HOW IS POWER SHARED IN AFRICA?*

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Is African politics characterized by concentrated power in the hands of a narrow group (ethnically determined) which then fluctuates from one extreme to another via frequent coups? Employing data on the ethnicity of cabinet ministers since independence, we show that African ruling coalitions are surprisingly large and that political power is allocated proportionally to population shares across ethnic groups. This holds true even restricting the analysis to the subsample of the most powerful ministerial posts. We argue that the likelihood of revolutions from outsiders and coup threats from insiders are major forces explaining allocations within these regimes. Alternative allocation mechanisms are explored. Counterfactual experiments shedding light on the role of Western policies in affecting African national coalitions and leadership group premia are performed.

1 INTRODUCTION

How is power, as measured through the holding of pinnacle positions in national governments, shared in Africa? Using new evidence, comprising the ethnicity of each national cabinet member sampled at yearly frequency from independence, we answer this question for fifteen sub-Saharan African countries. We focus on the executive branch because it is well understood in African comparative politics that this is where power, both political and economic, resides (Jackson and Rosberg (1982), Posner (2005)). We focus on ethnicity, as it is the cornerstone of political organization in sub-Saharan Africa.[1]

Perhaps the most widely stated implication of ethnicity's prominence in African politics is the "Big Man" theory of power. The simplest version casts the Big Man as a relatively unconstrained decision maker, a personalist ruler with a strong preference for sharing power and spoils with his trusted co-ethnics through the "politics of ethnic exclusion." Former United Nations Secretary-General Kofi Annan (Annan 2004, p.12) describes that widely held view:

> It is frequently the case that political victory assumes a 'winner-takes-all' form with respect to wealth and resources, patronage, and the prestige and prerogatives of office. A communal sense of advantage or disadvantage is often closely linked to this phenomenon, which is heightened in many cases by reliance on centralized and highly personalized forms of governance.

The emphasis is often placed on the zero-sum nature of ethnic control of the state. Horowitz (1993, p.22) discusses narrow ruling elites in Kenya, Cameroon, and Zaire, mentioning explicitly "[Arap Moi's] regime that continues to exclude the two largest groups, Kikuyu and Luo"(counterfactually, as both groups were present in government at the time of his writing). Similarly, Horowitz (1985, p.510) discusses ethnic exclusion in Ghana's cabinets, reporting that "not a single Ewe was appointed to his [Nkrumah's] cabinet after 1961."Over 1962-65 ministries like Finance, Health, Labor and Communications all went to Ewe. The winner-take-all nature of ethnic interaction is also underlined by several examples in Alesina et al. (2013),

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[1]The literature on African ethnic politics is too vast to be properly summarized here. Among the many, see Bates (1981), Berman (1998), Bienen et al. (1995), and Easterly and Levine (1997), Posner (2004). Africanists often offer detailed analysis of cabinet ethnic compositions in their commentaries. See Khapoya (1980) for the Moi transition in Kenya, Osaghae (1989) for Nigeria, Posner (2005) for Zambia. Arriola (2009) considers cabinet expansion as a tool of patronage and shows cabinet expansion's relevance for leader's survival in Africa. Kramon and Posner (2011) present evidence from Kenya on the large impact of having a co-ethnic minister of education on educational attainment of an ethnic group.

Easterly and Levine (1997) or in theoretical models with sharp excludabilities, like Padro-i-Miquel (2007) among the others. Damaging effects of leaders' ethnic favoritism have been argued for economic growth tragedies (Easterly and Levine (1999), Bates, (1983)); societal peace (Horowitz (1985), Fearon and Laitin (2003), Roessler (2011)); and health outcomes (Brockerhoff and Hewett (2000)).

An alternative view of ethnicity in African politics accedes to its salience as an organizing principle, recognizes a strong co-ethnic preference, but highlights the leader's constraints in sharing power, as opposed to exclusion and full autonomy. Though leaders may prefer sharing exclusively with their own, they cannot do so freely from constraint, at risk of losing power. This more circumscribed view of a ruler's power, emphasizing constraints as opposed to autonomy, is also widely held, but mostly among Africanists. Kramon and Posner (2011) summarize a prevailing view in the literature:

> Scholars such as Joseph (1987), van de Walle (2007), and Arriola (2009) emphasize the extent to which presidents keep themselves in power by co-opting other powerful elites—usually elites that control ethnic or regional support bases that are distinct from the president's—by granting them access to portions of the state (what Joseph, following Weber, calls prebends) in exchange for their loyalty and that of their followers. [...] In practice, this is done by allocating cabinet positions, with the understanding that the holders of those cabinet positions will use their ministries to enrich themselves and shore up their own regional or ethnic support bases, and then deliver them to the president when called upon.

Put more succinctly by Arriola (2009): "All African leaders have used ministerial appointments to the cabinet as an instrument for managing elite relations."[2]

A first pass at the data, presented in Section 2, suggests the more nuanced view to be closer to the truth. African autocracies function through an unexpectedly high degree of proportionality in the assignment of power positions, even senior ministerial posts, across ethnic groups. While the country leader's ethnic group receives a premium in terms of cabinet posts relative to its size (measured as the group's total population share), such premia are comparable to formateur advantages in parliamentary democracies. Rarely are large ethnic minorities left out of government, and their size does matter in predicting the share of posts they control, even when they do not coincide with the leader's own ethnic group. Leaders do favor their own, but seem to face binding constraints in how far they are able to do so.

What are these constraints? The vast literature on political arrangements in African autocracies suggests two. On the one hand, leaders cannot maintain their regime without the support of a significant portion of the population. The ever-present possibility of rebellion, or attack on the whole edifice of a regime, is mitigated by coopting elites from other ethnic groups into government. However, this alone is insufficient to secure leadership survival. Leaders also face the risk of being toppled from palace insiders, via coups d'état. To stave off this second threat, government insiders must be rewarded sufficiently well through patronage allocations. Section 3 develops a model that embeds these two constraints and demonstrates how the allocation of national cabinet posts can be employed by a leader to hold off such challenges to his regime. The model focuses on the strength (population size) of each ethnic group and shows how the size of a single elite's ethnic group affects his inclusion in a leader's cabinet and his patronage allocation if included. Differently from the large literature following the classic Baron and Ferejohn (1989) legislative bargaining setting, our model revolves around nonlegislative incentives.[3]

This makes sense given the focus on African polities. However, similarly to Baron and Ferejohn, we maintain a purely noncooperative approach. We show that the construction of a stable government can be modeled as an optimization problem for the current leader and how the solution to this problem depends on the solution to a similar hypothetical problem that would be faced by the elite of any other ethnicity, if they themselves were to become leaders. We prove that the stable fixed point of this patronage allocation problem uniquely determines the optimal composition of every potential leader's cabinet and inclines all

[2] There is again a large literature investigating ethnic constraints in the allocation of political and economic positions by leaders; sometimes described as "ethnic arithmetic", "ethnic balancing" or "regional juggling."Posner (2005, p.127) reports on the delicacy of such balancing practiced by Zambian president Kuanda over his long rule of that country. Legislative bodies, on the other hand, are relegated to lesser roles and to rubber-stamping decisions of the executive branch. See Barkan (2009, p.2).

[3] The literature on bargaining over resource allocation in non-legislative settings is also vast. See Acemoglu, Egorov, and Sonin (2008) for a model of coalition formation in autocracies that relies on self-enforcing coalitions and the literature cited therein for additional examples. Our model shares with most of this literature a non-cooperative approach, but differs in its emphasis on the role of leaders, threats faced by the ruling coalition, and payoff structure for insiders and outsiders.

leaders, irrespective of ethnicity, to prefer inclusion of elites from larger groups over a collection of smaller groups comprising equal support.

The empirical patterns of political inclusion and leadership premia as a function of ethnicity size follow the precise nonlinearities predicted by our model. The empirical variation in size of the ruling coalition and post allocations allows us to recover the model's structural parameters relating to the revolution and coup technologies for each country, as shown in Section 4. The estimates are consistent with large overhanging coup and revolution threats and large private gains from leadership. The estimated model performs well in predicting cabinet share allocations across ethnicities in out-of-sample periods and in Section 5 we show that it outperforms several relevant alternatives relying on different theoretical allocation mechanisms.

More crucially, in Section 6 we show how our framework can be useful in answering consequential politico-economic questions pertinent to African political equilibria. To provide operational content, we start from the observation that the constraints faced by autocratic leaders in sub-Saharan countries have been often affected by decisions of governments abroad, in part former colonial rulers that have continued to actively intervene in African politics throughout independence. We discuss how the policy decisions of these foreign governments might have mapped into the leaders' constraints (for instance tightening or relaxing revolution constraints), shedding light on the role of the West in affecting African national coalitions. Our counterfactuals allow us to address a set of intriguing questions. We show that, when France (by far the most interventionist of the ex-colonists) reduced her active military support in Western Africa in the mid-1990's, broader ruling coalitions and lower leadership shares ensued.[4] The end of the Cold War, associated with subsequent reduced foreign military support and non-military largesse to African dictators, produced similar effects in terms of broadening ethnic coalitions in Sub-Saharan Africa.[5] In the Online Appendix we also explore non-policy related counterfactuals, using the model to rationalize national partitions determined by the historical 1961 referenda in the British Cameroons and the 1956 Togoland referendum.

Analyzing how ruling elites evolve, organize, and respond to particular shocks is central to understanding the patterns of political, economic, and social development of both established and establishing democracies, and has been a focus of much research; Acemoglu and Robinson (2001b, 2005), Bueno de Mesquita et. al. (2003), Wintrobe (1998), Besley and Persson (2011), Aghion, Alesina, and Trebbi (2004). However, notwithstanding the well-established theoretical importance of intra-elite bargaining (Acemoglu and Robinson (2005), Bueno de Mesquita et al. (2003)), systematic empirical analysis beyond the occasional case study is rare for the case of autocracies or institutionally weak settings. This is not surprising given that these countries typically display low (or null) democratic responsiveness and hence lack reliable electoral or polling data. Posner (2005) offers an exception with regard to Zambian politics. Other recent studies relevant to the analysis of the inner workings of autocracies include Geddes (2003), who investigates the role of parties within autocracies, and Gandhi and Przeworski (2006), who consider how a legislature can be employed as a power-sharing tool by the leader. In what follows we present an empirical and theoretical contribution to this literature.

2 POWER DISTRIBUTION IN AFRICA

We begin by presenting an analysis of the power distribution of national governments in Africa in reduced form. Our objective here is to transparently illustrate whether one ethnic group dominates politics in the regimes we study and to what extent that fluctuates over time. In brief, we hope to provide a clear-cut picture of by how much a "Big Man" winner-takes-all view of African politics is amiss.

To this goal, we employ complete data on the ethnic affiliation of each national minister since independence (until 2004) on Benin, Cameroon, Cote d'Ivoire, Democratic Republic of Congo, Gabon, Ghana, Guinea, Liberia, Nigeria, Republic of Congo, Sierra Leone, Tanzania, Togo, Kenya, and Uganda. These

[4] Thomson (2004, p.137) notes the high (relative to the other colonists) rate of French post-independence intervention in Africa; the reasons for which Kroslak (2004) studies in detail. France was the only Western power to permanently maintain bases throughout Africa, with thousands of troops stationed on the continent (Kroslak 2004, p. 77), and pursuing at least 30 military interventions since 1963, (p.78). This moderated significantly starting in the early to mid 90's. This scaling back implied that: "Paris has ceased to be the Gendarme d'Afrique" (p.78). Recently, some have argued that French military intervention in Mali represents a return to its earlier policy of 'Francafrique'; for example Haski (2013).

[5] The end of the cold war saw a dramatic reduction in US state-to-state aid. Hentz (2004) documents a decline in US bilateral aid from a peak of $2.4 Billion in 1985 to a level less than half of that from 1990 onwards. The decline in Soviet support was much larger. China, on the other hand, has massively increased aid disbursements to Africa since then; see Taylor (2004) for numbers in the 1990s, and a recent upward revision in estimates since 2000 reported by Provost and Harris (2013).

fifteen countries are all part of equatorial Africa and jointly cover a population of 492 million, or 45 percent of the whole continent's population. In this sample we identify the ethnicity of more than 90 percent of ministers. The details on the protocol and construction of ethnicity and ministerial data, as well as evidence in support of the importance of the executive branch in African politics, are discussed in detail in Rainer and Trebbi (2011).[6]

Table I reports basic summary statistics for our sample by country, while Table II presents summary statistics disaggregated at the ethnic group-country level. We employ a fine classification of ethnicities, ranging from 9 (Guinea) to 37 (Tanzania) different groups, and our ministerial pool is deep (about $4,000$ unique ministers). Our cross-sectional sample size is comparable or exceeds that of most studies in government coalition formation for parliamentary democracies.[7]

Given this information, consider a country of population P and of N different ethnicities. The set of ethnicities is $\mathcal{N} = \{1, ..., N\}$. For every ethnic group $j \in \mathcal{N}$ let us indicate as X_{jt} its cabinet post shares in year t and with n_j its population size. An informative way of discussing power distributions across ethnicities is to focus on the disproportionality in the allocation of X_j's relative to what share of the population the group may hold (n_j/P). Africanists have discussed the issue of cabinet disproportionality in detail, as in Posner (2005), emphasizing how for countries with few reliable elections, this cabinet disproportionality measure might be a revealing statistic. By tracing $(X_{jt} - n_j/P)$ over time across all ethnic groups in each country, one can directly assess whether a single group displays substantial overweight and how this pattern shifts over time.

As a representative illustration, we report in Figure 1 the time series of $(X_{jt} - n_j/P)$ across all ethnicities in Cameroon and Sierra Leone.

As evident from the figure, the time series hover around zero for almost all groups, unless the leader is from that specific ethnicity, in which case there is a positive gap –a leadership premium. In Cameroon disproportionality is generally low and stable for all groups with the noticeable shift of cabinet positions between Fulani and Fang occurring in 1982, at the onset of the Biya regime. That year Paul Biya, a Fang from Bululand, succeeded the resigning president Ahmadou Ahidjo, the son of a Fulani chief. Sierra Leone also shows proportionality and stability, notwithstanding a much more troubled political history than Cameroon, and positive leadership premia. The one exception appears to be the underrepresentation of the Mende, a group form the South, under the presidency of Siaka Stevens (1971-1985). Born to a Limba father and a Mende mother,[8] Stevens always identified with the Northern faction, which in fact displays positive premia with the Limba over that period (at a population share of 8% occasionally capturing 4/20 of the seats). Similar patterns recur systematically. Complete time series plots for every country in our sample are reported in the Online Appendix Figure A1 to the paper. For example, in Guinea the shift in power between Malinke and Susu in 1984 at the death of Ahmed Sékou Touré, a Malinke, produced a visible drop in overweighting of that group and a jump in representation for the Susu, the new leader's group. Similar dynamics are salient between Kikuyu and Kalenjin in Kenya.

African cabinet allocations tend to closely match population shares with cabinet post shares and disproportionality is low. To systematically illustrate these features of the data, Table III reports a straightforward reduced-form regression of cabinet shares on population shares:

$$X_{cjt} = \alpha_1^X \frac{n_{jc}}{P_c} + \alpha_2^X L_{cjt} + \gamma_c^X + \delta_t^X + \eta_{cjt}^X$$

with L_{cjt} an indicator function for country c leader belonging to ethnicity j at time t, capturing leadership

[6]Briefly, we devised a protocol involving four stages. First, we recorded the names and positions of all government members that appear in the annual publications of *Africa South of the Sahara* or *The Europa World Year Book* between 1960 and 2004. Second, for each minister on our list, we searched the World Biographical Information System (WBIS) database for explicit information on his/her ethnicity. Third, for each minister whose ethnicity was not found in the WBIS database, we conducted an online search in Google.com, Google books, and Google Scholar. In addition to the online searching, we employed country-specific library materials, local experts (mostly former African politicians and journalists with political expertise), and the LexisNexis online database as alternative data sources. Fourth, we created a complete list of the country's ethnic groups based on ethnic categories listed by Alesina, et al. (2003) and Fearon (2003), and attempted to assign every minister to one of these groups using the data collected in the second and third stages.

[7]See for instance Diermeier, Eraslan, and Merlo (2003) and Ansolabehere, Snyder, Strauss, and Ting (2005).

[8]In the data mixed ethnicities occur, even if not frequently, and we typically assign representation in proportion in this case. That is, one post assigned to a minister of Limba and Mende ancestry would be then indicated as 0.5 seats going to each group. For the leader's ethnicity, in order to refrain from making arbitrary calls, we indicate both groups as leader's own, as in the case of Stevens. This has the cost of creating measurement error in the data.

TABLE IA

AFRICAN CABINETS – SUMMARY STATISTICS BY COUNTRY

Country	Time Period Covered	Years Missing	Years with Two Governments	# of Governments	Number of Leaders in Power[a]	Number of Government Ministers	Average Size of Government (# posts)	Total Number of Unique Ministers	Average Number of Governments per Minister	Number of Ethnic Groups	Number of Government Ministers with Missing Ethnicity	Percent of Government Ministers with Missing Ethnicity
Benin	1960-2004	1969, 1975	1968, 1970	45	10	730	16.22	209	3.49	15	1	0.14%
Cameroon	1960-2004	1969, 1975	1968	44	2	1445	32.84	262	5.52	21	43	2.98%
Cote d'Ivoire	1960-2004	1975	1970	45	4	1256	27.91	233	5.39	17	0	0.00%
Dem. Rep. Congo	1961-2004	1972, 1974	1970, 1973	44	4	1352	30.73	515	2.63	30	5	0.37%
Gabon	1960-2004	1975		44	2	1173	26.66	185	6.34	10	6	0.51%
Ghana	1960-2004	1975	1970	45	9	1140	25.33	362	3.15	22	0	0.00%
Guinea	1960-2004	1975	1969	45	2	1213	26.96	244	4.97	9	4	0.33%
Kenya	1964-2004	1975	1970	41	3	1010	24.63	155	6.52	16	2	0.20%
Liberia	1960-2004	1975	1970	45	10	938	20.84	272	3.45	15	9	0.96%
Nigeria	1961-2004	1975	1970	44	11	1499	34.07	473	3.17	17	13	0.87%
Rep. of Congo	1960-2004	1969, 1975	1968, 1970	45	7	918	20.40	239	3.84	10	9	0.98%
Sierra Leone	1960-2004	1972, 1975	1970, 1973	45	9	1109	24.64	288	3.85	14	0	0.00%
Tanzania	1965-2004	1972, 1974	1970, 1973	40	3	1016	25.40	158	6.43	37	0	0.00%
Togo	1960-2004	1975	1970	45	3	757	16.82	199	3.80	20	0	0.00%
Uganda	1963-2004	1972, 1974	1970, 1973	42	6	1037	24.69	205	5.06	26	3	0.29%

[a] In this column, we count a new nonconsecutive term in office of the same leader as a new leader. Source: Rainer and Trebbi (2011)

TABLE IB

SUMMARY STATISTICS BY GROUP

Variable	Obs	Mean	Std. Dev.	Min	Max
	Africa				
Group's Share of Cabinet Posts	11749	0.054	0.083	0.000	0.882
Group's Share of Population	11749	0.054	0.062	0.004	0.390
Leaders Ethnic Group Indicator	11749	0.061	0.240	0.000	1.000
Largest Ethnic Group Indicator	11749	0.058	0.234	0.000	1.000
Coalition Member Indicator	11749	0.552	0.497	0.000	1.000

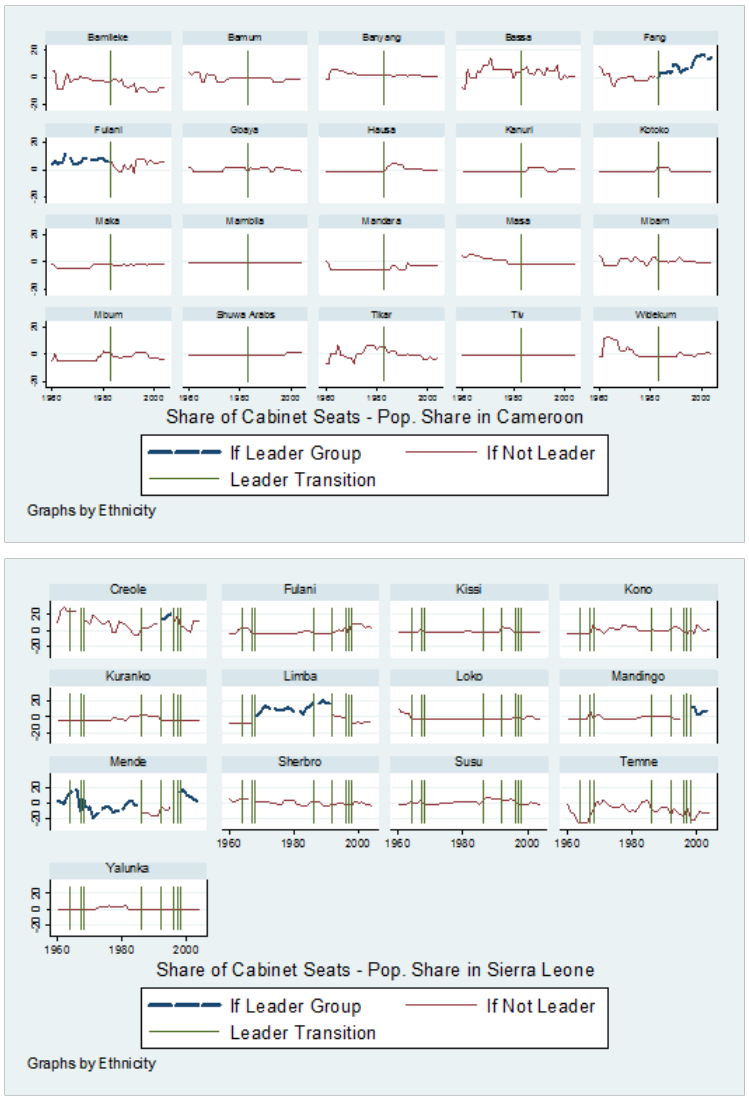
TABLE II

GROUP SIZE, LEADERSHIP, AND CABINET MEMBERSHIP, 1960-2004, ALL ETHNIC GROUPS[a]

	Is in Government Coalition?	Is in Government Coalition?	Is Leader Group?	Is Leader Group?
	(1)	(2)	(3)	(4)
Group Size	6.5887	8.0741	0.5353	0.5807
	(1.0925)	(0.6245)	(0.0871)	(0.154)
Largest Group		-0.5702		-0.0125
		(0.0593)		(0.0356)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	11749	11749	11749	11749

[a] Dep. Var. (1), (2) = Dummy for membership of the ruling coalition. Dep. Var. Cols. (3), (4) = Dummy for the group being the ethnicity of the leader. Group Size = Ethnic Share of Population. Largest Group = Largest Ethnic Group. Probit marginal effects and standard errors clustered at the country level in parentheses below.

Figure 1: Disproportionality in allocations, Cameroon and Sierra Leone, by ethnicity. 1960-2004.



premia, and including country, γ_c^X, and year , δ_t^X, fixed effects. Column 1 in Table III shows two striking features. First, the coefficient on the ethnic group share of the population α_1^X is positive and statistically significant, indicating a non trivial degree of proportionality between population shares and cabinet allocations, around .77. This rejects clearly the hypothesis of cabinet posts being allocated independently of population strength and at pure whim of the leader. Second, the leader's seat premium is precisely estimated, positive, but not excessively large: around 11 percent. Given an average cabinet size of 25 posts in our African sample, the leadership premium can be assessed as an additional $1.75 = 25 \times (0.11 - 1/25)$ ministerial positions on top of the leadership itself. Column 2 includes the square of the group size to capture nonlinearities in representation for larger groups. The coefficient on $(n_{jc}/P_c)^2$ is negative and statistically precise.

TABLE III

LEADERSHIP IN CABINET FORMATION, GROUP SIZE, AND ALLOCATION OF CABINET SEATS, 1960-2004. ALL ETHNIC GROUPS[a]

	Share of All Cabinet Seats (1)	Share of All Cabinet Seats (2)	Share of All Cabinet Seats (3)	Share of Top Cabinet Seats (4)	Share of Top Cabinet Seats (5)	Share of Top Cabinet Seats (6)
Group Size	0.774	1.0118	1.0198	0.7649	0.9033	0.8869
	(0.0755)	(0.1482)	(0.1228)	(0.0713)	(0.1667)	(0.1398)
Group Size^2		-0.924	-0.945		-0.538	-0.56
		(0.445)	(0.405)		(0.613)	(0.517)
Leader Group	0.1126	0.1108		0.2084	0.2073	
	(0.027)	(0.0271)		(0.0257)	(0.0258)	
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.55	0.55	0.5	0.49	0.49	0.3
N	11749	11749	11029	11749	11749	11029

[a] Dep. Var. Cols. (1)-(3) = Share of All Cabinet Posts Reported. Dep. Var. (4)-(6) = Share of Top Cabinet Posts (Presidency/Premiership, Defense, Budget, Commerce, Finance, Treasury, Economy, Agriculture, Justice, Foreign). Columns (3) and (6) exclude the leaders ethnic group in each country-year. Standard errors clustered at the country level in parentheses below coefficients. Group Size = Ethnic Share of Population. Group size squared coefficient and standard errors are x10,000.

This reduced-form finding supports the view of larger groups gaining seats, but being relatively less well represented than smaller ones, a specific type of nonlinearity which our model in Section 3 emphasizes. In Column 3 we restrict the analysis to non-leader ethnicities, increasing our precision. The allocation of top positions in African cabinets is explored in Column 4.[9] Both size and leadership status are again positive and significant. Quantitatively, it is surprising that α_1^X remains sizable in Column 4, close to the estimate in Column 1. Notice also how the effect of leadership increases for top ministerial appointments, this is however the result of the leader representing a larger share of a smaller set of posts. Given an average top cabinet size of 9 posts, the leadership premium can be assessed as an additional $0.87 = 9 \times (.208 - 1/9)$ ministerial positions on top of the leadership.

[9]We include as top ministerial posts: the Presidency/Premiership and deputies, Defense, Budget, Commerce, Finance, Treasury, Economy, Agriculture, Justice, State/Foreign Affairs. We have also experimented with more restrictive definitions (dropping economic posts) and expansive ones (including transportations, resources). The results we report are invariant to all such treatments.

Figure 2: Allocation of cabinet shares and population shares, full sample. 1960-2004

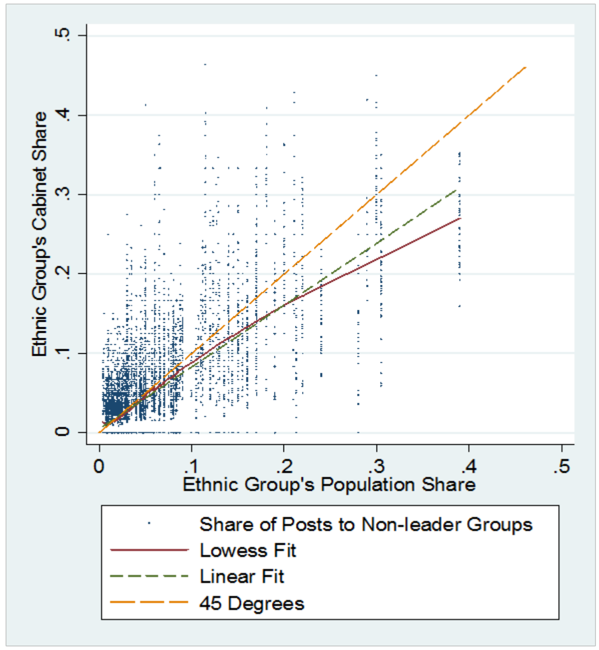


Figure 2 gives a stark graphical representation of the primitive features of the power distribution in Africa by fitting a nonparametric lowess estimator of cabinet shares as function of population shares, pooled across all countries and all (non-leader) ethnicities. The figure concurs with the proportionality and diminishing returns to size reported in Table III, but is free of parametric assumptions. Importantly, the bandwidth of the lowess estimator is 0.8, so the curvature at the upper extreme of the graph is not driven by a few large observations, but estimated using group shares as low as 0.04.

To further underscore the surprising nature of the stylized facts reported in this section, we also note that the degree of proportionality in ethnic representation shown in our African sample would not appear, from a purely quantitative standpoint, much different to that observed in the racial composition of a democratic benchmark, like the US cabinet for example. Indeed, we can confirm this with Figure A2, constructed for the US exactly as Figure 1 is for Africa, and reported in the Online Appendix. The period of White (compared with visible minorities) over-representation in US cabinets –1960 to 1985– has been followed by a period of Whites being under-represented relative to their population share. Excepting Liberia (a case we will discuss in some detail), this fluctuation is somewhat larger, and certainly not out of step with what we see for any group in our sample. What clearly differs from the US case is the process of coalition formation, which we explore below.

3 MODEL

We construct a model to explain the features of a leader's cabinet allocations by ethnicity documented in the previous section: stability, proportionality, diminishing returns to group size, and absolute leadership premia. Ethnicity is central to the model. Leaders are constrained in how they can treat their co-ethnic elites – they need their support to govern. They are also constrained in how they treat the elites from other ethnic groups. The support of a particular ethnic group is not essential, per se, but leaders must mitigate threats to their regime in the form of revolutions. They do this by including the elites from an ethnic group in their government. They also need to guard against threats to their own position arising from ambitious insiders in the form of coups. Cabinet allocations are used by the leader to mitigate these threats and are shown to hinge entirely on a single (readily observable) ethnic characteristic, the size of the ethnic group. The model shows how size determines which ethnicities are in the cabinet, which are out, the seat allocation a group receives, and how the leader's ethnic group size affects all of these.

3.1 Model Set-up

Consider an infinite horizon, discrete time economy, with per period discount rate δ. Each ethnicity is comprised of two types of individuals: elites, denoted by e, and non-elites, denoted by n. Ethnic group j has a corresponding elite size e_j and non-elite size n_j, with $e_j = \lambda n_j$ and $\lambda \in (0,1)$. Given a total population of non-elites of size P, $\Sigma_{i=1}^{N} n_i = P$. Let $\mathbf{N} = \{n_1, ..., n_N\}$. Without loss of generality we order ethnicities from largest to smallest $e_1 > e_2 > ... > e_{N-1} > e_N$. Elites decide whether non-elites support a government or not. Each elite decides support of $1/\lambda$ non-elite from its own ethnicity.

At time 0 a leader is selected from one of the ethnic groups $j \in \mathcal{N}$ with logistic probability proportional to group size

$$p_j(\mathbf{N}) = \frac{\exp(\alpha e_j)}{\Sigma_{i=1}^{N} \exp(\alpha e_i)} \tag{1}$$

Let $l \in \mathcal{N}$ indicate the ethnic identity of the selected leader and $\mathcal{O}$ the set of subsets of $\mathcal{N}$.

The leader chooses the allocation of leadership posts (i.e., cabinet positions or ministries) across the elites of the various ethnic groups. Posts are valuable because they generate patronage to post holders.[10] The total value of all posts is normalized to value 1. The leader also receives a non-transferrable personal benefit to being leader, valued at $F \geq 0$, capturing the personalistic nature of autocratic rents.[11] We indicate by Ω^l the set of ethnic groups in the cabinet other than the leader's own group, implying the country is ruled by an ethnic coalition $\left(\Omega^l \cup l\right) \in \mathcal{O}$. Elite members included in the cabinet are supporters of the leader. In the event of a revolution against the leader, the $1/\lambda$ non-elite controlled by each one of these 'insiders' necessarily supports the leader against the revolutionaries.

Let the per-member amount of patronage the leader transfers to an elite from group j included in his governing coalition be denoted x_j.[12] Posts are assumed infinitely divisible, so total patronage transferred to elite of j, if all of its elites are in government is a real number $x_j e_j \in [0,1]$.

Ethnic ties bind leaders. Leaders can choose to include cabinet ministers from across the ethnic spectrum – for example, choosing to include only a sub-set of the elite from any particular ethnicity. But they cannot exclude the elite from their own ethnic group from receiving a fair (i.e. proportionate) share of the patronage that remains. This is the only restriction imposed on leaders in deciding on post allocations, the only avenue via which the leader's ethnicity matters, and hence a key assumption in our model.[13]

Assumption (*Group Cohesion*): *A leader cannot exclude elites from his own ethnicity in the allocation of cabinet posts, and must share equally among them. Patronage can be offered to elites from other ethnicities without restriction.*

Let $\bar{x}_l$ denote the cabinet allocation going to an elite of leader $l's$ own ethnicity. From the *Group Cohesion* assumption:

$$\bar{x}_l = \left(1 - \Sigma_{i \in \Omega^l} x_i e_i'(l)\right)/e_l, \tag{2}$$

where $e_i'(l) \leq e_i$ denotes the number of elite from group $i \neq l$ chosen by a leader of ethnicity l in his governing coalition.

Leaders lose power or are deposed for different reasons. Leaders can lose power due to "exogenous" transitions outside their control (e.g. they may die or a friendly superpower may change its regional policy). Alternatively, leaders can be deposed by government outsiders via large scale political violence (a revolution)

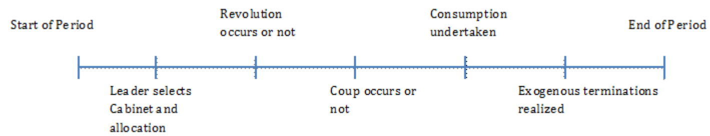
[10] Much anecdotal evidence links office-holding to patronage, often connoted by the term 'prebendalism.' See for example Arriola (2011) for an extensive discussion of this view, and Thomson (2004, p.17) for a description of patronage networks emanating from top ministers, through clientilist networks down to lowly peasants. Precise estimates of value are unavailable, but even official salaries reflect a huge imbalance relative to Western benchmarks. For example, a 2006 United Nations estimate of monthly payments for various professions at the end of Mobutu's rule in Zaire found Ministers to be in receipt of salaries 40 to 60 fold greater than those received by doctors or judges; Gebrewold 2009.

[11] From a modeling parsimony view, it may seem excessive to include a leadership premium in this form when, as we state in the prelude to this section, the model will endogenously generate leadership premia; suggesting such an exogenous F to be superfluous. Though not restricted to be strictly positive, it will be seen that to match the other stylized facts, a non-zero F is essential.

[12] This notation implicitly assumes elite from the same ethnicity receive an equal patronage allocation if they are included in the government. This is for notational simplicity and not a restriction of the model. In principle we allow leaders to offer elites from the same ethnicity differing allocations; an option that we shall demonstrate is generally not taken.

[13] The inability to govern without the support of one's own ethnic group is a given in African politics. The ethnic group is the basis of all grass roots political power, and in most cases the primary organizing principle in African politics. This assumption captures the centrality of ethnicity in the literature on African politics –see Footnote 1 for references.

Figure 3: Timing



or by insiders via a coup d'état; which are both events we consider endogenous to the model. We consider each in turn.

3.1.1 Exogenous Transitions

With probability ε something external to the model happens to the leader, so that he cannot lead any more. We can think of any one of a number of events happening, including a negative health shock or an arrest mandate from the International Criminal Court. We assume that such transitions induce a "transition" state where selection of the next leader is governed by the process defined for $p_j(\mathbf{N})$ in equation (1).

3.1.2 Revolutions

A revolution is triggered by an excluded ethnicity taking arms against the government.[14] Once started, the number of outsiders that will join the revolutionaries against the government depends on Nash equilibrium play in the revolutionary sub-game. The relative size of contestants determines the probability of revolution success. If N_I insiders support the government and $N_O = P - N_I$ outsiders fighting the revolution, the revolutionaries succeed with probability $\frac{N_O}{N_I+N_O}$.[15]

A successful revolution deposes the current leader. A new leader is then drawn according to the same process used at time 0, i.e. according to (1), and this leader then chooses his optimal governing coalition. A failed revolution leads to no change in the status of the government.

Revolutions are value-reducing. Conflicts destroy capital and infrastructure, drive away investors, lower economic activity, and reduce government coffers independently of the final outcome. Consequently, the total value of all posts – normalized to 1 already – is permanently reduced to the amount $r < 1$ after a revolution. The damage from conflict also depends on the military power of contesting factions – a factor we treat as exogenous, but which the history of post-colonial Africa has seen to be strongly influenced by Western powers.

We assume that the leader suffers $\psi \leq 0$ after a revolution attempt and that this is large enough to always make it optimal for leaders to want to dissuade revolutions. This assumption aims at capturing the extremely high cost of revolution for the rulers, in a fashion similar to Acemoglu and Robinson (2001, 2005).[16]

3.1.3 Coups

Assume – in the spirit of Baron and Ferejohn's (1989) proposer power – that each period one member of the ruling coalition has the opportunity to attempt a coup and the coup is costless. The identity of this individual is private information. If the coup is attempted, it succeeds with probability γ, and the coup leader becomes the new leader. If challenger j loses, he suffers permanent exclusion from this specific leader's patronage allocation.

[14] Another trigger for revolutions can be the defection of an ethnicity from within the governing coalition, implying an "insider" revolution constraint. In the working paper version of the paper, Francois, Rainer and Trebbi (2012), we allow for this extension. We also allow for it as a possibility in our estimations and check whether such constraint is violated at the estimated parameters vector ex post. To save space, we exclude discussion of it here, as such constraints imposed for revolutions "from within" never bind in the data.

[15] This contest function implies that only aggregates (and not their composition) matter in determining the strength of the fighting forces, and in a linear way. In the paper's online appendix, we develop a more general contest function allowing for fractionalization amongst ethnicities within the contesting forces to potentially reduce effectiveness, and report results for this generalization there too. The estimated form does come close to our restricted linear case, but can alter the estimates for other model parameters.

[16] As we will see when we come to the data, for our sample of 15 Sub-Saharan African countries, revolutions are rare events, validating our theoretical treatment of revolutions as arising 'exogenously' and not as events to be expected along the equilibrium path. Roessler (2011) reports 5 rebellions in total among these 15 countries between 1960 and 2004.

3.2 Analysis

We search for a stationary equilibrium in which a leader constructs a stable government by providing patronage to elites from other ethnicities in order to head-off endogenous threats to his incumbency; that is, revolutions and coups. Two factors guide the allocation of patronage by the leader: 1. The leader must bring in enough insiders to ensure his government dissuades revolution attempts by any subset of outsiders. 2. He must allocate enough patronage to insiders to ensure they will not stage a coup against him. Since we wish to analyze stationary equilibria, we define value functions that are time invariant.[17]

Let $V_j(\Omega)$ define the value of being in the governing coalition for a member of ethnicity j ($j \in \Omega$). Let $\bar{V}_j(\Omega)$ denote the value of being in the government coalition to an elite member from ethnicity j conditional on the leader also being from ethnicity j (and the member not being the leader himself). Let $V_j^{\text{leader}}(\Omega)$ denote the value of being the leader, if from ethnicity j. Let V_j^0 denote the value function for an elite of ethnicity j who is excluded from the current government's stream of patronage rents, and $V_j^{\text{transition}}$ denote the value function of elite j in the transition state; i.e. before a new leader has been chosen according to (1).

3.2.1 Necessary conditions to avoid a revolution

An excluded elite of ethnicity j has incentive to instigate a revolution with N_O outsiders (determined below) against a government of N_I insiders if and only if: $\frac{N_O}{N_I+N_O} rV_j^{\text{transition}} + \left(1-\frac{N_O}{N_I+N_O}\right) rV_j^0 \geq V_j^0$.

Once a revolution is started, and all valuations are reduced $1-r$ proportionately, it follows immediately that all groups not in the government have strict incentive to join the revolution. If the revolution succeeds, such groups receive $rV_j^{\text{transition}}$, which strictly exceeds rV_j^0 when the leader's group wins. Though outsiders may have preferred peace (and may not themselves have started a revolution), once it is started they will always side with the revolutionaries. Since $N_O + N_I \equiv P$, to avoid a revolution it is necessary that:

$$\frac{N_O}{P} rV_j^{\text{transition}} \leq \left(1-\left(1-\frac{N_O}{P}\right)r\right)V_j^0,\ \forall j \notin \Omega^l. \tag{3}$$

This condition is easier to satisfy the larger the size of the ruling coalition.[18]

3.2.2 Necessary conditions to avoid a Coup

At the start of each period, one (unknown to the leader) member of the governing coalition can attempt a coup d'état. To ensure an insider of ethnicity j will not exercise this opportunity, patronage transfers x_j must satisfy:

$$\begin{aligned} x_j + \delta\left((1-\varepsilon)V_j\left(\Omega^l\right) + \varepsilon V_j^{\text{transition}}\right) \quad &\geq \quad \gamma\left(\bar{x}_j + F + \delta\left((1-\varepsilon)V_j^{\text{leader}}\left(\Omega^j\right) + \varepsilon V_j^{\text{transition}}\right)\right) \\ &\quad + (1-\gamma)\left(0 + \delta\left((1-\varepsilon)V_j^0 + \varepsilon V_j^{\text{transition}}\right)\right) \end{aligned} \tag{4}$$

The left hand side of (4) is the value of being in the cabinet; it comprises the flow patronage allocation x_j which continues with probability $1-\varepsilon$ next period. With probability ε an exogenous transition occurs and then j's fate depends on the outcome of the transition process. The first term on the right hand side of (4) indicates the value of a successful coup; happening with probability γ. The new leader receives a flow value $\bar{x}_j + F$ and the continuation value of leadership next period provided no transitions occur. If an ε transition shock hits, the newly minted leader moves into the transition state. The second term is the value of a failed coup. With probability $1-\gamma$ the coup fails and the plotter loses his patronage (at least) until an exogenous leadership change occurs.

Condition (4) can be considerably simplified by utilizing the fact that we are searching for stationary equilibria (all proofs and extensions appear in the Online Appendix). Specifically:

Lemma 1. *Under stationarity, elite j's incentive to undertake a coup is fully determined by current period flow values. Specifically the values of x_j at which condition (4) holds are:*

$$x_j \geq \gamma\left(\overline{x}_j + F\right). \tag{5}$$

[17] Importantly, the assumption of stationarity, a common restriction, can be empirically assessed, a task we undertake in Section 4.

[18] Provided that $V_j^{\text{transition}}/V_j^0 > 1$, and this ratio is unaffected by the size of the ruling coalition, which we shall demonstrate subsequently.

Allocation x_j is the level of per-elite patronage required to dissuade each cabinet member from $j's$ elite from mounting a coup if the opportunity arises. This amount depends on $j's$ optimally chosen coalition, Ω^j indirectly through the term $\overline{x}_j$. Intuitively, each cabinet member must be paid the residual he would receive were he to become leader, $\overline{x}_j$, plus the direct returns to leadership, F, discounted by the chances of a coup succeeding.

Additionally, to avoid coups arising from within his own ethnicity, a co-ethnic's share of remaining residual – to which he cannot be excluded via the *Group Cohesion* assumption – must satisfy:

$$\bar{x}_l \geq x_l. \tag{6}$$

3.3 *Equilibrium*

Define the leader's indirect utility from coalition Ω: $W_l(\Omega) = \psi \times \Re(\Omega) + V_l^{\text{leader}}(\Omega) \times (1 - \Re(\Omega))$ with a revolution indicator defined as:

$$\Re(\Omega) = \begin{cases} 0 \text{ if } (3) \text{ holds,} \\ 1 \text{ otherwise.} \end{cases} \tag{7}$$

The optimal coalition selected by a leader with ethnic affiliation l is then:

$$\Omega^l = \arg \max_{(\Omega \cup l) \in \mathcal{O}} \{W_l(\Omega)\}. \tag{8}$$

The leader optimizes taking as given a 'price' for the elite of each ethnicity; i.e., the amount of x_j required to ensure their loyalty in cabinet. This is determined by the opportunity cost of the cabinet member's loyalty; their expected gains from a leadership attempt. But this, in turn, depends on the 'prices' that they would face in the ensuing sub-game where they become leader, i.e. the set of loyalty-inducing payments they would face. Which, again in turn, depends on the prices each of these would pay were they to become leader, and so on. An equilibrium here is thus a set of prices – cabinet allocations to the elite of each ethnicity included in the optimal coalition of any leader – that are mutually consistent. Formally:

Definition: A *stable equilibrium without coups and revolutions* is a set of equilibrium patronage allocations, $\hat{x}_j \; \forall \; j \in N$ and a set of governing coalitions Ω^l for any potential $l \in N$ comprising included ethnicities, $e'_j(l)$ for each leader l, such that:

(i). Given the vector $\hat{x}_j$, each leader's optimal coalition Ω^l solves (8) while satisfying equations: (3), (5) and (6).

(ii). Each leader's choice of Ω^l induces the patronage allocations $\hat{x}_j$.

We additionally restrict analysis to stationary equilibria; the patronage transfers received by a group of ethnicity j under a leader of ethnicity l are time invariant.

3.3.1 *Optimal Size*

Stationarity implies:

$$V_j^0 = \frac{\delta \varepsilon V_j^{\text{transition}}}{1 - \delta(1 - \varepsilon)}, \tag{9}$$

which allows us to define $n^* \equiv \left(1 - \frac{\delta\varepsilon(1-r)}{r[1-\delta]}\right) P$ as the minimal (and hence optimal) size of the forces mustered by the governing coalition such that a revolution will not be triggered.[19] With this many government supporters, the remaining $P - n^*$ do not find it worthwhile to undertake a revolution. Let $e^* \equiv \lambda n^*$, denote the corresponding number of elite required to ensure a total of n^* government supporters.

We can also use the size ordering of ethnicities already assumed to define a critical ethnicity j^* as:

$$\sum_{i=1}^{j^*-1} n_i/P < \frac{n^*}{P} < \sum_{i=1}^{j^*} n_i/P. \tag{10}$$

This j^* is the largest ethnicity which, if all of its elite are included in government, together with all of the elite from larger ethnicities, revolutions are dissuaded.

[19] Using equations (3) and (9) yields: $N_O \leq \frac{\delta\varepsilon(1-r)}{r[1-\delta]} P$. Since $\delta < 1$ it also immediately follows that $V_j^0 < V_j^{\text{transition}}$; which is necessary and sufficient for revolution returns to fall with the number of insiders.

3.3.2 Existence and Characterization

Any leader must obtain the support of e^* elite in total, and must pay them enough patronage to ensure their loyalty. Leaders do not vary except that some are from larger(smaller) ethnicities, and hence *must* include more(fewer) co-ethnics in their e^*. With respect to the remainder, every leader optimally chooses the 'cheapest' elite for whom loyalty can be assured. But as already discussed, these choices are interdependent. The next proposition establishes a necessary and sufficient condition under which internal consistency in these choices leads to a unique stationary outcome without coups or revolutions.

Proposition 1. *If and only if the patronage value of government is sufficiently high, there exists a stationary, sub-game perfect equilibrium in which there are no coups or revolutions. It comprises:*
(i) A 'base' group of ethnicities consisting of the largest groups in the population, 1 to j^*-2, all of whose elite are always included in government irrespective of the leader's ethnicity.
(ii) Another group of ethnicities, j^*-1 and j^*, who are included in government intermittently, depending on the ethnicity of the leader.
(iii) A group of small ethnicities, j^*+1 onwards, who are never in government unless the leader is of their ethnicity.
(iv) A set of patronage allocations, $\hat{x}_j$, that elite, j, from each ethnicity receive when in office. With

$$\hat{x}_j e_j = \frac{\gamma\left[1-\hat{x}_{j_*}e'_{j_*}-\frac{\gamma F}{1-\gamma}\Sigma_{i=1}^{j_*-1}e_i\right]}{1+\gamma(j_*-2)}+\frac{\gamma F}{1-\gamma}e_j,$$

where $\hat{x}_{j_*}$ and e'_{j_*} are defined in the appendix.
This equilibrium, along with its patronage allocations, is the unique sub-game perfect, stationary equilibrium without coups or revolutions.

Sufficiently high patronage is needed to support a stationary equilibrium without coups or revolutions. If it is insufficient relative to the spoils and chances of winning the leadership it will not be possible to both include an elite set of size e^* and give them enough to eschew coup opportunities. The existence of a base group included by any leader follows directly from the fact that all leaders face the same 'prices' ($\hat{x}_j$) necessary to ensure loyalty. All would then choose elite from the groups whose support is cheapest to buy; the base group.

Less clear is why the base group always consists of the largest ethnicities. Leaders from larger groups share residual leadership spoils (i.e., the patronage left after transfers to other elites) amongst more co-ethnics, making leadership less attractive for them. Offsetting this, leaders from larger groups need to include fewer non co-ethnics to attain the needed e^*. Part (i) implies that the large group size effect more than offsets the large residual effect, making elites from larger ethnicities 'cheaper' to buy loyalty from. The key to this result is that residual shares to own ethnicities are not controlled by the leader (due to *Group Cohesion*) and so do not bind at the no coup constraint; i.e. (6) is slack.[20] In contrast, it is optimal for a leader to transfer just enough to ensure loyalty of other elites; i.e. equation (5) always binds. Leaders thus pay a higher 'price' for co-ethnics than a leader of another ethnicity would. Leaders from larger groups must include relatively more of these high 'price' co-ethnics, lowering their returns to leadership and hence making them preferred partners in government.

The full composition of the ruling elite for any particular leader just depends on how many ethnicities that leader needs to attain a total of e^*. To get this total, groups 1 to j^*-2 are always included and hence comprise the 'base' stated in part (i). Groups near the inclusion margin, j^*-1 and j^*, are split as necessary to reach e^* and will be both in government if the leader is from a small ethnicity (as in part (ii) above), and excluded, at least partially, when leaders from larger ethnicities are in power. The smallest ethnicities, j^*+1 onwards, need the greatest transfers and are therefore excluded from government by any leader not sharing their ethnicity (part (iii) above). The robust patterns predicted for the key observable we have (ministerial post allocations by ethnicity) can now be established.

Proposition 2. *Equilibrium patronage transfers $\hat{x}_j$ satisfy:*
(i) Elites included from smaller groups receive more patronage per person than elites from larger groups: for

[20]Except for a measure zero set of parameters that we ignore.

$i, j \in \Omega$ with $n_i > n_j$ $\hat{x}_i < \hat{x}_j$.
(ii) If and only if $F > 0$, larger ethnicities receive strictly more patronage in total than smaller ones: for $n_i > n_j$, $\hat{x}_i e_i > \hat{x}_j e_j$.
(iii) The leadership premium accruing to the elite of a leader's own ethnic group is independent of that group's size.

Parts (i) and (ii) of this proposition jointly imply that patronage increases with group size, but less than proportionately. Note the importance of the leader's personal premium F in result (ii). This parameter governs the size of the group size penalty imposed on larger groups. For $F = 0$, the group size disadvantage is so great that all groups receive the same total patronage allocation. Intuitively, this is the only component of leadership rents that is not governed by the group sharing requirement, if this disappears, elite are disadvantaged in leadership precisely in proportion to their group size, so that they can be compensated proportionately less. The costs of buying off non-coethnics are the same for all leaders. This implies that the residual patronage to be shared with own group members (net of the payment to own group members when someone else is in power) is the same for all leaders. Hence the leadership premium is a constant absolute amount, and not proportionate to group size; yielding result (iii).

4 ECONOMETRIC SPECIFICATION

This section discusses our parameterization and likelihood function. We imperfectly observe $\{\hat{x}_i e_i'(l)\}_{i\in\Omega^l}$, the vector of the shares of patronage allocated to ethnic groups in the ruling coalition and assume this is due to a group-specific error ν_{jt}. Every player in the game observes such shares exactly, but not us. For excluded groups $j \notin \Omega^l$ and $j \neq l$ we also allow for the possibility of error (e.g. we could erroneously assign a minister to an ethnicity that is actually excluded from the ruling coalition). ν is assumed mean zero and identically distributed across time and ethnicities. The distribution of ν with density function $\beta(.)$ and cumulative function $B(.)$ is limited to a bounded support $[-1, 1]$ and set as $\nu \sim \text{Beta}(-1, 1, \xi, \xi)$ with identical shape parameters ξ.[21]

At time t we set $\hat{x}_{jt} = \hat{x}_j$, if $j \in \Omega^l$, and $\hat{x}_{jt} = 0$, if $j \notin \Omega^l$ and $j \neq l$. Note that the time dimension in $\hat{x}_{jt}$ arises from the identity of the leader l changing due to transitions. We then define the latent variable $X_{jt}^* = \hat{x}_{jt} e_j'(l) + \nu_{jt}$ and indicate the realized cabinet post shares for group $j \in \mathcal{N}$, $X_{jt} = X_{jt}^*$ if $X_{jt}^* \geq 0$ and $X_{jt} = 0$ if $X_{jt}^* < 0$. Right-censoring for $X_{jt}^* \geq 1$ is ignored, as $X_{jt} = 1$ never occurs in the data. We indicate with $\mathbf{X}_t = \{X_{1t,}..., X_{Nt}\}$ an empirical ministerial allocation observed in the data.[22] Absent any information on λ, the model can still be estimated and one is able to identify the product λPF (but not λ and F separately). We thus set $\lambda P = 1$ in the estimation, and rescale F when we discuss our results.[23]. We calibrate $\delta = 0.95$.

We derive first the likelihood of observing a specific coalition, then the likelihood of the set of coalitions observed for each leader, and then for the country. Given the vector of model parameters $\theta = (\gamma, F, r, \xi, \alpha, \varepsilon)$, conditional on the vector of exogenous characteristics $\mathbf{Z} = (\mathbf{N}, \lambda, \delta)$ and leader's identity l, a theoretical coalition Ω^l can be computed and matched to an empirical allocation $\mathbf{X}_t$. That is, given θ we recover $n^*/P = 1 - \frac{\delta\varepsilon(1-r)}{r(1-\delta)}$, then through (10) obtain j^* and, through Proposition (1), allocation $\mathbf{X}_t$. One can then partition a country's ethnic groups into four sets: the set of predicted coalition members that receive cabinet seats $G_1 = \left(j \in \Omega^l \wedge X_{jt} > 0\right)$; the set of predicted coalition members that do not receive cabinet seats $G_2 = \left(j \in \Omega^l \wedge X_{jt} = 0\right)$; the set of predicted non-members that are misallocated posts $G_3 = \left(j \notin \Omega^l \wedge X_{jt} > 0\right)$; the set of non-members that, as predicted, receive no post $G_4 = \left(j \notin \Omega^l \wedge X_{jt} = 0\right)$.

[21] For a discussion of why Beta is a suitable distribution function see Merlo (1997), Diermeier, Eraslan, and Merlo (2003), and Adachi and Watanabe (2007).

[22] As noted in Adachi and Watanabe (2007), the condition $\Sigma_{i\in\mathcal{N}} X_{it} = 1$ may induce ν to be dependently distributed across groups. Generally, independence of the vector $\{\nu_{it}\}_{i\in\mathcal{N}}$ is preserved since $\Sigma_{i\in\mathcal{N}} X_{it} = 1 \neq \Sigma_{i\in\mathcal{N}} X_{it}^*$ due to the censoring, but not for every realization of $\{\nu_{it}\}_{i\in\mathcal{N}}$. To see this, notice that were all observations uncensored, then $\Sigma_{i\in\mathcal{N}} X_{it} = \Sigma_{i\in\mathcal{N}} X_{it}^* = 1$, implying $\Sigma_i \nu_{it} = 0$, which would give to the vector $\{\nu_{it}\}_{i\in\mathcal{N}}$ a correlation of -1. In this instance we would only have $N-1$ independent draws of ν but N equations. A solution to this problem is to employ only $N-1$ equations for each cabinet. For this reason, we always exclude the smallest group's (N) share equation from estimation.

[23] Although systematic studies of African elites are rare, survey evidence in Kotzé and Steyn (2003) indicates λ to be possibly approximated by population shares of individuals with tertiary education in the country. Any bias introduced by employing tertiary education shares as proxies for λ can be, in theory, assessed by comparing estimates of the other parameters of interest relative to our baseline which operates without any assumption on the size of λ. For space limitations we do not explore this avenue here.

The likelihood contribution of an observed cabinet allocation $\mathbf{X}_t$ is then:

$$\mathcal{L}\left(\mathbf{X}_t|\mathbf{Z},l;\theta\right)=\prod_{i=1}^{N-1}\beta(X_{it}-\hat{x}_{it}e_i'(l))^{I(i\in G_1,G_3)}B(-\hat{x}_{it}e_i'(l))^{I(i\in G_2,G_4)}$$

where $I(.)$ is the indicator function.

A leadership spell is the period a country is ruled by a specific leader y of ethnicity l_y starting to rule at year t_y and ending at T_y. For each country we have a sequence of leadership spells $\mathbf{Y}=\{l_1,t_1,T_1;...l_y,t_y,T_y;...;l_Y,t_Y,T_Y\}$. For a sequence of coalitions observed in a country $\{\mathbf{X}_\tau\}_{\tau=t_y}^{T_y}$ under a leadership y with a leadership spell of duration T_y, the likelihood is:

$$\mathcal{L}\left(\{\mathbf{X}_\tau\}_{\tau=t_y}^{T_y}|\mathbf{Z},y;\theta\right)=\prod_{\tau=t_y}^{T_y}\mathcal{L}\left(\mathbf{X}_\tau|\mathbf{Z},l_y;\theta\right).$$

The transition and leader termination structure imply a likelihood of observing a leadership spell $\{l_y,t_y,T_y\}$ equal to $p_{l_y}(\mathbf{N})\times(1-\varepsilon)^{T_y-t_y}\varepsilon$, the product of the likelihood of picking leader l_y at time t_y and of him surviving exactly up to T_y. Considering all leadership spells for each country we have:

$$\mathcal{L}\left(\mathbf{Y},\{\mathbf{X}_\tau\}_{\tau=t_1}^{T_Y}|\mathbf{Z};\theta\right)=\prod_{y=1}^{Y}p_{l_y}(\mathbf{N})\left(1-\varepsilon\right)^{T_y-t_y}\varepsilon\left[\mathcal{L}\left(\{\mathbf{X}_\tau\}_{\tau=t_y}^{T_y}|\mathbf{Z},y;\theta\right)\right].$$

In principle, we could estimate a vector $(\gamma,F,r,\xi,\alpha,\varepsilon)$ for each country, but the identification of (α,ε) relies only on variations of leaders within countries, which in some systems are rare (e.g. Kenya, Cameroon). Our specification will allow for country-specific (γ,F,r,ξ), but impose a common (α,ε).[24]

5 MLE RESULTS

Table IV presents the maximum likelihood estimates of the model parameters $\theta=(\alpha,\varepsilon,\gamma,\mathbf{F},\mathbf{r},\xi)$ where we use the notation $\gamma=\left(\gamma^{BEN},\gamma^{CMR},...,\gamma^{UGA}\right)$, $\mathbf{F}=\left(F^{BEN},F^{CMR},...,F^{UGA}\right)$, and so on, for country-specific parameters. Beginning from the common parameters governing the leadership transitions, we find support for the view that larger groups are more likely to produce leaders. The parameter α is precisely estimated at $11.5>\exp(1)$, implying increasing returns to scale in the likelihood of leadership appointment for ethnic groups. The likelihood of exogenous breakdowns in power due to uninsurable coups, ε, is 11.5% and is again very statistically significant.[25] This implies a fairly high likelihood of per-period breakdown and translates into an effective per period discount rate of $\delta(1-\varepsilon)=84\%$.[26]

[24]The identification of the model was assessed through several rounds of Monte Carlo simulations. For given parameter values we simulated country histories and made sure the estimation based on the simulated data converged on the original structural values. Our likelihood function is parsimonious. This allows for a fairly extensive search for global optima over the parametric space. In particular, we first employ a genetic algorithm (GA) global optimizer with a large initial population of $10,000$ values and then employ a simplex search method using the GA values as initial values for the local optimizer. This approach combines the global properties of the GA optimizer with the proven theoretical convergence properties of the simplex method. Repeating the optimization procedure consistently delivers identical global optima. As evident from Proposition (1), γ and F multiply each other in the system of allocation equations, which occasionally makes it hard to identify them separately due to lack of sufficient variation in the data. This is an issue only for few countries. The theoretical proportionality slope $\gamma F/\left(1-\gamma\right)$ is always precisely identified instead.

[25]Our assumption about i.i.d. ε transitions can be checked. A diagnostic Breusch and Pagan (1980) LM test for cross-country dependence of ε cannot reject independence with a p-value of .84 and an Arellano-Bond panel model of a leader transition on its lag cannot reject serial independence with a p-value of .95.

[26]It is clear from this calculation why we need to calibrate δ, as it cannot be separately identified from ε.

TABLE IV

FULL CABINET - MAXIMUM LIKELIHOOD ESTIMATES[a]

α	11.5						
	(1.4)						
ϵ	0.115						
	(0.012)						
δ	0.95						
Country	ζ	r	γ	F	*LogLL*	Slope: $F\gamma/(1-\gamma)$	Leader-ship Premium
Benin	63.5	0.893	1.0e-13†	1.2e+13†	106.8494	1.26	0.120
	(5.0)	(0.011)	(0.018)	(2.1e24)		(0.034)	(0.025)
Cameroon	254.5	0.9692	3.8e-13†	2.6e+12†	589.6414	0.98	0.086
	(15.3)	(0.0047)	(0.0083)	(5.5e+23)		(0.016)	(0.008)
Congo, Dem Rep.	178.8	0.886	0.200	3.99	514.6169	1.00	0.074
	(10.3)	(0.011)	(0.034)	(0.95)		(0.040)	(0.009)
Cote d'Ivoire	172.7	0.9209	0.381	0.33	418.7874	0.20	0.148
	(11.8)	(0.0076)	(0.016)	(0.12)		(0.066)	(0.008)
Gabon	72.9	0.9847	3.8e-11†	2.5e+10†	201.4787	0.93	0.100
	(6.8)	(0.0092)	(0.081)	(5.3e+19)		(0.058)	(0.020)
Ghana	79.6	0.854	0.77	0.41	150.2744	1.36	0.016
	(4.8)	(0.013)	(0.38)	(0.89)		(0.120)	(0.021)
Guinea	126.7	0.9909	0.089	6.9	270.5889	0.67	0.199
	(10.5)	(0.0035)	(0.021)	(2.1)		(0.032)	(0.010)
Kenya	250.9	0.9667	0.107	6.9	562.5347	0.82	0.105
	(14.5)	(0.0042)	(0.025)	(2.0)		(0.029)	(0.006)
Liberia	24.5	0.894	0.233	-2.26	-67.6506	-0.69	0.430
	(2.0)	(0.014)	(0.056)	(0.23)		(0.260)	(0.041)
Nigeria	139.9	0.9577	0.385	1.03	521.5482	0.64	0.058
	(7.3)	(0.0046)	(0.045)	(0.22)		(0.035)	(0.008)
Rep. of Congo	76.0	0.9317	0.498	0.000	261.4404	0.00	0.270
	(5.2)	(0.0071)	(0.033)	(0.086)		(0.085)	(0.009)
Sierra Leone	69.8	0.9010	0.574	0.262	180.2609	0.35	0.198
	(5.2)	0.0092)	(0.034)	(0.051)		(0.055)	(0.016)
Tanzania	142.8	1.0000	0.112	4.84	337.3617	0.60	0.070
	(7.2)	(0.0058)	(0.040)	(2.56)		(0.095)	(0.015)
Togo	53.6	0.840	0.582	0.34	45.4974	0.48	0.234
	(4.2)	(0.014)	(0.060)	(0.17)		(0.140)	(0.013)
Uganda	134.3	0.929	1.0000†	1.5e-12†	273.8432	1.68	-2.7e-14
	(8.5)	(0.016)	(8.1e-8)	(1.4e-7)		(0.053)	(2.1e-9)

[a] Asymptotic standard errors in parentheses. The *logLL* reported is specific to the contribution of each country.
† For these countries we can identify the slope $F\gamma/(1-\gamma)$ but there is insufficient variation in the data to pin down F, γ separately. An insider constraint considering a unilateral deviation of a coalition member into staging a revolution from the inside is verified in all countries (excluding Liberia).

Concerning country-specific parameters, we begin with the revolution technology parameter r; where $1-r$ is the share of value destroyed by the revolution. Table IV reports values of r generally above 80% and precisely estimated for virtually every country. Larger values of r imply less destructive revolutions, more credible threats to the leader from outsiders, and hence pushing towards more inclusive governments. The precision parameter ξ governing the Beta distribution of the error terms is generally quite high. Larger values of ξ imply tighter distributions of the group specific error ν; suggesting a good fit of the model. The country with the lowest precision is Liberia, with a $\xi = 24.5$.

Liberia requires a short diversion as it is, during the 1960 -1980 period of American-Liberian rule, a clear outlier. During the Americo-Liberian era, the country was essentially ruled by a small minority of freed American slaves repatriated there in the 1820's. On average the Americo-Liberian regime concentrated around 50% of cabinet seats into a 4% population group. The international economic and political support for the Americo-Liberians sustained their central rule but waned over time, with a coup ending the regime in 1980. The Americo-Liberian period clearly violates our model's assumptions as we are ignoring the vast military-economic advantage and international support via which this group flourished. We consider Liberia in much of the discussion below as a useful falsification case.

The coup technology parameter, γ, and the private returns to leadership F are of particular interest for understanding the allocation of seats. Increasing γ for given F makes coups more threatening for a leader because of their higher success rate, and induces a more proportional allocation of government posts. Increasing F for given γ makes coups more threatening for a leader as well, because of the higher value of taking over if the coup is successful, again inducing a more proportional allocation. Estimates of both parameters are generally precise.[27] Only Liberia, for reasons stated above, seems to reject the model. Averaging the estimates of γ in the ten countries for which we have interior estimates and excluding Liberia, one can notice the importance of the coup threat in driving the allocation of cabinet posts. The average likelihood of coup success γ is fairly large, about 35%. In order to interpret F, which averages at 2.5.[28], we need to scale by λP the estimates of F reported in Table IV. This delivers private rents to the leader as a share of total value of patronage in the country. Using as benchmark for the elite share of the population 1/1000 gives us a scaling factor $1/\lambda P = (.001 \times P)^{-1}$. Averaging the estimates of the rescaled F, implies that yearly private rents as a share of total patronage allocated in a country of 20 million people are around $2.5/(.001 \times 20M)$, probably not an unrealistic figure when multiplied by total value of government patronage in the country.[29]

We also computed the structural slope of cabinet allocations as function of size of the ethnic group, $\gamma F/(1-\gamma)$. These estimates are positive and statistically significant with the exception of Liberia, which is negative – implying over-representation of small groups (an unsurprising fact given the pre-1980 era). Positive slopes imply that a larger group size predicts a larger share of posts (and patronage). For the ten countries (excluding Liberia) for which we have interior estimates of γ and F, and for Benin, Cameroon, Gabon, and Uganda the slope is also statistically smaller than 1, implying under-representation of non-leader groups and positive leadership premia, which we verify in the last column of Table IV. Concerning the estimated leadership premia accruing to a member of the base coalition, the estimates are precise and positive, consistent with our theoretical setup. We find average leadership premia across our countries around $9-12$ percent share of the cabinet seats, independent of leader group size and close to that shown in Section 2.

An important check comes from the analysis of top cabinet positions, like defense or finance. Our results are not just an artifact of the leadership allocating minor cabinet roles to ethnicities different from the leader's own. The results hold true even when restricting the analysis to the subsample of the most powerful ministerial posts. In Appendix Table AII we report ML estimates for a model giving weight 1 to the top posts and 0 to all other ministries. Given the precision of our ML estimates, we can typically reject equality of the estimates across the two models, but magnitudes appear economically very similar.[30]

[27] The two parameters are theoretically identified per Proposition (1). For Benin, Cameroon, and Gabon the model does not pin down γ and F precisely, pushing γ toward a corner of 0 and F toward large valuations. Uganda instead displays an imprecise, high γ. As we show below, the model fit for these countries is good. It is the case that in these four countries we can only pin down precisely the theoretical slope $\gamma F/(1-\gamma)$ of allocations (which is highly statistically significant in all four cases in Table IV), but there is not sufficient variation in the data to separately identify the parameters γ and F. The estimates of γ and F for these four countries should be only taken as reflection of this specific feature of the data.

[28] It may be worthwhile noticing here that the null hypothesis $F = 0$ would imply, per Proposition (1), equal shares of posts across all groups in the ruling coalition, independently of their share of the population. Evidence in Section 2 and in Table IV rejects this null.

[29] As a hypothetical benchmark one can consider a country with a GDP of \$30 Billion and government spending/GDP of 30% (similar to current Kenya or Cameroon in our sample). This would deliver yearly private rents from office around \$1.4 million. Such estimates, however, have to be considered with extreme caution, as it is particularly complex to exactly quantify the absolute size of both ethnic elites and government patronage.

[30] Appendix Table AIII reports results for the more general revolution contest function $\left(\frac{\Sigma_{i \in \mathcal{N}_O} n_i^{\chi}}{\Sigma_{i \in \mathcal{N}_O} n_i^{\chi} + \Sigma_{i \in \mathcal{N}_I} n_i^{\chi}}\right)$, which nests our specification and allows for ethnic fractionalization within contesting groups in a revolution to alter effectiveness due to

An extensive investigation of the model fit over the full 1960-2004 sample and of out-of-sample goodness of fit from the 1960-80 period projected onto 1980-2004 is performed in Francois, Rainer, and Trebbi (2012).[31] In the working paper version of the paper we also provided robust evidence of the model fit not deteriorating within specific institutional subsamples –military versus civilian rule; autocratic versus democratic forms of government– reassuring on the robustness of our finding with respect to relevant institutional dimensions. We also explore these four institutional subsamples in the following section.

6 ALTERNATIVE MODELS OF ALLOCATION

We now assess the relative performance of our baseline model against five relevant theoretical alternatives.

(i) *Random Allocation.* Were the leader only concerned with giving an appearance of fair representation of ethnic interests (i.e. pure window dressing), he could just pick political pawns at random (plus/minus a statistical error ν). Censoring should be allowed in such alternative setup, but only due to the coarseness of the posts (e.g. a group with 1/30 of the population can not be proportionally represented in a cabinet of 20 seats). Formally, this would imply:

$$\hat{x}_{jt}e_j = e_j \text{ for any } j$$

and latent shares equal to $X^*_{jt} = \hat{x}_{jt}e_j + \nu_{jt}$. Although relying on the lack of rationality of non-elites (systematically fooled by such window dressing), this alternative model appears a strong challenge to our baseline. It directly embeds proportionality of seat allocation and has the ability to accommodate censoring.

(ii) *Big Man.* A second alternative model of allocation that we explore here is a strong version of the big man autocratic model. We wish to reject starkly a pure interpretation of ethnic favoritism on the part of the ruler, a winner-take-all specification of the form:

$$\hat{x}_{jt}e_j = \begin{cases} 0 \text{ for any } j \neq l \\ 1 \text{ for } l \end{cases}.$$

Although the reader may have developed a strong intuition for the likely lack of fit of this alternative, it is useful to assess it in formal specification tests, given its extreme parsimony (an advantage in specification tests).

(iii) *Despotism with Window Dressing.* A more sophisticated window dressing strategy on the part of the leader, maintaining the incentive to proportionally track population shares, would be to follow a "despotism with window dressing" approach: Give very little to each elite, extract substantial leadership premia thanks to high bargaining power, but include all proportionately. Although we do not present an explicit microfoundation of such model, a transparent representation of this alternative would imply:

$$\hat{x}_{jt}e_j = \begin{cases} \alpha_1 e_j & \text{for any } j \neq l \\ \alpha_1 e_j + \alpha_0 & \text{for } j = l \end{cases},$$

where α_1 represents a window-dressing parameter (possibly very low) and α_0 captures the despot's leadership premium, and with α_0 and α_1 both country-specific parameters. Interestingly, this model nests both the *big man* and the *pure window* dressing models, but it is also more parametrically intensive. This alternative shares many of the empirical features of our model (proportionality, leadership premia, censoring), but lacks diminishing returns to population shares, an important result of our theory.

(iv) *Polarization, Country-level.* A different class of models could hinge not only on population shares of groups, but also on the country's ethnic polarization (Esteban and Ray, 1994). The degree of inter-ethnic allocation might be affected by the level of polarization, defined with the standard $POL = K \sum_{j=1}^{J} \sum_{k=1}^{J} \left(\frac{n_j}{P}\right)^{1+\alpha} \left(\frac{n_k}{P}\right) d_{jk}$, where distance among ethnic groups $d_{jk} = 1$ if $j \neq k$, and 0 otherwise, and constant K normalized to 1.[32] This alternative could incorporate a polarization effect α_2 (common across countries) and maintain a country-specific window-dressing parameter α_1:

$$\hat{x}_{jt}e_j = \alpha_1 e_j + \alpha_2 POL \text{ for any } j.$$

coordination costs χ. The baseline model in Table IV imposes $\chi = 1$, while Table AIII shows that a model with a χ slightly below 1 fits the data better in a majority of countries. A positive χ value lower than 1 implies reducing fractionalization increases the effectiveness of given government forces in the contest function, suggesting another reason for leaders to prefer elites from larger groups. Since estimates are very close to 1 we focus on the simpler $\chi = 1$ specification from here on.

[31] Sample fit statistics are reported in the Online Appendix (Figures A3-A10).

[32] Esteban and Ray (1994) show that the main parameter $\alpha \in (0, 8/5]$. We pick the mean $\alpha = 4/5$, which is also indicated by the authors as being a reasonable choice (~ 1, see Aghion, Alesina, and Trebbi, 2004).

(v) *Polarization, Relative Shares.* Alternatively, instead of country's polarization level, one might postulate a group's population share relative to the next largest group as the relevant determinant of cabinet allocations:

$$\hat{x}_{jt}e_j = \alpha_3 e_j/e_{j-1} \text{ for any } j,$$

setting $e_1/e_0 = 1$ and α_3 being country-specific.

Since all five alternative models are non-nested relative to the baseline, we perform generalized likelihood ratio tests of model selection and employ both the Vuong (1989) and Clarke (2003) tests. The null hypothesis for both the Vuong and Clarke tests is that the baseline and each alternative model are both true against a two-sided alternative that only one of the two models is true. The former test has better power properties when the density of the likelihood ratios of the baseline and the alternative is normal, while the latter is a more powerful test when this condition is violated. The baseline specification is always our main model from Table IV, and it is tested against all alternatives. Table V reports all tests.

Our model fares substantially better than any proposed alternative according to the Vuong test for non-nested models.[33] The test statistic of the baseline against the random allocation model is 19 and we reject the null of equivalent fit with a p-value of < 0.001 based on a difference of 45 degrees of freedom (r, F, γ for 15 countries).[34] The rejection of the big man autocratic model is even starker, with a test statistic of 60.1 in favor of the baseline. Employing the Clarke test we reject the null of equal fit for the random coalition model with a p-value of 0. We reject the null of equal fit for the big man model with a p-value of 0.0002. Interestingly the big man model fares slightly better using the Clarke test, as the statistic is based on the number of positive differences between individual log likelihoods, independently of the actual size of those differences. The best alternative appears to the despotism with window dressing model, but again the statistical tests formally assert the superiority of our baseline, with p-values < 0.001. Our model appears closer to the actual data generating process relative to all alternatives. With respect to the despotism with window dressing model, however, a caveat is in order. One could add to this alternative a microfounding element that would give a similar diminishing returns motive as in our model. This would make the two only distinguishable based on relative parametric parsimony. Only the addition of further data, specifically related to the amounts of rents accruing to the leadership group, could clearly separate the models. We believe this is an avenue worth exploring in future research.

Table V also reports Vuong and Clarke tests for the four subsamples considered in Section 5 (military, civilian, autocracies, democracies) plus tests for the top cabinet posts only. In all subsamples the baseline model trumps all five alternatives, indicating that our theoretical setup does not appear confounded by mechanisms at work within these specific subsets. The only exception is the case of democratic regimes for models 1, 3 and 4, which all feature linear proportionality in ethnic shares.[35] Due to the small sample of democratic regimes and to the discrepancy between the two sets of tests (Vuong and Clarke do not indicate a unanimous winner against the baseline), this does not indicate that democratic periods represent radical breaks from our baseline allocation model.

7 COUNTERFACTUALS

We can now employ our model to study alternative profiles of African national coalitions under some policy relevant counterfactuals. This section focuses exclusively on questions related to policy by foreign governments who have exercised vast influence over Africa since independence. Specifically, we will examine changes to the cost of revolutions parameter, $1 - r$, and to the private benefits of leadership, F. We will argue that these are parameters heavily influenced by foreign policy; specifically the large number of direct, covert, and promised military interventions (on r) and foreign aid (on F).

The ongoing political importance of Africa to former colonists (France being a paramount example) and its strategic importance as a theatre for super-power conflict during the Cold War, lead to direct or covert military support on a large scale. Backing in the form of weapons, tactical advice, etc., was supplied to

[33]In the Online Appendix we show that the generalization of the model including non-linearities in the contest function fits better still.

[34]The Vuong test statistic is asymptotically distributed as a standard normal.

[35]For civilian regimes the Clarke test appears inconclusive between the baseline and the despotism with window dressing model, but the Vuong test rejects soundly. Concerning democracies, democratic periods are a small portion of our total country/year observations (14%) which may be the reason why results appear less conclusive in this subsample. But another possibility, which we cannot rule out, is that the coup and revolution threats which leaders assuage in autocracies via cabinet allocations are simply not pressing in democracies, so that the model is truly less applicable there.

sympathetic governments, their proxies, and rebel groups. Foreign powers sometimes supported, sometimes opposed, and often shifted their stance with respect to African leaders.[36] Often foreign powers (in the clear case of US/USSR for example) supported opposing sides. While it is unclear what impact this influx of military support could have had on the probability of coup success, γ in our model, foreign military support for and against incumbent governments maps unambiguously into the destructiveness of revolutions, the cost of large-scale revolt $(1-r)$. Indeed, we can provide empirical validation for this intuition by examining two cases where relatively dramatic declines in foreign military support occurred.

The first case is the end of the Cold War itself in 1989, the impact of which we can estimate on the whole sample. We use this event to calibrate the effect on the parameter r, through the reduction in military support, by splitting the sample and estimating r from independence to 1989 seperately from that post-1990 onwards. We report the separate estimates of Cold War and post-Cold War parameters in the Online Appendix Table AIV. As conjectured, the direction of change in r is clear: after the Cold War ends, the destructive capacity of revolutions, $1-r$, falls in all countries. On average r increases by 4.7% post-1989, confirming our intuition that civil wars, if started, would have led to less overall damage without super-power involvement.

A second case is calibrated off a shift in France's Africa policy in 1994. Following a series of corruption scandals, the rise of Edouard Balladour to the Prime Ministership, and the reduced direct prerogative of the President in French Africa, French military involvement in the continent underwent a step-wise reduction.[37] Focusing on the six West-African Francophone countries in our sample (Benin, Cameroon, Cote d'Ivoire, Gabon, Guinea, and Togo) we estimate the implications on r of this reduction by computing parameters between the periods 1960-93 and 1994-2004 separately. Appendix Table AV again shows a clear structural break between the earlier and later periods for all six former French colonies and as conjectured, the latter period coincides with lower cost (less destructive) revolutions in all six countries; r rises 5.65% on average.

We take these estimates to imply that foreign military policy could conceivably affect the costs of conflict parameter r, and calibrate a reduction in the cost of revolt in the range of 5% to explore as a benchmark effect of foreign policy. We use our model to explore the impact on ministerial allocations across all countries in our sample. Specifically, Table VI reports the effect of a 5% rise in r (i.e. a reduction in the the cost of revolt $1-r$) over the whole 1980-2004 period for all countries (except Liberia). The share of the population with at least one minister represented in the coalition would have risen from the baseline of 76.3 to 88.6%.[38] The leader's groups would have suffered even more dramatically with its share of cabinet seats falling from 24.1% to 14.2% on average across countries. The largest group's shares would also fall, but less substantially.

The implication of this exercise is that foreign military involvement on the continent substantially increased the allocation of cabinet positions – and by implication the share of patronage – going to the leader's group. This would obviously have been true if foreign support was only received by the leader's side. But this was never the case, and it is not how we have modeled it. Our counterfactuals do not reflect the simple effect of leaders getting more because they had powerful foreign backers. Instead, they reflect the effect of the proliferation of conflict potential – weapons, resources, troops, training. These increased the destructive potential of conflicts, and by doing so, actually lowered returns to instigating conflict. This created a huge advantage to incumbent leaders, as it diminished the attractiveness of the opposition's pursuing one important avenue of regime change; namely engaging in a civil war. In response, leaders could govern with less inclusiveness, and the model's quantification of these effects shows substantial benefits to the leader, and his group, ensued.

The Cold War period also featured extensive and strategic use of non-military aid to developing countries. Africa was no exception. Much of the foreign largesse translated directly into private benefits for leaders in the form of access to valuable social networks, international recognition, and prestige rents from office, suggesting an increase in the parameter F in our model.[39] However, the historical evidence here is less

[36] For example, the 1979 deposing of Emperor Bokassa of the Central African Republic was almost a French invasion, rather than a coup, and reversed earlier French protection of the regime; Thomson (2000) p.137.

[37] Africa was tradtionally the sole perogative of the Elysee Palace but it came increasingly under the control of the Ministry of Foreign Affairs. This eventually ended in its folding in to the Ministry of Foreign Affairs in the late 90s, see Kroslak 2004 for discussion of these events' impact on French Africa policy.

[38] We relegated figures reporting counterfactual coalitions by country to the Online Appendix (Figures A11-A22).

[39] Status rents associated with head-of-state support and visits to France and the US are clear examples. Additionally, the leader's off-shore financial interests (often protected in the ex-colonist's property market or financial institutions) is another personalized rent from office strongly influenced by foreign governments.

TABLE VI

COUNTERFACTUAL ANALYSIS[a]

	Coalition Size (% Total Population)	Leadership Share (% Cabinet Posts)	Largest Group Share (% Cabinet Posts)
Data	76.3	24.1	23.5
Reduction in the cost of revolutions $(1-r)$ (i.e. the destructiveness of open revolt against leader) $\Delta r/r = +5\%$	88.6	14.2	18.9
Reduction in the private nontransferable benefits of the leadership F $\Delta F/F = -25\%$	76.3	30.0	21.5
Reduction in the likelihood of success of an attempted coup dtat γ against the leader $\Delta\gamma/\gamma = -25\%$	76.3	34.0	21.6
Increase in ethnic fractionalization among ethnicities in the country $n_i' = \begin{cases} n_i - 1\% & \text{if } i = 1, \ldots, \frac{N}{2} \\ n_i + 1\% & \text{if } i = \frac{N}{2}+1, \ldots, N \end{cases}$	75.4	21.5	21.8

[a] Averages across all countries. Excluding Liberia. We estimate the model for the 1960-80 sample, then we modify one parameter for each counterfactual exercise and present the model predictions over the 1980-2004 period. We take as given the sequence of leaders and their ethnicities over the 1960-2004 period.

useful for estimating "reasonable" policy impacts, than in the case of military invervention. Though personal transfers from the Cold War era subsided, Chinese aid started to increase in the early 1990's, and has grown massively since then making it infeasible to perform a simple pre/post calibration on F like we did for r above.[40] Table VI reports the impact of a hypothetical change in F on allocations via a second counterfactual experiment. Since we do not have exact estimates to calibrate a change in F, we employ a five-fold change relative to the one used for r (a 25% reduction in the private benefit from leadership). We do this to contrast the sensitivity of allocations with respect to r compared to the model's relative invariance in F, which we now discuss.

Unlike a change in r, lowering F does not change leadership group inclusiveness, which is pinned down by threats of revolution. However, it does affect how much patronage included members receive. The leaders prize is smaller, so returns to coups fall, making insiders cheaper to incentivize. Overall, the leader's group enjoys a higher share of posts; 30% on average after a 25% reduction in F.[41] We see a subtly different effect of declines in foreign non-military largesse compared to declines in foreign military support here. A falling F has a direct negative effect on a leader – he has less personal benefit – but indirectly benefits him by making the leadership a less coveted position. Consequently, coup threats fall and insider support can be bought with less patronage. The clearest winners from such a change are not the leaders themselves, but the other members of the leader's group. The direct decline in F is immaterial to them, but they retain more residual to consume as a group. As indicated above, non-military support is also much weaker in its effects; almost an order of magnitude so. A five fold larger percentage change in F than for r implies a change for the leader's group that is about half that of the change in r.

Finally, in the Online Appendix, the model is used to rationalize the endogenous national partitions determined by the historical 1961 British Cameroons and the 1956 Togoland referenda.

8 CONCLUSIONS

The new data this paper explores on the ethnic composition of African ministerial cabinets since independence strongly rejects the view of African autocracies as being run as stereotypical "one man shows." The data display inclusive coalitions and a strong degree of proportionality between ministerial positions and ethnic groups' population sizes, suggesting a substantial degree of political bargaining occurring within these regimes. These findings are confirmed when limiting the analysis to top cabinet posts alone.

Through the lens of our model, these empirical regularities conform to a view of large threats to leadership survival both from revolutions and internal coups, which push African leaders towards inclusiveness of other elites. Our parsimonious model displays an accurate fit of the data in and out of sample, performs well against alternatives, and can be considered a useful stepping stone in the analysis of African politico-economic dynamics. To this end, we perform counterfactual experiments focused on the effects of foreign interventions on model parameters. Western military support is unambiguously positive in its effect on allocations for both leader's groups and large groups in the population making governments less inclusive of smaller groups. In contrast, foreign financial support that benefits leaders directly, though not affecting inclusiveness of coalitions, leads to greater spreading of benefits to smaller and non-leader groups.

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[40] Chinese foreign aid disbursements are not publicly released but are undoubtedly large, and have been increasing. Taylor (2004) documents the increases of the early 90s and Provost and Harris (2013) provides more recent numbers. An online collaboration of researchers http://china.aiddata.org documents over U.S. $75 Billion dollars in flows for specific projects.

[41] We report the effects of a comparable change in coup success probability, γ and they are similar, see row 3 of Table VI. But for the reasons stated above this does not seem to be as directly influenced by foreign policy.

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