STONE CENTER ON SOCIO-ECONOMIC INEQUALITY
WORKING PAPER SERIES

No. 96

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Denis Cogneau
Zhexun Mo

December 2024

REVISED
October 2025

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Denis Cogneau † Zhexun Mo ‡

October 9, 2025

*This work was made possible thanks to the funding of the French National Agency for Research (ANR), Project Afristory ANR-11-BSHS1-0006, Project Colecopol ANR-19-CE41-0006, and EUR grant ANR-17-EURE-0001. We thank Elise Huillery for sharing data. We are grateful to Sika Alaye and Deborah Houngbedji for great research assistance in digitizing archival data from Archives Nationales du Sénégal and Bibliothèque Nationale de France. We thank Gareth Austin, Jérôme Bourdieu, Juliette Crespin-Boucaud, Pierre Cyrille-Hautcoeur, Esther Duflo, Elise Huillery, Leigh Gardner, Lionel Kesztenbaum, Sylvie Lambert, Thomas Piketty, Lindsey Pruett, Tom Raster, Oliver Vanden Eynde, Madeline Woker, as well as participants at the Applied Lunch Seminar & Economic History Seminar at PSE, and at LSE-Cambridge Workshop in African Economic History for their helpful comments. The usual disclaimer applies.

†Corresponding Author. Paris School of Economics, EHESS, IRD; denis.cogneau@psemail.eu

‡Stone Center on Socio-Economic Inequality, Graduate Center-CUNY & World Inequality Lab; zmo@gc.cuny.edu

Abstract

We study the enforcement of two pillars of colonial rule in French West Africa—military conscription and head tax collection—using new district-level data from 1919 to 1949. Tax compliance was strikingly high, with about 80 percent of liable taxpayers meeting obligations despite limited administrative capacity. Military recruitment targets were likewise consistently met despite avoidance and poor health. Spikes in head tax rates significantly increased tax-related protests, prompting colonial authorities to moderate rates in times of crisis and adjust burdens to perceived district affluence. Yet local shocks such as droughts or crop price collapses were largely ignored.

JEL Classification: D73, D74, F54, H11, H30, H26, H71, N37, N47, O12, P43, P48

Keywords: Colonialism; State Capacity; Taxation; Compliance; Conflict; Military Conscription; West Africa; French Colonial Empire

1 Introduction

Colonial states in Africa have been described as either despotic or weak.[1] In practice, they were sometimes both, yet at different scales: Jutta Bolt et al. (2022) argue that they were authoritarian at the national level but had to negotiate with precolonial institutions at the local level. Economic history has already said a lot about the outcomes of colonial administration, in terms of development or fiscal performance (e.g., Frankema & Booth, 2019), but less about its procedures. In order to study the balance between the coercive capacity of colonial states and the agency of colonized people, we analyze two of the most important components of French colonial rule in Sub-Saharan Africa: military conscription and the head tax.

While in British colonies African armies were composed of volunteers (e.g., Moradi, 2009), in French colonies military conscription was one of the many forms taken by forced labor (Killingray & Omissi, 1999). With more than 25,000 West African soldiers killed on the French front during World War I (hereafter WWI), the term "blood tax" (*impôt du sang*) came into use. Conscription came on top of the system of civilian forced labor, the so-called *prestations*, also known as "sweat tax" (*impôt de la sueur*) (Fall, 1991; van Waijenburg, 2018).[2] However, conscription was resisted by draft evasion and seasonal migration to neighboring British colonies (Asiwaju, 1976; Echenberg, 1991; Okia, 2022; Pruett, 2024). We may wonder whether military recruitment was significantly hampered by non-compliance of the colonized.

The head tax (*capitation* or *impôt personnel*) was another extractive tool, manifested as

[1]On the one hand, Crawford Young (1994, p.160) describes them as *"the purest modern form of autonomous bureaucratic autocracy"*, Mahmood Mamdani (2018) characterizes them as *"decentralized despotism"*; according to Patrick Manning (1998), French colonial states did not make an exception in this regard. On the other hand, Frederick Cooper (2019) dubs them "gatekeepers", unable to extend power inward, and Jeffrey Herbst (2000, pp.73–80) speaks of *"administration on the cheap"* with *"limited ambition."*

[2]In 1925, according to Marlous van Waijenburg (2018), 20 million days were worked for civilian forced labor in six colonies of French West Africa (excluding Mauritania and Niger), that is an average of 8.5 days per eligible male (one fifth of the total population); note that this number corresponds to the official figure, nothing is known of days effectively worked, that could be lower or higher. According to our data, around 7 million days corresponded to conscript labor (365 days worked by the stock of conscript soldiers), and forced labor by reservists (*brigades de travail*) represented around 1.5 million days.

a regressive poll tax with a fixed rate imposed on the teenage and adult population.[3] In French West and Central Africa in 1925, capitation brought 28 percent of total tax revenue (1.5 percent of GDP), almost as much as trade taxes (1.9 percent) (Cogneau et al., 2021). However, since colonial fiscal capacity building has been described as effort-minimizing (Frankema, 2011), we may wonder to what extent this performance reflected high enforcement and compliance, or only the high tax burden imposed on a minority of reachable and docile taxpayers.[4]

Our questions are then the following. First, was the French colonial state successful enough in implementing both the conscription system and the head tax collection scheme, i.e., was it able to draft the number of recruits it targeted and to raise the revenues it aimed at? Second, what were the forms taken by resistance or non-compliance from the colonized? Third, how much effort was exerted by colonial authorities to achieve their goals and cope with resistance: Did they grant some consideration to equity? Were they flexible enough to finetune their policies according to local conditions?

To address these questions, we created a unique panel dataset that covers military conscription and head tax collection at the district level for every year from 1919 to 1949, at the apex of French colonial rule. We built a demographic model to estimate the populations of eligible military recruits and liable taxpayers in each year. To look at indigenous resistance, we also make use of the conflict data collected by Elise Huillery (2011).

First of all, we reveal high compliance to head tax collection: even under the most conservative demographic assumptions, and regardless of the years examined, the collected head tax revenue consistently exceeded 80 percent of the theoretical expectation, based on head tax rates and estimates of the eligible population. Similarly, during the peacetime interwar period, military recruitment targets were routinely met with little difficulty; and at the start of World War II (hereafter WWII), colonial authorities were

[3] Young (1994, p.129) regarded it as *"leading the way"* to achieve *"a basic equilibrium between the requirements of hegemony and revenue"*. The involvement of police forces in its collection is described by Richard Reid (2012, p.183) as *"the most visible, and the most dreaded manifestation of conquest"*.

[4] The British authorities had given up imposing a head or hut tax in Gold Coast and in Nigeria. Furthermore, in Sierra Leone, they had to fight a "Hut Tax War" in 1898 before being able to implement it with the collaboration of local chiefs (Frankema, 2010, p.467).

able to mobilize very large numbers of soldiers.

Second, this seemingly high compliance was still accompanied with some resistance from the local populations. For military conscription, it was manifested in high absenteeism rates at the recruitment boards. In terms of tax collection, spikes in head tax rates significantly increased the likelihood of tax-related protests, and tax compliance significantly went down during the Great Depression.

Third, despite these acts of defiance, the colonial administration granted little consideration to local conditions. Recruitment quotas were allocated in proportion to local population. Three quarters of young men were judged unfit for military service because of poor health, and an additional fifth evaded the drafting process, yet the pool of fit individuals was usually enough to meet the recruitment targets. The identification of liable taxpayers was based on rudimentary enumerations and mainly relied on the cooperation of local chiefs who were also in charge of tax collection. Only the setting of tax rates reflected a certain degree of adaptation. Higher rates were applied to districts with better perceived economic conditions, yet excessive increases were especially avoided in the same districts, and everywhere during the Great Depression. Last, we find no evidence of fine-tuning of policies with respect to local shocks like drops in cash crop prices or severe droughts, and very limited responsiveness to local protests.

In sum, the colonial state was coercive enough to meet its objectives, without caring too much about indigenous resistance. At the same time, it was perhaps weak enough or at least cautious enough to remain pragmatic and refrain from setting too high demands.

Our paper contributes to several strands of literature. First, we add to the extensive literature on fiscal capacity and state building (Besley & Persson, 2009, 2010), with particular attention to the tax compliance dimension (Slemrod, 2019). Recent advances bring this question to the field through randomized controlled trials conducted with tax authorities (e.g., Pomeranz & Vila-Belda, 2019; Bergeron et al., 2024). A growing number of historical studies also examine the formation of fiscal capacity over the long run (e.g., Cantoni et al., 2024), including analyses of tax compliance behavior such as in medieval

Paris (Slivinski & Sussman, 2019) and among nineteenth-century Moscow aristocrats (Korchmina, 2022). On colonial Africa in particular, the literature has predominantly emphasized the institutional and administrative features of tax collection (Frankema, 2010; Frankema & van Waijenburg, 2014; Gardner, 2010, 2012), and the long-term persistence of colonial public finance schemes (Huillery, 2009; Mkandawire, 2010). To the best of our knowledge, this paper is the first to quantitatively assess the compliance of colonized people with taxation in Africa. In their article on British Native Authorities in West and East Africa, Bolt and Gardner (2020) analyze the determinants of tax revenue per capita at the local level, but do not disentangle tax pressure from taxpayers' compliance.

Secondly, we also contribute to the economics of labor coercion (Acemoglu & Wolitzky, 2011). While a growing economic literature has concentrated on the long-term developmental impacts of coercive colonial labor practices—such as mines or land concessions (Dell, 2010; Lowes & Montero, 2021), ethnicity-based subjugation (Blouin, 2022), prison labor (Archibong & Obikili, 2023), military conscription (Mo et al., 2025; Salem & Seck, 2025), or seasonal wage labor (Denton-Schneider, 2024; Dupas et al., 2025)—there is limited quantitative research on the institutional formation of these coercive labor systems, with the exception of van Waijenburg (2018) who quantifies the contribution of civilian forced labor to the financing of French colonial states in Africa. We further address this gap by empirically documenting the hierarchical structure and demographic reach of the military conscription system in former French West Africa.

Third and ultimately, we contribute to the body of literature examining historical sources of unrest and conflict in Africa, before (Besley & Reynal-Querol, 2014) and after slave trade abolition (Fenske & Kala, 2017), under colonial rule (Papaioannou & de Haas, 2017) and in the post-colonial era (Michalopoulos & Papaioannou, 2016). Our work adds to this literature by differentiating among types of civil conflicts based on their underlying motives, and highlighting the impact of tax increases or enforcement on conflict, like in the case of postcolonial India (Shapiro & Vanden Eynde, 2023) or early modern France (Davoine et al., 2025; Giommoni et al., 2025).

The remainder of this paper is organized as follows. Section 2 provides a short historical background, describes the organization of military conscription and head tax collection, and the corresponding data. Section 3 introduces measures of compliance with conscription and taxation and delivers first-order results. Section 4 examines the incidence of individual acts of defiance and of collective protests from the colonized. Section 5 analyzes how military recruitment was achieved and how colonial authorities tried to limit conflicts about taxation. Section 6 concludes.

2 Colonial Administration, Conscription and Taxation

French West Africa (*Afrique Occidentale Française*, henceforth AOF)[5] was organized as a federation of eight colonies, namely, as illustrated in Figure 1 from West to East and from North to South: Mauritania, Senegal, Guinea, Ivory Coast, Dahomey (present-day Benin) on the coast of the Atlantic Ocean; French Sudan (Mali), Upper Volta (Burkina Faso) and Niger, three landlocked territories. It straddled a vast area of 4.7 million square kilometers wide, eight times the size of France, although two-thirds of this area was not well suited for agriculture. With 13 million people only in 1920 (versus 39 in France), the population density was low. In Mauritania and Niger, the majority of people were considered as nomads; they were not subject to conscription and paid a tax on livestock instead of the head tax. Because the modalities of colonial rule were different in these two colonies, we focus on the six other colonies of AOF.[6]

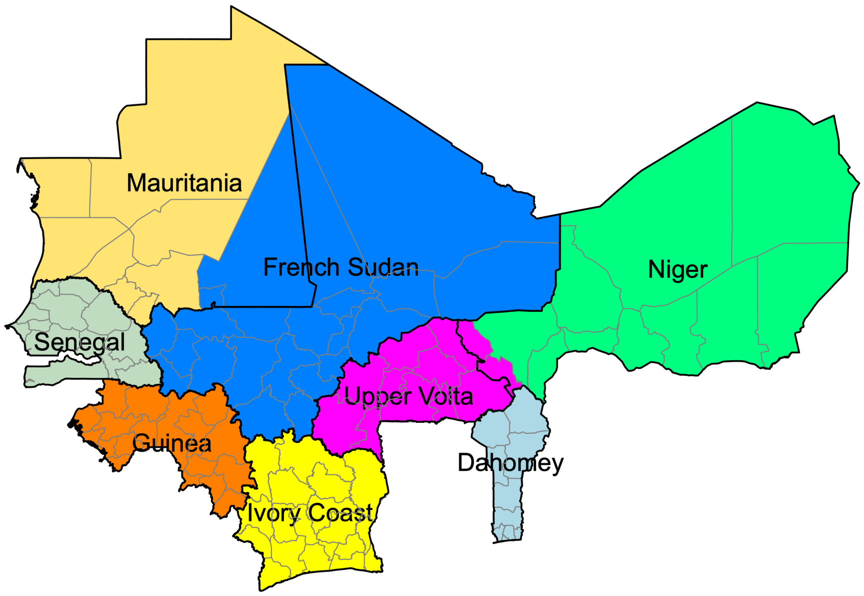
2.1 Administrative Organization of French West Africa

The AOF federation was officially created in 1895. Civilian administration only gradually became effective from the early 1900s to 1920, with it taking the longest for remote

[5]The terms French West Africa and AOF are used interchangeably in this paper.

[6]Furthermore, In Senegal, natives from the municipalities of Dakar, Gorée, Rufisque and Saint-Louis (the *Quatre Communes*) had some kind of French citizenship. After WWI, this made them subject to universal conscription in France and they did not contribute to the pool of colonial African *Tirailleurs*. They were also subject to the same tax obligations as Europeans, the same head tax and also a property tax specific to urban areas. Given their exceptional status, we also exclude these municipalities from the following analyses.

Figure 1: Administrative Regions in French West Africa (1925)



Notes: The bold lines delineate the contemporary country boundaries. The differentially colored region indicate the colonial-time outreach of each single colony within the French West Africa federation. As can be seen, parts of colonial French Sudan include a few districts belonging to contemporary Mauritania. And parts of colonial Upper Volta also include a few districts which belong to contemporary Niger. These districts are dropped in our analyses (more detailed below).

regions like Forest Guinea. At the top, a General Governor headed the federation from Dakar, Senegal. In the middle, a Lieutenant Governor was in charge of each of the eight colonies. At the bottom, the colonies were then divided further into districts (*cercles*) and sub-districts (*subdivisions*). At the local level, district administrators (*commandants de cercle*) were in charge of tax collection, military recruitment, and mobilization of forced labor. They also supervised indigenous justice, oversaw the construction and maintenance of public infrastructure, and managed education and health expenditures (Huillery, 2009). Large geographical distances, combined with the limitation of communication means, contributed to their omnipotent status (Delavignette, 1939; Cohen, 1971). Given that French civil servants were very few, administrators also had to rely on the cooperation of African chiefs who received wages and rewards for their services (Zucarelli, 1973).

2.2 Conscription System and Corresponding Data

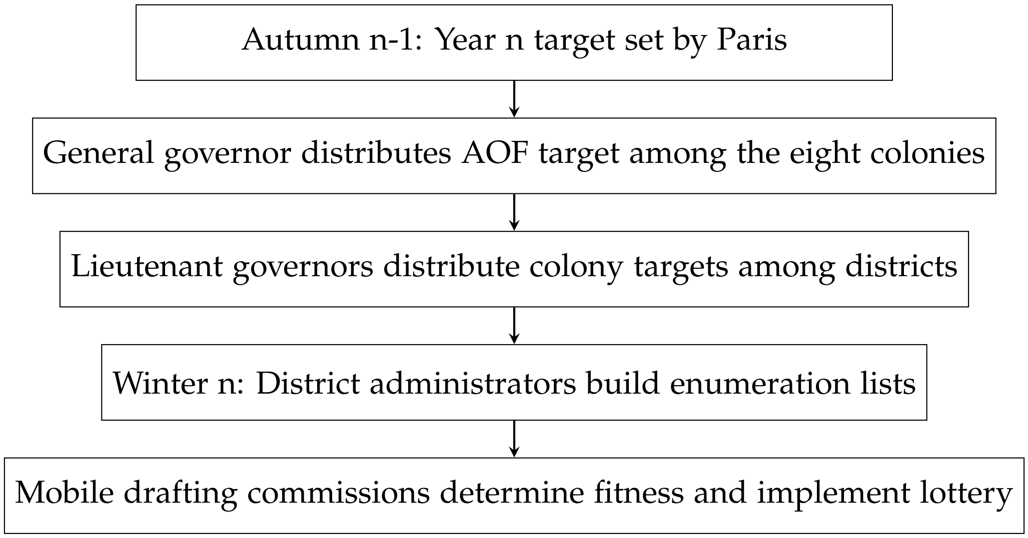
West African colonial soldiers were called *Tirailleurs Sénégalais*, even when they did not originate from Senegal. Since the second half of the nineteenth century until WWI, they had gradually become one of the main pillars of French imperial order. At the time, local chiefs were directly asked to select additional recruits among their people. It was only after 1920 that a formal conscription system was put in place in order to facilitate future levies.[7]

The post-WWI formal conscription system was very much inspired by the partial conscription by lottery applied in France before 1870 (Cogneau & Kesztenbaum, 2021). It was carried out against the backdrop of the pyramidal organization of AOF, as shown in Figure 2. To start with, every autumn, the Minister of War in Paris would indicate the number of soldiers to be recruited for the entire AOF in the next year. The General Governor would then distribute the annual quotas to the eight colonies. In each colony, the Lieutenant Governor would further divide the allocated colony-level quota into district-specific conscription targets and send them to district administrators for the ultimate fulfillment of conscription. This disaggregated level of administration is also the level of analysis in this paper.

During the month of December or January in the following year, after having received the fixed recruitment quota, the district administrators would build an enumeration list of indigenous young men who were regarded as potential recruits for the district in that given year. This process was carried out with the assistance of local chiefs. Young men became eligible at the age of 20 and remained so until the age of 28, even though age was seldom precisely recorded in African societies. The enumerated soldiers would then be called upon in their residential villages or towns to travel to the drafting centers in their own district for medical examination. It was at this point in time that some individuals would try to hide and escape from the conscription calls. If caught, these absentees

[7] The new system allowed sending troops to German Rhineland (1919-30), Syria (1920-22), and Morocco (1925-26). In 1939-40, around 50,000 West Africans fought in France. After WWII, some were also sent against the rebellion in Madagascar (1947), and to fight the independence wars of Indochina and Algeria.

Figure 2: Conscription Implementation Process in French West Africa



were automatically conscripted, except when considered particularly unfit for military service. Individuals who were present at the conscription centers would then receive medical examinations to determine whether they were fit for the military or not. There were four reasons for which individuals could be judged as unfit: (i) *Exempté*: physically unfit; (ii) *Dispensé*: already having a family member serving in the military; (iii) *Ajourné*: seemingly under-aged and obliged to come back in the future for reexamination; (iv) *Sursitaire*: temporarily exempted from service due to accepted obligations like education.

Among the soldiers who were deemed fit, the drafting commission first asked who would volunteer to join the army, for four, five, or six years of service. Unlike conscripts, volunteers earned a small salary. In many cases, military authorities put a cap on the number of volunteers. Indeed, the doctrine of conscription specified that the army should not rely too heavily on volunteers, as their numbers could fluctuate and decline during wartime. Conscripted soldiers were expected to serve for three years. According to the official target (quota) in the district, the commission would then perform a lottery to recruit a portion of the remaining fit, who together with volunteers would constitute the overall "first portion" (*première portion*) soldiers. Ultimately, the fit individuals who were left out of the lottery would form the "second portion", also known as "reservists", who were activated at the beginning of WWII. Some of them were also mobilized for public works, in the so-called labor brigades (*brigades de travail*).[8]

Our conscription data were digitized from the annual military reports in *Série-4D* at the National Archives of Senegal in Dakar. We could construct an original district-year-level (yet unbalanced) panel military dataset from 1923 until 1947. More details on this panel can be found in Appendix A.1.

The top panel of Table 1 shows descriptive statistics for the main variables that characterize the recruitment process.

2.3 Head Tax Levy and Corresponding Data

The capitation was a lump sum tax, hence the most regressive form of tax levy applied to almost the entire teenage and adult population. During the initial years of colonial rule, the tax base even extended to children aged between 8 and 14. Later on, the age threshold was moved up to 14-16 in the mid-1930s for all colonies. Soldiers (*tirailleurs*), their wives and their children were all exempted from the head tax. Military reservists employed in public works were also exempted, as well as policemen in some cases (*gardes de cercles*). Individuals unable to work, physically impaired or too old were also exempted, as well as school students. Nomads, who represented a significant share of the population in Northern French Sudan, like in Mauritania and Niger, paid a tax on livestock (*zekkat*), and were therefore exempt from the capitation or paid significantly lower rates. Exempted individuals could never make more than 2 percent of eligible taxpayers.

Apart from the basic capitation (*impôt personnel*), additional poll tax rates could also apply to the same population: for local public works (*taxe vicinale*), indigenous medical assistance (*assistance médicale indigène*), or in replacement of suppressed forced labor duties (*taxe représentative des prestations*, *taxe additionnelle à l'impôt personnel*). We sum up all different forms of head tax rates into one. Annually, the lump-sum tax rate to be

[8] See Mo et al. (2025) for further details on the activation of such military reserivsts as forced labor workers for public infrastructure projects, especially in the context of French Sudan (present-day Mali).

Table 1: Summary Statistics for Conscription and Head Tax

	Military Variables				
	Mean	SD	Min	Max	N
Target (net of R.A.)	146.5	113.7	5	730	903
Recaptured Absentee (R.A.)	7.5	19.7	0	197	903
Enumerated	2495.5	1874.7	105	10,840	903
Enumeration rate (%)	132.5	62.7	13	636	903
Absentee	497.8	733.5	0	5,213	903
Absence Rate (%)	18.8	15.8	0	82	903
Fit	437.7	461.6	5	4931	903
Fitness Rate (%)	23.3	14.7	3	100	903
Volunteer	27.0	46.5	0	368	903
Volunteering Rate (%)	9.0	15.9	0	97	903
Drafted Soldier (First Portion)	111.2	98.3	0	590	903
Lottery Rate (%)	35.0	22.9	0	100	903
Military Enforcement Rate (%)	99.4	7.2	21	162	903
	Taxation Variables				
	Mean	SD	Min	Max	N
Head Tax Rate	16.1	7.6	2	67	1,906
Actual Tax Levy	1,558,817	1,304,534	28,087	10,235,578	1,906
Estimated Theoretical Tax Levy	1,839,113	1,514,094	87,129	9,387,934	1,906
Tax Compliance Rate (%)	85.1	22.0	13	218	1,906

Notes: Top panel: sample of district-years for which all conscription variables are not missing; all figures are numbers of men, excepting rates in percent (%). Bottom panel: sample of district-years for which both the head tax rate and the actual amount levied are not missing; all figures are in francs at 1937 prices, excepting the compliance rate in percent (%). See below for the definitions of Military Enforcement Rate (MER) and of Tax Compliance Rate (TCR). For the latter, the reported figure corresponds to our mean demographic scenario.

levied in the following year was first proposed by the district administrator late in the previous year, and then it was submitted to the Lieutenant Governor of the colony for ultimate approval. Rates were usually set at the district level, or else the within-district variation in rates was limited. Once the head tax rate was approved by the head of the respective colonies and with the advent of the new calendar year, the entire district-level administration would start to engage in tax collection efforts throughout the whole year.

The bulk of capitation was collected by local chiefs who received a wage payment and a share of the amount collected as a reward (*remise*), under the supervision of district and sub-district administrators and of upper-tier chiefs (*chefs de provinces*, *chefs de canton*). Cogneau et al. (2021) show that total payments to the chiefs never represented more than 7 percent of the total amount collected; furthermore, the wage paid also compensated them for other administrative functions. We share the same finding, with wages representing around 2 percent and rewards slightly more than 4 percent of the total amount of head tax collected on average.

In most cases, especially in the early years, tax collection relied primarily on village-level estimates of the number of liable taxpayers and on registers listing the names of local chiefs (*rôles numériques*), rather than household- or individual-level rolls (*rôles nominatifs*). In practice, this meant that chiefs were held responsible for collecting the total head tax due from their communities, acting as intermediaries between the administration and the population. Based on these estimates, district administrators calculated the expected annual tax yield as the product of the head tax rate and the assessed tax base. This base was only marginally revised from year to year, except when colony-wide changes in age thresholds prompted a discontinuous adjustment.

The main source for head tax rates is the yearly colonial budget (*budget local*) of each colony, where head tax schedules are specified. From this source, also using Huillery (2009) for some years, we could construct a district-year-level panel of head tax rates and actual amounts levied. More details on this panel can be found in Appendix A.2.

3 Measuring Enforcement

The first-order question we seek to address regarding the coercive capacity of the colonial state is whether the colonial administration successfully met its objectives in both conscription and head tax collection.

3.1 The Easy Enforcement of Conscription

On the side of the colonial authorities, the fulfillment of the target numbers can be measured by the Military Enforcement Rate (*MER*) constructed as the following:

$$MER_{ict} = \frac{Recruited_{ict}}{Target_{ict}} \tag{1}$$

In a given district i in colony c and year t, the enforcement rate is calculated as the fraction of the total number of recruited soldiers out of the military target assigned to the district in that given year. Specifically, *Recruited* refers to the sum of (i) the number of recaptured absentees who were automatically recruited, (ii) the number of volunteer soldiers, and (iii) the number of soldiers assigned to the first portion after the lottery (*appelés*). *Target* is the target number (recruitment quota) assigned by the Lieutenant Governor.

On average, in peacetime, a district received a quota of approximately 145 soldiers to be recruited annually among its 20-year-old young male population (Table 1). At the end of the day, the quota was almost always met in each district each year. As defined in Equation 1, the Military Enforcement Rates (*MER*) averaged at 99.4 percent, with a small standard deviation of 7 percent. The median of *MER* was 100 percent, as well as the bottom and top deciles. The *MER* lied below 97 percent in less than 5 percent of the cases, and below 66 percent in less than 1 percent. Some of the cases that deviate from 100 percent, either downward or upward, might even be measurement errors.

On average, three-quarters of the recruits were first portion soldiers selected through the lottery, one-fifth were volunteers, and a small remainder (5 percent) consisted of recaptured absentees. Ultimately, the average lottery rate was around 35 percent, which means that a larger share of the fit young males were assigned into the pool of reservists (or to forced labor in public works).

3.2 The High Compliance with Head Tax

In terms of tax collection, unlike conscription, there was no particular taxing target assigned by higher-level colonial officials. However, every year district administrators themselves would stipulate a forecast amount to be collected in their respective districts. Like for military targets, the actual amount collected ended up corresponding very closely to this forecast amount. This shows that administrators were able to make local chiefs collect enough money to fit with their forecasts, which then played the role of a local target. However, the estimated forecast did not necessarily reflect the true tax potential at the district level; enumeration efforts were limited and the number of taxpayers was most often casually updated from the previous year. We then resort to constructing our own estimate of the theoretical tax base.

Concretely, the Tax Compliance Rate (TCR) is calculated as specified in equation 2:

$$TCR_{ict} = \frac{Collected_{ict}}{Theoretical_{ict}} \tag{2}$$

For the numerator term on the actual total amount of head tax collected at the district level, corresponding figures were taken from the annual colony-specific definitive accounts (*comptes définitifs*).[9] Secondly, for the denominator term, the theoretical amount of total head tax was further constructed as the product between the actual head tax rate and an estimated tax base:

$$Theoretical_{ict} = Rate_{ict} \times Base_{ict} \tag{3}$$

The tax rate is the average lump-sum amount due by each liable taxpayer in district i in

[9] At the colony level, actual total amount is always available. At the district level, in the few cases where it was missing we replaced it with the forecast amount to be collected for that year, which, as we already mentioned, was usually closely met.

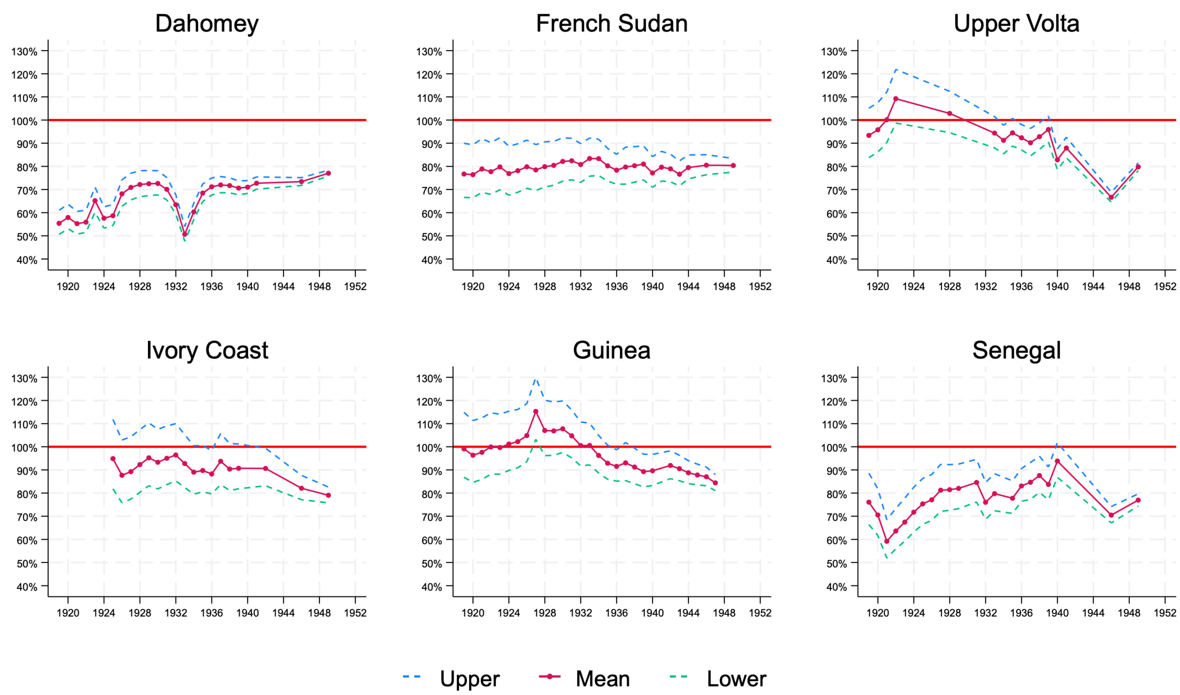
year t (see data section above). The tax base is the estimated liable population in district i, i.e., the number of people in the age range fixed by decree in the corresponding colony c in year t.

We built a demographic model in order to generate population time series for each of the six colonies. The model estimates the total population as well as its age structure, so that the number of liable taxpayers is available in each year, and also the number of eligible conscription recruits (20-year-olds). The demographic projections are anchored on the levels reached by three variables: total population in 1960, drawn from World Development Indicators (World Bank); crude birth rates and infant mortality rates for 1950 and 1960 drawn from Tabutin and Schoumaker (2004). Details on the model and on the simulations can be found in Appendix A.3. We selected two simulations that, in our view, provide a good sense of the possible range of demographic changes between 1914 and 1950 in French West Africa, both in terms of fertility and mortality. They differ first in the magnitude of these changes, and second in how gradual these changes were. We view the first (resp. second) scenario as providing a lower (resp. upper) bound for the number of liable taxpayers, hence an upper (resp. lower) bound for our estimates of tax compliance. The mean of the lower bound and the upper bound provides us with an intermediate demographic scenario. With respect to the total population, even our upper bound estimates are more conservative than those of Frankema and Jerven (2014), who did not estimate age pyramids.

Figure 3 shows our estimates of Tax Compliance Rates (TCR) at the level of each colony.[10] In each colony and in each year, the lower bound of TCR is most of the time above 60 percent, and very often above 80 percent. It is in Dahomey where compliance is the lowest; it even drops significantly during the Great Depression (1932-1934), as indeed was noticed by colonial administrators at the time. However, from 1919 to 1949, the average TCR in Dahomey still reaches 66 percent according to our mean demographic

[10] Each graph plots $TCR_{ct} = \sum_{i \in c} Collected_{ict} / \sum_{i \in c} Theoretical_{ict}$. This can be estimated even in the few cases where only colony-level collected amounts $Collected_{ct}$ are available. We could alternatively compute: $TCR^*_{ct} = \sum_{i \in c} (Collected_{ict} / Rate_{ict}) / Base_{ct}$, which does not necessitate estimating district level liable population, only colony level $Base_{ct}$ (as liability age-based rules do not vary among districts of a given colony). We checked that the two estimates were very close to each other.

Figure 3: Tax Compliance Rates - Colony Level (1919-1949)



Notes: Estimates of Tax Compliance Rates (TCR) at the colony-year level, based on three demographic projections: Upper, Mean and Lower. See definition of TCR in Equation 2. See text and Appendix A.3 for the definition of demographic scenarios. The red bar locates at y-axis of 100 percent, which indicates full compliance, where the actual amount collected (or the forecast amount) is equal to the theoretical tax base. Points that fall above the red line indicates that the total amount collected is larger than the theoretical tax base; and vice versa.

projection (62 percent according to our lower bound). Senegal comes second with a period average of 77 percent. French Sudan is characterized by very stable rates around 80 percent. The average rates for Ivory Coast, the Upper Volta, and Guinea are above 90 percent. In the latter two cases and for a few years before WWII, the estimated TCR lies above 100 percent for our mean scenario, although not for our more conservative lower bound (with only one exception for Guinea in 1927). This might be due to measurement errors in head tax rates at the district level. We rather believe that in early years, colonial administrators could more often "overshoot", i.e., overestimate the eligible population of villages and demand excessive amounts to chiefs. In the late 1940s, when both population estimates and tax registration are already less uncertain, all colony-level TCR converge to 80 percent. Our estimates say that the total tax amount that was collected corresponds to what would result from the compliance of 80 percent of liable individuals. We cannot ascertain that this number of individuals actually paid the tax, as it was most often collected on a collective basis with the intermediation of the chiefs. The latter could have chosen to exempt some and overtax others. Yet it is hard to believe that such a large tax bill was honored by only a small number of docile individuals or households.

At the district level, the average of TCR is found to reach 85 percent under the mean demographic scenario, as reported in the bottom panel of Table 1. The median TCR is close to 86 percent, while the bottom decile reaches 58 percent and the top decile 110 percent. At this level, as compared to colonies' averages, measurement errors make data more noisy.

4 Resistance to Conscription and Taxation

We now examine how colonized natives resisted conscription and taxation, either through evasion or protest.

4.1 Conscription: Individual Avoidance and Limited Collective Protests

Absenteeism at the drafting commissions could certainly be a sign of reluctance to conscription and of non-compliance with colonial rule. We can compute the Absence Rate ($AbsR$) as the ratio of the number of absent young men at the drafting commissions to the number of those who had initially been enumerated and registered:

$$AbsR_{ict} = \frac{Absent_{ict}}{Enumerated_{ict}} \tag{4}$$

As already underlined by Echenberg (1991), the colonial authorities were indeed sometimes confronted with high rates of absenteeism in the conscription process, as shown in Appendix Figure A3. Absentees could make up as high as 40 percent of enumerated young men, and on average 19 percent across colonies and years (see Table 1). Lindsey Pruett (2024) shows that the expansion of the railway network facilitated absenteeism. Perhaps consistently enough, we find that absenteeism is slightly more pronounced in districts with larger land area—potentially offering greater opportunities for hiding. Whereas military authorities often complained about draft evasion toward British colonies, we fail to identify an effect of the proximity to international borders, perhaps because evaders also escaped enumeration. As can be seen in Table 1, the number of absentees was always far above the number of volunteers.[11]

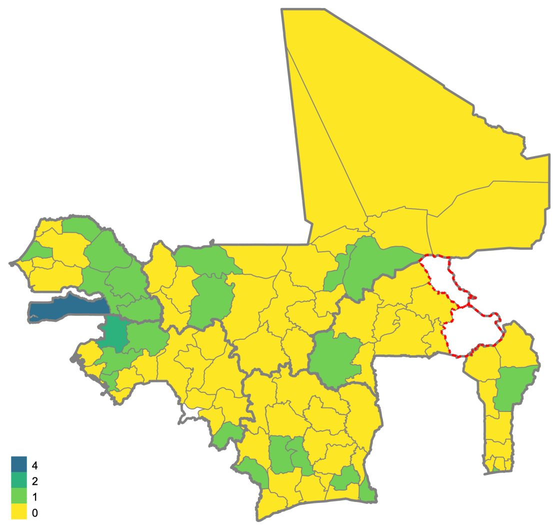
Outside of individual absenteeism, the conflict data collected by Huillery (2011), from the political reports written by governors, allow us to distinguish protests directly associated with military conscription. Appendix A.4 provides more details on how these data are constructed. It must be acknowledged that they can be influenced by reporting biases. However, the prevalence of this type of conflict appears very limited, especially compared to other types (see below).[12] In contrast with head tax rates and tax-related

[11] Even if this was within the context where the military authorities fixed caps on volunteering, as they preferred to rely on mandatory conscription. Moreover, it should also be noted that it is impossible to check how much free will was involved in individual volunteering.

[12] Casamance, the part of Senegal that lies south of the British Gambia, constitutes a prominent exception, as is visible on the map of Figure 4; in fact, Casamance was generally hostile to all colonial interventions (see maps in Figures 5 and 6 below).

protests (see below), we found no correlation between target increases and conscription-related protests. While significant proportions of eligible young men tried to escape recruitment, absenteeism was more an individual decision and colonial authorities were not confronted with strong collective resistance to conscription, at least after WWI.[13]

Figure 4: Occurrence of Conflicts about Military Recruitment (1919-1949)



Notes: The map documents the total number of military recruitment-related conflicts at the colonial district level from 1919 till 1949 (the sample covers only ten years of this time period, ending with digits of 3, 6 and 9). The two districts left blank are Dori and Fada, which belong to contemporary Burkina Faso, but were re-attached to the colony of Niger during the partition of Upper Volta (1932-1947). As such they are excluded from our analysis.

Among non-absentees, an average of only 23 percent of potential recruits could be deemed fit (see Table 1). This fitness rate was very low if compared to similar figures reported for the metropolitan French army during the same period of time.[14] Absentees might have been healthier than average. However, we argue that absenteeism was never an important constraint, as in the vast majority of cases enough fit men were present to fulfill the recruitment target.

[13]Our data start in 1919, thus disregarding the significant riots that occurred during WWI: in 1915 in the district of Beledougou in French Sudan, following a severe drought (1913-14), in the districts of Dedougou and Bobodioulasso in Western Upper Volta (Michel, 2003, p.37-40), then in 1916 in Dahomey (d'Almeida Topor, 1973). During WWII, there were few examples of large-scale rebellion (Thobie et al., 1990, p.341). According to our data, in the mobilization year of 1939, most of the protests took place in Niger where conscription used to be lighter in peacetime; this colony is anyway excluded from our analysis. Other cases were the districts of Bandiagara and Mopti in Central French Sudan and Nzerekore in Forest Guinea.

[14]For example, at the end of the 19th century in a poor district of Paris, 65 to 85 percent were judged fit (Cogneau & Kesztenbaum, 2021).

4.2 Taxation: Collective Protests in Times of Excessive Tax Increases

We then wonder whether excessively high tax rates led to conflicts between colonial authorities and the local population.[15] In addition to protests related to conscription, Huillery's data enable us to differentiate between protests associated with taxation and other types of protests. As can be seen from the map in Figure 5 compared to that in Figure 4, tax-related protests are more frequent than conscription protests. Cross-sectionally, the Pearson correlation coefficient between the two types of protests is 0.33. Other types of protests, i.e., non-military and non-tax, were far more frequent (Figure 6), and also spatially correlated with tax-related protests, with a correlation coefficient reaching 0.46. Some districts were in conflict in almost all years, as ten years are observed and many districts had more than 7 protest records between 1919 and 1949.

Regarding the incidence of protests over time, Huillery's data focuses on years ending in digits 3, 6, and 9 during the period between 1919 and 1949. This sampling approach results in a relatively small sample size for analysis and precludes the measurement of conflict duration. Figure 7 shows that the frequency of tax-related protests increased during the Great Depression, reaching more than 20 percent of the districts in 1933. This conflict boom comes after a steep increase in head tax rates, between 1926 and 1933. Remember that tax compliance fell at the same time, especially in Dahomey, Ivory Coast and Senegal (Figure 3). Then, between 1933 and 1936, the mean head tax rate moved little (before growing again until 1940), as the colonial administration tried to mitigate protest and restore compliance. The frequencies of other types of protests were more stable over time.

[15] With regard to the colonized agency, we also looked for some relationship between tax rates and absenteeism or volunteering on the military side. Higher tax rates might call for additional labor to earn the necessary cash income and push young men to escape conscription, or else volunteer to exempt their families from the head tax and also earn a small pay. Possibly because these two motives counteract each other, we did not find any significant correlation. We did not find that absenteeism or volunteering correlate with weather conditions or drought incidence, either.

Figure 5: Occurrence of Protests about Taxation (1919-1949)

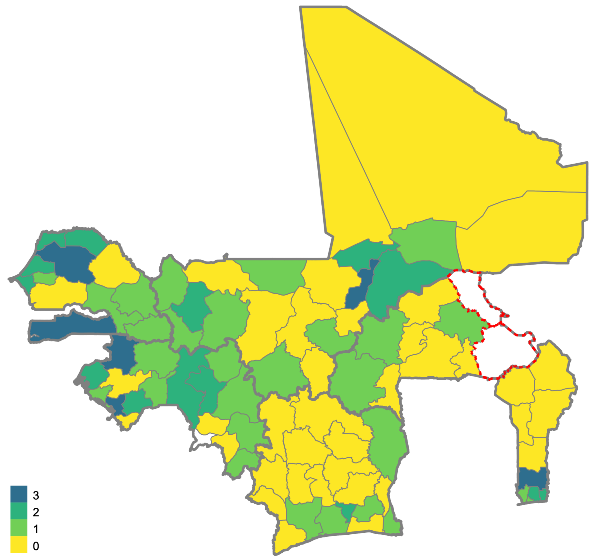
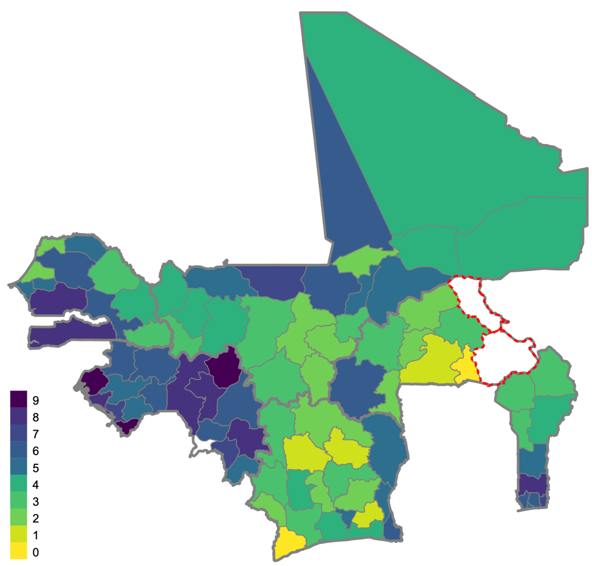
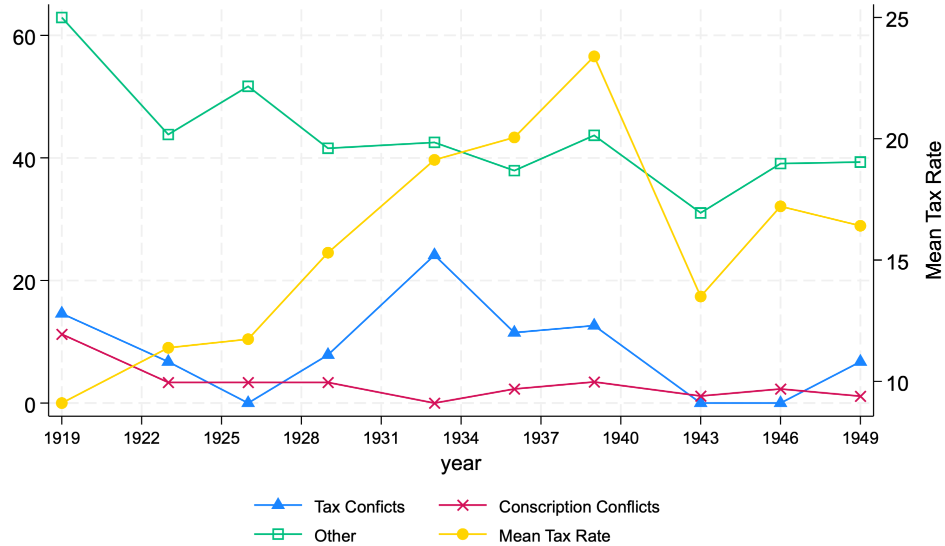


Figure 6: Occurrence of Protests Not Linked to Conscription or Taxation (1919-1949)



Notes: The maps document the total number of tax-related protests (Figure 5) and of all kinds of general protests (not related to military recruitment or taxation, Figure 6) at the colonial district level from 1919 till 1949 (the sample covers only ten years of this time period, ending with digits of 3, 6 and 9). The two districts left blank are Dori and Fada, which belong to contemporary Burkina Faso, but were re-attached to the colony of Niger during the partition of Upper Volta (1932-1947). As such they are excluded from our analysis.

Figure 7: Protest Occurrence across Time in AOF (1919-1949)



Notes: The graph plots the share in percent of districts with each kind of reported conflict 1919 till 1949 on the left scale, and the time evolution of the mean head tax rate (in 1937 francs) on the right scale.

We further analyze how head tax rates correlate with the incidence of tax-related protests and other types of reported protests. Our approach follows Bazzi and Blattman (2014), who examine the impact of commodity export prices on civil conflict. The main specification is a linear probability model:

$$Y_{ict} = \beta_0 + \beta_1 Rate_{ict} + \eta_i + \theta_i \times t + v_{ct} + u_{ict}, \tag{5}$$

where Y_{ict} is a binary indicator capturing the incidence, onset, or termination of a given type of conflict. Specifically, it equals one if at least one protest of that type occurred in district i of colony c in year t, and zero otherwise. $Rate_{ict}$ denotes either the level of the head tax rate or its logarithm.[16] We examine both forms because the head tax was a lump-sum poll tax: it is ambiguous whether the relevant margin is the absolute level or the proportional (logarithmic) change. In poorer districts with initially low tax rates, a given absolute increase may be more burdensome than a proportional one. The

[16]We also tested an alternative determinant of conflict: weather shocks, measured by the Standardized Precipitation Evapo-transpiration Index (SPEI) from Vicente-Serrano et al. (2010) (see Appendix A.5). No significant effect was detected, perhaps reflecting the limited quality of historical climate data.

specification includes district fixed effects (η_i), district-specific linear time trends ($\theta_i \times t$), and colony-year fixed effects (v_{ct}) to absorb district specificities and colony-wide shocks wit respect to both conflict and taxation. Our favored estimation method is ordinary least squares with dummy variables, yet first-differenced models give similar results.[17] Columns (1) and (4) of Table 2 report estimates of $\hat{\beta_1}$ for tax-related protests (column 1) and other types of protests (column 4). The top panel presents results using the level of the head tax rate, while the bottom panel uses its logarithm.

Table 2: Impact of tax rate variations on protests

	Tax protest			Other protest		All protests
	Incidence	Onset		Incidence	Onset	Termination
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	+0.896**	+1.004**	+1.488**	+0.310	-0.774	-1.558
	(0.411)	(0.424)	(0.563)	(0.627)	(0.939)	(1.539)
Colony-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
District Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	390	815	390	342
	(1′)	(2′)	(3′)	(4′)	(5′)	(6′)
Log. Tax Rate	+0.126	+0.178**	+0.352**	0.128	-0.275	-0.662**
	(0.088)	(0.085)	(0.143)	(0.131)	(0.263)	(0.311)
Colony-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
District Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	390	815	390	342

Notes: Tax (resp. Other) protest (columns 1 to 5): The dependent variable equals 1 (else 0) if at least one significant protest directly related (resp. not related) to taxation is observed in year t. All protests termination (column 6): equals 1 (else 0) if no conflict is observed in year t. Linear probability model estimated by ordinary least squares, with district fixed effects, district-specific linear time trends, and with colony-year fixed effects. Column (2): districts where no tax-related protest was reported in $t-3/4$. Columns (3) & (5): districts where no conflict of any kind was reported in $t-3/4$). Column (6): districts where at least one conflict was reported in $t-3/4$). Tax Rate = Level of the head tax rate (in '00 francs 1937). Bottom panel: Log. Tax Rate = Logarithm of the head tax rate. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

Results suggest that higher head tax rates make tax-related protests more likely to occur. According to column 1, raising the head tax rate by one standard deviation, equivalent to 2.6 francs,[18] increases the probability of a tax protest by more than 2 percentage points.

[17] Models with year fixed effects only (i.e., v_t) also give similar results, as well as conditional logits, see Appendix A.7.2.

[18] This is the standard deviation of the residual of the regression of the head tax rate on all controls: η_i,

This is a large effect, because the average prevalence of tax conflict incidence is only 9 percent. The effect of the logarithm of the head tax rate is less precisely estimated, yet the magnitude is quite similar (1.4 p.p.). Results from column 4 suggest that the impact of tax rates on non-tax protests is much weaker, also keeping in mind that these kinds on protest are more frequent (average prevalence is 44 percent). As argued by Bazzi and Blattman (2014), the determinants of conflict onset are not necessarily the same as the ones of conflict termination. To analyze conflict onsets, we present results obtained when restricting our analysis sample to district-years where no tax-related protest was reported in the previous time period (column 2), or else where no conflict of any kind was reported (columns 3 and 5). The effect of the head tax rate on the onset of tax protests is similar to the one on incidence, and it even turns significant in the logarithmic specification (column 2). When further restricting the sample to district-years with no conflict of any kind in the period before, the effect of tax rates on the surge of tax protests is even stronger (column 3): as high as 4 percentage points for one standard deviation in the level (3.4 p.p. for the logarithm), while the average prevalence of conflicts onset is 6 percent. As the causes of conflict may be hard to disentangle, the distinction between tax-related and other types may be fuzzy, so that having no conflict at all as the starting point may improve the identification of causality. Anyway, the onset of other kinds of protests still appears insensitive to tax rates (column 5). Last, tax protests are too rare to allow analyzing their termination, but we can analyze the correlation between tax rates and the likelihood of the termination of all protests, whether tax-related or not. This is what is done in column 6. Higher tax rates seem to increase the likelihood that conflict lasts longer, although only significantly so in the logarithmic specification.[19]

Next, we investigate the heterogeneity in protest responses to taxation. In particular, even if absolute or proportional variations in tax rates seem to matter the same on average, they do not necessarily mean the same variation in tax burden for districts with high or low rates. Given that proximity to sea ports is a significant determinant of head

$\theta_i \times t$, and v_{ct}, not the mere standard deviation of the head tax rate which is as high as 8 francs.

[19]The standardized impact is then -4.8 percentage points, for an average likelihood of protest termination of 53 percent.

tax rates (see Table 4 below), we partition our analysis sample into two halves based on this variable, within each colony. Appendix A.7.3 shows that the aforementioned results stem from districts closer to sea ports. In these districts, the monetary economy is more developed and average income is higher, yet the poorest segments of the population may face the same deprivation as those in remote districts. As they endure a heavier tax burden (the tax rate is 53 percent higher than in remote districts), they may be more prone to protest about tax increases. Furthermore, population density near sea ports may facilitate coordination for protests. One telling example of protest onset caused by tax increases is the case of three districts of Ivory Coast (Agneby, Lahou and Sassandra), all relatively close to the sea port of Abdijan, in the year 1939. They were imposed tax rates increases of more than 30 francs between 1936 and 1939, because in 1937 the forced labor obligations had been replaced by a supplementary tax of 25 francs.

Our estimation method assumes strict exogeneity of tax rates. District fixed effects, district time trends and colony-year fixed effects make this assumption more credible, yet omitted district-specific shocks might still impact both the likelihood of protest and the setting of the tax rate. However, it is likely that the variables that drive tax increases, like economic affluence, are negatively correlated with the odds of conflict, leading to a downward bias on the coefficient of tax rates. Anyway, the best we can do to relax the exogeneity assumption is to estimate dynamic panel models for both protests and tax rates, using lagged values as internal instruments, following Arellano and Bond (1991) and Roodman (2009). Appendix A.7.4 implements this kind of models. The impact of tax rates on conflict is left unchanged. We even identify an effect of previous tax protests (and not of non-tax protests) on decreasing subsequent tax rates, although the magnitude of this effect is small (a 1 franc decrease). We also reveal a significant mean reversion of tax rates: colonial authorities aimed to limit conflict by imposing less-than-proportional tax increases in districts with already high rates, like districts close to sea ports.

We conclude that colonial authorities could be confronted with significant protests when they tried to impose high tax increases. During the Great Depression, these protests turned numerous, tax compliance dropped, and both factors led the governors to temporary moderation. The rise of head tax rates resumed after 1936 until WWII. In the 1940s, inflation pushed real tax rates downward, and as of 1949 they had not recovered to their prewar levels. As forced labor was definitively abolished in 1946, colonial public finances started to rely more on less archaic and more progressive forms of taxes, starting with taxes on imports (Cogneau et al., 2021).

5 Explaining Enforcement

We now examine how colonial authorities managed to enforce their military recruitment targets and to ensure high enough compliance with the head tax, despite facing individual or collective resistance from the colonized population.

5.1 Conscription: Low Targets and Lottery

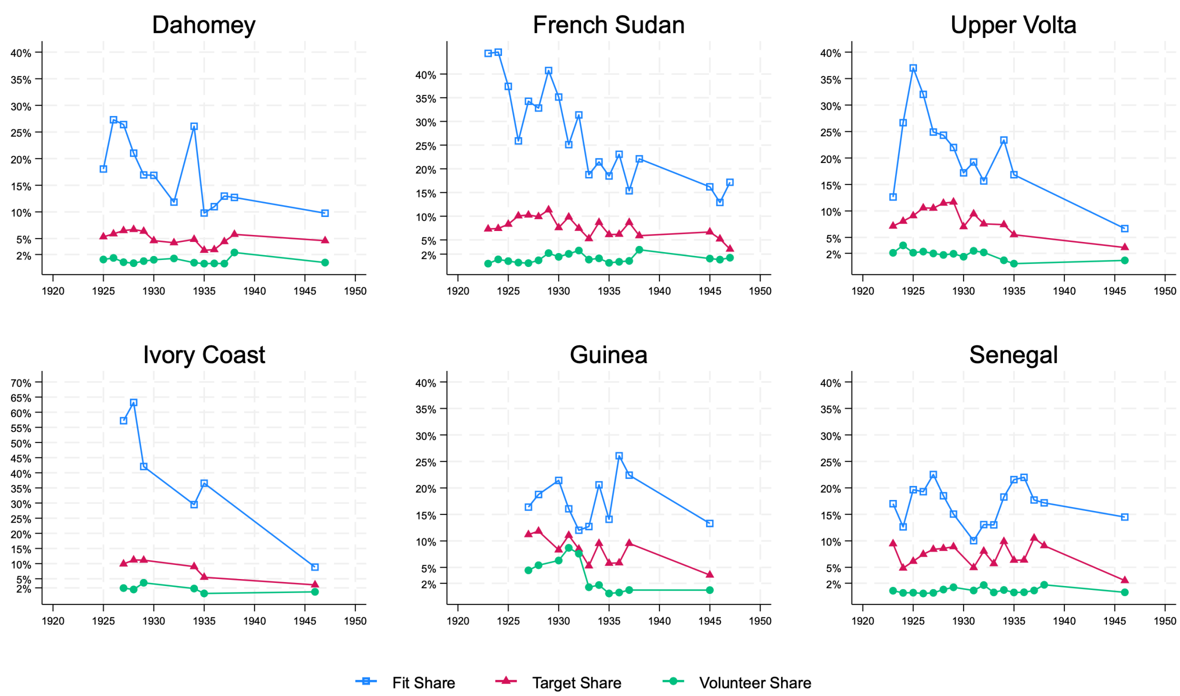
Regarding conscription, we may first wonder whether recruitment targets were modulated according to local conditions. In contrast with head tax rates that we analyze below, we find that it was not the case. In Table 4, we regress the (logarithm of) target on a few characteristics of districts, dummy variables for colonies and year fixed effects. We find that (log) target is linked almost one-to-one to (log) district population as estimated by the colonial administration in 1925.[20] The only other variable that is found to impact the target is district land area: Targeted recruitment is on average slightly lower in more spatially stretched-out districts. As mentioned earlier, absenteeism is also higher in larger districts, given that recruitment efforts are likely to be more costly. Once population is taken into account, average target numbers do not even vary across colonies. Other variables coded by Huillery (2009), like presence of an ancient kingdom or resistance to colonial conquest, do not correlate with target. Population alone explains 69 percent of the variance of (log) target across space and time. District and colony-year fixed effects absorb 91 percent in total. As illustrated and explained in Figure 2, following a top-down target allocation, variations in targets across time, at the district level, are firstly

[20] This colonial enumeration is different from our own estimates using our demographic model (see Appendix A.3), yet reflects accurately the knowledge of colonial authorities of the time.

dictated by the variation in the aggregate target, at the level of the whole federation of AOF. Combined with the results above, we could conclude that as a first approximation, the aggregate target was distributed among districts proportionately to population.

In peacetime, the target allocated annually to a colonial district was usually far below the total number of fit young males who were available for recruitment. This can be seen in Figure 8. The target share of 20-year-olds seldom surpassed 10 percent. In many colonies, and especially in Ivory Coast, fitness standards could even be adjusted upwards across years, such that, as fewer 20-year-old men had to be recruited, fitness ratios also tended to decrease.

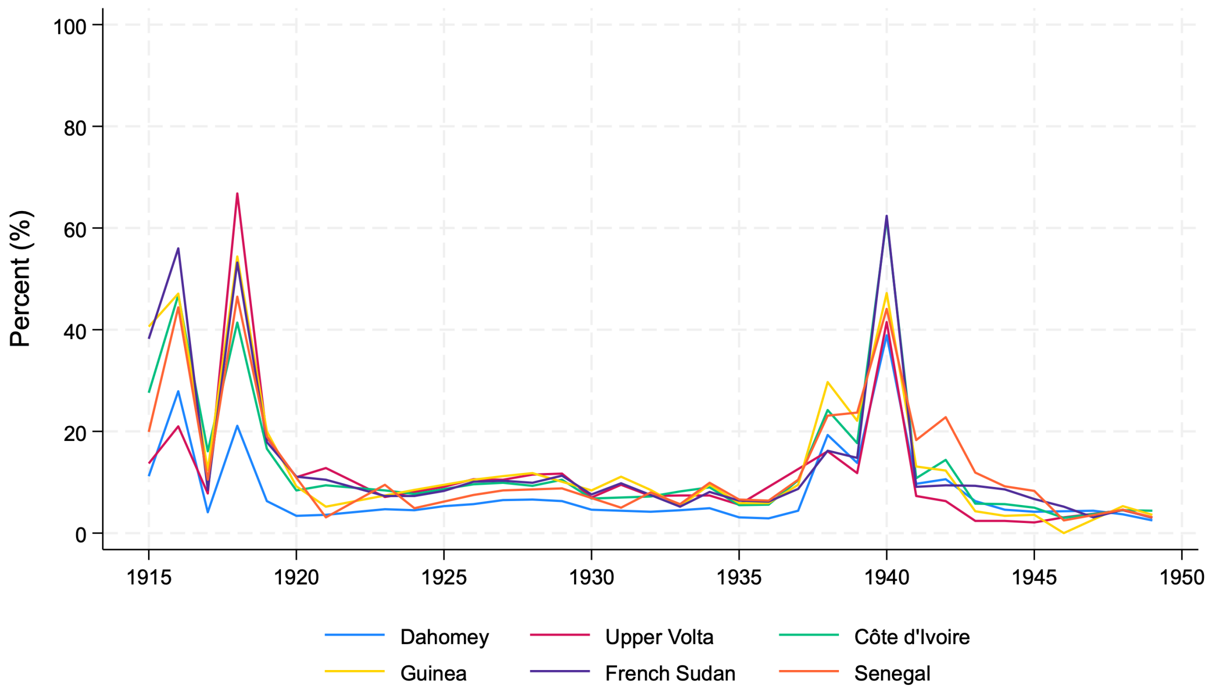
Figure 8: Fit, Target and Volunteers as Shares of 20-Year-Old Men



Notes: As a denominator, we make use of our estimate of the number of 20 year-old males in each district (around 0.9 percent of total population), according to our intermediate demographic projection computed as the mean of our two extreme scenarios, upper and lower, see Appendix Table A3.

Conscription was also extensively applied during the two World Wars. For WWI, as explained above, the formal conscription system was not yet implemented and recruitment mainly relied on mere coercion and local chiefs' authority. Figure 9 shows that the num-

Figure 9: Drafted Soldiers as Shares of 20-Year-Old Men from WWI to 1950



Notes: WWI recruitment figures are from Michel (2003). Other aggregate colony-level figures are from Senegal/AOF archives (4D files). WWII recruitment: in 1938, on top of usual conscription, around 20,000 reservists were mobilized, from the second portions of 1937 and 1938, resulting in a total draft of around 29,000; in 1939, around 24,000 were drafted in total, because of an additional call of 12,000 in July; in 1940, the expected draft was initially of 31,000, yet an emergency draft was called up, to 71,000 in total, although the reinforcement troops were not sent to France, due to the armistice in June; between 1941 to 1944, the number of conscripts gradually went back to pre-war levels. As a denominator, we make use of our estimate of the number of 20 year-old males in each district (around 0.9 percent of total population), according to our intermediate demographic projection computed as the mean of our two extreme scenarios, upper and lower, see Appendix Table A3.

ber of conscripted young men reached levels as high as 40 to 60 percent of the number of 20-year-olds (this is just a benchmark, for the age range of conscripts was surely wider). For WWII, between 1938 and 1940, the conscription system also made it possible to draft large additional numbers of young men, by mainly mobilizing military reservists (second portion): first the youngest ones who had not been drawn by the lottery from 1937 to 1940 cohorts (about 60,000 men), then the older ones from 1931 to 1936 (about 35,000). This also came at the price of more flexible health standards as in 1939 the percentage of fit among the examined went up to 33 percent.[21] Even if we exclude these years from our analysis for the lack of precise district-level data, the aggregate figures show that the system could accommodate large targets. For sure, this would not have been possible on a permanent basis; colonial administrators acknowledged that conscription should not drain the scarce labor needed for subsistence or cash crop agriculture for too long.[22]

Knowing how district targets were set does not tell us how they were enforced on the ground. As previously mentioned, the drafting process was composed of a host of six successive stages: (i) capturing previous years' absentees; (ii) enumerating eligible young men; (iii) calling them to be present at the conscription center; (iv) assessing exemptions and fitness; (v) admitting volunteers; and (vi) performing the lottery. When the assigned target number varied from one year to another, which sub-stages of the recruitment process were contributing the most to meeting this variation? We constructed the following ratios for econometric analysis: (i) of enumerated young males to the 20-year-old population ($Enum.R.$), (ii) of individuals present for medical exams to the number of enumerated ($Pres.R.$), (iii) of the deemed fit to present individuals ($Fit.R.$), (iv) of volunteers to the deemed fit ($Vol.R.$), and lastly (v) of conscripts to the number of deemed fit individuals minus volunteers, the lottery rate ($Lott.R.$).

[21] National Archives of Senegal, Série-4D15: "Note sur le recrutement indigène de l'Afrique Occidentale Française", Dakar, 13 juin 1940 ("Note on Indigenous Recruitment in French West Africa," Dakar, June 13, 1940).

[22] Ibid., page 27: "the distribution of new batches of calls will become increasingly difficult as we approach the limit of the availability of men who are not absolutely essential to the maintenance of local family crops."

Then we run the following regression models, estimated by ordinary least squares:

$$\Delta LY_{ict} = \alpha_0 + \alpha_1 \Delta LT_{ict} \times \mathbb{1}(\Delta T_{ict} \geqslant 0) + \alpha_2 \Delta LT_{ict} \times \mathbb{1}(\Delta T_{ict} \leqslant 0) + v_{ct} + u_{ict} \qquad (6)$$

where LY_{ict} is the logarithm of one of the five ratios listed above, and LT_{ict} is the logarithm of the target number for a given district i in colony c in year t. Δ is the variation (first-difference) between two successive years.[23] We distinguish positive and negative variations of targets, as a decrease in the target did not put the same constraint on recruitment process compared to an increase in military quota would do. v_{ct} is a colony-year fixed effect meant to absorb colony-wide shocks that could affect both target fixation and recruitment conditions, given that the drafting commissions are organized at the level of the colony, as described in section 2.

With the same purpose and alternatively, we implement a two-stage least squares instrumental variable (IV) strategy inspired by the top-down target allocation. For each district, we constructed a predicted target number based on the district's share in the federal recruitment of 1927 (the first year when all six colonies are observed). In each year, predicted target is computed as the 1927 share times aggregate recruitment in the six colonies of French West Africa.[24] Provided that shares are independent from actual year-to-year target variations, this "Bartik" fixed share variable makes a valid exogenous instrument (Goldsmith-Pinkham et al., 2020). It is also a strong instrument, highly correlated with the actual target.[25] However, this identification strategy is only an alternative to colony-year fixed effects v_{ct}, for they explain more than 99 percent of the variance of the instrument (as expected from its construction).

Our analysis only applies to the majority of districts where the six stages of the conscrip-

[23] $t/t-1$ or $t/t-2$ if $t-1$ is missing: $\Delta LY_{ict} = LY_{ict} - LY_{ict-1/2}$. Restricting to strictly successive years ($t/t-1$) does not alter our conclusions. We also considered variations from the last non-missing year over a longer time period, in order to include post-WWII years (see Appendix Table A1). Again, this did not alter our conclusions.

[24] In years before or after 1927 when not all districts are observed, we recompute the share accordingly.

[25] More precisely, to fit the setting of Equation 6, the positive and negative changes in this variable; these two instruments explain 58 percent of the variance of actual positive changes in targets (F-stat = 328) and 49 percent of negative changes (F-stat = 474).

tion system could be implemented. In 39 cases, mostly in remote districts of Guinea and Upper Volta in certain years, no lottery was implemented. The targets were just met by recapturing last year's absentees and/or by recruiting volunteers.[26] We also identified 17 cases in which the target increase could not be met by further increasing the lottery rate, because the latter was already too high (ranging between 48 percent and 100 percent); in order to meet the recruitment quota, fitness standards were adjusted downward and more volunteers were recruited. Outside of these unusual cases which are still included in our regression analysis, we expect that moving the lottery rate was the dominant strategy to fulfill the quota.

Table 3: Impact of Target on Recruitment Decisions

	(1) Enumeration ΔL.Enum.R.	(2) Absenteeism ΔL.Pres.R.	(3) Fitness ΔL.Fit.R.	(4) Volunteers ΔL.Vol.R.	(5) Lottery ΔL.Lott.R.
Ordinary least squares:					
ΔL. Target ($\geqslant 0$)	+0.116	+0.059	+0.023	+0.759	+1.206***
	(0.132)	(0.041)	(0.193)	(0.527)	(0.232)
					[0.378][1]
ΔL. Target ($\leqslant 0$)	+0.657***	-0.0758*	+0.098	+0.522	+0.307
	(0.154)	(0.042)	(0.139)	(0.615)	(0.266)
Colony-year fixed effects	Yes	Yes	Yes	Yes	Yes
Two-stage least squares:					
ΔL. Target ($\geqslant 0$)	-0.086	+0.035	+0.256*	-0.630**	+1.081***
	(0.087)	(0.047)	(0.151)	(0.308)	(0.204)
					[0.690][1]
ΔL. Target ($\leqslant 0$)	+0.201*	-0.005	+0.355**	+2.527***	-0.029
	(0.107)	(0.046)	(0.179)	(0.451)	(0.289)
Observations	684	684	684	508	684

Notes: Ordinary least squares (top panel) and Two-stage least squares (bottom panel) estimations. ΔL. indicates the change in the logarithm of the variable of interest between year t and year $t-1$, or year $t-2$ if year $t-1$ is missing. Enum.R. = ratio of enumerated young men to our estimate of 20-year-old male population (mean demographic scenario). Pres.R. = ratio of examined (present) to enumerated. Fit.R. = ratio of fit men to examined. Vol.R. = ratio of volunteers to fit. Lott.R. = ratio of conscripted (first portion) to fit men minus volunteers (lottery rate). Standard errors are clustered at the colonial district level. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

[1] P-value of testing ΔL. Target ($\geqslant 0$) = 1: probability of wrongly rejecting that the elasticity of the lottery rate to the target is one, in the case of a target increase.

[26] From the sample size of 903 in Table 1, the variations of target in two successive years are only available in 736 cases. 52 cases correspond to data points in which no lottery was implemented in the current year (39 cases) or in the previous year (13), and are thus excluded from analysis, so that the analysis sample size gets down to 684.

Results are shown in Table 3. For target increases, we cannot reject that the average elasticity of the lottery rate is equal to one, with both estimation methods, as can be seen in column 5. Target increases seem to have little effect on earlier stages according to OLS estimates with colony-year fixed effects; according to IV estimates, a slight decrease in the share of exemptions (column 3) could be compensated by a decrease in the share of admitted volunteers (column 4).[27] For target decreases, we cannot safely reject that the elasticity of the lottery rate is just null. We find that less enumeration effort is implemented (column 1). IV estimates also point to a downward adjustment of fitness ratios (hence a strengthening of fitness standards or more exemptions) and of the share of volunteers. These results are corroborated by an even simpler accounting analysis shown in Appendix A.7.5 using the numbers of individuals at each stage rather than ratios. Strikingly enough, we find no significant effect of target variations on absenteeism (column 2). Either colonial subjects were insensitive to—or simply unaware of—military authorities' objectives. Alternatively, it could also be that these authorities were able to keep absenteeism under control when they needed to.

We conclude that recruitment targets were generally low enough so that the lottery system could accommodate any kind of target increase. The lack of detailed data does not allow to apply the same analysis to the WWII period, yet it seems that the system could accommodate large increases in the recruitment target by mobilizing fit reservists. In times when recruitment objectives were relaxed, the military authorities felt freer to choose among a variety of options at all stages of the recruitment process: chasing the existing absentees less, enumerating less, exempting more, and/or accepting fewer volunteers.

5.2 Taxation: Modulation of Tax Rates across Space and Time

We now aim to provide insights into head tax management.

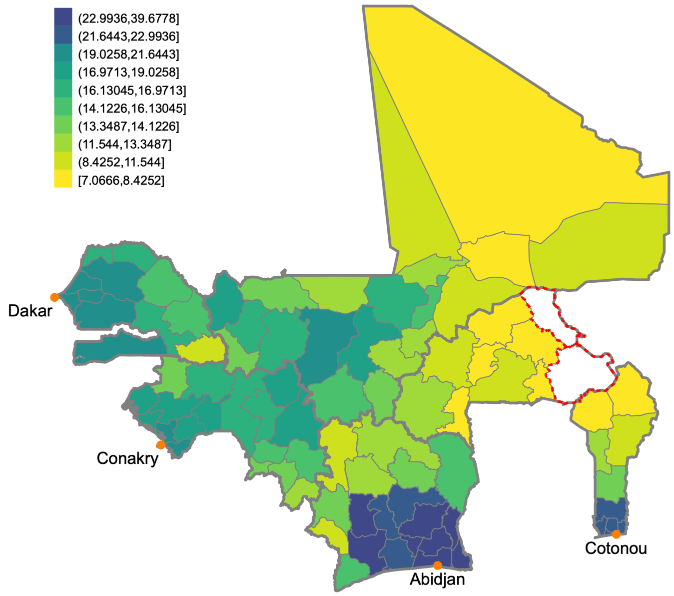
[27] Even if WWII mobilization years are excluded, the latter effect might reflect that target increases occurred more often when the French army needed to send recruits to risky operations abroad, so that fewer people were ready to voluntarily pay the "blood tax".

We first calculate an estimate of the number of taxpayers that the tax administration managed to reach in each district, as the total amount of tax revenues divided by the rate (i.e., $Collected_{ict}/Rate_{ict}$). As discussed above, this number closely reflects the expected tax base that guided district administrators during the collection phase, when asking local chiefs to implement the tax levy in their villages. As can be seen in Table 4 column 2, like military recruitment targets, the number of taxpayers only significantly correlates one-to-one with population in 1925 (as enumerated by colonial authorities). Of course, this is mechanically consistent with the principle of a head tax that was imposed to all teenage and adult individuals. The colonial administration just based both the number of young men to be drafted and the number individuals to be taxed on its coarse demographic count of each district. This also means that differences in average compliance between colonies (Figure 3) stem from the fact that our own population estimates differ from colonial enumerations. Within colonies, we could not identify any robust correlate of district-level compliance (TCR_{ict}, see equation 2).

However, the colonial administration had another discretionary tool to manage the tax burden, which was the head tax rate. While the number of taxpayers was uniformly set, there was local variation in rates. The map of Figure 10 depicts the deciles of the average head tax rates. As rates range from a minimum of 7 francs to a maximum of 40 francs (at 1937 prices), it reveals significant spatial variation and inequalities in tax burden. As can be seen in Table 1, the average head tax rate was 16 francs at 1937 prices. For AOF, Cogneau et al. (2021) estimate the average annual income per capita of the African poor (more than 90 percent of population) to lie around 400 francs from 1919 to 1949. 400 francs per capita translates into 650 francs per adult (15 year-old and above), so that 16 francs represented 9 days of adult average income. This figure was comparable in magnitude to the in-kind taxation corresponding to forced labor requirements (the sweat tax).

In contrast with military targets, colonial authorities modulated the tax rates according to their perceptions of the districts' relative economic affluence, hence capacity to pay. Table 4 (column 3) shows that district head tax rates indeed correlate positively with es-

Figure 10: Spatial Distribution of Mean Head Tax Rates (1919-1949)



Notes: Colors identify deciles of mean head tax rates (in francs of year 1937) between 1919 and 1949. Darkest colors correspond to upper deciles (higher rates). The two districts left blank are Dori and Fada, which belong to contemporary Burkina Faso, but were re-attached to the colony of Niger during the partition of Upper Volta (1932-1947). As such they are excluded from our analysis.

timated population (as of year 1925), the presence of a railway line or of palm tree plantations (one of the main cash crops and exported commodities of the time, apart from groundnuts that were mainly cultivated along railway lines in Senegal). Within each colony, relative proximity to one of the four sea ports indicated on the map (Abidjan, Conakry, Cotonou, Dakar) also strongly correlates with the tax rate. Poorer landlocked colonies were less taxed (Upper Volta and French Sudan); within French Sudan, districts along the Niger river were taxed more. Dahomey and Ivory Coast were very much split into two parts: the southern forest and coastal areas with palm tree plantations were heavily taxed, while the northern hinterland was imposed low tax rates. Colony dummies, distance to sea port and year fixed effects combined explain 70 percent of the variance of (logged) head tax rates; other variables in Table 4 just add an additional 5 percent.[28] District and colony-year fixed effects together explain 95 percent, like in the case of military targets. Again, this leaves limited room for idiosyncratic time variations

[28]For the few points in Huillery (2009) data where payments to chiefs were available, we also found no correlation between chiefs' average wage, or the share of the tax that chiefs could keep for themselves (*remise*), and the tax rate. None of the two variables correlate with compliance either, yet data are scarce and noisy.

in tax rates at the district level.

Table 4: Determinants of Military Targets, Number of Taxpayers and Head Tax Rates

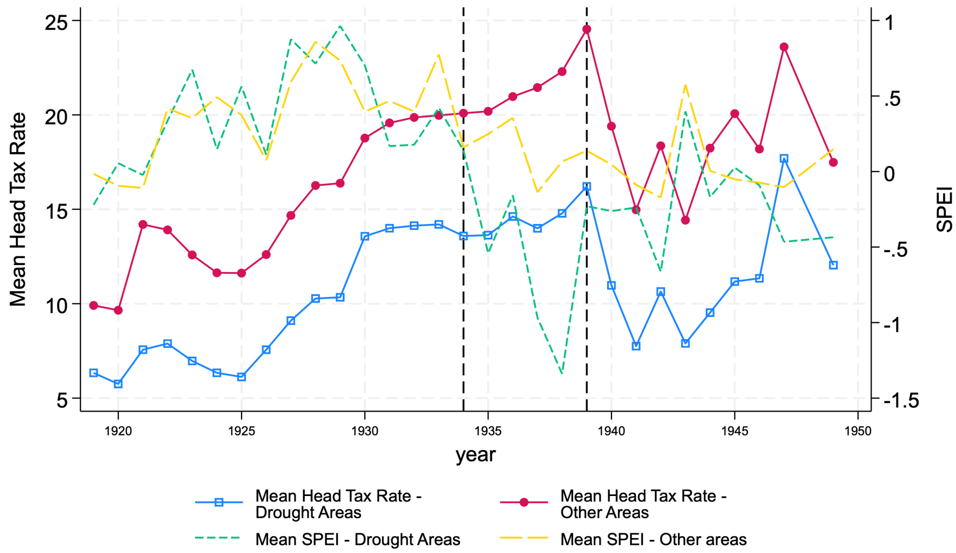
VARIABLES	(1) Log Target	(2) Log Taxpayers	(3) Log Head Tax Rate
Log. Pop. 1925	+0.953***	+1.025***	+0.093***
	(0.040)	(0.041)	(0.035)
Log. Land Area	-0.135***	-0.044	-0.018
	(0.045)	(0.055)	(0.032)
Railway	+0.049	0.044	+0.143***
	(0.058)	(0.036)	(0.047)
Groundnuts	+0.091	0.090	+0.049
	(0.090)	(0.058)	(0.073)
Palm trees	-0.087	-0.085	+0.249**
	(0.156)	(0.090)	(0.100)
Log. Distance to port	+0.059	+0.019	-0.215***
	(0.065)	(0.047)	(0.033)
Dahomey	-0.136	-0.044	-0.374***
	(0.109)	(0.078)	(0.084)
Upper Volta	+0.024	-0.109	-0.840***
	(0.100)	(0.081)	(0.082)
Ivory Coast	-0.062	+0.089	+0.055
	(0.106)	(0.060)	(0.089)
Guinea	-0.093	+0.095	-0.011
	(0.100)	(0.059)	(0.067)
Fr. Sudan	-0.027	-0.130	-0.164**
	(0.093)	(0.089)	(0.066)
Senegal	0	0	0
	(-)	(-)	(-)
Year FE	Yes	Yes	Yes
Observations	903	1,906	1,906
R-squared	0.843	0.896	0.750

Notes: Target sample: districts for which all conscription variables are not missing. Head tax sample: districts for which both the head tax rate and the amount levied are not missing. Log Taxpayers = Logarithm of the amount collected divided by the tax rate ($Collected_{ict}/Rate_{ict}$). Pop. 1925 = Enumerated population in 1925. Railway = Equals 1 (else 0) if railway line going through the district. Groundnuts (resp. Palm trees) = Equals 1 (else 0) if district belongs to the top quartile of groundnut (resp. Palm kernel and palm oil) income per capita. Log. Distance to port = Logarithm of distance to the nearest sea port (Abidjan, Dakar, Conakry or Cotonou); the variable is centered on the logarithm of the mean of each colony, so that the coefficients of colony dummies correspond to average distance to port in the colony. Standard errors (in parentheses) are clustered at the level of districts (*cercles*): *** p<0.01, ** p<0.05, * p<0.1.

We finally question whether the colonial authorities were able to fine-tune taxation according to changing local conditions over time. Most of their decisions on taxation were rather uniform, like on conscription. During the Great Depression (1932-1935), as seen before (section 4.2), they resolved not to increase head tax rates further. This policy applied to almost all colonies and districts, irrespective of idiosyncratic local conditions. In 1937, under the left-wing government of the Popular Front in France, they adjusted upward the age liability threshold, to 14-year-old, in all colonies, except Dahomey which, possibly because of its propensity to protest and its lower compliance, had already benefited from an even higher threshold of 16-year-olds since 1926. However, this adjustment came with an increase in tax rates; in some cases, an additional head tax was just introduced to replace the sweat tax, i.e., the in-kind taxation corresponding to forced labor liabilities. As seen in section 4.2, discretionary tax increases could trigger significant protests; yet protests only led to very limited adjustments in the tax rate. To avoid conflict, governors and administrators just tended to limit the growth of tax rates in districts with already high rates; mean reversion led to a slow convergence of tax rates across time. However, cash crop producing districts were wealthier to start with, and as such were imposed higher tax rates all along the time period. These districts were severely affected by the sharp decline in export prices during the Depression. Despite this huge shock, Figures in Appendix A.7.6 show that they were not treated differently. It should be noted that we could not identify any effect of cash crop price shocks on protests in the corresponding districts, which could explain why colonial authorities did not care to grant them tax rebates.

Poorer districts hit by a severe drought in 1937-1938 received no different treatment. Figure 11 highlights the 13 districts where the Standardized Precipitation Evapotranspiration Index (SPEI) dropped below minus one in 1938. These districts had already been experiencing adverse weather conditions since 1935, and only began to recover by 1939. Being among the poorest regions, they had always faced lower head tax rates. However, the gap in average taxation between these districts and others remained constant over time. Similarly to the aforementioned cash crop price shocks, there was no significant

Figure 11: Head Tax Rate and Drought Incidence



Notes: The graph plots mean head tax rates for two groups of districts: (i) the 13 districts (over 88) that display a Standard Precipitation Evapo-transpiration Index (SPEI) below -1 for the year 1938, meaning that a severe drought occurred (ii) all other districts. It also reports the evolution of mean SPEI for the two groups, on the right scale. Four of the 13 districts are in Northern Dahomey (Atacora, Borgou, Djougou, and Moyen-Niger), while the remaining nine are in French Sudan (Bandiagara, Gao, Goundam, Gourma, Macina, Mopti, Niafunke, San, and Tombouctou).

response from the side of the colonial authorities towards the drought conditions. It is worth reiterating that we found no evidence of an effect of weather on protests, which could again explain the apparent indifference of colonial authorities (see footnote 16).

We conclude that when deciding about head tax, colonial authorities showed some care for the relative economic affluence of districts and for the general business climate, and some caution in tax rates increases in the fear of protests. However, they remained blind to more specific variations over time and did not fine-tune the setting of tax rates, either due to lack of attention or because they felt they were already doing enough to avoid conflict.

6 Conclusion

We investigated the enforcement of two pillars of French colonial rule in West Africa, military conscription and head tax collection, using novel data at the district level between

1919 and 1949. We found that colonial authorities almost always met their military recruitment targets, despite low health conditions and frequent individual avoidance. We also estimated that collected tax revenues represented around 80 percent of tax liabilities, even under the most conservative demographic scenario.

With regard to conscription, recruitment targets fixed for each district were roughly proportional to local population, and showed no particular care for local socio-economic conditions. In peacetime, they were kept relatively low, as they seldom surpassed 10 percent of 20-year-old men, so that they could be met quite smoothly by randomly drawing from the pool of fit young men. Conflicts related to military recruitment were rare after WWI, and resistance to conscription was mainly an individual matter (absenteeism at drafting boards). At the time of WWII, the conscription system allowed to dramatically increase recruitment, but for the rest of the time colonial authorities did not want to stress subsistence and cash crop agriculture by draining too much the scarce labor force.

With regard to taxation, the identification of liable taxpayers was also based on coarse population enumerations and tax collection relied on local chiefs' intermediation. Yet, colonial administration set higher tax rates in what it perceived as economically affluent districts, such as those close to sea ports. As tax increases could trigger significant tax-related protests, moderation applied to the districts bearing the heaviest tax burdens, and almost everywhere during the Great Depression. Despite these adjustments, the colonial administration largely remained uniform in its approach, much like its policies for conscription. In the 1930s, districts exporting cash crops whose prices had collapsed were not treated differently, and the severe drought spell that hit certain districts did not trigger any tax rebate either.

Taken together, our findings portray the colonial state as a coercive yet constrained actor. The colonial administration was not able or did not care to fine-tune its policies according to detailed and time-varying local conditions. It is mainly by limiting its demands that it managed to maintain order and achieve its objectives.

An important dimension that warrants further investigation is the role of local intermediaries—particularly chiefs—in the enforcement of colonial policies. These actors, whether drawn from traditional hierarchies or appointed by colonial authorities, played a pivotal role in recruitment and taxation. As independence approached, urban nationalist movements increasingly challenged their authority, raising questions about the long-term implications of indirect rule. Future research could usefully explore how the legitimacy and structure of African elites evolved in the postcolonial period, contributing to our understanding of contemporary state capacity in Africa (Acemoglu et al., 2014; Robinson, 2023).

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A Online Appendix

A.1 Military Sample

Early on in the second half of the nineteenth century, the *Tirailleurs Sénégalais* had constituted the army that conquered West Africa under the French command; many had been recruited from the pool of freed slaves (Echenberg, 1991). Then in peacetime, they became the main pillar of colonial order, aside from the indigenous police forces hired by the colonial administrations. In contrast with the latter, the whole cost of colonial military forces was taken in charge by the Ministry of Colonies in France, i.e., maintenance, equipment, and also the wages of French officers and Non-Commissioned Officers (Cogneau et al., 2021).[29] As of 1910, some 11,000 colonial soldiers belonged to regiments located in AOF, more than 80 percent being natives, and were complemented by 7,000 policemen and other members of security forces (Cogneau, 2023, p.168). Major rises in military recruitment were achieved for the conquest war of Morocco (1912), then for WWI, when 165,000 soldiers across the entire AOF were called, along with 570,000 other soldiers from the rest of the empire (Cogneau, 2023, p.187). At the time, local chiefs were directly asked to select additional recruits among their people, for a period limited to the conflicts.

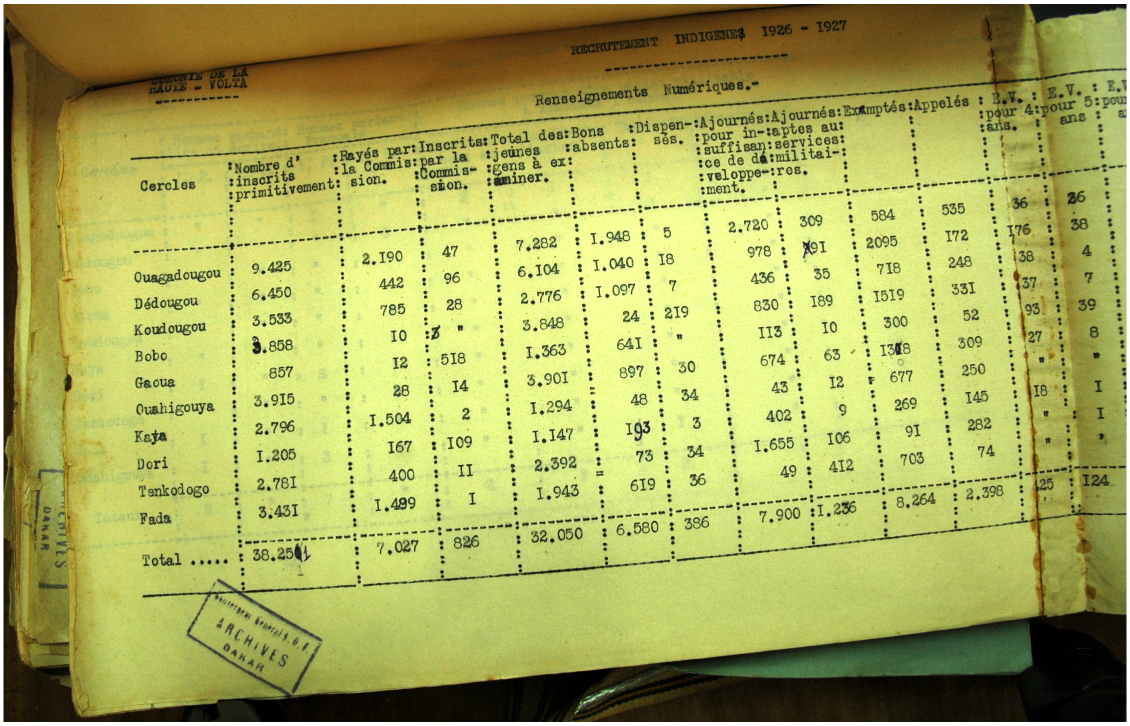
It was only after 1920 that a formal conscription system was put in place, in order to facilitate future levies. The military conscription took place in the form of a mobile drafting commission that moved from one district to another to carry out the recruitment procedure. Such a commission was usually composed of one French army officer as chairman, the district administrator, two clerks and one military physician. An example of the actual itinerary of a mobile drafting board in Ivory Coast can be seen in Figure A1.

[29] Usually officers refer to high-rank and non-commissioned officers refers to lower rank like sergeants.

Figure A1: Itinerary of Mobile Drafting Board in Ivory Coast

Military reports contain detailed information on the recruitment procedures of mobile drafting commissions. Specifically, they include information on the recruitment quota assigned to a given district, the total number of enumerated young males, absentees, fit individuals, actual recruits, volunteers and reservists. Figure A2 shows an example of a drafting table, for Upper Volta (Burkina Faso) in 1927.

Figure A2: Example of Mobile Drafting Board Tables - Upper Volta (Burkina Faso), 1927



COLONIE DE LA HAUTE - VOLTA

RECRUTEMENT INDIGENES 1926 - 1927

Renseignements Numériques.-

Cercles	Nombre d'inscrits primitivement	Rayés par la Commission	Inscrits par la Commission	Total des jeunes gens à examiner	Bons absents	Dispensés	Ajournés pour insuffisance de développement	Ajournés aptes aux services militaires	Exemptés	Appelés	E.V. pour 4 ans	E.V. pour 5 ans	E.V. pour …
Ouagadougou	9.425	2.I90	47	7.282	I.948	5	2.720	309	584	535	36	26	
Dédougou	6.450	442	96	6.I04	I.040	I8	978	I9I	2095	I72	I76	38	
Koudougou	3.533	785	28	2.776	I.097	7	436	35	7I8	248	38	4	
Bobo	3.858	I0	"	3.848	24	2I9	830	I89	I5I9	33I	37	7	
Gaoua	857	I2	5I8	I.363	64I	"	II3	I0	300	52	93	39	
Ouahigouya	3.9I5	28	I4	3.90I	897	30	674	63	I3I8	309	27	8	
Kaya	2.796	I.504	2	I.294	48	34	43	I2	677	250	"	"	
Dori	I.205	I67	I09	I.I47	I93	3	402	9	269	I45	I8	I	
Tenkodogo	2.78I	400	II	2.392	73	34	I.655	I06	9I	282	"	I	
Fada	3.43I	I.489	I	I.943	6I9	36	49	4I2	703	74	"	,	
Total	38.25[illegible]	7.027	826	32.050	6.580	386	7.900	I.236	8.264	2.398	425	I24	

Gouvernement Général de l'A.O.F. ARCHIVES DAKAR

Based on these yearly conscription reports, we constructed an original district-year-level panel military dataset from 1919 until 1949. Due to the quality of archival data, some years of drafting commissions tables remain missing and the panel is rather unbalanced.

For instance, there is little or next-to-none detailed archival information on drafting commissions during WWII. The World War years (1938-1944) are dropped altogether in the end, also due to the fact that the normal peacetime recruitment strategies did not apply to the special wartime needs, such as mass mobilization of second-portion reservists and even different standards of enumeration and of physiological fitness. In the anticipation of war, a first wave of mobilization of reservists took place in 1938.

We also drop years before 1922 (1923 in Dahomey), as the formal conscription is still not in place, and year 1946 for Dahomey and Guinea when plagues caused disruptions in the drafting process.

Furthermore, not all information is available for all different sub-procedures of the recruitment process. This is very much the case for the assigned quota (target) compared to the information for the rest of the recruitment process, as the target numbers usually appear on separate documents or pages, while the rest are usually organized within one table on the same page per colony/year.

At the end of the day, Table A1 shows the composition of the panel that we exploit, sorted by colony and year, indicating the number of district-year observations within each colony-year conscription table.

Table A1: Military Sample

Year	Dahomey	Upper-V.	Ivory C.	Guinea	Fr. Sudan	Senegal	Total
1923	0	8	0	0	12	10	30
1924	0	8	0	0	14	9	31
1925	8	8	0	0	14	10	40
1926	8	8	0	0	14	10	40
1927	8	8	17	18	14	10	75
1928	8	8	17	18	14	10	75
1929	8	8	17	0	14	10	57
1930	8	8	0	18	14	0	48
1931	0	8	0	18	14	10	50
1932	8	8	0	18	14	10	58
1933	0	1	0	18	14	10	43
1934	8	8	17	18	14	10	75
1935	8	8	17	17	14	10	74
1936	8	1	0	18	14	10	51
1937	8	1	0	18	14	10	51
1945	0	1	0	18	14	0	33
1946	0	8	17	0	14	10	49
1947	8	1	0	0	14	0	23
Total	96	109	102	197	250	149	903

Notes: Sample of districts for which all conscription variables are not missing. Between 1932 and 1947, Upper Volta was split in three parts which were allocated to Ivory Coast, French Sudan and Niger. In the years when no records are available for Ivory Coast, only one district (the one in French Sudan) has data. Due to changes in district boundaries across time (mergers or splits), a few districts in Dahomey, Ivory Coast, French Sudan and Senegal had to be merged to maintain, as much as possible, a balanced panel.

A.2 Taxation Sample

Huillery (2009) only recorded capitation data at three-year intervals, specifically only for the years ending with suffix 3, 6, 9. To get a more complete panel, we digitized head tax rates and collected amounts for each year between 1919 and 1945. For years 1946 and 1949, we retained Huillery's data.

Head tax rates were usually set at the district level (*cercle*). They were sometimes differentiated across sub-districts (*subdivision*) level, and even more rarely distinguished among ethnic groups within a given sub-district. For instance, in 1938 in the district of Daloa (Ivory Coast) and in the sub-districts of Daloa, Issia and Vavoué, the Bete areas were taxed at a 25-franc rate, while other ethnic areas were taxed at 20 francs. The within-district variation in rates was usually limited. We estimated average tax rates at the district level using the best information we could find about the distribution of eligible population across sub-districts and ethnic groups; in most cases, we could use the distribution of prospective tax payers (*rôles primitifs*) across sub-districts and ethnic groups (hence assuming uniform compliance within each district).

In a few rare cases, like in some districts of Dahomey or Ivory Coast in the early years, the head tax rate could also be modulated according to gender and age. We assumed that adult men and women each made up 42.5 percent of total taxpayers, and children 10 to 16 year-old to make up the remaining 15 percent.

We believe these averaging procedures do not introduce large biases in the measurement of tax burden at the district level.

Indigenous migrants were sometimes distinguished (*population flottante*), and were imposed the highest rates, equal to the maximum rate in the colony, or even above that in rare cases. The actual amount collected for this population group was seldom above 1 percent of total tax revenues in all colonies.

Europeans were also in general subject to higher head tax rates. The head tax levied on Europeans is usually distinguished from the indigenous part, and the total never represented more than 1 percent of total head tax revenues. In Senegal, apart from the natives of the "Four Communes" who had quasi-citizenship which we exclude from our analysis (see above), residents of other towns (*communes mixtes, escales*) were also treated separately, for the head tax and property tax they paid; most of taxpayers there were Europeans, and the total amount that was collected was never above 2 percent of colony's head tax totals.

At the end of the day, Table A2 shows the composition of the district-year panel that we exploit, sorted by colony and year, with the number indicating the number of district-level observations available for each colony within a given year.

Table A2: Taxation Sample

Year	Dahomey	Upper-V.	Ivory C.	Guinea	Fr. Sudan	Senegal	Total
1919	11	8	0	18	20	11	68
1920	11	8	0	18	20	11	68
1921	11	8	0	18	19	11	67
1922	11	8	0	18	19	0	56
1923	11	0	0	18	20	12	61
1924	11	0	0	18	19	0	48
1925	11	0	18	18	20	11	78
1926	11	0	18	18	20	12	79
1927	11	0	18	18	20	12	79
1928	11	8	18	18	20	12	87
1929	11	0	18	18	20	10	77
1930	11	0	18	18	20	0	67
1931	11	0	18	18	20	10	77
1932	11	0	18	18	20	10	77
1933	11	8	18	18	20	10	85
1934	11	8	17	18	20	10	84
1935	11	8	17	18	20	10	84
1936	11	8	17	18	20	10	84
1937	11	8	15	18	14	6	72
1938	11	8	12	18	14	10	73
1939	11	8	12	18	20	10	79
1940	11	8	0	18	14	9	60
1941	11	8	0	0	14	0	33
1942	0	0	12	18	0	0	30
1943	0	0	0	18	20	0	38
1944	0	0	0	18	0	0	18
1945	0	0	0	13	0	0	13
1946	11	8	18	18	20	9	84
1947	0	0	0	13	0	0	13
1949	11	8	18	0	20	10	67
Total	275	128	300	494	493	216	1,906

Notes: Sample of districts for which both the head tax rates and the amount levied are known. Due to changes in district boundaries across time (mergers or splits), a few districts in Ivory Coast, French Sudan and Senegal had to be merged in the 1930s and early 1940s to maintain, as much as possible, a balanced panel.

A.3 A Demographic Model for French West Africa (1914-1960)

The demographic projections are anchored on the levels reached by three variables: total population in 1960, drawn from World Development Indicators (World Bank); crude birth rates and infant mortality rates for 1950 and 1960 drawn from Tabutin and Schoumaker (2004). The projections run from 1914 until 1960, yet we only use their results for our analysis period 1919-1949. Before 1960, we assume that international migration was negligible so that population growth is equal to the birth rate minus the death rate; indeed, migration flows from Upper Volta (present-day Burkina Faso) or French Sudan (Mali) to Ivory Coast only turned important in the late 1950s, with the booms of coffee, cocoa and wood exports. In all projections, our estimates of population levels for 1950 are also close to the ones reported by Tabutin and Schoumaker (2004), except for Mali whose population is very much understated compared to World Development Indicators.

The projections are defined by the values taken by two exogenous variables in 1914: the natural growth rate and the infant mortality rate. The model assumes a stable age structure before 1914, i.e., all ages growing at a constant rate. Then, in each year between 1914 and 1960, new births and new deaths between age 0 and age 79 are computed from the crude birth rate and the mortality quotients at each age (${}_1q_a$). The structure of mortality quotients after 1 year-old (${}_1q_2/{}_1q_1, \ldots$ until ${}_1q_{79}/{}_1q_1$, with ${}_1q_{80}$=1) is fixed and imported from the estimates of the mortality quotients for the US blacks in 1900, by Haines (1994); infant mortality in this population was estimated at 170‰, i.e., a level comparable to West Africa's average for 1960. Across time, all mortality quotients are assumed to vary proportionally to infant mortality (${}_1q_0$). Two parameters are then computed for the demographic projection to fit with the initial natural growth rate (given the stable population assumption) and with total population in 1960: (i) the initial crude birth rate (or the initial death rate, given that initial natural growth rate is fixed); (ii) the ratio of infant mortality ${}_1q_0$ to ${}_1q_1$ (or any other mortality quotient, as their structure is assumed to be fixed).

In the first scenario, for each colony, the initial natural growth rate for 1914 is assumed to be already high at 0.75 percent per annum. Infant mortality is assumed to decline linearly by only 10 percent between 1914 and 1950 (and then, mortality quotients ${}_1q_a$ at each age a as well). The crude birth rate is also assumed to linearly decline from its (endogenous) level for 1914 to the (observed) level for 1950. The limited decline of mortality implies that the birth rate must have increased by 24.5 percent until 1950; and fertility even more, given the decrease of the share of women 15-49 year-old in total population. Increases in fertility during the colonial period and until the late 1970s seem to be credible features of African demographics (Walters, 2021). If we assumed a larger decline in mortality, then the fertility increase would be lower, although this would bring little change to the number of eligible individuals. Between 1920 and 1950, for the whole region, population grows at an average annual rate of 1.49 percent. This figure is close to the one (1.51 percent) estimated by Frankema and Jerven (2014), yet population levels are higher, based on World Bank figures for 1960, especially for Mali. Hence, for the measurement of the tax base and of tax compliance, even this upper bound scenario is more conservative than Frankema and Jerven (2014) estimates (which anyway only provide population totals and not age pyramids).

In the second scenario, for each colony, the initial natural growth rate for 1914 is assumed to be at 0.25 percent per annum only. Changes in mortality and in fertility are also assumed to start as late as in 1935, so that population growth stays constant at 0.25 percent between 1920 and 1935. Between 1935 and 1950, infant mortality then drops by 20 percent and the crude birth rate increases by 43 percent. Again, we could assume a larger drop of mortality and a smaller increase in fertility, but this would bring little change. Between 1920 and 1950, for the whole region, population only grows by 0.71 percent annually. The number of eligible taxpayers even decreases a bit. The population level in 1920 is 38 percent higher than in Frankema and Jerven (2014).

We want to avoid over-estimating tax compliance through under-estimating eligible populations. In this regard, the second scenario provides the most conservative lower bound for compliance, as both total population and the share of eligible individuals in total population are high. It is hard to think of an even more conservative lower bound, as a population growth rate as low as 0.25 percent in 1914 is already a bold assumption. Furthermore, according to the data compiled by Tabutin and Schoumaker (2004), for the decade between 1950-54 and 1960-64, the maximum decrease of the infant mortality rate was of 15 percent (in Ivory Coast and Upper Volta). It is unlikely that health improvements were more rapid between 1935 and 1950, compared to the late colonial period 1950-1960.

Table A3 shows the aggregate results of our two demographic projections.

Table A3: Aggregate Results of the Two Demographic Projections

	1920	1930	1940	1950	1920/1950
Scenario 1: upper bound for tax compliance					
Infant mortality (‰)	229	223	217	210	-8.3%
Crude birth rate (‰)	42	45	48	52	+24.5%
Population (million)	11.9	13.3	15.4	18.5	+1.49% p.a.
Under 15-year-old (%)	36.5	38.5	40.8	43.1	+6.6 p.p.
Men 20 year-old (%)	0.94	0.91	0.91	0.93	-0.01 p.p.
eligible to head tax (million)	9.3	9.8	9.4	10.7	+0.48% p.a.
Scenario 2: lower bound for tax compliance					
Infant mortality (‰)	265	265	247	211	-20.1%
Crude birth rate (‰)	37	37	41	52	+41.8%
Population (million)	15.0	15.4	16.0	18.5	+0.70% p.a.
Under 15-year-old (%)	32.9	32.9	33.7	39.5	+6.6 p.p.
Men 20 year-old (%)	0.93	0.93	0.91	0.82	-0.11 p.p.
eligible to head tax (million)	12.1	12.0	10.8	11.4	-0.22% p.a.
Frankema and Jerven (2014)					
Population (million)	10.8	12.5	14.3	17.0	+1.51% p.a.

The demographic model provides us with conservative estimates of the total population of eligible individuals in each colony. This is sufficient to compute colony-level average compliance (see footnote 10 in main text).

In order to compute compliance at the district level, we need to distribute this population across districts. Huillery (2009) provides us with coarse official enumerations of total population for each district in the year 1925. These enumerations give colony totals that are lower than our most conservative (lower bound) simulation, by 32 percent on average, and by 12 (Upper Volta) to 88 percent (Dahomey).[30] We disregard these totals and only use the share of each district to distribute our colony-level demographic estimates of the tax base, under the two assumptions that (i) the proportional lack of coverage of colonial enumerations is the same across districts and that (ii) districts do not deviate too much from the colony average in terms of age structure. Yet we may worry that some districts grew more than others between 1925 and 1950. Even if long-distance migration between colonies was still limited before 1950, coastal and/or more urbanized districts, districts connected to railway and/or producing a significant quantity of cash crop should have attracted short-distance migrants within each colony. As more affluent districts also displayed higher capitation rates (see below), underestimating these districts' weight may bias upward our estimates of tax compliance. We then make use of another colonial enumeration for the year 1956. For example, the population share of the district of the capital city of Ivory Coast (*Lagunes*) grows from 4.4 to 8.3 percent between 1925 and 1956. We linearly interpolated the district population weights between 1925 and 1956; at the end of the day, this sophistication does not make a big difference for the evolution of compliance.

A.4 Conflict Data

Huillery (2011) collected and constructed data on conflicts, from the so-called "political reports" written by governors of colonies. Her data distinguishes conflicts linked to military conscription and tax-related conflicts from other types of conflicts (including for example land disputes). The data collection sampled the years ending in digits of 3, 6, 9 from 1919 till 1949 in our period of interest, which implies a small sample size for analysis, and makes that conflict duration cannot be measured. Furthermore, within each one of these conflict categories, the initiating actor can be either chiefs or colonial subjects; the second case is far more frequent, this reflecting in particular the fact that chiefs were usually cooperating with colonial authorities. In addition, another layer

[30] Except for Senegal and Dahomey for which they dramatically underestimate total population, they are quite close to our less conservative scenario, as well as to estimates from Frankema and Jerven (2014).

denotes whether the conflict episode was directed against the colonial authorities, or was an internal conflict among the colonized; here, the first case is far more frequent. We did not choose to consider these distinctions, because a conflict about taxation that would oppose chiefs and subjects should still involve colonial authorities in the background. The data also allow for multiple conflicts in the same district in a given year, yet this is a very unfrequent occurence that does not necessarily capture intensity. Individual conflicts are also graded as either basic, significant, or "threat to colonial order". Only a few conflicts are just basic and we retain conflicts that were at least significant. We also find that the distinction between significant and threatening is not relevant.

Table A4: Conflict and Taxation sample

Year	Dahomey	Upper-V.	Ivory C.	Guinea	Fr. Sudan	Senegal	Total
1919	11	8	19	17	20	12	87
1923	11	8	19	17	20	12	87
1926	11	8	19	17	20	12	87
1929	11	8	19	17	20	12	87
1933	11	8	19	17	20	12	87
1936	11	8	19	17	20	12	87
1939	11	8	19	17	20	12	87
1943	11	8	19	17	20	12	87
1946	11	8	19	17	20	12	87
1949	11	8	19	17	20	12	87
Total	110	80	190	170	200	120	870
Total w/o 1919	99	72	133	136	180	108	728

Notes: Sample of districts for which both the conflict status and the head tax rate are known. When analyzing the relation between tax rates variations and conflict onset, year 1919 drops due to first-differencing.

A.5 Weather Data

In order to measure weather shocks during the colonial years, we gathered historical data of a particular drought index, namely the Standardized Precipitation Evapotranspiration Index (SPEI for short in the following) constructed by Vicente-Serrano et al. (2010). Compared to other drought indices, this measure takes into account both temperature and rainfall intensities in measuring the drought likelihood of a given area, and has been rather widely exploited in applied social sciences research in recent years

(Harari & Ferrara, 2018; Webb, 2024).

The SPEI values are calculated at monthly intervals at the rather dis-aggregate geographical grid level (0.5 degree * 0.5 degree[31]). It's a standardized index with mean value zero, and variance one with respect to the entire long-term sample (1900-2018). In addition, it's also monotonically decreasing in terms of drought likelihood, such that a positive value is associated with improved weather conditions.

We further project these grid-level SPEI values onto the entire geographical area of the colonial districts at their 1925 boundaries, in order to obtain annual district-level averages. Finally, given that the SPEI indices constructed by Vicente-Serrano et al. (2010) were based on the rainfall and temperature data gathered by Harris et al. (2018), we also gather weather data from an independent source (Matsuura & Willmott, 2018) to create self-constructed SPEI values for additional robustness checks.

A.6 Cash Crops Data

For cash crop export price data, we extracted export unit values from trade data of French colonies (Senegal for groundnuts, Dahomey for palm oil and palm kernels). For missing years we complemented data by using the cash crop export price series from the African Commodity Trade Database (ACTD) (Frankema et al., 2018).

For cash crop production data, we mainly rely on the archival records compiled by Rossignol et al. (1944), where the authors noted down the export production quantity (in tons) of major cash crops in all AOF colonies at the district level, for the year of 1943. This record remains the earliest and most comprehensive source on cash crop production values for French West Africa that we could find. We digitized the export production of main cash crops in AOF, such as groundnuts, cocoa, coffee, palm oil, palm kernel and cotton, at the district level. Given the event of redistricting in AOF across time, we also scale the export production figures back to the 1925 colonial district boundaries.

[31] One grid corresponds to a squared area with side length of around 55 kilometers.

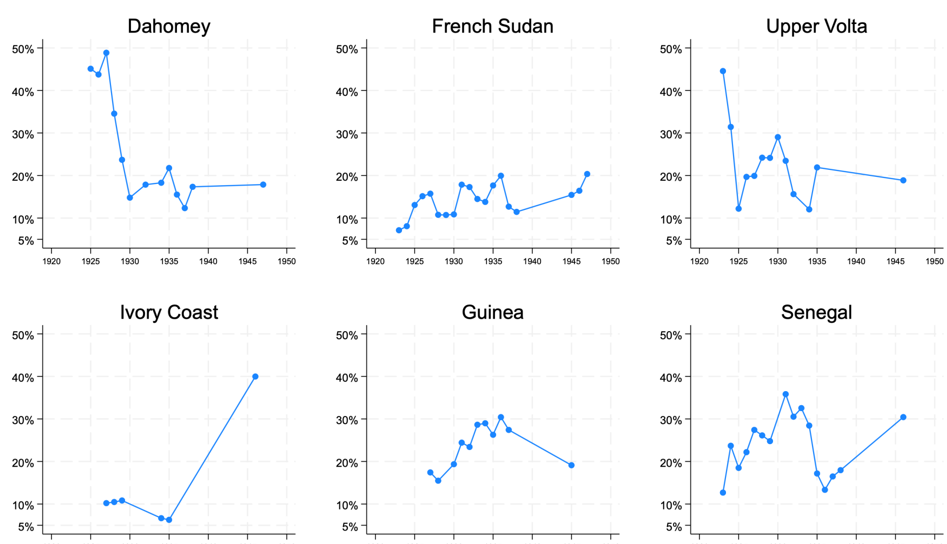
We finally only use groundnut, palm oil and palm kernel output data, as these three commodities were by far the main exports of French West Africa until 1950. The major takeoff of cocoa and coffee cultivation in Ivory Coast, for example, only began in the 1950s, after our period of interest. Furthermore, most of the expansion of groundnut and of palm tree production was achieved in the 1920s, so that we expect our 1943 data to be able to identify quite well districts that were specialized in these commodities, even for earlier years.

We define districts highly specialized in groundnut as districts belonging to the top quartile of groundnut output per capita (with population from colonial enumerations of 1925): nine districts in Senegal and two districts in French Sudan. Likewise we define districts highly specialized in palm trees as districts belonging to the top quartile of palm oil and palm kernel total income per capita, computed with 1925 export prices and 1925 population: five districts in Dahomey and two districts in Ivory Coast.

A.7 Additional Results

A.7.1 Absenteeism rates across colonies (1919-1949)

Figure A3: Absenteeism Rates



Note: See definition of $AbsR$ in Equation 4.

A.7.2 Conditional logit estimates for the impact of tax rates on protests

Table A5 reports the estimates of a conditional logit model for the impact of the tax rate on the incidence of protests. Beyond broad protest incidence, we again distinguish protest onset from protest ending, like in Table 2. Analysis samples are cut in size, because the 41 districts (over 87) where no protest ever occurred are dropped. The specification also precludes introducing colony-year fixed effects and district-specific time trends, because of incidental parameter problem and convergence failure of the maximum likelihood. These results are then best compared with those of the linear probability model with only year fixed effects, which are reported in Table A6. We just report the conditonal logit model estimated coefficients, for marginal effects can only be computed while assuming null district fixed effects, which is meaningless. The statistical significance of these coefficients are very much in line with those of the linear probability models, both with the head rate in level (top panel) and with its logarithm.

Table A5: Impact of tax rate on protests: conditional logit model

	Tax protest			Other protest		All protests
	Incidence	Onset		Incidence	Onset	Ending
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	+0.097***	+0.135***	+0.230***	+0.057***	+0.041	-0.075*
	(0.033)	(0.046)	(0.079)	(0.020)	(0.031)	(0.041)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	439	309	100	797	343	281
	(1′)	(2′)	(3′)	(4′)	(5′)	(6′)
Log. Tax Rate	+0.641	+2.142*	+4.403***	+1.115***	+1.411**	-0.487
	(0.914)	(1.213)	(1.533)	(0.354)	(0.712)	(0.714)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	439	309	100	797	343	281

Notes: Tax (resp. Other) protest: The dependent variable equals 1 (else 0) if at least one significant protest directly related (resp. not related) to taxation is observed in year t. Conditional logit model estimated by maximum likelihood, with district as the grouping variable and with year fixed effects. Column (2): districts where no tax-related protest was reported in $t-3$ (or $t-4$). Columns (3) & (5): districts where no protest of any kind was reported in $t-3$ (or $t-4$). Column (6): Top panel: districts where at least one protest was reported in $t-3$ (or $t-4$). Tax Rate = Level of the head tax rate (in francs 1937). Bottom panel: Log. Tax Rate = Logarithm of the head tax rate. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Impact of tax rate variations on protests: year FE only

	Tax protest			Other protest		All protests
	Incidence	Onset		Incidence	Onset	Ending
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	+0.855***	+0.963**	+1.122***	+1.233**	+0.816	-1.378*
	(0.291)	(0.302)	(0.367)	(0.441)	(0.659)	(0.729)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	392	815	392	342
	(1′)	(2′)	(3′)	(4′)	(5′)	(6′)
Log. Tax Rate	+0.062	+0.106**	+0.162***	0.227***	+0.255*	-0.112
	(0.046)	(0.043)	(0.059)	(0.072)	(0.131)	(0.132)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	390	815	390	342

Notes: See Table 2 for definition of variables and analysis samples. Linear probability model estimated by ordinary least squares, with district fixed effects and only year fixed effects. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

A.7.3 Heterogeneity of tax-driven protests with respect to distance to port

We estimate the following model:

$$Protest_{ict} = \beta_0 + \beta_1.Rate_{ict}.\mathbb{1}(D_{ic} \leq m_c) + \beta_2.Rate_{ict}.\mathbb{1}(D_{ic} \geq m_c) + \eta_i + \theta_i.t + v_{ct} + u_{ict}$$

and report $\hat{\beta_1}$ and $\hat{\beta_2}$ along with their standard errors in Table A7. $Rate_{ict}$ is either the head tax rate in level (top panel) or its logarithm (bottom panel), D_{ic} is distance between the centroid of district i and the nearest port (Abidjan, Conakry, Cotonou or Dakar), and m_c is the colony-specific median of this distance. η_i is a district fixed effect, $\theta_i.t$ a district-specific linear time trend, and v_{ct} a colony-year fixed effect.

Estimates reveal that the effect of the head tax rate on tax-related protests is only significant for districts that are close enough to one of the main sea ports. We refer the reader to the main text for more comments.

Table A7: Impact of tax rate variations on protest: heterogeneity analysis

	Tax protest			Other protest		All protests
	Incidence	Onset		Incidence	Onset	Termination
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate - Close to port	+0.928**	+1.030**	+1.623***	+0.284	-0.802	-1.540
	(0.410)	(0.426)	(0.558)	(0.620)	(0.908)	(1.588)
Tax Rate - Far from port	+0.219	+0.395	+0.035	+0.859	-0.468	-1.711
	(0.652)	(0.645)	(0.558)	(1.034)	(2.168)	(1.841)
Test $\beta_1 = \beta_2$: p-value	0.201	0.281	0.025	0.531	0.861	0.914
Colony-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
District Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	390	815	390	337
	(1′)	(2′)	(3′)	(4′)	(5′)	(6′)
Log. Tax Rate - Close to port	+0.191**	+0.242**	+0.476***	0.115	-0.294	-0.708*
	(0.093)	(0.096)	(0.161)	(0.149)	(0.280)	(0.373)
Log. Tax Rate - Far from port	+0.043	+0.095	+0.176	0.144	-0.248	-0.616**
	(0.097)	(0.093)	(0.115)	(0.142)	(0.292)	(0.304)
Test $\beta_1 = \beta_2$: p-value	0.057	0.096	0.029	0.821	0.840	0.740
Colony-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
District Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	815	681	390	815	390	337

Notes: See Table 2 for definition of variables and analysis samples. Close to port (resp. Far from port) = *Within each colony*, district belongs to the top (resp. bottom) half of distance to the nearest main sea port. Test $\beta_1 = \beta_2$: p-value of wrongly rejecting equality between the close to ports coefficient and the far from ports coefficient. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

A.7.4 Dynamic models of tax-related protests and of tax rates

In a first stage, we look at a dynamic alternative to the basic model for the incidence of tax-related protests which is specified in Equation 5 and whose results are shown in column (1) of Table 2. We then estimate the following model:

$$TProtest_{ict} = \lambda_1.TProtest_{ict-3/4} + \lambda_2.TProtest_{ict-6/7} + \gamma.Rate_{ict} + \eta_i + \theta_i.t + v_{ct} + u_{ict}$$

and report $\hat{\lambda_1}$, $\hat{\lambda_2}$, and $\hat{\gamma}$, along with their standard errors in Table A8. $TProtest_{ict}$ indicates the occurrence of at least one tax-related protest in district i of colony c during year t. As conflict data from Huillery (2011) is only available for years ending in digits of 3, 6 and 9, from 1919 to 1949, once lagged protests are for years $t-3$ or $t-4$ and twice lagged protests are for years $t-6$ or $t-7$. $Rate_{ict}$ is the head tax rate in level. η_i is a district fixed effect, always included (and including a constant). $\theta_i.t$ is a district-specific linear time trend, and v_{ct} a colony-year fixed effect. We report estimates with only year fixed effects (v_t instead of v_{ct}, columns 1 & 4), with only colony-year fixed effects and no district time trends (2 & 5), and finally with the full list of the above equation (3 & 6). We first report ordinary least squares estimates, where the coefficient of lagged dependent variables are potentially biased downward, and where the tax rate is assumed to be strictly exogenous (columns 1 to 3). We then report estimates from dynamic panel models, using the xtabond2 Stata command (Roodman, 2009). We implement GMM models à la Arellano and Bond (1991), where first-differenced variables are instrumented by their (at least) twice lagged levels. In order to curtail the number of internal instruments as much as possible, as advised by Roodman (2009), we only use two lags, i.e., $t-6/7$ and $t-9/10$. Estimates are similar when admitting a higher number of lags in the instruments' set. Last, we favour one-step estimates, for two-step estimates are not necessarily superior and do not behave very well. We also tried the system-GMM estimator that additionally instruments levels with lagged first-differences, following Blundell and Bond (1998), yet adding another assumption about initial conditions; results were very similar.

Compared to OLS, the dynamic panel models very much re-estimate the dynamic de-

Table A8: Impact of tax rate on protest incidence: dynamic models

	OLS			Dynamic panel		
	(1)	(2)	(3)	(4)	(5)	(6)
Tax protest $t-3/4$	-0.096**	-0.159***	-0.203***	-0.016	-0.062	-0.042
	(0.048)	(0.046)	(0.057)	(0.066)	(0.061)	(0.065)
Tax protest $t-6/7$	-0.173***	-0.173***	-0.219***	-0.094**	-0.102***	-0.091**
	(0.019)	(0.023)	(0.036)	(0.038)	(0.038)	(0.042)
Tax Rate	+0.921***	+0.729**	+0.828*	+0.987**	+0.750*	+1.375**
	(0.321)	(0.347)	(0.428)	(0.469)	(0.428)	(0.647)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Colony-Year FE	No	Yes	Yes	No	Yes	Yes
District Time Trend	No	No	Yes	No	No	Yes
Observations	679	679	679	554	554	554
N. of internal IV	-	-	-	25	25	25
A.-B. test for AR(2): p-value	-	-	-	0.448	0.340	0.277
Sargan test: p-value	-	-	-	0.090	0.168	0.192
Hansen test: p-value	-	-	-	0.164	0.250	1.000

Notes: The dependent variable equals 1 (else 0) if at least one significant protest related to taxation is observed in year t. Tax Rate = Level of the head tax rate (in '00 francs 1937). All models include district fixed effects, and either year fixed effects only (col. 1 and 4) or else colony-year fixed effects (col. 2 and 5), and additionally district-specific time trends (col. 3 and 6). Columns (1)-(3): Ordinary least squares. Columns (4)-(6): Dynamic panel models where first-differences of the three variables are instrumented by available twice or thrice lagged levels in each year, i.e. using $t-6/7$, or $t-6/7$ and $t-9/10$ when possible (see text). N. of internal IV is the number of such internal instrumental variables. A-B test for AR(2): probability of wrongly rejecting the absence of second order serial autocorrelation of Δu_{ict}. Sargan and Hansen tests (overidentification): probability of wrongly rejecting the consistency of instrumental variables. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

pendence of current protests on their lagged realizations, so that protests' incidence very little depends on protests' history. Yet, they leave the impact of tax rates variations unaffected, so that the estimated coefficients are very close to the ones of Table 2. Note again that here the potential endogeneity of the head tax rate is addressed by instrumenting its time variations $\Delta Rate_{ict} = Race_{ict} - Rate_{ict-3/4}$ by lagged levels $Rate_{ict-6/7}$ and $Rate_{ict-9/10}$. The Arellano and Bond tests fail to reject the absence of second order serial autocorrelation (AR(2)) of first-differenced residuals Δu_{ict}, hence of first order autocorrelation (AR(1)) of u_{ict}, which is a necessary condition for the validity of model specification. Overidentification diagnoses (Sargan and Hansen tests) seem just correct, suggesting that internal instruments (lagged levels) are not too inconsistent with each other. Note that the Sargan test is only valid under homoskedastic errors, whereas reported standard errors are clustered by district; however, withdrawing this option brings very little change to estimated standard errors. With district-specific time trends (column 6), the p-value of 1.000 of the Hansen test looks weird, yet the Sargan test may be seen as reassuring (and without clustering, the standard error of the coefficient of the tax rate is just 0.699 instead of 0.647).

We also implemented the same models while replacing the level of the head tax rate by its logarithm, like in the bottom panel of Table 2. Identification is less satisfactory and precision is low, although the estimated coefficients show the same magnitude as the basic estimates and are not significantly different. Furthermore, like in Table A7, a higher and statistically significant impact is recovered for districts close to ports, again with a similar magnitude, provided that we allow for a slightly higher number of lags in the instruments' set.

In a second stage, we wish to explore whether some reverse causation holds, running from the incidence of protests to the choice of the tax rate. We then estimate the following model:

$$Rate_{ict} = \mu.Rate_{ict-3/4} + \delta_1.TProtest_{ict-3/4} + \delta_2.NTProtest_{ict-3/4} + \eta_i + \theta_i.t + v_{ct} + u_{ict}$$

and report $\hat{\mu}$, $\hat{\delta_1}$ and $\hat{\delta_2}$, along with their standard errors in Table A9. All variables are defined in the same way as above. Another potential determinant of tax rates is introduced, which is previous (lagged) protests not related to taxation, $NTProtest_{ict-3/4}$. Again, columns (1) to (3) present ordinary least squares estimates, where the coefficient of lagged tax rate is potentially biased downward and previous protests are assumed to be strictly exogenous. Then, columns (4) to (6) present dynamic panel model estimates of exactly the same kind as above. Instead of being purely exogenous, lagged protests are assumed to be predetermined, i.e., potentially correlated with u_{ics} for $s < t$ but not for $s \geq t$, in coherence with the previous dynamic model where the (current) tax rate impacts the (current) incidence of protests in year t. We again implement first-differenced GMM models, using again twice and thrice lagged levels as instruments, and selecting one-step and robust (clustered) estimates.

The OLS estimates suggest that a tax protest might lead to some tax rate moderation three years after, although only slightly so: by around 1 franc, while the average head tax rate was 16 francs (at 1937 prices). They also suggest that "placebo" non-tax protests do not impact the choice of tax rate. The dynamic model estimates are very similar to the OLS. It is even true for the persistence coefficient μ (not significantly different, even if higher at face value in columns 5 & 6 compared to 2 & 3). μ is much lower than 1, suggesting strong mean reversion: tax increases are quite mitigated when tax rates are already high; this feature might already be seen as a sign of cautious behaviour from tax authorities. Then, with the exception of the model with only year fixed effects (column 4), a previous tax protest also seems to significantly impact the subsequent tax rate, whereas non-tax protests have no effect. However, serial autocorrelation and overidentification diagnoses put the model's specification into question. Adding more lags of the right-hand side variables, and/or more lags in the instruments' sets do not bring much change. System-GMM models provide the same results. Although their specification is questionable, almost all models get the same significant and negative effect of previous tax conflicts on the tax rate, with always the same limited magnitude of around 1 franc. Moreover, if we use information on tax rates for years $t-1$ and

$t-2$ (i.e., also fixed after a protest in $t-3$) and analyse average tax rates for $t-2/t$ instead of just the tax rate in t, the Arellano and Bond test for serial autocorrelation greatly improves and the same estimates come out, i.e, a one franc impact. Likewise, models for the logarithm of the tax rate also show a bit better in terms of specification tests, and again point to a limited impact of previous tax protests that could lead to a slight decrease of the tax rate by around 4 percent. These logarithmic models also reveal a significant mean reversion of tax rates: the coefficient of the lagged logged tax rate ranges from 0.5 to 0.8.

Table A9: Impact of previous protests on tax rates: dynamic models

	OLS			Dynamic panel		
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate $t-3$	+0.243***	+0.275**	+0.197***	+0.230***	+0.363***	+0.362***
	(0.049)	(0.060)	(0.070)	(0.064)	(0.065)	(0.052)
Tax protest $t-3$	-0.850**	-1.133***	-1.189***	-0.323	-1.378***	-1.445***
	(0.510)	(0.390)	(0.417)	(0.626)	(0.454)	(0.467)
Non-Tax protest $t-3$	+0.092	+0.057	+0.004	+0.083	+0.043	+0.065
	(0.299)	(0.236)	(0.230)	(0.367)	(0.249)	(0.263)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Colony-Year FE	No	Yes	Yes	No	Yes	Yes
District Time Trend	No	No	Yes	No	No	Yes
Observations	728	728	728	641	641	641
N. of internal IV	-	-	-	42	42	42
A.-B. test for AR(2): p-value	-	-	-	0.041	0.114	0.118
Sargan test: p-value	-	-	-	0.000	0.000	0.000
Hansen test: p-value	-	-	-	0.006	0.116	1.000

Notes: The dependent variable is the head tax rate in year t in 1937 francs. All models include district fixed effects, and either year fixed effects only (col. 1 and 4) or colony-year fixed effects (col. 2 and 5), and additionally district-specific time trends (col. 3 and 6). Columns (1)-(3): Ordinary least squares. Columns (4)-(6): Dynamic panel models where first-differences of the three variables are instrumented by available twice or thrice lagged levels in each year, i.e. using $t-6/7$, or $t-6/7$ and $t-9/10$ when possible (see text). N. of internal IV is the number of such internal instrumental variables. A-B test for AR(2): probability of wrongly rejecting the absence of second order serial autocorrelation of Δu_{ict}. Sargan and Hansen tests (overidentification): probability of wrongly rejecting the consistency of instrumental variables. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

A.7.5 Accounting model for the recruitment process

The drafting process was composed of a host of six successive stages: (i) capturing previous years' absentees; (ii) enumerating eligible young men; (iii) calling them to be present at the conscription center; (iv) assessing exemptions and fitness; (v) admitting volunteers; and (vi) performing the lottery and drafting first portion conscripts. Alternatively to the analysis of decision ratios in section 5.1, we implement here an even simpler analysis of the numbers of individuals at each stage. For each of the six stages we perform the following regression analysis:

$$\Delta Y_{ict} = \alpha_0 + \alpha_1 \Delta T_{ict} \times \mathbb{1}(\Delta T_{ict} \geqslant 0) + \alpha_2 \Delta T_{ict} \times \mathbb{1}(\Delta T_{ict} \leqslant 0) + v_{ct} + u_{ict}$$

where Y_{ict} is either the number of recaptured, enumerated, present, fit, volunteers or conscript soldiers in district i, colony c and year t, and where Δ is the variation (first-difference) between two successive years ($t/t-1$, or $t/t-2$ if $t-1$ is missing). T_{ict} is the target number. v_{ct} are colony-year fixed effects that are meant to capture shocks that could have affected the recruitment process as a whole.

Table A10 shows both the Ordinary Least Squares (OLS) and the Instrumental Variable (IV) estimates, like for decision ratios in Equation 6 and Table 3. In the case of a target increase of one additional recruit, it is mostly the number of first portion conscripts that moves upward by 0.86 (OLS) / 0.87 (IV) in column 6; average variations at other stages are not statistically significant at the 95 percent confidence level. In the case of a downward adjustment of the target, less effort is devoted to recapturing previous years' absentees, and fewer volunteers are admitted, such that the final number of conscripts only decreases by 0.60 (OLS) / 0.57 (IV) on average in column (6); it also appears that fewer young men are enumerated, examined, and declared fit. As the target number is met in the great majority of cases, we can check that the sum of the coefficients for $\Delta Recaptured$, $\Delta Volunteer$ and $\Delta Conscript$ is very close to one (OLS: 0.04+0.09+0.86=0.99 for positive target variations and 0.13+0.23+0.60=0.96 for negative target variations; same for the IV estimates).

A.7.6 Head tax rates and cash crop price shocks

Figures A4 and A5 show that colonial authorities did not choose to grant head tax rates adjustments to districts hit by the drop in cash crop prices in the first half of the 1930s,

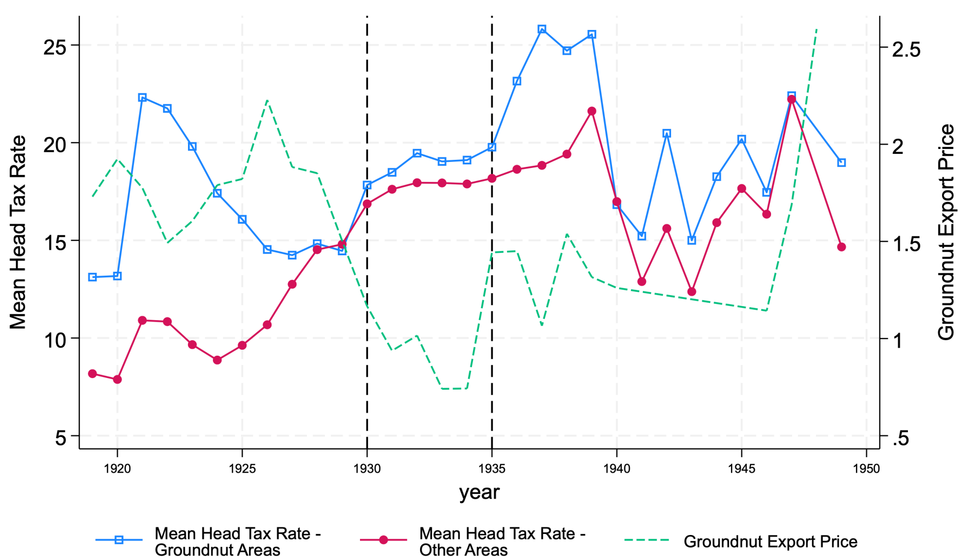
Table A10: Impact of Recruitment Target on Various Stages of Drafting Board

	(1) Δ Recapt.	(2) Δ Enum.	(3) Δ Pres.	(4) Δ Fit	(5) Δ Vol.	(6) Δ Consc.
Ordinary least squares:						
Δ Target ($\geqslant 0$)	+0.0549	+0.2137	+0.6046	-0.9552	+0.0519	+0.8830***
	(0.0393)	(0.9942)	(0.7684)	(0.9827)	(0.0684)	(0.0690)
Δ Target ($\leqslant 0$)	+0.1315***	+1.4384	+0.9683	+1.4630**	+0.2207***	+0.6148***
	(0.0353)	(1.4384)	(0.9683)	(1.4630)	(0.0777)	(0.0761)
Colony-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Instrumental variable:						
Δ Target ($\geqslant 0$)	+0.0653*	-0.5646	+0.5844	-0.7144	+0.0594*	+0.8697***
	(0.0367)	(1.2293)	(0.7405)	(0.6365)	(0.0351)	(0.0421)
Δ Target ($\leqslant 0$)	+0.1171***	+2.5221**	+2.4257**	+2.1374**	+0.2704***	+0.5718***
	(0.0255)	(1.2491)	(1.1123)	(0.8301)	(0.0744)	(0.0766)
Observations	736	736	736	736	736	736

Notes: Ordinary least squares (OLS, top panel) and Instrumental variable (IV, bottom panel) estimation of Equation 6. Δ indicates the change in the variable of interest between year t and year $t-1$, or year $t-2$ if $t-1$ is missing. Δ Target ($\geqslant 0$) (resp. $\leqslant 0$) = Positive (resp. negative) changes of the target. Recapt.= Recaptured absentee. Enum. = Enumerated. Pres. = Present. Fit = Declared fit for military service. Vol. = Volunteer. Consc. = Conscripts, first portion of the conscription lottery. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1.

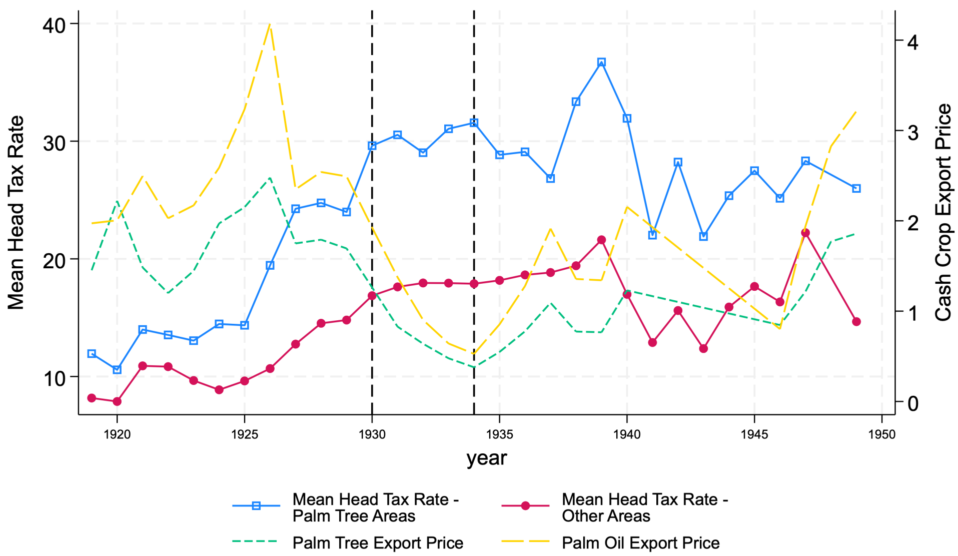
whether for groundnut producing districts or palm trees growing districts.

Figure A4: Head Tax Rate and Groundnut Areas



Notes: The graph plots mean head tax rates for two types of districts: (i) the ones that belong to the top quartile of groundnut income per capita (nine districts in Senegal, and two districts in French Sudan / Mali), (ii) all other districts. It also reports the evolution of unshelled groundnut export prices, in 1937 francs per kilogram (right scale).

Figure A5: Head Tax Rate and Palm Oil Areas



Notes: The graph plots mean head tax rates for two types of districts: (i) the ones that belong to the top quartile of palm oil and palm tree kernel income per capita (five districts in Dahomey / Benin, and two districts in Ivory Coast), (ii) all other districts. It also reports the evolution of palm tree kernels and of palm oil export prices, in 1937 francs per kilogram (right scale).