Political Favoritism as a Driver of Subnational Border Changes in Africa

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Abstract

This paper investigates the political drivers of subnational border changes in Africa, focusing on the role of favoritism by national leaders. Using detailed data on administrative boundaries from the GAUL dataset and a unique dataset on leaders' birthplaces, we analyze border changes across the continent from 1990 to 2014. Employing a grid-based methodology and two-way fixed effects regressions, we show that cells near a leader's birthplace are significantly more likely to experience border reforms, particularly through the splitting of administrative units. Our results are robust to models that account for staggered treatment designs and heterogeneous treatment effects. Further analysis reveals that these reforms are more common in autocratic states and often aim to benefit leaders' home regions through increased economic activity – measured using nightlight intensity – ethnic consolidation, or resource annexation. We also contribute to the literature on ethnic heterogeneity by examining how border reforms influence ethnic fractionalization and polarization at the subnational level. These findings shed light on the strategic use of border reforms as a tool for political favoritism in Africa.

Keywords: Border reforms, economic development, favoritism, night-light data, Africa

JEL Classification: *D73, H77, R11*

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1 Introduction

After gaining independence from colonial powers in the 1960s, most African leaders viewed the establishment of a strongly centralized state as essential for forging a unified national identity. This emphasis on centralization stemmed from the challenges posed by the arbitrary nature of national borders, which were drawn during the colonial era without regard for the ethnic diversity within many countries (Fessha, 2012). From the late 1980s to the early 2010s, this centralized approach came under pressure as international donor states, the World Bank, and other global institutions strongly advocated for decentralization reforms in developing countries. Decentralization was promoted as a strategy to enhance governance, improve economic efficiency, and foster greater local participation in decision-making processes (Bardhan and Mookherjee, 2006). For instance, the World Bank invested heavily in decentralization programs, committing a total of $7.4 billion to such initiatives between 1990 and 2007 across the developing world (Lewis, 2018).

In Africa, decentralization reforms were frequently accompanied by extensive changes to the administrative structure of nations. A significant aspect of these changes involved the reconfiguration of sub-national boundaries, which reshaped the territorial frameworks of governance (Erk, 2018). These border reforms often resulted in a complete overhaul of the structure and organization of provincial, regional, or local governments. A particularly common outcome was the creation of additional administrative units, a phenomenon referred to as administrative unit proliferation (Grossman and Lewis, 2014; Pierskalla, 2019).

The effectiveness of decentralization and associated sub-national border reforms remains a contested issue in the literature. Empirical evidence provides mixed results regarding their impact. For instance, Cohen (2024) examines a border reform in Uganda and finds negative effects on infrastructure development and lower economic performance in newly split-off districts. Similarly, Billing (2019) finds that the local provision of public goods, proxied by nightlight intensity, decreased in newly created splinter provinces in Burkina Faso. Baskaran and Blesse (2019), on the other hand, find that while sub-national border changes do not significantly affect broader economic development, they do have significant positive effects on the delivery of public goods, suggesting improvements in administrative efficiency in certain areas. However, the broader developmental impacts of such reforms appear to be more limited. Furthermore, He (2022), using data from 132 developing countries, identifies an inverse U-shaped relationship between government fragmentation and state capacity. This finding highlights a trade-off in designing administrative divisions, where increasing fragmentation can initially improve state capacity but eventually lead to diminishing returns and potential inefficiencies.

Moreover, while these reforms are often presented as efforts to improve governance and development, their underlying motivations might not always be benign. Politicians may implement sub-national border reforms for personal benefits or strategic political reasons rather than purely developmental objectives. Therefore, understanding the determinants and political drivers behind these reforms is crucial. This analysis can help illuminate the conditions under which such changes are likely to enhance economic outcomes, as opposed to scenarios where they may inadvertently hinder progress.

Emerging research increasingly examines how sub-national government tiers are geographically partitioned, shedding light on the political drivers behind these changes. In Uganda, for instance, district creation has been identified as a mechanism for national leaders to engage in patronage politics. Green (2010) argues that such reforms allow leaders to distribute new bureaucratic positions to loyalists, consolidating their political power. Grossman and Lewis (2014) further demonstrate how district creation shifts the balance of power in favor of the central government. Newly established administrative units often lack bargaining power and are highly dependent on the central government for resources, planning, and service delivery. This dynamic strengthens the central authority's control over sub-national entities. Crouch (2010) also finds that a large-scale administrative reform in Indonesia, involving the creation of new districts, increased the central government's influence over local governance.

Similarly, Hassan and Sheely (2017) highlight how border changes in Kenya have been used as tools for electoral strategy. In some cases, leaders have manipulated boundaries to create ethnically homogeneous regions, thereby appeasing specific ethnic groups and increasing their chances of reelection. Evidence from Ghana also underscores the political utility of border reforms. Resnick (2017) finds that district creation has been used to foster malapportionment, a practice that disproportionately benefits the ruling party by reallocating electoral influence in their favor. While much of the existing research on sub-national border changes has concentrated on single-country case studies, our study adopts a much broader approach. We analyze sub-national border changes across the entire African continent, offering a comprehensive perspective on this phenomenon. Our central hypothesis is that national leaders – such as presidents, prime ministers, and cabinet members – engage in favoritism by leveraging border changes and administrative reforms to benefit their own ethnic groups or people in their home regions. This hypothesis aligns with the broader literature on patronage politics and the role of elites in shaping territorial governance, but our study extends this analysis to a continental scale. Additionally, we close the gap to the literature on regional favoritism (see, for example, Hodler and Raschky, 2014).

Our analysis explores several potential channels through which national leaders may utilize border reforms to benefit their own regions or people. The first channel focuses on the leaders' birthplace: leaders may reshape administrative borders specifically around their home region to create units that consist predominantly of their own ethnic or social groups. This allows for precise allocation of central government funds and resources to their local communities, fostering loyalty and support from their immediate base.

The second channel is broader and concerns ethnic targeting in general. Leaders might employ border reforms to create more ethnically homogeneous regions that favor their ethnic group, even if these regions are not directly tied to their birthplace. By doing so, leaders can enhance the political cohesion and support of their ethnic group across a wider area, facilitating targeted benefits and consolidating their power.

Lastly, leaders might use border reforms to annex resource-rich areas—such as regions with gold, diamonds, or other valuable minerals—into their home regions. This strategy allows leaders to secure greater control over valuable resources and channel their benefits toward their local communities or political interests.

To systematically analyze sub-national border changes in Africa between 1990 and 2014, we utilize the GAUL dataset from the Food and Agriculture Organization of the United Nations (FAO), which provides detailed information on administrative boundaries. By employing GIS software, we trace and analyze changes at both the first tier of administrative structures, referred to as ADM1 regions (e.g., provinces or regions), and the second tier, known as ADM2 regions (e.g., districts or municipalities). This approach builds upon and expands the work of Baskaran and Blesse (2019), enhancing its scope and resolution.

A key challenge in conducting statistical analysis using administrative regions as units of analysis is that some regions ceased to exist during the time frame due to boundary changes. To address this issue, we circumvent the problem by creating a uniform grid or raster covering the African continent. Each grid cell measures 0.5 degrees longitude by 0.5 degrees latitude. These grid cells serve as the consistent units of analysis, enabling us to systematically evaluate patterns and effects of border reforms over time.

We first establish that cells located near the birthplace of a national leader in office are more likely to experience a border or region change. To test this hypothesis, we utilize a dataset of leaders and their birthplaces, originally used in Asatryan et al. (2023). Using this dataset, we identify the birthplaces of national leaders and draw a circle with a 50-kilometer radius around each birthplace. Cells within this radius are classified as ”treated” during the years when the respective leader was in office. Using a two-way fixed effects (TWFE) panel regression approach, we demonstrate that cells located near the birthplaces of national leaders in office are statistically significantly more likely to experience a border or region change. This effect is particularly pronounced when considering changes resulting from the splitting of regions.

Additionally, we explore possible effect heterogeneities and find that these changes are primarily driven by autocratic states. In contrast, we observe no significant effect for cells near a leader's birthplace in more democratic states, highlighting the role of regime type in shaping the impact of border reforms. Importantly, these results remain robust even when employing newer models designed to account for heterogeneous treatment effects in staggered treatment designs or treatment reversals.

Following this analysis, we show that cells newly merged into a leader's home region, or cells that remain part of a leader's region after a split, experience higher economic development in the aftermath of border reforms. This is measured using nightlight intensities, a widely recognized proxy for economic activity. These findings align with our hypothesis that leaders use border reforms to benefit their home regions, specifically by directing resources and fostering economic activity in areas under their influence.

Furthermore, we demonstrate that cells predominantly inhabited by the ethnic group of national leaders are more likely to be incorporated into more ethnically homogeneous regions following border reforms. To do so, we calculate a measure of ethnic composition for each administrative unit using the GREG dataset from Weidmann et al. (2010). This finding highlights the role of ethnic targeting in the design of administrative boundaries. Additionally, our results indicate that resource-rich cells are significantly more likely to be merged into a leader's region compared to other cells. This suggests that national leaders strategically use border reforms to consolidate access to valuable resources within their home regions.

This paper makes several important contributions to the literature on subnational border reforms and political economy. Unlike much of the existing research, which focuses on single-country case studies, we adopt a comprehensive approach by analyzing border changes across the entire African continent. Our study provides a novel perspective on the role of national leaders in shaping administrative boundaries, testing hypotheses related to favoritism using detailed data on leaders' birthplaces, resource distributions, and ethnic composition. Additionally, we contribute to the literature on ethnic heterogeneity by examining how border reforms influence ethnic fractionalization and polarization at a subnational level. By combining ethnic data with administrative boundary changes, we offer new insights into the strategic use of reforms to create ethnically homogeneous regions or consolidate ethnic majorities.

The remainder of our paper is organized as follows. Section 2 describes the data sources, and Section 3 identifies the countries and cells affected by subnational border reforms. Section 4 presents descriptive statistics, highlighting characteristics of expired regions, reforming countries, and cells near leaders' birthplaces, as well as changes in ethnic heterogeneity. Section 5 outlines our empirical strategy, while Section 6 presents our main findings that cells near leaders' birthplaces are more likely to experience border changes.

Section 7 explores channels of favoritism, and Section 8 concludes with a summary of our findings.

2 Data

2.1 GAUL Data and PRIO-Grid

To identify and analyze subnational border changes in Africa, we use the Global Administrative Unit Layers (GAUL) dataset. Developed by the Food and Agriculture Organization (FAO), this dataset provides detailed maps of administrative boundaries worldwide, including comprehensive data for African countries at both the first and second administrative tiers, covering the years 1990 to 2014. While the GAUL data is not officially validated by national government services, it is generally considered complete and reliable for research purposes (see Brigham et al., 2011). For further validation, Baskaran and Blesse (2019) cross-checked GAUL's first-tier boundary changes with the updated online supplement[1] of Law (2010) , confirming its overall consistency. The GAUL shapefiles assign each administrative unit – such as a region, province, or municipality – a unique identification code. Additionally, for any administrative unit created or dissolved during the timeframe, the dataset includes a starting year and an end year. Units are marked as expired if they are either split into multiple new units or merged with others to form a new unit, disregarding minor boundary adjustments. These attributes allow us to systematically track and characterize administrative units that were altered during the study period. To identify newly drawn or vanished borders over time, we overlay the shapefiles of administrative boundaries for each year. As noted before, conducting statistical analysis using administrative units as observational units poses challenges, primarily because many of these units ceased to exist during the study period due to boundary changes. To address this issue, we construct a uniform grid, or raster, covering the African continent. Each grid cell measures 0.5 degrees of latitude by 0.5 degrees of longitude, which corresponds to approximately 2500 square kilometers at the equator.

These grid cells serve as the observational units in our panel regression approach, enabling us to track changes systematically across time and space. Using GIS software, we overlay the annual administrative boundary shapefiles from the GAUL dataset onto this grid. For each cell and year, we identify whether a new boundary was introduced or an existing boundary disappeared. Cells with a newly created border are classified as "split cells", while those where a border has vanished are designated as "merger cells".[2] Using this approach, we identify cells where a new border was created or an old one removed.

[1] www.statoids.com

[2] It is possible for a cell to experience both types of changes in a single year; however, this is uncommon.

However, particularly at the ADM1 level, where regions can cover vast areas, it is possible for a cell to experience no direct border change but still belong to a newly created region. To address this, we identify the new regions associated with border changes and classify all cells that are at least 10% covered by such a region also as split or merger cells, depending on whether the new region resulted from a split or a merger. An example of this procedure is depicted in Figure A.1 in the Appendix.

To complement our analysis, we leverage the PRIO-grid dataset developed by Tollefsen et al. (2012), which aligns with our raster resolution of 0.5 by 0.5 degrees. PRIO-grid provides a rich array of socioeconomic and geographical variables for each grid cell, facilitating a detailed exploration of factors that may influence or correlate with border changes. Among the variables included are climate-related measures, such as precipitation levels and periods of drought, as well as temporal data on population and nightlight emissions. Nightlight emissions, in particular, are widely regarded as a valuable proxy for economic activity in contexts where reliable administrative data on economic development is unavailable (e.g., Chen and Nordhaus, 2011). Recognizing their importance, alongside population data, for our study, we enhance the PRIO-grid dataset by incorporating additional information from satellite imagery provided by the National Oceanic and Atmospheric Administration (NOAA)[3] and high-resolution population data from the WorldPop project[4] described in Christopher T. Lloyd and Tatem (2019). This augmentation enables us to address gaps in the PRIO-grid data and ensure a comprehensive representation of these critical variables.

2.2 Leader Data

Our analysis draws on data from the WhoGoV database from Nyrup and Bramwell (2020), which provides detailed information on ministers and cabinets in African countries between 1992 and 2016. This dataset is one of the most comprehensive sources of ministerial data, offering information on key variables such as the years ministers were in office, their official positions, party affiliations, portfolios, and personal details like birth and death years. Building on this, Asatryan et al. (2023) enriched the dataset by adding geographic information, identifying the birthplaces and birth regions of ministers. In their study, the authors explored how leaders' birthplaces relate to economic outcomes such as nightlight intensity, providing valuable insights into the spatial dimensions of governance. For our purposes, we utilize this geocoded dataset, which includes information on 9,415 unique ministerial birthplaces across 120 countries. For African countries specifically, approximately 50.96% of ministerial birthplaces are covered.

[3]www.noaa.gov
[4]www.worldpop.org

To investigate whether leaders or ministers influence administrative border reforms in their home regions, we create a treatment variable that captures the time when a leader born near a region is in office. This requires incorporating the geographic location of leaders' birthplaces into our analysis grid. For each leader in office during a given year within the study's time frame, we define a 50-kilometer buffer—a circular area centered on their birthplace. Any grid cell within this buffer that overlaps by at least 5% and belongs to the same country as the leader is designated as treated. This approach allows us to systematically analyze whether proximity to a leader's birthplace impacts border reform activity. An illustrative example of this process is provided in Figure A.2 in the Appendix.

2.3 Data on Ethnic Heterogeneity

Given the extensive debate surrounding the effects of ethnic fractionalization on economic and political outcomes (e.g., Montalvo and Reynal-Querol, 2021), incorporating measures of ethnic heterogeneity is crucial for our analysis. However, obtaining precise data on ethnic diversity at the regional level poses significant challenges due to the lack of granular, contemporary information. To address this limitation, we adopt an approach similar to Seidel (2023), which combines multiple data sources to construct measures of ethnic heterogeneity. Specifically, we utilize the Geo-Referenced Ethnic Groups (GREG) dataset from Weidmann et al. (2010). This dataset provides spatial boundaries for ethnic group territories based on the Soviet Atlas Narodov Mira from 1960. While the source is somewhat dated, the territorial boundaries of ethnic groups tend to be relatively stable over time, making the data a useful approximation.

We integrate these spatial data with administrative boundaries for both the first-tier (ADM1) and second-tier (ADM2) regions. To estimate the population distribution within these ethnic territories, we leverage high-resolution population data from the WorldPop project, which provides a grid with a resolution of 1 km^2 for each year of the study period. By overlapping ethnic territories with administrative borders and population data, we estimate the size of each ethnic group within each region annually.

One limitation of the GREG dataset is its inability to account for the composition of populations in territories where multiple ethnic groups overlap. However, this issue is relatively minor in our context: only 148 out of 1,165 group territories in Africa (approximately 12%) are shared by multiple groups, and these territories account for just 6% of the African population as of the year 2000. Consequently, we proceed with the simplifying assumption that each territory is fully inhabited by the primary ethnic group assigned to it.

Using this combined data, we calculate two widely used measures of ethnic heterogeneity – ethnic fractionalization and ethnic polarization – for each region and year. These measures, commonly employed in the literature (e.g., Alesina et al., 2003; Miguel and Gugerty, 2005), are defined by the equations below:

$$EthnicPolarization_r = 1 - \sum_{g=1}^{m} (\frac{0.5 - s_{g,r}}{0.5})^2 * s_{g,r} \tag{1}$$

$$EthnicFractionalization_r = 1 - \sum_{g=1}^{m} s_{g,r}^2 \tag{2}$$

Where, m represents the total number of ethnic groups within an administrative region r, and $s_{g,r}$ is the population share of ethnic group g in the region. The original purpose of the polarization index, as explained by Montalvo and Reynal-Querol (2005), was to measure how far the distribution of ethnic groups deviates from the bipolar distribution $(1/2, 0, 0, \ldots, 0, 1/2)$, which represents the highest level of polarization. This reasoning is often used in studies of ethnic conflict, as bipolar distributions may intensify competition and tensions between groups. Ethnic fractionalization reflects the probability that two randomly selected individuals belong to different ethnic groups. These metrics allow us to quantitatively assess the role of ethnic diversity in shaping the outcomes of sub-national border reforms. We cross-checked our results with the Historical Index of Ethnic Fractionalization (HIEF) dataset developed by Dražanová (2020). The HIEF dataset uses a different set of data sources and it calculates ethnic fractionalization only at the national level, not at the regional level as in our analysis. However, when we compute national ethnic fractionalization using our methodology, the results are broadly consistent with those from the HIEF dataset, providing additional confidence in the validity of our approach.

2.4 Complementary Data

To enrich our analysis, we incorporate several socioeconomic and political variables as controls. These variables help us explore potential effect heterogeneity and uncover the mechanisms through which national leaders may attempt to benefit their home regions via border reforms.

First, we include data from the Polity5 dataset, provided by the Polity Project[5]. This dataset assigns a political regime score to each country and year, ranging from -10 (autocracy) to $+10$ (full democracy). Countries with a score greater than 5 are classified as at least partially democratic, allowing us to consider the potential influence of regime type on border changes and their outcomes.

[5] www.systemicpeace.org

Second, recognizing the importance of colonial history in shaping African nations, we incorporate an index of colonial impact for 44 of the 55 African countries, as developed by Ziltener et al. (2017). This index, ranging from 0 to 100, quantifies the extent to which colonial rule has influenced the economic, political, and social systems of these countries, allowing us to examine whether colonial legacies play a role in shaping subnational border reforms.

Lastly, given Africa's resource richness, we include geocoded mining data used in Asatryan et al. (2024). This dataset, developed by MinEx Consulting, a private mining consulting company, provides a comprehensive inventory of significant mineral deposits across Africa. It includes all mineral commodities except bulk minerals (e.g., coal, iron ore, bauxite, potash, and phosphate). The database covers a substantial share of known deposits, including 99% of giant-sized deposits, 95% of major deposits, 70% of moderate deposits, and 50% of minor deposits. This geospatial data allows us to investigate whether national leaders leverage border reforms to secure access to valuable mining resources for their home regions.

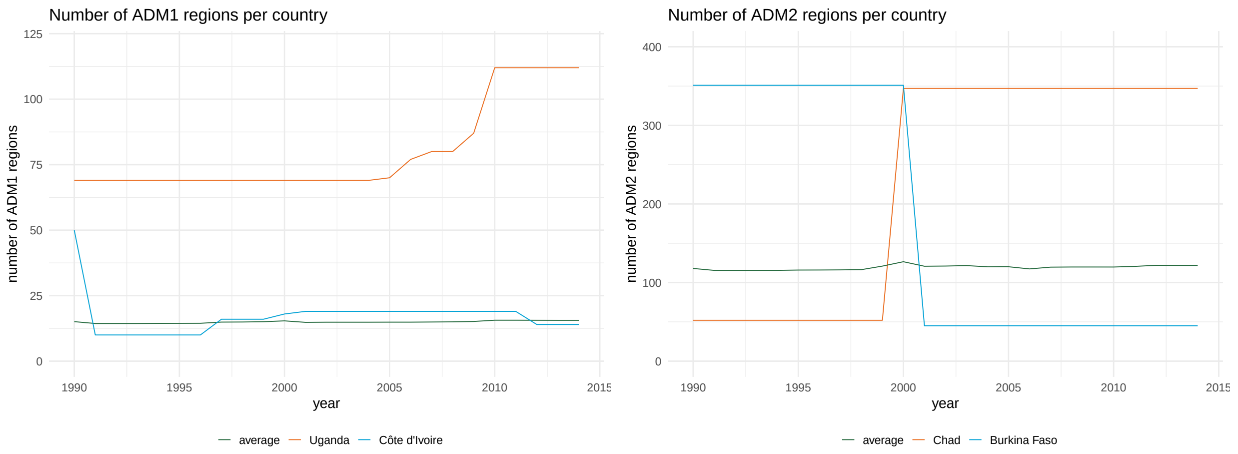
3 Border Changes in Africa

The legacy of colonial rule has profoundly shaped the administrative and territorial structures of African states. Both national and sub-national borders were frequently drawn as straight lines, disregarding natural geographic features or the ethnic composition of the population. This arbitrary demarcation created a foundation of administrative structures that were often mismatched with the social and cultural realities on the ground (see for example Easterly and Levine (1997)).

Following independence, the political priority of many newly independent African states was to establish and maintain strong centralized governance. This focus on centralization was seen as critical for fostering national unity in the face of internal ethnic and regional diversity. Consequently, administrative boundaries and structures remained largely unchanged for decades after independence, with most countries beginning to reform their sub-national borders in the 1980s and 1990s. In the period between 1990 and 2014, sub-national border reforms were widespread across Africa. A total of 34 out of the 55 African countries experienced changes to either their first or second-tier administrative boundaries. Specifically, 24 countries experienced changes at the first tier (ADM1 regions), while 29 countries saw modifications at the second tier (ADM2 regions). Furthermore, 19 countries underwent changes at both tiers, highlighting the extensive nature of border reform efforts across the continent during this time frame.

Figure 1 presents the evolution of the number of administrative regions at both the first (ADM1) and second (ADM2) tiers across African countries during the study period. On

Figure 1: Number of regions over time



Notes: The left panel shows the evolution of the number of ADM1 regions per country, while the right panel depicts the changes in ADM2 regions. Both panels show modest overall increases in the average number of regions, alongside dramatic changes in specific countries, often occurring within a single year as part of major administrative reforms.

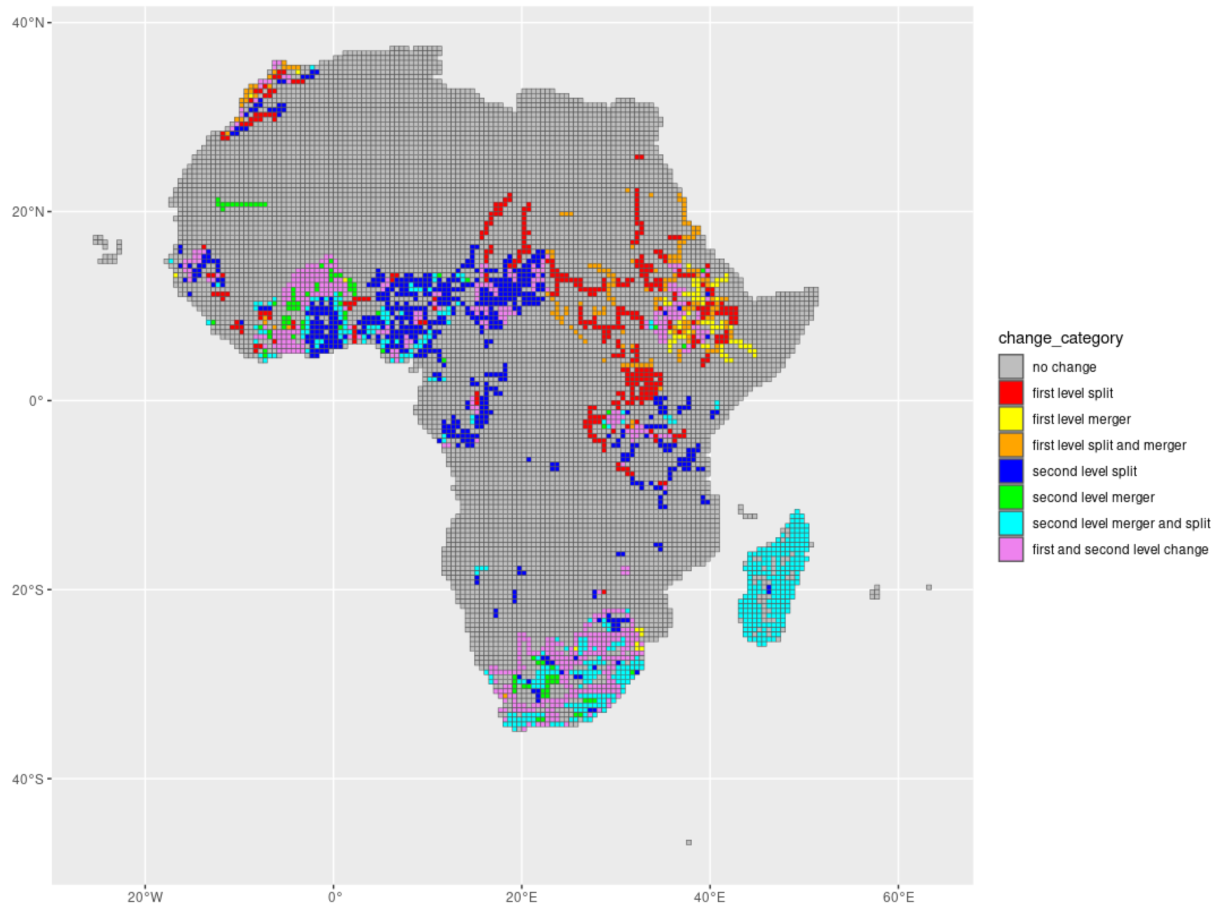
average, the number of ADM1 regions per country increased slightly, rising from 15.07 regions in 1990 to 15.58 regions in 2014. However, this modest average conceals significant variation among individual countries. Uganda experienced the largest increase in ADM1 regions, with the number rising dramatically from 69 to 112, while Côte d'Ivoire saw the largest decrease, with its ADM1 regions dropping from 50 to 14 over the same period.

Similarly, the average number of ADM2 regions per country also showed a slight increase, moving from 117.94 in 1990 to 121.84 in 2014. Yet again, certain countries experienced far more pronounced changes. Chad exhibited the most significant expansion, with ADM2 regions increasing from 52 to 347, while Burkina Faso saw a sharp decline, with its ADM2 regions decreasing from 352 to 45. The timing of these changes is also notable. The graphs highlight that in cases such as Burkina Faso and Chad, these significant shifts in the number of administrative regions occurred within a single year, reflecting large-scale administrative reforms. This pattern of abrupt and sweeping changes is not uncommon in the context of sub-national border reforms in Africa.

To make the analysis of sub-national border changes more tractable for statistical purposes, we construct a uniform grid of raster cells across Africa. Each cell measures 0.5 degrees by 0.5 degrees, corresponding to approximately 50 square kilometers at the equator. This process results in a grid of 10,602 cells covering the entire continent.

For each cell, we track the occurrence of border changes annually throughout the study period (1990–2014) at both the first tier (ADM1 regions) and second tier (ADM2 regions) of the administrative hierarchy. When a new border appears within a cell, we classify this as a split change at the respective administrative level. Conversely, when a border within a cell disappears, we classify this as a merger change at the corresponding level. This systematic approach allows for precise identification and quantification of border dynamics over time. Figure 2 illustrates the grid-based structure applied to Africa, with each cell color-coded to reflect the type and occurrence of changes within its boundaries. Of the 10,602 cells in the grid, 2,329 – approximately 23% – experienced a border change during the study period. Specifically, 1,135 cells recorded changes at the first tier (ADM1 regions), 1,447 cells at the second tier (ADM2 regions), and 253 cells experienced changes at both levels. These figures represent the cells in which an actual border changed within the timeframe.

Figure 2: Grid Representation of Africa with Border Changes

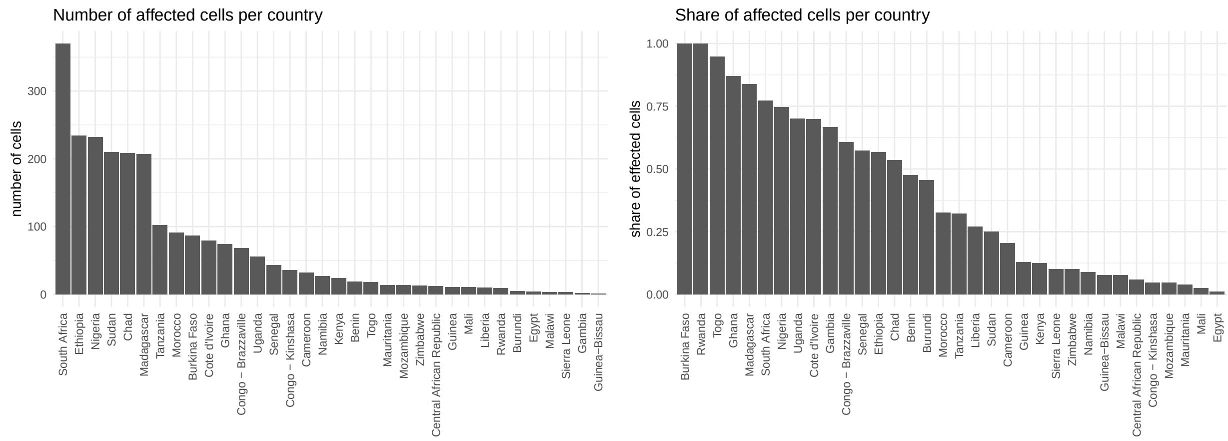


Notes: This map shows the grid representation of Africa, where each cell measures 0.5° x 0.5° (approximately 50 km² at the equator). Cells are color-coded to indicate the type of administrative border changes they experienced between 1990 and 2014.

It is important to note, however, that this analysis does not yet account for cells indirectly affected by administrative reforms. When we expand the analysis to include cells that did not experience a direct border change but were at least partially covered by a newly created region, the number of cells affected by changes in the administrative structure rises to 4,377 – approximately 43% of all cells. This broader measure underscores the extensive impact of sub-national border reforms across the continent.

Figure 3 illustrates the distribution of the 2,329 cells experiencing border changes across the 34 African countries where such reforms occurred. The left panel of the figure displays the absolute number of affected cells per country, while the right panel shows the proportion of affected cells relative to each country's total number of cells. In absolute terms, it is

Figure 3: Distribution of Border Changes Across African Countries



Notes: The left panel shows the absolute number of grid cells affected by border changes in each of the 34 countries that experienced reforms, while the right panel illustrates the proportion of affected cells relative to the country's total area. Countries without border reforms are excluded.

unsurprising that larger countries by area, such as South Africa, Sudan, and Ethiopia, have the highest number of affected cells. South Africa leads this group with over 300 cells experiencing border changes during the study period. However, the relative distribution paints a more nuanced picture. In 14 of the 34 countries, over 50% of the cells were affected by border changes, indicating widespread administrative restructuring. At the same time, 12 countries had fewer than 10% of their cells affected, suggesting more limited or localized border changes within their territories. This contrast highlights the varying intensity and scope of sub-national border reforms across the continent.

4 Descriptive Statistics

To begin our analysis, we examine the characteristics of regions that ceased to exist, or "expired", during the study period. As previously discussed, a region is considered to have expired if it was either split into multiple new regions or merged with another region to form a new administrative unit. Beyond the characteristics of these expired regions, we also investigate the broader context of the countries in which these border reforms occurred. Understanding the socioeconomic and political profiles of these countries provides valuable insights into the drivers and implications of subnational border reforms.

The upper part of Table 1 provides a comparative summary of descriptive statistics for regions that expired versus those that did not expire during the timeframe. This comparison is made separately for first-tier (ADM1) regions and second-tier (ADM2) regions, highlighting differences in population size, economic activity, ethnic composition, and other relevant variables between the two groups. The lower part of Table 1 collects socioeconomic variables at the country level, comparing countries that reformed their administrative units with those that did not.

Looking at the regional variables, Table 1 highlights several notable differences between the 275 ADM1 regions that expired and the 851 regions that did not. Regions that expired tend to have a higher population, both in absolute terms and as a percentage of their respective country's total population. However, these regions are smaller in area, both in absolute size and relative to the country's total area. In terms of economic activity, expired regions exhibit lower nightlight emissions, suggesting less economic activity compared to regions that persisted. This finding holds both for absolute nightlight emissions and when measured relative to the country's average emissions. The results concerning ethnic heterogeneity are more nuanced. When measured by the ethnic fractionalization index defined in Equation (2), expired regions are, on average, more ethnically fractionalized than regions that did not expire. However, when comparing the relative ethnic fractionalization of a region to its country's overall fractionalization, the opposite pattern emerges. This suggests that, while expired regions may appear more ethnically heterogeneous in general, they are not significantly more diverse relative to other regions within the same country. Importantly, all these observed differences between expired and non-expired regions are statistically highly significant.

For ADM2 regions, the results are similar. The 1,482 regions that expired tend to have larger populations on average but emit fewer nightlights, indicating lower levels of economic activity compared to the 6,592 regions that did not expire. Ethnic fractionalization is generally higher in expired ADM2 regions, but these regions are not more heterogeneous when compared to other regions within the same country. Unlike ADM1 regions, however, there are no statistically significant differences in the area size of expired and non-expired ADM2 regions.

The lower part of Table 1 compares the characteristics of countries that reformed at the respective tier of their government structure with those that did not. Several patterns emerge from this analysis. Countries that implemented administrative reforms are, on average, significantly more populated than those that did not. While they emit fewer nightlights overall – indicating potentially lower levels of economic activity – this difference is not statistically significant. Similarly, countries that reformed tend to be more autocratic on the Polity5 index, but this difference is also not statistically significant. In terms of ethnic composition, countries that underwent administrative reforms are significantly more ethnically fractionalized than those that did not, highlighting the potential role of ethnic diversity in driving or necessitating such changes. Regarding colonial history, the results differ by administrative tier. Countries that reformed ADM1 regions show no significant difference in the extent to which they were impacted by colonialism compared to countries that did not reform ADM1 regions. However, for ADM2 regions, the difference is statistically significant, with countries that reformed ADM2 regions being more heavily influenced by colonial legacies.

Table 1: Characteristics of expired and not expired regions

	ADM1			ADM2		
	no change	change	difference	no change	change	difference
Region variables						
population	975t	1134t	$159t^{***}$	111t	204t	$93t^{***}$
			(35192)			(1941)
population share	0.0742	0.0584	0.0158^{***}	0.0087	0.0093	0.0006^{**}
			(0.0020)			(0.0002)
area	3.1572	2.6813	-0.4759^{***}	0.3937	0.4117	0.0180
			(0.13236)			(0.0116)
area share	0.0739	0.0547	-0.0192^{***}	0.0091	0.0092	0.0001
			0.0022)			(0.0002)
nightlights	4.67302	3.3668	-1.3062^{***}	6.9507	4.6147	-2.3360^{***}
			(0.1264)			(0.0970)
nightlights relative	1.4890	1.1693	-0.31975^{***}	2.3539	1.5974	-0.7565^{***}
			(0.0366)			(0.0311)
EF-index	0.1908	0.2509	0.0601^{***}	0.0837	0.1327	0.0490^{***}
			(0.0051)			(0.0014)
EF-index relative	1.0240	0.3784	-0.6456^{**}	1.6156	0.2213	-1.3943^{*}
			(0.2160)			(0.5554)
Observations	851	275		6592	1482	
Country variables						
population	6530t	23516t	$16986t^{**}$	7739t	19461	$11722t^{**}$
			(5030000)			(5245188)
average nightlights	3.2455	2.794	-0.4515	3.4058	2.7226	-0.6832
			(0.4348)			(0.4249)
polity5 index	-4.3846	-4.5238	-0.1392	-3.476	-5.231	-1.755
			(1.4356)			(1.412)
colonization index	61.500	65.955	4.455	57.333	68.154	10.821^{**}
			(4.179)			(3.970)
ethnic fractionalization	0.3173	0.5949	0.2776^{**}	0.2611	0.5994	0.3383^{***}
			(0.0840)			(0.0788)
Observations	31	24		26	29	

Notes: * ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$) The table summarizes the characteristics of expired and non-expired administrative regions at both the ADM1 (first tier) and ADM2 (second tier) levels. The upper part of the table provides statistics for population, area, nightlight emissions, and ethnic heterogeneity, distinguishing between regions that expired and those that persisted. The lower part of the table compares country-level characteristics between countries that implemented border reforms and those that did not. Relative measures in the table refer to the share of a region's population or area relative to the country total, or for variables like nightlights and fractionalization indices, the ratio of the region's value to the country average.

Table 2 presents the characteristics of cells classified as treated – those located within a 50 km radius of the birthplace of a national leader in office. The results indicate that treated cells tend to differ significantly from other cells. On average, they are more populous and are covered by a greater number of regions at both the first (ADM1) and second (ADM2) tiers. Treated cells also exhibit higher nightlight intensity, suggesting greater economic activity. Furthermore, these cells have a higher probability of experiencing a border change at both the first and second administrative tiers. These descriptive statistics highlight notable differences between treated and untreated cells, providing initial evidence that proximity to a leader's birthplace may be associated with unique administrative and economic characteristics.

Table 2: Characteristics of cells with and without "leader"-treatment

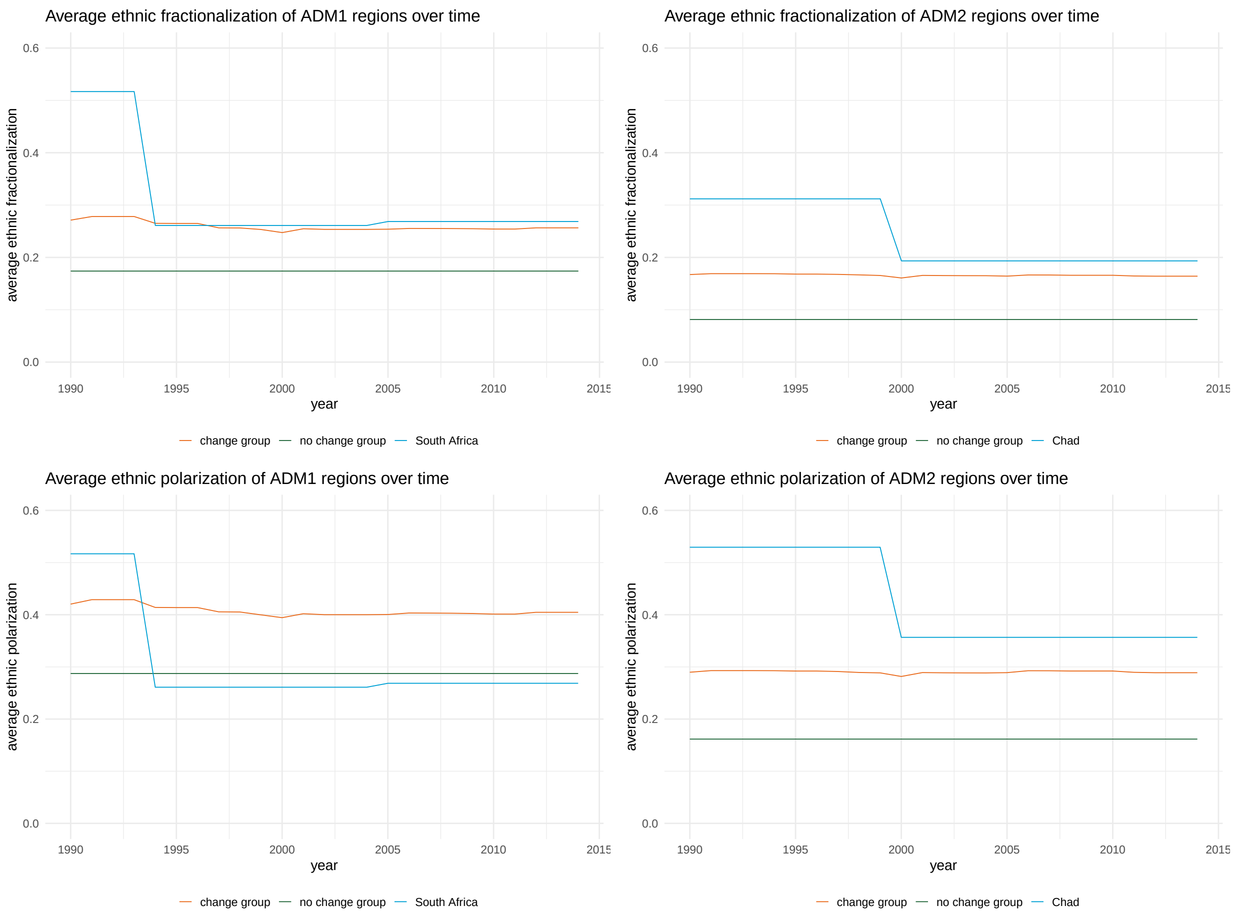
	Leader treatment	No leader treatment	Diff	Std. Error	Obs.
population	228538.5	52898.1	175640.4***	1377.4	10602
1st lvl regions	1.783345	1.434586	0.348845***	0.003903	10602
2nd lvl regions	3.9047	2.06903	1.83567***	0.01022	10602
nightlights	1.023456	0.224499	0.798957***	0.010620	10602
any border change	0.0184252	0.0111709	0.0072543***	0.0006178	10602
any 1st lvl change	0.008506	0.0050869	0.0034191***	0.0004190	10602
any 2nd lvl change	0.0126123	0.0074424	0.0051699***	0.0005069	10602

Notes: * ($p < 0.1$), ** ($p < 0.05$), *** ($p < 0.01$). The table summarizes the characteristics of treated cells, defined as those located within a 50 km radius of the birthplace of a national leader in office.

Next, we examine how border reforms have influenced the ethnic composition of administrative units. To do this, we calculate the ethnic polarization and ethnic fractionalization measures, as defined in Equations (1) and (2), for each year and each administrative unit. For consistency, we use population data from the year 2000 across all years of analysis. This approach allows us to compute the average ethnic heterogeneity for administrative units at both the first (ADM1) and second (ADM2) tiers for each country. By holding the population data constant, we eliminate the impact of differing population growth rates among ethnic groups. This ensures that any observed changes in ethnic heterogeneity are attributed solely to the effects of border reforms rather than demographic shifts.

The results of this analysis are depicted in Figure 4. The two diagrams on the left display the average ethnic polarization and fractionalization for ADM1 regions, while the two diagrams on the right show the same metrics for ADM2 regions. For both tiers of government, we compare the average fractionalization and polarization in countries that reformed their borders with those that did not. For the group of countries that did not reform their borders, there is no change in ethnic heterogeneity over time, as expected, since the population data is held constant. In contrast, for countries that implemented border reforms, we observe that, regardless of the measure or the administrative tier, average ethnic heterogeneity decreased only slightly. This suggests that reducing ethnic heterogeneity was not a primary goal or driver of these reforms. Nevertheless, there are notable outliers, which are additionally included in the graphs. In South Africa, first-tier border reforms reduced ethnic fractionalization by over 20 percentage points. Similarly, in Chad, second-tier border reforms led to a reduction in ethnic fractionalization of over 10 percentage points.

Figure 4: Ethnic fractionalization and polarization over time



Notes: The plots visualize average ethnic fractionalization and polarization for administrative regions, comparing countries that implemented border reforms with those that did not. The two diagrams on the left display these metrics for ADM1 regions, while the two diagrams on the right show them for ADM2 regions. For countries that did not reform their borders, ethnic heterogeneity measures remain constant, as population data is held fixed.

5 Empirical Strategy

To investigate whether proximity to a leader's birthplace increases the probability of a cell experiencing a border change, we employ the following approach. As previously described, our data is structured as a panel with grid cells as the observational units, covering the timeframe from 1990 to 2014.

For each cell-year observation, we define a binary outcome variable indicating whether a border change occurred. We analyze two different definitions of border changes as outlined in Section 2. The narrow definition considers only actual border changes, where a boundary was created or removed within a cell. The wider definition includes not only actual border changes but also cells that were sufficiently covered by a newly created region, resulting from a merger or split, even if no direct boundary change occurred within the cell. We conduct separate regressions for each outcome definition, each tier of administrative structure (ADM1 and ADM2), and for each type of change (splits and mergers).

Treated cells are defined as those falling within a 50 km buffer around the birthplace of a national leader in office, as explained earlier. Since national leaders rarely remain in office for the entire timeframe, the treatment status of many cells changes over time. Figure A.3 in the appendix illustrates how the treatment status evolves for these cells. In such cases, the classic two-way fixed effects (TWFE) estimator is unfortunately not applicable, as it assumes a constant treatment status throughout the panel. Initially, we address this limitation by simplifying the analysis: we treat all cells as if they were continuously treated for the entire timeframe. However, to account for the dynamic treatment status more rigorously, we later employ the method developed by Imai et al. (2023), which allows for treatment switching and provides more accurate estimates under these conditions.

Given the staggered rollout of treatment without treatment reversals, the classic TWFE estimator becomes applicable for an event-study framework. As our baseline model, we estimate the following equation:

$$y_{i,t} = \alpha + \sum_{n=-5}^{5} \beta_{t-n} I_{i,t-n} + \gamma_i + \delta_t + \epsilon_{i,t} \tag{3}$$

where $y_{i,t}$ is a binary outcome variable, equal to one if the cell i experienced some administrative change at time t, and β_{t-n} represents the treatment effect for the year $t-n$ relative to the treatment. $I_{i,t}$ is an indicator variable for whether the treatment occurred in year $t-n$. Furthermore γ_i represents cell fixed effects, δ_t represents year fixed effects, and ϵ_{it} is the error term. We cluster standard errors at the cell level to account for within-cell correlation over time. As is standard in difference-in-differences designs, our identifying assumption is that, in the absence of treatment, treated and control cells would have followed common trends. This assumption allows us to attribute differences in outcomes to the treatment effect rather than pre-existing differences between the groups.

In recent years, many authors (see, for example, Borusyak et al., 2024; Imai and Kim, 2021; Roth and Sant'Anna, 2023; Sun and Abraham, 2021) have highlighted potential biases in the TWFE estimator when applied to staggered treatment rollout designs, in the presence of heterogeneous treatment effects. Since our design likely includes such heterogeneity, we also compute the estimator proposed by Gardner (2022), implemented using the R-Studio package by Butts (2021). His method follows a two-step approach. In the first step, group-and year-specific effects are estimated using the sample of untreated observations. In the second step, the treatment effect is calculated by comparing treated and untreated observations, accounting for the group- and year-specific effects obtained in the first step.

One possible source of treatment effect heterogeneity is the degree of democracy in the country where the cell is located. It is plausible that in more democratic countries, where institutions are stronger and checks and balances are more robust, national leaders face greater constraints, making it harder to directly influence border changes to serve their personal preferences. To test this hypothesis, we divide the full sample based on the Polity5 index into two subsamples: an "autocracy" sample and a "democracy" sample. Countries in the democracy sample have an average Polity5 score above 2, while those in the autocracy sample score below 2. Although the Polity5 index classifies countries with scores above 6 as democracies, our threshold ensures that the two subsamples are of roughly equal size. Consequently, these categories should be interpreted as representing the more democratic and more autocratic halves of the sample, rather than strict classifications of democratic and autocratic regimes. This stratification allows us to examine whether the proximity to a leader's birthplace has a differential impact on the likelihood of a border change, depending on the level of democratic governance in the country.

To ensure the robustness of our results, we run all regressions both with and without control variables. For time-invariant controls, we include the initial number of regions that at least partly cover a cell, the initial population of the cell, and the initial nightlight intensity of the cell. These variables capture baseline characteristics of the cells that could influence the likelihood of a border change. For time-varying controls, we include a dummy variable indicating whether a cell experienced a border or region change within the last four years. This variable accounts for potential temporal dependencies in administrative reforms, as past changes may affect the probability of subsequent reforms.

6 Results

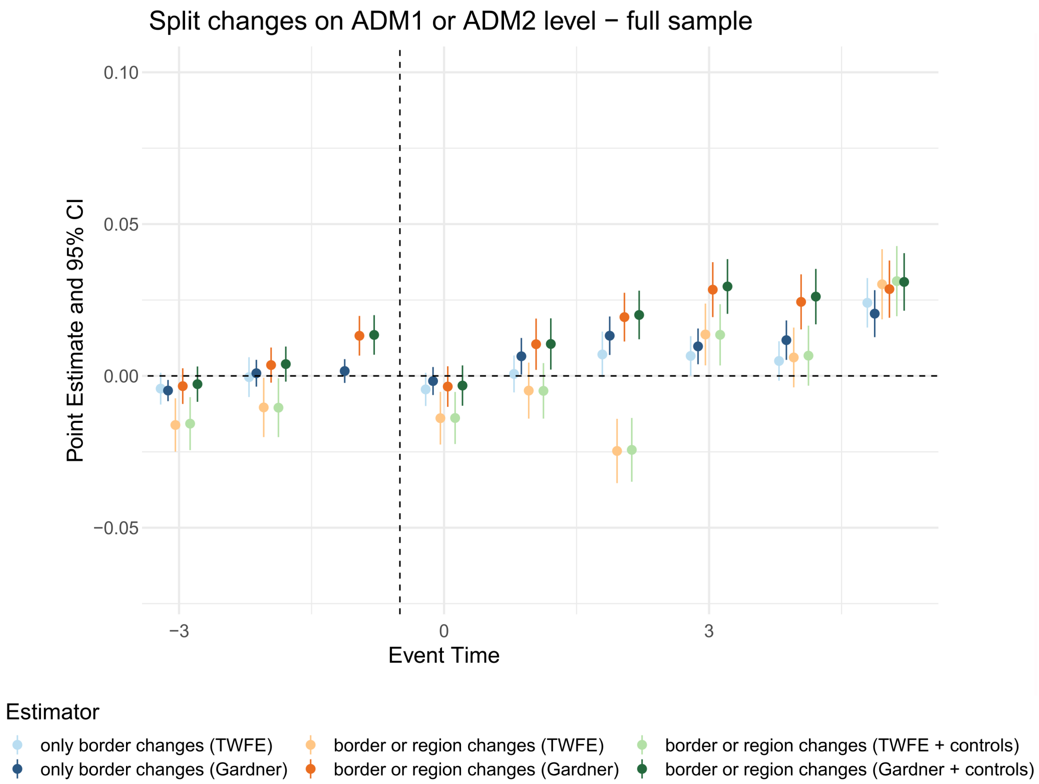
Figure 5 presents the event study results from a series of regressions using our baseline model. The upper panel displays estimates where the outcome variable is a split change at any tier of government, while the lower panel focuses on merger changes at any tier. Each panel includes results for six different regression configurations. First, we consider border changes in the narrow sense, focusing solely on actual border changes. Second, we use the wide definition of border changes, which includes cells sufficiently covered by newly created regions resulting from splits or mergers. Third, we use the wide definition with the inclusion of control variables as a robustness check, as outlined earlier. Each of these configurations is estimated using two methods: the classic TWFE procedure and the procedure proposed Gardner (2022), which accounts for potential biases in staggered treatment designs.

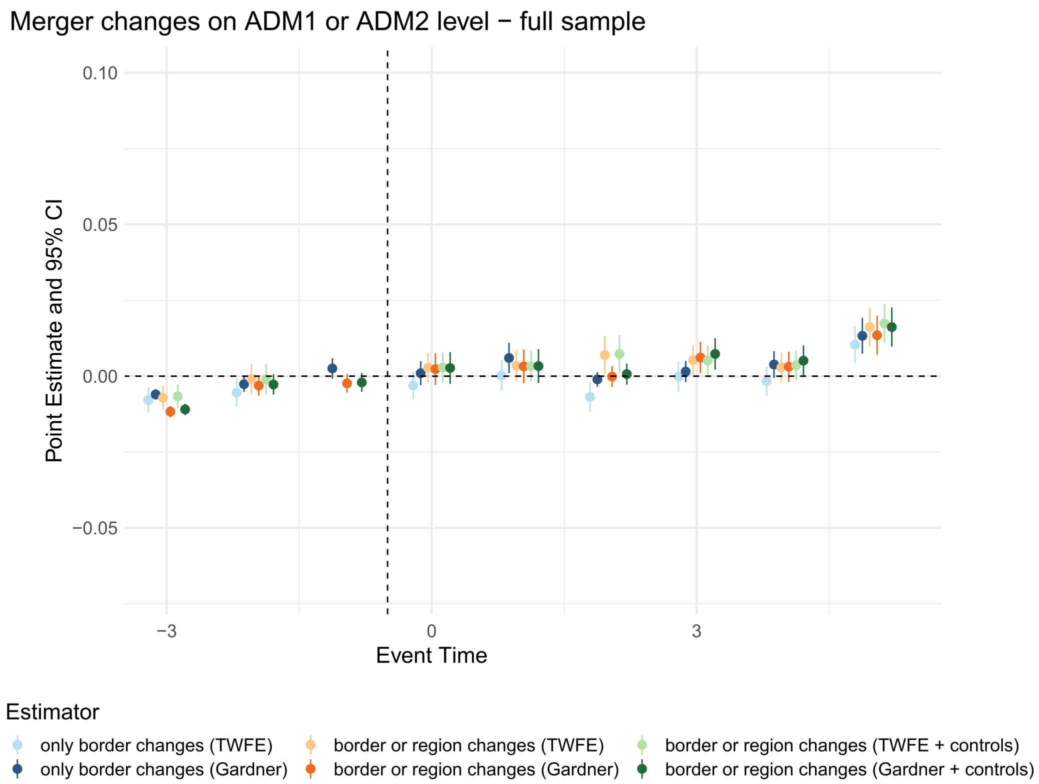
Nearly all model specifications find a significant increase in the probability of a split change occurring between two and five years after treatment, with an estimated increase of approximately three percentage points in each of these years. For merger changes, all models detect a significant increase in probability, but only in the fifth year post-treatment, and the effect size is much smaller compared to split changes. In some cases, there are differences between the TWFE estimator and the Gardner (2022) procedure. Notably, in these instances, the Gardner estimator yields significant results, while the TWFE estimator does not, providing additional support for our findings. These findings suggest that leaders are indeed attempting to influence border changes near their birthplaces. The greater increase in the probability of splits compared to mergers aligns with our hypothesis that leaders may seek to create regions that consist predominantly of their own ethnic or social groups, facilitating more targeted governance and resource allocation.

Figure 6 explores treatment effect heterogeneities by comparing results across democratic and autocratic states. The upper panel presents results for the ”autocracy” subsample, while the lower panel shows results for the ”democracy” subsample. The outcome variable captures any kind of administrative change at any tier of government structure, with six regression configurations included in each panel, consistent with Figure 5. The results suggest notable differences in treatment effects between democratic and autocratic states. In the democracy sample, no significant effects are observed in any year following treatment. In contrast, the autocracy sample reveals pronounced effects: for any kind of change, there is a significant effect in every year post-treatment, with the probability of a change increasing by up to seven percentage points in the fourth and fifth years. Again, the estimates from the classic TWFE procedure are often smaller than those obtained using the Gardner (2022) method, consistent with findings in Figure 5. The results suggest that in more democratic states, where institutions are stronger and checks and balances are more robust, national leaders have less influence over border changes compared to more autocratic states.

As a robustness check, we also employed the procedure proposed by Imai et al. (2023), which accounts for treatment reversal. The estimates were computed using the RStudio implementation provided in Kim et al. (2024). Figure 7 presents the results from both the Gardner (2022) and Imai et al. (2023) procedures. The upper panel displays results for the ”autocracy” subsample, while the lower panel shows results for the ”democracy” subsample. In this analysis, the outcome variable captures either split or merger changes at the ADM1 level, using the wide definition of border changes. The results are largely consistent across both methods. However, the effects estimated using the Imai (2023) procedure are slightly smaller compared to those obtained with the Gardner method. In the democracy sample, we observe nearly no significant effects for either type of change. In contrast, both methods identify strong, significant effects for split changes in autocracies, while the effects for merger changes, though significant, are much smaller in magnitude.

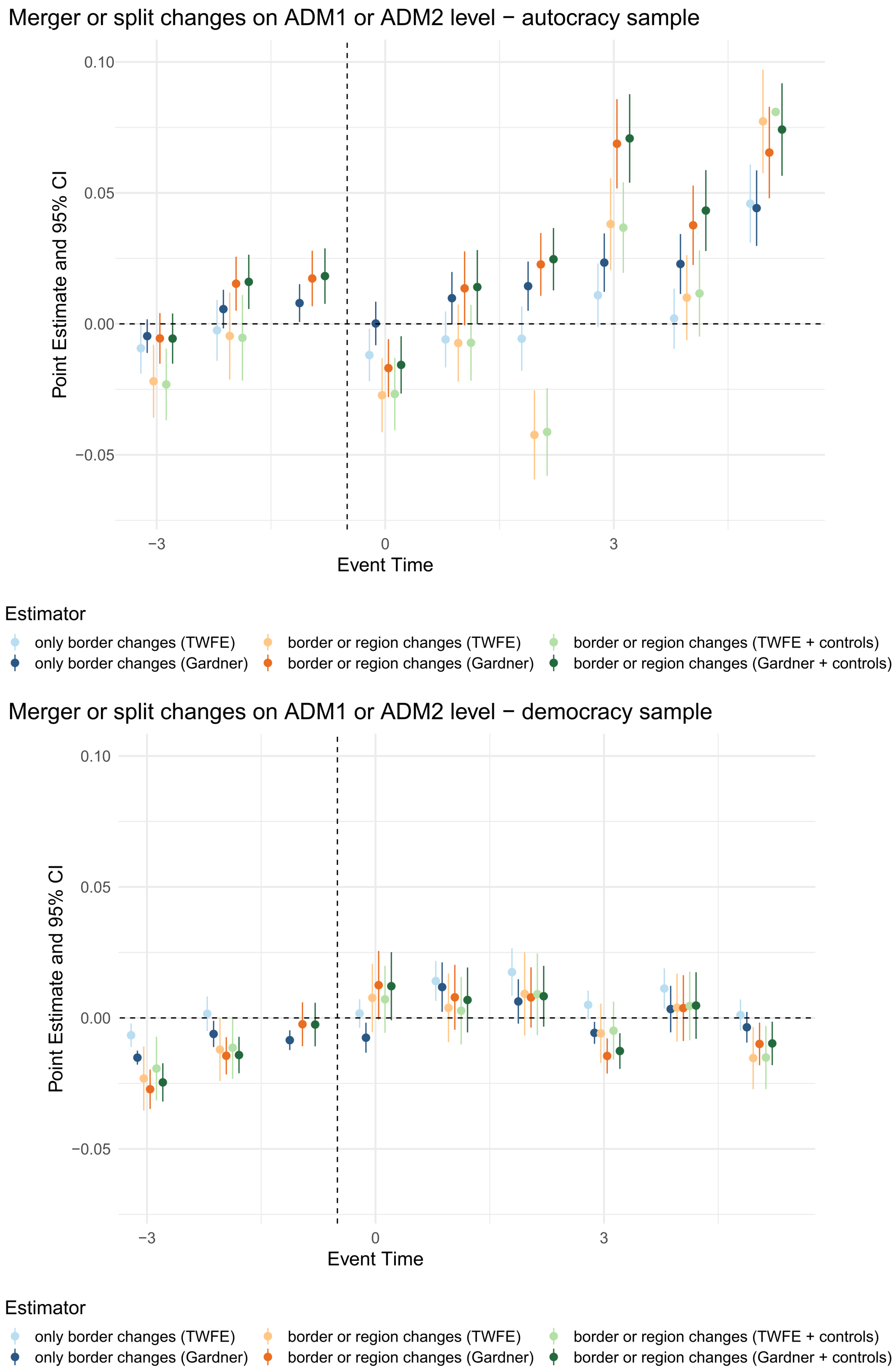
Figure 5: Baseline Results





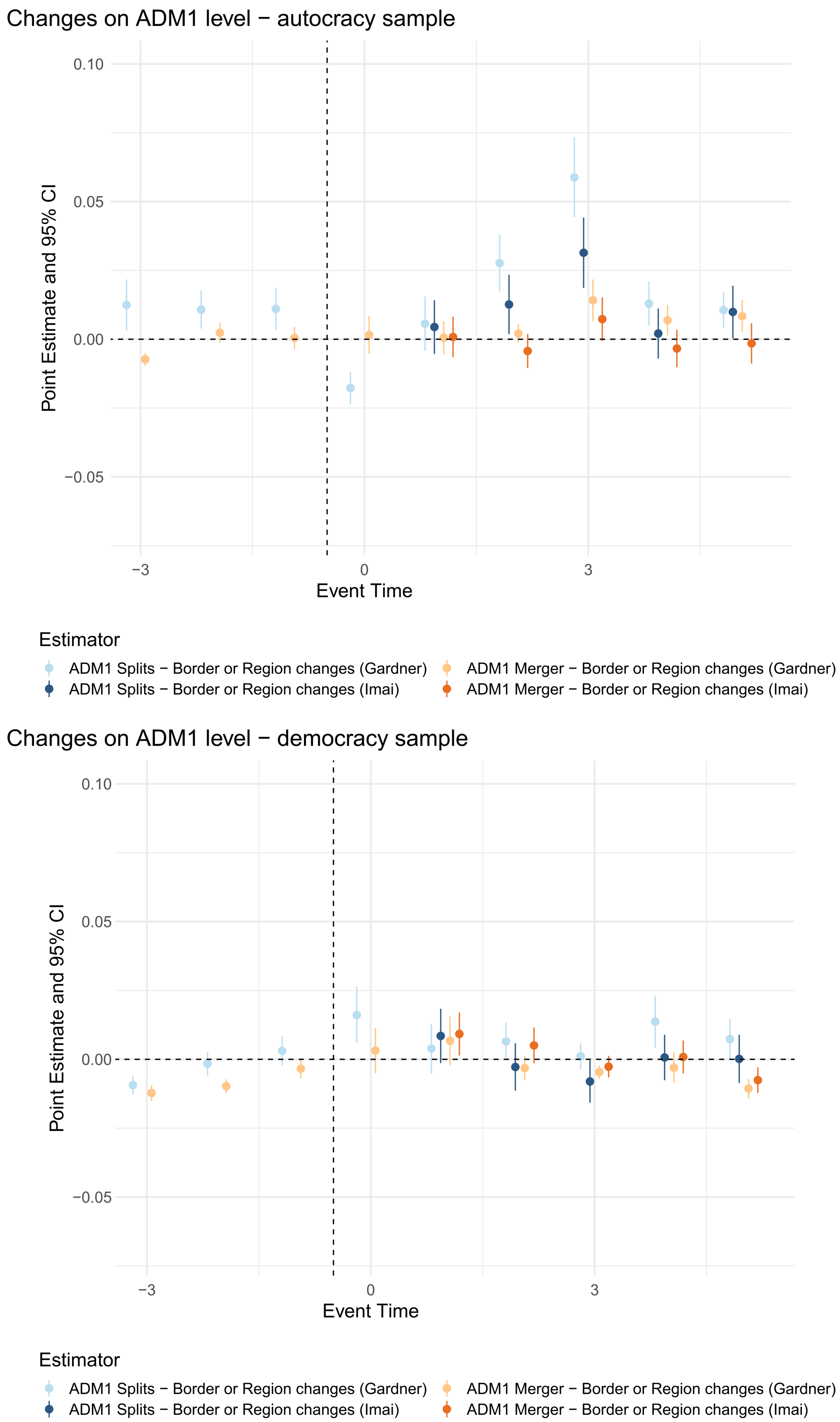
Notes: The figure displays the event study results for the likelihood of a split change (upper panel) and a merger change (lower panel) at any tier of government. Each panel includes results for six regression configurations, based on narrow and wide definitions of border changes, with and without control variables. The configurations are color-coded for clarity, distinguishing between the different estimation methods and model specifications.

Figure 6: Heterogeneity Analysis



Notes: The figure displays the event study results for the likelihood of any type of administrative change at any tier of government. The upper panel presents results for the ”autocracy” subsample, while the lower panel shows results for the ”democracy” subsample. Each panel includes results for six regression configurations, based on narrow and wide definitions of border changes, with and without control variables. The configurations are color-coded for clarity, distinguishing between the different estimation methods and model specifications.

Figure 7: Results for Panel Matching procedure



Notes: The figure presents the event study results for split or merger changes at the ADM1 level, using the wide definition of border changes. The upper panel displays results for the "autocracy" subsample, while the lower panel shows results for the "democracy" subsample. Results are estimated using both the Gardner (2021) procedure and the Imai (2023) procedure, which accounts for treatment reversal. Configurations are color-coded for clarity, distinguishing between the two estimation methods.

7 Extensions

7.1 Favoring the Leader's Birth Region

One possible reason for leaders to influence subnational border reforms is to favor their birth region and promote its economic development. To investigate this, we compare three groups of cells: those that remain part of a leader's birth region after a border change, those that are newly merged into the leader's birth region, and those that are cut off from the leader's birth region as a result of border reforms. Using nightlight intensity as a proxy for economic activity, we assess whether remaining in or being merged into a leader's birth region leads to higher economic development compared to cells that are excluded. Preliminary results indicate that cells linked to a leader's birth region experience a relative increase in nightlight intensity, suggesting targeted investment in areas associated with the leader's origin. **-work in progress-**

7.2 Resource Annexation

Resource annexation represents another possible motivation for subnational border reforms, where leaders aim to merge resource-rich areas into their home regions to secure control over valuable assets. To examine this, we use geocoded data on significant mineral deposits and analyze whether resource-rich cells are disproportionately likely to experience border changes aligning them with a leader's home region. The findings indicate that cells containing valuable resources such as gold or diamonds are more likely to be targeted for administrative changes, suggesting that border reforms are used strategically to consolidate access to and control over economic resources. **-work in progress-**

7.3 The Role of Ethnic Homogeneity

A potential channel driving subnational border reforms could be ethnic targeting, where leaders strategically use these changes to create regions that are more ethnically homogeneous and favor their own ethnic group. To analyze this, we calculate changes in ethnic fractionalization and polarization for regions affected by border reforms, leveraging the methodology outlined in Section 3. The results suggest that cells predominantly inhabited by the leader's ethnic group are more likely to end up in regions with reduced ethnic diversity after reforms. This supports the hypothesis that leaders use border reforms as a tool for strategic ethnic consolidation, aligning administrative boundaries with ethnic lines to strengthen their political base. **-work in progress-**

8 Conclusion

This paper investigates the political drivers of subnational border changes in Africa, focusing on the role of favoritism by national leaders. Using a comprehensive dataset covering the African continent from 1990 to 2014, we demonstrate that proximity to a leader's birthplace significantly increases the likelihood of border changes. This effect is particularly pronounced in autocratic states, where leaders face fewer institutional constraints, while no significant effects are observed in more democratic states.

Our analysis reveals that border changes near a leader's birthplace are primarily associated with the creation of new administrative units through splits rather than mergers. This aligns with the hypothesis that leaders use border reforms to create regions that are predominantly composed of their ethnic or social group, facilitating targeted governance and resource allocation. Further extensions explore potential channels for these reforms. Leaders appear to leverage border changes to reduce ethnic diversity in regions associated with their ethnic group, consolidate resource-rich areas within their home regions, and foster economic development in their birth regions. These findings highlight the multifaceted strategies employed by leaders to use administrative reforms as tools of political favoritism. Overall, our results underscore the importance of political motivations in shaping administrative boundaries, with implications for understanding governance, state-building, and resource distribution in developing contexts.

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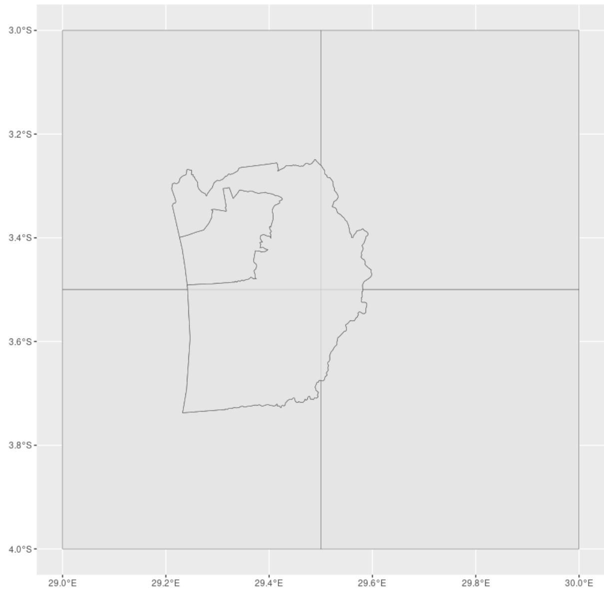
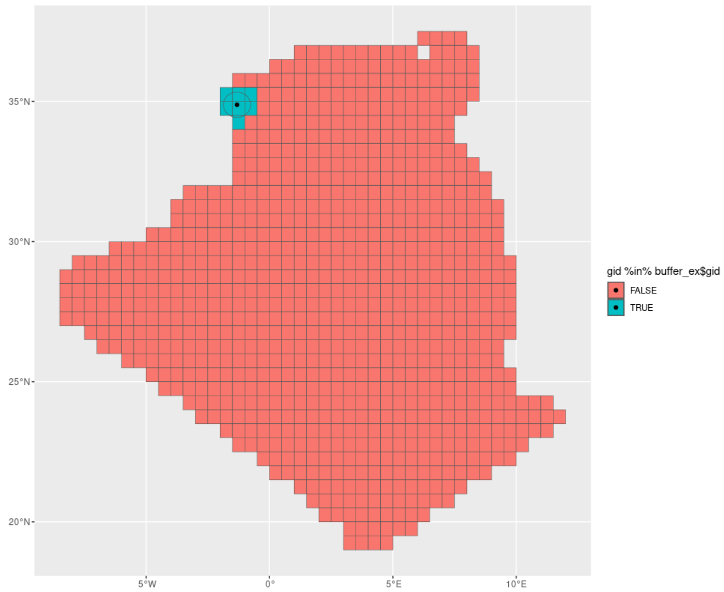
Appendix

Figure A.1: Example of Split Cell Identification Procedure



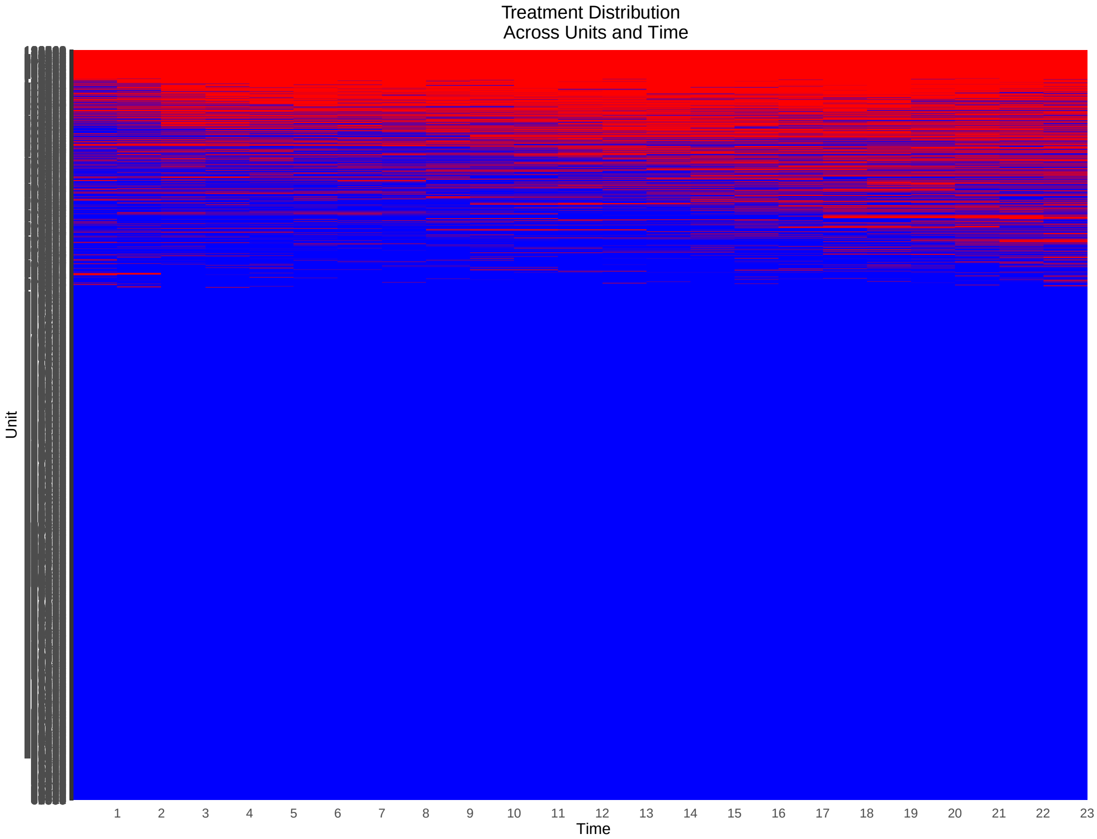
Notes: This figure illustrates the region of Bujumbura in Burundi, which was divided in 1990 into Bujumbura Rural (the outer part) and Bujumbura Mairie (the inner part). The top-left cell is classified as a split cell because a new administrative border was drawn within its area. Similarly, the bottom-left cell is considered a split cell, as more than 10% of its area is covered by Bujumbura Rural, a region created through the division of Bujumbura. In contrast, the top-right and bottom-right cells are not classified as split cells since the coverage by Bujumbura Rural in these cells does not meet the 10% threshold.

Figure A.2: Construction of Leader-Treatment Dummy



Notes: The figure depicts the cell representation of Algeria, highlighting the birthplace of Mourad Medelci, marked by a point indicating the city of Tlemcen. Medelci served as a cabinet member from 2000 to 2013. Cells that are predominantly covered by Algeria and at least partly fall within the 50 km buffer around Tlemcen are classified as treated during this timeframe.

Figure A.3: Treatment Variation Plot



Notes: This plot illustrates the treatment variation for the leader-treatment dummy created using the R-package Kim et al. (2024). The construction of the dummy is explained in Section **??**. The x-axis represents the time dimension spanning 1992 to 2014, while the y-axis represents the different cells of the grid. A red-colored bar indicates that the corresponding cell is treated during this timeframe.