Pacification and Gender in Colonial Africa: Evidence from the Ethnographic Atlas

Henderson, Morgan and Whatley, Warren

University of michigan, University of Michigan

7 December 2014

Pacification and Gender in Colonial Africa: Evidence from the Ethnographic Atlas

Morgan Henderson
morghend@umich.edu

Warren C. Whatley
wwhatley@umich.edu

Department of Economics
University of Michigan
Ann Arbor, Michigan 48109

This version:
December 7, 2014

JEL Classifications: J12, N47, O15, P48
Keywords: Colonialism, Africa, Property Rights, Gender, Family Structure

Abstract

We combine the date-of-observation found in Murdock's Ethnographic Atlas and a newly-constructed dataset on the date-of-colonization at the ethnic-group level to study the effects of the duration of colonial rule on a variety of political, economic, and social characteristics of ethnic groups in Africa. We find that the duration of colonial rule is correlated with a dramatic shift in gender roles in Africa by increasing the relative status of men in lineage and inheritance systems but also reducing polygyny as a marriage system. A causal role for the duration of colonial rule is confirmed by a difference-in-difference analysis that uses never-colonized ethnic groups as a control group and by an analysis of changes in kinship terminology that tests for within-group changes in descent and inheritance rules. We are able to rule out missionary influence and Islam as mechanisms for these effects.

In so far as colonial rule was brought home to the ordinary African villager, it was usually through the agency of the district commissioner... a "white chief" exercising his rule directly or indirectly according to the rules of the colonial power which he served.

Michael Crowder, "The White Chief of Tropical Africa," 1978, p. 125.

The Commissioner went away… In the many years in which he had toiled to bring civilization to different parts of Africa he had learned a number of things…. As he walked back to the court he thought about that book… He had already chosen the title… The Pacification of the Primitive Tribes of the Lower Niger.

Chinua Achebe, Things Fall Apart (1959) pp. 208-09.

1 INTRODUCTION

George Murdock's *Ethnographic Atlas* (1967*)* is a rich compendium of European ethnographic observations on African societies. There is a tendency in the contemporary history and development literatures to use the *Ethnographic Atlas* as a snapshot of pre-colonial Africa: a description of the state of the continent as it existed on the eve of colonial rule.[1] We feel that this tendency is both problematic and a sub-optimal use of the rich ethnographic detail contained in the *Ethnographic Atlas*. First, the data in the *Ethnographic Atlas* is not a snapshot of Africa. Each of the 530 observations on Africa has a date stamp that records the approximate date-of-observation. According to Murdock, the "approximate time level to which the ethnographic data pertains" ranges from 1830 to 1960 (Murdock 1967, p. 116). It is neither a panel nor a cross-section, but the tendency has been to ignore the temporal heterogeneity despite the very real possibility that groups observed in 1830 may systematically differ from groups observed in 1960, and for reasons having to do with the passage of time.

Second, current research tends to focus on the static boundaries of African chiefdoms and how African elite political hierarchies from the past continue to shape economic development in

[1] This tendency is notable in recent work on the relationship between pre-colonial institutions and contemporary economic development (Michalopolous and Papaioannou 2013; Michalopolous and Papaioannou 2011; Englebert 2000; Gennaioli and Rainer 2007); the relationship between factor endowments and institutional development (Fenske 2013); the relationship between "traditional" plough use and gender norms today (Alesina, Giuliano and Nunn 2013); the effects of the trans-Atlantic slave trade on ethnic institutions (Whatley 2011, 2014) and current levels of trust (Nunn and Wantchekon 2011); and work on the determinants of pre-colonial political centralization (Osafo-Kwaako, and Robinson. 2013; Obikili, Nonso. 2013).

Africa today.[2] The *Ethnographic Atlas*, however, contains an abundance of other richly-nuanced ethnographic detail on the beliefs, practices and institutions that shaped the everyday lives of the people governed by these elites – like family structure, kin relations, gender relations, inheritance patterns and the like – all of which feature prominently in the economic ascendancy of the West. We might want to see how the regions differed in this regard.

Finally, the *Ethnographic Atlas* contains information that spans 130 years of African history. Perhaps researchers tend to view the *Atlas* as a snapshot of Africa because Africa is thought to be "traditional" and slow to change, or maybe even void of history before European conquest. Perhaps it is because many of the ethnographies were written by European missionaries, district commissioners and anthropologists who held biased, ethnocentric and racist views of the Africans they studied, like the district commissioner in Achebe's *Things Fall Apart (1959)*. Or perhaps quantitative researchers mistrust ethnographic information, especially ethnographic information that has been coded for quantitative analysis.

We do not believe that any of these potential biases should preclude the investigation of the historical information contained in the *Atlas*. The time stamp is a feature of these data just like spatial boundaries and political centralization, and it offers a unique opportunity to study historical changes in Africa during a crucial episode in its history – the period of European colonial rule. The time stamp, for example, can be used to estimate the duration of colonial rule experienced by each society prior to being observed by ethnographers. Estimating and assigning a different duration of colonial rule to each society in the *Ethnographic Atlas* creates the opportunity to study the process of pacification of African societies by paramount "white chiefs," as distinct from African chiefs, which has been the general tendency thus far.[3]

In this paper we exploit the temporal heterogeneity in the *Ethnographic Atlas* to document some of the ways that African societies were changed by the duration of time that white chiefs held paramount authority over them. To do this, we construct a measure of colonial occupation as the duration of time between the date-of-colonization of an ethnic group's territory and the date-of-observation as recorded in the *Ethnographic Atlas*. We take great care to estimate sub-national

[2] Michalopolous and Papaioannou (2011, 2013), Englebert (2000); Gennaioli and Rainer (2007); Acemoglu, Reed and Robinson (2013).
[3] See footnote 2.

dates of colonization and to control for possible endogeniety in both the date-of-colonization and the date-of-observation. We then look to see if the estimated duration of colonial rule can explain any of the variation in the structures and institutions of the societies recorded in the *Ethnographic Atlas*. We control for a long list of geographic feature that might be correlated with societal characteristic. We include a number of variables designed to randomize the date-of-colonization and the date-of-observation. We control for the influences of broad changes over time in colonial policies, globalization, world wars and other macro events and trends. What remains is an estimate of *the marginal effects on African societies of time spent as colonial subjects of European colonial powers*. We call this *pacification*.

We find that, conditional on this very rich set of geographic controls and using within-colony and within-decade variation in the duration of colonial rule, colonial pacification dramatically changed gender roles in Africa. Pacification reduced polygyny, reduced matriliny in descent rules and inheritance rights and increased patriliny in descent rules and inheritance rights. These are fundamental changes in the principles of organization of pre-state societies, and we are encouraged by the fact that our statistically significant findings are primarily on family structure, lineage and descent variables -- precisely the kinds of scientific observations that anthropologists were trained to make.

Were these effects causal? Did pacification *cause* these changes in gender roles, or was the timing of colonization and the timing of observation coincident with changes that were already taking place? Would these changes have taken place in the absence of colonization by Europeans? We acknowledge the difficulty in answering this question definitively, but we present further evidence that these changes were in fact caused by the duration of pacification. We show that the results are largely robust to using a differences-in-differences analysis that uses never-colonized groups as a control group. Furthermore, the cross-sectional results are validated by a unique estimation technique that uses information encoded in linguistic kinship terms as a proxy for within-group *historical* change in descent rules and inheritance rights. Finally, we are able to rule out missionary influence as a mechanism for these effects.

Section 2 of the paper describes the *Ethnographic Atlas* and its coverage. Section 3 discusses the data and the controls variables that we use to identify and estimate pacification effects. This

section highlights the construction of a new variable that measures the date-of-colonization at the ethnic-group level. Section 4 presents empirical results on time trends and the duration of pacification. In section 5 we conduct two additional tests of causation, and in section 6 we examine potential mechanisms. We conclude, in section 7, by discussing the significance of the results for the study of Africa in the colonial era and beyond.

2 THE ETHNOGRAPHIC ATLAS

The *Ethnographic Atlas* was initially published by George P. Murdock in the journal *Ethnology* in 29 installments between January, 1962 and July, 1980. His intention was to be comprehensive: "The editors of this journal feel that ethnological science has long stood in need of some coordinated means by which the vast accumulation of ethnographic knowledge can be... classified (Murdock 1962, p. 113)." The first issue introduced variables relating to the social organization of 100 societies "representing a fairly even distribution throughout the world Murdock 1962, p. 113)." Each subsequent issue added both variables and groups, culminating in a summary volume in 1967 that listed over 60 variables for 862 societies, with variables ranging from "Marital Residence" to "Jurisdictional Hierarchy" to "Ground Plan of Dwelling." Later issues increased the number of societies to 1267. The complete Ethnographic Atlas was digitized and published in 1999 by J. Patrick Gray.

The *Ethnographic Atlas* covers all continents except Antarctica, but by Murdock's own admission it is more complete for some areas than others. Murdock surveyed "practically the entire ethnographic literature (1967, p. 109)" for Africa, North America, and South America, and claimed "comparable completeness (p. 109)" for North Africa as well. Murdock admitted that his coverage of Europe was especially weak but claimed confidence in his coverage of Africa: "the author has reason to believe that a completely exhaustive survey of the literature would reveal... in Africa a few new societies but probably no additional clusters (p. 115)." Murdock used both primary sources (ethnographic and anthropological studies based on direct fieldwork) and secondary sources which were themselves based on "the archives of missionary societies, as well as field notes and special communications by anthropologists and others (Forde 1954, p. v)." [4]

[4] We count 1,453 consulted references listed in the *selected* bibliographies in George Murdock, *Africa: Its People and their Culture History* (1959).

Murdock intended the *Ethnographic Atlas* to be the basis for the statistical analysis of ethnographic studies. Specifically, he envisaged researchers drawing random samples from each of 412 world clusters to perform cross-cultural studies documenting statistical regularities and testing theories of social structure and change.[5] Murdock was always engaged in debates about the causes of social change,[6] but economists studying Africa have tended to use his data more as a turn-of-the-century census of Africa.

Interpreted as a cross-section, the African data in the *Ethnographic Atlas* are revealing (see Appendix 1 for a full description of the data and Appendix 2 for a description of the variables used in this study). On the date of observation, most societies in the *Ethnographic Atlas* relied very little on gathering, hunting, or fishing, instead using animal husbandry and agriculture as sources of subsistence. On average, groups relied on animal husbandry for about 30% of their food needs and agriculture for 60%. The average group practiced extensive or shifting agriculture and the mean size of local communities was approximately 400 people. Most groups were organized into petty chiefdoms rather than large states, notable exceptions being the Bubi, Kafa, Moroccans, and Tunisians. Within local communities there were generally three levels of jurisdictional hierarchy: nuclear family, extended family, and clan-barrio. Class stratifications existed and were fairly well-developed, with discernible wealth distinctions for the average group, although this is subject to wide variation. Polygyny was far more prevalent than monogamy. Slavery was present in approximately 37% of the groups at the time of observation, but had been *formerly* present and subsequently abolished in 56% of our sample. Succession to local political office was determined primarily by an "absolutist" (67%) selection process rather than a "liberal" (2%) or "democratic" (9%) one. Primogeniture in both land and property inheritance was more prevalent than equality of inheritance distribution, although not by a wide margin. Approximately 65% of the groups disbursed inheritable goods along patrilineal lines, and 15% along matrilineal lines. The median group was observed in 1920 with 27 years of colonial occupation. When restricted to groups observed after the onset of colonial rule, the average is 30 years.

[5] The Cross-Cultural Survey project was initiated in 1937. Murdock used the first 150 societies to test theories of social structure and change in the book *Social Structure* (1949).
[6] See Murdock, *Social Structure* (1949), chapter 8 entitled "Evolution of Social Organization." Also note the title of his book on Africa cited in the footnote above.

In order to determine the approximate locations of the societies recorded in the *Ethnographic Atlas*, we follow convention and link the *Ethnographic Atlas* to the "Murdock Map," a 1959 map drawn by George Murdock that depicts the geographic boundaries of traditional ethnic homelands (Murdock 1959). Of the approximately 830 groups represented by the Murdock Map, our dataset contains observations for 441. If an ethnic group straddles what is now a country border it is divided into two group-country observations. If it straddles three borders then it is divided into three group-country observations, etc. The resulting group-country dataset contains approximately 680 group-country observations across 48 modern-day countries. This allows the analysis to control for colonial and colonizer-specific effects on group characteristics. Some variables in the EA are more complete than others, ranging from no missing observations to almost 2/3 missing. We restrict our analysis to the more-complete variables of economic and social significance. Figure 1 displays the Murdock Map of ethnicities and the locations of the 684 group-country observations found in the *Ethnographic Atlas*.

3 DATA AND ESTIMATION EQUATION

Until now, the *Ethnographic Atlas* has been interpreted as a cross-sectional snapshot of pre-colonial Africa, like the flat map image in Figure 1. But it is not a simple cross-section. Figure 2 shows the distribution of observations by the date of observation. Observations span the entire colonial period. Only a small percentage is pre-colonial. The colonial "scramble" for Africa followed the Berlin Conference of 1885, but only 11 percent of the observations in the *Ethnographic Atlas* were made before 1900. The modal decade of observation was the 1920s when almost 25 percent of observations were made. More than 35 percent of the observations were made 1930 or later.

We exploit this temporal heterogeneity to investigate the effects of colonial pacification. We step systematically towards the estimation of the following equation with the goal of better identifying pacification and its effects:

$$Y_{ki} = \alpha + \beta_{1k} TIME_i + \beta_{2k} DUR_i + \theta_{1k} X_i + \theta_{2k} Z_i + C_i + R_i + \varepsilon_i \qquad (1)$$

Y_{ki} is the kth characteristic of group *i* as recorded in the *Ethnographic Atlas*. $TIME_i$ is the approximate date-of-observation of group *i* as recorded in the *Ethnographic Atlas*. DUR_i is the

duration of colonial rule over group *i*. The coefficient on DUR_i (β_{2k}) is the estimated effect of the duration of colonial occupation on the k^{th} characteristic of the societies in the *Ethnographic Atlas*, holding calendar *TIME* effects constant – or the effects of pacification. X_i is a vector of geographic controls for group *i* that correlate with group characteristics and $TIME_i$. Z_i is a vector of controls for endogenous selection on DUR_i. C_i is colony and colonizer fixed effects and R_i is region fixed effects.

3.1 The date-of-observation

Most of the recorded dates in the Ethnographic Atlas ($TIME_i$) are the first years of decades (1890, 1900, 1910, etc.). Murdock leaves no clues as to his method for assigning dates, but one can reasonable assume that he inferred the dates "to which the ethnographic Atlas pertain" from the vast number of publication he consulted, and that he intended the dates to be decade markers. We therefore interpret the date of observation in the broad sense of the decade in which the observation was made.[7]

3.2 Geographic controls

Given that our outcomes are a range of economic, social, and political characteristics of groups, we attempt to control for factors that might influence both date-of-observation and the development of group-level characteristics. Our primary motivation is to proxy for inter-group trade. Trade very plausibly influenced both the development of group characteristics and the ease of observation by ethnographers.

The vector of spatial controls (X_i) comprises variables measuring the distance from the centroid of group *i* to the coastline; the distance from the centroid of group *i* to the nearest major river; a dummy variable indicating that the group is located within 50 kilometers of the coastline; measures of ethnic density within 50 and 100 kilometer radii of the centroid of group *i*[8]; mean elevation of group *i*; a measure of the water area in the territory of group *i*; an index of soil

[7] In the final analysis of the impact of colonial duration we do not investigate nor try to identify the impact of the passage of calendar time, but rather use date of observation as a control variable in an analysis of colonial duration. In that context, we interpret date of observation as a control variable that allows us to identify the effects of the duration of colonial rule on group characteristics, holding decade constant.

[8] We use all groups from the *entire* "Murdock Map" (1959) for our measures of ethnic density, not only the linked groups. Given that only about half of the land area of Africa is linked from the map to the Ethnographic Atlas, this helps account for spatial correlation between observed and unobserved groups.

quality for group i; the land area, in square kilometers, of group i; and an index of malaria suitability in the territory of group i.[9] We also control for region fixed effects (R_i) in order to account for potential differences in both outcomes and date of observations due to fixed, large-scale variation such as climate.

3.3 Controls for date-of-observation

In an effort to further randomize the date-of-observation for group i ($TIME_i$) we add two additional controls. The first is the fraction of groups contiguous to observation i that were never observed. This controls for unobserved factors that may have influenced whether or not a society was observed and placed in the *Ethnographic Atlas*. If a society is surrounded by unobserved societies then it is likely that its date-of-observation is not random but related to the reasons why the contiguous societies were not observed, like being inhospitable to Europeans or being fierce resistors of pacification. A second variable is added that is similar to the first but uses information on the observation dates of contiguous societies. This variable measures the average date of observation for the societies contiguous to group i.

3.4 The date-of-colonization

The $TIME_i$ variable is recorded in the Ethnographic Atlas but the DUR_i variable must be constructed. It is the duration of time between the date-of-colonization and the date-of-observation. Common knowledge has it that the colonization of Africa was a rapid "scramble" -- that as late of the 1870s much of Africa was still unknown to outsiders -- then following the Berlin Conference of 1885 the continent was quickly parceled according to nearly-current country borders (Pakenham 1991). In reality, parts of Africa had repeat European contact and colonization for many years prior to 1885, while other parts of Africa remained largely untouched by European influence well into the 20th century (Hargreaves 1985). In this sub-section we take great care to date the onset of colonial occupation and assign those dates to each society found in the Ethnographic Atlas.

Creating group-level measures of the date of colonial occupation is not a trivial exercise. Consider Nigeria. When was it colonized by the British? There was a commercial European

[9] We use Stelios Michalopolous and Elias Papaioanno's geo-linked Ethnographic Atlas for some of our data; we have replicated most of the geographic covariates. https://sites.google.com/site/steliosecon /research

presence on the Nigeria coast dating back centuries before 1885. According to the *Transatlantic Slave Voyages Database* slaves were exported from Lagos as early as 1652, and the British annexed and colonized Lagos, the largest city in modern Nigeria, in 1861-1862. The Oil Rivers Protectorate in the Niger Delta was formed in 1884, renamed the Niger Coast Protectorate in 1893 and then merged in 1900 with territory purchased from the Royal Niger Company to form the Southern Nigeria Protectorate which covered roughly the southern third of modern Nigeria. The Northern Nigeria Protectorate was established by the Royal Niger Company in 1886 and then taken over by the British in 1900. In 1914 the Southern and Northern Nigeria Protectorates were merged to form the Colony and Protectorate of Nigeria. The modern boundaries of Nigeria were established starting in 1898 when Britain and France ended an eight-year conflict with the Anglo-French Agreement, which settled the western border of Nigeria. The boundaries were finalized in 1960 when Northern Cameroons (which was initially part of German Kamerun but ceded to Great Britain in 1919 by a League of Nations Mandate following World War 1) was incorporated into newly independent Nigeria.

Should the date of colonization for Nigeria be 1862, 1884, 1900, 1914, or 1919? Perhaps in 1906, when Lagos was incorporated into the Southern Nigeria Protectorate? Perhaps, as Ola Olsson (2009) argues, in 1851 when "the British replace[d] the local king in Lagos after a naval attack (p. 548)?" Should an area administrated by a government-chartered company count as an official government colony? Nigeria represents a particularly challenging case, but to some extent all African colonies defy exact colonial dating. Commercial influence preceded official colonization in almost every case and final colony borders were often not fixed until the early 20th century.

The solution to the classification problem depends on what you want the variable *DUR* to capture. Given the results of Acemoglu et al (2001) and La Porta et al (1997, 2008), it seems reasonable that the date of colonization should capture the beginning of systematic colonization, with the concurrent importing of laws, institutions, and customs from the colonizer countries. To that end, we seek the marginal effect of *systematic colonial administration of the land*, rather than something like an "outside contact" effect or a "commercial contact" effect. Following the literature, we code protectorates, annexes, and colonies as being equivalent.

Few authors have attempted to empirically assess the effects of colonial occupation on outcomes in Africa, in part because of this classification problem. We offer a contribution to the literature by refining the date-of-colonization at the ethnic group-level. Instead of coding the entirety of a modern country as being colonized at a single date, we allow sub-national territories to be colonized at different dates depending on the colonizing activity in the region. We largely rely on Pakenham (1991) and Hargreaves (1985) for dates and territories. When lacking any other source, we follow the lead of Sacerdote and Feyrer (2005) and use Wikipedia as a first approximation, and then consult the underlying sources for confirmation.

Take Nigeria as an example. Ethnic groups located in the Lagos colony are coded as being colonized in 1862, when Lagos was colonized. Ethnic groups in the Oil Rivers protectorate are coded as being colonized in 1884; groups in the rest of Southern Nigeria are coded as being colonized in 1900 and groups in the Northern Nigeria protectorate in 1900. Where groups do not lie completely within one colony or another we assign the group to the colony that contains the majority of the group's territory. See Figure 3 for a representation.

3.5 Controls for date-of-colonization

Given the lack of systematic record-keeping in most parts of late 19th century Africa, and given the vast geographical scope of the continent, any coding of date-of-colonization will inevitably contain error. Although attenuation bias due to random measurement error would cause our estimates to be biased towards zero, the error in this particular case need not be random. It is well-known that the African hinterland took years or decades to come under *effective* colonial administration following the imposition of *official* colonial administration (Herbst, 2000). It is therefore possible that, even with our refined coding of colonization date we still overstate the duration of *effective* colonial rule over far-flung groups. Our sub-national dating of colonial occupation allows for within-country heterogeneity in the date of colonization, which is consistent with historical accounts of hinterlands remaining largely unaffected by early colonial presence along the coast,[10] but we go a step further. We account for the actual distance between the seat of colonial authority and the homelands of ethnic groups. When a territory is colonized,

[10] From J.D. Hargreaves, *Western Africa 1886-1905*: "There was clearly great diversity in which the new colonial order initially presented itself to African rulers and their subjects, and in the ways by which they tried to come to terms with it. But by 1905 – although there were still removed districts in the rain-forest and desert where no effective 'pacification' had yet taken place – the fact of colonial rule had generally been accepted."

the first official act is to set up a colonial headquarters. Colonial authority then radiates outward from the headquarters into the surrounding hinterland. This takes time. The Oil Rivers Protectorate, for example, is coded as being colonized in 1884, but an ethnic group located some distance from the colonial headquarters of the Oil Rivers Protectorate may not have interactions with white chief authority until sometime later. To account for this spatial dimension of the broadcast of colonial authority, we include as a control variable the distance between the colonial headquarters of each colonized territory and the centroid of each ethnic group in that territory.

Lastly, we include colony fixed effects (C_i) that control for differing selections into colonization and different colony-specific policies. It is well-documented that the European powers had different agendas for their colonial conquests in Africa – a north-south route and the deterrence of the slave trade for the United Kingdom; new markets for the French; political clout for the Germans. Even within colonizers there is evidence that colonial regimes pursued different policies in order to better adapt to local conditions (Frankenma and van Waijenburg 2014). To the extent that these agendas influenced choice of territory, which in turn may have influenced group societal characteristics, it is necessary to use within-colony variation for our estimates (Sanderson 1985). Even if the colonization of Africa approached a "scramble" where the identity of the colonizer was randomly assigned, differing colonial policies like the French tendency toward assimilation or the British policy of indirect rule means that duration effects might differ by colonizer. If this is the case then including colony fixed effects is a conservative estimation strategy but it will not bias the results.

There are three possible methods for assigning colonizer to ethnicities: the initial colonizer; the colonizer at the time of observation; and the major colonizer during the era of colonization (the colonizer with the most years of colonization). The three are not equivalent because colonial possessions were re-assigned following World War I.[11] We follow the lead of Bertocchi and Canova (2002) and assign the colonizer with the longest duration at the time of observation. The Luguru, for example, in the colony of Tanzania were observed in 1930. Tanzania began its colonial experience in 1890 as German East Africa (with the Anglo-German treaty of 1890) and

[11] In 1919, the League of Nations issued a mandate stripping Germany of its colonial possessions, and transferring their ownership to other European countries. In particular, Germany was divested of Burundi (Belgium), Cameroon (UK and France, mostly France), Rwanda (Belgium), Tanzania (UK), and Togo (UK and France, roughly equal portions), Namibia (South Africa, and, by connection, UK).

became a British Mandate in 1919. The Luguru experienced 29 years of German rule and eleven years of British rule before being observed in 1930. We therefore code Luguru as a Germany colony.[12]

To account for possible spatial correlation in the dependent variables we follow Michalopolous and Papaionnou (2013) and use Camerson, Gelbach, and Miller (2011) standard errors and double-cluster at the country-level and the ethnic language-family level.[13]

4 EMPIRICAL RESULTS

The goal is to identify and estimate the impact of colonial pacification on the economic and political characteristics of the African societies found in the Ethnographic Atlas. We begin with the impact of calendar *TIME* and then add *DUR* to pick up the effects of the duration of colonial rule holding calendar *TIME* effects constant. We call these duration affects the effects of pacification – the effects of the duration of time that colonizers ruled, holding calendar time effects constant.

4.1 Calendar *TIME* trends

Column (1) of Table 1 reports simple OLS regressions of group characteristics (Y_{ki}) on the date of observation ($TIME_i$) with no controls. As time passed, the ethnographies in the Ethnographic Atlas tended to record less reliance on nomadic activities like hunting and animal husbandry and more reliance on sedentary activities like agriculture -- changes generally consistent with modernizing economies. "Jurisdictional hierarchy at the local level" tended to increase over time, but "jurisdictional hierarchy beyond the local level" (what has been called "political centralization") tended to decrease over time, as did "political integration."[14] There is no evidence in these data of any diffusion of the plough over the 130 years covered by the sample, but there was a clear tendency to abolish slavery[15] and move towards a more-equitable

[12] In practice, the choice of colonizer in situations like this makes little difference to the magnitudes and statistical significance of regression coefficients.
[13] Restricting the sample to the group level by dropping all but the largest repeated country-group observations does not substantially change the results.
[14] Jurisdictional Hierarchy at the Local Level is defined as group organization in which there is "original and definitive jurisdiction over some sphere of social life in which the organization has the legitimate right to make decisions having a significant effect on its members (Murdock 1962)."
[15] It is worth noting that the variable v70 in the Ethnographic Atlas is mis-coded in the electronic version. The variable classifies group-level slavery as being either Absent, Hereditary and socially significant; Non-Hereditary

distribution of inherited property.[16] We find no evidence that ascension to village headship or lineage systems of descent and inheritance were systematically influenced by the passage of calendar *TIME* between 1830 and 1960.

Column (2) of Table 1 adds the spatial controls and the two variables that control for endogeniety in the *TIME* of observation. The R-squares improve considerably, but the only other substantive change is the negative coefficient on Jurisdictional Hierarchy Beyond the Local Community, which loses statistical significance. The substantive similarity of the coefficients in columns (1) and (2) argues for the plausible exogeniety of date-of-observation in the *Ethnographic Atlas.*

Given that it is possible to interpret the coefficient in an OLS linear probability model as probabilities (given sufficient variation in the outcome variable) we find that the time effects on slavery are substantively large: an additional decade is associated with a 10.6 percentage point increase in the likelihood that an ethnic group would have abolished slavery, and a 8.0 percentage point decrease in the likelihood that slavery would still exist at the time of observation. Relative to their sample means, these effects imply a positive 18% and negative 21% change, respectively. Since the *Ethnographic Atlas* codes variables on different scales (some are 0-9; some 0-5; some 0-3; some 0-1) direct comparisons of coefficients are not especially informative. However, comparisons of standardized "beta" coefficients for outcomes that changed significant over time reveal that the effects of *TIME* on the abolition of slavery and the presence of slavery are approximately twice as large as the next largest association. Altogether, these estimates imply that groups in Africa were undergoing economic, political, and social change in the later 19th and early 20th centuries, with the most rapid change being the abolition of slavery.

---

and incipient; and present but type not identified; but treats groups that did, and did not, abolish slavery in the same manner. This has the effect of making slavery seem much more prevalent, according to v70 at the time of observation, than it actually was. We correct this in our analysis. See appendix 2 for more details.

[16] We condition our measure of abolition of slavery on the group having at one point had slavery; that is to say, we exclude from this regression groups for which slavery has been historically absent.

4.2 Pacification

Revealing though they are, these time trends do not necessarily reveal much about the effects of pacification. The date-of-observation (*TIME*) does not correlate one-for-one with the duration of colonial rule (*DUR*) because there was no uniform date-of-colonization for all groups. While it is true that the *TIME* effects in columns (1) and (2) include the effects of time spent under colonial rule, they also include time effects that have nothing to do with the duration of time spent under colonial rule -- like the globalization of trade, broad changes in colonial policy, world wars, climate trends, and general technological, cultural and development trajectories that were unaffected by the duration of colonial rule. Since our goal is to use *DUR* to identify and estimate the effects of pacification, we add *DUR* to the equation and retain the *TIME* variable as a control for the other covariates that changed over calendar time.[17] By allowing the *levels* of the outcome variables to change over time, we are using within-decade variation in *DUR* to identify the effect of an additional year of pacification. Figure 4 shows that there is a substantial amount of within-decade variation in *DUR*.[18]

This is the complete specification of equation (1). We add the variable measuring the distance between the occupied group's homeland and the colonial headquarters. We also add colony fixed-effects to control for systematic variations across colonies. Finally, we restrict the sample to groups observed *after* the imposition of colonial rule. We omit from the sample groups observed before the imposition of colonial rule and groups in Liberia and Ethiopia that were never officially colonized by European powers. This drops approximately 20% of our sample.

The results are reported in column (3) of Table 1. We measure *DUR* in 10-year intervals to make the estimated coefficients easier to read. The estimated coefficients change dramatically. The shift from hunting to agriculture that was picked up by the *TIME* trends in columns (1) and (2) disappears. Apparently the shift was not correlated with pacification but was a *TIME* trend

[17] The variable *TIME* is specifications (1), (2) and (3) are nearly identical because the date of observation recorded in the Ethnographic Atlas is almost universally the first year of a decade. We control for *TIME* linearly rather than non-parametrically in specifications (1) and (2) for ease of descriptive exposition. Specification (3) controls for *TIME* non-parametrically, but the results do not change substantively if we control for *TIME* linearly.

[18] For ease of viewing, the figures are reported without outliers. Four groups located in Equatorial Guinea and Mozambique are recorded as having more than 390 years of duration. Our main results are robust to dropping these four outliers from the sample.

largely independent of pacification, like favorable movements in global commodity prices and/or changes in colonial fiscal and development policies, among others.[19]

Surprisingly, the same interpretation might apply to the abolition of slavery. Note that while the magnitude of the coefficient on *DUR* remains large and positive, it is no longer statistically significant at conventional levels. This is the case for both the presence of slavery and the abolition of slavery. This suggests that the large *TIME* trends estimated in columns (1) and (2) were independent of the duration of white chief rule within-decade. The historical literature on the abolition of slavery in colonial Africa is extremely cautious about attributing too much to the colonial administration's commitment to abolish slavery.[20] The moral mission to abolish slavery was a pretext for colonial occupation, in no small part to garner support from missionaries on the ground and political constituencies back home, but following occupation the primary goals quickly shifted to social control and self-sufficiency of the colonial administration (Phillips (1989). The abolition of slavery was not always consistent with these objectives. Abolition could advance over time and space, but in the long-run it could not jeopardize the larger goals of social control and administrative self-sufficiency. The estimates in columns (2) and (3) of Table 1 are consistent with this view. Abolition proceeded over time but not because of persistent and consistent pressure from white chiefs. It progressed across time and space in a host of idiosyncratic local outcomes and policy changes that balanced the competing colonial objectives of social control, economic development and political support at home and in the colonies.

On the other hand, the duration of time that white chiefs held paramount authority over African chiefs had dramatic effects on other local institutions in Africa. Pacification was associated with large, dramatic and systematic changes in gender relations in Africa. The longer a white chief ruled over an African society, the lower the observed incidence of polygyny and the greater the observed shift from matriliny to patriliny in descent and inheritance rules. The estimated *DUR* effect typically runs counter to the *TIME* counterpart and explains why they were not captured by the estimated coefficients on *TIME* in specifications (1) and (2), an early indication that pacification caused these changes.

[19] We cannot identify the sources separately. TIME lumps together all large-scale time trends and policy changes.
[20] Getz (2004); Dooling (2007); Phillips (1989); Miers and Roberts (1988); Miers and Kopytoff (1977); Miers and Klein (2006); Lovejoy and Falola (2003).

The estimated decline in polygyny finds support in the empirical literature.[21] Fenske (2013a) examines correlates of polygyny in sub-Saharan Africa using data from Demographic and Health Surveys, and documents a substantial decline in polygyny across former colonies in sub-Saharan African since the 1970s. Moreover, he finds that an increase in exposure to Catholic missions during the colonial era reduces the current prevalence of polygyny. Given that a substantial fraction of public education in colonial Africa was provided by missionaries (Frankenma 2012, Gardner 2013), and considering *de facto* Christian prohibitions on polygyny, it is possible that a negative pacification-effect on the incidence of polygyny could operate through religious-based public education. We return to this point in section 6.

The estimated shift from matriliny to patriliny has no counterpart in the empirical literature, except for the general view that the relative position of African women suffered under colonial rule.[22] Given the generally held belief that descent rules evolve over long periods of time and function to regulate social behavior (see Murdock, *Social Structure*) a systematic change associated with colonial pacification is surprising, if not revolutionary.[23] If lineage rules function as a kind of "rule of law' in pre-state societies (Bates 2010) then a systematic change would be a fundamental indicator of how "things fall apart" in parts of Africa under colonial rule. We are particularly intrigued by this possibility, so in section 5.2 we investigate this relationship further. We test for *within-group* changes in descent rules by looking to see if pacification disrupted the close association between descent rules and their traditional kinship nomenclature. We turn to the question of mechanism in section 6.

5. FURTHER TESTS

We have documented that holding decade constant and conditional on having been colonized, pacification tend to lower the incidence of polygyny as a marital system, and tended to encourage patriliny and discourage matriliny. These results are not necessarily causal. There exist two margins for endogeneity of *DUR*: the date-of-observation recorded in the *Ethnographic Atlas* and the estimated date-of-colonization. It is possible that European countries selected areas

[21] Dalton and Leung (2014).
[22] See Cocuery-Vidrovitch (1994); Burrill, Roberts and Thornberry (2010).
[23] Since kinship systems tend to be stable over time (Kutsoati and Morck 2012), this result is very unexpected and new in the economics literature: the duration of the imposition of European laws and institutions is systematically associated with change in a fundamental and long-standing system of dynamic group organization.

(and therefore homelands of ethnic groups) for colonization that displayed certain desirable characteristics (e.g. natural resources). It is also possible that anthropologists and ethnographers selected groups for observation that had other desirable characteristics (e.g. peacefulness that facilitated observation) although the similarity of results in columns (1) and (2) in Table 1 suggests that this is unlikely to be a major concern. A hypothetical ethnic group with long *DUR* could have been colonized early and observed late because it was a resource-laden land occupied by a warlike people who were hostile toward outsiders. If this group had a patrilineal inheritance system for unrelated reasons then our regression will erroneously attribute this patriliny to longer pacification. We have employed a rich set of geographic controls and controls for endogeniety in *DUR* and *TIME* in order to minimize the likelihood of such a spurious result, but the possibility remains.[24]

The ideal solution is to use a pair of instruments that are both correlated with the timing of colonization and the timing of observation, but unrelated to the determinants of group-level characteristics.[25] Given the lack of consensus in the historical growth literature regarding the former, this presents a significant challenge. Furthermore, it stands to reason that any variable that affects ease of observation also reflects the ease of inter-group contact, which would certainly affect group characteristics. Finding appropriate instruments for colonial duration on the African continent seems *a priori* very unlikely. In this section, we present two additional tests that we believe provide additional evidence that the results on *DUR* in column (3) are indeed causal: (1) we use never-colonized societies as a control groups in a diff-in-diff analysis and (2) we use legacy kinship terms within each group's language as a proxy for recent changes in descent rules.

[24] As a further check on our dating scheme for colonization, we used the maps in the *Cambridge History of Africa*, Vol. 6 to assign dates of colonization in particular parts of Africa. For example, upon the signing of the Makoko Treaty in 1883, Pierre de Brazza claimed the French Congo for France, which encompasses the territories currently known as Gabon, the Republic of the Congo, and the Central African Republic (Pakenham 1991). Consequently, and consistent with our historical sources, in the original specification we classified the Central African Republic as having been colonized between 1889 and 1903. The maps, however, tell us to re-code the entire country to 1902. Similarly, we had coded Mali as having been colonized between 1886 and1893 but the maps say 1902. We also adjust Nigeria to being colonized uniformly in 1914. We re-perform our preferred specification for the impact of colonial tenure, and find the results substantively invariant to the re-coding. Tables are available from authors upon request.

[25] Feyrer and Sacerdote (2009) quite ingeniously use prevailing wind patterns as an instrument for date of colonization of islands. Unfortunately, this strategy is not applicable to mainland Africa.

5.1 A quasi-natural experiment

Implicitly considering colonial duration as a treatment variable begs the question: what is the control group? We rejected using a treatment-control methodology because the natural control group (ethnicities that were never colonized) is very small relative to the treatment group.[26] However, it is instructive to observe how patriliny, matriliny and polygyny trended over *DUR* in these never-colonized groups.

We construct an artificial control group consisting of groups in the never-colonized countries of Liberia and Ethiopia. The treatment group consists of the countries surrounding them: the Ivory Coast, Sierra Leone, Eritrea, Somalia, and Sudan. To construct placebo measures of *DUR* for the control group, we assumed that the never-colonized groups had the average date-of-colonization of their contiguous treatment groups. For Liberia, the colonization date is the average for Sierra Leone and Ivory Coast (1887); for Ethiopia it is the average for the Sudan, Eritrea, and Somalia (1897). We then calculate placebo *DUR*s for each ethnic group in these control countries. If there is no true pacification effect (and outcomes were trending the same way in both groups) then we should see no differential effect.

The results are reported in Table 2. The standard errors are large because of the crude design of the placebo and the small number of observations, but the signs of the coefficients all suggest that the trends in the control group were opposite those in the treatment group. In the never-colonized groups, polygyny was *increasing* relative to the treatment group, matriliny was *increasing* relative to the treatment group (and significantly different) and patriliny was *decreasing* relative to the treatment group (with the patriliny result nearly statistically significant at p = .11). We interpret this as suggestive evidence that the results in column (3) of Table 1 are indeed causal.

5.2 Lineage systems and kinship terms

The second test uses an idea found in Murdock's book *Social Structure* (1949) to test for within-group changes in descent rules and lineages groupings. According to Murdock, descent rules sort members of societies into groups of related kin. Each person (called Ego) is born into a kin-

[26] There are 23country- groups in Ethiopia and 12 country-groups in Liberia that comprise the never-colonized, relative to 684 total country-groups.

group. The kin-group consists of Ego's nuclear family, its extensions and its generations past and future. For a variety of reasons (having to do with economic resources, environment, post-marital settlement patterns, culture and historical factors) some members of Ego's kin-group are more important than others. These constitute Ego's lineage group, determined by the community's descent rule and to whom Ego has certain "contractual" obligations and rights. In communities with unilineal descent rules, Ego's lineage group is related through one of Ego's parents. In matrilineal descent communities it is Ego's mother and in patrilineal descent communities it is Ego's father. The descent rule determines Ego's lineage group, which determines Ego's social status, marriage prospects, obligations in child-rearing, civic obligations (labor, military and charity), inheritance lines and lines of authority. To political scientists like Robert Bates (2010) lineages enforce a kind of pre-state "rule of law" at the village level, often called customary law. Elders and other authorities within the lineage group met out intra-group justice. Other forms of negotiated justice like blood-feuds settle inter-group conflict.

A long-standing idea in anthropology is that firmly established lineage groupings adopt unique kin naming conventions that reflects the descent rule they have chosen.[27] In firmly established matrilineal societies the "equilibrium" naming convention is called the Crow naming system. For patrilineal societies it is called Omaha. The *Ethnographic Atlas* contains data on kinship terms for 55% of our colonized sample.[28]

Kinship terms are relevant for our purposes because of the *historical* information they may contain. If a lineage system changes so does the kin-naming convention that describes it *but with a lag*. In his book *Social Structure* (1949) Murdock describes his theory of social change and how one could use kin terms to identify within-group changes in descent rules and lineage groupings:

[27] According to Murdock, "The scientific significance of kinship systems was first appreciated by Morgan (1870) in what is perhaps the most original and brilliant single achievement in the history of anthropology (Murdock 1949, p. 91)." The claim to scientific status stems from the fact that the nuclear family and its incest taboo are universal human institution and norms. From these universal conditions flow kin-relationships across families and generations. A kinship terminology system emerges to reduce the kin terms (for the primary (8), secondary (33) and tertiary (151) kinship relations) to a manageable size. The kinship terminology system reflects the boundaries, opportunities and contractual arrangements of the kin-group. Every beginning anthropology student has to learn the basic kin-naming systems and the corresponding descent rules.

[28] The six major kin naming systems are Crow, Eskimo, Hawaiian, Iroquois, Omaha, and Sudanese

> Adaptive changes in kinship terminology … are frequently not completed until the new rule of descent has become established, and sometimes not for a considerable period thereafter, so that they may continue for some time to reflect the previous form of social organization (page 221-222)."

We look to see if *DUR* disrupted the link between descent rules and their traditional kin naming conventions. Since changes in kin terminology necessarily lag behind changes in the descent rule they describe, legacy kinship terms from a prior lineage grouping are evidence of recent change in the descent rule. This strategy effectively differences away the kind of time-invariant unobservable characteristics of groups that could have led to selective colonization by Europeans or selective observation by anthropologists.

We perform two tests that exploit the quasi-longitudinal nature of the kinship data. To reiterate, long-standing matrilineal descent societies converge on the Crow naming convention and long-standing patrilineal descent societies converge on the Omaha naming convention.[29] We first test for the disrupting effects of *DUR*. We look to see if *DUR* increases (+) or decreases (-) the probability that a group observed to be patrilineal/matrilineal had a naming convention that was *not* Omaha/Crow. The results of this test are reported in columns (1) and (2) in Table 3. Column (1) is estimated on the sample of observed matrilineal groups and we look to see if *DUR* disrupted (+) or reinforced (-) the link with Crow nomenclature. Column (2) is run on the sample of observed patrilineal groups and we look to see if *DUR* disrupted (+) or reinforced (-) the link with Omaha nomenclature. The only statistically significant result is found on the descent rules for inheriting mobile property. Pacification disrupted matrilineal descent in property inheritance.

We also test for emergence. We look to see if *DUR* increased (+) or decreased (-) the probability that groups with naming conventions that were *not* Omaha/Crow were nonetheless observed to be patrilineal/matrilineal. The results are reported in columns (3) and (4) of Table 3. Column (3) is estimated on the sample of societies that did *not* have Crow naming conventions when observed, and we look to see if *DUR* increased (+) or decreased (-) the probability that these

[29] See http://anthro.palomar.edu/kinship/kinship_6.htm. This is confirmed in our data. The correlation coefficient between Crow kinship terms and Matriliny is .21; for Crow kinship terms and Patriliny it is -.27. For Omaha kinship terms and Matriliny it is -.18, and for Omaha kinship terms and Patriliny it is .24.

groups would nonetheless be observed as matrilineal. Column (4) is estimated on the sample of societies observed to *not* have Omaha naming conventions, and we look to see if *DUR* increased (+) or decreased (-) the probability that these groups would nonetheless be observed to be patrilineal. The results show that pacification tended to discourage the emergence of matriliny in descent rules, in the inheritance of land and the inheritance of moveable property. It also tended to encourage emergence of patrilineal descent in the inheritance of land. These results confirm the results reported in column (3) of Table 1: pacification discouraged matriliny and encouraged patriliny. They also support the interpretation that pacification, measured as the number of years that white chiefs held paramount authority over black chiefs, caused these changes.

Murdock himself argued, on the basis of a complex cross-sectional analysis of his data, that there existed a transitional lineage system he coined the "Guinea-type" because of its prevalence in West Africa:

> This type, which is named for its prevalence in West Africa, is transitional… It is devised to accommodate those tribes which formerly belonged to one of the stable bilateral types, Eskimo and Hawaiian, and which have evolved patrilineal descent rules on the basis of patrilocal residence without having yet undergone the adaptive modifications in cross-cousin terms necessary to achieve a more typical patrilineal structure (pp. 235-236).

Murdock identified another special case as the "Sudanese-type" -- communities using distinct descriptive names for almost every kin relationship. These societies

> ...occur mainly in a band across central Africa from west to east on both sides of the boundary between the Bantu and Sudanese linguistic areas. Although many tribes in the same area do not exhibit use of descriptive terminology, the distribution nevertheless suggests that some obscure historical or linguistic cause has been operative. The second group embraced in the Sudanese category consists of those patrilineal societies which have developed

> asymmetrical cross-cousin terminology without arriving at a more characteristic Omaha pattern (pp. 238-239).

Murdock did not venture a guess as to what caused these recent transitions towards patrilineal descent. We present evidence that the transitions were caused by the duration of colonial pacification that these societies had recently experienced.[30]

6 MECHANISMS

In this section we briefly examine potential mechanisms for our two main results: that longer pacification led to a shift away from polygyny; and that longer pacification led to a shift away from matriliny and toward patriliny. Peters (1997) argues that during the period of colonial rule the matrilineal institutions in Malawi came under attack because of "the promotion of a patriarchal nuclear family by Christian and Islamic missions" and "the assumption of a male-headed household in government policies." Consequently, we use our baseline specification (with full geographic controls, decade indicators, and colony fixed effects) to test for three possible mechanisms: exposure to Islam, exposure to Christian missions, and direct imposition of colonial policy.

6.1 Islam

If Islam in Africa tended to suppress matrilineal descent and polygyny and encourage patrilineal descent, and if the geographical distribution of Islam varies systematically with the duration of colonial rule then it is possible that the influence of Islam, rather than pacification, drives our main results. Indeed, there is some evidence that the current geographical incidence of Islam is higher along pre-Islamic trade routes and that Islam spread in sub-Saharan Africa through contact with Muslim traders (Michalopolous et al 2012).

We test for this by geocoding a 1918 map of the geographic distribution of religions in Africa (Bartholomew and Brooke, 1918) and superimposing it onto the Murdock Map. We assign to each group-country observation a 0/1 indicator for whether the majority of its land area lies

[30] Today, we refer to the remaining matrilineal societies in Central Africa that did not make the colonial transition from matriliny to patriliny as the "Matrilineal Belt."

within the area labeled "Mohammedans" on the map.[31] We then re-perform our baseline specification, but include the "Islam" indicator and an interaction between "Islam" and *DUR*. These results are presented in Table 4, Panel a. The distribution of Islam does not explain any of the transition from matriliny to patriliny. Nor does it explain our result for polygyny.

6.2 Missionary influence

It is well documented that British colonies effectively contracted out their schooling infrastructure to Catholic and Protestant missions in exchange for the missions' freedom to win over as many converts as possible (Frankema 2012; Peters 1997). If missions actively attempted to subvert traditional systems of matriliny and polygyny, and if exposure to missions is correlated with the duration of colonial rule, then it is possible that the pacification effect is being driven by missionary influence. To test for this, we re-perform our baseline specification, but now include the number of missions in group-country *i*, as well as the interaction between the number of missions and *DUR*.[32] Because we are already controlling for land area in square kilometers, the coefficient on the number of missions takes on a per-km interpretation.

These results are presented in Table 4, Panel B. The number of missions per sq. km does not affect the estimated effects of pacification on the matrilineal outcomes: estimated effects for matriliny in descent, matriliny in land inheritance and matriliny in property inheritance are all virtually identical to their baseline values, and the number of missions does not significantly affect these estimates. This is also true for the patrilineal outcomes, but with one exception: a greater effect of pacification on patriliny in land inheritance when the number of missions per km increases. This significant interaction, combined with the fact that there is not a significant pacification effect on patrilineal land inheritance, suggests that direct missionary influence is, at most, a second-order driver of our results. Pacification dominates the missionary effect in all other regressions, and only when pacification does not explain a patriliny effect (in land inheritance, even in the baseline regression) does missionary exposure have any explanatory power.

[31] Of course, the fact that the map was published in 1918 does not necessarily mean it refers to Africa in 1918. However, based on the names of colonies in the map – "Belgian Congo", established in 1908, and "German East Africa", which ceased to exist in 1918 - we are reasonably sure that the map is intended to depict Africa sometime between 1908 and 1918.

[32] The map is taken from Roome (1924). We thank Nathan Nunn for making the digitized version available.

We do find that direct missionary exposure explains a small part of the pacification effect on polygyny. The pacification effect remains, but the effect of an additional mission is significant: group-countries with one additional mission per sq. km have a larger (in magnitude) pacification effect of .049 percentage points, which is equivalent to an additional 2.7 years of pacification (recalling that the estimate duration effects are for decades of colonial duration). Furthermore, the positive and significant coefficient on the number of missions speaks to the endogeneity of mission placement: missions were more likely to originally locate in areas with high incidences of polygyny.

6.3 Direct colonial control

In order to control for territorial constraints on the broadcast of colonial authority, we controlled in our baseline specification for the distance between the centroid of group-country *i* and its colonial capital at the time of observation. Here we interact *DUR* and distance to the colonial capital to test whether groups located farther from the colonial capital experienced systematically different pacification effects. The results are in Table 4, Panel C.

There is some evidence that the effects of pacification are weaker for ethnic groups located farther from the colonial capital. In all regressions except the one for matriliny in land inheritance, the interaction term indicates weaker pacification effects for groups farther away: positive in distance for matriliny and polygyny, and negative in distance for patriliny. Moreover, the magnitudes of these effects are large. Relative to a group located at the colonial capital (which, for example, has a *DUR* effect of -.035 for the incidence of matriliny in property inheritance), a group that is the mean distance from the colonial capital (687 km) would have a *DUR* effect of -.0136, a reduction of about 60%. While the coefficients on the interaction terms are not significant at conventional levels, two are significant at the 15% level (matriliny in property inheritance and patriliny in property inheritance).

7 CONCLUSION

Conditional on a rich set of geographic controls, and using within-colony and within-decade variation in the duration of colonial rule, an additional year of colonial pacification was

associated with a lower incidence of polygyny, less matriliny as a system of descent, more patriliny as a system of descent, less matriliny in land and property inheritance, and more patriliny in property inheritance. These results are largely robust to a differences-in-differences design using never-colonized groups as the control group. Furthermore, these results are validated by a unique estimation technique that uses information encoded within linguistic kinship terms as a proxy for past social structure. We are also able to rule out missionary influence as a mechanism for these results.

In matrilineal societies women's status is elevated because lineage rights run through women. Our analysis cannot identify the precise reasons why colonial pacification discouraged matriliny and encouraged patriliny. The most-likely channel is through the authority that colonizers held over their colonized subjects. White chiefs imposed their particular brand of masculine laws, customs and norms on the African societies they ruled (and observed). The recent evidence of an association between traditional plough use and a stronger masculine bias in gender roles (Alesina, Paolo and Nunn, 2013) is consistent with this interpretation. European nations traditionally used the plough in agriculture activities. African societies did not. The duration of the contact between European colonizers and the African subjects they ruled over is the most-obvious channel for the transplantation of European laws, customs and cultures that favored men.[33]

In Central Africa, the anthropologist Mary Douglas (1964) describes how the transition from matriliny to patriliny was set in motion by the practice of wife-pawning. In matrilineal societies, wife pawning converted matrilineal lineage rights (in land) into inheritable patrilineal property rights (in the pawned wife). Lovejoy and Falola (2003) document that most pawns in the colonial era were women and that pawnship rose substantially in the colonial era, although they caution that this might be a reflection of better recordkeeping in the colonial era (pp. 1-26). Policing the abolition of slavery may have also contributed to wife-pawning by inadvertently making wife-pawning the more acceptable way for Africans to control labor.

[33] See Coquery-Vidrovitch (1997, pp. 59-68) for a discussion of several cases of what she calls the "patrilineal offensive" in the colonial era which included the introduction of the plow and the importation of European legal traditions that favored men. Also see Alan Watson (1974) on the concept of legal transplants as an approach to studying comparative law.

Our analysis does not capture everything that colonial rule changed in Africa, only those changes associated with pacification and recorded in the *Ethnographic Atlas*. As for possible long-term effects, modern survey data in Malawi, where matriliny and patriliny co-exist, show that matriliny in rural settings may be the more-efficient descent rule when high-wage employment opportunities exist for men. In matrilineal systems, men have weaker inheritance rights and weaker rights in divorce settlements, so they are more inclined to work longer hours for wage income, over which they have stronger claims (Telalagic 2012, 2014). Matriliny is also an efficient labor-recruitment device in land-abundant economies, like those of pre-colonial Africa, because matrilineal land rights keep women on the land and attract men to the land (Wilks 1993, ch. 2; Murdock 1949, chs. 3-5). On the other hand, matrilineal inheritance rules disperse the wealth that nuclear families accumulate because it grants inheritance rights to mothers' sisters' sons. Whatever its development potential, the growth-equity trade-off is very different from the Western European pattern of accumulation through male primogenitor. Whatever the development potential, it largely fell apart under colonial rule.

References

Acemoglu, Daron; Simon Johnson and James A. Robinson. 2001. "The Colonial Origins of Comparative Development : An Empirical Investigation." *American Economic Review*, 91(5), 1369-401.

Acemoglu, Daron; Tristan Reed and James Robinson. 2012. "Chiefs: Economic Development and Elite Control of Civil Society in Sierra Leone." *Journal of Political Economy*, 122(2), 319-68.

Achebe, Chinua. 1959. *Things Fall Apart*. New York: Doubleday.

Alisena, Albert; Paolo Giuliano and Nathan Nunn. 2013. "On the Origins of Gener Roles: Women and the Plough." *Quarterly Journal of Economics*, 28(2), 469-530.

Bartholomew, J. D. and G. C. Brooke. 1918. *A Literary and Historical Atlas of Africa and Australasia*. Dent.

Bates, Robert. 2010. *Prosperity and Violence: The Political Economy of Development*. New York: W. W. Norton.

Bertocchi, Graziella and Fabio Canova. 2002. "Did Colonization Matter for Growth? An Empirical Exploration into the Causes of Africa's Underdevelopment." *European Economic Review*, 46(10), 1851-71.

Burrill, Emily S.; Richard L. Roberts and Elizabeth Thornberry eds**.** 2010. *Domestic Violence and the Law in Colonial and Postcolonial Africa*. Athen: Ohio University Press.

Camerson, C.; J. Gelbach and D. Miller. 2011. "Robust Inferences with Multi-Way Clustering." *Journal of Business and Economic Statistics*, 28(2), 238-49.

Coquery-Vidrovitch, Catherine. 1997. *African Women: A Modern History*. Oxford: Westview Press.

Crowder, Michael. 1978. *Colonial West Africa*. London: Frank Cass and Company.

Dalton, John T. and Tin Cheuk Leung. 2014. "Why Is Polygyny More Prevalent in Western Africa: An African Slave Trade Perspective." *Economic Development and Cultural Change*, 62(4), 599-632.

Dooling, Wayne. 2007. *Slavery, Emancipation and Colonial Rile in South Africa*. Athen: Ohio University Press.

Douglas, Mary. 1969. "Is Matriliny Doomed in Africa?," M. Douglas and P. Kaberry, *Man in Africa.* London: Tavistock Publications,

____. 1964. "Matriliny and Pawnship in Central Africa." *Journal of the International African Institite*, 34(4), 301-13.

Englebert, Pierre. 2000. "Pre-Colonial Institutions, Post-Colonial States, and Economic Development in Tropical Africa." *Political Science REsearch Quarterly*, 53(1), 7-36.

Falola, Toyin and Paul E. Lovejoy. 1994. *Pawnship in Africa : Debt Bondage in Historical Perspective*. Boulder: Westview Press.

Fenske, James. 2013a. "African Polygamy: Past and Present," *MPRA Working Paper No. 48526.*

____. 2013b. "Does Land Abundance Explains African Institutions?" *The Economic Journal*, 123(573), 1363-90.

Feyrer, James and Bruce Sacerdote. 2009. "Colonialism and Modern Income: Islands as Natural Experiments." *Review of Economics and Statistics*, 91(2), 245-62.

Forde, Darryl ed**.** 1954. *People of Central Cameroons*. London: International African Institute.

Frankema, Ewout. 2012. "The Origins of Formal Education in Sub-Saharan Africa: Was British Rule More Benign?" *European Review of Economic History*, 16(4), 335-55.
Frankema, Ewout and Marlous van Waijenburg. 2014. "Metropolitan Blueprints of Colonial Taxation? Comparative Development in British and French Africa, 1880-1940." *Journal of African History*, 55(3), 371-400.
Gardner, Leigh. 2013. "Was Independence Really Better Than Colonial Rule? A Comparative Study of Liberia and Sierra Leone," Manuscipt,
Gennaioli, Nicola and Ilia Rainer. 2007. "The Modern Impact of Precolonial Centralization in Africa." *Journal of Economic Growth*, 12, 185-234.
Getz, Trevor R. 2004. *Slavery and Reform in West Africa: Towards Emancipation in Nineteenth Century Senegal and the Gold Coast*. Athens: Ohio University Press.
Hargreaves, J.D. 1985. "West Africa, 1886-1905," *Cambridge History of Africa.* London: Cambridge University Press,
Herbst, Jeffrey. 2000. *States and Power in Africa: Comparative Lessons in Authority and Control*. Princeton: Princeton University Press.
Kutsoati, Edward and Randall Morch. 2012. "Family Ties, Inheritance Rights and Successful Poverty Alleviation: Evidence from Ghana," *NBER Working Paper.*
La Porta, Rafael; Florencio Lopez-de-Silanes and Andrei Shleifer. 2008. "The Economic Consequences of Legal Origin." *Journal of Economic Literature*, 46(2), 285-332.
La Porta, Rafael; Florencio Lopez-de-Silanes; Andrei Shleifer and R Vishny. 1997. "Legal Determinants of External Finance." *Journal of Finance*, 52, 1131-50.
Michalopoulos, Stelio; Alireza Naghavi and Giovanni Prarolo. 2012. "Trade and Geography in the Origins and Spread of Islam," NBER working papers,
Michalopoulos, Stelios and Elias Papailoannou. 2011. "The Long-Run Effects of the Scramble for Africa," *NBER Working Paper.*
____. 2013. "Precolonial Ethnic Institutions and Contemporary African Development." *Econometrica*, 81(1), 113-52.
Miers, Suzanne and Martin Klein eds**.** 1999. *Slavery and Colonial Rule in Africa*. London: Routledge.
Miers, Suzanne and Igor Kopytoff eds**.** 1997. *Slavery in Africa: Historical and Anthropological Perspectives*. Madison: University of Wisconsin Press.
Miers, Suzanne and Richard Roberts eds**.** 1988. *The End of Slavery in Africa*. Madison: University of Wisconsin Press.
Murdock, George P. 1959. *Africa: Its People and Their Culture*. New York: McGraw-Hill.
____. 1967a. *Ethnographic Atlas*. Pittsburgh: University of Pittsburgh Press.
____. 1962. "Ethnographic Atlas." *Ethnology*, 1(2), 265-86.
____. 1967b. "Ethnographic Atlas: A Summary." *Ethnology*, 6(2), 109-236.
____. 1949. *Social Structure*. New York: Macmillan Co.
Nunn, Nathan and Leonard Wantchekon. 2011. "The Slave Trade and the Origins of Mistrust in Africa." *American Economic Review*, 111(7), 3221-52.
Obikili, Nonso. 2014. "The Transatlantic Slave Trade and Local Political Fragmentation in Africa," *Economic Research South Africa, working paper no 406.*
Olsson, Ola. 2009. "On the Democratic Legacy of Colonialism." *Journal of Comparative Economics*, 37, 534-51.
Osafo-Kwaako, Philip and James Robinson. 2013. "Political Centralization in Pre-Colonial Africa," *NBER Working Paper No. 18770.*

Pakenham, Thomas. 1991. *The Scramble for Africa: The White Man's Conquest of the Dark Continent from 1876 to 1912*. New York: Random House.
Peters, Pauline E. 1997. "Against All Ods: Matriliny and Gender in the Shire Highlands of Malawi." *Critique of Anthropology*, 17(2).
Phillips, Anne. 1989. *The Enigma of Colonialism: British Policy in West Africa*. London.
Roome, William R. M. 1924. "Ethnographic Survey of Africa: Showing the Tribes and Languages; Also the Stations of Missionary Societies."
Sanderson, G.N. 1985. "The European Partition of Africa," *Cambridge History of Africa.* London: Cambridge University Press,
Telalagic, Selma. 2012. "Domestic Production as a Source of Marital Power: Theory and Evidence from Malawi," *Cambridge Working Paper in Economics #1243.*
Telalagic, Selma 2014. "Kinship and Consumption: The Effects of Spouses' Outside Options on Household Productivity," *Oxford Department of Economics Discussion Paper #720.*
Watson, Alan. 1993. *Legal Transplants: An Approach to Comparative Law*. Athens: University of Georgia Press.
Whatley, Warren. 2014. "The Transatlantic Slave Trade and the Evolution of Political Authority in West Africa," E. Akyeampong, R. Bates, N. Nunn and J. Robinson, *Africa's Development in Historical Perspective.* Cambridge: Cambridge University Press, 460-88.
Whatley, Warren and Rob Gillezeau. 2011. "The Impact of the Slave Trade on Ethnic Stratification in Africa." *American Economic Review*, 101(3), 571-76.
Wilks, Ivor. 1993. *Forests of Gold : Essays on the Akan and the Kingdom of Asante*. Athens: Ohio University Press.

Table 1. OLS Estimates on TIME and DUR

	(1)		(2)		(3)	
DEPENDENT VARIABLES	INDEPENDENT VARIABLE					
	TIME		TIME		DURATION	
	(without controls)	R^2	with controls	R^2	with controls	R^2
	(years)		(years)		(decades)	
Gathering	-0.00161	0.002	0.00056	0.145	0.00031	0.513
	(0.001)		(0.002)		(0.015)	
Hunting	-0.00459*	0.016	-0.00376**	0.179	-0.00733	0.351
	(0.002)		(0.002)		(0.009)	
Fishing	0.00314	0.004	0.00201	0.245	-0.00535	0.325
	(0.003)		(0.003)		(0.020)	
Animal Husbandry	-0.01168*	0.017	-0.00564	0.438	0.02546	0.523
	(0.006)		(0.004)		(0.018)	
Agriculture	0.01420**	0.029	0.00626*	0.382	-0.01117	0.438
	(0.006)		(0.004)		(0.023)	
Intensity of Agriculture	0.00504	0.009	0.00336	0.271	-0.00007	0.391
	(0.004)		(0.003)		(0.020)	
Mean Size of Local Communities	0.00196	0.001	-0.00754	0.283	0.35784	0.638
	(0.008)		(0.010)		(0.226)	
Jurisdictional Heirarchy, Local	0.00415**	0.019	0.00379***	0.280	-0.00542	0.345
	(0.002)		(0.001)		(0.006)	
Jurisdictional Hierarchy, Beyond Local	-0.00523*	0.013	-0.00316	0.180	0.00494	0.293
	(0.003)		(0.002)		(0.012)	
Animals and Plow Cultivation	-0.00071	0.001	0.00087	0.366	-0.00260	0.578
	(0.002)		(0.002)		(0.006)	
Subsistence Economy	0.00568*	0.012	0.00234	0.179	-0.00207	0.362
	(0.003)		(0.003)		(0.012)	
Class Stratification	-0.00426	0.004	-0.00175	0.124	0.04672	0.269
	(0.003)		(0.004)		(0.033)	
Presence of Slavery	-0.00686***	0.097	-0.00784***	0.248	-0.00413	0.310
	(0.002)		(0.001)		(0.005)	
Slavery Abolished	0.00984***	0.164	0.00990***	0.288	0.02850	0.329
	(0.001)		(0.001)		(0.022)	
Democratic Institutions	0.00021	0.000	0.00002	0.038	0.00320	0.246
	(0.001)		(0.001)		(0.002)	
Absolutist Institutions	-0.00110	0.003	-0.00090	0.138	-0.00209	0.375
	(0.001)		(0.002)		(0.005)	
Liberal Institutions	-0.00008	0.000	-0.00027	0.065	-0.00067	0.261
	(0.000)		(0.000)		(0.002)	
Relative Monogamy	0.00014	0.000	0.00002	0.182	0.00141	0.416
	(0.001)		(0.001)		(0.001)	
Relative Polygamy	-0.00177	0.006	-0.00189	0.195	-0.02120***	0.309
	(0.001)		(0.001)		(0.005)	
Primogeniture in Land Inheritance.	-0.00355***	0.024	-0.00520***	0.153	-0.00816	0.267
	(0.001)		(0.002)		(0.008)	
Primogeniture in Property. Inheritance.	-0.00416***	0.032	-0.00468***	0.167	-0.01681*	0.257
	(0.001)		(0.001)		(0.009)	
Equality in Land Inher.	0.00477***	0.048	0.00474***	0.187	-0.00561	0.280
	(0.001)		(0.001)		(0.006)	
Equality in Prop. Inher.	0.00330**	0.020	0.00344***	0.237	0.02427**	0.330
	(0.001)		(0.001)		(0.011)	
Matrilineal Descent	-0.00122	0.005	-0.00044	0.105	-0.02703***	0.399
	(0.001)		(0.001)		(0.003)	
Patrilineal Descent	0.00091	0.002	-0.00057	0.123	0.02912***	0.381
	(0.001)		(0.001)		(0.005)	
Patriliny in Land Inheritance	0.00234*	0.012	0.00062	0.262	0.01480	0.453
	(0.001)		(0.001)		(0.013)	
Matriliny in Land Inheritance	-0.00180	0.011	-0.00142	0.084	-0.02983***	0.410
	(0.001)		(0.001)		(0.007)	
Patriiliny in Property Inheritance	0.00035	0.000	-0.00094	0.220	0.03045***	0.462
	(0.002)		(0.001)		(0.005)	
Matriliny in Property Inheritance	-0.00098	0.003	-0.00034	0.141	-0.02519***	0.468
	(0.001)		(0.001)		(0.005)	
Political Integratin	-0.01863***	0.066	-0.01731***	0.301	0.03052	0.608
	(0.007)		(0.006)		(0.105)	

Notes: Regression (1) uses as independent variable Murdock's "Date of Observation" with no other controls. Regression (2) uses as independent variable Murdock's "Date of Observation", with geographic controls (listed below), region indicators, and Ethnographic Atlas selection controls (listed below). Regression (3) uses as independent variable "Colonial Tenure", defined as date of observation minus date of colonization, and restricts the sample to groups that were in countries that were colonized, and which also have non-negative colonial tenure. It uses as controls decadal indicators, Ethnographic Atlas selection variables (listed below), geographic controls (listed below), colony fixed effects, and distance from group centroid to colonial headquarters for colonizing country.
Geographic controls comprise a dummy if the group-country is coastal; the number of other ethnicities within 50 and 100 kilometers of the centroid of each group-country; the land area in square kilometers; the distance in km to the closest major river; the distance in km to the nearest point on the coast; a malaria stability index; average land quality for cultivation; mean elevation of each group-country; and a measure of water area. Ethnographic Atlas selection controls are "Fraction of contiguous groups not in EA", which measures the fraction of groups that are contiguous to group i in the Murdock Map (1959), but which are not included in the Ethnographic Atlas, and "Average Date of Observation of Contiguous Groups" which measures the average date of observation, in the EA, of all groups contiguous to group i.
Standard errors are adjusted for two-way clustering at the country and ethno-linguistic family level. Standard errors are included in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<.01$.

Table 2. Diff-in-Diff Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Matrilineal	Patrilineal	Patriliny in Land	Matriliny in Land	Patriliny in Property	Matriliny in Property
VARIABLES	Polygyny	Descent	Descent	Inheritance	Inheritance	Inheritance	Inheritance
Duration (years)	-0.00334	-0.00423	0.00466	0.00398**	-0.00318	0.00408	-0.00449
	(0.008)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
Duration * Never Colonized	0.00244	0.00562**	-0.00999	-0.00303	0.00402	-0.00200	0.00381
	(0.011)	(0.003)	(0.006)	(0.004)	(0.004)	(0.004)	(0.003)
Observations	92	92	92	70	70	74	74
R-squared	0.329	0.490	0.466	0.529	0.592	0.582	0.614

Notes: this sample is restricted to groups in the Ivory Coast, Ethiopia, Sierra Leone, Liberia, Eritrea, Somolia, and the Sudan. All groups in Liberia are assigned a "placebo" colonization date of 1887, which is the average of the colonization dates for contiguous neighboring countries Sierra Leone and Ivory Coast. All groups in Ethiopia are assigned a placebo colonization date of 1897, which is the average date of colonization for contiguous neighboring countries Sudan, Eritrea, and Somolia. Tenure is then calculated as the different between date of observation and date of colonization (placebo and real). The sample is restricted to those groups with non-negative tenures. All specifications incorporate "major" colonizer fixed effects, region fixed effects, fraction of contiguous neighboring groups included in the EA, average date of observation for neighboring groups, and geographic controls. Geographic controls include a dummy if the group-country is coastal; the number of other ethnicities within 50 and 100 kilometers of the centroid of each group-country; the land area in square kilometers; the distance in km to the closest major river; the distance in km to the nearest point on the coast; a malaria stability index; average land quality for cultivation; mean elevation of each group-country; and a measure of water area. "Fraction of contiguous groups not in EA" measures the fraction of groups that are contiguous to group i in the Murdock Map (1959), but which are not included in the Ethnographic Atlas. "Average Date of Observation of Contiguous Groups" measures the average date of observation, in the EA, of all groups contiguous to group i. Standard errors are adjusted for two-way clustering at the country and ethno-linguistic family level. Standard errors are included in parentheses. * p<0.1; ** p<0.05; *** p<.01.

Table 3. Descent and Kinship Terms Analysis

	(1)	(2)	(3)	(4)
INDEPENDENT VARIABLES	DEPENDENT VARIABLES			
	Not Crow	Not Omaha	Matrilineal	Patrilineal
	IN DESCENT			
Colonial Tenure (in 10s of years)	-0.02846	-0.00656	-0.02478***	0.02141
	(0.027)	(0.013)	(0.004)	(0.021)
Observations	60	199	290	264
R-squared	0.874	0.343	0.559	0.461
	IN LAND INHERITANCE			
Colonial Tenure (in 10s of years)	.	-0.01052	-0.02196***	0.06612**
	.	(0.028)	(0.006)	(0.029)
Observations	38	158	223	209
R-squared	.	0.290	0.601	0.565
	IN PROPERTY INHERITANCE			
Colonial Tenure (in 10s of years)	0.03971*	-0.00079	-0.02805***	0.02384
	(0.024)	(0.015)	(0.007)	(0.025)
Observations	65	166	251	234
R-squared	0.804	0.308	0.676	0.510
SAMPLE	Matrilineals	Patrilineals	Not Crow	Not Omaha

Notes: the sample is initially restricted to the ethnic groups with non-negative tenure, and all specifications incorporate colony fixed effects, distance to the nearest colonial capital at date of observation, fraction of contiguous neighboring groups included in the EA, average date of observation for neighboring groups, and geographic controls (listed below).

Column (1) restricts the sample to "currently" matrilineal groups. Dependent variable is a 0/1 indicator for use of non-Crow kinship terms.
Column (2) restricts the sample to "currently" patrilineal groups. Dependent variable is a 0/1 indicator for use of non-Omaha kinship terms.
Column (3) restricts the sample to groups with non-Crow kinship terms. Dependent variable is a 0/1 indicator for group being currently matrilineal.
Column (4) restricts the sample to groups with non-Omaha kinship terms. Dependent variable is a 0/1 indicator for group being currently patrilineal.

Geographic controls comprise a dummy if the group-country is coastal; the number of other ethnicities within 50 and 100 kilometers of the centroid of each group-country; the land area in square kilometers; the distance in km to the closest major river; the distance in km to the nearest point on the coast; a malaria

stability index; average land quality for cultivation; mean elevation of each group-country; and a measure of water area. “Fraction of contiguous groups not in EA” measures the fraction of groups that are contiguous to group i in the Murdock Map (1959), but which are not included in the Ethnographic Atlas. “Average Date of Observation of Contiguous Groups” measures the average date of observation, in the EA, of all groups contiguous to group i. “Distance to Colonial Capital at Date of Observation” measures the distance in kilometers to the nearest capital of the colonizer of group i. Standard errors are adjusted for two-way clustering at the country and ethno-linguistic family level. Standard errors are included in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<.01$.

Table 4: Possible Mechanisms for Main Results

	(1) Matrilineal Descent	(2) Matri. in Land Inher	(3) Matri. in Prop. Inher	(4) Patrilineal Descent	(5) Patri. in Land Inher	(6) Patri. in Prop. Inher	(7) Relative Polygamy
Panel A: Islamic Influence							
Colonial Duration (in 10s of years)	-0.0269***	-0.0293***	-0.0256***	0.0291***	0.0147	0.0314***	-0.0214***
	(0.003)	(0.007)	(0.005)	(0.004)	(0.013)	(0.005)	(0.005)
Islamic in 1918?	0.05774	-0.04944	-0.03226	-0.13053	-0.06870	-0.05841	-0.06632
	(0.106)	(0.122)	(0.135)	(0.101)	(0.149)	(0.149)	(0.119)
Islamic * Duration	-0.01388	-0.00098	0.01757	0.02053	0.01404	-0.01638	0.02404
	(0.024)	(0.022)	(0.028)	(0.028)	(0.032)	(0.035)	(0.034)
Observations	531	416	450	531	416	450	535
Panel B: Missionary Influence							
Colonial Duration (in 10s of years)	-0.0267***	-0.0291***	-0.0244***	0.0292***	0.01200	0.0305***	-0.01825***
	(0.003)	(0.007)	(0.005)	(0.005)	(0.012)	(0.005)	(0.007)
# of Missions in 1924	0.00171	0.00270	0.00332	0.00048	-0.01032	-0.00257	0.01639**
	(0.006)	(0.007)	(0.005)	(0.010)	(0.009)	(0.008)	(0.008)
Missions * Duration	-0.00011	-0.00065	-0.00034	-0.00064	0.00264*	-0.00136	-0.00488***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Observations	531	416	450	531	416	450	535
Panel C: Distance to Colonial Capital							
Colonial Duration (in 10s of years)	-0.0351***	-0.0298***	-0.0357***	0.0330***	0.01727	0.0440***	-0.03237***
	(0.010)	(0.008)	(0.010)	(0.009)	(0.018)	(0.012)	(0.012)
Distance to Colonial Capital	-0.05604	0.02194	-0.06757	0.06112	-0.00418	0.19605	-0.14107
	(0.117)	(0.120)	(0.129)	(0.135)	(0.130)	(0.171)	(0.104)
Distance to Col. Cap. * Duration	0.02294	-0.00016	0.03216	-0.01109	-0.00744	-0.04129	0.03147
	(0.022)	(0.020)	(0.022)	(0.025)	(0.026)	(0.027)	(0.026)
Observations	531	416	450	531	416	450	535

Notes: Panel A tests for difference in duration effect by Islamic status; Panel B tests for differences in duration effect by missionary exposure; and Panel C tests for differences in duration effect by distance from colonial capital. All regressions include geographic, Ethnographic Atlas, and colonial controls. Geographic controls comprise a dummy if the group-country is coastal; the number of other ethnicities within 50 and 100 kilometers of the centroid of each group-country;

the land area in square kilometers; the distance in km to the closest major river; the distance in km to the nearest point on the coast; a malaria stability index; average land quality for cultivation; mean elevation of each group-country; and a measure of water area. Ethnographic Atlas selection controls are "Fraction of contiguous groups not in EA", which measures the fraction of groups that are contiguous to group i in the Murdock Map (1959), but which are not included in the Ethnographic Atlas, and "Average Date of Observation of Contiguous Groups" which measures the average date of observation, in the EA, of all groups contiguous to group i. Colonial controls comprise the distance from the centroid of group-country i to the colonial capital of its colonizing country in thousands of km and country fixed effects. Standard errors are adjusted for two-way clustering at the country and ethno-linguistic family level. Standard errors are included in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Figure 1

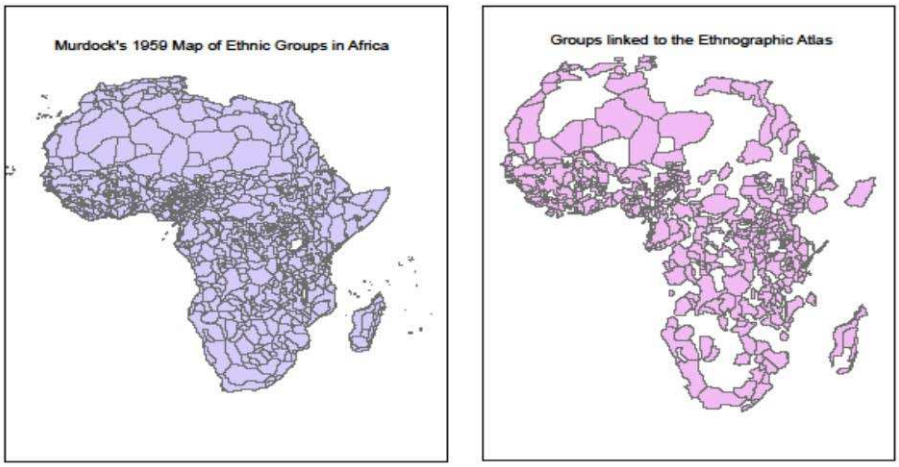

Murdock's 1959 Map of Ethnic Groups in Africa
Groups linked to the Ethnographic Atlas

Figure 2. Frequency of date of observation

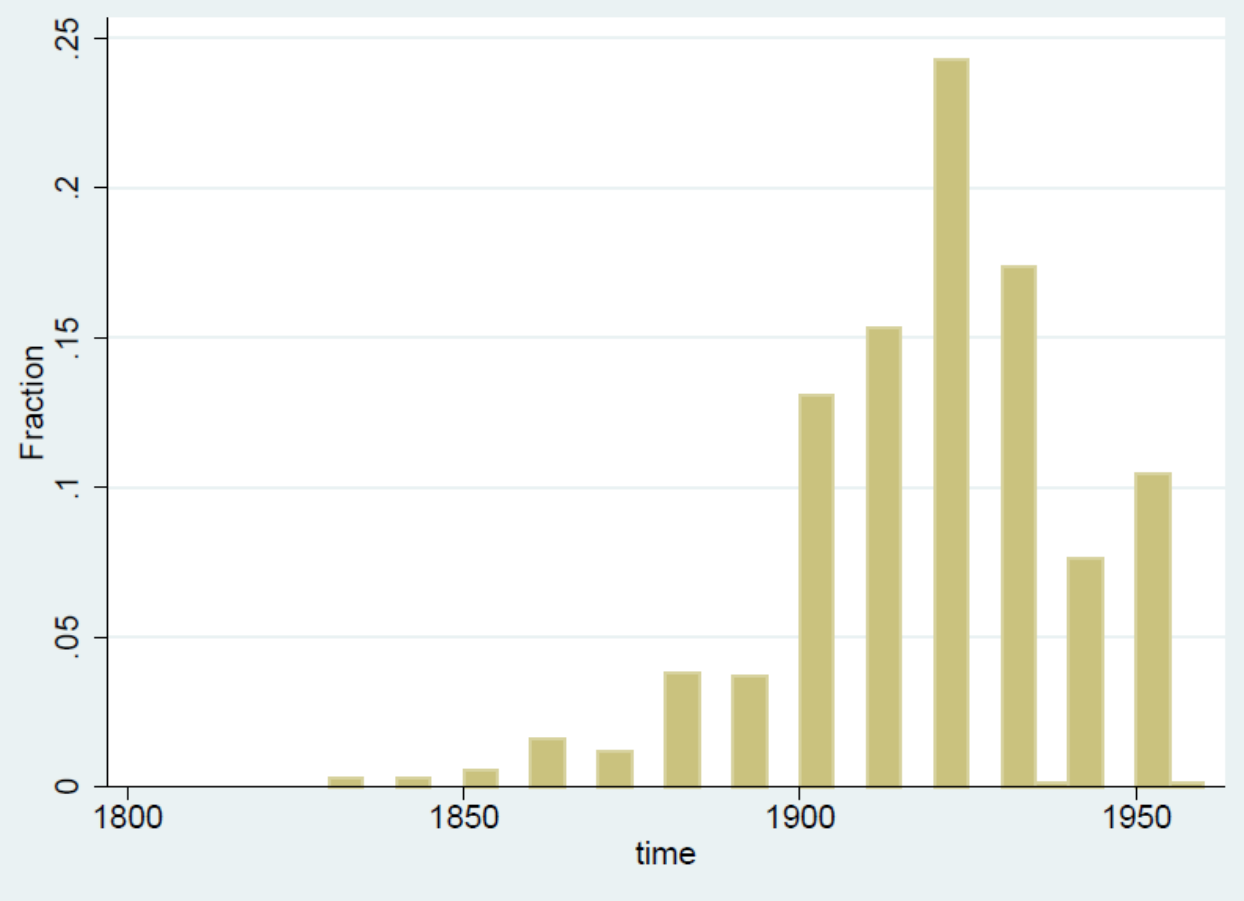


Figure 3 – Colonization Dates of Ethnic Groups in Nigeria

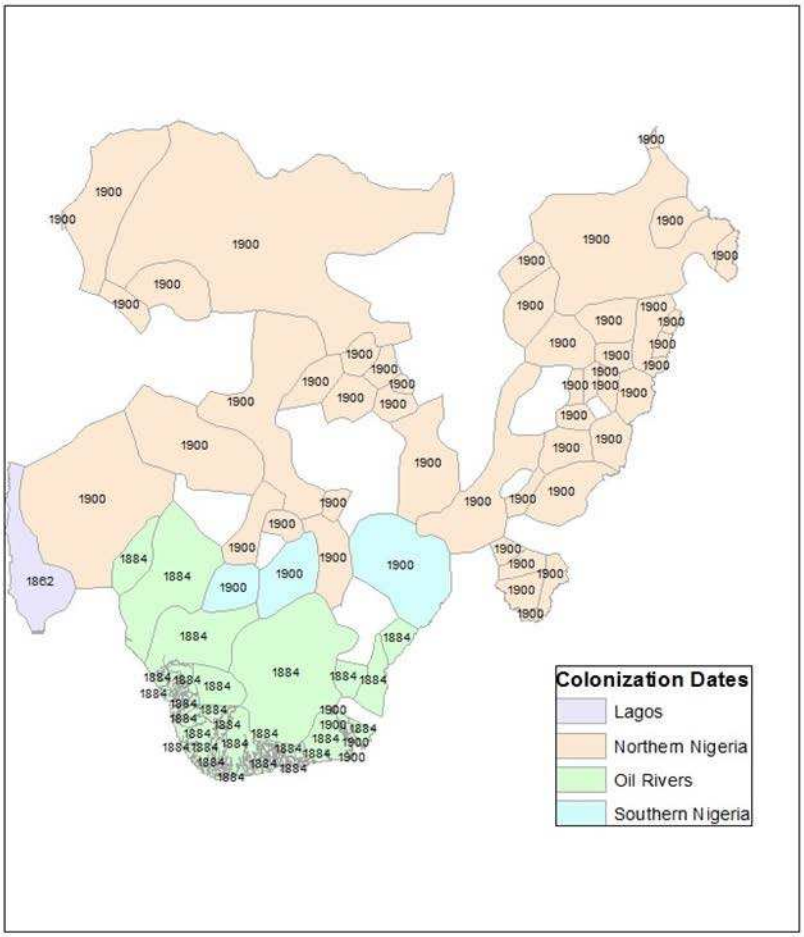
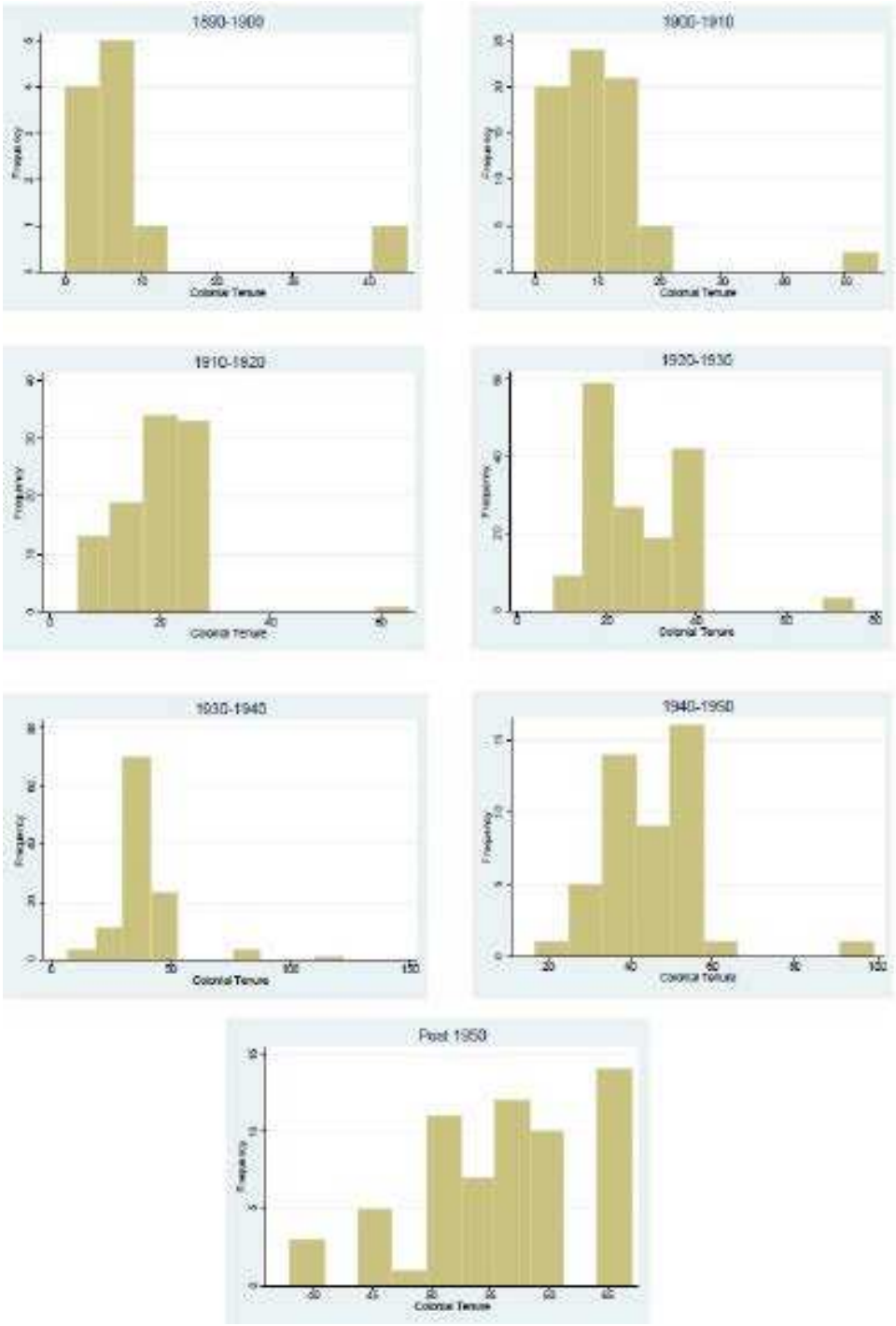


Figure 4. The Duration of occupation by decade



Appendix 1

Summary Statistics for variables

Variable	Mean	St. Dev.	Range	N
Reliance on Gathering	.3829161	.8470335	0-9	679
Reliance on Hunting	.8276878	.7669803	0-9	679
Reliance on Fishing	.8306333	1.058414	0-9	679
Reliance on Animal Husbandry	2.409426	1.900233	0-9	679
Reliance on Agriculture	5.543446	1.795795	0-9	679
Intensity of Agriculture	3.606195	1.14905	1-6	678
Mean Size of Local Communities	4.019608	1.949058	1-8	255
Jurisdictional Hierarchy of Local Community	1.920354	.6427635	1-3	678
Jurisdictional Hierarchy Beyond Local Community	2.221239	.9698666	1-5	678
Animals and Plow Cultivation	1.119469	.4633113	1-3	678
Subsistence Economy	6.02651	1.135069	1-9	679
Class Stratification	2.397188	1.41436	1-5	569
Abolition of Slavery	.5730994	.4951104	0-1	513
Slavery Present	.360	.4805	0-1	608

Relative Democracy	.09	.2864684	0-1	500
Relative Absolutism	.698	.4595851	0-1	500
Relative liberality	.024	.1532023	0-1	500
Monogamy	.0356083	.1854491	0-1	674
Polygamy	.5014837	.5003691	0-1	674
Primogeniture in Land Inheritance	.5424063	.4986905	0-1	507
Primogeniture in Property Inheritance	.4771127	.4999162	0-1	568
Equality in Land Inheritance	.3530572	.4783923	0-1	507
Equality in Property Inheritance	.4383803	.4966258	0-1	568
Matrilineal Descent	.1646707	.371161	0-1	668
Patrilineal Descent	.7095808	.454296	0-1	668
Relative Patriliny in Land Inheritance	.6793169	.4671826	0-1	527
Relative Matriliny in Land Inheritance	.1650854	.3716103	0-1	527
Relative Patriliny in Property Inheritance	.6390845	.4806894	0-1	568

Relative Matriliny in Property Inheritance	.1971831	.3982224	0-1	568
Political Integration	3.87156	1.639224	1-8	109
Date of Observation	1917.239	21.448	1830-1960	679
Colonial Tenure	24.3618	23.00276	-54-122	644

Appendix 2: Variable Construction and Data Sources

Presence of slavery equals one if Murdock's v70 ("Type of Slavery") equals "incipient or nonhereditary", "reported but type not identified", or "hereditary and socially significant", **and** Murdock's v71 does not equal "Formerly Present but not currently existing", zero otherwise.

Abolition of slavery equals Murdock's v71 ("Former Presence of Slavery"), conditional on Murdock's v70 **not** equaling "absence or near absence.". The Ethnographic Atlas codes the variable "Former Presence of Slavery", as zero indicating either the historical absence *or* both current and historical existence and one indicating that there *was* slavery in the past, but no longer. That is, this captures the extent of "abolition" in its most logical form: one if there was some change in status of slavery as an institution within that group, and zero if not. Logically consistent though this is, this is not "abolition" in the usual sense of the word, i.e., a change from a society formerly with the institution of slavery, to without slavery at the time of observation. We transform this variable into "abolition" in the latter sense of the word by removing those groups from the sample for whom slavery has never existed; therefore, any change in slave status will be relative to those groups that had, and still have at the time of observation, slaves.

Monogamy equal one if Murdock's v8 ("Domestic Organization") equals "Independent Nuclear Family, Monogamous", zero otherwise

Polygamy equals one if Murdock's v8 ("Domestic Organization") equals "independent nuclear family, occasional polygyny", "Polygynous: Unusual co-wives pattern", "Polygynous: Usual co-wives pattern", zero otherwise

Democracy equals one if Murdock's v72 ("Succssion to the Office of Local Headman") equals "election or other formal consensus, nonhereditary", zero otherwise

Absolutist equals one if Murdock's v72 ("Succession to the Office of Local Headman") equals "Matrilineal heir" or "Patrilineal heir", zero otherwise

Liberal equals one if Murdock's v72 ("Succession to the Office of Local Headman") equals "influence, wealth or social status, nonhereditary", zero otherwise

Equality in inheritance distribution of land equals one if Murdock's v75 ("Inheritance distribution for real property [land]") equals "Equal or relatively equal", zero otherwise

Primogeniture in inheritance distribution of land equals one if Murdock's v75 ("Inheritance distribution for real property [land]") equals "Primogeniture (to the senior individual)", zero otherwise;

Equality and primogeniture of movable property defined in the same was as for land, but using Murdock's v77 ("Inheritance distribution for movable property [land]").

Matriliny in Property Inheritance equals one if Murdock's v76 ("Inheritance rule for movable property") equals "Matrilineal" or "Other matrilinear heirs", zero otherwise

Matriliny equals one if Murdock's v43 (Descent: Major Type) equals "Matrilineal", zero otherwise

Patriliny in Property Inheritance equals one if Murdock's v76 ("Inheritance rule for movable property") equals "Patrilineal" or "Other patrilinear heirs", zero otherwise

Patriliny equals one if Murdock's v43 (Descent: Major Type) equals "Patrilineal", zero otherwise

Matriliny and patriliny in land inheritance defined the same as for property, but using Murdock's v74 ("Inheritance rule for real property [land]").

Patrilineal Kinship equals one if Murdock's v27 ("Kin Terms for Cousins") equals "Omaha", zero otherwise

Matrilineal Kinship equals one if Murdock's v27 ("Kin Terms for Cousins") equals "Crow", zero otherwise

Distance from the coast, distance from the nearest major river, coastal indicator, and ethnic density measures created using Nunn's (2011) ArcGIS shapefile of the Murdock Map, and ESRI shapefiles for countries and river systems in Africa.