explained as stateless societies had several problems: warfare on a large scale called for strong military command and permanent officials, traders needed a way to protect goods for transit, there was a need for a system of law allowing aliens to come and go in peace and there needed to be a system to facilitate borrowing and collection of debts. These needs could only be offered by permanent officials and central direction. A reverse causation is also plausible: densely populated areas were likely to coincide with a higher division of labour which likely required a higher level of political organisation than extensive labour organisation.

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rivers. Since altitude is also an important determinant of disease environment, I include for each district the altitude of its main town. Finally, access to the sea is a strong determinant of economic opportunities (exports, salt production, fishing along the coast). I therefore include a dummy for coastal districts. Please refer to Appendix A for more detail on data sources.

3.2 Data on European settlement

District-level data on European settlers come from colonial censuses. The number of European settlers was globally very low as in almost all extractive colonies in Africa, India and Asia (Mc Evedy and Jones, 1975; Curtin *et al.* 1995, p. 435). The African colonies where the proportion of Europeans exceeded 1% are Southern and South-Central Africa, Angola and the Maghreb (Acemoglu *et al.*, 2001). In 1910, there were a total of 7,610 Europeans living in French West Africa, which progressively increased to 13,239 in 1925 and 53,087 in 1950,[10] representing alternatively 0.6‰, 1‰ and 3‰ of French West African population. At the district level, the average number of European settlers grew up from 68 in 1910 to 118 in 1925 and 525 in 1950. But these figures mask a huge heterogeneity across districts which can be appreciated by the gap between the average number of European settlers per district and the median one: half of the districts had less than 16 settlers in 1910, 23 in 1925 and 86 in 1950.

3.3 Data on district hostility towards colonial power

I collected data on African attitudes towards French power and especially hostility at the district level. Data come from the political annual reports[11] written by the district administrators of the governor. These reports aimed to inform the governor on the political climate in each district of the colony. The district administrators therefore chronicled every political event that occurred in their district during the year: good/bad disposition of the population, riots, opposition from the local chiefs, difficulty in collecting taxes or in recruiting civil servants, refusal to do coerced labour, etc. I[12] read every report for years ending by '3', '6' and '9' from 1906 to 1956, and coded political events expressing hostility

[10] Actually, this is not the exact number of Europeans in 1950 since I used censuses from 1947 to 1953 to calculate this total, depending on data availability at the colony level.

[11] Paris, National Archives, Fonds Afrique Occidentale Française, série G, sous-série 2.

[12] Angélique Roblin also provided excellent assistance in collecting these data.

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towards colonial power. Among events expressing hostility, I distinguished expressions of severe importance when (1) it clearly showed the determination to jeopardise the colonial power—clashes with a significant group in the district, people running away to escape tax collection or the activism of religious movements, and (2) it necessitated a repressive intervention from the French administration: military repression, the destitution of a local chief, the dispatching of policemen to force people to pay taxes or enrol in coerced labour, or intervention to punish some rebellious people.

To construct a relevant measure of hostility, I focus on the period 1906–20. Historians actually distinguish between three types of African resistance: (1) resistance to military conquest, before effective direct administration of the large and populous territories, which was therefore unlikely to influence European settlement; (2) resistance characterised by the refusal to obey, pay taxes, do coerced labour and to enrol in police forces, which directly affected the profitability of colonial activities and was therefore likely to influence European settlement; (3) 'modern nationalism', which was borrowed from the West by the local western-educated elite with the goal of taking over the colonial state after WWII (Curtin *et al.*, 1995, p. 514; Rioux, 2007, p. 668). What interests me is the hostility that might dissuade Europeans from settling beginning in 1906 because the arrival of European settlers began at the end of the military pacification, contemporaneously with the implantation of an administrative structure. After 1920, the expressions of this type of hostility declined until 1945, when French administrators faced the third type of hostility ('modern nationalism'), which does not have much relevance in this paper because it mostly took place in capitals and favoured areas without any influence on the location of European settlers.

Let $E(n)$ be the number of events expressing hostility in year n, $S(n)$ the number of severe events expressing hostility in year n [by construction $E(n) \geq S(n)$] and N the total number of years for which I observe hostility. I construct three indicators of hostility. The first indicator H_1 is the occurrence rate of events expressing hostility over 1906–19:

$$H1 = \frac{1}{N} \sum\nolimits_n \mathbb{1}_{E(n)>0}$$

The second indicator H_2 equals the occurrence rate of only severe events expressing hostility:

$$H2 = \frac{1}{N} \sum\nolimits_n \mathbb{1}_{S(n)>0}$$

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The third indicator H_3 equals the average annual number of severe events expressing hostility:

$$H_3 = \frac{1}{N}\sum_n S(n)$$

The difference between H_1 and the two others is that the two others focus on severe events only. H_2 and H_3 are thus less dependent on the variation in the narrative profusion of district administrators and how they discriminate between minimally and severely hostile areas. The difference between H_2 and H_3 is that H_3 discriminates between areas according to the annual number of events expressing hostility in the same year. Hostility could actually be expressed not only once a year but also twice or more. H_3 thus takes into account the intensity of hostility in the same year as another dimension of severity.

To make this completely clear, let me give an example. Take three districts A, B and C and two years T and $T+1$. The following table reports the number of events expressing hostility regarding their degree of importance and the resulting values of H_1, H_2 and H_3 over $(T, T+1)$.

Measures of hostility: Examples

	A	B	C
T			
Minor or moderate	1	0	0
Severe	0	1	2
$T+1$			
Minor or moderate	0	1	0
Severe	0	0	3
H_1	0.5	1	1
H_2	0	0.5	1
H_3	0	0.5	2.5

Empirically, the correlation between the three indicators is very large: 0.80 between H_1 and H_3, 0.87 between H_2 and H_3 and 0.92 between H_1 and H_2. The results obtained do not actually depend on which indicator is used. Table 1 shows that hostility was a major issue according to the annual political reports: on average, the occurrence rate of events expressing hostility is 0.49. The vast majority of these events were severe since the occurrence rate of severe events is 0.43. Finally, districts experienced on average 1.03 severe events per year. The variations are large since some districts experienced no hostility at all, whereas others experienced hostility every year with on average more than four severe events per year. Figure 3 shows the distribution of hostility within former French West Africa.

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Table 1: Summary Statistics on Districts

Variable	Mean	Standard deviation	Minimum	Maximum	Number of observations
Current performances[a]					
Literacy rate (more than 15 years old)	21.64	15.78	0.20	68.63	109
At least 1 year in primary school (>7 years old)	18.63	11.62	2.03	70.54	109
At least 1 year in secondary school (>12 years old)	8.05	6.82	0	41.21	109
Having access to private water	11.72	15.88	0	92.92	109
Connected to electricity	13.66	17.86	0	87.51	109
Using a modern fuel	22.4	30.67	0	99.99	109
Proportion of people having a house with a solid roof	4.07	9.00	0	59.55	109
Proportion of people having a house with solid walls	22.31	22.47	0	84.11	109
Stunting rate (less than 5 years old children)	36.88	12.25	7.14	85.71	89
Colonial period[b]					
1910: number of European settlers per 1,000 inhabitants	1.25	3.73	0	30.64	110
1925: number of European settlers per 1,000 inhabitants	2.73	12.32	0.026	113.75	110
Occurrence rate of events expressing hostility (H_1)	0.49	0.30	0	1	110
Occurrence rate of severe events expressing hostility (H_2)	0.43	0.29	0	1	110
Average annual number of severe events expressing hostility (H_3)	1.03	0.99	0	4.2	110
Teachers per 100,000 inhabitants over 1930–39	9.21	20.62	0	206.98	110

(*continued on next page*)

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Table 1: *Continued*

Variable	Mean	Standard deviation	Minimum	Maximum	Number of observations
Doctors per 100,000 inhabitants over 1930–39	20.06	49.53	2.19	463.27	92
Public works per square kilometre over 1930–39	69.93	480.68	0	5,000.27	110
Pre-colonial period[c]					
1910 population density	8.50	15.20	0.01	132.49	110
Desert-edge area dummy	0.14	0.34	0	1	110
Pre-colonial kingdom dummy	0.49	0.50	0	1	110
Amorphous area dummy	0.12	0.32	0	1	110
Geographical characteristics[c]					
Altitude (feet)	799.42	583.51	0	3,044	110
Latitude	11.83	3.73	4.77	20.97	110
Longitude	−5.82	6.10	−17.06	12.92	110
Annual rainfalls average over 1915–75 (mm)	1,063.67	683.63	17	3,248	110
Coastal dummy	0.19	0.39	0	1	110
River dummy	0.66	0.47	0	1	110

Statistics are all calculated at the district level.
[a]National Households Surveys around 1995 in former French West African colonies.
[b]Colonial censuses and colonial annual political reports, Archives Nationales, Paris, France.
[c]Appendix A.

3.4 Data on current development

Data on current performance come from national household survey in Senegal, Benin, Mali, Niger, Guinea, Mauritania, Upper Volta and Ivory Coast.[13] I collected the geographical coordinates of household localities and matched these localities with their colonial district using colonial maps from 1925 to compute statistics on districts' current performances.[14] The national household surveys are not designed to be representative at the

[13] Please refer to Appendix A for more details about data sources.

[14] Districts contain on average 450 households, 620 children 7–12 years old and 370 less than 5 years old.

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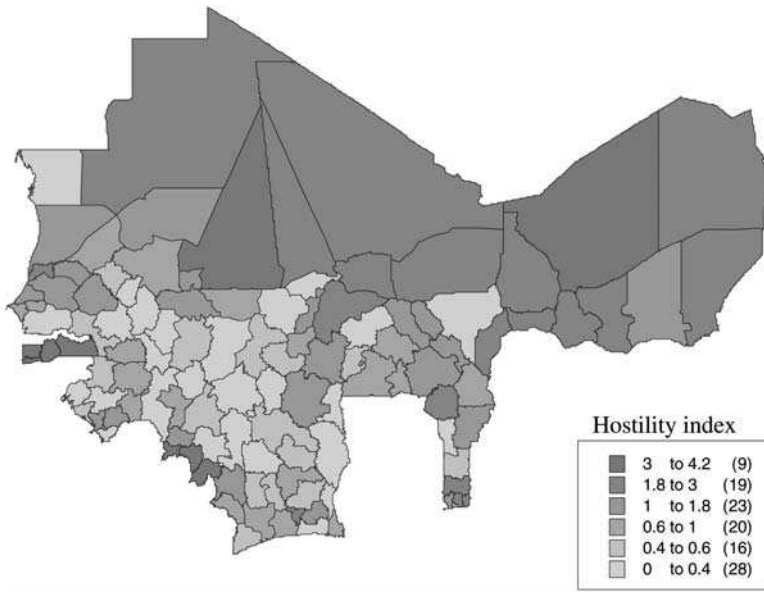


Figure 3: Hostility towards Colonial Power as Measured by H_3 (Average Annual Number of Severe Events Expressing Hostility over 1906–20). *Source*: Author's computations based on colonial annual political reports over 1906–20.

district level, which is an unsolvable caveat for my analysis. I use only comparable variables from these surveys and use country-fixed effects to address the issue of comparability due to the fact that these surveys span almost 10 years.

I focus on indicators of permanent income rather than on income or consumption because of their higher volatility. The idea is to examine the long-term impact of European settlement on structural outcomes and therefore to avoid noise coming from recent shocks and poor data quality. I focus on four dimensions of the welfare of the districts. First, educational performance is captured by the literacy rate of people 15 years old and above, the proportion of people 7 years old and above who have attended primary school for at least 1 year and the proportion of people 12 years old and above who have attended secondary school for at least 1 year. Second, health performance is captured by the proportion of children less than 5 years old suffering from stunting[15]—the Mauritanian

[15] I used international standards associated with each age (measured in months) to calculate the rate of stunting children in each district. A child is said to suffer from stunting if her height is less than 2 standard deviations under the median height.

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survey does not contain information about children's height, so Mauritanian districts are excluded from these statistics and all related regressions. Third, equipment performance is captured by the proportion of households connected to electricity, the proportion of households having access to private water and the proportion of households using a modern fuel (gas or electricity) for cooking. Finally, the quality of the housing is measured by the proportion of households living in a home with solid walls (cement or hard brick) and the proportion of households living in a home with a solid roof (cement or tiles).

Summary statistics of these development indicators are presented in Table 1. Correlation between these indicators is not very large (e.g., the correlation between literacy rate and the height of other indicators varies from 0.14 to 0.57), which legitimates to run regressions on the indicators one by one rather than an index to check that our results are not driven by a particular outcome.

4. The European settlement and long-run development

4.1 Evidence on the allocation of European settlers over French West Africa

I test empirically the expected correlation between European settlement, economic prosperity and political development from before colonial rule and hostility by running ordinary least squares (OLS) regressions of the form:

$$E_i = \alpha + \delta H_i + P_i\gamma + H_i * P_i\nu + S_i\mu + X_i\lambda + \varepsilon_i, \qquad (1)$$

where E_i is the share of Europeans in district i population in 1925, H_i the measure of hostility in district i over 1906–20, P_i a set of proxies for economic prosperity from before colonial rule in district i, $H_i{}^*P_i$ the product of hostility with proxies for initial economic prosperity, S_i a set of proxies for political status from before colonial rule in district i and X_i a set of geographical control variables. My coefficients of interest are δ, γ and ν: δ represents the effect of hostility on European settlement when pre-colonial prosperity is zero, γ represents the effect of initial economic prosperity when hostility is zero and ν represents the supplemental effect of hostility depending on economic prosperity, since hostility is likely to be important

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Table 2: The Determinants of 1925 European Settlement

Independent variables	(1)	(2)	(3)	(4)	(5)
1910 population density	0.10***		0.12***	0.07**	0.35***
	(0.037)		(0.04)	(0.037)	(0.067)
Desert-edge area dummy	2.78*		4.81***	3.13	13.33***
	(1.62)		(1.76)	(2.06)	(3.30)
Hostility (H_3)		−0.74	−1.59***	1.36**	1.00
		(0.57)	(0.60)	(0.68)	(0.74)
1910 population density * hostility (H_3)					−0.14***
					(0.03)
Desert-edge area dummy * hostility (H_3)					−5.41***
					(1.51)
Number of inhabitants	110	110	110	110	110
R^2	0.08	0.02	0.14	0.31	0.47
Control variables					
Initial political status	No	No	No	Yes	Yes
Geographical characteristics	No	No	No	Yes	Yes

Dependent variable is Europeans per 1,000 inhabitants in 1925; initial political status variables are kingdom dummy and acephalous area dummy; geographical characteristic variables are average annual precipitations over 1910–70, altitude, longitude, latitude, navigable river dummy ε.
Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

especially in prosperous areas (cf. Section 1). The number of observations is 110.[16]

Table 2 shows that Europeans were attracted by initially prosperous areas. The dissuasive impact of hostility on European settlement was also large and significant, though mainly driven by net effects controlling for initial prosperity. One additional severe event expressing hostility per year reduced the number of European per 1,000 inhabitants in 1925 by 1, which is not a small effect since there were on average 2.7

[16] Note that Dakar and Saint-Louis are excluded from the sample because of the lack of data on political climate in these two specific districts. Dakar was the capital of French West Africa and Saint-Louis the capital of Senegal and Mauritania. These two cities had a particular legal status. Consequently, no annual political reports were written on Dakar and Saint-Louis. The number of observations is thus 110.

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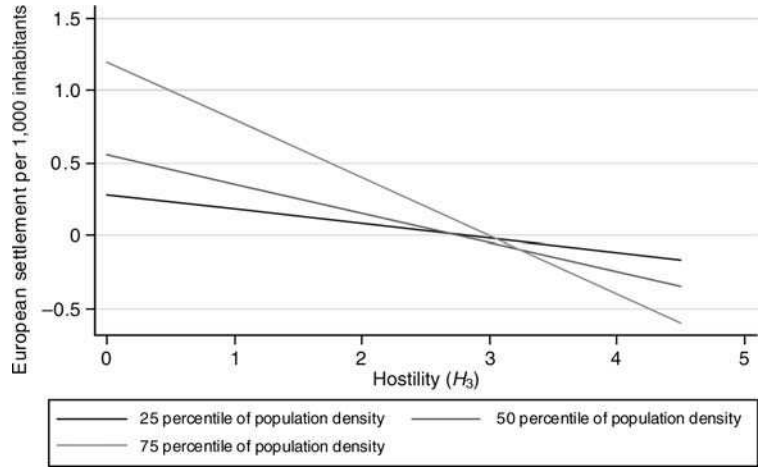


Figure 4: Effect of Hostility on European Settlement along Population Density Distribution

settlers.[17] Table 2 also shows that the dissuasive effect of hostility was larger for densely populated areas than for sparsely populated areas. Figure 4 represents the differences in the dissuasive impact of hostility along the distribution of the population density. It shows that most hostile areas at the 75th percentile of population density lost 2 European settlers per 1,000 inhabitants, whereas most hostile areas at the 25th percentile of population density lost only 0.5 European settlers per 1,000 inhabitants. These results thus confirm the previous predictions: Europeans were more attracted by prosperous areas but hostility disturbed this preference and created large differences in settlement within prosperous areas.

One might be concerned that the negative relationship between European settlement and hostility towards colonial power could reflect a reverse causation. Results in Table 3 could actually be interpreted as the negative impact of European settlement on hostility: the more Europeans in the districts, the less hostile. To address this reverse causation issue, I use a Granger causality type argument thanks to the evolution patterns of European settlement and hostility. I use European settlement in 1910 and 1925 (E_t and E_{t+1}, respectively) and hostility over 1906–20 and 1920–40 (H_t and H_{t+1}, respectively). The reverse causation issue can be

[17] Note that this statistic is calculated without Dakar and Saint-Louis.

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Table 3: Granger Causality between Hostility and European Settlement

Independent variables	Dependent variable	
	Europeans per 1,000 inhabitants in 1925 (1)	Hostility (H_3) over 1920–40 (2)
Europeans per 1,000 inhabitants in 1910	2.08***	−0.006
	(0.11)	(0.02)
Hostility (H_3) over 1906–20	−0.69**	0.13***
	(0.33)	(0.05)
Number of observations	110	110
R^2	0.85	0.18
Control variables		
1910 population density	Yes	Yes
Desert-edge area dummy	Yes	Yes
Initial political status	Yes	Yes
Geographical characteristics	Yes	Yes

Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable. Initial political status variables are kingdom dummy and acephalous area dummy; geographical characteristics variables are average annual precipitations over 1910–70, altitude, longitude, latitude, navigable river dummy.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

tested by running regressions of the form:

$$E_{t+1,i} = \alpha + \delta H_{t,i} + \beta E_{t,i} + X_i\lambda + \varepsilon_i,$$
$$H_{t+1,i} = \sigma + \gamma H_{t,i} + \tau E_{t,i} + X_i\nu + \varepsilon_i, \quad (2)$$

where $E_{t,i}$ is the number of Europeans per 1,000 inhabitants in time t in district i, $H_{t,i}$ the level of hostility in time t in district i and X_i a set of control variables in district i. With this specification, coefficient δ represents the Granger causal impact of hostility on European settlement since the potential effect of European settlement on hostility is captured by $E_{t,i}$, while coefficient γ represents the Granger causal impact of European settlement on hostility since the potential effect of hostility on European settlement is captured by $H_{t,i}$.

Results are reported in Table 3. Hostility towards colonial power over 1920–40 clearly had a negative Granger causal impact on European settlement, while European settlement had no Granger causal impact on hostility, which supports my interpretation that hostility disturbed European settlement and created large differences in settlement within prosperous

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areas. Omitted variables can still be an issue in this specification, so results can only be interpreted as showing Granger causality and not causality in the usual (randomised experiment) sense of the word.

4.2 OLS estimates of the impact of European settlement on current performance

I compare the development performance of the districts according to European settlement in 1925 by running OLS regressions of the form:

$$Y_i = \alpha + \beta E_i + P_i\gamma + S_i\mu + X_i\lambda + C_i\sigma + \varepsilon_i, \quad (3)$$

where Y_i is an outcome variable in district i, E_i the number of Europeans in district i per 1,000 population in 1925, P_i a set of proxies for initial economic prosperity in district i, S_i a set of proxies for initial political status of district I, X_i a set of geographical control variables and C_i a set of country-fixed effects. My coefficient of interest is β, which represents the impact of European settlement net of its correlation with pre-colonial economic, political and geographical characteristics. I include country-fixed effects to address cross-country comparability issue.

Table 4 gives evidence that European settlement is strongly positively correlated with current performance. Coefficients on Europeans per 1,000 inhabitants in 1925 in panel C show that for one additional European per 1,000 inhabitants in 1925, the current performance rate goes up by 0.50 to 1.6 percentage points in each dimension: education, equipment, quality of housing, except health (the coefficient is not significant). A 1 standard deviation increase in the number of Europeans per 1,000 inhabitants would approximately produce a 1 standard deviation increase in current performance rate (from 0.5 to 1.20 depending on which performance is considered). Panel A also shows that the variance in European settlement in 1925 explains a large part of the variance in current performances in most of cases. Note that *P*-values of the test of joint significance on control variables are reported in Panel C so that one can see whether the controls explain a significant share in the variation of the outcomes. No regular pattern emerges from this, which leaves unclear the explanatory strength of geography versus initial economic and political development.

Yet this strategy produces biased estimates if there are unobserved district characteristics that are correlated with current performances. It is not clear whether the bias would be upwards or downwards since such

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Table 4: The Impact of European Settlement on Current Outcomes: OLS Estimates

Independent variables	Dependent variable: district performance rate (in percentage points) with respect to								
	Literacy (1)	Primary school (2)	Secondary school (3)	Water (4)	Electricity (5)	Modern combustible (6)	Wall solidity (7)	Roof solidity (8)	Stunting (9)
Panel A: Main effects									
Europeans per 1,000 inhabitants in 1925	1.10*** (0.23)	1.00*** (0.16)	0.69*** (0.08)	1.74*** (0.20)	2.03*** (0.21)	1.85*** (0.47)	1.48*** (0.34)	0.72*** (0.13)	−1.49** (0.66)
R^2	0.17	0.26	0.36	0.42	0.45	0.13	0.15	0.22	0.06
Number of observations	109	109	109	109	109	109	109	109	89
Panel B: Main effects with country-fixed effects									
Europeans per 1,000 inhabitants in 1925	0.92*** (0.14)	0.75*** (0.12)	0.63*** (0.08)	1.55*** (0.19)	1.88*** (0.18)	0.94*** (0.25)	1.35*** (0.26)	0.70*** (0.11)	−0.88 (0.64)
R^2	0.74	0.65	0.59	0.52	0.66	0.79	0.57	0.54	0.27
Number of observations	109	109	109	109	109	109	109	109	89
Panel C: Net effects controlling for initial characteristics									
Europeans per 1,000 inhabitants in 1925	0.70*** (0.15)	0.65*** (0.12)	0.58*** (0.08)	1.27*** (0.21)	1.60*** (0.20)	0.57*** (0.27)	0.99*** (0.27)	0.50*** (0.11)	−1.48** (0.86)
R^2	0.81	0.75	0.67	0.62	0.73	0.83	0.69	0.69	0.37
Number of observations	109	109	109	109	109	109	109	109	89

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Table 4: *Continued*

Independent variables	Dependent variable: district performance rate (in percentage points) with respect to								
	Literacy (1)	Primary school (2)	Secondary school (3)	Water (4)	Electricity (5)	Modern combustible (6)	Wall solidity (7)	Roof solidity (8)	Stunting (9)
P-values of the test of joint significance on controls									
Control variables									
Initial prosperity	0.01	0.00	0.08	0.02	0.12	0.25	0.10	0.98	0.39
Initial political status	0.42	0.08	0.23	0.51	0.16	0.58	0.11	0.92	0.61
Geography	0.05	0.17	0.08	0.40	0.06	0.01	0.00	0.00	0.62

Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable. Initial prosperity variables are population density in 1910 and desert-edge dummy; initial political status variables are kingdoms and amorphous area dummies; geographical variables are average annual precipitations over 1915–75, altitude, longitude, latitude, river dummy and coast dummy. Regressions in panels B and C include country-fixed effects: Senegal, Ivory Coast, Guinea, Mauritania, Niger, Benin, Upper Volta (excluded: Mali).

***Significant at the 1% level.

**Significant at the 5% level.

*Significant at the 10% level.

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unobserved characteristics that attracted settlers could have either a positive or a negative influence on current performances.

4.3 IV estimates of the impact of European settlement on current performance

A way of solving the problem of omitted variables is to instrument the number of European settlers. Some solutions to this problem have been found in the literature, especially in Acemoglu *et al.* (2001, 2002) and Feyrer and Sacerdote (2009). Feyrer and Sacerdote (2009) use wind speed as a random source of variation in the length of colonialism, which is obviously unemployable outside the context of islands. Acemoglu *et al.* (2001, 2002) use European settler mortality as an exogenous source of variation of European settlement but I cannot use this variable as an instrument for European settlement since this variable is very imprecise and volatile due to very small numbers of Europeans per district (I refer to Appendix C for further evidence and discussion on this point).[18] In this paper, I use hostility towards colonial power as an instrument for European settlement. The underlying assumption is that hostility towards colonial power affected European settlement (as shown in Section 4.1) but did not directly affect the long-term development path. Since such an assumption is hard to acknowledge (as discussed in what follows), I will relax it and assume that conditionally on some observable characteristics affecting both hostility and current performances, hostility towards colonial power was something accidental that created exogenous variation in European settlement.

Hostility could violate the exclusion relation in two ways: first, if hostility depended on pre-colonial district characteristics which influenced the long-term development path (something that preceded colonial experience, like initial prosperity and political development); second, if hostility created particular conditions in the districts which influenced the long-term development paths independently from European settlement [something that followed colonial experience, positively like greater collective

[18] Some scholars might want to use instruments like distance to the nearest seaports since it was negatively correlated with European settlement: all settlers from Europe arrived in West Africa by boat and were therefore more likely to settle near the port from which they entered. But this alternative instrument is far from convincing since distance to the nearest seaport is highly correlated with distance to the coast, which, in turn, reflects an intrinsic ability to advance economically in the modern age due to low transportation costs for trade and greater ability to adopt Western technology, among others.

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action and social cohesion (Banerjee *et al.*, 2008), or negatively like anarchic indigenous politics and current conflicts]. To test the influence of initial economic prosperity and political status on hostility, I run regressions of the form:

$$H_i = \alpha + P_i\gamma + S_i\mu + X_i\lambda + \varepsilon_i, \quad (4)$$

where H_i is the measure of hostility in district i, P_i a set of proxies for initial economic prosperity in district i, S_i a set of proxies for initial political status of district i and X_i a set of geographical control variables. Empirical results are reported in Table 5. They show that early hostility was significantly higher in more densely populated areas and in desert-edge areas, meaning that economic prosperity encouraged resistance and hostility—probably because the prosperous areas had more to defend and fight for than poor areas. Initial political development also influenced hostility towards colonial power in a non-linear way: kingdoms and amorphous areas were more hostile than the rest of the region—plenty and lack of social authority was both hard to control by the colonial power. It is also worth noting that the significantly positive coefficient on latitude probably reflects a correlation between Islam and hostility, which is recurrently mentioned in administrators' annual reports.[19] Hostility was thus evidently correlated with intrinsic district characteristics that also potentially influenced their development path.

Yet administrators' annual reports also give evidence that district characteristics did not completely explain the differences in levels of hostility. Hostility is often presented as a mismatch between a specific colonial administrator and the African population, except after WWII when hostility was almost driven by elite groups in biggest cities to obtain independence. A first accidental source of hostility, reported in Cohen (1974), is the heterogeneity of French colonial administrators in regard to their educational background and their vision of the role of colonialism. Some colonial administrators were diplomatic and succeeded in creating a favourable political climate with the local people, whereas others were brutal and provoked aggressive reactions. Another accidental source of hostility could be the emergence of a specific leader personally inclined to resistance towards colonial authority, like Samori in eastern Guinea. Administrators reported cases where chiefs accepted some indemnities, whereas others declined the same offer because of their 'personality' and inclination towards

[19] Islamic penetration came historically from North Africa and is therefore distributed north-to-south.

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Table 5: The Observable Determinants of Early Hostility and Correlation with Later Hostility

Independent variables	Dependent variables				
	Hostility H_3 over 1906–20	**Hostility H_3 over 1920–40**	**Hostility H_3 over 1920–40**	**Hostility H_3 over 1940–56**	**Hostility H_3 over 1940–56**
Hostility (H_3) over 1906–20		0.13*** (0.05)	0.08 (0.05)	0.10* (0.06)	0.01 (0.06)
Population density in 1910	0.013** (0.006)	0.002 (0.003)	0.001 (0.003)	−0.004 (0.004)	−0.003 (0.003)
Desertic area dummy	0.84*** (0.29)	−0.036 (0.15)	0.08 (0.15)	0.12 (0.19)	0.31 (0.18)
Pre-colonial kingdom dummy	0.46*** (0.17)	0.03 (0.09)	0.05 (0.08)	−0.03 (0.11)	0.01 (0.10)
Acephalous area dummy	1.58*** (0.27)	−0.31* (0.16)	−0.37** (0.15)	0.34* (0.20)	0.23 (0.18)
Altitude	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Coastal dummy	0.22 (0.27)	0.19 (0.14)	0.10 (0.13)	0.10 (0.17)	−0.04 (0.16)
River dummy	0.05 (0.17)	−0.10 (0.09)	−0.13 (0.08)	0.04 (0.11)	0.00 (0.10)
Annual rainfalls	0.00036* (0.00021)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Latitude	0.14*** (0.04)	−0.03 (0.02)	−0.04* (0.02)	−0.01 (0.03)	−0.00 (0.01)
Longitude	0.06*** (0.02)	−0.02** (0.01)	−0.014* (0.008)	0.005 (0.01)	0.01 (0.01)
Casamance fixed effect			1.60** (0.41)		2.64*** (0.50)
Number of observations	110	110	110	110	110
R^2	0.45	0.18	0.29	0.17	0.35

Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable. Hostility (H_3) is the average annual number of severe events expressing hostility.
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.
$^{+}$Significant at the 15% level.

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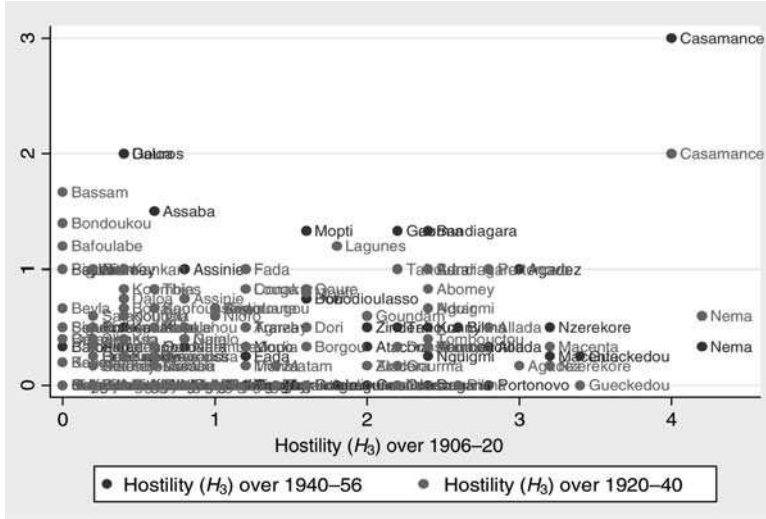


Figure 5: Hostility over Three Consecutive Periods

opposition. An example that illustrates such variations can be found in the two neighbouring Bambara kingdoms, Kaarta and Segu: the Fama Mademba of Segu accepted to collaborate and to receive an annual indemnity from the colonial power, whereas the king of Kaarta, Koulibaly, declined. Consequently, the level of hostility in the corresponding districts is much higher in former Kaarta than in former Segu. Another example is Sine Saloum and Baol in Senegal: they are neighbouring districts, both densely populated, both under a pre-colonial kingdom, with very similar anthropological and geographical characteristics. Baol was significantly more hostile than Sine Saloum: the average annual number of severe events expressing hostility was 0.6 in Baol and 0.2 in Sine Saloum. Such discontinuity between similar districts can be observed with Ouahigouya and Dedougou in current Upper Volta, among many others.

Moreover, Table 5 shows that early hostility was not correlated with later hostility: there is no significant correlation between 1906–20 hostility and 1920–40/1940–56 hostility once Casamance is controlled for. Early hostility is therefore unlikely to impact current outcomes (current conflicts, governance and indigenous politics) since it did not even impact hostility in the consecutive periods. Figure 5 plots 1906–20, 1920–40 and 1940–56 hostility to give evidence of the quasi-independence of hostility over time. Conditional to observable characteristics that capture main pre-colonial differences, early hostility towards colonial power seems somehow

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accidental and constitutes an exogenous source of variation in European settlement.

First-stage estimates are presented in Table 2 column (5). The partial R^2 associated with this instrumentation strategy is 0.28 (the *F*-statistic on excluded instruments in the first-stage regression is 11.52), thus avoiding problems caused by the use of weakly correlated instruments. Table 6 reports IV estimates of the impact of European settlement on current performance. Table 6 also reports spatial autocorrelation index (Moran's *I*) for predicted residuals to check that the estimates obtained from IV estimator are not overly precise.[20] As a matter of fact, residuals are not spatially correlated since Moran's *I* are small and almost insignificant. Instrumental variable point estimates are of the same size but less significant than OLS point estimates: out of nine outcomes, three are no longer significantly correlated with 1925 European settlement. But the general picture that emerges from this analysis still holds: colonised areas that received more European settlers have performed better historically than colonised areas that received less Europeans settlers. For instance, for one additional European per 1,000 inhabitants in 1925, the current proportion of households connected to electricity goes up by 1.4 (having access to private water by 1.6) percentage points. These results do not mean that colonisation, *per se*, was a positive experience since I do not compare colonised versus non-colonised areas, but colonised areas with many Europeans performed better in the long run than colonised areas with few Europeans.

4.4 An overall change in the distribution of prosperity over the twentieth century?

The final question that I want to examine is whether the colonial experience created a reversal of fortune within former French West Africa, as Acemoglu *et al.* (2002) observe at the worldwide level: most prosperous pre-colonial areas in 1500 became the least prosperous in 2000. To test this reversal of fortune, I use the straightforward strategy used in Acemoglu *et al.* (2002): I compare district development performance according to pre-colonial economic prosperity by running OLS regressions of the form:

$$Y_i = \alpha + P_i\gamma + S_i\mu + X_i\lambda + C_i\sigma + \varepsilon_i, \quad (5)$$

[20] Spatial autocorrelation would overestimate precision because, since events tend to be concentrated, there are actually fewer number of independent observations than are being assumed.

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Table 6: The Impact of European Settlement on Current Outcomes: IV Estimates

Independent variables[a]	**Dependent variable: district performance rate (in percentage points) with respect to**								
	Literacy (1)	**Primary school (2)**	**Secondary School (3)**	**Water (4)**	**Electricity (5)**	**Modern combustible (6)**	**Wall solidity (7)**	**Roof solidity (8)**	**Stunting (9)**
Europeans per 1,000 inhabitants in 1925	0.38+	0.15	0.40***	1.62***	1.38***	0.63	1.29***	0.41**	−2.48
	(0.26)	(0.23)	(0.15)	(0.36)	(0.34)	(0.46)	(0.47)	(0.19)	(2.67)
R^2	0.80	0.71	0.66	0.61	0.73	0.83	0.68	0.69	0.35
Number of observations	109	109	109	109	109	109	109	109	89
Included instruments	Initial economic prosperity: population density in 1910, desert-edge dummy								
	Initial political development: kingdom dummy, amorphous area dummy								
	Geography: average annual precipitations over 1915–75, altitude, latitude, longitude, river dummy and coast dummy								
Excluded instruments	Hostility (H_3), H_3^* population density in 1910, H_3^* desert-edge dummy								
	Test for spatial autocorrelation of residuals								
Moran's I[b]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance [0,1]	0.18	−0.16	−0.23	−0.06	−0.14	−0.06	−0.20	−0.12	−0.17
	(0.16)	(0.28)	(0.12)	(0.73)	(0.36)	(0.71)	(0.18)	(0.43)	(0.33)
Distance [1,2]	0.003	−0.02	0.06	0.08	0.16**	0.05	0.03	0.06	−0.11
	(0.87)	(0.91)	(0.38)	(0.21)	(0.03)	(0.48)	(0.62)	(0.36)	(0.20)
Distance [2,3]	−0.12*	−0.03	−0.05	−0.13**	−0.11	−0.03	−0.00	−0.13*	0.06
	(0.1)	(0.77)	(0.50)	(0.05)	(0.13)	(0.79)	(0.93)	(0.06)	(0.26)
Distance [3,4]	−0.06	−0.12*	−0.09	−0.03	−0.09	−0.00	−0.08	−0.04	−0.08
	(0.48)	(0.07)	(0.18)	(0.78)	(0.18)	(0.90)	(0.23)	(0.62)	(0.32)

[a]Standard error values are in parentheses. ***Significant at the 1% level; **5% level; *10% level; +15% level.
Each cell represents the coefficient from a 2SLS regression of the dependent variable on the independent variable.
Instrumented variable is the number of Europeans per 1,000 inhabitants in 1925.
[b]Two-tailed *P*-values are based on the null hypothesis that Moran's *I* is 0 in parentheses. ***Significant at the 1% level; **5% level; *10% level.

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where Y_i is an outcome variable in district i, P_i a set of proxies for initial economic prosperity in district i, S_i a set of proxies for initial political status of district i, X_i a set of geographical control variables and C_i a set of country-fixed effects. My coefficient of interest is γ, which represents the correlation between from before colonial rule and current economic performance. Table 7 reports the results. Coefficients on initial economic prosperity are all positive or neutral. The relationship between pre-colonial and current economic performance is therefore positive but not very strong. But the general pattern is not a reversal of fortune. The colonial experience rather altered the distribution of prosperity within former French West Africa than actually reverse it. This positive or neutral relationship between pre-colonial and current economic performance indeed reflects the fact that some of the richest pre-colonial areas are no longer richer than the others, but they are not less rich. Other less prosperous areas before colonial times may have been favoured by colonial power and therefore caught up with the most prosperous. This result is also consistent with the mechanism driving European settlement. As predicted by Acemoglu *et al.* (2002), Europeans preferred prosperous areas in West Africa because the profitability of extraction was higher in prosperous areas than in poor ones. With respect to this factor, Europeans thus tended to reinforce pre-colonial inequalities by settling in prosperous areas. Yet on the other hand, hostility towards colonial power was more severe in prosperous areas, which dissuaded Europeans from settling. These two mechanisms tended to compensate for one another and therefore did not completely reverse the distribution of prosperity. One might want to think of pairs of districts that illustrate this specific long-term impact of French colonisation in West Africa. The most spectacular example is Porto-Novo versus Cotonou. From before colonial rule, Porto-Novo was a very prosperous area: one of the most densely populated areas out of West Africa. A powerful kingdom was controlling the southern part of current Benin (not a very expanded kingdom though). Because King Behanzin was particularly hostile towards French colonisers (even if his predecessor Glélé was much more docile and had signed friendship treaty), the French administration and private investors preferred the nearby district of Cotonou to settle. Cotonou grew rapidly and became the first economic place in Benin. Many other pairs of districts had similar stories: Niamey overtook Dosso, Thies overtook Tivaouane, Abidjan overtook Assinie, Bamako overtook Mopti, Ouagadougou overtook Bobo-Dioulasso, etc.

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Table 7: Did Prosperous Pre-colonial Areas Fall Behind?

Independent variables	Dependent variable: district performance rate with respect to								
	Literacy	Attended primary school	Attended secondary school	Water tap	Electricity	Modern combustible	Solid wall	Solid roof	Stunting
Panel A: pre-colonial prosperity variables									
Population density in 1910	0.25***	0.20***	0.14***	0.39***	0.38***	0.05	0.33***	0.08	0.16
	(0.07)	(0.5)	(0.04)	(0.1)	(0.11)	(0.11)	(0.12)	(0.05)	(0.18)
Desertic area dummy	10.05***	10.54***	3.03	12.28**	8.69*	12.11**	6.88	5.34**	−7.71
	(3.2)	(2.67)	(196)	(4.74)	(5.21)	(5.50)	(5.97)	(2.62)	(4.70)
Number of observations	109	109	109	109	109	109	109	109	89
R^2	0.68	0.62	0.40	0.38	0.39	0.77	0.49	0.39	0.29
Initial political controls	No	No	No	No	No	No	No	No	No
Geographical controls	No	No	No	No	No	No	No	No	No
Panel B: adding geographical and political controls									
Population density in 1910	0.12*	0.12**	0.08*	0.26**	0.22**	−0.11	0.12	0.03	0.14
	(0.07)	(0.58)	(0.04)	(0.1)	(0.11)	(0.11)	(0.12)	(0.05)	(0.19)
Desertic area dummy	9.96**	11.74***	3.88	8.83	6.57	8.19	13.83	0.73	−6.42
	(3.93)	(3.35)	(2.45)	(5.88)	(6.16)	(6.50)	(6.85)	(2.84)	(6.54)
Number of observations	109	109	109	109	109	109	109	109	89
R^2	0.76	0.68	0.50	0.47	0.39	0.83	0.64	0.61	0.34
Initial political controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable. Initial political controls are kingdom dummy and amorphous area dummy; geographical controls are average annual precipitations over 1910–70, altitude, longitude, latitude, navigable river dummy and coast dummy. Each regression includes country-fixed effects.

***Significant at the 1% level.

**Significant at the 5% level.

*Significant at the 10% level.

$^{+}$Significant at the 15% level.

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5. Why did European settlement play a positive role?

5.1 Potential institutional channels

The positive impact of European settlement in the former colonies has already been explored, especially in Acemoglu *et al.* (2001). In this paper, the authors show that the relationship between European settlement and current performance works through the quality of the institutions brought by Europeans. Europeans adopted different colonisation policies in different colonies with different associated institutions. At one extreme, in places where the disease environment was not favourable to European settlement, Europeans set up extractive institutions characterised by little protection of private property or checks against government expropriation. At the other extreme, in places where the disease environment was favourable to European settlement, Europeans migrated and created what the historian Alfred Crosby (1968) calls 'neo-Europes', primarily Australia, New Zealand, Canada and the USA. In these colonies, the settlers tried to replicate European institutions with strong emphases on private property and checks against government expropriation. In regard to the way institutions encourage productive activities, capital accumulation, skill acquisition and innovation, the extractive strategy was associated with 'bad' institutions, whereas the settlement strategy was associated with 'good' institutions. They use the protection against the risk of expropriation index from Political Risk Services, and the constraint on executive index and the democracy index from the Polity III data set as proxies for the quality of institutions.

There exists no measure of the quality of institutions at the infranational district level. I therefore cannot test directly the validity of this potential explanation within former French West Africa. The question is *de facto* slightly different within former French West Africa since the global colonisation policy ('extraction' versus 'migration') was homogenous all over the region. In former French West Africa, Europeans pursued an extractive strategy only. Therefore, the potential variations in the quality of institutions, if any, could not come from differences in colonial strategy. The question here is why European settlement had a positive impact on current development conditional to their extractive strategy. One might be surprised that the impact of European settlement was positive given the poor nature of the institutions they implemented.

Within former French West Africa, the risk of expropriation, constraint on executives and political participation of local populations were formally driven by the same set of rules since the legal system was uniform all over

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the region.[21] Colonial regulations were defined by the General Governor of the whole French West Africa, if not by the Minister of the Colonies for the whole French empire. The administrative organisation was remarkably homogenous, as were the economic and social rules. If differences in European settlement created some differences in institutions, it should therefore be related to the application of colonial rule, not to the colonial rules themselves. I adopt the definition of institutions as 'sets of rules, compliance procedures and moral and ethical behavioural norms that constrain the behaviour of individuals' (North, 1981). With respect to this definition, *de jure* institutions within colonial French West Africa did not differ except for a few exceptional towns in Senegal. But this does not prevent *de facto* variation. For instance, African people living close to many European settlers could take a greater advantage of the new legal code than people living in sparsely settled areas, where customary law was more likely to compete with colonial rule. Aldashev *et al.* (2007) show examples of situations where formal and informal laws are seen as conflicting with each other. The general picture that emerges from the literature is that legal pluralism tends to produce neutral or negative effects. I consciously leave aside this question because I cannot give any empirical evidence of such differences. I can only argue that the positive impact of European settlement within former French West Africa did not run through the quality of formal institutions, and that the bad nature of institutions brought by colonisers gives little support to an institutional explanation of the positive role of European settlers on current outcomes.

5.2 The role of private and public investments

Another potential explanation on why European settlement had a positive impact on current performances is that Europeans increased investments in areas where they were lived, simply because Europeans were themselves administrators, businessmen or missionaries and had the capital for major investments that African people lacked. The mechanism running behind the previous findings could therefore be far more direct than the one stressed by the broad literature on institutions: the key determinant of the positive impact of European settlement could be the investments themselves rather than the 'incentives' to invest created by a more

[21] Except the four 'communes' (Saint-Louis, Dakar, Rufisque and Goree), whose inhabitants were French citizens. Some fiscal rules were also different in these cities. Three of them are excluded from my empirical study (Goree, Dakar, Dakar and Saint-Louis).

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favourable institutional environment. On the private side, Europeans invested in resource extraction (peanuts, vegetable oils, wood, cotton, leather, cocoa, coffee, minerals). Private investors were likely to introduce new crops and new techniques to increase total yields that could be channelled into exports. On the public side, Europeans invested in public goods such as education (building schools and paying teachers), health (building hospitals and dispensaries and paying doctors and nurses) and infrastructure (roads, wells, bridges, harbours, railways, air transport). Note that all public expenses were financed by local tax revenue and not by European taxpayers. These investments created new job opportunities for local people, some improvements in agricultural productivity and a greater access to human capital formation, which could be the key reason why regions with numerous Europeans settlers grew faster than regions with few settlers.

Unfortunately, I have no district-level data on private investments, neither during the colonial era nor today. The only empirical evidence I can bring is on public investments: I collected district-level data on colonial public investments in education, health and infrastructures from annual colonial budgets[22] so I can test whether differences in European presence within French West Africa are correlated with differences in access to public goods. For further details on data on colonial public investments, I refer to Huillery (2009). The question is whether European settlers tended to favour colonial public investments and whether this relationship explains the positive impact of European settlers on current performance.

Figures 6 and 7 show the correlation between the number of European settlers in 1925 per 1,000 inhabitants and colonial public investments in teachers and doctors[23] over 1930–39. The correlation is significant and positive, which could be interpreted as the fact that European settlers encouraged public investments. An alternative explanation that is just as plausible is that Europeans had incentives to settle in areas with high colonial public investment. This potential reverse causation is not a crucial issue for the purpose of this paper, which is to explain why areas with a higher concentration of European settlers in 1925 are more developed today, all other things being equal. Since European settlement and colonial public investments largely worked together, I just point out that the positive influence of European settlers on current performances may reflect the

[22] The annual colonial budgets are in the Archives Nationales in Dakar, Senegal.

[23] I do show the graph with investments in public works, which is the exact same kind of graph.

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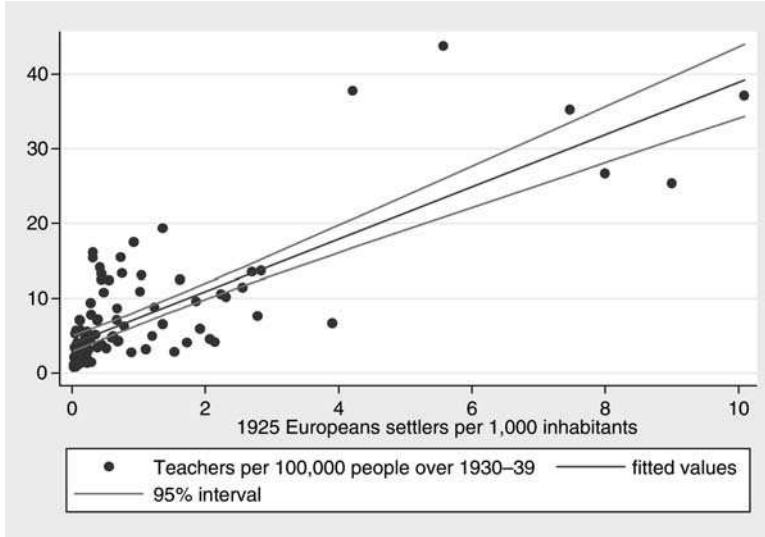


Figure 6: Education Public Investments and European Settlement

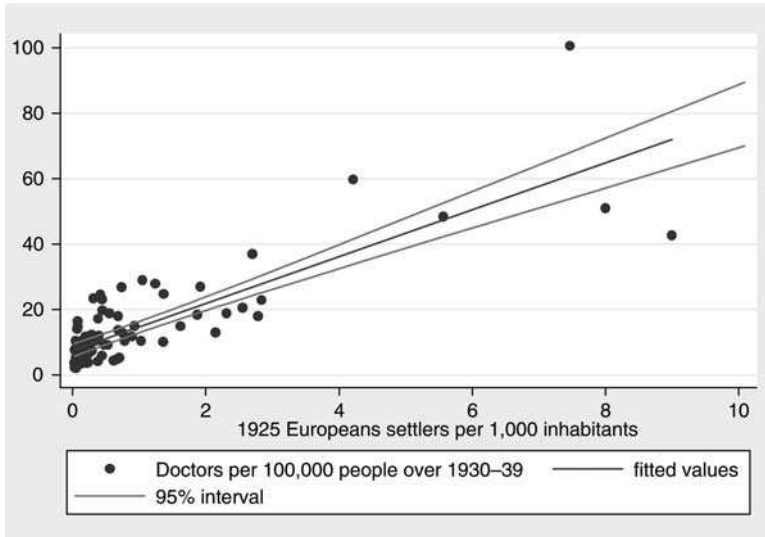


Figure 7: Health Public Investments and European Settlement

positive influence of colonial public investment. But since my motivation is rather to flesh out the channels of the effect of Europeans on modern development, I test whether the coefficient on 1925 (earlier) European

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settlers changes when introducing 1930–39 (later) investments in specification (3).

$$Y_i = \alpha + \beta E_i + \pi I_i + P_i\gamma + S_i\mu + X_i\lambda + C_i\sigma + \varepsilon_i, \qquad (6)$$

where Y_i is an outcome variable in district i, E_i the number of Europeans in district i per 1,000 population in 1925, I_i the 1930–39 colonial investment corresponding to Y_i (teachers for education, doctors for health and public works for access to infrastructures), P_i a set of proxies for pre-colonial economic prosperity in district i, S_i a set of proxies for pre-colonial political status of district i, X_i a set of geographical control variables and C_i a set of country-fixed effects. My coefficients of interest are β, which represents the impact of European settlement, and π, which represents the impact of colonial public investment, net of both their mutual correlation and their correlation with pre-colonial economic prosperity, political status and geography.

Table 8 shows that colonial public investments partly explain the positive relationship between European settlement and current performance, but they do capture a maximum of half of the whole effect of European settlement. The size of most coefficients on European settlement decreases, showing that previous estimates of European settlement partly captured the effect of colonial public investment, but most of the positive effect of European settlers on current outcomes remains unexplained. A key hypothesis that remains the most plausible is the private investment hypothesis, on which I cannot give any evidence at this stage.

6. Conclusion

Many economists and social scientists believe that differences in colonial experiences are at the root of large differences in current outcomes across countries. This paper explores the impact of the colonial experience within a more homogenous area so as to bring a better understanding of underlying mechanisms. The main results of this paper are as follows. (1) European settlers preferred prosperous areas within West Africa, which is consistent with the Acemoglu *et al.* (2002) premise since the general colonial policy was 'extraction'. Europeans thus tended to reinforce pre-colonial inequalities by settling in prosperous areas. (2) This preference towards prosperous areas was discouraged by hostility towards colonial power. Hostility actually dissuaded Europeans from settling and the consequence is that areas which were both rich and hostile received less European settlers than rich and non-hostile areas. When hostility was

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Table 8: Do Colonial Public Investments Explain the Positive Influence of European Settlement?

Independent variables	Dependent variable: district performance rate with respect to								
	Literacy (1)	Primary school (2)	Secondary school (3)	Water (4)	Electricity (5)	Modern combustible (6)	Wall solidity (7)	Roof solidity (8)	Stunting (9)
Teachers per 100,000 inhabitants over 1930–39	−0.00 (0.06)	0.11** (0.05)	0.07** (0.03)						
Doctors per 100,000 inhabitants over 1930–39									−0.09 (0.21)
Public works per square kilometre over 1930–39				0.23*** (0.07)	0.04 (0.07)	−0.09 (0.10)	0.16* (0.09)	0.18*** (0.03)	
Europeans per 1,000 inhabitants in 1925	0.71*** (0.22)	0.36** (0.18)	0.39*** (0.12)	0.59** (0.29)	1.46*** (0.29)	0.84** (0.39)	0.51 (0.40)	1.02*** (0.30)	−0.42 (1.83)
Number of observations	109	109	109	109	109	109	109	109	89
R^2	0.81	0.77	0.69	0.66	0.73	0.84	0.69	0.76	0.31
Pre-colonial prosperity controls									
Pre-colonial political statuses	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Standard error values are in parentheses. Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable. Pre-colonial prosperity controls are population density in 1910, desert-edge dummy, former trade counter dummy; pre-colonial political statuses are kingdoms and amorphous areas; geographical controls are average annual precipitations over 1910–70, altitude, longitude, latitude, navigable river dummy and coast dummy. Each regression includes country-fixed effects.

***Significant at the 1% level.

**Significant at the 5% level.

*Significant at the 10% level.

$^{+}$Significant at the 15% level.

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severe in a prosperous area, Europeans preferred to settle in a calm neighbouring area even if it was less prosperous. (3) Colonised and highly settled areas had faster development paths than colonised and poorly settled areas. The impact of European settlement was thus positive even in an 'extractive' colonisation context, working partly through colonial public investments: the more Europeans settlers, the more colonial investments in education, health and infrastructure. (4) The distribution of prosperity within former French West Africa did not reverse. Yet hostile and initially rich areas lost part of their pre-colonial advantage. Some calmer areas caught up with them and sometimes overtook them. Differences in hostility towards colonial power thus explain why certain changes in the prosperity distribution occurred within former French West Africa. It sheds light on the emergence of new dynamic areas like Cotonou, Niamey, Bassam, Abidjan, Dakar, Conakry, Port-Etienne, Bamako, Thies or Kaolack, and the relative decline of some of the most dynamic, pre-colonial areas like Porto-Novo, Abomey, Fuuta-Djalo, Kankan, Agadez, Timbuktu, Casamance, Waalo, Fuuta Toro, Macina or Hausa land.

Acknowledgements

I am grateful to Denis Cogneau and Thomas Piketty for their valuable guidance. Alexander Moradi, José de Sousa and seminar participants at DIAL, Paris School of Economics, Nuffield College and the CSAE conference provided very helpful comments. Historical data used in this paper have been collected by the author within the research project 'Long Term History and Resources Distribution in Africa' directed by Denis Cogneau (IRD, DIAL, Paris). Financial support from the French Ministery of Research is gratefully acknowledged. Martine Lorenzo, Angélique Roblin, Xavier Midon and Angelina De Baecque have provided excellent research assistance for archive extraction.

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Appendix A: Data Description and Sources

Variable	Description	Source
1910 population density	Total population divided by total land (1910)	Colonial censuses (Archives Nationales, Paris, France, série G, sous-série 22) and maps (Documentation Française, Paris, France)
1910 and 1925 European settlement	Number of European settlers per 1,000 inhabitants around 1910 and in 1925	
Desert-edge dummy	1 if the district is located at the desert-edge, 0 otherwise	FAO map at http://www.fao.orq/farminqsystems/FarminqMaps/SSA/12/AL/map/m10000.h
Kingdom dummy	1 if the district was part of a pre-colonial kingdom over 1850–80, 0 otherwise	See Appendix B
Amorphous area dummy	1 in case of total absence of pre-colonial political authority before 1880, 0 otherwise	Same sources as in Appendix B
Altitude	Altitude of the main town in the district, in metres	Website http://fallingrain.com/world
Latitude	Mean of the latitude of the households in the district	
Longitude	Mean of the longitude of the households in the district	
Annual rainfalls	Average annual rainfalls in millimetres over 1915–75	ORSTOM records
River dummy	1 if the district has a navigable river, 0 otherwise	Colonial annual budgets, 1925, Documentation Française, Paris, France
Coastal dummy	1 if the district is on the coast, 0 otherwise	
Hostility towards colonial power	Occurrence rate of events expressing hostility (H_1), occurrence rate of severe events expressing hostility (H_2) and average annual number of severe events expressing hostility (H_3).	Political annual reports written by the district administrators to the colony governor (Archives nationales, Paris, France, série G, sous-série 2)

(*continued on next page*)

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Appendix A: *Continued*

Variable	Description	Source
Colonial public investments in education	Average annual number of teachers paid on public budget over 1930–39	Colonial annual budgets, Archives du Sénégal, Fonds AOF
Colonial public investments in health	Average annual number of doctors paid on public budget over 1930–39	
Colonial public investments in infrastructure	Average annual expenses in public works paid on public budget over 1930–39	
Literacy rate	Percentage of more than 15-year-old literate individuals	EPCV (1998) for Upper Volta, ESAM II (2000) for Senegal, EIBC (1994) for Guinea, EPCES (1995) for Niger, EMCES (1994) for Mali, EPDS (1993) for Ivory Coast, EPCV (1995) for Mauritania and QUIBB (2002) for Benin
Primary school attendance rate	Percentage of people 7 years old and above who have attended primary school for at least 1 year	
Secondary school attendance rate	Percentage of people 13 years old and above who have attended secondary school for at least 1 year	
Access to a private water tap	Percentage of households having access to private water	
Connected to electricity	Percentage of households connected to electricity	
Using a modern combustible	Percentage of households using a modern fuel (gas or electricity)	
Wall solidity	Percentage of households living in a house with solid walls (cement or hard bricks)	
Roof solidity	Percentage of households living in a house with a solid roof (cement or tiles)	
Stunting rate	Percentage of children less than 5 years old suffering from stunting	

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Appendix B: Data on Pre-colonial Kingdoms

District	Related pre-colonial kingdomDescription	Source
Bondoukou	Abron	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978)
Porto-Novo	Adjatche	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Baol	Bawol	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Thies	Bawol	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Borgou	Borgu	Bouche (1991); Ki-Zerbo (1978); Curtin (1978)
Hautegambie	Bundu	Coquery-Vidrovitch and Moniot (1993); Curtin (1978)
Abomey	Dahomey	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Allada	Dahomey	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Ouidah	Dahomey	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Adrar	Emirate of Adrar	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Brakna	Emirate of Brakna	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Tagant	Emirate of Tagant	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Trarza	Emirate of Trarza	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Kindia	Fuuta Jaalo	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Koumbia	Fuuta Jaalo	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Labe	Fuuta Jaalo	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Mamou	Fuuta Jaalo	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)

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Appendix B: *Continued*

District	Related pre-colonial kingdomDescription	Source
Pita	Fuuta Jaalo	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Matam	Fuuta Toro	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Podor	Fuuta Toro	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Bobodioulasso	Gwiriko	Ki-Zerbo (1978)
Louga	Jolof	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Nara	Kaarta	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Nioro	Kaarta	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Tivaouane	Kajoor	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Goure	Kanem-Bornu	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
NGuigmi	Kanem-Bornu	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Sikasso	Kenedugu	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978)
Kong	Kong	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Dori	Liptako	Ki-Zerbo (1978); Curtin (1978)
Fada	Liptako	Ki-Zerbo (1978); Curtin (1978)
Bandiagara	Macina	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Gourma	Macina	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Mopti	Macina	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Kankan	Samori	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Kissidougou	Samori	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Kouroussa	Samori	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Assinie	Sanwi	Ki-Zerbo (1978)

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Appendix B: *Continued*

District	Related pre-colonial kingdomDescription	Source
Macina	Segu	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Segou	Segu	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Sinesaloum	Siin Salum	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Dosso	Sokoto	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Konny	Sokoto	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Tessaoua	Sokoto	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Zinder	Sokoto	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Tenkodogo	Tenkodogo	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Dagana	Waalo	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Kaya	Wagadugu	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Koudougou	Wagadugu	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Ouagadougou	Wagadugu	Bouche (1991); Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)
Ouahigouya	Yatenga	Coquery-Vidrovitch and Moniot (1993); Ki-Zerbo (1978); Curtin (1978)

Appendix C: Why Not Using Settlers' Mortality as an Instrument

Acemoglu *et al.* (2001, 2002) use European settler mortality as an exogenous source of variation of European settlement. To use the same instrument, I need settler mortality rates at the district level. I have therefore

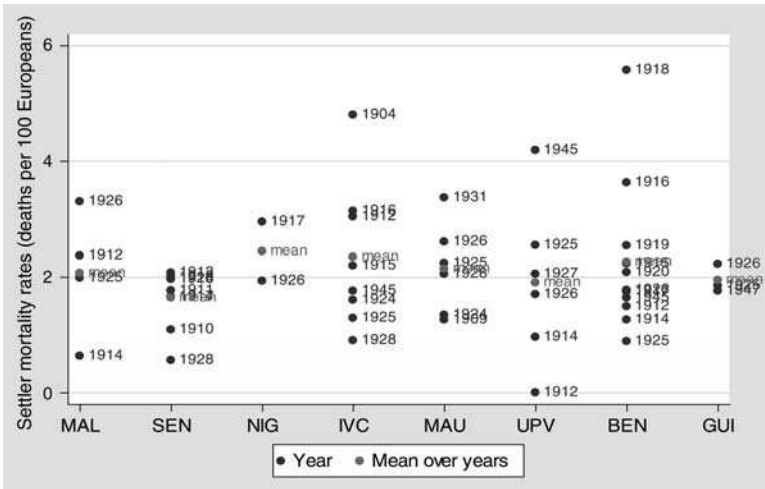
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collected data from French national archives on district mortality rates (colonial censuses report the number of Europeans in the district and the number of deaths over the year). But the problem with settler mortality in West African districts is due to the fact that there were very small numbers of Europeans per district. In 1925, for instance, half of the districts had less than 23 Europeans settlers. Only 25% of the districts had more than 80 settlers. Such small numbers of settlers produce very volatile and unrepresentative mortality rates. At the national level, settler mortality rates can be calculated on the basis of larger numbers of European settlers, which gives more reliable data.

Figure C1 represents the values of settler mortality rates at the colony level between 1912 and 1947. It is apparent that national settler mortality rates are also volatile from year to year, in a range of 0–6%. Data from colonial censuses thus give much lower settler mortality than the data used in Acemoglu *et al.* (2001). The average national mortality rates are also very close to one another. In conclusion, settler mortality rates, as observed by colonial records, were not sufficiently varied within former French West Africa to explain differences in European settlement.

Appendix Graph 1

Settler Mortality within Former French West Africa



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