The Long-run Effects of Africa's Wave of Democratization

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Abstract

I investigate the effects of Africa's 1990s wave of democratization on economic performance and long-run development. In the first part of the study, I document, using a dynamic panel fixed effects estimation, a robust positive impact of democratization on income per capita. When an average African country moves from a nondemocratic to a democratic regime its income per person increases by about 1.2 %. Alternatively, if it improves by 10 % on the liberal democracy index, its GDP per capita rises by 1.3 %. In the second part, I investigate the association between democratization and long-run development. To isolate the *causal* impact of democratization on long-run development, I exploit African borders that split *same* people (ethnicity) into present-day consolidated democracies and nondemocracies. In this exercise, I begin by showing grid cell-level panel fixed effects estimates of the impact of democratization on nighttime lights, a proxy of subnational development. I then use a within-ethnicity regression discontinuity specification to compute the development discontinuities across democratic-nondemocratic partitions. I find that democratic and nondemocratic partitions were at similar levels of development during the early years of democratization. However, democratic partitions became increasingly more developed over time, leading to a persistent development divergence. Today an average democratic partition is about 7 percentage points more likely to have light at night relative to its nondemocratic counterpart. I also compile an individual-level data capturing members of split ethnicities and use it to show the differential positive impact of democratization on human development and several contemporary measures of socioeconomic outcomes.

Keywords: Africa, democratization, economic performance, development

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I. Introduction

> Following independence, African political regimes tended to evolve in three stages: consolidation of authoritarian rule by the mid-1970s, crisis management under authoritarian rule to the late 1980s, and an outburst of democratization starting in 1990. (Ndulu and O'Connell, 1999, p. 45)

The so-called third wave of democratization[1] brought the single most transformative political change towards democracy in Africa.[2] This wave of democratization was massive and unprecedented. It upended the personalistic, authoritarian, military and one-party rule that had characterized Africa's political landscape in the post-independence period. Between 1988–1994 African multiparty democracies allowing meaningful national political competition more than quadrupled, moving from 5 to 21. For the first time, opposition political parties won national elections in at least 19 countries when only one country had witnessed such case in the three decades prior (Goldsmith, 2001). The number of African democracies rose from just four in 1988/89 to nineteen in 1995, a development closely accompanied by immense improvements in political rights and civil liberties (see figures 1a and 1b). In effect, by 1994 there was no longer a *de jure* one-party state in Africa (Bratton and Van de Walle, 1997).

In this study, I ask and investigate whether Africa's wave of democratization affected its economic performance and long-run development. This question is important because one of the prime reasons for the region's en bloc democratization was to initiate some structural reforms aimed at propelling the desired economic and development outcomes in the region (Bates, 2006; Collier et al., 2007; Sandbrook, 1996; Van de Walle, 1999). Moreover, tackling Africa's underdevelopment problem is not only a recurring issue in contemporary comparative development, but the region's development tragedy has also been increasingly attributed to the lack of democratic governance(See Ake, 1996; Bates, 2010). In the African case, "it is difficult to escape the association between nondemocratic rule and economic failure."(Lewis, 2008, p. 95). Thus, the persistent question of whether democratization fosters growth and development is especially significant for Africa. Despite its significance, however, no study has yet investigated systematically the democracy-growth and/or democracy-development nexus in the African context. In this study, I attempt to fill this gap.[3]

The democracy-growth or -development relationship has long been a topical debate. Trolling the literature, one easily finds sharply contrasting results on the effect of democratization on economic performance and development. While earlier studies such as (Barro, 1996;

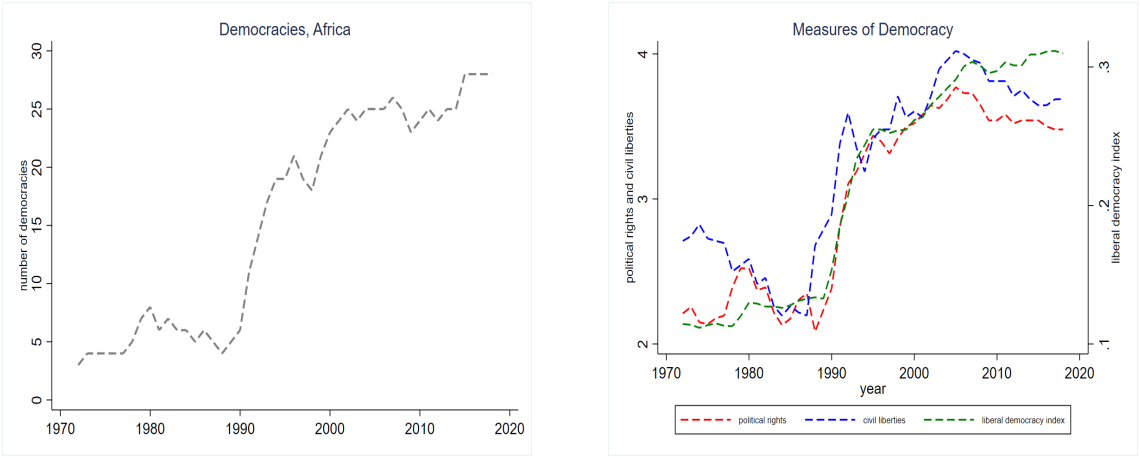
[1] Huntington (1991) categorizes modern world's democratic transitions into three waves. The first, longest wave happened 1828–1926 and the second, shorter wave was between 1943–1962 while the third occurred after 1974.

[2] In this study Africa will refer to all sub-Saharan African countries according to World Bank's classification.

[3] The terms democratization and democracy, and per capita income and growth will be used interchangeably.

Helliwell, 1994; Murtin and Wacziarg, 2014) find a null or negative impact of democratization on economic growth, more recent works (Acemoglu et al., 2019; Madsen et al., 2015; Papaioannou and Siourounis, 2008; Rodrik and Wacziarg, 2005) find a positive impact of democratization on growth.

Differences in empirical results stem from several factors. One source of the differences is a result of modeling democracy as an immediate cause rather than a stock of historical process that can affect long-run growth (Gerring et al., 2005; Persson and Tabellini, 2009). Furthermore, democratization may depend on past level of economic development as argued by (Barro, 1999; Epstein et al., 2006; Lipset, 1959) or may follow episodes of economic crisis (Acemoglu and Robinson, 2001; Brückner and Ciccone, 2011; Haggard and Kaufman, 1995), both of which point to concerns of endogeneity in isolating the impact of democratization on economic performance. In other words, democratizing and non-democratizing countries may be systematically different. Previous studies have been fraught with these empirical concerns.



(a) Democracies in Africa

(b) Liberal Democracy, Political Rights, and Civil Liberties

Figure 1: The figures display Africa's democratization trend from 1972 to 2018. The left panel shows the number of democracies, which is defined as countries having a Polity2 score greater than zero and being classified as free or partly free by Freedom House. The right panel shows yearly performances in liberal democracy index from V-Dem alongside civil liberties and political rights from Freedom House.

Different from related works, the context of my study severely limits these empirical challenges. For example, concern about potential differences with regard to democratic capital is nearly absent in the African case because on the eve of the democratization wave, only three countries – Botswana, Gambia, and Mauritius – had comparatively longer history of democratic traditions. The problem of systematic differences between democratizing and non-democratizing countries is also absent since Africa's democratization wind swayed almost all countries. By the end of 1997, 44 out of the 48 African countries had held some

form of competitive, free and fair national elections (Bratton, 1998).[4] With regards to the potential episode of economic recession prior to democratization, Acemoglu et al. (2019) suggest adding autoregressive components in the regression specification to account for the past dynamics of GDP. In particular, I further tackle the problems of endogeneity by comparing levels of development of two sides of borders dividing a present-day democracy and nondemocracy. I am able to group African countries into consolidated democracy and nondemocracy (or failed democracy) because the region's overwhelming democratization trend of the 1990s was only temporary in many countries (Arriola et al., 2023).

I start the empirical part with a standard dynamic panel fixed effects model that accounts for GDP persistence and income convergence dynamics. Then I move to the border areas where I confine the analysis to democratic and nondemocratic partitions. Next, I focus on the Ghana-Togo border as a case to provide further fine-tune evidence on the impact of democratization. Lastly, I conduct a falsification analysis around a pseudo border.

In the dynamic panel fixed effects analysis I attempt to understand the impact of Africa's wave of democratization on income per capita at the national level. I use both dichotomous and continuous measures of democracy. For the dichotomous measure, country c is coded as a democracy at time t if it satisfies two conditions. First, its Polity2 score from Polity5 is strictly greater than zero. Second, Freedom House should have classified it as either free or partly free.[5] This dichotomous index estimates the average impact of a country moving from a nondemocracy to a democracy, either temporarily or permanently. I use the liberal democracy (libdem) index from V-Dem as my continuous measure of democracy. Libdem is on a 0–1 scale (low to high) and captures broad attributes of democracy beyond sheer elections.

Both measures of democracy, I find, have significant and positive impacts on income. On average, transitioning from a nondemocratic regime to a democracy increases income per person by about 1.2 %, which translates to an increase of $24.17 per person in my sample period (1990–2018). When I use the continuous measure, I find that a 10 % increase in the libdem index leads to a 1.3 % increase in GDP per capita. This implies that a full range increase in the libdem index (i.e. from 0 to 1) is associated with a 13 % increase in GDP per capita, equivalent to a $270 increase of average income per person. Although panel fixed effects estimates are not necessarily causal due to time-varying omitted variables, these estimates are robust to the inclusion of standard controls in the literature. The estimates also remain robust conditional on region-specific time trends.

I discuss and provide empirical evidence on the mechanisms of causation. I show that

[4]The holdouts were D.R. Congo, Eswatini, Nigeria, and Somalia. Nigeria did hold presidential elections in June 1993, but the then military junta quashed the results and no winner was declared.
[5]This classification is borrowed from (Acemoglu et al., 2019)

Africa's democratization has had significant impact on several determinants of income such as physical capital, human capital, economic liberalization, trade, and foreign capital inflows. I also provide suggestive evidence that the impact of democratization on income is not confounded by the effects of the market-economy focused structural adjustment programs that were rolled out in the region in about the same time.

In the remainder of the study I use the above-described dichotomous and continuous measures of democracy to classify countries into consolidated democracies and nondemocracies. I then identify ethnic groups that live astride the borders dividing these contrasting regime types. Given that ethnic groups are similar in all respects save regime type, long-run development disparities across the democratic-nondemocratic sides of a given ethnic group effectively become a function of regime type. If democratization does affect income, as I have shown at the national level, then democratic partitions should also be relatively more developed today. This identification strategy rests on two main assumptions. First, the two partitions of a given ethnicity should only differ with respect to the regime type they are subject to. Second, ethnic geography should not have systematically influenced state border formations in a manner that affects contemporary development correlates. Both of these conditions are shown to hold.

For the analysis at the border areas, I construct square grid cells of size 10 km x 10 km and extract their nighttime lights which I use as proxy for subnational development. In the first instance, I assign grid cells with their respective countries' yearly libdem scores and democracy-nondemocracy statuses. I then run panel fixed effects estimation to examine the impact of democratization on subnational development. I find a robust positive impact of democratization on subnational development. A one-point increase in the libdem index is associated with a 14 percentage points (pp) increase in the probability of a grid cell having light at night. Likewise, a country moving from a nondemocracy to a democracy increases the chances of a grid cell having light by 5 pp.

Next, I compute border discontinuities across democratic-nondemocratic partitions. In this exercise, I use a within-ethnicity Regression Discontinuity (RD) design and estimate the disparities in subnational development across democratic-nondemocratic partitions over time. The within-ethnicity specification allows me to neutralize the confounding effects of ethnic-related factors so that I estimate the difference in development outcomes between two ethnic partitions (or members) as a function of regime type. This exercise is conceptually equivalent to comparing the outcome of individual i^T when treated (democracy) to the outcome of the same individual when not treated i^C (nondemocracy). Similar to the traditional RD, in this scenario the borderline is the "threshold" separating the treated from the control, and the main assumption is that the probability of receiving the treatment discontinuously jumps at the borderline (Keele and Titiunik, 2015). I report estimates from different band-

widths but my preferred estimates are those from 50 km radius around the borders since such estimates are less likely to be confounded by hard-to-account-for factors.

The results from the RD analysis can be summarized as follows. I find small-to-zero differences in levels of development between democratic and nondemocratic ethnic partitions during the early years of democratization. Limited by data unavailability in the pre-democratization era, I find that as at 1993 a grid cell in a democratic partition was no more likely to have light at night than its counterpart in a nondemocratic partition. However, beyond this point in time nighttime lights in democratic partitions differentially increased, leading to significant development divergence across democratic-nondemocratic partitions. In 2013, an average democratic partition was about 7 pp more likely to have light at night compared to an average nondemocratic partition. Given that the sample area is subnational, this represents substantial divergence. Precisely, it is equivalent to about 37 % increase above an average grid cell's probability of having light at night. These results are robust to several sensitivity checks including altering the dependent variable, adding a rich set of local controls, conditioning on historical development and population distribution, using a two-dimensional RD, adopting optimal mean square error bandwidth estimators, assigning separate slopes to each ethnic partition, and using different democracy-nondemocracy classification.

Aside the aggregate level, I also look at micro-level disparities across democratic-nondemocratic partitions. I compile individual-level data on members belonging to partitioned ethnicities and use it to compute contemporary socioeconomic disparities. I find that members of split groups residing on the democratic sides of borders exhibit significantly better socioeconomic conditions. Residing on the democratic side, for example, reduces one's economic insecurity – an index measuring the frequency with which people face shortages of the most pressing needs – by about 0.24 points on a 0–1 scale. It also improves one's self-reported wellbeing by about 7.5 pp. My data shows that these disparities likely stem from the fact that residents at the democratic side are more educated and more likely to be waged employed. Similar patterns emerge when I compare access to public goods. Democratic sides have more improved access to public goods, particularly paved road, electricity and sewage system. I show suggestive evidence that these individual-level disparities are not systematically confounded by selective migration of members of split ethnicities.

In my case-study analysis focusing on the Ghana-Togo border, I provide evidence of the impact of democratization on human development. While Ghana remains Africa's most improved democracy, Togo is a typical nondemocracy which has been under one-family rule since the late 1960s. This border thus subjects about 15 different groups into two sets of regimes and therefore serves as the most ideal democracy-nondemocracy scenario for a case study.

Across the Ghana-Togo border I compare levels of human capital by birth cohorts before and after Ghana's democratic transition in 1992. The idea is that if democratization matters for human development, cohorts born after democratization should have higher levels of human capital. My results suggest that democratization does matter for human capital accumulation. I find a significant, differential increase in human capital on the Ghana side of the border after democratization. Compared with their cohort members on the Togo side, cohorts on the Ghana side of the border would have about one extra year of schooling after democratization. They are also about 6 pp more likely to have some form of formal education. I do not find such disparities across the border for cohorts born in the pre-democratization era.

In the falsification analysis, I place the Ghana-Togo border at an old colonial border that no longer splits any ethnic groups. Given the absence of regime differences today, I expect not to find any systematic and/or significant development disparities across the pseudo border. The results confirm this hypothesis, thereby reinforcing the importance of post-independence regime type differences in comparative development.

This study offers two broad contributions to the literature. Firstly, it is the first study that offers a systematic investigation of the economic and development effects of Africa's wave of democratization. It shows that Africa's wave of democratization is associated with higher income and better development outcomes. Thus it adds to previous works investigating the impact of democracy on growth in Africa (Feng, 1996; Fosu, 2008; Lewis, 2008; Tiruneh, 2006; Van de Walle, 1999). However, my work improves on the measurement of democracy and empirical methodology. My study is also the first to look at the impact of democracy on subnational development in Africa.

Secondly, it contributes to the large body of literature investigating the impact of democratization on economic performance and development. While previous studies are plagued with various forms of endogeneity, focusing on the African context affords avenues to bypass these challenges. Notwithstanding their within-country dissimilarities, African states share several commonalities and similarities as regards history, ethnic, cultural and linguistic patterns and problems (Berg-Schlosser, 1984; Ravenhill, 1980). This scenario limits the severity of confounders in estimating the impact of democratization on growth. In addition, exploiting African border designs as natural experiment to compute subnational development across democratic-nondemocratic partitions helps to further neutralize the confounding roles of both observed and unobserved factors. To my knowledge, this is the first time such a method has been used in the related literature. I am also not aware of any previous study documenting the impact of democratization on subnational development.

The remainder of the study is organized as follows. In the next section I discuss the related literature and in section III. I investigate the impact of democratization on income at

the cross-country level. In section IV., I confine the analysis to the border areas where I identify groups astride borders diving a consolidated democracy and a nondemocracy, and then describe the methodology and data used. I report the empirical estimates from the border regions in V. and conclude the study in section VI.. I conduct a case-study analysis in appendix section B.

II. Related Literature

This study is related to several strands of literature. First of all, it concerns the impact of democracy on economic performance in Africa. While related studies do find a positive association between democracy and income in Africa, they are riddled with empirical lapses. While some of them offer only descriptive analysis like those of (Lewis, 2008; Van de Walle, 1999), others use aggregate data that discards useful growth information (Feng, 1996; Fosu, 2008; Tiruneh, 2006). Those using annual panel data such as (Bates et al., 2012; Carbone et al., 2016; Knutsen, 2013) fail to account for both country and time-specific effects. There are a few exceptions, however. One is Nkurunziza and Bates (2003) who use system GMM to estimate the impact of political variables – regime type, stability, violence – on economic growth in Africa, finding a significant and positive effect of democracy on growth. However, their study is only built on Hoeffler's (2002) refutation of the significance of the "African dummy" in flawed growth regressions. Their data are also quinquennial and the sample period is 1960–1990, the pre-democratization era.

Another is De Kadt and Wittels (2019) who employ a synthetic control method and investigate the economic impacts of Africa's wave of democratization and find both positive and negative results in individual-country cases. Masaki and van de Walle (2015) also use "democracy level" and "democracy duration" to show that the economic impacts of democracy in Africa are more pronounced for countries with longer democratic history. Despite their relevance, none of these studies account for the potential bias from the drop in GDP prior to democratization. Also, my employed model directly provides the comparative economic impact of being in a democracy against being in a nondemocracy. This modeling best suits the African context given the regular fluctuations in countries' democratic statuses over time.

Some related studies look at the impact of these political reforms on other outcomes. Using a principal-agent and game theory models complemented with empirical exercise, Bates (2006) investigates whether the political reforms of the 1990s affected policy reform. He concludes that while the democratic reforms might have helped curtail the opportunistic use of political power, it increased the likelihood of political chaos and failed to produce sound macroeconomic policies. Kudamatsu (2012) use household-level data to examine the impact of the democratization wave on infant mortality and finds substantial reduction in

infant mortality after democratization. Similarly, Fetzer et al. (2016) study the impact of the democratization on patterns of urbanization and find that the democratic reforms propelled catch-up growth of non-capital cities and made urbanization more uniform.

My study is also related to previous studies that examine the impact of democracy on micro-level outcomes. Using individual-level data I show that democratization is associated with improved human development in the form of increased years of schooling and access to formal education. This finding is corroborated by two related works. The first is Harding and Stasavage (2014) who demonstrate that educational attainment is higher in African democracies because they are more likely to abolish school fees. The second study is due (Stasavage, 2005) who show that democratization caused increased education spending in Africa. Along same line, my study also documents a positive impact of exposure to long democratic traditions on subjective wellbeing, economic insecurity and access to public goods. Dorn et al. (2007) argue that higher self-reported wellbeing in democratic traditions is a result of citizens' direct participation in the political process, perceived fairness of procedural framework and political outcomes that are closely aligned with citizens' preferences. Higher public goods provision in democracies is also explained by the power of such goods to influence the support of a larger fraction of the population (Deacon, 2009).

This study is also related to the body of work examining the political economy of African borders. Africa's contemporary state borders were hurriedly demarcated in the late 19th century by European colonizers. With minimal regard to ethnic geography, this process resulted in splitting same people into two or more countries, a historical accident that has persisted till date (Asiwaju, 1985). A number of studies have investigated the long-run effects of this historical exercise. Michalopoulos and Papaioannou (2016), for example, show that ethnic partitioning has caused high prevalence of conflicts and economic deprivation and inequality in partitioned ethnic homelands. It has also increased political instability and secessionist attempts (Englebert et al., 2002). More closely related studies exploit the designs of the borders to study various outcomes. Michalopoulos and Papaioannou (2014) leverage on them to study the impact of national institutions on subnational development whereas (Dimico, 2017) use them to study the effect of ethnic size on development. My study is the first to exploit these border designs to study the effect of democratization on development.

Another related strand of literature is the debate on state penetration in Africa. It is generally believed that African countries have limited state reach because governments fail to broadcast power beyond the capital cities (see Forrest, 1988; Herbst, 2000). One implication of this argument is that development in the hinterlands is less likely to be affected by national institutions and/or regime type. Indeed Michalopoulos and Papaioannou (2014) find that, except where there is a border capital, national institutions have no measurable

effects on development in Africa's border regions. My findings, however, suggest that state penetration is likely stronger in Africa's democracies. I find consistent, robust estimates that democratic partitions are more developed today, a finding not undergirded by the presence of capital cities.

Lastly, my study relates to the current state of democracy in Africa. Many observers worry about the recent resurgence of military coups and democratic retreat in the region. Powell and Thyne's (2011) military coups data show 14 coup attempts (nine successful) in Africa between 2020–2023. Despite the military resurgence, however, popular support and desire for democracy in Africa has been sturdy (Gyimah-Boadi, 2015; Mattes, 2019). Afrobarometer's round 8 survey (conducted 2020/2021) shows that about seven out of ten Africans prefer democracy to alternative forms of government. The main pattern of the current military interventions reveals that coups are (re)occurring in Africa's failed democracies. My findings suggest that better development outcomes in Africa's consolidated democracies have acted to thwart military coups.

III. Democratization and Economic Performance in Africa

My sample covers all contemporary sub-Saharan African (SSA) countries from 1990 to 2018.[6] I choose the 1990–2018 period as I intend to capture the effect of the post-1990 democratization trend. Moreover, the Polity5 dataset currently stops at 2018. All economic data come from the World Development Indicators (WDI).

III.I Empirical Framework

I estimate the impact of democratization on GDP per capita (in 2015 dollars) using the following dynamic panel fixed effects model:

$$y_{ct} = \sum_{j=1}^{q} \beta_j y_{ct-j} + \alpha Democ_{ct} + \gamma_t + \delta_c + \varepsilon_{ct} \tag{1}$$

With c and t denoting country and year, y_{ct} is the natural logarithm of GDP per capita. The first term on the right represents the lags of log GDP per capita. By adding lags of the dependent variable on the right-hand side the specification models the relationship between democratization and economic performance accounting for GDP persistence and income convergence dynamics. Adding the lags of GDP per capita also accounts for the potential dip in GDP prior to democratization which helps avert biased estimates (Acemoglu et al., 2019). The trough in income prior to Africa's democratization can be observed in figure 2. GDP per capita dipped just before the 1990s and picked up after the mid-1990s. Since my sample starts from 1990 I include up to five lags ($q = 5$) to capture the GDP trough in the first half of the 1990s.

$Democ_{ct}$ is country c's democracy status. Related studies choose either a categorical or a continuous measure of democracy. While categorizing countries into democracy or non-democracy reduces the possibility of measuring outcomes as democracy, categorical indexes are heavily weighed by procedural aspects of a regime such as how the chief executive office is filled. While continuous measures correct this problem they are broad in scope and clouded by outcomes, making their use in empirical analysis unappealing.

To be objective, I use both measures of democratization as they each have their benefits and shortcomings. The continuous measure I use is the Liberal Democracy (libdem) Index from V-Dem. Libdem is a 0–1 continuous index (from low to high) encompassing several attributes of democracy. The index is computed as: $v2x\_libdem = .25 * v2x\_polyarchy^{1.585} + .25 * v2x\_liberal + .5 * v2x\_polyarchy^{1.585} * v2x\_liberal$, where *polyarchy* represents electoral democracy and *liberal* emphasizes the liberal principle of democracy. While electoral democracy embodies electoral competition, fair elections, free

[6] Only South Sudan is excluded from this sample as it only became independent in 2011.

civil and political organizations and independent media, the liberal aspect of this index assesses the limits put on the government and the extent to which the rights of individuals and minority groups are protected against the tyranny of the state and that of majority groups. The liberal dimension also incorporates the rule of law and individual liberty, and the judicial and legislative constraints on the executive (Coppedge et al., 2016). The correlation between these two components is very high at 0.87 in my sample. Because of this I do not provide their disaggregated impacts on income and growth.

The average libdem in my sample period is pretty low (.27). However, as figure 3 depicts, there exist significant disparities, with Cabo Verde scoring the highest (.68) while Eritrea scores the lowest (.17). Only nine countries – Cape Verde, Mauritius, Botswana, South Africa, Namibia, Ghana, Sao Tome and Principe, Benin, and Senegal – have average scores above .50 between 1990 and 2018. Despite the low average, the libdem index turns out to have a strong positive association with income as shown in figure 4. Countries with a higher libdem score tend to have higher GDP per capita. This observation would be useful in later analysis where I categorize countries into consolidated democracies and nondemocracies.

For the categorical (dichotomous) measure I follow (Acemoglu et al., 2019). A country is coded as a *democracy* in year t if, first, its Polity2 score is strictly above *zero* and, second, if it is identified as either *free* or *partly free* by Freedom House. The Polity2 index characterizes regimes on a -10 – +10 scale where -10 and +10 represent full autocracy and +10 full democracy respectively. The zero score generally serves as the threshold in characterizing a regime as democratic or otherwise.

Freedom House classifies a country in one of three ways, *not free*, *partly free* or *free*. In my sample period, an average African country would be counted 11 times as being "not free". While 11 of them would be counted as free or partly free, seven of them are consistently identified as "not free" for the entire period under review. These seven are Sudan, Somalia, Equatorial Guinea, Rwanda, Chad, Democratic Republic of the Congo, and Cameroon.

Figure 5 shows countries' democratic scores from 1990 to 2018 based on this classification. Again, the figure depicts large disparities among countries. Exactly 13 countries cannot be identified as democracies in my sample period whereas four are consistently coded as a democracy each year from 1990 to 2018. The remaining 31 countries have had varying democracy-nondemocracy statuses between 1990 and 2018.

When using the dichotomous measure, $Democ_{ct}$ takes a value one if country c is a democracy in year t as described above and zero otherwise. This categorizing is particularly suitable in the African context since some democratic takeoffs were only temporary. The estimates would therefore show the comparative economic effect of a country being in a democracy as against being in a nondemocracy across time. Thus, the variation and hence the estimates

will come from the 31 countries with time-varying democracy-nondemocracy statuses.

γ_t is year fixed effects which account for global and/or year-specific shocks. δ_i is country fixed effects accounting for country-specific, time invariant factors such as history, geography, culture, language and institutions. I also estimate the results accounting for regional trends by adding region-by-year fixed effects.

A concern about equation 1 is that the autoregressive component causes inconsistent estimates of α. However, as the bias is of the form $1/T$, it significantly reduces as T gets larger (Kiviet, 1995; Nickell, 1981). Monte Carlo simulations show that when $T = 30$ fixed effects regression with lag dependent variable becomes superior to or performs as well as its alternatives since the bias reduces considerably (Judson and Owen, 1999). In my sample $T = 29$, implying that the autoregressive components should not materially bias my estimates.

III.II Estimates

Table 1 reports the impacts of democratization on income. Columns (1)–(3) use continuous measure of democratization while the remaining columns use the dichotomous indicator. Columns (1) and (4) include only five lags of the dependent variable whereas columns (2) and (5) add controls for openness (import plus exports), government consumption, household consumption, and gross fixed capital formation. All enter the model as natural logs of their percentages of GDP. While these are standard controls in the literature, they have huge number of missing observations. For this reason, my preferred estimates are those in columns (1) and (4).

The results show statistically positive impacts of democratization on GDP per capita. The estimate in column (1) suggests that a 10 % increase in the liberal democracy index causes a 1.3 % increase in income per person. This result means that a 100 % increase in the libdem index, which represents a full-range increase from 0 to 1, corresponds to a 13 % increase in income. The dichotomous indicator has a similar impact: its estimate (column 4) suggests that transitioning into a democracy increases income per person by 1.2 percent.

Adding the controls in columns (2) and (5) do not change the main results. The coefficient estimate of democratic transition has increased substantially, however. In columns (3) and (6) I add region x year interactions to account for region-specific shocks and time trends.[7] This does not change the results.

How large are these impacts? Given the outcome mean as \$2014.27, transitioning from a nondemocracy to a democracy increases average income by \$24.2 per person. On the other

[7]The regions are Central, Eastern, Southern and Western Africa. I use the categorizations from the African Union (AU). The only exception is Mauritania which I add as part of Western Africa although the AU classifies it as North Africa.

hand, a full-range increase in the libdem index raises average income per person by about $270. Thus, improvements in liberal democracy and episodes of democratic regime lead to substantial gains in income in Africa.

III.III Discussion

The findings suggest that Africa's wave of democratization has had a positive and significant impact on income. But how did this wave of democratization affect income? Moreover, the democratic shock in Africa was preceded by (in some cases coincided with) the era of structural adjustments that mandated the receding of government's active role in the economy. In other words, the impact of democratization on income is likely picking up the effects of these structural adjustment programs (SAPs). I address these concerns in this section.

Arguments that democratization is conducive for growth advance that democracy disciplines political office holders by providing accountability mechanisms such as competitive elections which help reduce rent seeking and provide incentives for governments to execute sound policies. In addition, in democracies "good performance" is rewarded electorally by the population, which ensures the expansive and efficient delivery of public goods and services (Adam et al., 2011). Investments in public goods also in turn increase the stock of physical and human capital.

It has also been shown that democratization facilitates economic liberalization (see Rode and Gwartney, 2012) which also causes growth (Aixalá and Fabro, 2009; Billmeier and Nannicini, 2013; Doucouliagos and Ulubasoglu, 2006). Further, democracies reduce political instability in the sense of sudden, unconstitutional and violent government changes that deter foreign capital inflows. This point is particularly related to the African context where post-1990 military coups and violent removal of governments tend to be frequent in nondemocracies.

I test some of these arguments. Specifically, I test the relationship between my measures of democratization and several propellers of income including openness, physical capital, human capital, foreign capital inflows, and economic liberalization. Physical capital is proxied by gross fixed capital formation, and foreign capital inflows refer to net foreign direct investments (net FDI). Primary school enrolment is used as proxy for human capital.

I use the Economic Freedom of the World (EFW) index from the Fraser Institute as proxy for economic liberalization. The EFW index assesses the degree to which policies and institutions of a country conform to the free-market principles. Its summary index is constructed based off 45 data points, but its broad five categories are size of government, legal system and property rights, sound money, freedom of international trade, and regulation (Gwartney et al., 2023). Each of this category is measured on a 0–10 scale with higher values

denoting increasing economic freedom. I use the simple mean of all the five categories in my analysis. The index is published annually starting from 2000; data for prior years are available at five-year intervals.[8] My analysis for this index will therefore cover 2000–2018 period.

The effects of democratization on the determinants of income are reported in table 2. Openness, physical capital and capital inflows are expressed as logs of percent GDP. Human capital is the log of the ratio of total enrolment to the population of the corresponding age group for that particular level of education. I add log GDP as control for the size of the economy or market.

The results generally indicate that democratization has a positive effect on all the determinants of income under review. There are mixed results, however. Whereas the liberal democracy index has a positive impact on all the determinants except human capital, democratic transition does not have a statistically significant effect on capital inflows and economic liberalization. The finding that liberal democracy enhances economic liberalization is expected since the EFW index also encapsulates aspects of liberal democracy such as the rule of law and impartial judiciary.

Turning to the second concern, the SAPs of the 1980s primarily stressed economic liberalization (Herbst, 1990; Rodrik, 1990) and therefore their impact would necessarily pertains the question of whether economic liberalization affects growth in Africa. In other words, the main effects of SAPs on growth should be largely captured by adding a comprehensive measure of economic liberalization to the specification. I add the EFW to my main democracy-growth specification. The EFW index, to my knowledge, is the most comprehensive extant measure of economic liberalization. Due to the EFW's shorter time coverage, here I run an AR(1) regression, although the results are not dependent on this alteration.

The results are shown in Panel B of table 1. Economic liberalization tends to increase per capita income. A point increase in the EFW index leads to about 1.8-2 percent increase in GDP per capita. Despite this substantial effect, however, democratization still has a statistically and economically significant impact on income.

Even though the EFW has limited coverage, one must note that part of the effects of the SAPs should be reflected in openness which I have consistently added as a control. Thus, the impact of democratization on income is less likely to be confounded by the SAPs.

[8]There is no data for Equatorial Guinea, Eritrea, and Sao Tome and Principe

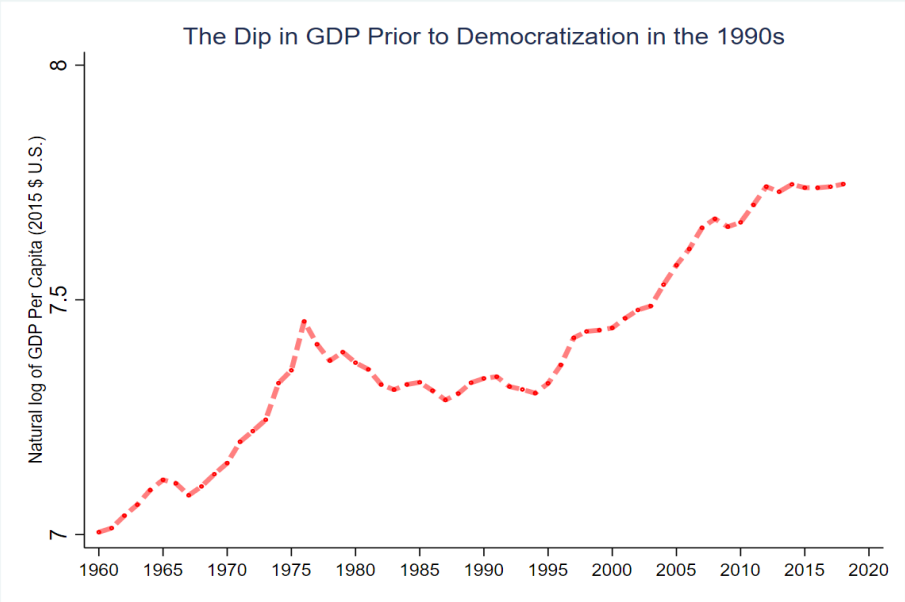


Figure 2: The figure shows the dip in GDP per capita prior to Africa's democratization in the early 1990s. Natural log of GDP per capita is in 2015 dollars. Data is from the World Development Indicators.

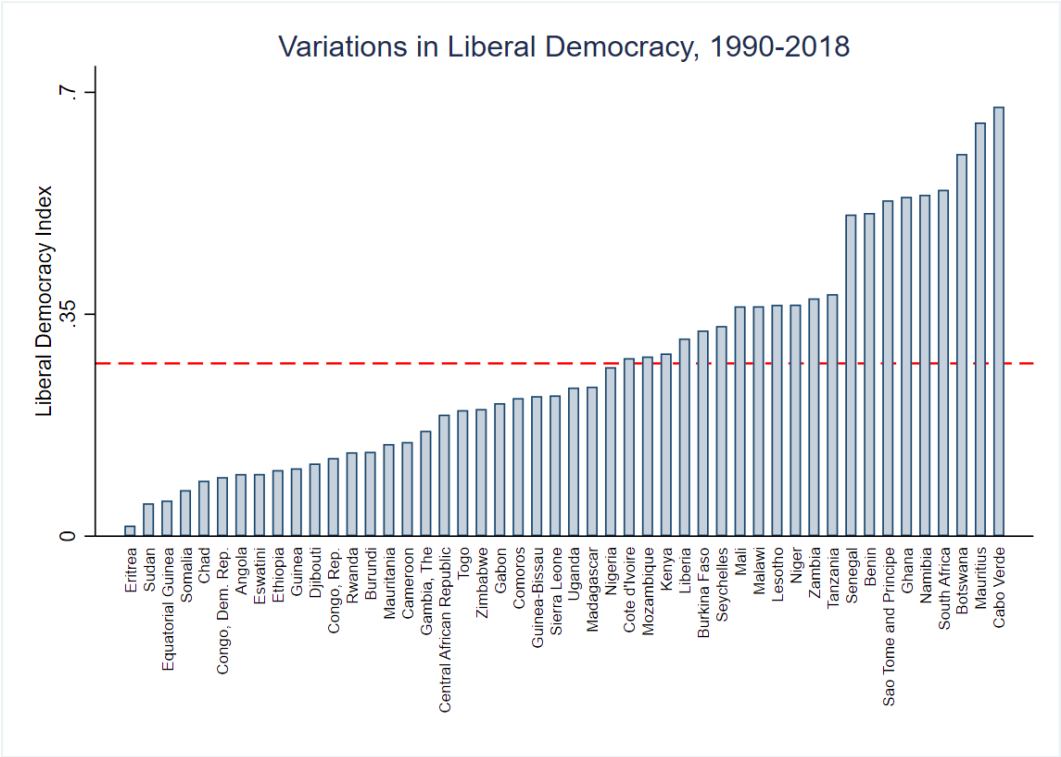


Figure 3: The figure shows countries' liberal democracy scores (libdem index) averaged between 1990 and 2018.

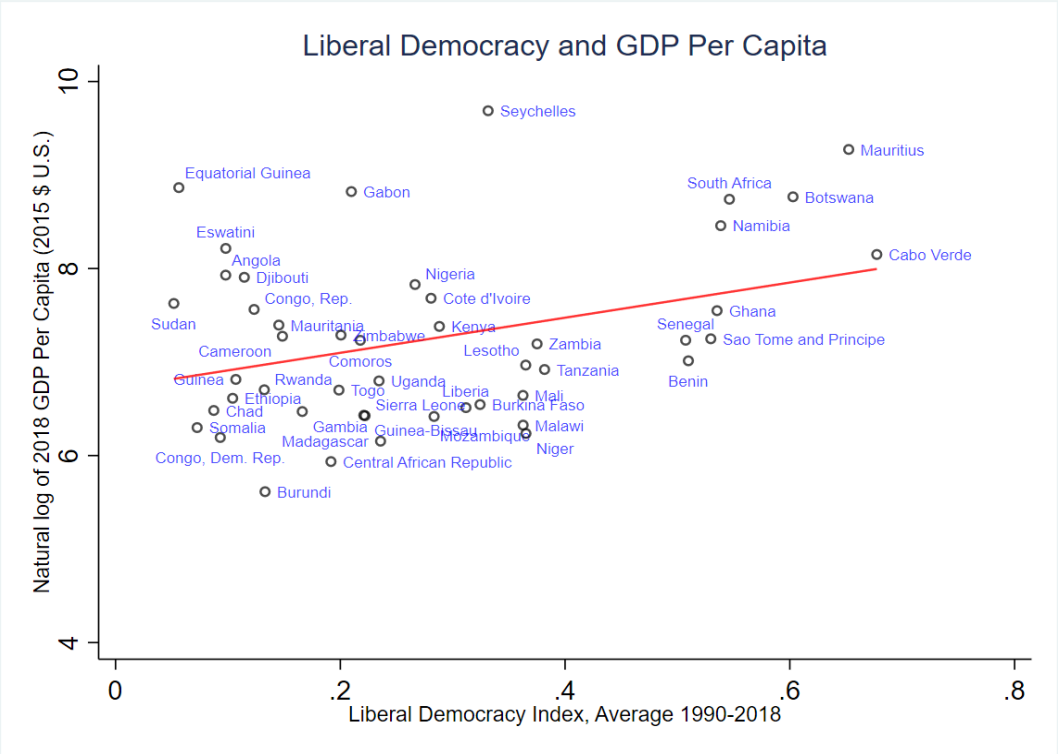


Figure 4: The figure shows the correlation between the liberal democracy index (average of 1990–2018) and GDP per capita (natural log of 2018 GDP per capita in 2015 dollars).

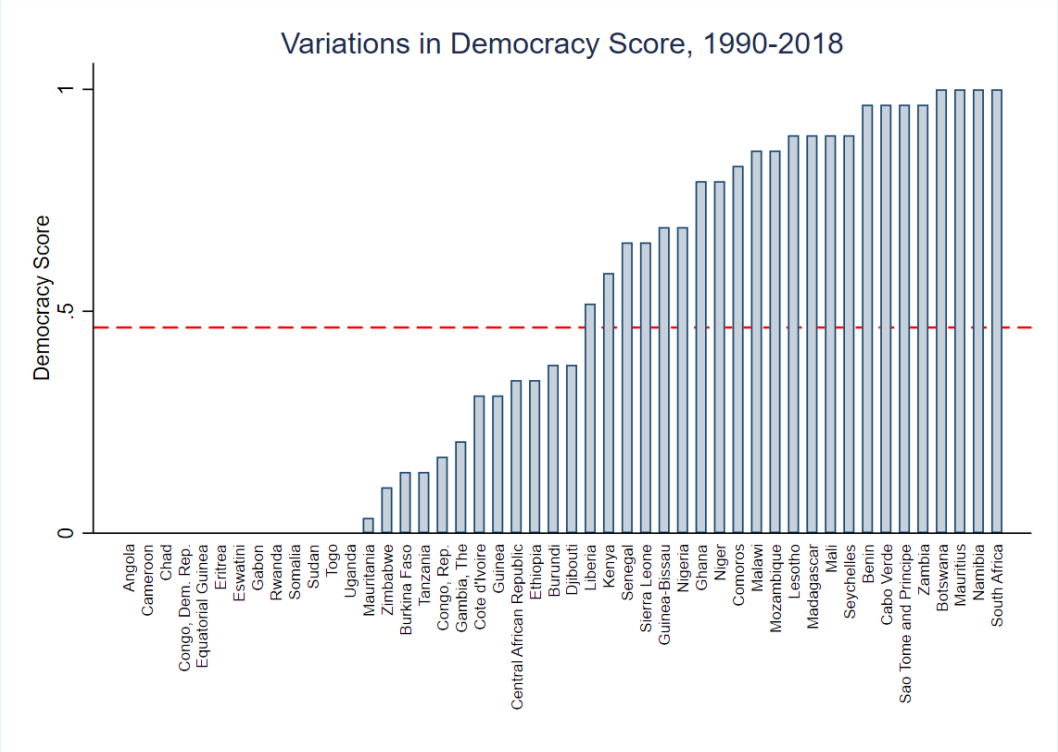


Figure 5: The figure shows countries' democracy scores averaged between 1990 and 2018.

Table 1: Democratization and Income

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Impact of Democratization on Income					
liberal democracy	0.126***	0.131***	0.126***			
	(0.030)	(0.033)	(0.033)			
democracy (1/0)				0.012**	0.020***	0.018**
				(0.006)	(0.007)	(0.007)
Observations	1,074	835	835	1,074	835	835
Within R-sq.	0.92	0.88	0.88	0.92	0.88	0.88
Controls	NO	YES	YES	NO	YES	YES
Region x Year	NO	NO	YES	NO	NO	YES
	Panel B. Accounting for the Effects of Economic Liberation					
liberal democracy	0.164***	0.151***	0.117**			
	(0.046)	(0.045)	(0.045)			
democracy (1/0)				0.031***	0.024***	0.016**
				(0.006)	(0.007)	(0.007)
economic liberalization	0.018***	0.020***	0.019**	0.021***	0.022***	0.020**
	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Observations	667	563	563	667	563	563
Within R-sq.	0.83	0.81	0.80	0.83	0.81	0.80
Controls	NO	YES	YES	NO	YES	YES
Region x Year	NO	NO	YES	NO	NO	YES

The table displays the estimates of the impact of democratization on income. Income is proxied by the natural log of GDP per capita expressed in 2015 dollars. Columns (1)–(3) use the liberal democracy (libdem) index as proxy for democracy while the remaining columns use a dichotomous indicator of democracy. All models include country fixed effects and year fixed effects. The models in Panel A include up to five lags of the dependent variable and those in Panel B have only one lag of the dependent variable. The controls are gross fixed capital formation, openness, government consumption, and household consumption. Columns (3) and (6) add four sub-regional x year interactions. Heteroskedasticity-robust standard errors reported in parenthesis below estimates. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Democratization and the Determinants of Income

	(1) Physical capital	(2) Openness	(3) Net FDI	(4) Human capital	(5) Economic liberalization	(6) Physical capital	(7) Openness	(8) Net FDI	(9) Human capital	(10) Economic liberalization
liberal democracy	0.500**	0.555***	1.291*	0.063	0.881***					
	(0.211)	(0.123)	(0.708)	(0.104)	(0.250)					
democracy (1/0)						0.139***	0.083***	-0.082	0.061***	0.025
						(0.046)	(0.028)	(0.146)	(0.023)	(0.062)
Observations	1,073	1,119	1,213	1,110	696	1,072	1,118	1,212	1,109	696
R-squared	0.553	0.815	0.484	0.751	0.910	0.557	0.813	0.483	0.753	0.909

The table displays the effects of democratization on various determinants of income. All models include country fixed effects and year fixed effects. I also control for the size of economy or market by adding log GDP. Heteroskedasticity-robust standard errors reported in parenthesis below estimates. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

IV. Democratization and Subnational Development in Africa

The foregoing analysis shows that democracy is associated with increased per capita income. However, panel fixed effects estimates are not necessarily causal due to the confounding effects of unaccounted-for time-varying variables. Omitting important variables in the specification lead to overstating the impact of democracy on income and/or development. Fixed effects estimation does not also effectively address the potential bidirectional causation between democracy and income or development. In the rest of the study, I exploit the "arbitrary" designs of African borders to estimate the *causal* effect of democratization on development outcomes.

IV.I Using African Borders as Natural Experiments

African borders are infamously noted for splitting same people into two or more countries. Groups of similar history, heritage, language, customs and institutions live astride almost all African borders. Partitioned groups are numerically high. On average they constitute not less than 40 percent of their respective country's population (Englebert et al., 2002; Englebert, 2000). In some extreme cases such as Senegal, Burundi, Rwanda, and Zimbabwe they make up not less than 90 percent of the population (Alesina et al., 2011).

African contemporary borders were demarcated by European colonizers during the Scramble for Africa in the late 19th century. The scramble for spheres of control and protectorates necessitated the formal delineating of territories to avoid fierce rivalries and potential wars. This process culminated in the splitting of homogeneous people into different spaces which subsequently morphed into contemporary African states. Borders divided people because Europeans had limited presence in, and knowledge about, the continent at this time (except the coastal belts). Spheres of control and/or mandated territories were also allotted with no anticipation of them becoming sovereign states in the foreseeable future.

There is a debate as to whether African borders were partitioned arbitrarily. Paine et al. (2024) contend and show that not all African borders were randomly designed as some meso-level political frontiers and physical features played significant role in the partitioning of some borders. However, even if it were the case that the partitioning of borders followed physical features such as rivers, streams and hill, then the process would have been less endogenous to ethnic limits. Indeed, Müller-Crepon et al. (2023) illustrate that ethnic geography was less likely to shape state borders in Africa, unlike elsewhere.

My identification strategy rests on the fact that ethnic geography was not the primary determinant of border partitioning. Even if ethnic geography determined border partitioning, causality will only fail if border partitioning by itself determines current correlates of development. Additionally, using African borders for causal inference rests not on the sys-

tematic arbitrary partitioning of all borders. Establishing causality rests on showing the non-systematic differences between split and nonsplit groups with respect to (un)observable factors that would independently affect contemporary development correlates. It has been shown by (Michalopoulos and Papaioannou, 2016) that such systematic differences do not exist.

The other identifying assumption is that the only marked difference between democratic-nondemocratic partitions today is regime type. This is important because one has to impose additional assumptions if other political and administrative lines suddenly change at the border.[9] I am not aware of any other political boundaries that change across African borders.

IV.II Identifying Democratic-Nondemocratic Ethnic Partitions

I identify partitioned groups by superimposing contemporary African borders on Murdock (1959)'s ethnic map which shows the spatial distribution of more than 840 ethnic regions in Africa. Shown in figure 6a, the red lines represent contemporary African state borders and the blue lines are ethnic limits.

To identify democratic-nondemocratic partitions I group countries into consolidated democracies and nondemocracies (or failed democracies) using two strict criteria. First, the country should have a long democratic tradition. This means it should be consistently coded as a democracy (as described in section III.) since the 1990s. This criterion excludes countries with temporary democratic episodes and/or those that only recently (post 2000) made a permanent transition to democracy.

Second, the country should have recorded substantial progress on the liberal tenet of democracy. By this, I mean the country should have, on average, an annual libdem score of 0.50 between 1990–2018. Although the threshold is quite arbitrary, incorporating the libdem is important because it tends to have a strong effect on economic performance, as previously shown. In the following section, I also show that it has a strong impact on light density at night, my proxy of income at the subnational level. In addition, African countries are also noted to fall short on the liberal tenet of democracy. In other words, progressing halfway on the libdem scale is a remarkable milestone for an average African country given the region's poor performance on this dimension. For example, while countries like Lesotho (0.37), Malawi (0.36), Nigeria (0.27) and Zambia (0.38) would meet the first criterion, their average annual scores on liberal democracy are below the 0.50 threshold. In effect, I compare Africa's top democracies to its nondemocracies or frail democracies. Later on I relax this criterion in order to test the robustness of my results.

[9] If other factors were to systematically change across borders, then one has to assume, for example, that only regime type difference is the primary cause of development differences at the border.

This criteria produces eight consolidated democracies including Benin, Botswana, Cabo Verde, Ghana, Mauritius, Namibia, Sao Tome and Principe, and South Africa. Cabo Verde, Mauritius, and Sao Tome and Principe will be excluded from the analysis since they are islands sharing no land borders with other countries. This leaves five consolidated democracies sharing land borders with ten nondemocracies – Angola, Burkina Faso, Cote D'Ivoire, Eswatini, Mozambique, Niger, Nigeria, Togo, Zambia, and Zimbabwe.

The borders dividing these two sets of regime types are depicted in figure 6b.[10] I identify 56 partitioned groups on the borders dividing democracies and nondemocracies. However, I consider only groups that have at least 5 percent of their ethnic homeland partitioned into either a democratic or nondemocratic country. This allows for digitizing errors in the ethnic map (Michalopoulos and Papaioannou, 2016, 2014) and also accounts for the possibility that minor partitions are unlikely to be inhabited. This leaves 45 major partitioned ethnic groups across democratic-nondemocratic borders.

These groups are displayed in appendix table A1. The table shows the countries groups are split into, the corresponding splits shares and the shares of groups' democratic partitions. While most groups are split into only two countries, some are partitioned into three or four countries. The shares of ethnic homelands falling in democratic side of borders also vary considerably. It ranges from a low of 5.5 % for the Busansi split into Ghana, Burkina Faso and Togo to a high of 92.5 % for the Dagombas across the Ghana-Togo border. Also, note that where groups are split into two countries, the shares of democratic partition perfectly aligns with one of the two partitions of a given group. However, where a group has three or four partitions, the share of democratic partition then becomes the sum of all its partitions falling in democracies. To demonstrate, even though the Mbukushu are split into Angola (73.7 %), Namibia (11.6 %) and Botswana (14.7 %), its democratic partition is 26.3 % representing the sum of its partitions in Namibia and Botswana. Thus, estimates of RD design will provide the difference in the level of development between the democratic side of Mbukushu (26.3 %) to its nondemocratic side (73.7 %).

Using these partitioned ethnicities to identify the causal impact of democratization means that I take each ethnic partition on side as a proper counterfactual to its counterpart on the other side of the border. The democratic and nondemocratic partitions of a given ethnic group should serve as proper counterfactuals in so far as they are similar in all respects except regime type. Thus, all things same, long-run development divergence across the two sides of the border effectively becomes a function of regime type differences.

To illustrate this logic, figure 7 shows groups astride the current Ghana-Togo border. In figures 8a and 8b, I show the trends in liberal democracy and duration of democracy for

[10]The democracies in southern Africa have contiguous borders which allow me to group them with a single border separating them and their nondemocratic neighbors.

Ghana and Togo. While Ghana sustained its democratic take off that occurred in the early 1990s, Togo failed to fully transition to a democratic regime. In particular, the libdem index shows that prior to 1992 both countries had visibly similar democratic trends, except during Ghana's brief democratic periods of 1969/70 and 1979/80.[11] After its democratic take off, Ghana's libdem score sustainably jumped ahead of Togo's. In effect, the groups astride the border are subject to two different regimes, democracy and nondemocracy. It is these scenarios that allow me to identify the impact of democratization at the border areas.

IV.III Threats to Identification

The obvious potential threat to the identification strategy is selective migration. The empirical estimates will be severely biased if migration is selective and/or systematic across democratic-nondemocratic partitions.

Addressing the bias from selective migration is an onerous task, especially when the sample covers a wide range of borders. However, knowing the potential direction of migration flow will be loosely informative about the direction of bias of the empirical estimates. To get an idea of the pattern of migration, I examine predetermined individual-level covariates across democratic-nondemocratic partitions for members belonging to split ethnicities. I use data from Afrobarometer survey rounds 5–8 and compare age, gender, and type of place of residence (rural-urban).[12] I run a simple test of no discontinuities with slopes fitted separately on each sides of the borders. The results, estimated within 50 km and 100 km radii, are shown in appendix table A2.

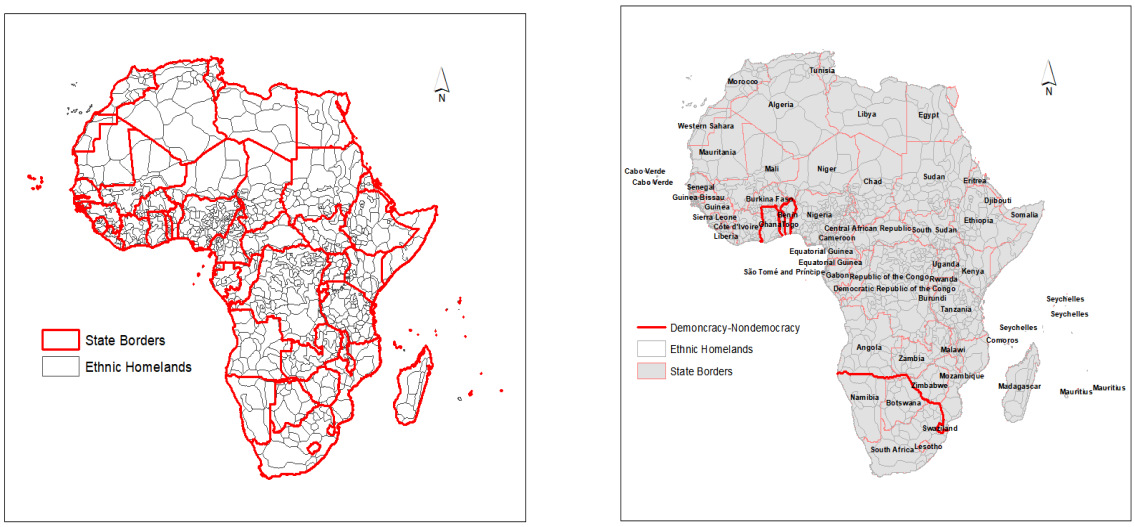
The results from the narrow (50 km radius) window show no significant disparities across democratic-nondemocratic partitions with respect to age and gender. Within the 100 km radius, the gender variable again shows no significant disparities, but age is negative and marginally significant. On the other hand, the results indicate that the democratic sides are more rural. Although this does not necessarily imply a democratic-nondemocratic flow of migration, it hints at the fact that my main empirical estimates will likely be conservative.

It should also be noted that selective migration will only likely affect results from survey data. This threat is less severe when aggregate data such as nighttime lights are used. Estimates from nighttime light will only be biased if migration systematically caused the growth of some border cities as to be disproportionately captured in nighttime lights. Except a few border capitals, African border areas lack model cities to cause such bias. In my sample, I also drop all capital/commercial cities. I further binary-transform the light data in order to avoid such biases.

[11] The spike of 69/70 was a result of the National Assembly Elections of 29th August 1969 while that of 1979/80 highlights the presidential elections of 18th June 1979 in Ghana.

[12] Although type of place of residence is not necessarily predetermined, it helps to gauge which side of the border people will move to or from. For example, the rural areas will more likely be the senders.

As a last check of bias, I also compute results from wider neighborhood around the borders. Computing estimates from such universe allows me to check the direction of bias of my preferred estimates.



(a) (b)

Figure 6: The left panel shows Africa's contemporary state borders superimposed on ethnic homelands. The right panel depicts borders dividing top democracies and nondemocracies in Africa.

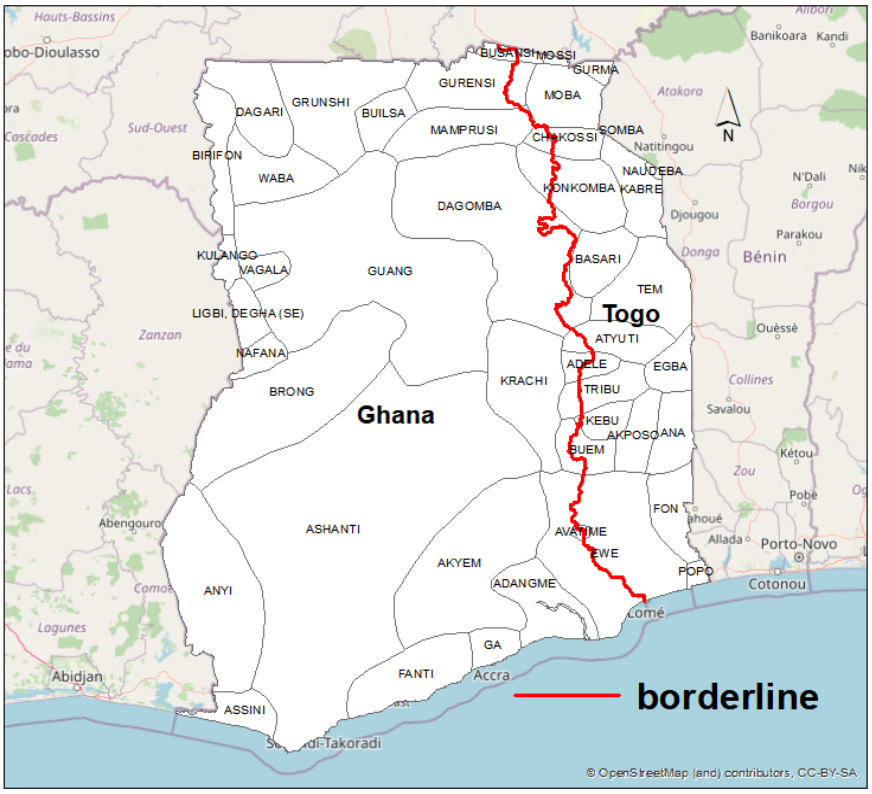
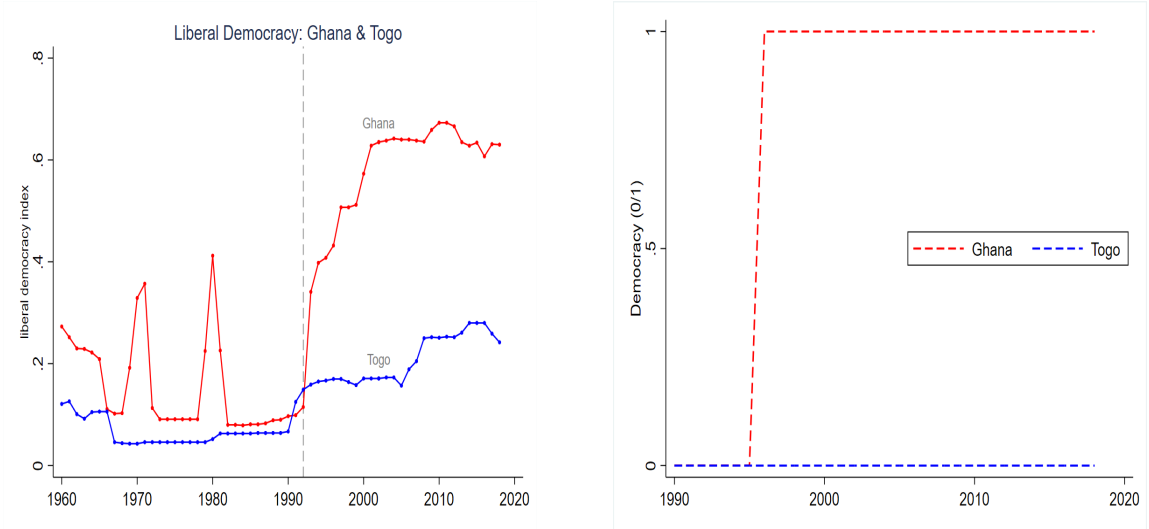


Figure 7: Sample Partitioned Ethnic Groups Across Ghana-Togo border.



(a) (b)

Figure 8: The left panel shows trends in liberal democracy (libdem index) while the right panel shows duration of democracy

IV.IV Estimation Framework I: Panel Fixed Effects Estimation

In the border areas I first estimate the impact of democratization on development using a panel fixed effects estimation at the grid cell level. I assign grid cells with their respective country's yearly libdem scores and democracy-nondemocracy statuses. The regression equation to be estimated is:

$$y_{gt} = \beta Democ_{gt} + \gamma_t + \phi_g + \varepsilon_{gt} \tag{2}$$

The dependent variable y_{gt} is the proxy of development of grid cell g in year t. $Democ_{gt}$ is the yearly libdem and democracy status of grid cell g in year t. ϕ_g and γ_t are grid cell and year fixed effects.

IV.V Estimation Framework II: Border Discontinuities

The second estimation strategy I use at the border areas is a regression discontinuity (RD) design. Let ethnic group e occupy a space with total area 1, where today ρ and $1-\rho$ of its space (members) lie (reside) in a consolidated democracy and nondemocracy respectively. I estimate the development disparities between ρ and $1-\rho$ using:

$$y_{ic} = \alpha + \tau\rho + f(DB_{ic}) + \eta_e + \xi_{ic} \tag{3}$$

y_{ic} is the outcome of interest of unit i (respondent or grid cell) in country c. ρ is the share of ethnic homeland e that falls in a consolidated democracy. My unit of analysis will be at the grid cell or respondent level, hence this can alternatively be interpreted as a dummy equals one if grid cell (respondent) i falls (resides) in a consolidated democracy and zero otherwise. By comparing a consolidated democracy to a failed democracy or nondemocracy over time, I am considering democracy as a cumulative historical process, where its effects may take time to fully emerge.

The function $f(DB_{ic})$ is the polynomial of unit i's geodesic distance to the border. For my preferred estimates, I choose a 50 km radius around the border and estimate a local linear regression fitted separately on each side of borders. The advantage with local linear regression is that it addresses the drawbacks of bias, inflexibility, and sensitivity of estimates to boundary points associated with higher-order fits (Gelman and Imbens, 2019).

Conducting RD analysis in a narrow neighborhood comes with upsides and drawbacks. Analysis in a narrow window trades variance for smoothing bias. That is, the relatively fewer observations in a narrow neighborhood reduce bias but increase variance of the estimated coefficients (Cattaneo et al., 2019; Fan and Gijbels, 1996). RD estimates are also sensitive to the choice of neighborhood. Because of this, I also report estimates from wider windows in order to test the robustness of my preferred estimates. In such cases I fit a cubic polynomial

in distance to the border. I also test the robustness of my results to estimators that use optimal bandwidths.

η_e is ethnicity fixed effects accounting for time-invariant factors unique to each ethnic group. This within-ethnicity specification allows me to estimate, without the confounding effects of ethnicity, the difference in the outcome variable between ρ and $1-\rho$. It follows that for every ρ on one side of the border, there must exist a corresponding $1-\rho$ to compare on the other side. Thus, the estimates will come from groups that have matching pairs from each side of the border.

The coefficient of interest is τ. Given the within-ethnicity specification, τ essentially provides the local average treatment effect of democratization. A distinct feature of spatial RD is that treatment effects may vary along the borderline. Conceptually, τ then will provide the average of all the local average treatment effects across all set of boundary points on the borderline (see Keele and Titiunik, 2015).

IV.VI Data

This section discusses the data used in the border analysis.

IV.VI.I Measuring Subnational Development

Africa lacks official income statistics at fine subnational units, so I use nighttime light to proxy for subnational development or income level at the border. This data data comes from the Defense Meteorological Satellite Program's Operational Line-scan System (DMSP-OLS) for the period 1992—2013. Light images are captured by satellites that travel across the world each night between longitudes -180 and 180 degrees and latitudes -65 and 75 degrees. The collected images are processed to remove clouds, ephemeral lights and other "noise" that may contaminate the data. The resultant images are grided into pixels, each measuring 1 sq. km with assigned digital numbers from 0 to 63, where 0 means no light and higher values denote more light.

Light density data has now been widely used as a proxy of development or income due to its appealing properties. Compared with other proxies of income such as national GDP, light data is more objectively collected and far from being intentionally manipulated (Martinez, 2022). It is also available at the finest level (approx. 1 sq. km), which allows me to track development at the border at a precise resolution. Use of light data is also preferred in countries where income statistics are poor and unreliable. I construct square grid cells of size 10 km x 10 km and extract their nighttime lights for each year from 1992 to 2913.

IV.VI.II Individual-level Outcomes

I also use individual-level data from Afrobarometer survey rounds 5–8 to compare disparities in socioeconomic outcomes across democratic-nondemocratic partitions. Afrobarometer is an independent, not-for-profit organization that conducts opinion polls on social, political, economic and international issues across more than 30 African countries. Survey samples are nationally representative and comprise of either 1200 or 2400 respondents. The survey questions are also standardized but are regularly updated. In this study, all survey questions used appear same across all countries and survey rounds

In the survey data I glean and compile information on respondents belonging to partitioned ethnicities. Afrobarometer data has detailed ethnicity information on respondents, although names of groups vary from different sources. For all the 45 major partitioned ethnic groups identified, I search their alternative names from other sources, mainly Encyclopedia Britannica, Oxford Reference, and Joshua Project. This allows me to identify these groups from the Afrobarometer data even if they are entered differently from the Murdock's ethnic map.

I look at five main outcomes from the survey data.

1. Economic Insecurity: I construct an economic insecurity (econins) index which captures the frequency with which people face shortages of the most pressing needs. Afrobarometer asks respondents about how often they lack or face shortages of basic needs: *Over the past year, how often, if ever, have you or anyone in your family: Gone without [enough food], [enough clean water for home use], [medicines or medical treatment], [enough fuel to cook your food], [cash income].* There are five possible answers: 0=never, 1=just once or twice, 2=several times, 3=many times, and 4=always. For each respondent i, I define *economic insecurity* as the average of their responses to the five questions. To ease interpretation, I further standardize it on a 0–1 scale and then multiply it by 100 ($standardized\ econins = \frac{econins_i}{4} \times 100$) so that the coefficient will be interpreted as percentage points.

2. Subjective Wellbeing: I complement the econins index with a subjective wellbeing measure. Afrobarometer asks respondents to rate their present living condition: *In general, how would you describe: Your own present living conditions?* 1=Very bad, 2=Fairly bad, 3=Neither good nor bad, 4=Fairly good, 5=Very good. I define "subjective wellbeing" as taking a value one if a respondent feels fairly good or very good about their living condition and zero otherwise.

3. Human Capital: I also look at respondent's highest level of education. Afrobarometer codes respondent's education on a range from 0 to 9 where 0 means no formal education and 9 represents postgraduate education. I define "education" dummy equals to one for all respondents that have completed a minimum secondary education.

4. Employment: The next variable examined is employment status. The survey question specifically asks about waged employment status: *Do you have a job that pays a cash income? [If yes, ask] Is it full-time or part-time? [If no, ask:] Are you presently looking for a job.* 0=No, not looking, 1=No, looking, 2=Yes, part time, 3=Yes, full time. I define *employed* if the respondent is either waged employed part time or full time.

5. Access to Public Goods: Lastly, I look at access to public goods. Survey interviewers code the presence of several public goods and amenities within a walking distance (usually in the sampling unit) from the respondent. I focus mainly on the provision of electricity, piped water, paved road and sewage system since these are most likely to be provided by the government.

Summary Statistics: Table 3 shows the summary statistics from the Afrobarometer survey data. The sample comprises members of partitioned ethnicities residing within 50 km from the democratic-nondemocratic borders. The sample size varies from 6,989 to 7,022, and it is roughly balanced with respect to gender composition. However, since the sampling area is subnational, about 58 percent of the sample is rural.

Among the components of economic insecurity, cash income is the most frequently lacked item followed by medical care whereas cooking fuel ranks last. Despite these differences, they have high positive pairwise correlations. Cash income and medical care have the strongest correlation (0.51), suggesting that the lack of income prevents people from seeking medical attention. The smallest pairwise correlation is 0.34, which occurs between access to clean water and cooking fuel.

In general, economic insecurity in the sample is low with a mean of 35.7 on a 0–100 scale. However, respondents that reported having either a fairly good or very good living conditions only constitute 28.6 percent of the sample. Thus, lower levels of economic insecurity do not necessarily imply better subjective wellbeing. This is why I investigate these variables separately. Educational attainment is also low in the sample, with only 22 percent of respondents having completed a minimum secondary education. In addition, only about one in three respondents reports having a waged employment.

Turning to public goods provision, electricity is the most accessible good followed by piped water. About 64 percent of respondents have access to the national grid and 57 percent reside within a walking distance from a source of piped water. But most respondents do not have access to sewage system.

Comparing the mean statistics across democratic-nondemocratic partitions, one sees significant disparities. Respondents from the democratic side report comparatively better socioeconomic conditions. Economic insecurity is about 12 pp lower on the democratic sides. Subjective wellbeing, employment and educational attainment are all higher on the

democratic sides of the borders. The democratic sides also have more improved access to public goods.

Table 3: Summary Statistics of Individual-level Data

	Whole Sample					Democratic Partitions			Nondemocratic Partitions		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	N	mean	min	max	sd	N	mean	sd	N	mean	sd
age	6,989	36.38	18	100	14.31	4,191	36.71	14.31	2,798	35.88	14.29
female	7,022	0.496	0	1	0.500	4,211	0.497	0.500	2,811	0.496	0.500
rural	7,022	0.580	0	1	0.494	4,211	0.557	0.497	2,811	0.614	0.487
food shortage	7,018	1.150	0	4	1.228	4,209	1.036	1.189	2,809	1.323	1.265
water shortage	7,015	1.323	0	4	1.449	4,207	1.101	1.354	2,808	1.657	1.521
med care shortage	7,001	1.390	0	4	1.308	4,199	1.140	1.221	2,802	1.763	1.345
cooking fuel shortage	7,009	0.868	0	4	1.151	4,203	0.735	1.089	2,806	1.067	1.211
income shortage	7,009	2.413	0	4	1.301	4,206	2.141	1.304	2,803	2.821	1.185
economic insecurity	7,021	35.72	0	100	23.71	4,210	30.77	22.89	2,811	43.13	22.98
employment status	7,015	0.294	0	1	0.456	4,206	0.327	0.469	2,809	0.244	0.430
min. secondary comp.	7,012	0.222	0	1	0.416	4,203	0.237	0.425	2,809	0.200	0.400
subjective wellbeing	6,989	0.286	0	1	0.452	4,196	0.311	0.463	2,793	0.248	0.432
electricity grid	7,014	0.639	0	1	0.480	4,203	0.667	0.471	2,811	0.598	0.490
piped water	6,925	0.565	0	1	0.496	4,175	0.592	0.492	2,750	0.524	0.500
sewage system	6,992	0.212	0	1	0.409	4,195	0.235	0.424	2,797	0.177	0.382
paved road	7,015	0.300	0	1	0.458	4,204	0.323	0.468	2,811	0.266	0.442

V. Results

This section reports the main results from the democratic-nondemocratic partitions. The panel fixed effects results are reported first followed by RD results.

V.I Panel Fixed Effects Estimates

The panel fixed effects estimates of the impact of democratization on subnational development are reported in table 4. Columns 1–3 report estimates using the libdem index as the independent variable and the remaining columns display estimates of the impact of democratic transition. I show estimates from three forms of the light data including binary transformation, mean light and log light density.

Panel A of the table displays my preferred estimates. Across all models both measures of democratization have significant positive impacts on light density at night. The estimate in column (1) of Panel A suggests that a point increase in the libdem index (that is, moving over the entire range of the index from 0 to 1) is associated with a 16 pp increase in the probability of a grid cell having light at night. Model (4) also suggests that if a country transitioned from a nondemocracy to a democracy, the probability of a grid cell having light increases by about 3.5 pp. Estimates in the other columns show that the main results do not change when the dependent variable is altered. The estimates from Panel B also show that my results are robust to using the whole sample (universe of partitioned ethnic homelands). With the exception models (2) and (3), the estimates in both panels are also quite similar.

V.II RD Estimates of Subnational Development Disparities

Before reporting the RD estimates, I examine the preliminary trends in light density at night across democratic-nondemocratic partitions. This exercise is important since I will be reporting yearly RD estimates to track development discontinuities across democratic-nondemocratic partitions over time.

The preliminary patterns are displayed in figures 9a and 9b. The figures show the yearly mean probabilities of a grid cell having light at night within 50 km radius and universe of democratic-nondemocratic partitions respectively. Two main patterns emerge. First, the probability of having light at night was similar across democratic-nondemocratic partitions during the early years of democratization. This insight is particularly pronounced for grid cells within 50 km radius from the borders. From 1992 to 1994 there existed no remarkable differences in mean probabilities of having light across these two sets of regime types. In 1994, for example, an average democratic side and nondemocratic side had .08 and .07 probabilities of being lit at night, respectively. The second observation from the figures

is that democratic sides recorded substantially greater amount of lights over time, even though the trends in light on both sides had similar slopes. Specifically, starting from 1995 the democratic sides developed faster than the nondemocratic sides.

I now estimate these disparities using the RD specification. The estimated disparities are reported in figures 10a and 10b.[13] The outcome variable is binary taking a value one if the grid cell has light and zero otherwise. Binary transformation obviates outliers from driving the main results. Moreover, the light data has no standard unit and therefore the binary-transformation helps ease the interpretation of estimates.

The top panel displays the results from the 50 km radius. It can be observed that the results follow closely from the preliminary patterns described above. Democratic-nondemocratic partitions were at similar levels of income during the early years of democratization. The coefficient estimates for 1992 and 1993 are small and not statistically significant. The point estimates gradually increased in size and statistical significance levels over time. As at 2013, an average democratic partition had about 7 pp increase in the probability of having light compared with its nondemocratic counterpart. Given the context (subnational), this impact is substantial. Compared to the sample mean of 0.19, the impact is equivalent to an increase of about 37 percent in the probability of a democratic grid cell being lit.

The bottom panel shows the estimates for the universe of democratic-nondemocratic ethnic partitions. The main patterns and estimates are similar to the baseline results. In other words, the estimates are not driven by the choice of neighborhood.

To further visualize these results, I pick two ethnicities (the first two from appendix table A1) astride a democratic-nondemocratic border and display their decadal changes in lit-unlit grid cells. Figures 11a – 11c show the lit and unlit grid cells for the Adele group who are partitioned 48 % and 52 % in Ghana (democracy) and Togo (nondemocracy) respectively. With green denoting light and yellow representing dim, both sides of Adele's partitions had no lit grid cells in 1992. However, while some grid cells on the Ghana side became lit over time, all those on the Togo side recorded no light.

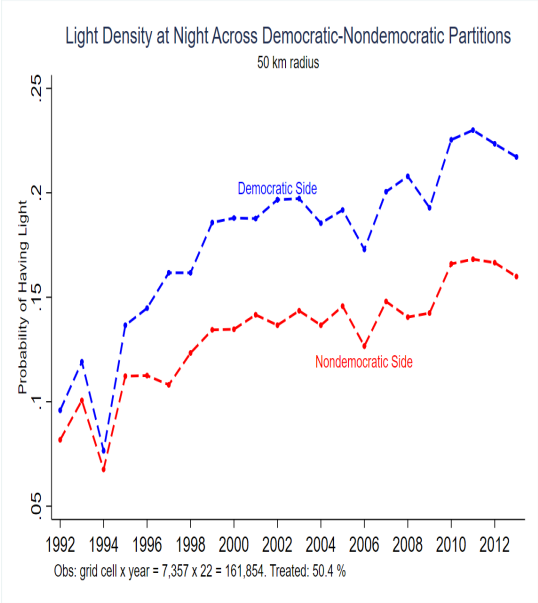
The second sample is the Ambo group (figures 11d – 11f) split with a straight-line border between Angola (nondemocracy) and Namibia (democracy) in a 41 % and 59 % ratios. Unlike the Adele, the two partitions of the Ambo had lit grid cells in 1992. Both sides also recorded an increase in the number of lit grid cells over time. However, the democratic side (Namibia) recorded a greater, differential number of lit grid cells over time. The main takeaway here is that while development is still possible absent democratization, the lack of democratization hobbles the pace of development.

[13]For visualization purposes, most estimates for odd years are excluded.

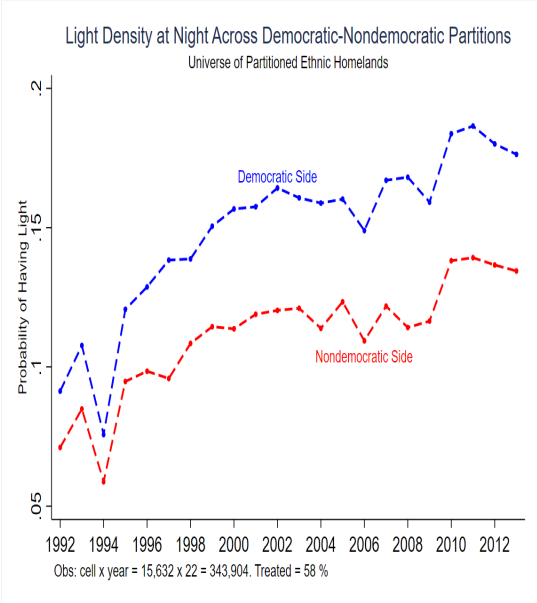
Table 4: Impact of Democratization on Light Density at Night

	(1) lit cell	(2) mean light	(3) log light	(4) cell lit	(5) mean light	(6) log light
	Panel A. 50 km Radius Around Democratic-Nondemocratic Ethnic Partitions					
Liberal Democracy Index	0.160***	0.447***	0.717***			
	(0.017)	(0.071)	(0.071)			
Democracy(1/0)				0.035***	0.059***	0.155***
				(0.005)	(0.022)	(0.023)
Observations	144,364	144,364	144,364	144,364	144,364	144,364
R-squared	0.743	0.870	0.837	0.742	0.869	0.837
Grid Cell F.E.	YES	YES	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES	YES	YES
	Panel B. Universe of Democratic-Nondemocratic Ethnic Partitions					
Liberal Democracy Index	0.196***	0.980***	1.108***			
	(0.011)	(0.056)	(0.052)			
Democracy (1/0)				0.040***	0.081***	0.175***
				(0.004)	(0.019)	(0.017)
Observations	326,282	326,282	326,282	326,282	326,282	326,282
R-squared	0.770	0.899	0.861	0.769	0.898	0.860
Grid Cell F.E.	YES	YES	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES	YES	YES

The table displays the panel fixed effects estimates of the impact of democratization on subnational development within democratic-nondemocratic ethnic partitions in Africa. Subnational development is proxied by light density at night and the unit of analysis is a 10 km x 10 km grid cell. All models include grid cell and year fixed effects. In columns (1) and (4) the outcome variable takes a value one if the grid cell has light and zero otherwise. In columns (2) and (5) the grid cell's mean light density is used as the dependent variable whereas in columns (3) and (6) the dependent variable is the natural logarithm of mean light density (y= ln(.01 + mean light)). Panel A shows estimates within 50 km from borders separating democratic and nondemocratic ethnic partitions whereas Panel B shows estimates for the universe of democratic-nondemocratic ethnic partitions. Standard errors clustered at the grid cell. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

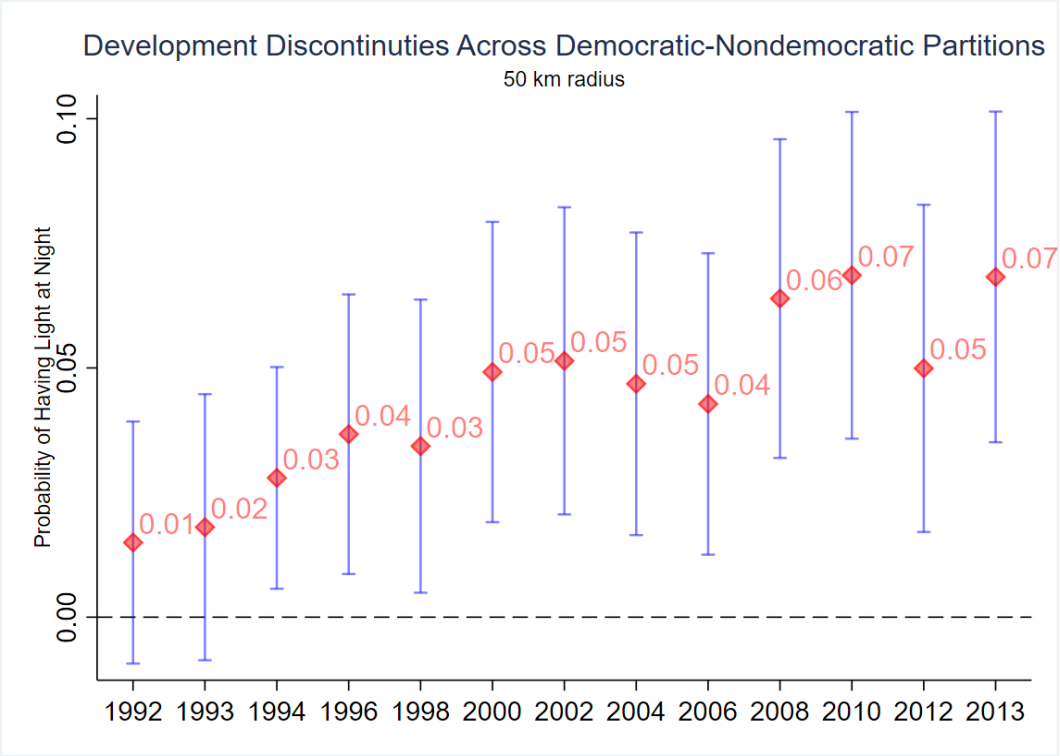


(a)

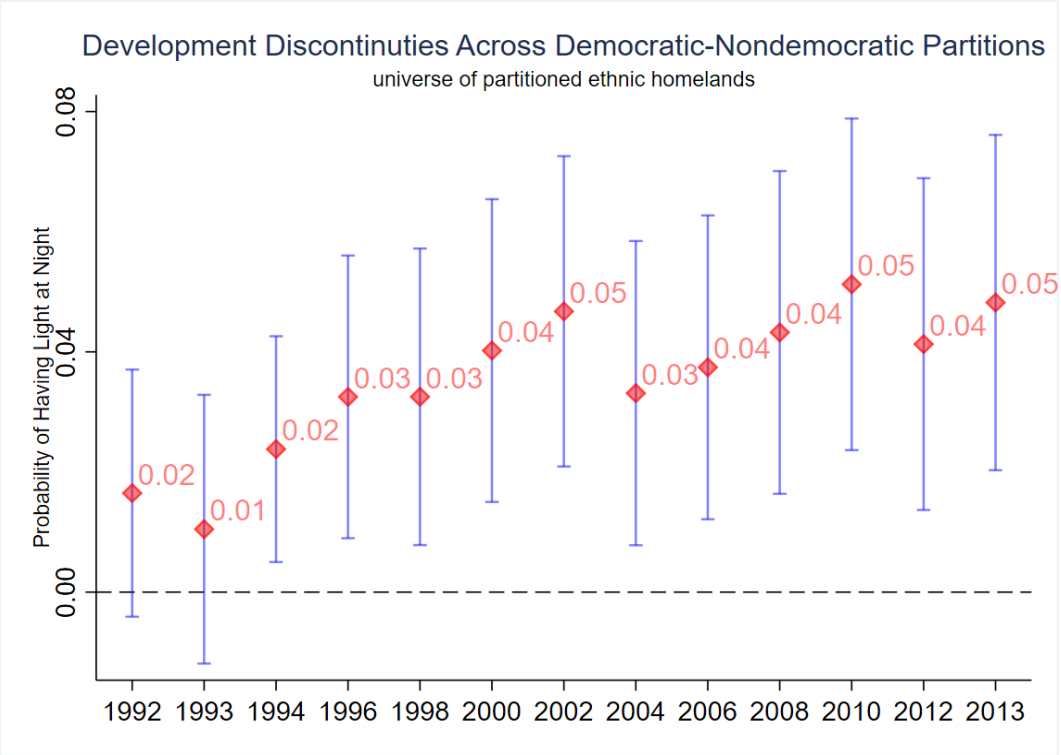


(b)

Figure 9: The figures display the yearly mean probabilities of a grid cell having light at night within democratic-nondemocratic partitions. The left panel shows the trends for grid cells within 50 km radius whereas the right panel shows for the universe of democratic-nondemocratic partitions.

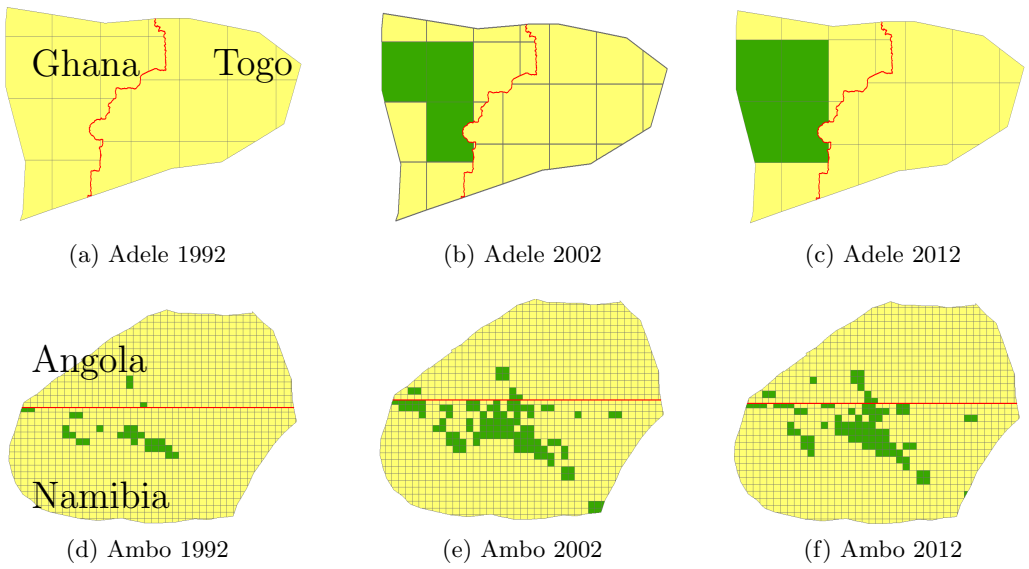


(a)



(b)

Figure 10: The figures display RD estimates of subnational development disparities across democratic-nondemocratic partitions. The top panel shows estimates from the 50 km radius around borders whereas the bottom panel displays estimates from a 100 km radius. All models include ethnicity fixed effects.



(a) Adele 1992 (b) Adele 2002 (c) Adele 2012

(d) Ambo 1992 (e) Ambo 2002 (f) Ambo 2012

Figure 11: The figures display the decadal changes in lit (green) and unlit (yellow) grid cells for two samples of partitioned groups that reside astride borders diving a consolidated democracy and a nondemocracy. The top three figures represent the Adele who reside across the Ghana-Togo border while the bottom three show the Ambo group on the Angola-Namibia border. The red lines is the contemporary borderlines dividing these groups into a democracy and a nondemocracy. In the top panel the democratic side is Ghana whereas it is Namibia in the bottom panel

V.II.I Sensitivity Checks

I test the sensitivity of the above results to different specifications and checks. Estimates are reported for only the 50 km radius. Where results are shown in a table, estimates before 1996 are not shown in order to fit results into the page.

1. Changing the Dependent Variable: I replace the binary light outcome with grid cells' mean light density at night. This exercise tests if my main results are robust to alternative forms of the dependent variable. The estimates, reported in appendix figure A1, show that the main results do not change. The estimated development disparities, barely statistically significant in the beginning, grew larger over time.[14] The estimate for 2013 indicates that being in a democratic partition increases a grid cell's mean nighttime light by about 64 % above the mean (0.50).

2. Covariates: In this exercise I condition the estimates on local covariates. Generally, in a narrow neighborhood covariates only improve precision of RD estimates; they do not cause substantial changes in the coefficient estimates. Appendix figure A2 reports estimates of the development discontinuities conditional on location and geography controls including distance to a river (km), distance to the seacoast (km), precipitation (mm), elevation

[14] I also conduct similar exercises where I replace the outcome with the natural logarithm of light density and sine transformed light data. In both cases the main results remain unchanged.

(meters), slope (degrees), and log grid cell size.[15] There is improvement in precision (standard errors not reported) but the main results do not change. The point estimates are also similar, suggesting that my baseline estimates are less likely to suffer from omitted variable bias and the effects of other confounders.

3. Population Density: Lights at night reflect human settlements and activities which imply that uninhabited areas are unlikely to have lights. My estimates will be biased if there exist systematic differences in settlement patterns and population clustering between democratic and nondemocratic partitions. To account for this possibility, I control for population density so that I capture development differences between democratic and nondemocratic partitions beyond human activities and population distribution.

To do this, I could either include log population density with log light density as the dependent variable or use the binary forms of both variables. That is, I could control for inhabited grid cells with a binary light density outcome. I prefer the log-log specification as that precisely controls for population density and human activity (using the binary-binary does not change the main results).

I use the United Nation's gridded population data compiled and interpolated from countries' population censuses. I control for population density in 1960 and 1990 which respectively represent the first post-independence and pre-democratization population censuses. By jointly controlling for these variables, I also indirectly net out the confounding effects of potential historical and post-colonial development differences prior to democratization.

The results from this exercise are reported in appendix figure A3. The main pattern does not change. The point estimates for 1993 and 1994 are small and not statistically different from zero. All other estimates are larger and statistically significant. The results imply that the documented development differences across democratic-nondemocratic partitions hold beyond population distribution and potential historical development disparities.

4. Two-dimensional RD: Letting $x = longitude$ and $y = latitude$, I add $x+y+x^2+y^2+xy+x^3+y^3+x^2y+xy^2$ to specification 3 so that the model becomes a two-dimensional RD (see Dell, 2010). Since grid cells are spatially identified by their latitude-longitude coordinates, this specification controls for units' precise spatial characteristics. However, this approach, although more flexible and likely to yield precise estimates, increases the likelihood of overfitting especially in a narrow neighborhood. Nonetheless, the results are robust to this specification as shown in panel A of appendix table A3. The results pattern does not change and the estimates are similar.

[15] I control for grid cell size because although grid cells are of the same size, those bordering the seacoast or border will be comparatively smaller. Since I exclude grid cells 2 km from the borders, the smaller grid cells will be those bordering the seacoast.

5. Ethnicity-specific Slopes: Instead of applying a common slope for all partitions on each side of the border, I assign separate slopes to each partition of the 45 split groups (total 90 slopes). As ethnic groups occupy different geographic segments along a border, this exercise controls for further unobserved within-group factors. It also accounts for spatial heterogeneities within and between partitioned ethnic homelands. This parametrization does not also change the main results (shown in Panel B, appendix table A3).

6. Optimal MSE Bandwidth Estimators: I estimate the development discontinuities across democratic-nondemocratic partitions using optimal mean squared error (MSE) bandwidth estimators with a triangular kernel. I report estimates from all the three bandwidth estimators, including conventional, bias-corrected, and robust bias-corrected. The estimates are reported in Panel C of appendix table A3. Again the main results do not change. The only time all the estimators produce jointly insignificant estimates are 1992 and 1993 (not shown in the table).

7. Using a Different Democracy-Nondemocracy Classification: Lastly, I use a different criterion to classify countries as consolidated democracy and nondemocracy. The previous criteria incorporated the libdem index which accentuates the liberal dimension of democracy. As the libdem threshold I used was rather arbitrary, I test the robustness of my results to its exclusion. In other words, I now consider a country as a consolidated democracy if it has been consistently coded as a *democracy* since the 1990s. Remember that a country was coded a democracy if its Polity2 is greater zero and its Freedom House's rating is at least *partly free*.

This new criterion adds five additional consolidated democracies, namely Lesotho, Malawi, Mozambique, Nigeria and Zambia. Because Lesotho lies entirely inside South Africa, it is excluded from the analysis, leaving nine consolidated democracies sharing land borders with eleven nondemocratic neighbors. The new democracy-nondemocracy borders are displayed in appendix figure A4. Although 117 ethnic groups are partitioned by these borders, the major partitions make up about 73 percent (85 groups).

The results from this exercise are reported in appendix figure A5. The point estimates record visible drops, but the main results do not change. The estimates are economically small because this exercise does not compare a top democracy to a nondemocracy. It partly compares frail democracies to nondemocracies as in, for example, Mozambique and Zimbabwe. Even so, the estimates represent substantial increases when compared to the outcome mean. The point estimates for 2012 and 2013, for instance, both represent a 38 % increase in the probability of having light at night above the outcome mean. Thus, in relative terms, these estimates are large.

Another useful criterion would be to compare countries that score above the median libdem

(0.223) to those scoring below it, in the sample period. However, this criterion yields same democratic-nondemocratic countries as in this sensitivity check. Thus, the baseline results are also robust to using the median libdem threshold.

V.III RD Estimates of Individual-level Disparities

I now turn to micro-level disparities. All the individual-level estimated disparities across democratic-nondemocratic partitions are reported in table 5. Panel A reports the preferred estimates (50 km radius) and Panel B shows estimates for the whole sample.

The results in Panel A of the table indicate that residing in democratic partitions is associated with improved socioeconomic outcomes. On a scale of 0–100, living on the democratic side of the border significantly reduces one's economic insecurity by almost 24 pp, which corresponds to a drop of 66.7 % of the outcome mean. Residing on the democratic side also improves one's subjective wellbeing by about 27.6 %. A possible explanation is that residents on the democratic side are more educated and more likely to be waged employed as shown in columns (3) and (4).

Access to public goods also exhibits similar patterns. The democratic sides have easier access to public goods. Specifically, residing on the democratic side of a border increases one's access to paved road and sewage system by about 11 pp. It also improves access to electricity by 21 pp. The coefficient of access to piped water is not statistically significant at any conventional level.

Panel B of the table shows estimates of these disparities for all members of partitioned ethnicities regardless of their current place of residence. These estimates allow me to determine the direction of bias from my preferred estimates (in Panel A of the table). Despite the sample size being more than double, the estimates in Panel B are not very different from those in Panel A. All estimates are statistically significant and still confirm that residents on the democratic side have better living conditions and improved access to public good.

There are two possible explanations for these results. One is that the increase in bandwidth does not induce a corresponding increase in variations among respondents belonging to same ethnicity across the borders. Note that the estimates of the disparities come from matching two individuals of same ethnicity who are subject to two different regime types. If the larger bandwidth does not increase the variations in matching pairs, the estimates would not record remarkable changes.

The second explanation is that there are no marked disparities in living conditions between members of partitioned ethnicities who choose to migrate and those who stay. Alternatively, this means that the potential biases from in and out migration offset each other. In effect, the results suggest that the estimates are less likely to be systematically affected by

(selective) migration.

Table 5: Socioeconomic Disparities Across Democratic-Nondemocratic Partitions

	(1) economic insecurity	(2) subjective wellbeing	(3) education	(4) employment status	(5) paved road	(6) electricity	(7) piped water	(8) sewage system
				Panel A. 50 km radius around border				
treated	-23.591***	0.075***	0.099***	0.270***	0.112*	0.212***	0.051	0.113*
	(1.628)	(0.027)	(0.029)	(0.033)	(0.067)	(0.045)	(0.057)	(0.059)
Obs.	6,974	6,942	6,965	6,968	6,968	6,967	6,878	6,945
R-sq.	0.207	0.054	0.145	0.123	0.124	0.405	0.262	0.163
Outcome Mean	35.72	0.286	0.222	0.294	0.300	0.639	0.564	0.212
Ethnicity F.E.	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES
				Panel B. universe of partitioned members				
treated	-23.516***	0.112***	0.114***	0.237***	0.176***	0.224***	0.107**	0.138***
	(1.397)	(0.024)	(0.022)	(0.025)	(0.048)	(0.040)	(0.045)	(0.049)
Obs.	14,708	14,638	14,674	14,681	14,708	14,696	14,575	14,598
R-sq.	0.204	0.049	0.182	0.133	0.165	0.380	0.298	0.285
Outcome Mean	32.21	0.320	0.285	0.315	0.342	0.679	0.590	0.275
Ethnicity F.E.	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES

The table displays the RD estimates of the disparities in socioeconomic outcomes across democratic (treated) and nondemocratic partitions. Economic insecurity is a standardized measure (0–100) assessing the frequency with which people face shortages of food, water, cooking fuel, medical treatment, and cash income. Subjective wellbeing is a dummy equal to one if a person rates their present living conditions as fairly or very good. Education equals to one if a person has completed a minimum secondary education, and employed is also equals to one if a person is waged employed. In columns (5)–(8) the dependent variable equals one if the stated public good is within walking distance from the respondent. All specifications include ethnicity and survey round fixed effects. The controls are respondent's age and its square, gender, and type of place of residence (rural/urban). Standard errors are clustered at the district/municipality. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

VI. Conclusion

Africa experienced its most unprecedented democratization wave in the early 1990s when almost all African countries became practical democracies. By close of 1997 only four countries had not completed a competitive, free and fair general elections. The primary reason behind this wave of democratization was to foster economic growth and development that was so much needed in the region. The hitherto authoritarian and paternalistic political systems not only bred political instability, but also undermined growth. In this study I investigate the effect of Africa's wave of democratization on economic performance and development.

The study is broadly divided into two parts. In the first part I use a standard panel fixed effects model to estimate the impact of democratization on economic performance. Accounting for GDP persistence and income convergence dynamics, I find that democratization leads to increased income. A 10 % increase in the liberal democracy index, a continuous and broad measure of democracy, raises income per person by about 1.3 %. Further, if a country transitions from a nondemocratic regime to a democracy I find that its GDP per capita increases, on average, by about 1.2 %. I test the mechanisms via which Africa's democratization could have affected income and find that democracy increases physical and human capital, foreign capital inflows, economic liberalization, and openness. I also show that the effect of democratization on income is not driven by the en masse structural adjustments that were implemented in Africa in the 1980s.

In the second part of the study, I try estimating the impact of democratization on development by exploiting African borders that split same ethnicity into democracies and nondemocracies. I am able to group African countries into consolidated democracy and nondemocracy (or failed democracies) because some countries quickly reverted back to nondemocracies after their initial democratic takeoffs in the early 1990s. Confiding the analysis to a sample of democratic-nondemocratic ethnic partitions, I first look at the impact of democratization on subnational development using panel fixed effects estimation at the grid cell level. Grid cells are assigned with their respective country's annual democratic scores or statuses. I find a robust positive impact of democratization on subnational development as proxied by light density at night. A one-point increase in the liberal democracy index increases the probability that a grid cell has light at night by 16 percentage points (pp) while moving from a nondemocracy to a democracy increases it by 3.5 pp.

I then use a within-ethnicity regression discontinuity design to compute development disparities across democratic-nondemocratic ethnic partitions. To the extent that groups astride borders are similar in all respects except regime type, this specification computes the causal effects of democratization on development. In this exercise I find that during the early

years of democratization, democratic and nondemocratic partitions were similar in levels of income. However, democratic partitions recorded higher differential income over time. Today, an average democratic partition is about 5–7 pp more likely to have light at night relative to its nondemocratic counterpart. These results are robust to several sensitivity checks and also pass a falsification test conducted around a placebo border.

Compiling individual-level data for members belonging to partitioned ethnicities, I also find that democratization differentially increases human development by increasing years of schooling by a year and access to formal education by 6 pp. Residing in democratic partitions is also associated with significant improvements in other socioeconomic outcomes including economic security, subjective wellbeing, waged employment, and access to public goods.

In sum the study makes valuable contribution to the literature, yet it also embodies some limitations. Some African countries lack consistent national statistics, hence the cross-country estimates rely heavily on countries with consistent data. This may be a source of selection bias. This problem is partly corrected for by the light density data which is consistent and more reliable. However, the light data has limited time coverage as it does not cover the pre-democratization era. The light data is also criticized on grounds of its "blooming" feature. That is, lit areas spread their lights beyond their true boundaries, which artificially inflates the number of lit areas. Future research could pluck these data lapses or use other proxies of income and development to build on this work. Future works could also use my classification of democracy-nondemocracy and the identification strategy to investigate how democratization affects political preferences at the border areas. My study also leaves out the explanations for why some African countries reverted to autocracies and dictatorships. This is an avenue for future research.

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Appendix

A Tables and Figures

Appendix Table A1: Democratic-Nondemocratic Partitions

Ethnic Group	Countries Split Into	Democratic Partition (%)
Adele	Ghana (48 %), Togo (52 %)	48 %
Ambo	Angola (41 %), Namibia (59 %)	59 %
Ana	Togo (66.7 %), Benin (33.3 %)	33.3 %
Anyi	Côte d'Ivoire (58.3 %), Ghana (4241.7 %)	41.7 %
Assini	Côte d'Ivoire (46 %), Ghana (49 %)	49 %
Atyuti	Togo (87 %), Ghana (13 %)	13 %
Avatime	Togo (48.6 %), Ghana (51.4 %)	51.4 %
Bargu	Niger (2.6 %), Nigeria (19 %), Burkina Faso (1.8 %), Benin (76.6 %)	76.6 %
Birifon	Burkina Faso (48 %), Ghana (52 %)	52 %
Brong	Côte d'Ivoire (15.7 %), Ghana (84.3 %)	84.3 %
Buem	Togo (60 %), Ghana (40 %)	40 %
Busa	Nigeria (86 %), Benin (14 %)	14 %
Busansi	Togo (3.6 %), Burkina Faso (90.6 %), Ghana (5.5 %)	5.5 %
Chakossi	Togo (73.4 %), Ghana (26.6 %)	26.6 %
Dagari	Burkina Faso (33 %), Ghana (67 %)	67 %
Dagomba	Togo (7.5 %), Ghana (92.5 %)	92.5 %
Dendi	Niger (38.5 %), Nigeria (0.8 %), Benin (60.8 %)	60.8 %
Egba	Nigeria (51.8 %), Togo (7.6 %), Benin (40.5 %)	40.5 %
Ewe	Togo (55.5 %), Ghana (42 %)	42 %
Fon	Togo (14.3 %), Nigeria (0.15 %), Benin (85 %)	85 %
Grunshi	Burkina Faso (32 %), Ghana (68 %)	68 %
Gun	Nigeria (50 %), Benin (46.5 %)	46.5 %
Gurensi	Burkina Faso (13 %), Togo (13 %), Ghana (74 %)	74 %
Gurma	Togo (1 %), Burkina Faso (72 %), Niger (12 %), Benin (15 %)	15 %
Herero	Angola (9 %), Namibia (91 %)	91 %
Hiechware	Zimbabwe (19.4 %), Botswana (80.6 %)	80.6 %
Kabre	Togo (62 %), Benin (38 %)	38 %
Konkomba	Togo (76 %), Ghana (24 %)	24 %
Kwangare	Angola (84 %), Namibia (16 %)	16 %
Ligbi, Degha (Se)	Côte d'Ivoire (28.5 %), Ghana (71.5 %)	71.5 %
Mbukushu	Angola (73.7 %), Namibia (11.6 %), Botswana (14.7 %)	26.3 %
Nafana	Côte d'Ivoire (26.3 %), Ghana (73.7 %)	73.7 %
Naudeba	Togo (16 %), Benin (84 %)	84 %
Ndebele	Zimbabwe (94.6 %), Botswana (5.6 %)	5.6 %
Nukwe	Zambia (5.2 %), Angola (44.2 %), Botswana (24.3 %), Namibia (26.4 %)	50.6 %
Popo	Togo (28.5 %), Benin (63.5 %)	63.5 %
Ronga	Mozambique (59.5 %), Eswatini (5.3 %), South Africa (34.7 %)	71.5 %
Sotho	Lesotho (23.8 %), South Africa (76.2 %)	76.2 %
Subia	Zambia (52.7 %), Zimbabwe (6.1 %), Botswana (11 %), Namibia (30.1 %)	41.2 %
Swazi	Eswatini (55.5 %), South Africa (44.5 %)	44.5 %
Tem	Togo (82.7 %), Benin (17.3 %)	17.3 %
Thonga	Mozambique (58.3 %), South Africa (41.7 %)	41.7 %
Tlokwa	Zimbabwe (8.5 %), Botswana (14.3 %), South Africa (77.2 %)	91.5 %
Tribu	Togo (75.5 %), Ghana (24.5 %)	24.5 %
Venda	Zimbabwe (30.6 %), South Africa (69.4 %)	69.4 %

The table shows the major democratic-nondemocratic partitions used in the analysis.

Appendix Table A2: Border Discontinuities in Demographics

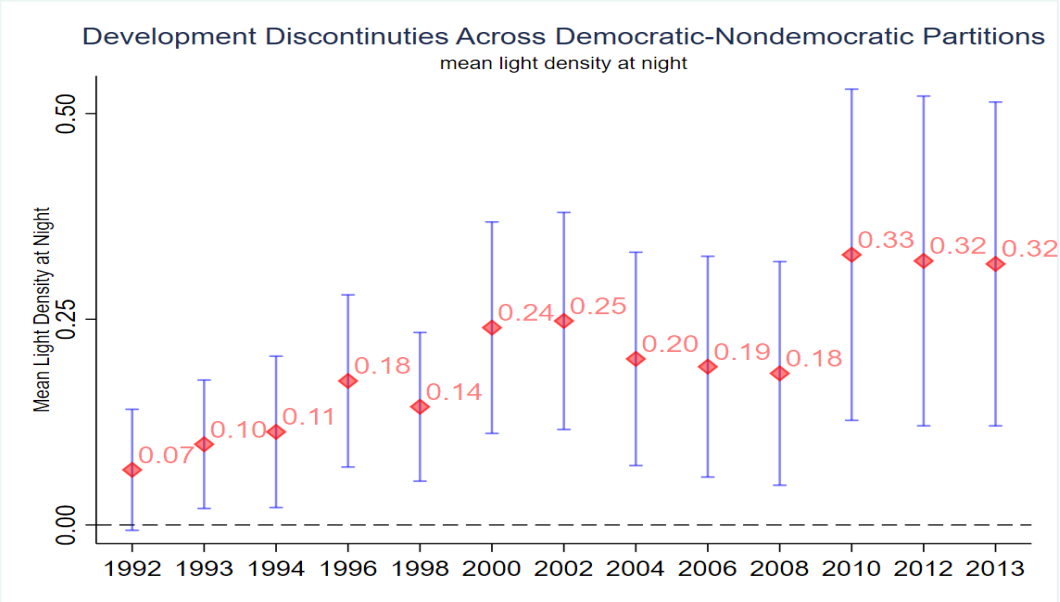
	50 km			100 km		
	age	female	rural	age	female	rural
treated	-0.260	-0.001	0.1003***	-1.571*	0.007	0.288***
	(0.609)	(0.022)	(0.021)	(0.855)	(0.031)	(0.030)
Obs.	6,989	7,022	7,022	10,231	10,275	10,275
R-sq.	0.003	0.000	0.016	0.004	0.000	0.034

The table displays estimates testing the discontinuities in predetermined covariates across democratic-nondemocratic partitions. The "treated" refers to the democratic side of the border. Robust standard errors are reported in parenthesis below the estimates. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

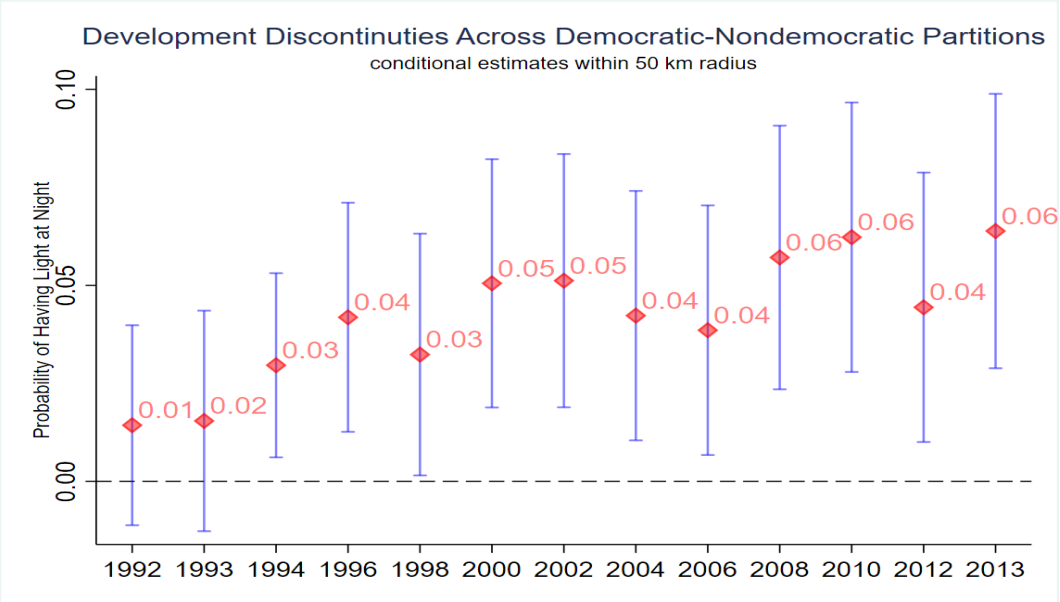
Appendix Table A3: Sensitivity Checks

	1996	1998	2000	2002	2004	2006	2008	2010	2012	2013
					Panel A. Two Dimensional RD					
treated	0.042***	0.039***	0.055***	0.057***	0.051***	0.048***	0.069***	0.074***	0.055***	0.073***
	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.017)	(0.017)
Obs.	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562
R-squared	0.243	0.242	0.280	0.262	0.264	0.233	0.249	0.271	0.273	0.239
					Panel B. Ethnicity-Specific Slopes					
treated	0.036**	0.037**	0.047***	0.047***	0.045***	0.041**	0.064***	0.073***	0.056***	0.075***
	(0.015)	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.017)	(0.018)	(0.018)	(0.018)
Obs.	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562	6,562
R-squared	0.258	0.262	0.306	0.282	0.289	0.255	0.277	0.296	0.292	0.257
					Panel C. Optimal MSE Bandwidth Estimators					
Conventional	0.035**	0.034**	0.032*	0.038*	0.043**	0.043**	0.064***	0.066***	0.054***	0.070***
	(0.016)	(0.017)	(0.019)	(0.020)	(0.018)	(0.018)	(0.019)	(0.020)	(0.020)	(0.020)
Bias-corrected	0.036**	0.034**	0.026	0.032	0.042**	0.043**	0.065***	0.067***	0.057***	0.075***
	(0.016)	(0.017)	(0.019)	(0.020)	(0.018)	(0.018)	(0.019)	(0.020)	(0.020)	(0.020)
Robust	0.036*	0.034*	0.026	0.032	0.042*	0.043**	0.065***	0.067***	0.057**	0.075***
	(0.019)	(0.020)	(0.022)	(0.023)	(0.022)	(0.022)	(0.023)	(0.024)	(0.024)	(0.024)
Obs.[L R]	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685	6146 8685
Eff. N.[L R]	2965 3010	2976 3019	2562 2566	2454 2479	2822 2912	2838 2948	2826 2923	2796 2871	2816 2890	2800 2879
Eff. Bias N.[L R]	4035 4223	4026 4177	3896 4014	3783 3909	3978 4103	3948 4069	3931 4056	3910 4033	3930 4056	3943 4066

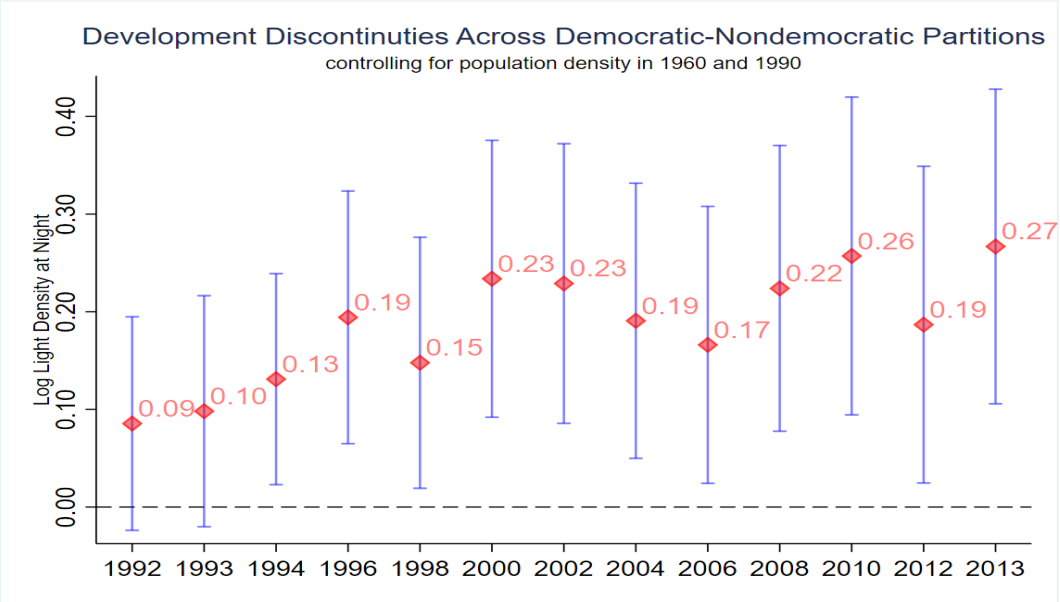
The table displays the results from the sensitivity checks of the baseline results showing the development disparities across democratic-nondemocratic partitions. The model in Panel A uses a two dimensional RD whereas the one in Panel B assigns unique slopes to each partitioned ethnicity along a border. Panel C estimates the disparities using optimal MSE bandwidth estimators with a triangular kernel. The dependent variable takes a value one if a grid cell has light and zero otherwise. All specifications include ethnicity fixed effects. To fit results into the page, estimates before 1996 are not shown. Standard errors are clustered at the grid cell. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$



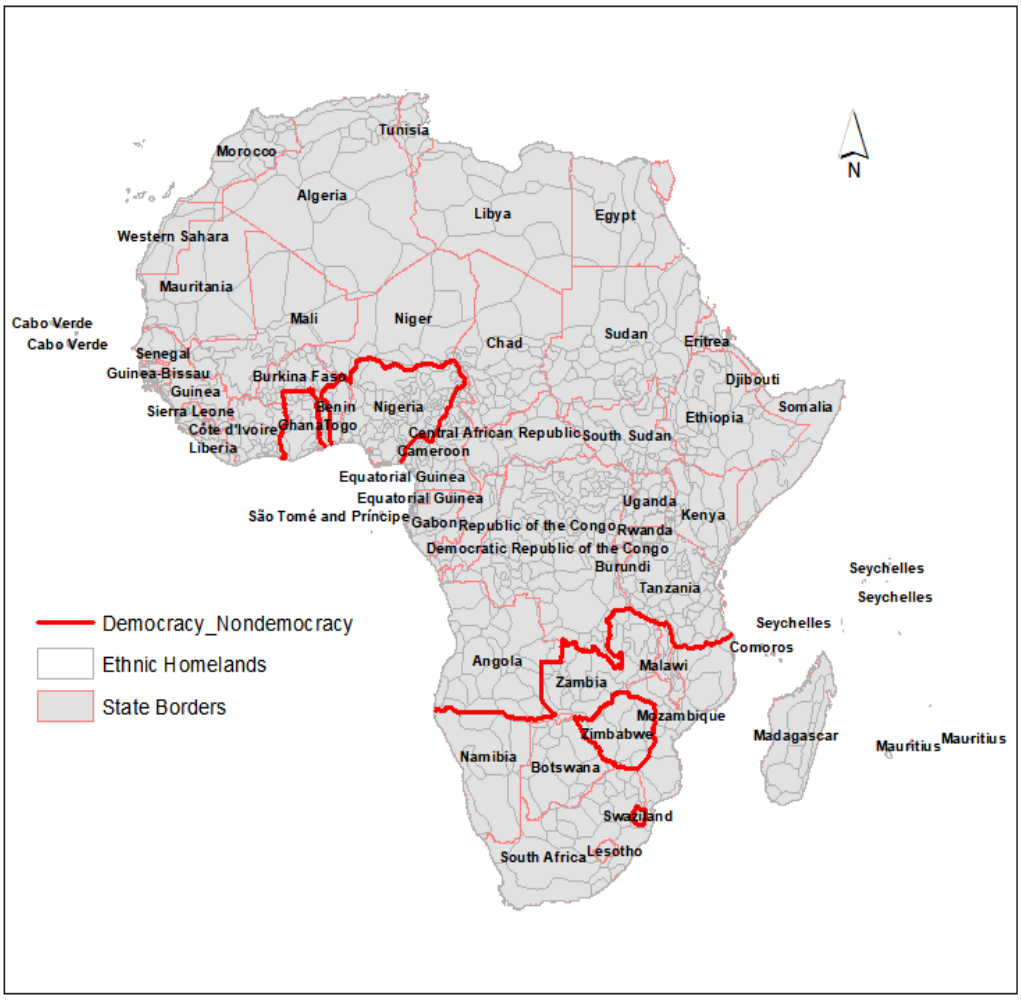
Appendix Figure A1: The figure shows the RD estimates of the development discontinuities across democratic-nondemocratic partitions. The dependent variable is mean light density at night. Standard errors are clustered at the grid cell.



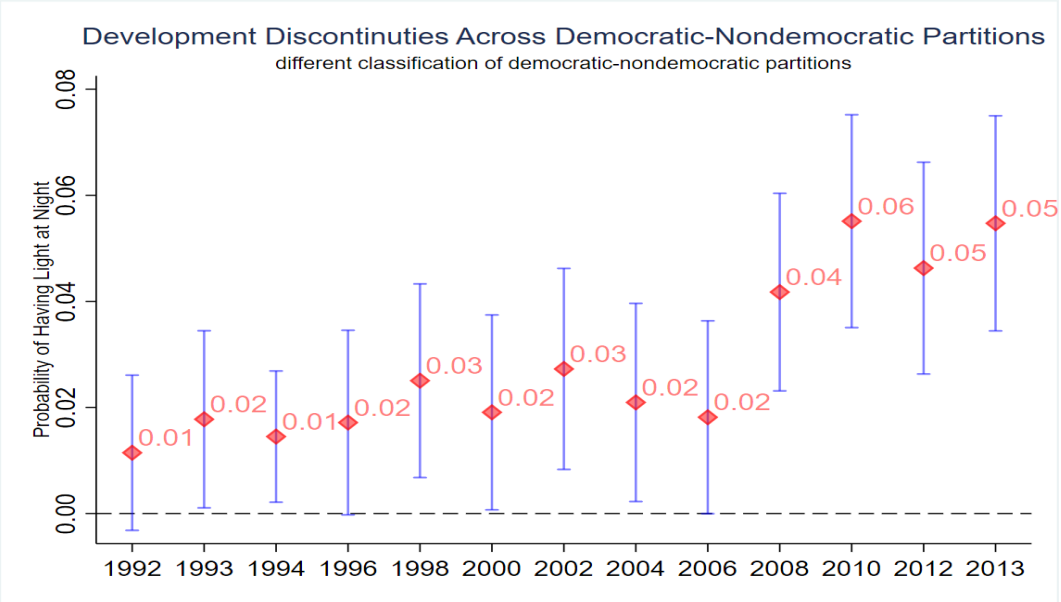
Appendix Figure A2: The figure shows conditional RD estimates of the development discontinuities across democratic-nondemocratic partitions. The dependent variable takes a value one if a grid cell has light and zero otherwise. The controls are distance to river, distance to seacoast, mean elevation, mean precipitation, slope, and grid cell size. Standard errors are clustered at the grid cell.



Appendix Figure A3: The figure shows RD estimates of the development discontinuities across democratic-nondemocratic partitions controlling for log population densities in 1960 and 1990 (ln population = ln(0.01 + population density)). The dependent variable is log light density lny = ln(0.01 + mean light). Standard errors are clustered at the grid cell.



Appendix Figure A4: The figure displays ethnic homelands and the contemporary state borders that divide ethnicities into democracies and nondemocracies.



Appendix Figure A5: The figure shows the RD estimates of the development discontinuities across democratic-nondemocratic partitions. In this exercise I use a weaker classification of consolidated democracy to test the robustness of my main results. The dependent variable takes a value one if the grid cell has light and zero otherwise. Standard errors are clustered at the grid cell.

B Further Evidence & Falsification Analysis

In this section I provide a fine-tuned evidence on the impact of democratization on human development. I also conduct a falsification analysis around a placebo border.

I use the border diving Ghana and Togo to investigate the impact of democratization on human capital. The Ghana-Togo border is ideal for this analysis because it divides Africa's most improved democracy, Ghana, and a typical nondemocracy, Togo. On the libdex index Ghana recorded the most impressive performance from 1990 to 2018 (figure B1). While Ghana's score jumped from 0.097 in 1990 to 0.63 in 2018, an average African country moved from 0.153 to 0.310. Togo improved by 0.175 points over same period, moving from 0.067 to 0.242. In my sample period, it has recorded no democratic episode. It also has had a single family in power since the 1967.

This border is also comparatively more "arbitrary". It partitions about 15 ethnic groups with 11 of them identified as major partitions. These groups also vary sharply in levels of ethnic political complexities. While some of them such as the Dagombas are highly centralized, some have paramount kingdoms (Ewe, Mamprussi) and others have no centralized authority (The Konkombas). Thus, this border affords a typical setting I exploit to provide further evidence of the impact of democratization on human development.

BI Democratization and Human Development

I investigate whether democratization improves human development, specifically human capital as measured by access to formal education and years of schooling. To identify the effect of democratization on human capital, I compare birth cohorts across the Ghana-Togo border before and after Ghana's democratic transition in 1992. The data used is from the household member recode of DHS' 2014 standard survey. My sample covers members who were at least 12 years old at the time of the survey. Cohorts < 12 years old are excluded from the analysis because they either had yet to be enrolled in school or were currently enrolled in primary school.

Figures B2a and B2b report the disparities in access to formal education and years of schooling across the Ghana-Togo border for different birth cohorts, respectively. Formal education takes a value one if the respondent has a formal education and zero otherwise. Years of schooling is in single years. I control for respondent's type of place of residence, gender and marital status.

The estimates are reported in decadal birth-cohort intervals including 1993–2002, 1983–1992, 1973–1982 and 1963–1972. All pre-1963 cohorts are however grouped into one category. It is worth stating that my estimates here are based on Intent to Treat (ITT) analysis as members do not always follow their cohorts. In other words, members are analyzed

regardless of whether they adhered to their cohort-treatment status or not.

The results show a fairly clear pattern. Ghana's democratization has had a significant differential impact on human development. The effect is more pronounced in years of schooling, suggesting that children stay in school longer after democratization. This echoes the work of Harding and Stasavage (2014) and Stasavage (2005) who respectively find that African democracies are more likely to abolish school fees and spend more on education.

To be specific, the estimates show that the post-democratization cohort (1993–2002) on the Ghana side of the border are about 6 pp more likely to have acquired some level of formal education compared to the their counterparts on the Togo side. They also have one extra year of schooling relative to their Togolese counterparts. Estimates for the other birth cohorts are comparatively smaller and not statistically different from zero.

BII Falsification

I conduct a falsification exercise around a pseudo border that formerly divided the colonies of Great Britain (Gold Coast) and Germany (Germany Togoland) as depicted in figure B3b. The Gold coast-Germany Togoland border existed from about 1884 to 1914 when Germany lost the First World War and hence its African "possessions". The Germany Togoland was divided between Great Britain and France, and the portions allotted to them respectively became British Togoland and French Togoland. Following independence, the British Togoland merged with the Gold Coast to form modern Ghana, and French Togoland is now Togo.

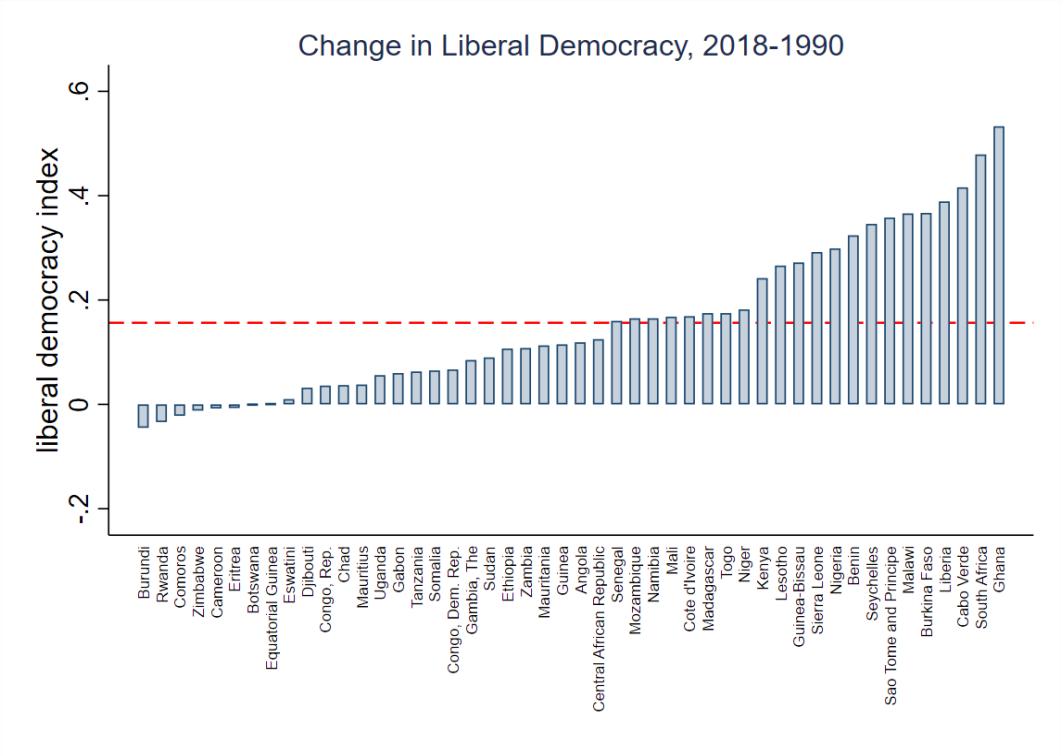
I run the falsification analysis over the Gold Coast-British Togoland border. To the extent that the border no longer exists and therefore regime differences are absent across this border, there should exist no systematic disparities in development outcomes. This exercise is helpful in reinforcing arguments about the importance of democratic governance in the post-independence era.

To be consistent, the sample covers only the otherwise "partitioned" ethnicities across this border. Ten groups are would have been divided across this border, but only half of them are major partitions (those with at least 5 % of their land in Gold Coast or British Togoland). The major partitions (used in the analysis) are Dagomba, Ewe, Gurensi, Krachi, and Mamprusi.

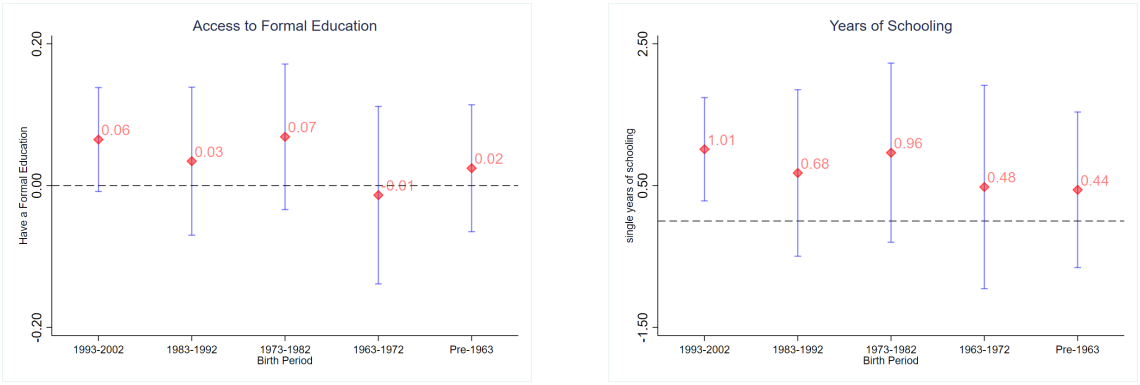
I first reproduce my baseline results using the Ghana-Togo border. The estimates are shown in figure B4. The main patterns do not change. However, the estimates are clearly larger than those from the baseline results. The reason is that the two-country comparison allows to compute estimates net off country-level time-invariant factors. In other words, the democracy dummy in this specification captures "everything" unique to Ghana as opposed

to Togo. In addition to differences in regime type (democracy vs. nondemocracy), other distinct factors include institutions, history, language, geography, and ethnicity. The last two factors are unlikely to drive the results as they are "controlled" for in the specification. The other factors are also unlikely to drive these results because if it were so it should have been apparent in the human development results documented above. In other words, birth cohorts should have systematically diverged in the pre-democratization if other factors were plausible explanations for the contemporary development divergence across the border.

The falsification results are displayed in figure B5. I report only unconditional results within 50 km radius but the results do not change if I consider universe of partitioned ethnic homelands and/or include local covariates. The treated side is the Gold Coast and control is the British Togoland. The results indicate no systematic border discontinuities. Almost all the coefficient estimates are small and statistically not different from zero. In fact, the most recent estimates are consistently the same. In sum, the falsification results suggest that post-independent regime differences play influential role in comparative development.



Appendix Figure B1: The figure shows country-level changes in the Liberal Democracy Index from 1990 to 2018.



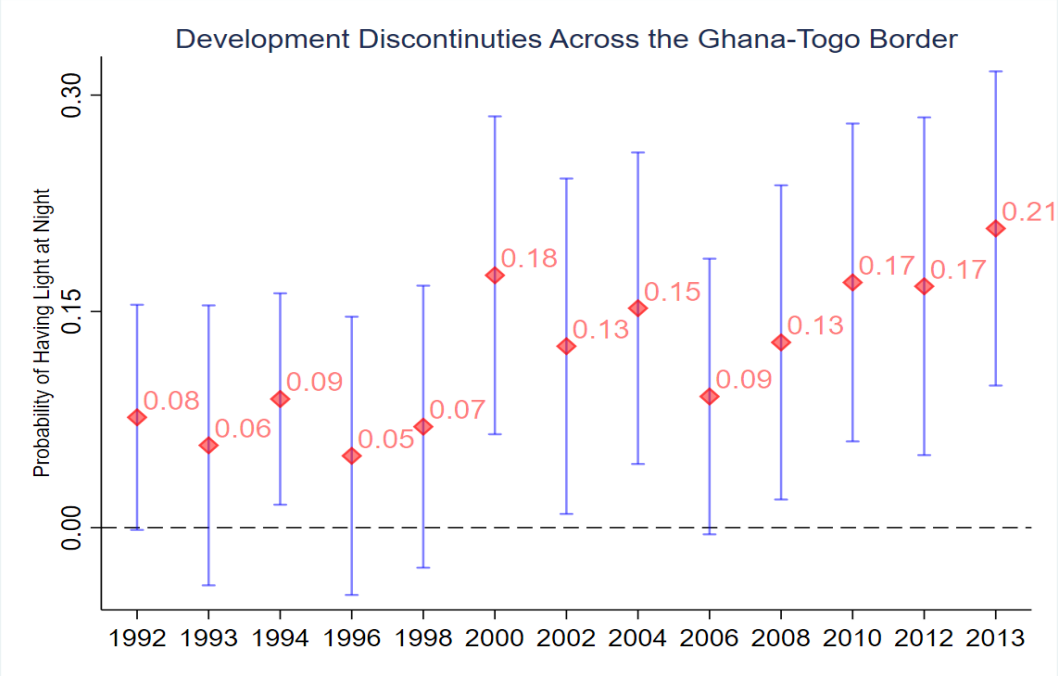
(a) (b)

Appendix Figure B2: The figures display RD estimates of the disparities in human capital across the Ghana-Togo border (50 km radius). The dependent variable in the left panel is access to formal education which takes a value one if the respondent has some form of formal education and zero otherwise. In the right panel the dependent variable is single years of schooling. All specifications include ethnicity fixed effects and controls for type of place of residence (rural/urban), gender and marital status. Standard errors are clustered at the survey sampling unit.

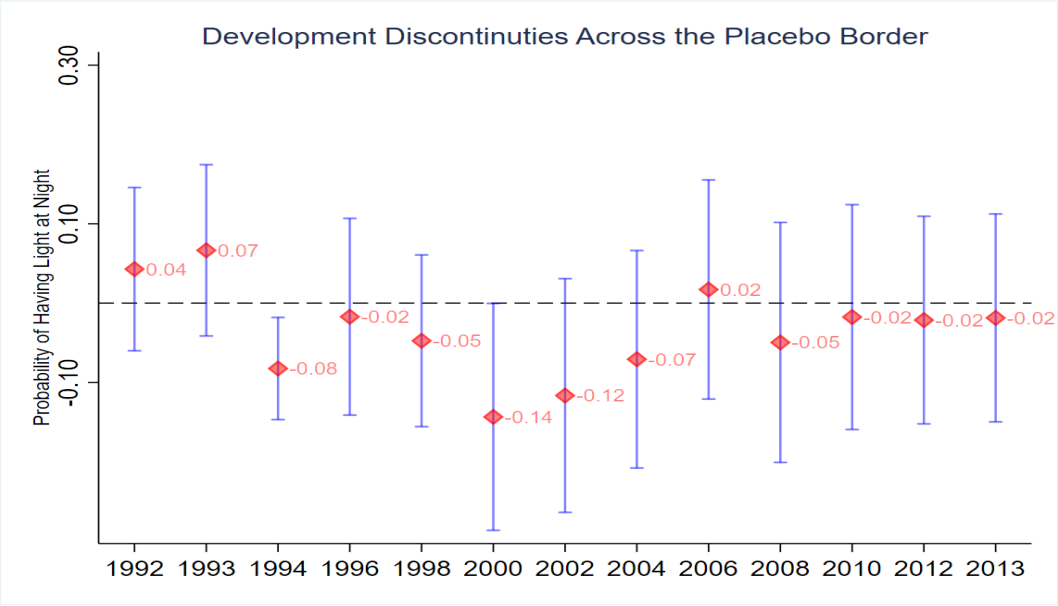
(a) The Gold Coast & Germany Togoland

(b) The Gold Coast, British Togoland & French Togoland

Appendix Figure B3: The left figure shows the Gold Coast and Germany Togoland respectively controlled by Great Britain and Germany until 1914. The right figure depicts the partitioning of Germany Togoland into British Togoland and French Togoland after World War I.



Appendix Figure B4: The figure shows RD estimates of the development discontinuities across the Ghana-Togo border. The dependent variable takes a value one if the grid cell has light at night and zero otherwise. All models include ethnicity fixed effects. Standard errors are clustered at the grid cell.



Appendix Figure B5: The figure shows RD estimates of the development discontinuities across the Gold Coast-British Togoland border. The dependent variable takes a value one if the grid cell has light at night and zero otherwise. All models include ethnicity fixed effects. Standard errors are clustered at the grid cell.