The Ethnic Politics of Nature Protection: Ethnic Favoritism and Protected Areas in Africa

Stephen Dawson* Felix Haass† Carl Müller-Crepon‡
Aksel Sundström*

July 24, 2024

Abstract

Nature protected areas are hailed as an institutional solution to the global biodiversity crisis. However, conservation entails local economic costs for some communities and benefits for others. We propose that the establishment of protected areas in Africa follows an ethno-political logic which implies that governments distribute protected areas such that their ethnic constituencies are shielded from their costs but enjoy their benefits. We test this argument using continent-wide data on ethnic groups' power status and protected area establishment since independence. Difference-in-differences models show that political inclusion decreases nature protection in groups' settlement areas. Yet, this effect is reversed for protected areas that plausibly generate tourism income. We also find that ethno-political inclusion is linked to legal degradation of protected areas. Our findings on the ethno-political underpinnings of nature protection support long-voiced concerns by activists that politically marginalized groups carry disproportional costs of nature conservation.

Keywords: Environmental protection, protected areas, ethnic politics, political economy, Africa, GIS

*Department of Political Science, University of Gothenburg
†Department of Political Science, University of Oslo
‡Department of Government, London School of Economics and Political Science

It's a decree from the Cameroonian prime minister that says a national park is created at such and such a place, from point A to point B, without the people who live there ever having been involved.

- Spokesperson of the Baka, a minority group evicted from the Lobéké Park. [1]

Introduction

The global loss of biodiversity and the climate crisis are two major challenges facing humanity that are at the center of international commitments such as the Sustainable Development Goals. Protected areas (PAs) have become the most established policy instrument for nature conservation. By now, they cover more than a tenth of all land on the African continent. This share will likely rise substantially due to the international ambition to protect 30 percent of global land areas by 2030, agreed upon by 195 countries during the 15th Conference of Parties (COP15) in 2022 through the Kunming-Montreal Global Biodiversity Framework (UNEP 2022).

While the benefits of protected areas for biodiversity and conservation are well established, they come with substantive cost to local populations who are often excluded from political power. Indeed, political activists across the globe campaign against national parks and other forms of protected areas. The NGO *Survival International*, for example, accuses UNESCO World Heritage parks of forced evictions and other human rights abuses (Survival International 2024). Ethnic groups without political clout that are reported to have faced evictions from protected areas include, for example, the Basarwa in Botswana, the Masaai in Tanzania, the Twa in DR Congo, and the Ogiek in Kenya. Such concerns are echoed by a UN Special Rapporteur, who noted that "national parks and conservation areas have resulted in serious and systemic violations of indigenous peoples' rights through expropriation of their traditional lands" (UN 2016). We systematically follow up on these concerns and ask whether access to political power shields ethnic groups from bearing the costs of the establishment of protected areas.

We argue that the establishment of protected areas significantly restricts land-use and human livelihoods. PAs thus come at significant socio-economic costs for

[1] See https://pulitzercenter.org/stories/southeastern-cameroon-baka-people-are-marginalized-name-nature-conservation (last accessed: 16 July 2024).

local populations but have, in most but not all cases, few local benefits. We develop the consequent logic of PA allocation by national governments directly from the literature on ethnic favoritism (Franck and Rainer 2012; De Luca et al. 2018; Kramon and Posner 2016). Governments have incentives to designate PAs such that their ethnic constituencies are shielded from their costs. This leads them to establish PAs in settlement areas of ethnic groups that are not represented in the national executive. This cost-based logic should be offset or even reversed for parks with substantive local economic benefits, arising particularly where parks' charismatic megafauna attract tourists. Governments lastly have incentives to degrade previously established PAs in areas demographically dominated by their ethnic constituents, thus reducing the conservation costs they bear.

Our study of the ethno-political determinants of the geography of protected areas contributes directly to the rapidly growing literature on the political economy of environmental protection and degradation. Previous studies have found important effects of lobbying (Harding et al. 2023), representation (Gulzar, Lal, and Pasquale 2023), and political institutions (Sanford 2023) on nature protection and degradation of forests in particular. Our work speaks to an emerging interest in the political economy of protected area placement (Alger 2023; Beacham 2023, 2024). Closest to our study are (Mangonnet, Kopas, and Urpelainen 2022) who study how the designation of PAs in Brazil is biased towards areas dominated by the national opposition. Foundational for our study, they find that political representation can partially shield communities from the costs of nature protection.

We address four gaps in the literature. First, we expand the theoretical argument to incorporate political competition along ethnic rather than party-lines in PA allocation, thus accommodating (semi-)autocratic settings and reflecting a dominant political cleavage in multi-ethnic states. Second, we add theoretical nuance by assessing variation in the costs and benefits PAs entail for local populations. Third, we go beyond PA establishment and assess their potential degradation over their subsequent lifetime. Lastly, we improve upon previous studies external validity by assessing our arguments with data from the entire African continent since countries' independence.

Our empirical approach uses spatio-temporal data on the power status and location of ethnic groups (Vogt et al. 2015) in tandem with the location of PAs from the World Database on Protected Areas (WDPA) in African states since independence to 2020 (Hanson 2022). Specifically, we create a sample of spatially evenly distributed points over the African continent which we observe each year. Overlaying these points with geographic information from the Ethnic Power Relations (EPR, Vogt et al. 2015) dataset, we identify for each point in which ethnic settlement area it is located. Exploiting temporal variation in each ethnic groups' access to political power in a generalized difference-in-differences setting, we estimate the effect of ethnic inclusion on a geo-point's chance of being designated as a protected area. By including point and country-specific year fixed effects, our design allows us to isolate time-varying, political drivers from time-invariant causes of PA designation, such as ecological suitability. We complement these tests with a case illustration of PA degradation in Kenya.

We document an overall negative effect of an ethnic group's political inclusion on the probability PA establishment in their homelands. This effect is consistent when applying recently developed methods for robust DiD estimation and event studies. Yet, the effect of political inclusion is muted by the presence of large mammals, which make the establishment of PAs more attractive due to substantive revenues from tourism. Drawing on data on legal degradation of PAs, we lastly document that PAs in settlement areas of included groups are disproportionately more likely to be institutionally degraded than when the group inhabiting their surroundings is politically excluded or irrelevant. Overall, our findings underline the ethnic dimension of conservation.

What we know about where and why PAs are established

A large literature investigates the consequences of designating areas for conservation. Scientists largely agree that PAs tend to protect nature, in that they help avoid deforestation (Ribas et al. 2020; Miteva, Pattanayak, and Ferraro 2012) and improve biodiversity conservation overall (Rodrigues et al. 2004; Leverington et al. 2010; Naughton-Treves, Holland, and Brandon 2005). Yet, they are not optimally located. Research on patterns of PA establishments largely document that authorities prioritize areas where protection is less expensive rather than those most threatened by biodiversity loss (Joppa and Pfaff 2009; Venter et al. 2018; Ando et al. 1998; Jenkins et al. 2015; d'Albertas et al. 2021; Gorenflo and Brandon 2006; Keles et al. 2020). Some PAs might even be 'paper parks' – existing in name only (Di Minin and Toivonen 2015) without any conservation benefits. This finding implies political and economic biases in allocation decisions. Recent work has started to theorize about the political economy of protected area placement. Alger (2023) suggests that industry interests affect governments choices to conserve certain areas, or not. Beacham (2023, 2024) adds to this by reasoning about how PA placement is also affected by the bargaining power of local political actors.

Many studies highlight the relationship between the costs of PA designations for the local population and the benefits for the people in power who make the allocation decision. Jones (2006) studies the origins of the larger PAs on the African continent and suggests that, rather than protecting wildlife, many PAs stemmed from the desire of colonial administrators to hunt big game wildlife undisturbed (see Neumann 2001; Peluso 1993). This feature of PA designation as an instrument of political self-interest is also present in the study of Mangonnet, Kopas, and Urpelainen (2022). Studying Brazil, they find that incumbents designate PAs predominantly in opposition areas, so that their antagonists incur the costs of land use limitations. Studying Zambia, Kenya, and Zimbabwe, Gibson (1999), in contrast, focuses more on the benefits of certain wildlife policies for the persons in charge and how these rewards shape inertia and change of conservation policy in Africa.

Two omissions are apparent in the literature on the political economy of PA designation. The first omission is the lack of attention to ethnic politics in theoretical arguments about PA allocation. A sizeable share of PAs are designated in multi-ethnic states, many of them in Africa, where group identities play an important role in politics (Eifert, Miguel, and Posner 2010; Lynch 2018). A large literature has demonstrated the importance of ethnic favoritism in the biased allocation of political goods and/or discrimination based on ethnic characteristics (Franck and Rainer 2012; Beiser-McGrath, Müller-Crepon, and Pengl 2021; Hodler and Raschky 2014; Burgess et al. 2015; De Luca et al. 2018; Kramon and Posner 2013). We bridge the gap between the favoritism and environmental protection literature and to study the ethno-political logic of environmental politics broadly and PA designation more specifically. The literature's second gap consists of the absence of systematic, large-N, cross-country evidence (but see see Beacham 2024, 2023 for an exception). Most studies rely on analyses of single, or only few countries for empirical evidence. Without a robust statistical basis it becomes difficult to disentangle systematic drivers from idiosyncratic ones.

Theory

In this section, we outline our theoretical argument, expectations and the observable implications from this reasoning.

The costs and benefits of protected areas

While conservation through setting aside areas for protection certainly serves the global common good of combating biodiversity loss, there is a long standing debate on the *local* impact of PAs on human populations (Upton et al. 2008; Mojo et al. 2020). The more critical vein of this literature points to the burden such reserves have on the ground by fuelling economic deprivation: "It is frequently local people, sometimes in poor countries with a rich biodiversity, who bear the social cost when habitats are set aside for conservation" (Bostedt 1999, p. 71). Similarly, Adams and Hutton (2007) note that "the costs of PAs are mostly born locally, while benefits accrue globally" (p. 161). Coad et al. (2008) classify these local burdens as stemming from (a) displacement, (b) changes in land tenure and (c) restrictions in access.

Displacement refers to the forced removal of communities from their land (Agrawal and Redford 2009; Brockington and Igoe 2006; Brockington and Wilkie 2015). Changes in land management mostly consist of shifts from customary to state control over land use and rights, which can entail restrictions for indigenous and migrating communities resulting in areas of 'no man's land' with unclear land titles (Cernea and Schmidt-Soltau 2006). Restrictions in access to resources can harm both large- and small-scale resource extraction operations such as mining, logging, agriculture, fishing and hunting, which can negatively impact local populations' essential livelihoods (Mangonnet, Kopas, and Urpelainen 2022).

All three of these costs are exemplified in the experiences of local populations in Uganda, where a rich biodiverse environment in need of protection meets a history of political struggles between ethnic groups. Smaller ethnic groups such as the Batwa – part of the Banyarwanda people living near the Rwandan border in the south-west of the country – and the Benet – of eastern Uganda – have been forcibly evicted from their homelands to make way for the demarcation of the Bwindi Impenetrable National Park and the Mount Elgon National Park, respectively. The plight of the Benet people and their resettlement was politicised by the opposition FDC party in their manifesto ahead of the 2021 election.[2] The incumbent NRM party also approached the Benet community before elections with promises of degazetting this land in return for their groups' political support (Dirkse 2017). A local resident (quoted in Dirkse 2017) suggests that "during elections, we are allowed to take our cows to the forest, but after that...we are not allowed anymore".

The context of Uganda also illustrates the politicisation of the local costs of conservation. The larger Acholi ethnic group, excluded from executive politics in distinct periods of time, have used their limited number of representatives in parliament to attempt to shield the region from the negative consequences of conservation. When the East Madi Wildlife Reserve was gazetted in 2002, it resulted in a dispute over the boundaries between two districts and made a group of Acholi inhabitants effectively landless (Reuters 2019). Since then, the Acholi people have opposed further demarcation in their territory. Gilbert Olanya, then leader of the Acholi Parliamentary Group, demonstrated his opposition by stating in parliament that "as long as [I am] a Member of Parliament, no activity will take place to demarcate the land".[3] These cases collectively demonstrate the contested nature of PA establishment in localities due to the costs incurred by local populations in terms of displacement, land tenure, and land use.

A contrasting vein of research points to the possible economic benefits conservation can have locally. Accordingly, having a PA in the locality can improve ecosystem conditions and thereby provide long-term income opportunities (Naidoo et al. 2019). PAs might thus increase local economic development, partic-

[2] Party manifesto of FDC. See `https://fdc.ug/wp-content/uploads/2020/12/FDC-Manifesto.pdf` (last accessed: 16 July 2024).

[3] Quoted in Olanya (2016)

ularly when they come with infrastructure investments (Andam et al. 2010, 2008). PAs can also generate second order economic benefits in the form of increased local employment in conservation management (e.g. local guides, rangers; Watson et al. 2014).

Tourism is arguably the largest local revenue stream generated by PAs. Protected areas help to preserve nature and its wonders (Gray et al. 2016), thereby attracting national and international visitors willing to pay to see protected wildlife. According to estimates by the German Ministry of Economic Cooperation and Development, nature tourism "accounts for 88% of Africa's overall tourism revenue" and conservation areas attracted 70 million visitors in 2015 (Berghöfer et al. 2021, 4; see also Balmford et al. 2015; Naidoo et al. 2019, 2016). Yet, not all parks generate the large tourist crowds and their consumption. McKinnon et al. (2016) stress that increased economic and material well-being from PAs is intrinsically linked to "commercial enterprises (e.g., eco-tourism or trophy hunting) that rely on the presence of charismatic species" (p.2). This is the case of the "Big Five", lions, leopards, rhinoceros, elephants, and African buffalos targeted by so many Safaris in Eastern and Southern Africa. We therefore expect that PAs come mostly with costs but may bring offsetting benefits depending on their capacity to attract tourists.

The ethnic politics of allocating costs and benefits from PAs

Leaders are incentivized to not allocate public bads towards areas where their constituents and supporters reside (e.g. Monogan, Konisky, and Woods 2017). The use of the term 'public bads' is not as common as its widely used antonym but generally refers to unwanted activities, such as school closures or air pollution, where the possible benefits of the activity are reaped elsewhere, and the local area is exposed to its costs (Costello, Quérou, and Tomini 2017). Given our discussion above, we suggest that whether PAs can be considered a local public bad or a local public good depends on the predominantly economic implications for the local population in terms of obstructing or facilitating opportunities for revenue. We rely on the assumption of Harjunen, Saarimaa, and Tukiainen (2023), who note that for leaders, an essential task is "the question of where to locate local public goods (or bads)" (p. 863). Focusing on the political context of the African continent, we argue that this allocation is conditioned by ethnic politics. We propose that who bears the costs from PA establishments and who reaps the benefits depends on the ethnic power structure of executive politics.

An assumption of our argument borrows insights from work on the politics surrounding land tenure in Africa. While tenure regimes on the continent vary – smallholders have more power over their lands in some settings compared to others – land rights are often weak and affected by politics (Boone 2015; Honig 2022).[4] We find this aspect important: weak land tenure should give national politicians the leeway to alter them in a biased manner should they wish to do so. For instance, Boone (2011) illustrates how the discretionary allocation of land rights in settlement schemes have been biased to favor groups belonging to leaders' core constituencies. We expect a similar process to be at work with the allocation of PAs – often demanded by larger goals of increased protection in international agreements and subsequently allocated through centrally based domestic decisions. Drawing again on insights from the Ugandan context, we note that the Executive Director of the Uganda Wildlife Authority stated in a self-authored article that "Protected areas are created by parliament and their boundaries determined by an act of parliament. Therefore, any changes can only be effected by the parliament." [5] With these insights, we assume that weak land rights give rise to the possibility of leaders to steer PAs away from one's constituencies.

A second assumption of our argument relies on the description of politics in Africa where citizens tend to identify with one of the ethnic groups in the country. We follow Kimenyi (2006, p. 65) and refer to this concept as social groups with a shared culture and language. Moreover, our argument builds on the assumption that ethnic groups are concentrated in specific territories. While localities and individuals across Africa are frequently multi-ethnic, ethnic groups tend to have geographically-concentrated settlement areas, widely known and politically relevant "homelands" in which a large plurality of the population identifies with the

[4] In the conceptualization by Boone (2015), the distinction between 'statist' and 'neo customary' tenure regimes captures important differences in this regard.

[5] See https://www.newvision.co.ug/news/1183065/stop-trading-votes-encroachment (last accessed: 16 July 2024).

group (Müller-Crepon 2024).[6]

Insights on the political economy of patronage in Africa generally hold that a leader's ethnicity matters for which groups receive public goods and services (Kramon and Posner 2016). Societies with substantial ethnic heterogeneity could produce a situation of an 'ethnicisation' of public resources (Rabushka and Shepsle 1972), where leaders supply goods to those of the same group as themselves to a larger extent than others. This ethnic favoritism "refers to a situation where coethnics benefit from patronage and public policy decisions, and thus receive a disproportionate share of public resources, when members of their ethnic group control the government" (Burgess et al. 2015, p. 1817). We suggest that similar processes should be at work when it comes to the allocation of the local public goods and bads of conservation.

Given that ethnic groups are geographically distributed in territories across Africa, we suggest that local goods and bads from protected areas should map spatially and that leaders selectively put costs on non-coethnics and benefits on coethnics. Our argument is informed by two models on why one could expect leaders of a certain ethnicity to benefit their own group. The first reasoning is about intergroup solidarity. This line of thought assumes that elite actors or a leader of a certain ethnic group will favor coethnics through policies in a setting of high heterogeneity and polarization, but not because of self-interest. This model does not see rulers as acting only to stay in power, rather to benefit their own group. In the words of Franck and Rainer (2012) this view on how a leader in such settings acts is about 'ethnic altruism', as the ruler is assumed to want the highest utility for their own ethnic group.

A second and contrasting model builds on the interest-group theory of government and posits that leaders are self-interested when navigating ethnic politics (Kimenyi 2006). This entails not only that they favor their coethnics over other

[6] Building on Kimenyi (2006), we rely on a tradition of scholarship that uses the term 'geoethnicity', suggesting that benefits for a given area would benefit a certain group. Cobbah (1988, cited in Kimenyi (2006)) noted that "In Africa, this ethnic identity is above all other things a territorial identity. Nothing defines the ethnic group better than its 'standing place'. Thus the term geoethnicity has been used to describe the African ethnic phenomenon. Geoethnicity as opposed to non-territorial ethnic identification involves the historic identification of an ethnic group with a given territory, an attachment to a particular place, a sense of place as a symbol of being and identity".

groups but also that they essentially use the their groups' welfare for instrumental reasons. As such, they allocate public goods and bads to balance political support and would primarily evaluate the impact of these actions on coethnics based on their presumed political response. Related, Franck and Rainer (2012) theorize that a leader in this office-seeking conceptualization has two reasons to favor their own group: first, attaining their support could be cheaper, because goods can be transferred more efficiently, and second, the promise of support through 'quid pro quo' from coethnics could be more reliable than from others.

Both these models assume that a leader or elites value the welfare of coethnics above that of non-coethnics, and result in similar expectations when considering how leaders may distribute public goods and bads. The rationale to shield coethnics from receiving these costs in the first model is primarily because of the negative impact on the welfare of coethnics. The reason why it might be unwise to allocate public bads to coethnics in the reasoning of the second model is because of how these groups might react if they are faced with leaders that 'betray' their own group. If given the choice, the preference of an office-seeking ruler is to place this cost in the homelands of non-coethnics.

We argue that a change in political representation in the national government will have ramifications on the allocation of PAs as local public goods and bads. We build on the reasoning by Miquel (2007), who considers patterns of ethnic inclusion regarding the allocation of patronage and presents a model which predicts that "a change in the group controlling power should be followed by a change in taxation, spending, and allocation of public resources" (p. 1270). It follows that a similar process of change should take place when it comes to the allocation of local costs or benefits. We therefore propose that PA allocation patterns are affected by a change in a group's inclusion in political power.

From this reasoning follows that a group's inclusion in power matters for how public goods and bads are allocated. Given that revenue-generating tourism in most cases is likely an ancillary consideration of protection and that PA tourism is estimated to be lowest in Africa compared to other regions (Balmford et al. 2015), we expect PAs – on average – to be more of a local public bad than good, by obstructing the ability of local inhabitants from utilizing resources from the land. As such, political leaders will seek to prevent coethnics from incurring the costs of PAs, and becoming included in political power should decrease the risk of having one's territory becoming protected. In this stylized reasoning, inclusion in national executive politics of a group would therefore tend to 'insulate' its area from receiving protected status.

Hypothesis 1 *Settlement areas of politically included ethnic groups are less likely to be transformed into protected areas.*

Nevertheless, we believe that PAs do in some cases generate revenues that offset or even outweigh their local economic costs. These benefits can accrue to the ethnic groups in whose territories the PA is located. Given the large potential benefits from tourism in some cases, we expect that ethnic groups are more likely to establish PAs in their homelands where the expected revenue from tourism is particularly high. One of the greatest appeals of tourism in Africa is the presence of rare, large terrestrial mammals. These include the so-called Big Five game animals (Elephant, Rhinoceros, African buffalo, Lion, and Leopard), but also Giraffes and Apes, such as Gorillas or Chimpanzees. Making access to these species available through PAs, lends itself to particularly profitable tourist operations, such as safaris and lodges, and allows the government to issue hunting licences. Consequently, we expect included ethnic groups to establish PAs in their homelands, particularly in areas where these kinds of large, terrestrial animals are present.

Hypothesis 2 *The negative effect of political inclusion on the establishment of protected areas should decrease (or even reverse) in areas with the potential for tourism.*

Our reasoning also suggests that leaders will strive to reduce the costs of existing PAs in their groups' settlement areas. This can in particular take the form of actions to degrade protected areas' legal status. Protected areas are not permanent institutions and rules regarding protection are sometimes relaxed or eliminated to permit use of the land. In line with our argument, we suggest that there is an ethnopolitical dimension to this decision as well, such that governments can create economic opportunities for coethnics by rescinding or alleviating protection laws in included groups' homelands. With this reasoning, PAs that were established (and likely seen as a cost) in a (previously) excluded group's territory will become an obstruction when there is a shift in the power status of an ethnic group toward political inclusion. An observable implication from this logic is that there should be a higher likelihood of PAs being legally degraded in the territories of a group that becomes included in power.

Hypothesis 3 *Protected areas in settlement areas of included ethnic groups should be at higher risk of legal degradation than those located elsewhere.*

Data

Our empirical analysis takes points in geographic space as the its main unit of analysis. As the main (in)dependent variables, we measure whether, in any given year between states' independence and 2020, points are located in a protected area as well as inside the main settlement region of a group included in the national executive of a state.

Geo-points

We choose spatial points as units of analysis to directly accommodate the spatial structure of our main outcome and treatment variables: we are interested in whether the political representation of an area's main ethnic groups increases the size of protected areas in it. Treatment and outcome variables are thus defined as spatial areas that are not nested or otherwise aligned. In this setup, spatial points directly solve several problems associated with alternative, *areal* units of analysis. First, due to the modifiable areal unit problem (Fotheringham and Wong 1991), there is no stable 'natural' unit to which outcomes and treatments can be assigned – protected areas often span across administrative units and artificial grid cells as do (at times overlapping) ethnic settlement areas. Even more importantly, areal units such as administrative units or ethnic settlement areas might only be partially covered by parks and many spatial covariates vary within them. This creates the risk of ecological inference. Lastly, the interpretation of effect magnitudes is challenging where units are not of the same size.

Spatial points mitigate these problems as they have no areal extent. They avoid issues of ecological inference as each point is unequivocally placed either inside or outside any ethnic settlement area and national park. In addition, the use of points regularly sampled from geographic space yields a clear probabilistic interpretation of estimates of the effect of ethnic inclusion as the percentage point change in the area of included groups that is covered by protected areas. In turn, the issue of "double-counting" outcomes and treatments that cover multiple points is an inferential problem dealt with through standard error clustering.[7]

The most important choice when using spatial points as the main units of analysis is the density of the sampling frame. A denser sampling yields more points, allows for greater precision, but increases the extent of spatial clustering in the data. Our baseline analysis is based on a sampling scheme of 1 point per 2'000km^2,[8] with points located on a regular hexagonal lattice (see Figure 3). A robustness check shows robust estimates when choosing a density between 1 point per 500 to 8'0000km^2 (see Figure A3 in the appendix).

Protected areas

The primary source of data for our dependent variable, protected areas, is the World Database on Protected Areas (WDPA) (Hanson 2022), which is part of the collaborative Protected Planet project between the UN Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN). The database is compiled by submissions from a range of governmental and non-governmental organizations. Along with information on an area's date of establishment, reported land and marine size, and governance structure, each protected area is represented by either a point or polygon geometry. We focus our analysis on the polygon data, since points have no areal extent and therefore do not overlap with our unit of analysis by definition. The data covers the full temporal extent of our data, from countries' independence to 2020.

Across the entire sample, protected areas cover 6 percent of points. This number

[7] Areal units are of course also frequently affected by this problem.

[8] This is similar to the resolution of the PRIO grid (Tollefsen, Strand, and Buhaug 2012) where grid cells have a size of approximately 2'500km^2 at the equator.

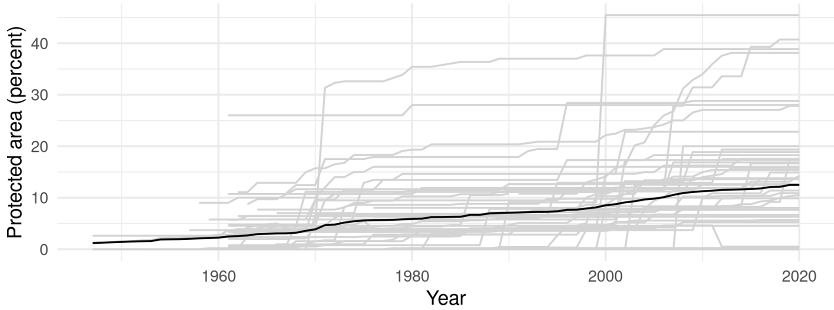


Figure 1: Share of protected land in Africa over time

Note: Area estimated by authors based on the main point data (see section on methods). The black line shows the mean across Africa, grey lines plot individual countries since independence.

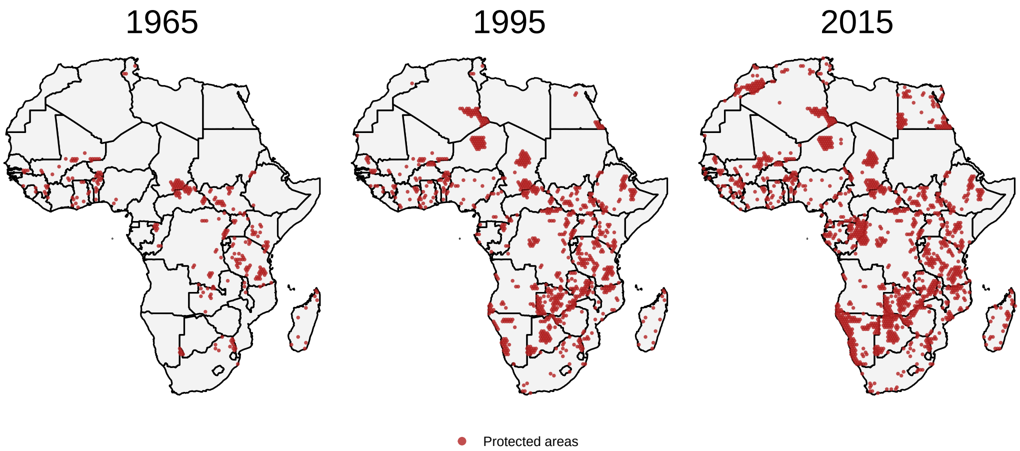


Figure 2: Map of protected areas in 1965, 1995, and 2015

Note: Borders shown for independent countries in 2015. Geo-point resolution is 1 point per 2000 km^2.

masks the substantial increase in nature protection over time, from 2 to 12 percent between 1960 and 2020. Figure 1 shows that this increase was not synchronous across all states—indeed, some states designated a substantive amount of their national area as protected area already in the 1970s while others established large PAs only after 2000.

Ethnic inclusion and exclusion

Our main independent variable captures whether a point in a given year is located in the settlement area of an ethnic group that is included in the national executive or not. We turn to the Ethnic Power Relations data to derive this measure (Vogt et al.

2015). The EPR provides information on whether politically relevant ethnic groups across Africa where included in the national executive on January 1st of every post-independence year up to 2020. Political inclusion, as defined by the EPR, must go beyond "token" inclusion, thus providing meaningful political representation to a group. Inclusion varies from full dominance of the executive by a groups' elites to them being junior partners in a power-sharing coalition. We combine these differing levels of access to executive power into a single indicator of political inclusion coded as a simple dummy variable.

In addition to the political inclusion data, the EPR provides data on the settlement areas of ethnic groups. This data allows us to determine whether, in a given year, a point lies within the settlement area of an included ethnic group or not. The latter category includes points that are located in an area demographically dominated by groups implicitly coded by the EPR as politically irrelevant as well as those that are mobilized but excluded from executive power.

Illustration of data setup

Figure 3 illustrates the resulting spatio-temporal data structure taking the example of the eastern border region of Uganda. The whole country in 2019 is illustrated in Panel A, and the rectangular inset is illustrated in Panel B in the same point in time. Each spatial point (labelling in Panel B) is attributed to two types of polygons: ethnic groups' territorial homeland and protected areas. The blue area in the north-west corner of Panel B is the ethnic homelands of the Langi/Acholi and the Teso groups, who during 2019 were excluded from executive power. The yellow area in the south-west corner is part of the the ethnic homeland of the Basoga, who during 2019 were included in executive power. The dark green areas represent active protected areas up to the end of 2019.

Our approach furthermore captures the temporal variation of the data, specifically when protected areas are established and when ethnic groups are included in or excluded from political influence. This variation is illustrated in Panel C, where each row corresponds to a specific spatial point in Panel B. To take the example of point 4514 in the centre of Panel B, we can see how this point has fluctuated between political inclusion and exclusion over the years, and how this point ultimately came under protection in 2006.

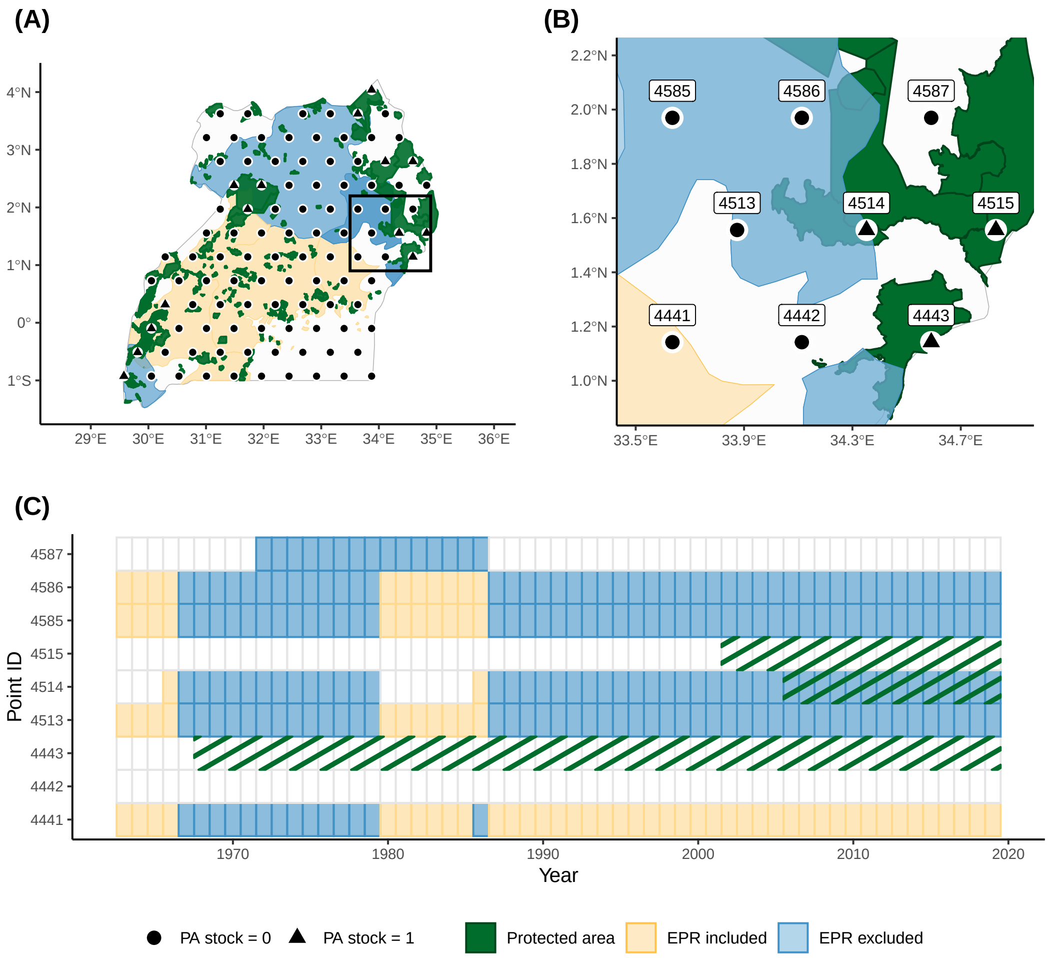


Figure 3: Illustration of data structure using the example of Uganda.

Note: Panel A represents the spatial structure of the data in 2019. Panel B magnifies the square inset of Panel A at the same point in time. Numerical labels in Panel B refer to the ID number of each geo-point. Point shapes represent the value of the dependent variable (circle = unprotected, triangle = protected). Panel C shows the temporal structure of the data (EPR and protected status) for the same points throughout the entire period since Ugandan independence in 1962.

Empirical strategy

We estimate the effect of ethnic inclusion on a geo-point's probability of becoming designated as protected area as a linear probability model of the following form:

$$\text{protected area}_{icy} = \beta_1 \text{Ethnic inclusion}_{icy} + \gamma_i + \rho_y + \epsilon_{ic} \tag{1}$$

where protected area$_{icy}$ is a dummy variable taking 1 indicating that geo-point i in country c was covered by a protected area in year y. Ethnic inclusion$_{icy}$ is a dummy variable that takes 1 when an ethnic group whose territory covers geo-point i is included in power, as measured by the ethnic power relations dataset. We are interested in $\hat{\beta}_1$, the OLS estimate of the effect a geo-point being included in power on the probability to be designated as a protected area.

To causally identify $\hat{\beta}_1$ we implement a generalized difference-in-differences design with staggered treatment timing: in our baseline specification, we add geo-point (unit) fixed effects γ_i and year (time) fixed effects ρ_y. The geo-point fixed effects control for any time-invariant differences between geo-points, such as their biodiversity, altitude, or resource wealth, in short general geographical suitability for protection. Our estimates thus focus on variation *within* points. Doing so is important, since it avoids bias from most prominent geographic drivers of PA allocation identified (e.g. Joppa and Pfaff 2009).

The year fixed effects account for shocks and developments common to all geo-points in the sample, such waves of independence, the end of the Cold War, or the generally growing share of protected territory and politically included groups. In more conservative specifications, we replace the year fixed effects with country-year fixed effects $\alpha_c y$. Country-year fixed effects control for all potential confounders that are constant within a country-year: any country-specific shocks, such as civil war outbreaks or democratization events. Crucially the country-year fixed effects also account for country-specific conservation "shocks," such as the ratification of conservation treaties or the entering into force of such treaties.

Consequently, $\hat{\beta}_1$ only uses variation over time within a geo-point's ethnic power status as compared to other points in the same year (or country-year) to estimate an effect on a point's designation as protected area. We cluster standard errors ϵ_{ig} by unit and ethnic group-year (through which the treatment—the power status—is assigned), to address temporal and spatial autocorrelation which arises from the sampling of our spatial points.

Causal identification of $\hat{\beta}_1$ rests on a strict exogeneity assumption (also known as parallel trends assumption), constant treatment effects, and no carryover effects. The latter two assumptions in particular can be violated in a setup such as ours

Table 1: The effect of EPR inclusion on PA establishment

	DV: Stock PA (0/1)		
	(1)	(2)	(3)
EPR included	-0.008**	-0.011***	
	(0.003)	(0.003)	
EPR excluded			0.011***
			(0.003)
EPR irrelevant			0.008
			(0.007)
Num.Obs.	724817	724817	724817
Unit FE	Yes	Yes	Yes
Year FE	Yes	No	No
Country x Year FE	No	Yes	Yes
R2	0.785	0.800	0.800
R2 Within	0.000	0.000	0.000

Note: The table reports OLS estimates. Robust standard errors clustered by geo-point and ethnic group-year in parentheses. Unit of observation is the geo-point. Significance levels: $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{+}p < .1$.

where treatments are staggered and can be reversed (Liu, Wang, and Xu 2022). To account for these possibilities we assess violations of these assumptions with a counterfactual estimator and provide event study plots that are robust to these potential violations (see Figures A1 and A2 in Appendix B.1).

Results

Table 1 presents the main results from estimating Equation 1. Model 1 presents the baseline model with unit and year fixed effects, Model 2 replaces the year fixed effects with country-year fixed effects, and Model 3 replaces the ethnic inclusion dummy with two variables, ethnic exclusion and political irrelevance (ethnic groups coded as not being politically relevant) to get a better understanding which of the reference categories to the ethnic inclusion variable is driving reported effects.

Across the first two models we observe a negative and statistically significant coefficient for the EPR inclusion dummy variable. Once an ethnic group is included in power, the geo-points within that group's territory become less likely to be designated as and covered by a protected area.

The coefficient size ranges between -0.008 and -0.011, indicating a reduction of about 0.8-1.1% in the probability of a point being designated as protected area once its ethnic group is included in power. This is a sizable effect compared to a baseline probability of any geo-point being designated as protected area of about 6%, amounting to more than 40% of the within geo-point standard deviation of PA designation.

In Models 1 and 2, the reference category for the EPR inclusion variable are two types of political participation: points that are in excluded ethnic groups' territory and points that are in politically irrelevant ethnic groups' homelands. As the coefficients in Models 1-2 indicate that included groups are less likely to receive protected areas, an ensuing question is: which types of groups *receive* the parks? Model 3 disaggregates the reference category of the EPR inclusion dummy to answer this question. The positive and statistically significant coefficient of the EPR exclusion dummy indicates that it is the groups that are actively excluded from power who receive the protected area. The coefficient for politically irrelevant groups is similarly sized but imprecisely estimated. The latter is at least partially due to the fact that EPR codes very few groups as changing their political relevance, thus limiting within-point variation over time.

Robustness tests

One major concern about the effect estimates presented in Table 1 is that they could be biased by imperfect comparisons between control and treatment observations, due to the staggered timing of our treatment variable (ethnic inclusion) in our data setup (Callaway and Sant'Anna 2021; Liu, Wang, and Xu 2022). To account for this possibility we re-estimate Models 1 and 2 from Table 1 using a series of counterfactual estimators developed by Liu, Wang, and Xu (2022). These estimators impute counterfactuals for each treated observation using only untreated observations to estimate treatment effects (ibid.). In this way, these estimators circumvent the problem with the classic OLS implementation of DiD that potentially use already-treated units as control observations. A crucial feature of these estimators over other, similar estimators (see e.g. Callaway and Sant'Anna 2021) is that they

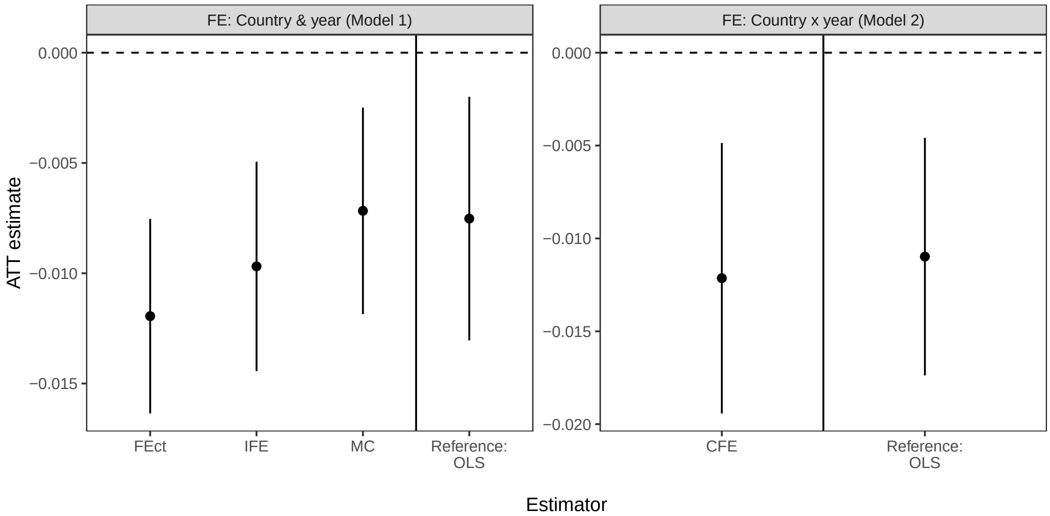


Figure 4: Accounting for staggered treatment timing in DiD settings

Note: The plot shows the estimated Average Treatment Effect on the Treated (ATT) with 95% confidence intervals based on bootstrapped standard errors. Numerical results for coefficient estimates can be found in Appendix A1. Panel labels indicate fixed effects structure and the corresponding Model from Table 1. The reference OLS estimate corresponds to the estimate from Table 1. Estimates obtained using the `fect` package in R from Liu, Wang, and Xu (2022).

allow for the treatment status to reverse which corresponds well to our data structure where ethnic groups can come in and out of political power. Liu, Wang, and Xu (2022) implement a counterfactual two-way fixed effects estimator ("FEct"), an interactive fixed effects estimator ("IFE"), a matrix completion estimator ("MC") and a complex fixed effects estimator ("CFE"). While the first three allow for unit and time fixed effects, the latter also allows the inclusion of more complex fixed effects structures, including country-specific year effects.

In Figure 4 we present results from all four estimators and compare them to the corresponding Models 1 and 2 from Table 1. The right panel displays the estimates from the FEct, IFE, and MC estimators which only implement country and year effects, the right panel shows results from the CFE estimators which allows for the more conservative country-specific year effects. Across estimators, the results are similar to the OLS estimates. If anything, the OLS results are somewhat smaller, suggesting that the effect sizes reported in Table 1 are conservative. Overall, Figure 4 implies that the main results are robust to potential biases that could arise from the staggered difference-in-differences design. In Appendix B.1 we use the estimates from the CFE model to present event study plots. Results are in line with theoretical expectations: park establishment become less likely in ethnic settlement areas that are included in power, but becomes more likely again once groups are excluded from the executive.

We also implement a series of additional robustness tests. First, our results might be driven by the resolution of our geo-points. Since we arbitrarily sample geographic points we might miss variation in park establishment at a very fine-grained level. Consequently we re-run our models at different resolutions of our main data set (see Appendix B.2). Results are robust to these alternative strategies. We also investigate heterogeneity by country. Our results could be driven by one large country that masks heterogeneous effects across other countries. We reestimate our models removing one country at a time and report results in Appendix B.3. While we observe some heterogeneity in effects there is no country that is driving the results themselves, increasing the confidence in the robustness and generalizability of the results. Finally, we explore if the results are affected by the sizes of the PAs. We reestimate Model 2 from Table 1, but recode the outcome variable by only keeping parks with varying sizes. Results reported in Appendix B.4 suggest that—while the main effect size slightly decreases as we consider only larger parks—the results are largely robust to PA size.

Observable implications

Having found overall support for our main expectation, the next sections focus on our empirical tests of Hypothesis 2, on park profitability, and Hypothesis 3, on PA degradation.

Park profitability

So far we have investigated the consequences of economic costs generated by PAs and the resulting negative effects on PA designation in politically included ethnic territories. But under certain conditions parks can also generate economic benefits for locals in the region. As theorized, one of the most important revenue sources generated by protected areas is tourism. Our expectation is that the negative ef-

Table 2: Park profitability

	DV: PA Cover (0/1)		
	All parks		Placebo: strict reserves and wilderness
	1	2	3
EPR included	-0.025***	-0.024***	-0.001
	(0.005)	(0.006)	(0.001)
EPR included x Large mammals	0.026***	0.019**	0.001
	(0.006)	(0.007)	(0.001)
Sample	Full	High. biodiv.	Full
Unit FE	Yes	Yes	Yes
Country x Year FE	Yes	Yes	Yes
Num.Obs.	724817	361947	724817
R2	0.800	0.830	0.926
R2 Within	0.001	0.000	0.000

Note: The table reports OLS estimates. Robust standard errors clustered by geo-point and ethnic group-year in parentheses. The indicator for large mammal presence is time invariant and therefore drops out of the estimations. Unit of observation is the geo-point. Significance levels: $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{+}p < .1$.

fect of being included in power on PA establishment is attenuated in places where expected revenue from tourism is particularly high, i.e., in areas where large, terrestrial animals are present.

To test this expectation we use habitat shapefiles of the IUCN Red List of Threatened Species to measure the presence of the following large nine terrestrial mammals for each geo point: Elephants, Rhinoceros, Buffalos, all big cats (Lions, Leopards, Cheetahs), Giraffes, Gorillas and Chimpanzees. If indeed local tourist profitability shapes effect heterogeneity, we should observe PA designation in ethnically included groups' territory particularly in areas with a high number of large terrestrial mammals. We therefore expect the coefficient of an interaction term between the dummy for EPR inclusion and a dummy indicating the presence of above-median number of large mammals to be positive and statistically significant.

We present results of this estimation in the first column of Table 2. The interaction between EPR inclusion and above-median presence of large mammals is indeed positive and statistically significant. Substantively, the results indicate that geo-points in ethnic homelands that become politically included without or with only a low large mammal presence are 2.5 percentage points less likely to receive a

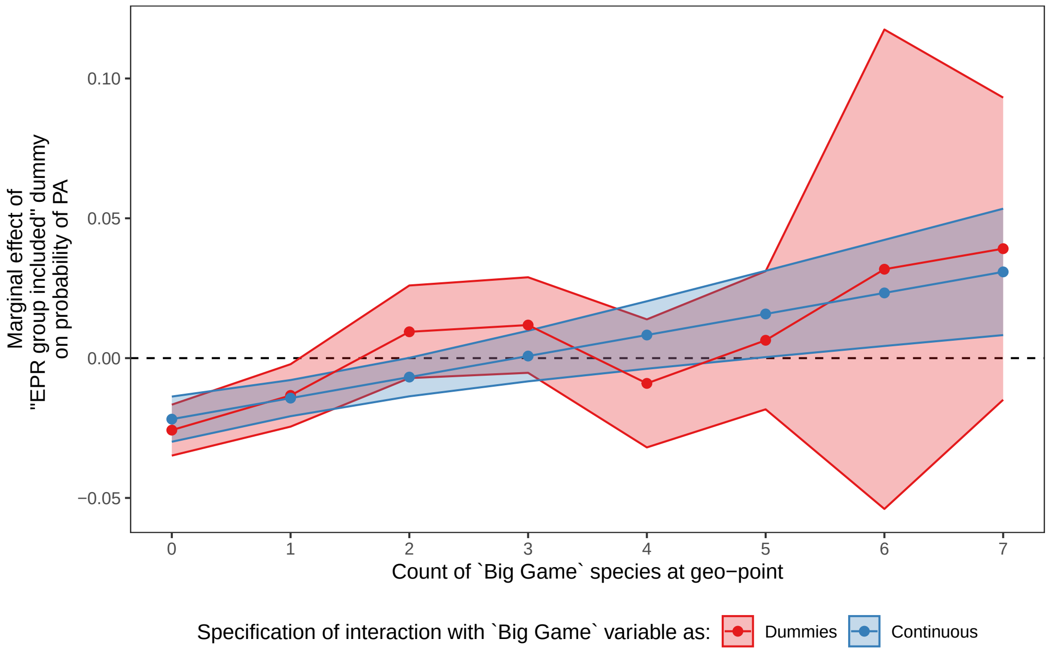


Figure 5: Marginal effects for EPR inclusion at different levels of large mammal presence

Note: Numerical results for marginal effects estimates available in Appendix A2

park. This effect is almost completely negated in areas with a high number of large mammals.

Investigating this interaction in closer detail, we find that the effect of EPR inclusion even turns positive in locations where a high number of big mammals are present. Instead of using a dummy for the above-median count of large mammals, we calculate the marginal effects of EPR inclusion at different numbers of large mammals having their habitat at any given geo-point. We model both a linear/continuous interaction of EPR inclusion with the count of mammals and a fully categorical interaction where each number of mammals present receives an individual dummy (with no mammal habitat as reference category) to account for potential non-linearities in the data distribution (Hainmueller, Mummolo, and Xu 2019). Results are presented in Figure 5 and show that the marginal effect of EPR inclusion becomes positive at high numbers of mammals present. The effect of individual dummy variables is not very precisely estimated at high numbers of mammals present given the scarcity of locations with many species simulateneously present. Nevertheless, we consider this as suggestive evidence for the interpretation that the profits generated by tourism can counteract the localized costs of PA establishment, making PAs a local public good that is more likely to be allocated among included ethnic groups.

We probe the plausibility and robustness of this result with three different pieces of evidence. First, the interaction effect might be a result of a high correlation between general biodiversity and presence of big mammals. To ensure this finding is not driven by high-biodiversity areas we limit our results to geo-points that have an above-median number of species. The interaction effect, reported in Model 2, remains positive and statistically significant, but is slightly smaller in substantive size.

Second, we implement a placebo test in which we replace the dependent variable of simple park presence at a geo point with a measure that captures only parks designated as strict reserves or wilderness reserves according to the WDPA's IUCN classification (where available). These types of parks are generally less suited to generate large-scale tourism profits, since most human visits in these types of PAs are prohibited or limited to a minimum. If PA designation is a function of the local profitability generated by the presence of large mammals, we should not see any effect of EPR inclusion on these types of parks. Results are presented in column 3 of Table 2 and are consistent with that expectation: we do not see any statistically significant effect of interacting ethnic inclusion with any of the two biodiversity measures on PAs that are designated as strict reserves or wildernesses.

Third, we plausibilize further that the presence of large mammals helps to generate tourism revenue. We correlate park visitor estimates from Balmford et al. (2015) with a measure of parks' biodiversity, generated by interpolating IUCN habitat shapefiles with park areas. The plot shows that only the local presence of large mammals is positively correlated with higher visitor numbers. None of the other indicators of local biodiversity, both aggregated and divided by species, display a positive correlation with park visitors. These results strengthen our confidence that the presence of large terrestrial mammals helps to generate tourism revenue through designating protected areas—and that ethnic politics plays a role in capturing these profits for the ethnic group included in the ruling coalition.

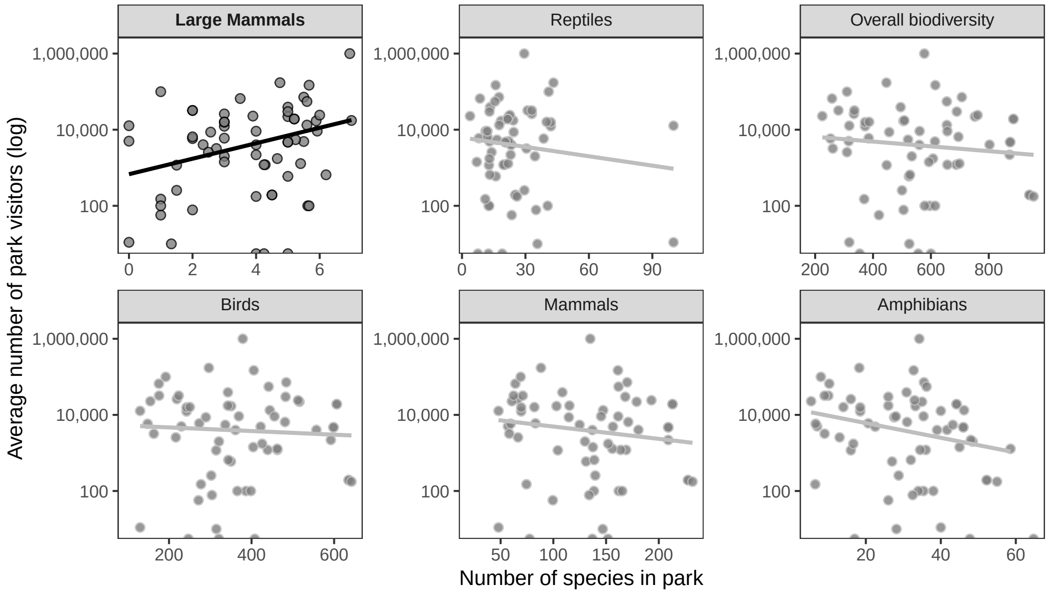


Figure 6: Park biodiversity and visitor numbers

PA degradation

We investigate an additional theoretical implication that results from a cost-incurring logic of PAs: governments should seek to degrade existing PAs in the ethnic settlement areas of their co-ethnic more than PAs in other areas. We therefore draw first upon a qualitative account of of the Mau Forest complex in Kenya and substantiate it with a cross-country quantitative analysis of protected area degradation events.

PA degradation in the homelands: qualitative illustrations from Kenya

The Mau Forest complex, a uniquely large mountain forest that covers south-western Kenya, has had its status as protected land change as a result from ethno-political struggles. In this area, "land became inextricably linked with ethnicity and political patronage" (Vayda 2021) and, similarly, Klopp (2012) notes that "the Mau Forest became one of the clearest demonstrations of how power and patronage dynamics caused massive deforestation". In short, the fate of these Kenyan protected forests is a vivid example of how PAs may be degraded through formal declassification by a ruler seeking to maintain support from an ethnic group.

These forests are located in Kenya's Rift Valley. The region, home to violent eviction schemes by the British colonial government, faced an influx of ethnic Kikuyu during the first decades of rule under Jomo Kenyatta, a Kikuyu himself (Oyugi 2002). When power shifted from Kenyatta to Daniel arap Moi, the dynamic in the region was tilted by his politics to uphold his support among the Kalenjin. As such, the 1980's witnessed the removal of Kenyatta-era Kikuyu settlers from the Mau forest (Boone 2012). Forested lands faced an extensive resettlement scheme in the 1990s, used to shift the ethnic composition in the region to strengthen support for Moi (Klopp 2012; Morjaria 2012). In the words of Alberatazzi, Bini, and Trivellini (2023) (p. 26): "thousands of Kalenjin people [the same ethnic group as President Moi] looking for land came from the neighboring Rift Valley districts ... the forest land redistribution to Kalenjin families would have worked to strengthen the political power of the KANU government in the district."

As documented by Kweyu (2022), the Moi government used the Mau Forest to reward loyal politicians and secure the Kalenjin vote in the 1992 and 1997 elections. Moreover, "the Kalenjin were allowed to occupy the forestland left by the displaced communities ... and the gazetted forest reserve faced massive "illegal" encroachments and settlements mainly by the Kalenjin community" (p. 252). This signal of lax rule enforcement (a *de facto* declassification of protection) was complemented by *de jure* actions to declassify forests. Accounts suggest how 2001, the final year of Moi's presidency, resulted in massive degazettement of forests (Kweyu et al. 2020, 2019). In the run-up to the 2002 elections alone, almost a third of the South-Western Mau Forest Reserve and more than half of the area of the Eastern Mau Forest Reserve was degazetted (Boone 2012).

This declassification of protected land, allowing some to live in those areas previously assigned as PAs, created rifts between ethnic groups that are still visible. In recent decades, there have been evictions with a heavy political negotiation, as some of those given land in the Mau forest during the 1980's and 1990's were politicians with substantial influence. We are likely to see more from evictions from lands that used to be protected, which will present ethno-political concerns. Alberatazzi, Bini, and Trivellini (2023) note that these evictions "in the name of conservation ... are linked to shifting allegiances in the central government" (p. 91).

Large-N illustration of inclusion and PA degradation

To identify the degradation of protected areas we rely on the Protected Area Downgrading, Downsizing and Degazettement (PADDD) Tracker,[9] an initiative co-managed by the World Wildlife Fund and Conservation International. PADDD traces the downgrading (decrease in legal restrictions regarding human activities), downsizing (legal boundary changes to reduce the area) and degazettement (removal of all legal protection) of protected areas. We combine PADDD events that are geo-coded to at least to the PA-centroid level[10] with EPR geodata to determine whether each event occurred in a PA that is inside an included, excluded, or other area.

The (geo-referenced) PADDD data is mainly clustered in a few countries in our sample, with Kenya and South Africa collectively accounting for 69.7% of PADDD events. Overall, however, the number of African countries recorded as having at least one geo-referenced PADDD event is 22. Table 3 presents descriptive results for the proportion of PADDD events in included, excluded and other areas together with the proportion of land covered by those same categories across different samples. A graphical representation of the temporal nature of the relationship between ethnic power shifts and protected area establishment and degradation is illustrated with the Kenyan case in Figure 7.

There is initial indication that park degradation is primarily concentrated in the territories of ethnically included groups. Even relative to the proportion of included territory across Africa, protected areas are disproportionately degraded in included areas. Nowhere is this stronger than in the Kenyan case, where 63.8% of degradation events took place in ethnically included areas which constitute only 37.8% of land across all years since independence (1963).

In Table 4 we estimate the effect of ethnic inclusion on the probability of receiving a PADDD event using a series of linear probability models (LPM) across samples of all countries in which at least one PADDD event is recorded (Models 1-2) and Kenya only (Models 3-4). We take protected area-years as the unit of anal-

[9]See https://www.conservation.org/projects/paddd-protected-area-downgrading-downsizing-and-degazettement

[10]In the case of missing geographical precision for the PA in question, events are sometimes given points at the national capital. These observations are omitted from the analysis

Table 3: PADDD events

	All countries	PADDD countries			Kenya		
	Land	Land	PADDD	Diff.	Land	PADDD	Diff.
Included (%)	43.4	45.8	55.9 (208)	+10.1	37.8	63.8 (88)	+26
Excluded (%)	31.4	25.3	27.7 (103)	+2.4	22.5	16.7 (23)	-5.8
Other (%)	30.0	34.5	27.7 (103)	-6.8	41.3	23.9 (33)	-17.4

Note: The table reports the percentage and number of PADDD events in included, excluded, and other territories along with the total percentage of land covered by the same categories. The Diff. columns indicates the disproportionality in likelihood of each group receiving a PADDD event. Land percentages are calculated by pooling the points for all years across the sample in the main analysis. Results are presented for the countries that have at least one PADDD event and are thus in the PADDD sample, and Kenya only. Percentage totals surpass 100 due to overlapping ethnic group areas. Land coverage percentage is also reported for the whole sample from the main analysis for reference.

ysis to test our expectation that PAs in the homelands of included ethnic groups will be more likely legally degraded than PAs in other areas. This approach considers whether a protected area geographically intersects with a politically included ethnic group's homeland as well as whether that PA experienced legal degradation in a given year. Results are presented with (Models 1 & 3) and without (Models 2 & 4) unit (PA) fixed effects. All cross-national models include country-year fixed effects and Kenya-specific models include year fixed effects. The specification in Models 2 & 4 is our strictest approach and reflects that taken in previous analyses, whereby we effectively control for any time-variant factors between countries as well as time-invariant factors within countries - between PAs. We relax the second of these restrictions in models 1 and 3, as we consider repeated legal degradations of the same PA (such as periodic downsizing) to be as relevant as isolated degradations of different PAs. Note that the results of the analysis are likely downward biased due to the selection of PAs that can be degraded into the sample, such that we would expect *less* events in included areas.

The results of our less restrictive specifications in models 1 and 3 suggest a statistically significant positive effect of an ethnic group's political inclusion on legally degrading PAs in their homeland. The effect size is markedly higher in the Kenyan case, where political inclusion increases the likelihood of PA degra-

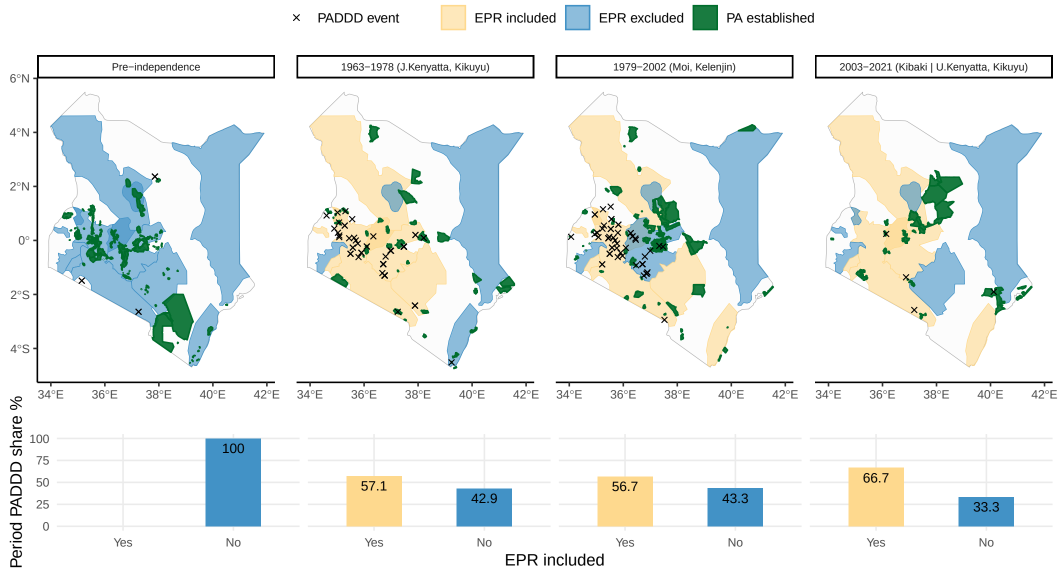


Figure 7: Map of protected area downgrades, downsizes and degazattement (PADDD), and establishment over phases of ethnic power status in Kenya

Note: PADDD events and PA establishments both refer to the time periods denoted at the top of each map. Time periods are determined by following the status of the Kikuyu ethnic group.

Table 4: PA Degradation

	DV: PADDD event (0/1)			
	PADDD countries		Kenya	
	(1)	(2)	(3)	(4)
EPR included	0.001**	0.001+	0.007**	0.010
	(0.000)	(0.001)	(0.003)	(0.007)
Num.Obs.	197960	197960	11457	11457
Unit FE	No	Yes	No	Yes
Country-year FE	Yes	Yes	Yes	Yes
R2	0.006	0.085	0.023	0.098
R2 Within	0.000	0.000	0.001	0.001

Note: The table reports OLS estimates. Robust standard errors clustered by PA in parentheses. Unit of observation is PA-year. Samples are limited to African countries with at least one recorded PADDD event in models 1-2, and Kenya only in models 3-4. Significance levels: $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{+}p < .1$.

dation in a given year by 0.7%. Considering that the likelihood of any PA being degraded in a given year is around 1% (the corresponding likelihood in the cross-country sample is 0.1%), this is a substantial effect size. Statistical significance is reduced in the tougher specification of the cross-national test in Model 2, and the coefficient for political inclusion loses significance in the same specification in the

Kenyan sample, possibly due to the spatial clustering of PADDD events visible in Figure 7 in combination with the relatively few PADDD events that remain in the sample after adding this restriction.

Conclusion

This study breaks new ground by investigating the role of the ethno-political economy of conservation in Africa. We present a theoretical framework that outlines how the inclusion or exclusion of ethnic groups from power shapes the designation and degradation of protected areas (PAs). By overlaying spatio-temporal data on ethnic group homelands and the establishment of PAs, we use a difference-in-differences approach to document a negative effect of political inclusion on PA establishment. We find support for a further implication of our argument: included groups are more likely to receive PAs that can generate tourism revenues. Moreover, we show that ethno-political inclusion is linked to the legal degradation of existing reserves. In all, this suggests that PAs are used to collect benefits to included groups and deflect costs towards excluded groups' territories.

This work brings knowledge to several scholarly discussions. We contribute by extending one of the few attempts to understand the politics of why some areas receive PAs (Mangonnet, Kopas, and Urpelainen 2022), with an ethno-political perspective and with a more extensive empirical scope. Furthermore, our study speaks to recent work on how political inclusion of marginalized groups affects conservation outcomes (Gulzar, Lal, and Pasquale 2023), as we show that nature protection policies may impose more costs on groups excluded from power. Our insights on elites' calculus to degrade protection regulations ties into scholarship on how politicians (mis)use elections to distort enforcement of environmental rules (Harding et al. 2023; Sanford 2023). We also contribute to research on the impact from conservation on humans (Andam et al. 2010), by giving new insights on why some ethnic groups might benefit from getting their homelands protected, while others only receive the costly livelihood restrictions from these institutions.

We see several promising avenues for further investigation. Theoretically, we see that our framework can be developed by including dynamics of elections in democracies as well as in competitive autocracies, as there is a significant interest in the relationship between election cycles and environmental protection outcomes (Cisneros, Kis-Katos, and Nuryartono 2021). Moreover, future research would benefit from extending our work to other regions of the world. Research could also test the theoretical framework we outline on other types of data, for instance by studying further aspects of how political inclusion is related to the degradation of environmental regulations, e.g. through logging or mining.

We also believe this study has relevance for policymakers. Area-based nature protection is today the most common policy response to remedy the global biodiversity crisis. In the years to come, PAs will likely be significantly expanded across the Global South. Will this be yet another burden on marginalized ethnic communities, or can it be an opportunity to attract funds? This study provides one piece to the puzzle of understanding this issue – illustrating that these institutions are indeed infused with the ethnic politics still present on the African continent. As such, we find it likely that enlarging the share of land under protection will give rise to both winners and losers. We welcome more research on this highly relevant topic.

References

Adams, William M., and Jon Hutton. 2007. "People, Parks and Poverty: Political Ecology and Biodiversity Conservation." *Conservation & Society* 5(2): 147–183.

Agrawal, Arun, and Kent Redford. 2009. "Conservation and Displacement: An Overview." *Conservation and Society* 7(1): 1–10.

Alberatazzi, Stefania, Valerio Bini, and Guido Trivellini. 2023. *Forest and Communities. Deforestation, Conservation and Socio-ecological Relations in the Mau Forest, Kenya*. Milano University Press.

Alger, Justin. 2023. "The Political Economy of Protected Area Designations: Commercial Interests in Conservation Policy." *Global Environmental Politics* 23(2): 54–73.

Andam, Kwaw S., Paul J. Ferraro, Alexander Pfaff, G. Arturo Sanchez-Azofeifa, and Juan A. Robalino. 2008. "Measuring the Effectiveness of Protected Area Networks in Reducing Deforestation." *Proceedings of the National Academy of Sciences* 105(42): 16089–16094.

Andam, Kwaw S., Paul J. Ferraro, Katharine R. E. Sims, Andrew Healy, and Margaret B. Holland. 2010. "Protected Areas Reduced Poverty in Costa Rica and Thailand." *Proceedings of the National Academy of Sciences* 107(22): 9996–10001.

Ando, Amy, Jeffrey Camm, Stephen Polasky, and Andrew Solow. 1998. "Species Distributions, Land Values, and Efficient Conservation." *Science* 279(5359): 2126–2128.

Balmford, Andrew, Jonathan M. H. Green, Michael Anderson, James Beresford, Charles Huang, Robin Naidoo, Matt Walpole, and Andrea Manica. 2015. "Walk on the Wild Side: Estimating the Global Magnitude of Visits to Protected Areas." *PLOS Biology* 13(2): e1002074.

Beacham, Austin. 2023. "Extraction, Contestation, and Conservation: Natural Resource Dependence and Protected Area Designation.".

Beacham, Austin. 2024. "Conserving What's Left: The International Political Economy of Protected Areas.".

Beiser-McGrath, Janina, Carl Müller-Crepon, and Yannick I. Pengl. 2021. "Who Benefits? How Local Ethnic Demography Shapes Political Favoritism in Africa." *British Journal of Political Science* 51(4): 1582–1600.

Berghöfer, Augustin, Nina Bisom, Elias Huland, Volker Koch, Johannes Kruse, Karla Locher, Marius Philipp, Isabel Renner, Karim Thibault, Michael Thiel, Ulrike Tröger, and Hugo Van Zyl. 2021. *Africa's Protected Natural Assets: The Importance of Conservation Areas for Prosperous and Resilient Societies in Africa.*

Boone, Catherine. 2011. "Politically Allocated Land Rights and the Geography of Electoral Violence: The Case of Kenya in the 1990s." *Comparative Political Studies* 44(10): 1311–1342.

Boone, Catherine. 2012. "Land Conflict and Distributive Politics in Kenya." *African Studies Review* 55(1): 75–103.

Boone, Catherine. 2015. "Land Tenure Regimes and State Structure in Rural Africa: Implications for Forms of Resistance to Large-Scale Land Acquisitions by Outsiders." *Journal of Contemporary African Studies* 33(2): 171–190.

Bostedt, Göran. 1999. "Threatened Species as Public Goods and Public Bads." *Environmental and Resource Economics* 13(1): 59–73.

Brockington, Daniel, and David Wilkie. 2015. "Protected Areas and Poverty." *Philosophical Transactions of the Royal Society B: Biological Sciences* 370(1681): 20140271.

Brockington, Daniel, and James Igoe. 2006. "Eviction for Conservation: A Global Overview." *Conservation and Society* 4(3): 424–470.

Burgess, Robin, Remi Jedwab, Edward Miguel, Ameet Morjaria, and Gerard Padró i Miquel. 2015. "The Value of Democracy: Evidence from Road Building in Kenya." *American Economic Review* 105(6): 1817–1851.

Callaway, Brantly, and Pedro H. C. Sant'Anna. 2021. "Difference-in-Differences with Multiple Time Periods." *Journal of Econometrics* 225(2): 200–230.

Cernea, Michael M., and Kai Schmidt-Soltau. 2006. "Poverty Risks and National Parks: Policy Issues in Conservation and Resettlement." *World Development* 34(10): 1808–1830.

Cisneros, Elías, Krisztina Kis-Katos, and Nunung Nuryartono. 2021. "Palm Oil and the Politics of Deforestation in Indonesia." *Journal of Environmental Economics and Management* 108: 102453.

Coad, Lauren, Alison Campbell, Lera Miles, and Katherine Humphries. 2008. The Costs and Benefits of Forest Protected Areas for Local Livelihoods: A Review of the Current Literature. Technical report Working Paper. UNEP World Conservation Monitoring Centre. Cambridge. U.K.: . http://www.unep.org/resources/report/costs-and-benefits-forest-protected-areas-local-livelihoods-review-current

Costello, Christopher, Nicolas Quérou, and Agnes Tomini. 2017. "Private Eradication of Mobile Public Bads." *European Economic Review* 94: 23–44.

d'Albertas, Francisco, Adrian González-Chaves, Clarice Borges-Matos, Vitor Zago de Almeida Paciello, Martine Maron, and Jean Paul Metzger. 2021. "Private Reserves Suffer from the Same Location Biases of Public Protected Areas." *Biological Conservation* 261: 109283.

De Luca, Giacomo, Roland Hodler, Paul A. Raschky, and Michele Valsecchi. 2018. "Ethnic Favoritism: An Axiom of Politics?" *Journal of Development Economics* 132: 115–129.

Di Minin, Enrico, and Tuuli Toivonen. 2015. "Global Protected Area Expansion: Creating More than Paper Parks." *BioScience* 65(7): 637–638.

Dirkse, Anna. 2017. *Master's Project: A Case Study of the "Benet Land Problem" in Eastern Uganda*. Doctoral Dissertation, University of Vermont.

Eifert, Benn, Edward Miguel, and Daniel N. Posner. 2010. "Political Competition and Ethnic Identification in Africa." *American Journal of Political Science* 54(2): 494–510.

Fotheringham, A S, and D W S Wong. 1991. "The Modifiable Areal Unit Problem in Multivariate Statistical Analysis." *Environment and Planning A: Economy and Space* 23(7): 1025–1044.

Franck, Raphaël, and Ilia Rainer. 2012. "Does the Leader's Ethnicity Matter? Ethnic Favoritism, Education, and Health in Sub-Saharan Africa." *American Political Science Review* 106(2): 294–325.

Gibson, Clark C. 1999. *Politicians and Poachers: The Political Economy of Wildlife Policy in Africa*. Cambridge University Press.

Gorenflo, L. J., and Katrina Brandon. 2006. "Key Human Dimensions of Gaps in Global Biodiversity Conservation." *BioScience* 56(9): 723.

Gray, Claudia L., Samantha L. L. Hill, Tim Newbold, Lawrence N. Hudson, Luca Börger, Sara Contu, Andrew J. Hoskins, Simon Ferrier, Andy Purvis, and Jörn P. W. Scharlemann. 2016. "Local Biodiversity Is Higher inside than Outside Terrestrial Protected Areas Worldwide." *Nature Communications* 7(1): 12306.

Gulzar, Saad, Apoorva Lal, and Benjamin Pasquale. 2023. "Representation and Forest Conservation: Evidence from India's Scheduled Areas." *American Political Science Review* , 1–20.

Hainmueller, Jens, Jonathan Mummolo, and Yiqing Xu. 2019. "How Much Should We Trust Estimates from Multiplicative Interaction Models? Simple Tools to Improve Empirical Practice." *Political Analysis* 27(2): 163–192.

Hanson, Jeffrey O. 2022. "Wdpar: Interface to the World Database on Protected Areas." *Journal of Open Source Software* 7(78): 4594.

Harding, Robin, Mounu Prem, Nelson A. Ruiz, and David L. Vargas. 2023. "Buying a Blind Eye: Campaign Donations, Regulatory Enforcement, and Deforestation." *American Political Science Review* , 1–19.

Harjunen, Oskari, Tuukka Saarimaa, and Janne Tukiainen. 2023. "Love Thy (Elected) Neighbor? Residential Segregation, Political Representation, and Local Public Goods." *The Journal of Politics* 85(3): 860–875.

Hodler, Roland, and Paul A. Raschky. 2014. "Regional Favoritism." *The Quarterly Journal of Economics* 129(2): 995–1033.

Honig, Lauren. 2022. "The Power of the Pen: Informal Property Rights Documents in Zambia." *African Affairs* 121(482): 81–107.

Jenkins, Clinton N., Kyle S. Van Houtan, Stuart L. Pimm, and Joseph O. Sexton. 2015. "US Protected Lands Mismatch Biodiversity Priorities." *Proceedings of the National Academy of Sciences* 112(16): 5081–5086.

Jones, Samantha. 2006. "A Political Ecology of Wildlife Conservation in Africa." *Review of African Political Economy* 33(109): 483–495.

Joppa, Lucas N., and Alexander Pfaff. 2009. "High and Far: Biases in the Location of Protected Areas." *PLoS ONE* 4(12): e8273.

Keles, Derya, Philippe Delacote, Alexander Pfaff, Siyu Qin, and Michael B. Mascia. 2020. "What Drives the Erasure of Protected Areas? Evidence from across the Brazilian Amazon." *Ecological Economics* 176: 106733.

Kimenyi, M. S. 2006. "Ethnicity, Governance and the Provision of Public Goods." *Journal of African Economies* 15(Supplement 1): 62–99.

Klopp, Jacqueline M. 2012. "Deforestation and Democratization: Patronage, Politics and Forests in Kenya." *Journal of Eastern African Studies* 6(2): 351–370.

Kramon, Eric, and Daniel N. Posner. 2013. "Who Benefits from Distributive Politics? How the Outcome One Studies Affects the Answer One Gets." *Perspectives on Politics* 11(2): 461–474.

Kramon, Eric, and Daniel N. Posner. 2016. "Ethnic Favoritism in Education in Kenya." *Quarterly Journal of Political Science* 11(1): 1–58.

Kweyu, R., K. Kiemo, T. Thenya, J. Emborg, and C. Gamborg. 2019. “Spatial and Political Factors in Forest Resource Conflicts: The Eastern Mau Forest Case 1992–2014.” *Society & Natural Resources* 32(11): 1276–1292.

Kweyu, Raphael. 2022. “Communicating Cultural Identity in the Management of Forest Related Conflicts in Eastern Mau, Kenya.” *Conflict Resolution Quarterly* 40(2): 249–269.

Kweyu, R.M., T. Thenya, K. Kiemo, and J. Emborg. 2020. “The Nexus between Land Cover Changes, Politics and Conflict in Eastern Mau Forest Complex, Kenya.” *Applied Geography* 114: 102115.

Leverington, Fiona, Katia Lemos Costa, Helena Pavese, Allan Lisle, and Marc Hockings. 2010. “A Global Analysis of Protected Area Management Effectiveness.” *Environmental Management* 46(5): 685–698.

Liu, Licheng, Ye Wang, and Yiqing Xu. 2022. “A Practical Guide to Counterfactual Estimators for Causal Inference with Time-Series Cross-Sectional Data.” *American Journal of Political Science* , ajps.12723.

Lynch, Gabrielle. 2018. “Ethnicity in Africa.” *Oxford Research Encyclopedia of African History* .

Mangonnet, Jorge, Jacob Kopas, and Johannes Urpelainen. 2022. “Playing Politics with Environmental Protection: The Political Economy of Designating Protected Areas.” *The Journal of Politics* 84(3): 1453–1468.

McKinnon, Madeleine C., Samantha H. Cheng, Samuel Dupre, Janet Edmond, Ruth Garside, Louise Glew, Margaret B. Holland, Eliot Levine, Yuta J. Masuda, Daniel C. Miller, Isabella Oliveira, Justine Revenaz, Dilys Roe, Sierra Shamer, David Wilkie, Supin Wongbusarakum, and Emily Woodhouse. 2016. “What Are the Effects of Nature Conservation on Human Well-Being? A Systematic Map of Empirical Evidence from Developing Countries.” *Environmental Evidence* 5(1): 8.

Miquel, Gerard Padró I. 2007. “The Control of Politicians in Divided Societies: The Politics of Fear.” *The Review of Economic Studies* 74(4): 1259–1274.

Miteva, Daniela A., Subhrendu K. Pattanayak, and Paul J. Ferraro. 2012. “Evaluation of Biodiversity Policy Instruments: What Works and What Doesn’t?” *Oxford Review of Economic Policy* 28(1): 69–92.

Mojo, Dagne, Ayub M. O. Oduor, Chao Fu, Yunli Bai, Huaping Long, Guoqin Wang, and Linxiu Zhang. 2020. “Effects of Protected Areas on Welfare of Local Households: The Case of Maasai Mara National Reserve in Kenya.” *People and Nature* 2(3): 856–867.

Monogan, James E., David M. Konisky, and Neal D. Woods. 2017. "Gone with the Wind: Federalism and the Strategic Location of Air Polluters." *American Journal of Political Science* 61(2): 257–270.

Morjaria, Ameet. 2012. "Electoral Competition and Deforestation: Micro Evidence from Kenya." Paper for the World Bank's 2012 annual bank conference on development economics. https://cega.berkeley.edu/assets/miscellaneous_files/wgape/20_Morjaria.pdf

Müller-Crepon, Carl. 2024. "Building Tribes: How Administrative Units Shaped Ethnic Groups in Africa." *American Journal of Political Science* , ajps.12835.

Naidoo, R., D. Gerkey, D. Hole, A. Pfaff, A. M. Ellis, C. D. Golden, D. Herrera, K. Johnson, M. Mulligan, T. H. Ricketts, and B. Fisher. 2019. "Evaluating the Impacts of Protected Areas on Human Well-Being across the Developing World." *Science Advances* 5(4): eaav3006.

Naidoo, Robin, Brendan Fisher, Andrea Manica, and Andrew Balmford. 2016. "Estimating Economic Losses to Tourism in Africa from the Illegal Killing of Elephants." *Nature Communications* 7(1): 13379.

Naughton-Treves, Lisa, Margaret Buck Holland, and Katrina Brandon. 2005. "The Role of Protected Areas in Conserving Biodiversity and Sustaining Local Livelihoods." *Annual Review of Environment and Resources* 30(1): 219–252.

Neumann, Roderick P. 2001. "Africa's 'Last Wilderness': Reordering Space for Political and Economic Control in Colonial Tanzania." *Africa: Journal of the International African Institute* 71(4): 641–665.

Oyugi, Walter O. 2002. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=5408e4d295a9151c81541b54f17c987327d4f0dd "Conflict in Kenya: A Periodic Phenomenon.".

Peluso, Nancy Lee. 1993. "Coercing Conservation?: The Politics of State Resource Control." *Global Environmental Change* 3(2): 199–217.

Rabushka, A, and K. A. Shepsle. 1972. *Politics in Plural Societies: A Theory of Democratic Instability*. Columbus: Charles E. Merrill Publishing Company.

Reuters. 2019. "'This Is Our Land': Uncertain Future for Ugandans Facing Eviction from Wildlife Reserve.".

Ribas, Luiz Guilherme dos Santos, Robert L. Pressey, Rafael Loyola, and Luis Mauricio Bini. 2020. "A Global Comparative Analysis of Impact Evaluation Methods in Estimating the Effectiveness of Protected Areas." *Biological Conservation* 246: 108595.

Rodrigues, Ana S. L., Sandy J. Andelman, Mohamed I. Bakarr, Luigi Boitani, Thomas M. Brooks, Richard M. Cowling, Lincoln D. C. Fishpool, Gustavo A. B. da Fonseca, Kevin J. Gaston, Michael Hoffmann, Janice S. Long, Pablo A. Marquet, John D. Pilgrim, Robert L. Pressey, Jan Schipper, Wes Sechrest, Simon N. Stuart, Les G. Underhill, Robert W. Waller, Matthew E. J. Watts, and Xie Yan. 2004. "Effectiveness of the Global Protected Area Network in Representing Species Diversity." *Nature* 428(6983): 640–643.

Sanford, Luke. 2023. "Democratization, Elections, and Public Goods: The Evidence from Deforestation." *American Journal of Political Science* 67(3): 748–763.

Survival International, Survival. 2024. "#DecolonizeUNESCO.".

Tollefsen, Andreas Forø, Håvard Strand, and Halvard Buhaug. 2012. "PRIO-GRID: A Unified Spatial Data Structure." *Journal of Peace Research* 49(2): 363–374.

UN. 2016. "Statement of Ms. Victoria Tauli-Corpuz, Special Rapporteur on the Rights of Indigenous Peoples, at the 71st Session of the General Assembly.".

UNEP. 2022. http://www.unep.org/news-and-stories/story/cop15-ends-landmark-biodiversity-agreement "COP15 Ends with Landmark Biodiversity Agreement.".

Upton, Caroline, Richard Ladle, David Hulme, Tao Jiang, Dan Brockington, and William Adams. 2008. "Are Poverty and Protected Area Establishment Linked at a National Scale?" *Oryx* 42: 19–25.

Vayda, Barbara. 2021. *Displacement for Conservation: Livelihood Adaptations to National Parks in East Africa*. Doctoral Dissertation, Naval Postgraduate School.

Venter, Oscar, Ainhoa Magrach, Nick Outram, Carissa Joy Klein, Hugh P. Possingham, Moreno Di Marco, and James E.M. Watson. 2018. "Bias in Protected-Area Location and Its Effects on Long-Term Aspirations of Biodiversity Conventions." *Conservation Biology* 32(1): 127–134.

Vogt, Manuel, Nils-Christian Bormann, Seraina Rüegger, Lars-Erik Cederman, Philipp Hunziker, and Luc Girardin. 2015. "Integrating Data on Ethnicity, Geography, and Conflict: The Ethnic Power Relations Data Set Family." *The Journal of Conflict Resolution* 59(7): 1327–1342.

Watson, James E. M., Nigel Dudley, Daniel B. Segan, and Marc Hockings. 2014. "The Performance and Potential of Protected Areas." *Nature* 515(7525): 67–73.

The Ethnic Politics of Nature Protection: Ethnic Favoritism and Protected Areas in Africa

Supplementary Material

Table of Contents

A Tables

A.1 Alternative DiD estimators

Table A1: Numerical results from different DiD estimators

Estimator	ATT estimate	Bootstrapped Standard Error	p-Value	Conf. Int. (Low)	Conf. Int. (High)
FE: Country & year (Model 1)					
Reference: OLS	-0.008	0.003	0.0075979	-0.01	-0.002
FEct	-0.012	0.002	0.0000001	-0.02	-0.008
IFE	-0.010	0.002	0.0000634	-0.01	-0.005
MC	-0.007	0.002	0.0026913	-0.01	-0.002
FE: Country x year (Model 2)					
Reference: OLS	-0.011	0.003	0.0007693	-0.02	-0.005
CFE	-0.012	0.004	0.0010841	-0.02	-0.005

A.2 Marginal effects estimates for interaction models

Table A2 presents the numerical results for the estimated marginal effect coefficients visualized in Figure 5.

Table A2: Marginal effect estimates for Figure 5

Count of 'Big Game' species at geo point	Marginal effect estimate	Standard Error	Conf. Int. (Low)	Conf. Int. (High)	p-Value
Continuous specification					
0	-0.022	0.004	-0.030	-0.014	0.000
1	-0.014	0.003	-0.021	-0.008	0.000
2	-0.007	0.004	-0.014	0.000	0.056
3	0.001	0.005	-0.008	0.010	0.857
4	0.008	0.006	-0.004	0.021	0.174
5	0.016	0.008	0.000	0.032	0.044
6	0.024	0.010	0.004	0.043	0.015
7	0.031	0.012	0.008	0.054	0.007
Dummy specification					
0	-0.026	0.005	-0.035	-0.017	0.000
1	-0.013	0.006	-0.024	-0.002	0.020
2	0.008	0.008	-0.009	0.025	0.347
3	0.013	0.009	-0.004	0.031	0.141
4	-0.009	0.012	-0.032	0.014	0.427
5	0.006	0.013	-0.018	0.031	0.607
6	0.032	0.044	-0.054	0.118	0.466
7	0.039	0.028	-0.015	0.093	0.154

B Robustness tests

B.1 Staggered treatment timing

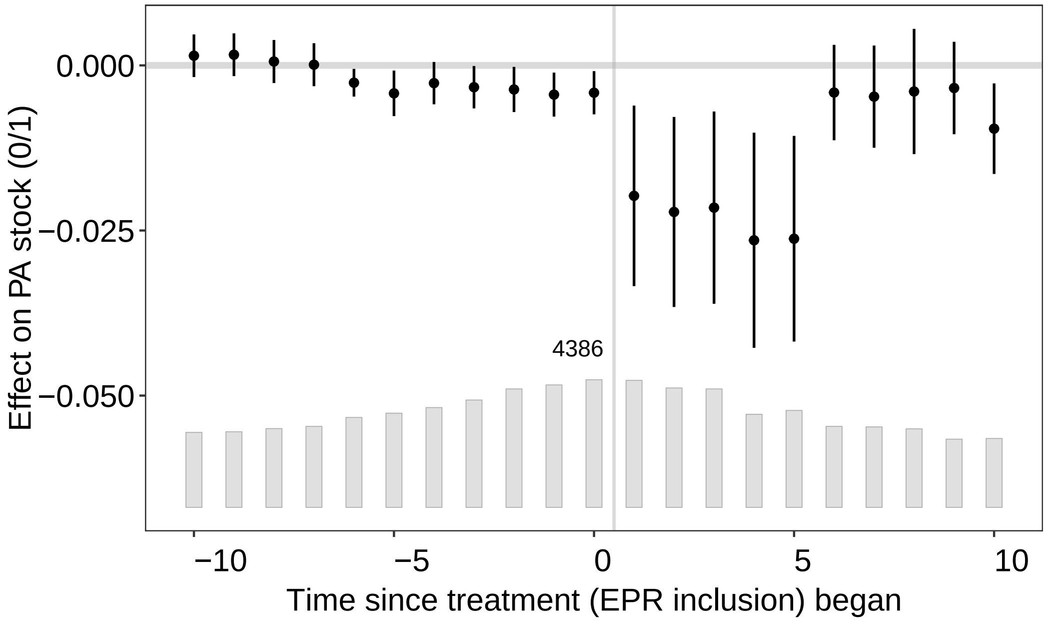


Figure A1: Estimates of EPR inclusion on protected area designation with varied treatment timing

Figure A1 displays the event study plot based on the counterfactual fixed effect estimator from Liu, Wang, and Xu (2022). The plot shows coefficients for leads/lags of the EPR inclusion dummy and provides an important check on the validity of the parallel trend assumption: the lead coefficient prior to treatment onset should indicate small and statistically insignificant differences between treated (included) and control geo-points. Only after the treatment actually happened should we observe distinct differences between treatment and control groups.

Figure A1 shows evidence that is consistent with these expectations. Before a geo-point is included in the ethnic power coalition (negative time periods), differences in protected area designation are small and statistically imprecise. Once the point becomes included through representation in the ethnic power-sharing coalition, the coefficient becomes large (in comparison to the pre-trend coefficient), negative, and statistically more precise. The effect seems to kick in immediately once a group is included in power and gradually peters off after approximately five years.

Another important implication of our theoretical model is that the effect of political inclusion guarding against designation as protected area should disappear once the group leaves power. The counterfactual estimators by Liu, Wang, and Xu (2022) provide a method to directly test this implication. Figure A2 shows a coefficient plot of leads and lags, similar to Figure A1, but testing what happens when a geo-point stops being represented in the ethnic power coalition.

Figure A2 is consistent with our theoretical expectations: once geo-points cease being represented in the power-sharing coalition, the “protection” effect of power

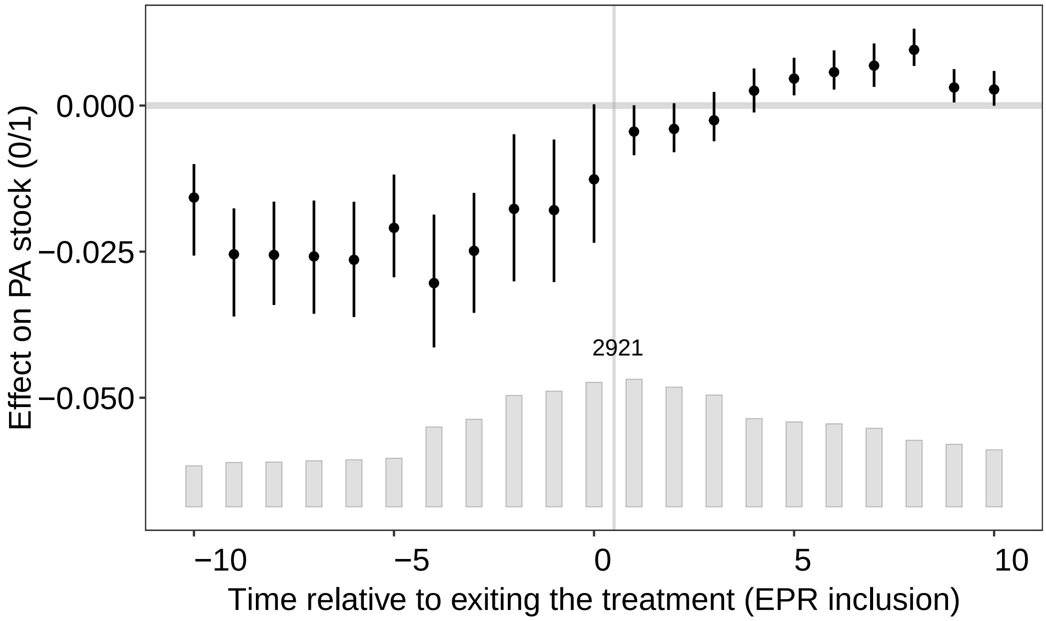


Figure A2: Treatment exit plot

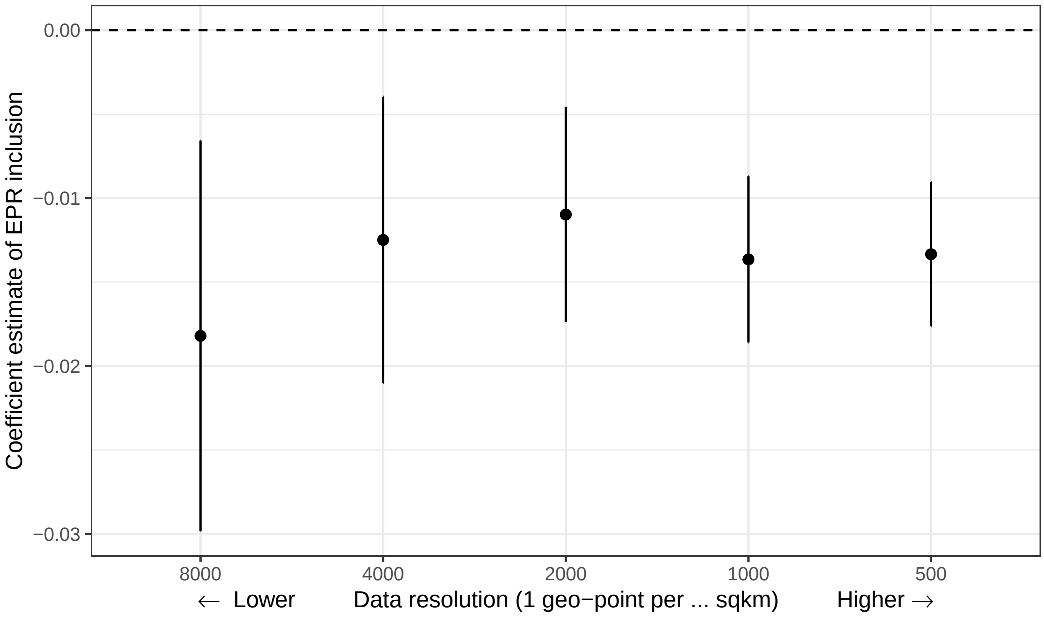
disappears and points are no longer less likely to be designated as a PA.

B.2 Data resolution

To check if results are driven by different resolutions of the geo-points sample, we estimate Model 3 from Table 1 using different spatial resolutions. We vary the resolution from 1 geo-point per 8000 sqkm (roughly corresponding to the centroid of a 90x90km rectangle) to 1 geo-point per 500 square kilometers (roughly corresponding to the centroid of a 22x22km rectangle).

The results are displayed in Figure A3. The plot demonstrates that our baseline estimates of the negative relationship between ethnic inclusion and PA designation are not substantively driven by the resolution of our spatial point sample.

Figure A3: Robustness test: different data resolutions



B.3 Removing one country a time

The single coefficient for EPR inclusion estimated in Table 1 could be disproportionally driven by a single country. To account for this possibility, we estimate Model 2 from Table 1 removing one country at a time. The resulting coefficients are displayed in the right-hand side of Figure A4. While there is some hetereogeneity, overall the negative effect EPR inclusion does not seem to be driven by a single country.

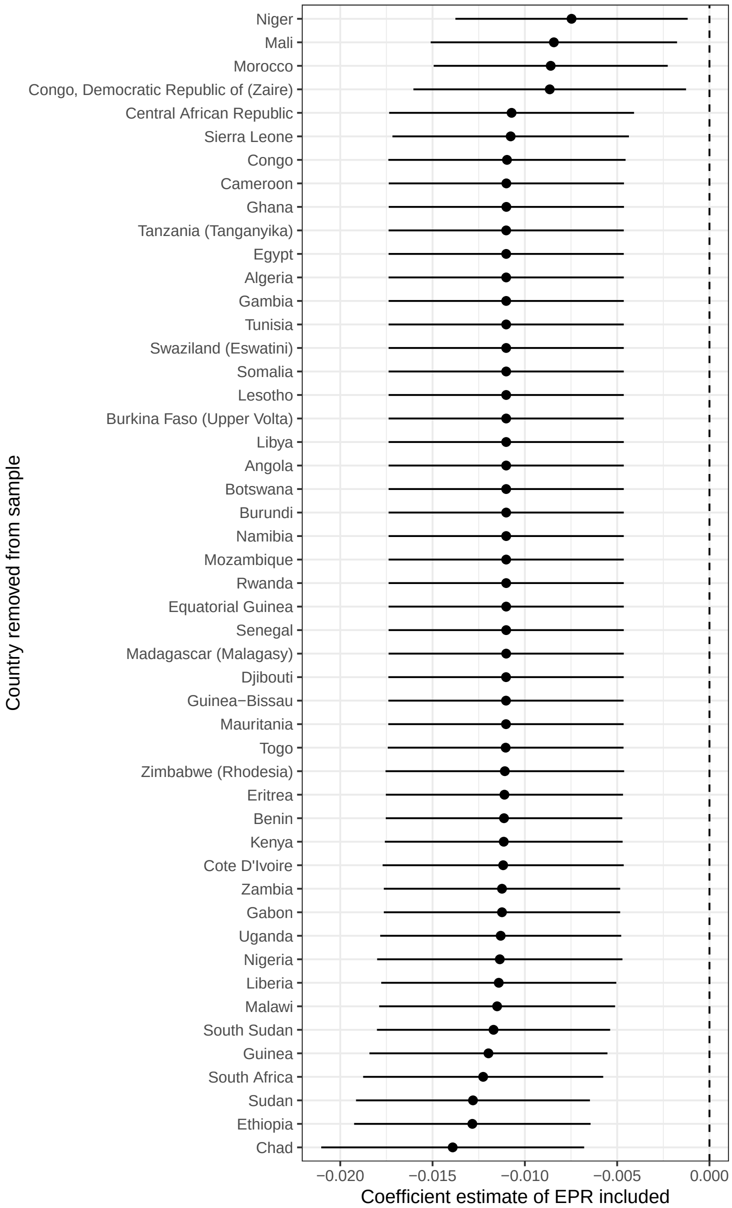


Figure A4: Estimates removing one country at a time

Note: Model specifications include unit and year fixed effects. 95% confidence intervals shown, based on robust standard errors clustered by unit ID and ethnic group-year.

B.4 Differently sized PAs

PA size is an important dimension since protected areas vary enormously in the space they occupy. PA sizes range from parks that are only 4 km^2 in size to almost 100 000 km^2, with more than 50% of parks concentrated at the lower end of the range, at less than approx. 10 000 km^2.

We also have theoretical reasons to expect that the effect of ethnic inclusion could vary with PA size. Smaller parks might be easier to designate since bureaucratic procedures to establish a smaller PA might be more efficient and more easily to control by political entrepreneurs. Larger PAs, on the other hand, might be more difficult to designate according to political-strategic considerations, given their national and international publicity, the number of parties and potential veto players involved, as well as constraints on ecological suitability which is likely to be higher for larger PAs.

We therefore recode our dependent variable, PA designation status of a geopoint, by different percentile cutoffs, depending on park. Specifically, we exclude designations in PAs that are smaller than $\sim$3000 km^2 (25%), $\sim$10 000 km^2 (50%), and $\sim$32 700 km^2 (75%) which means we stepwise increase the size of parks considered.

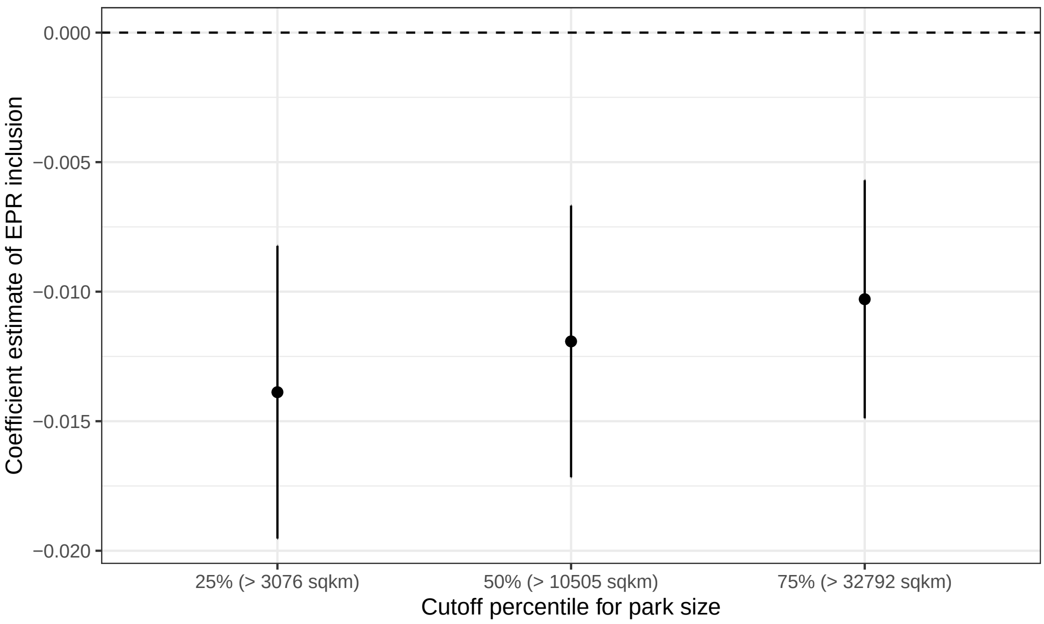


Figure A5: Park size

Figure A5 plots the coefficient of the models using the different cutoffs. The plot shows that the absolute effect size becomes smaller as we consider only larger parks in the sample. The difference between coefficients is substantively small and not very precisely estimated. Nevertheless, the trend at least suggests that ethnic inclusion helps groups to "protect" their home areas from smaller parks rather than larger parks.

C Additional Data

C.1 PADDD extent

Table A3 presents the geographic extent of protected area degradation (specifically degazettement and downsizing) in African countries. Data is presented for all observation for which there is information in the spatial magnitude of alterations, as reported by the PADDD tracker.

Table A3: PADDD extent

Country	Protected (KM^2)	Degazetted (KM^2)	Downsized (KM^2)	Degraded sum (KM^2)	Degradation ratio
Burkina Faso	62796	365	0	365	0.0058
Congo - Brazzaville	178345	0	1560	1560	0.0087
Côte d'Ivoire	48668	0	208.5	208.5	0.0043
Gabon	129733	0	160	160	0.0012
Guinea	71128	0	15.4	15.4	0.0002
Kenya	101282	21	13925.8	13946.7	0.1380
Malawi	18885	0	220.6	220.6	0.0117
Mali	99933	0	2448	2448	0.0245
Mozambique	146564	0	3770	3770	0.0257
Namibia	406920	0	3400	3400	0.0084
Nigeria	45777	0	135	135	0.0029
Rwanda	2774	2710	1600	4310	1.5535
South Africa	371469	1578.9	4129.7	5708.6	0.0154
Tanzania	415392	15	334	349	0.0008
Uganda	40449	2553	1335	3888	0.0961
Zambia	310461	0	24	24	0.0001
Total	2450576	7242.8	33266	40508.8	0.0165

Note: The table reports the spatial extent of degradation events in countries as reported by the PADDD tracker. Where data was available, figures are presented for the cumulative size of PAs degazetted and the extend of PA downsizing, calculated as the area prior to downsizing minus the area following downsizing. The degradation ratio is calculated as the sum of degraded land divided by the sum of (currently) protected land.

D References (Appendix)

Liu, Licheng, Ye Wang, and Yiqing Xu. 2022. "A Practical Guide to Counterfactual Estimators for Causal Inference with Time-Series Cross-Sectional Data." *American Journal of Political Science* , ajps.12723.