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ARTICLE

# Building tribes: How administrative units shaped ethnic groups in Africa

**Carl Müller-Crepon**

London School of Economics and Political Science

**Correspondence**
Carl Müller-Crepon, Assistant Professor at the London School of Economics and Political Science, Department of Government. Houghton Street, London, WC2A 2AE, UK.
Email: c.a.muller-crepon@lse.ac.uk

**Abstract**

Ethnic identities around the world are deeply intertwined with modern statehood, yet the extent to which territorial governance has shaped ethnic groups is empirically unknown. I argue that governments at the national and subnational levels have incentives to bias governance in favor of large groups. The resulting disadvantages for ethnic minorities motivate their assimilation and emigration. Both gradually align ethnic groups with administrative borders. I examine the result of this process at subnational administrative borders across sub-Saharan Africa and use credibly exogenous, straight borders for causal identification. I find substantive increases in the local population share of administrative units' predominant ethnic group at units' borders. Powerful traditional authorities and size advantages of predominant groups increase this effect. Data on minority assimilation and migration show that both drive the shaping of ethnic groups along administrative borders. These results highlight important effects of the territorial organization of modern governance on ethnic groups.

Ethnicity constitutes one of the most salient political cleavages. It affects public goods provision (Alesina & Ferrara, 2005), redistribution (De Luca et al., 2018; Franck & Rainer, 2012), and violent conflict (Cederman, Gleditsch, & Buhaug, 2013; Horowitz, 1985). Although it is well recognized that ethnicity and ethnic boundaries are socially and politically constructed (Barth, 1969; Posner, 2004, 2005; Wimmer, 2013), less is known about the drivers of that process. In particular, there is only sparse systematic evidence on the transformative effect of modern state governance on ethnic identities highlighted in qualitative studies on Europe (Weber, 1977) and Africa (Southall, 1970; Young, 1985).

This article addresses this gap and examines how territorial governance, that is governance through spatially bounded administrative divisions, shaped ethnic groups in sub-Saharan Africa. In doing so, I build on Mamdani's (2001; 2020) and Posner's (2005) seminal works on the relation between ethnicity and the colonial imposition of territorial governance by the state and traditional institutions. I argue that local and regional authorities tend to favor the largest ethnic group in their population, in particular where (neo-)traditional institutions are powerful. This incentivizes local ethnic minorities to assimilate into the majority identity or emigrate to coethnic governance units. The resulting change in ethnic demography crystallizes ethnic boundaries along often haphazardly drawn administrative borders and constitutes an important mechanism behind Iliffe's (1979, p. 324) statement that "Europeans believed Africans belonged to tribes; Africans built tribes to belong to."

Current scholarship traces the origins of (political) ethnicity in Africa to geography (Michalopoulos, 2012), colonial-era missionaries, cash crop agriculture (Pengl, Roessler, & Rueda, 2021) and indirect rule (Ali et al., 2019; McNamee, 2019), ethnic coalitions (Posner, 2004) and power distributions (Green, 2021),

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as well as political entrepreneurs (Kayira, Banda, & Robinson, 2019; Robinson, 2017).[1] I add a focus on the effects of territorial rule imposed by colonialism, which revolutionized local governance, fostered the "invention of tradition" (Ranger, 1997), and thus transformed ethnic identities (Lentz, 1995; Southall, 1970; Young, 1985). This focus also highlights an analogy between subnational "tribe-building" in Africa and "nation-building" elsewhere, both powered by material and ideological forces that aimed at increasing the congruence between ethnic groups and political units (Argyle, 1969).

I test my argument that administrative units shaped ethnic groups by estimating the change in ethnic groups' local population shares at units' boundaries using a regression discontinuity design (RDD). I find that the share of regions' (districts') main ethnic group sharply increases by 14 (8) percentage points or 54% (23%) at their borders with units dominated by a different group. Ruling out omitted variable bias and reverse causality from endogenous borders and their change, these local average treatment effects are robust to restricting variation to within colonial-era settlement areas of ethnic groups, as well as to variation at relatively straight, arbitrarily drawn subnational boundaries. Estimated treatment effects increase in the ethnicization of local governance, proxied by stronger traditional institutions and larger size advantages of predominant groups.

Assimilation and emigration by local minorities account for these border effects. Adapting the main RDD, I find that local minorities assimilate to the majority through language adoption and intermarriage. In addition, census data on 33 million individuals show ethnic sorting between administrative units: Local minorities emigrate more and immigrate less frequently than predominant groups in a manner that correlates strongly with the main treatment effects.

Evidencing the effects of administrative borders on local ethnic demography in Africa, the article highlights the endogeneity of ethnic identities and geography as a larger issue for the study of ethnicity. Ethnic identities are, at least in the long run and within (unknown) limits, partially a result of ethnicized territorial governance. This root of ethnic identities raises the crucial question of when, where, and how else citizens and political elites foster ethnic change to warp the political playing field in their favor (e.g., Brass, 1991; Posner, 2004).

[1] A related literature assesses individuals' ethnic versus national identification (e.g., Eifert, Miguel, & Posner, 2010; Robinson, 2014).

## THEORETICAL ARGUMENT

Governance through geographically bounded administrative units transforms ethnic groups because traditional and state authorities tend to ethnically specialize in governing large ethnic groups and discriminate against minorities. Minorities can improve their lot through assimilation or emigration, thereby selecting into a majority. Because ethnically biased governance and minority responses are delimited by administrative borders, the resulting transformation of ethnic groups aligns their geography with administrative boundaries. Minorities can alternatively demand secession, thus becoming a majority in a new governance unit. Although important, I here focus on ethnic change, leaving border change mostly as an empirical challenge.

### Ethnicized territorial governance

The establishment of administrative divisions in multiethnic states typically creates ethnically diverse units. This is because local ethnic diversity inhibits the drawing of homogeneous but nonoverlapping and contiguous divisions. In governing their multiethnic population, local governments—here used broadly, including traditional authorities and state governments—frequently favor large, powerful groups. Extensively analyzed, governments often cater material goods and services to "their" ethnic constituencies (De Luca et al., 2018; Franck & Rainer, 2012) for intrinsic (Chandra, 2007) or instrumental reasons (Fearon, 1999). Because large ethnic groups hold, on average, most executive power (Bormann, 2019), ethnic favoritism leaves ethnic minorities disadvantaged.

Ethnicized governance also emerges where governments specialize in large ethnic groups by using specific languages or drawing on ethnic traditions to foster their legitimacy. Both tools can increase coethnics' "quasi-voluntary compliance" (Levi, 1988). Facing a multiethnic population and economies of scale, specializing in small groups yields smaller, possibly negative benefits than specializing in large group(s). Governments will therefore specialize most in governing large groups, leaving minorities worse off.

Similar incentives can lead governments to ethnically homogenize minority populations (Alesina & Spolaore, 2005). Governments thus "re-educate" ethnic minorities to learn the majority's language and customs and increase their interaction with the state (Weber, 1977; Zhang & Lee, 2020).[2] At the extreme,

[2] See Fouka (2019) on potential backlash.

governments violently "right-people" their population through displacement and genocide (O'Leary, 2001).

In sum, I expect governments to favor the largest ethnic group in the population, leaving ethnic minorities disenfranchised, underserviced, and potentially subject to homogenization policies. The strength of these dynamics increases with the relative size of the largest ethnic group.

## Minority responses to ethnicized governance

To improve their lot under ethnicized governance, ethnic minorities may choose to assimilate, emigrate, or mobilize to create their own governance unit. Ethnic assimilation aims at changing one's language, religion, appearance, and taste to be able to better "pass" as a member of the majority group and claim its benefits (Laitin, 1995). As some group characteristics are innate or learned during childhood, assimilation often proceeds intergenerationally through ethnic intermarriage (Kalmijn, 1998). Alternatively, emigration offers an exit option for minority members who face discrimination in their governance unit. Migrants may either ethnically sort into units where they belong to the ethnic majority or head to prosperous areas where discrimination is offset by economic opportunity (Docquier & Rapoport, 2003).

Assimilation and ethnic sorting through migration increase the relative size of the largest group. As in Schelling's (1971) tipping point model, this will, ceteris paribus, reinforce governments' ethnic biases and reinforce minorities' incentives to assimilate or emigrate. However, parallel *heterogenizing* processes such as nonethnic migration likely prevent a stable, homogeneous equilibrium.

Spatially concentrated minorities may also mobilize against their discrimination and demand their own governance unit, achieved often by "upgrading" one or multiple subunits (Green, 2008; Grossman & Lewis, 2014). New borders can align administrative and ethnic geographies more closely but create new minorities where borders cut through ethnically diverse populations. Although certainly important, I here focus on *ethnic* change and address endogenous border change empirically below.

In sum, I argue that the initial geography of governance units and ethnic groups determines ethnic groups' status within each unit. In response to governance biased toward units' largest groups, minority assimilation and ethnic sorting through migration increase the relative size of plurality groups. As this process is spatially bounded, I expect a sharp increase of the local population share of unit's dominant groups at their borders.

## ADMINISTRATIVE UNITS AND ETHNICITY IN AFRICA

Sub-Saharan Africa provides a suitable testing ground for my argument. European colonialists created multiethnic administrative units with borders that often disregarded local ethnic geography. The ethnicization of subnational governance, particularly by "traditional" authorities, incentivized minorities to assimilate or emigrate. Structuring this process spatially, states' administrative borders thus shaped ethnic groups.

Although I expect territorial governance to affect ethnic identities beyond the subnational level in sub-Saharan Africa, my empirical focus has two benefits. First, African states are highly diverse, and most feature no majority group or homogenization into single ethnonational identities (Laitin, 1992). Subnational borders that "cement" ethnic identities may contribute to explaining this pattern. Second, African borders were often haphazardly drawn (e.g., Herbst, 2000), reducing the risk of reverse causality incurred when studying border effects elsewhere.

## The colonial introduction of administrative borders

Defining the state via its territory demarcated by borders is integral to the idea of modern statehood (Weber, 1919), but was virtually unknown to most of precolonial Africa (Asiwaju, 1983). Instead, even administratively centralized polities were unbounded and noncontiguous, their power radiating outwards from the center (Herbst, 2000). Political borders were conceptually even more foreign to acephalous societies where the lack of centralized power made separation lines redundant.

European colonizers radically changed these political topographies. Carving up the continent into colonies, they partitioned each into administrative units to roll out the territorial governance that established purported effective control. This creation of regions, districts, and further subdivisions was as revolutionary as the drawing of international borders (Asiwaju, 1983). Both sharply delimited the territorial scope of (sub)national governance by the state and the traditional institutions co-opted by it.

The design of governance units determined their initial ethnodemographic composition and may have been influenced by ethnic geography. Such influence was likely strongest in areas ruled indirectly through precolonial authorities, in particular the British colonies (Crowder, 1968; Müller-Crepon, 2020). Here as elsewhere, the predominant administrative

mindset expected individuals to belong to tribes, "discrete, bounded groups, whose distribution could be captured on an ethnic map" (Young, 1985, p. 74). Yet, the idea of "tribal homelands" as "natural" governance units (Asiwaju, 1970; Crowder, 1968) clashed with a reality of interspersed ethnic settlement areas (Cohen & Middleton, 1970) and political loyalties that cut across ethno-spatial lines (Lentz, 1995, Southall, 1970). Although perceptions of ethnic geography likely influenced the broad outlines of administrative units, this incompatibility meant that pragmatism coupled with administrative and geographic exigencies determined the precise location of borders (Lentz, 2006, p. 53), thus forcing "the round peg of existing authority patterns into the square hole of territory-based administration" (Posner, 2005, p. 30).

## Administrative geographies and the transformation of ethnicity

The introduction of territorial governance changed the relationship between rulers and their people from governance based on "ethnic" allegiances to governance based on individuals' place of residence (Herbst, 2000). However, ethnic identities remained important, being directly tied to customary law that often disenfranchised local minorities (Mamdani, 2001). This ethnicization of local governance powered the shaping of ethnic groups along administrative borders.

As the "customary" became the bedrock of local colonial rule and continued being influential in many postcolonial states, governance by local state and traditional authorities became ethnicized quickly. This is particularly well evidenced with regard to the distribution of the "goods of modernity": property rights, market access, and social services (Bates, 1974). Based on ethnically exclusive definitions of the "customary," these goods could and can often still today be distributed to local elites and their ethnic constituents (e.g., Bates, 1974; Posner, 2005; Vaughan, 2003). Although such favoritism sometimes relates to local public goods such as wells, schools, and roads (Ejdemyr, Kramon, & Robinson, 2018; Harris & Posner, 2019), minorities tend to also be individually disadvantaged by a biased access to (customary) land rights (Boone, 2014; Honig, 2017), justice (e.g., Choi, Harris, & Shen-Bayh, 2022), jobs (e.g., Brierley, 2021; Hassan, 2017),[3] material handouts such as food or seeds (van Hoorn & Rademakers, 2021), and education provided in the local vernacular (Pengl, Roessler, & Rueda, 2021).

Ethnic favoritism is thus not only a feature of African national politics, but also local politics. Afrobarometer (2018) data show that local ethnic minorities perceive local authorities as more unresponsive, tend to mistrust them more, and approve of them less than members of plurality groups. These patterns are stronger vis-à-vis traditional authorities than state authorities (Supporting Information [SI] A, p. 1), which reflects their continuing reliance on the ethnically defined "customary."

Administrative borders determine units' ethnic make-up, assign minority or majority status to individuals, and spatially delimit patterns of local ethnic favoritism. As argued above, this incentivizes local minorities to become part of a local majority through assimilation or emigration (see also Posner, 2005). Ethnic assimilation is historically frequent across sub-Saharan Africa, in particular among ethnic "strangers" (e.g., Cohen & Middleton, 1970). For example, Kenyan Kikuyu settlers in a former Maasai reserve assimilated by adopting language and traditions, as well as through intermarriage to secure land rights (Gravesen & Kioko, 2019).[4] In turn, emigration of ethnic minorities has been described as a vehicle of "revolt" against local discrimination by Asiwaju (1976).

Being important structuring elements of local politics, customs, traditions, and ethnic identities did not remain uncontested. Instead, the "invention" (Ranger, 1997) of traditions and history became a tool for political survival still used today (Iliffe, 1979; Robinson, 2017). Struggles over the customary played out, for example, as Councils of Elders in the Kenyan Taita Hills synthesized lineage practices to control the chiefs (Bravman, 1998, p. 157) or when obas, chiefs, and educated elites reconstructed contending versions of traditional authority in Nigeria's Oyo Province (Vaughan, 2003, p. 301). Such politically driven cultural and ethnic change is likely again bounded by the administrative borders that define the local political arena and individuals' incentives to adopt the changes fostered from above.

In sum then, prior literature suggests that ethnicized territorial governance spurred ethnic change within the boundaries of administrative units. As a result and throughout the colonial and postcolonial periods, minority assimilation and migration aligned ethnic geography with administrative borders. This alignment should increase with stronger traditional institutions, which entail greater bias toward locally predominant ethnic groups. The following quantitative analysis examines this argument systematically.

[3] Local education or health systems dominated by the local majority likely bias service provision toward their ethnic kin.

[4] See Stahl (1991) for similar evidence from Ghana and Schultz (1984) from Northern Cameroon. Green (2021) relatedly finds citizens attempting to pass as their presidents' coethnics.

## RESEARCH DESIGN

I investigate whether administrative boundaries have shaped ethnic groups in sub-Saharan Africa by examining individuals' ethnic identity across Demographic and Health Surveys (DHS, 2018) from 25 countries. Building on studies of African border effects (McCauley & Posner, 2015), I estimate the impact of administrative borders on the local population share of administrative units' plurality group in a spatial RDD (Henn, 2022; Keele & Titiunik, 2015).[5] Focusing on credibly exogenous intraethnic and straight borders addresses concerns over omitted variable bias and reverse causality. Additional analyses shed light on ethnic assimilation and migration as main mechanisms.

### The curious (and extreme) case of the Kenyan Luhya

The extreme and nonrepresentative case of the Luhya in western Kenya illustrates the intuition behind the RDD. At the outset of the 20th century, Bantu speakers dominated the North Kavirondo district, speaking between 15 and 26 mutually intelligible dialects (MacArthur, 2012). Elites from the Wanga held power in the district, which became part of Kenya's Western province after independence. Gold discovered in the early 1930s led local elites to foster a collective identity to fend off settlers. The resulting "umbrella-group" Luhya (or Luyia, "kinship") quickly became one of Kenya's main tribes with more than 650,000 members in 1948 (MacArthur, 2013). In neighboring South Kavirondo, the postcolonial Nyanza province, the Luo exhibited a similar rise to ethnic self-consciousness and political importance, fostered among others by the Luo Language Committee (Peterson, 2018).

How did this transformation and politicization of ethnic identities affect the ethnic demography in the Western and Nyanza provinces? Evidencing the extreme success of the Luhya identity as a regionally bounded construct, Figure 1 shows a sharp change at the border between today's Western and Nyanza provinces. The share of the Luhya population in enumeration areas (EAs) of the DHS (2018) drops from an average of roughly 90% to 5% as one crosses the border from the Western province, dominated by the Luhya, into the Nyanza province, which is predominantly Luo. Conversely, the Luo population increases from approximately 10% to more than 90% as one enters Nyanza. The presence of third groups makes the two border effects asymmetric. Although the integration and politicization of Luo and Luhya identities likely drove the historical process at the macro level, the sharp ethnic change at the border must be driven by horizontal change through individual assimilation or migration between the Luyha, Luo, and third groups. Otherwise, we would observe a smooth Luhya–Luo gradient around the border—if the border was drawn in a manner unrelated to local ethnic demography. I will pay particular attention to this assumption.

[5] An alternative research design would compare individuals' (localities') ethnic identity (composition) before and after the introduction of administrative borders. This is currently not feasible. Virtually all data on ethnicity are cross-sectional or aggregated to coarse and changing administrative units with low temporal resolution and cross-country coverage.

### Estimation strategy and data

The RDD generalizes the intuition behind Figure 1 for regions and districts across sub-Sahara Africa. As in the above example, each border between administrative units with differing plurality groups entails two treatments, one for each side. I capture this logic by "stacking" two RDDs per administrative border. This implies that each EA associated with a point coordinate $p$ enters the analysis twice with two outcomes. It is part of the treatment group of one of the RDDs with the local population share of the plurality group of its own administrative unit as the outcome. And, it is part of the control group of the other RDD with the share of the plurality group of the neighboring unit as the outcome.

This research design avoids an arbitrary assignment of treatment and control groups. As SI F.1 (p. 12) shows, the two-sided design therefore leads in expectation to the same but more precise point estimate than any one-sided design. In addition, it balances treatment and control groups. Because each EA is part of both groups, geographic covariates and the density function of the running variable are perfectly continuous at the border (SI C, p. 3).

Following Keele and Titiunik (2015), the baseline specification amounts to

$$Y_{p,s,b,t} = \alpha_{b,t} + \gamma_s + \beta_1 T_{u,t} + \beta_2 D_{p,b} + \beta_3 D_{p,b} \times T_{u,t} + \epsilon_{p,u,b,t}, \quad (1)$$

where the outcome $Y_{p,s,b,t}$ is the fraction of respondents in EA $p$ and administrative unit $u$ enumerated in survey $s$ that identifies with the local plurality group as defined by the treatment $t$ at border $b$. Because each border entails two treatments $t$, the main treatment dummy $T_{u,t}$ takes the values 0 and 1 for each EA. $\alpha_{b,t}$ denotes a border × treatment-side fixed effect, and $\gamma_s$ a survey-round fixed effect. I add $D_{p,b}$, the distance of $p$ to the respective border segment $b$, and the interaction of $D_{p,b}$ with the treatment dummy.

I cluster standard errors on the EA level to account for the correlation of the outcomes within them, and

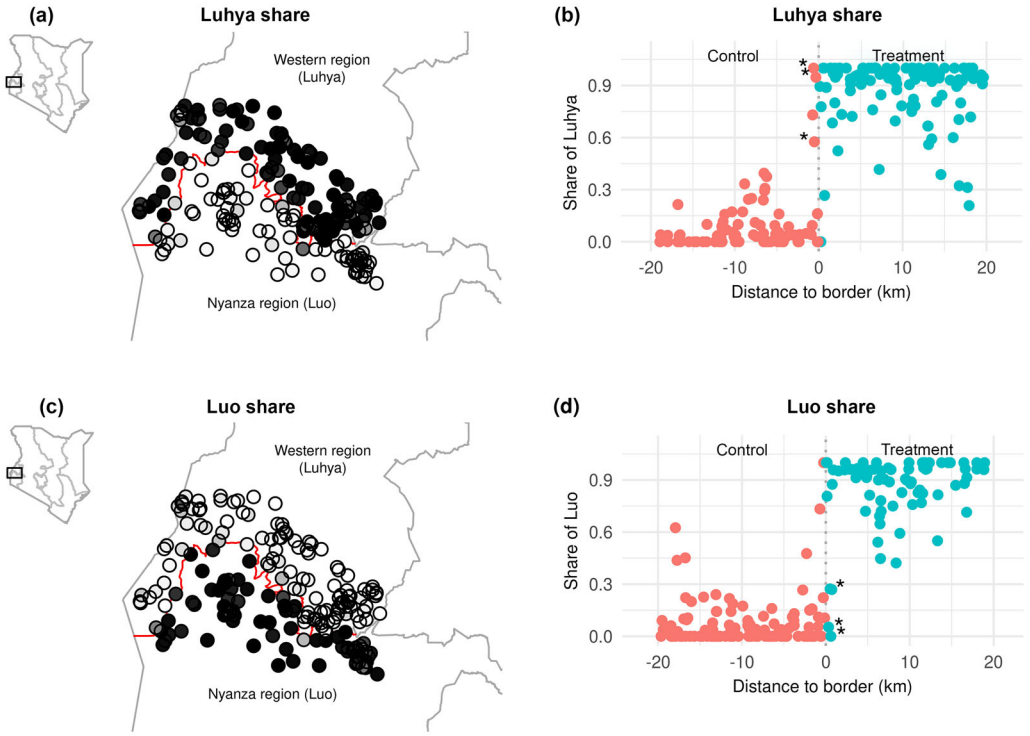


**FIGURE 1** Luhya and Luo around the Western-Nyanza regional border in Kenya. *Notes*: Panels (a) and (c): gradient from white to black equivalent to 0% to 100%. The Western region is the "treated" region in panel (b) and the "control" region in panel (d). Dots marked with a * in (b) and (d) are geographically attributed to the wrong region and have a flipped treatment/control status. Data come from the DHS (2018).

the administrative unit $u \times$ treatment $t$ level to capture the clustering of treatment assignments. In the baseline specification, I only analyze EAs within 20 km to the closest border.[6]

To estimate Equation (1), I combine spatial data on administrative units and ethnic settlement areas with georeferenced DHS (2018) data collected since the 1990s in 25 African countries (SI B.1, p. 2). I draw on the geographic data on districts and regions in 1990 from FAO's (2014) Global Administrative Unit Layers (GAUL) database.[7]

I derive the local plurality group of each administrative unit by spatially intersecting it with a map of ethnic "homelands" in the late nineteenth century[8] compiled by Murdock in 1959 (Nunn & Wantchekon, 2011). The ethnic group that covers the largest area of a unit is coded as its plurality group.[9] Groups' local plurality status proxies their politically predominant status, assuming that the largest ethnic group on average holds most political power (e.g., Bormann, 2019). This approach comes with two caveats. First, I may misidentify some groups because of measurement error from the map's low spatial precision and neglect of overlapping settlement areas. Where unsystematic, this should bias my estimates toward zero. Second, Murdock's knowledge of administrative borders may have biased the map. I address this concern through within-ethnic group comparisons, the use of alternative ethnic settlement data from the 1960s (SI F.7, p. 16), and by showing that results do not vary systematically with the alignment between administrative borders and Murdock's map (SI D.1, p. 5).

In the next step, I delineate all borders between administrative units with differing plurality groups and assign each EA from the DHS to its administrative district and region. I only keep borders between administrative units with at least one EA closer than 20 km to either side of the border. If an EA is closer than 20 km to one or more remaining borders $b$, it is assigned to the closest border. In a last step, I compute the two outcomes as the shares of the respondents in each EA that identifies with the plurality groups in its own and neighboring units. Ethnic identities are enumerated by the DHS mostly as respondents' ethnic group, tribe, and language. I use the ethnic link from Müller-Crepon, Pengl, and Bormann (2022) to match

[6] I show robustness to varying thresholds below. Because increasing the bandwidth adds new borders, optimal bandwidth estimators are inconsistent (see also Henn, 2022).
[7] SI E (p. 10) and F.8 (p. 16) show robustness to colonial and alternative contemporary border data, respectively.
[8] Although the exact time at which groups are depicted is unknown, the map is the earliest detailed and complete pan-African map of ethnic groups available.
[9] Identifying local plurality groups from survey data would introduce post-treatment bias.

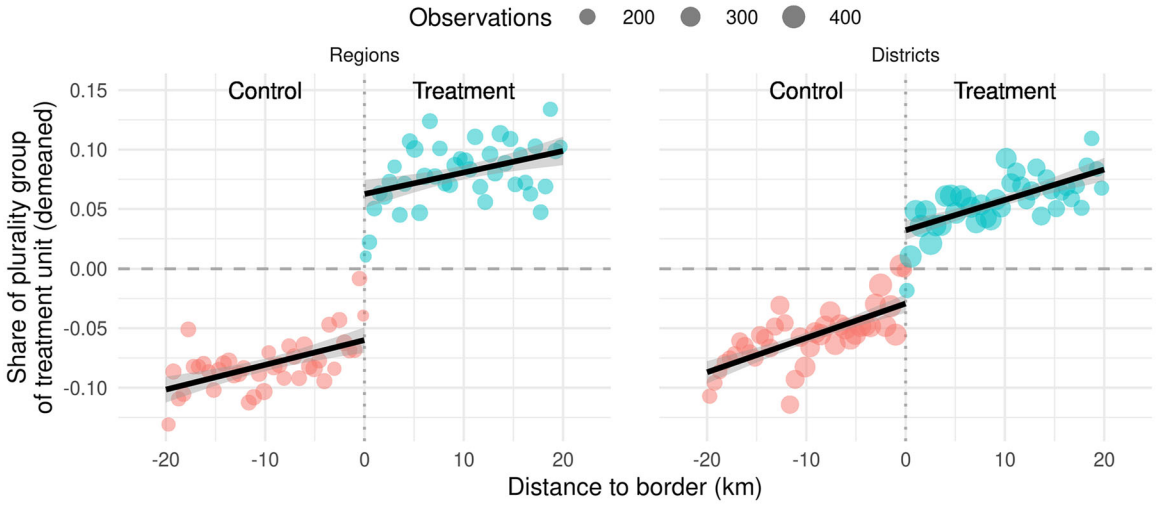


**FIGURE 2** Local plurality group share around the borders between treatment and control units. *Notes*: Shows the demeaned percentage of units' plurality groups within 20 km of borders between treatment and control units, and linear trends on each border side.

ethnic labels from the DHS to those on Murdock's map.[10]

In combination, these data come with two important caveats. First, the precise locations of administrative boundaries are uncertain.[11] This perturbs observed treatment assignment and biases estimates of $\beta_1$ toward zero. Second, EAs' coordinates are randomly displaced to preserve respondent's privacy, dislocating 99% (1%) of all rural clusters by up to 5 km (10 km) (Burgert et al., 2013).[12] As noted in Figure 1, some survey clusters are therefore assigned to the wrong administrative unit and treatment status. A number of robustness checks address these issues.

For an unbiased estimate of $\beta_1$ in Equation (1) borders must be drawn as-if-randomly at the local level. They must not line up with sharp precolonial ethnic boundaries (reverse causality) or any other geographical feature that causes spatial discontinuities in ethnic geographies (omitted variable bias). As discussed above, some administrative borders *roughly* followed ethnic geographies as perceived at the time. This entails the risk that they may have *exactly* lined up with sharp ethnic boundaries by chance or design. Other borders were drawn more haphazardly, as straight lines cutting across geographical features and ethnic settlement areas. I will use such borders below to improve causal identification.

If the main identifying assumption holds, the RDD identifies the local effect of the change in a unit's predominant group on that group's population share at the border. Because borderlands are peripheral, the analysis draws on a population with a low plurality group share of 33% and 39% for regions and districts, respectively. The sample is more rural, older, less educated, and materially poorer than other respondents in the same units. Its historical, ethnic, or environmental characteristics do not differ systematically (SI C, p. 3).

## EMPIRICAL ANALYSIS

Figure 2 plots the sharp increase in the share of local plurality groups at the 323 regional and 1,019 district borders in the data. Closely coinciding, Table 1 presents the results of estimating Equation (1) in Models 1 and 4. At the regional level, the share of treatment units' plurality group increases by 14 percentage points as one crosses from control into treatment units. This amounts to an increase of 54% from a plurality share at the border of 26% in the control group to 40% in the treatment group.[13] The effect of district borders amounts to 8 percentage points, bringing about an average increase of 23% in the plurality share at the border from 35% to 43%.[14] These effects are precisely estimated.

I assess the estimates' causal interpretability by zooming in on plausibly exogenous borders. Addressing potential reverse causality from ethnic geography, the first test focuses on survey clusters separated by administrative borders but located in the same ethnic settlement area on Murdock's (1959) map. Econo-

[10] I link groups if they share at least one common dialect.
[11] Fifty percent of border locations in the GAUL and Global Administrative Areas (GADM) databases differ by less than 100 m but 25% diverge by more than 1,000 m.
[12] Coordinates are displaced within the "right" region (but not district) on the basis of border data that do not always align with the GAUL data.
[13] In line with Equation (1), the control group outcome at the border is computed as the weighted average of all fixed effects.
[14] Effects of district borders within regions amount to 4 percentage points, whereas effects of district borders aligned with regional ones correspond to Model 1 in Table 1 (SI D.2, p. 7). Border effects thus increase in the scale of administrative units.

**TABLE 1** Effect of administrative borders on the population share of local plurality groups.

| | Outcome: Plurality group share (0-1) | | | | | |
|---|---|---|---|---|---|---|
| | Regions | | | Districts | | |
| | Baseline | Within groups | Straight borders | Baseline | Within groups | Straight borders |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treated | 0.143** | 0.136** | 0.103** | 0.079** | 0.085** | 0.091** |
| | (0.018) | (0.021) | (0.031) | (0.011) | (0.015) | (0.020) |
| Distance to border | 0.003** | 0.001 | 0.001 | 0.004** | 0.003** | 0.003** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Distance × Treated | −0.0003 | 0.001 | 0.004† | −0.0005 | −0.002 | 0.0004 |
| | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Cutoff | 20 km | 20 km | 20 km | 20 km | 20 km | 20 km |
| Max fractal dimension | 2 | 2 | 1.1 | 2 | 2 | 1.1 |
| Running var. linear | Yes | Yes | Yes | Yes | Yes | Yes |
| Survey FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Border FE | Yes | – | Yes | Yes | – | Yes |
| Group-Border FE | No | Yes | No | No | Yes | No |
| Mean DV | 0.33 | 0.34 | 0.31 | 0.39 | 0.4 | 0.37 |
| Control DV at border | 0.26 | 0.27 | 0.24 | 0.35 | 0.36 | 0.32 |
| Borders | 323 | 785 | 92 | 1019 | 1283 | 512 |
| Observations | 15,396 | 10,186 | 2,562 | 23,180 | 13,240 | 9,250 |
| Adjusted $R^2$ | 0.595 | 0.666 | 0.679 | 0.648 | 0.699 | 0.655 |

*Notes*: OLS linear models following Equation (1). The unit of analysis is the survey cluster. The outcome is the share of respondents in a cluster from the treatment unit's ethnic plurality group. The treatment coefficient captures the increase in the share of administrative units' plurality groups at their borders. Standard errors clustered on the EA and administrative unit × treatment levels. Significance codes: †$p < .1$; *$p < .05$; **$p < .01$.

metrically, this "within-group" analysis exchanges the previously border fixed effect with a border-ethnic group intercept. This precludes that the results are driven by an alignment of ethnic boundaries and administrative borders. The results in Models 2 and 5 closely coincide with the baseline results.

Second, a set of relatively straight borders further addresses reverse causality and potential omitted spatial features that cause administrative borders and sharp discontinuities in ethnic population shares. Assuming that straight borders are least likely caused by ethnic geography or omitted spatial features, I measure borders' straightness as their fractal dimension (Alesina, Easterly, & Matuszeski, 2011), the degree to which they fill a two-dimensional plane.[15] Perfectly straight lines have a fractal dimension of 1 and wiggly lines approach a value of 2. Figure 3 plots the distribution of the fractal dimension of observed borders, as well as four example lines. I limit the sample to EAs along borders with a low fractal dimension of less than 1.1. This corresponds to retaining only 16% (40%) of survey clusters along 92 (512) regional (district) borders. Shown in Figure 3d, these borders consist of few, straight line segments. The effects of straight borders in Models 3 and 6 are consistent with the baseline results. The estimated effect of regional borders slightly decreases to 10.3 percentage points whereas that of district borders slightly increases to 9.1 percentage points. Results are robust when varying the fractal-dimension cutoff and using borders' alignment with rivers or watersheds as arbitrariness measures (SI D.1, p. 5). Taken together, this shows that the main estimates are not substantively affected by reverse causality or omitted variable bias.

In principle, Table 1 reveals little information about the *global* effect of groups' plurality status on ethnic demographics beyond the *local* effect at units' borders. Two additional analyses suggest that the main estimates generalize to administrative units' interior. First, the treatment and control trends of plurality groups' population share toward administrative borders do not significantly differ in slope (see Figure 2 and Table 1).[16] This absence of effect bunching or reversal is suggestive of substantive increases in plurality groups' population share across the analyzed 20 km bandwidth. A second, correlational analysis in SI F.10 (p. 17) compares minority and plurality group shares among *all* DHS respondents. It suggests that

[15] See SI B.2 (p. 2).

[16] Model 3 suggests a slightly steeper slope for the treatment group ($p < .1$), which could imply growing effects towards the interior of the treated unit.

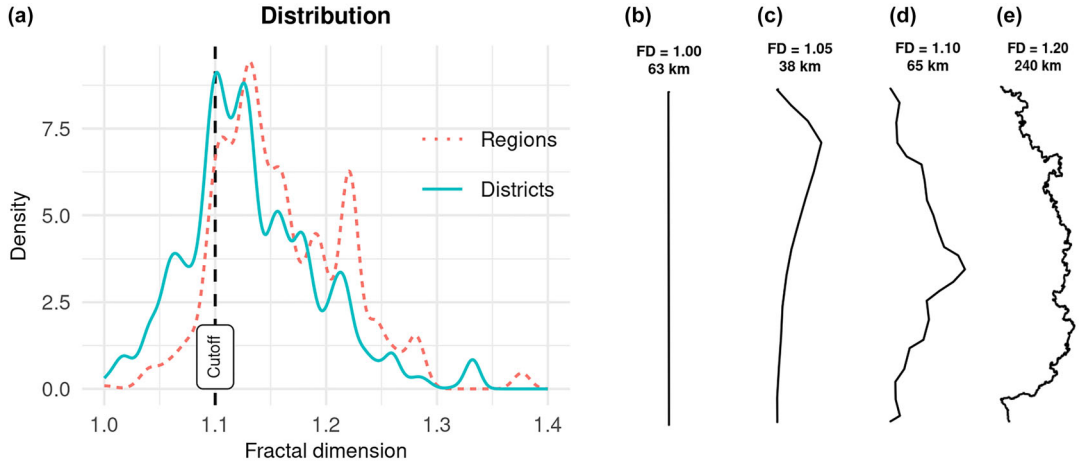


**FIGURE 3** Fractal dimension of borders. *Notes*: Distributions and examples are based on observations in the baseline analysis. FD in (b)–(e) refers to borders' fractal dimension.

units' plurality group shares are approximately twice as large as expected from groups' territorial settlement shares alone. This increase is larger than the main treatment effects.

In sum, the results support the hypothesis that administrative borders have significantly shaped ethnic groups. As one enters a region (district), the share of its largest ethnic group increases by approximately 14 (8) percentage points. This local treatment effect is consistent along credibly exogenous borders and likely generalizes to units' interior. I next assess whether treatment effect heterogeneity corresponds to observable corollaries of the theoretical argument and test the estimates' robustness. I then investigate assimilation and migration as mechanisms driving the results.

## Treatment effect heterogeneity

If minority discrimination by local governments drives the shaping of ethnic groups along administrative borders, treatment effects should increase with stronger traditional institutions that tend to be ethnically more exclusive. Effects should also increase in the population share and margin of the plurality group, as both incentivize greater ethnic specialization of governance.

I test these arguments by linearly interacting the treatment indicator and all other RDD-terms in Equation (1) with variables that operationalize these moderators: (1) a constitutionalization index of traditional institutions that proxies for their influence;[17] (2) the share of a unit's territory settled by the plurality group; and (3) its margin over the second largest group-share.

Figure 4 shows that treatment effects consistently increase with more constitutionalized and thus powerful traditional authorities.[18] Effects are also stronger in administrative units with larger plurality groups and ones that enjoy larger size advantages over the second-largest group. These patterns are stronger at the regional than at the district level where the first interaction is estimated noisily ($p < .1$) and the latter two feature a slight nonlinearity. In sum, administrative units with powerful traditional institutions and large plurality groups exhibit effects that are 1.5 to 2 times larger than average treatment effects. Additional analyses suggest that treatment effects do not increase with groups' postcolonial inclusion in national governments and are larger where groups have a history of ethnic civil war (SI D.4, p. 8).

## Effect timing

Probing the temporal dynamics underlying the main results, two additional analyses show that the main treatment effects are likely the result of colonial and postcolonial ethnic change. Figure 5 first assesses whether treatment effects increase among later-born individuals as effects accumulate across generations. Region-level treatment effects more than double between individuals born in the 1940s and 1990s whereas district-level effects show no increase. Assuming that most assimilation and migration happens early in individuals' life, the substantive treatment effects among individuals born in the 1940s evidence that the main effects are not purely driven by postcolonial dynamics.

[17] The first principal component explains 88% of variation in Holzinger et al.'s (2019) data on the constitutional acknowledgment, regulation, and positive integration of traditional institutions.

[18] SI D.3 (p. 7) shows consistent differences between former British and French colonies.

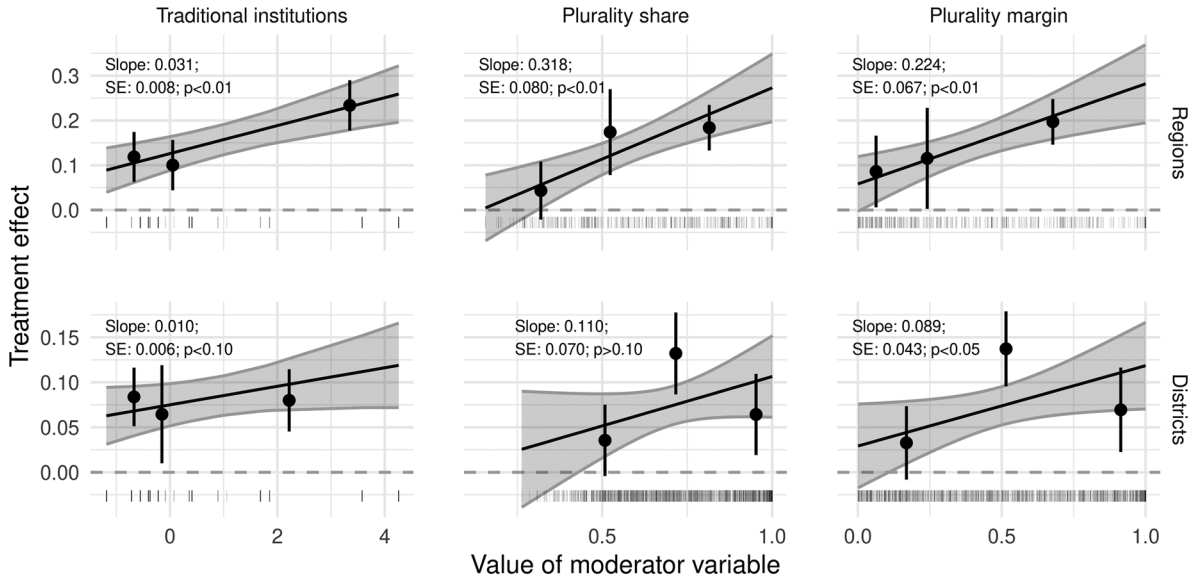


**FIGURE 4** Treatment Effect Heterogeneity. *Notes*: Results from linear interaction models and estimates by tercile of the moderator (Hainmueller, Mummolo, & Xu, 2019). Bars denote sample observations.

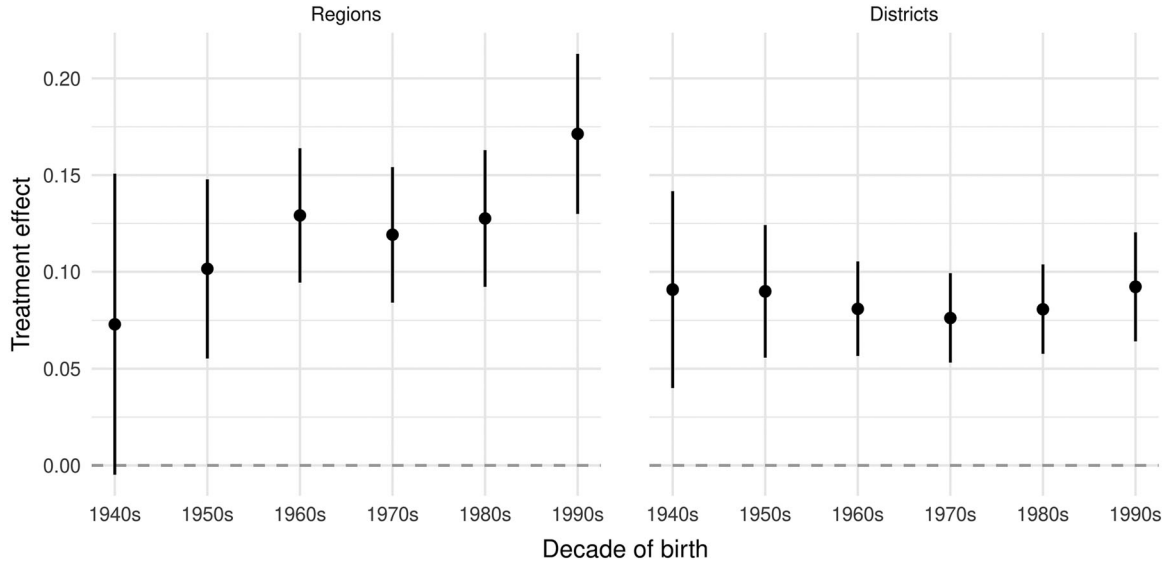


**FIGURE 5** Border effect estimates by birth decade. *Notes*: Estimation follows the baseline specifications in Models 1 and 4 in Table 1.

A second analysis in SI E (p. 10) accounts for postcolonial border change and compares treatment effects among (post)colonial administrative borders that either changed or remained stable. I find somewhat smaller, yet substantive effects at the borders of colonial regions and districts, in particular those that survived until 1990, but not along colonial borders that have disappeared. In turn, effects at 1990 borders of colonial origin are substantively similar to effects at newly drawn postcolonial borders. This again suggests that colonial and postcolonial developments contributed to the overall effects of borders on ethnic demography.

## Robustness tests

This section presents the main robustness checks summarized in Figure 6 and discussed further in SI F (pp. 11–18). Results for models within ethnic groups and across straight borders coincide with the baseline specification discussed below.

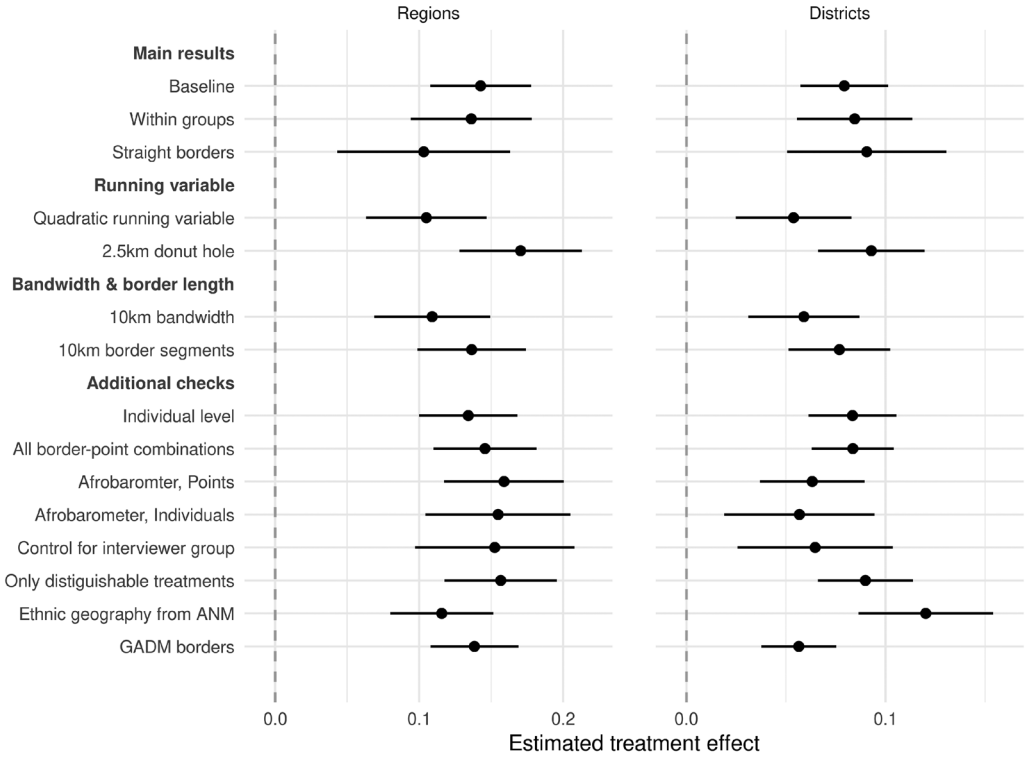


**FIGURE 6** Summary of robustness checks.

*Running variable*

Closely examining Figure 2 we see a nonlinearity in the outcomes very close (<5 km) to administrative borders which likely stems from noise in the spatial attribution of survey clusters to administrative units. To examine however a conservative scenario in which these nonlinear dynamics are indeed real, I control for a linear and quadratic trend toward the border in treatment and control groups. This decreases the estimated effect of regional (district) borders by 4 (2) percentage points. I also examine the liberal scenario in which these deviations are only due to measurement error. I do so by estimating a "donut"-RD, dropping all EAs closer than 2.5 km[19] to the border. Doing so increases the estimated border effects by 2 to 3 percentage points. This difference shrinks with lower minimum distance cutoffs. In sum, the baseline results are well-centered between the conservative and liberal estimates.

*Bandwidth and breadth*

The spatial setup of the RDD entails two other influential parameters, the first being the bandwidth of 20 km. SI F.3 (p. 13) shows that results remain mostly stable when subsetting the data to EAs closer to the border. With a 10-km bandwidth, effect estimates decrease on par with the quadratic specification discussed above. A second test avoids potentially undue influence of distant survey clusters located at opposite ends of a long border. To avoid such cases from driving the results, I define sub-border segments of a length of 10 km. Limiting variation to such short (or shorter) border segments does not substantively change the results.

*Additional robustness checks*

Further testing the stability of the results, I find that analyzing individual- rather than EA-level DHS data or data from the Afrobarometer (2018) does not affect the results. The results are robust to controlling for social desirability bias where respondents want to appear coethnic to interviewers from the local plurality group. Dropping observations where DHS's ethnic categories do not distinguish between the two plurality groups across a border increases effect estimates.[20] I lastly re-implement the RDD with alternative ethnic settlement data from the *Atlas Narodov Mira* (ANM; Bruk & Apenchenko, 1964) and administrative borders from the database of Global Administrative Areas (GADM), and conduct a country-by-country jackknife. These tests show stable results.

The permutations of the research design evidence the robustness of the main results. The following analysis of assimilation and ethnic migration patterns

[19] This is half the displacement radius of rural DHS clusters.

[20] In these 15% (25%) of the region (district) sample, effects are 0 because the same group shares appear as outcomes in treatment and control conditions due to one-to-many links between DHS's and Murdock's groups.

further supports the theoretical argument by testing its microfoundations.

## MECHANISMS: ASSIMILATION AND MIGRATION

The RDD estimates show discontinuous changes in ethnic demography at borders between administrative units with differing plurality groups. In the following, I test the argument that assimilation and ethnically biased migration patterns among minorities drive these results.

### Ethnic assimilation

Measuring individual-level assimilation in the presence of individual-level migration and absent panel data on individuals' (changing) ethnic identity is challenging. Assimilation can occur within one's own lifetime and over generations as frequently observed in immigrant populations (e.g., Fouka, 2019).

Illuminating individual assimilation, the Afrobarometer (AB) enumerates respondents' *ethnic self-identification*, their main spoken *language*, and, in round 4, *all languages*, thus capturing frequent multilingualism (Buzasi, 2016). Focusing on linguistic assimilation, we can test whether self-identified minority members speak the local plurality language as an important assimilation outcome (Cohen & Middleton, 1970).

Ethnic assimilation is also fostered by marriage between local minority and majority members, which increases children's identity choice set (Cohen & Middleton, 1970; Fouka, 2019). Following Bandyopadhyay and Green (2021) who describe frequent interethnic marriages across Africa, I use DHS records of spouses' ethnic identities to measure whether married female respondents have a local plurality husband.[21]

For these three measures of assimilation, Table 2 implements the baseline RDD specification but adds a dummy variable for whether respondents' ethnic self-identification in the AB or DHS data corresponds to the local plurality (Plurality member) in interaction with the treatment dummy. The treatment dummy then captures the change of the respective outcomes among self-identified ethnic minorities at region and district borders.

I find generally significant and meaningful border effects on minorities' assimilation. The estimated effect on self-identified minorities speaking the plurality language amount to 8.9 and 6.8 percentage points at regional (Model 1) and district (Model 3) borders, respectively. I observe a slightly smaller increase in listing the plurality language as minorities' main language, with the district-level estimate being statistically insignificant. These estimates suggest that minorities tend to linguistically assimilate to units' predominant groups.[22] Models 3 and 6 find similar patterns of interethnic marriage. Female minority members chance of marrying a plurality group member increases by 1.8 (2.6) percentage points at regional (district) borders with units dominated by a different group. Additional analyses in SI G (p. 19) suggest that posttreatment change in the "supply" of plurality men may explain this effect.

Part of the effect of administrative borders on plurality groups' population share thus likely works through minority assimilation. However, results in Table 2 cannot be *causally* interpreted as conditioning on "plurality group membership" introduces posttreatment bias. The existence of former minority members that have assimilated and now fully self-identify with the plurality group biases estimated treatment effects downwards. The estimates thus likely constitute conservative estimates of ethnic assimilation among minority members. Migrants, a source of additional selection bias, are the subject of the following analysis.

### Ethnic migration patterns

Ethnic sorting through migration constitutes the second mechanism behind the sharp decrease in the share of units' plurality group at administrative borders. Such sorting comprises (1) higher emigration rates of local minority members and (2) higher immigration rates of plurality members. Theoretically, border effects could also be driven by minority (plurality) members moving toward the interior (periphery) of a unit. Given data limitations, I only test for ethnic sorting through migration between administrative units.

To assess ethnically "biased" subnational migration patterns, I rely on census data samples from 11 countries in sub-Saharan Africa[23] provided by IPUMS (Minnesota Population Center, 2018). The records contain the region of birth and residence of 33 million individuals. The data from Burkina Faso, Mali, Senegal, Sierra Leone, and Zambia additionally contain the same variables for districts. The information on birth and residence units allows me to derive the full lifetime migration matrix of the population enumerated in each census. To assess distinct migration patterns of local minority and plurality members, I draw on IPUMS' geographic data on administrative units and

[21] SI Table A8 (p. 20) shows similar results for men and their first spouses.

[22] Additionally, SI Table A6 (p. 19) shows that plurality status increases ethnic versus national identification.

[23] Burkina Faso, Ghana, Liberia, Malawi, Mali, Rwanda, Senegal, Sierra Leone, South African, Uganda, and Zambia. See SI Table A1 (p. 2).

**TABLE 2** Minority assimilation to local plurality groups.

| | Regions | | | Districts | | |
|---|---|---|---|---|---|---|
| | Speak language | Main language | Inter-marriage | Speak language | Main language | Inter-marriage |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treated | 0.089† | 0.066* | 0.018* | 0.068* | 0.028 | 0.026** |
| | (0.049) | (0.029) | (0.008) | (0.034) | (0.020) | (0.007) |
| Plurality member | 0.430** | 0.716** | 0.745** | 0.352** | 0.724** | 0.673** |
| | (0.075) | (0.045) | (0.015) | (0.063) | (0.022) | (0.012) |
| Treated × Plurality member | −0.109 | −0.021 | 0.014 | −0.129† | −0.017 | 0.004 |
| | (0.103) | (0.061) | (0.013) | (0.075) | (0.039) | (0.009) |
| Source | AB | AB | DHS | AB | AB | DHS |
| Cutoff | 20 km | 20 km | 20 km | 20 km | 20 km | 20 km |
| Running var. linear | Yes | Yes | Yes | Yes | Yes | Yes |
| Survey FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Border FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean DV | 0.56 | 0.37 | 0.35 | 0.6 | 0.41 | 0.4 |
| Borders | 97 | 250 | 246 | 125 | 489 | 743 |
| Observations | 16,088 | 96,608 | 44,680 | 18,220 | 127,038 | 70,056 |
| Adjusted $R^2$ | 0.800 | 0.781 | 0.777 | 0.768 | 0.807 | 0.750 |

*Note*: OLS linear models. The unit of analysis are individuals. The outcomes capture assimilation with administrative units plurality groups as indicated in the column headers: Speaking the plurality language, using the plurality language as one's main language, and being married to a plurality group member. The treatment coefficient captures the increase in assimilation among local minority group members at administrative borders. Standard errors clustered on the point and administrative unit × treatment levels. Significance codes: $^{\dagger}p < .1$; $^{*}p < .05$; $^{**}p < .01$.

again take the group from Murdock's (1959) map with the largest spatial intersection as their plurality group. I draw on Müller-Crepon, Pengl, and Bormann (2022) to link the latter to IPUMS' ethnic labels and differentiate between local plurality and minority group members in the censuses.

With the resulting data, I conduct three analyses (Table 3). I first estimate the extent to which local plurality status reduces individuals' emigration from their regions and districts of birth (Models 1 and 4). Regions' (districts') plurality group members show an emigration rate that is 12 (17) percentage points lower than that among local minorities. Second, I estimate the effect of local plurality status on immigration into migrants' coethnic regions and districts (Models 2 and 5). Again, the extent of such coethnic migration bias is substantive. Migrants move with a 6.3 (8.1) percentage points higher probability toward regions (districts) dominated by their ethnic kin than to other units. Both analyses account for fixed effects at the ethnic group and administrative unit levels.

The third analysis in Models 3 and 6 is fully dyadic, the unit of analysis being the ethnic group nested in directed birth to residence unit dyads. The outcome consists in the share of an ethnic group in a birth unit that has migrated toward a given residence unit. Controlling for dyad and ethnic group fixed effects, the models assess the degree to which plurality groups differentially move between administrative units. The average migration rate between two regions (districts) amounts to 1.4% (0.63%) of the population of the source unit. Belonging to the predominant group in one's birth region (district) decreases this rate by 0.7 (0.3) percentage points. In turn, being a member of the plurality in the dyad's target unit increases it by 2.1 (0.7) percentage points. In size similar to the average dyadic migration rate, these effects are substantive, robust to different specifications, and remain stable across birth cohorts going back to the 1900s (SI H, pp. 19–24).

Local minority members are thus more likely to exit, and migrants preferentially move to coethnic administrative units. But do such ethnic migration patterns explain the effects of administrative borders on ethnic demographics? To answer this question, I derive unit-level migration biases as the coefficients in Models 1 and 2 (4 and 5) estimated separately for each region (district) in the IPUMS data. I take the resulting unit-level estimates and test whether they moderate the main RDD treatment effects from above in the 11 (5) countries for which I have region (district) level migration data.[24]

[24] I do so by adding them as an interaction term to Equation (1). For consistency, I here couple the DHS data with IPUMS' border data to estimate the RDD.

**TABLE 3** Ethnic migration patterns.

| | Share of migrants | | | | | |
|---|---|---|---|---|---|---|
| | Regions | | | Districts | | |
| | Emigrants | Immigrants | Dyadic | Emigrants | Immigrants | Dyadic |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ethnic plurality in source | −0.119** | | −0.007** | −0.170** | | −0.003** |
| | (0.018) | | (0.002) | (0.020) | | (0.001) |
| Ethnic plurality in target | | 0.063** | 0.022** | | 0.081** | 0.007** |
| | | (0.013) | (0.004) | | (0.012) | (0.001) |
| Unit of analysis | Source × group | Target × group | Dyad × group | Source × group | Target × group | Dyad × group |
| Group FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Source FE | Yes | – | – | Yes | – | – |
| Target FE | – | Yes | – | – | Yes | – |
| Dyad FE | – | – | Yes | – | – | Yes |
| Mean DV | 0.26 | 0.035 | 0.014 | 0.36 | 0.026 | 0.0063 |
| Observations | 6,519 | 7,255 | 169,632 | 9,942 | 15,161 | 628,983 |
| Adjusted $R^2$ | 0.640 | 0.599 | 0.696 | 0.487 | 0.603 | 0.306 |

*Note*: OLS linear models. Observations are weighted according to the number of individuals they include. Standard errors clustered on the migration source units in Models 1 and 4, target units in 2 and 5, and both in 3 and 6. Significance codes: $^{\dagger}p<.1$; $^{*}p<.05$; $^{**}p<.01$.

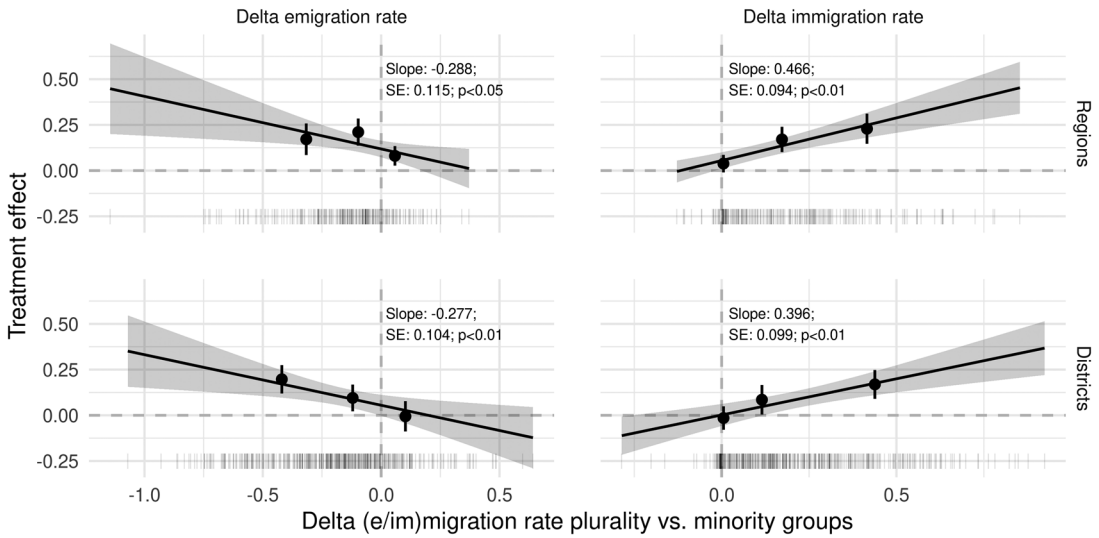


**FIGURE 7** Effect of borders on ethnic identities increase with ethnic differences in e- and immigration. *Notes*: Results from four linear interaction models and by tercile of the moderator (Hainmueller, Mummolo, & Xu, 2019). Gray bars denote sample observations.

Figure 7 shows that the effect of administrative borders on plurality groups' population share strongly increases with (1) the extent of local plurality members' lower emigration rate (*Delta emigration rate*) and (2) migrants' increased immigration rates into coethnic units (*Delta immigration rate*). For example, a decrease of plurality group members' differential emigration rate by 10 percentage points corresponds to a 3 percentage points larger border discontinuity of the plurality group share. Bearing in mind that this correlation between migration biases and ethnic discontinuities is not causally identified, this result nevertheless strongly suggests that ethnically biased migration contributed to the administrative borders effects on ethnic demography.

## CONCLUSION

John Iliffe (1979) argued that "Europeans believed Africans belonged to tribes; Africans built tribes to

belong to." This article has analyzed the effect of territorially bounded administrative units on ethnic demography as an important mechanism behind this argument. Colonialists devised administrative borders that frequently cut across ethnic geography, but local governance was nevertheless ethnicized on the bedrock of partly invented, partly preexisting "customary" institutions. In turn, local minorities created by administrative boundaries reacted to their politically diminished status, often assimilating to the local majority or emigrating.

My analyses support this account of the administrative shaping of ethnic groups. I find sharp spatial discontinuities in ethnic demographics at administrative borders: the share of regions' (districts') predominant ethnic group locally increases by about 14 (8) percentage points or 54% (23%) at borders to units dominated by a different group. Suggestive evidence shows that groups' plurality status has a substantively similar effect inside administrative units. Consistent with historical evidence, borders' effects increase with strong traditional institutions and larger dominant groups. I find that ethnic assimilation and ethnically biased migration patterns drive this phenomenon.

Taken together and acknowledging that the *global* effect of territorial governance on ethnicity cannot be empirically known absent a valid counterfactual, my argument and evidence offer an instrumentalist interpretation of constructivist accounts of the colonial transformation of ethnic identities in Africa. Ethnic identities and geographies are not prehistorically given but shaped by individual responses to ethnicized governance bounded by administrative borders. Once politicized, ethnic assimilation and migration patterns left ethnic identities crystallized along administrative borders, contributing to the alignment of administrative units and ethnic geographies.

Although my results highlight the impact of administrative borders on ethnicity, other relevant, parallel, and potentially intersecting processes have shaped ethnic groups and individuals' identification with them. For example, states' nation-building efforts can likely counteract strong local identities rooted in subnational administrative units. Ethnic competition and conflict, in turn, may increase the salience of some ethnic differences but decrease that of others. And national-level institutions beyond the constitutionalization of traditional institutions analyzed here may affect the localization of ethnic identities. Complementary to my findings, these highlight the need to better understand the foundations of one of the most important political cleavages in Africa and beyond.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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