

# Sectoral Interests and Regional Bloc Voting in African Countries

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## Abstract

This paper contributes to a new line of research on interest-based and policy determinants of electoral cleavages that are visible at the national level in African presidential contests since the 1990s. Using constituency-level electoral data, we identify persistent patterns of regional clustering in the presidential vote in the last several election rounds in Kenya, Malawi, and Zambia, underscoring both the persistence of these regional clusters over time and, using DHS survey data, that most of the regional electoral blocs are multiethnic. By combining these results with new data from economic geography, we also show that most of the persistent regional voting blocs display a distinct spatial overlap with specialized producer regions, mostly agricultural regions. These novel observations about the persistence of regional electoral blocs, the multiethnicity of regional electoral clusters, and the distinctive economic profiles of the electoral clusters combine to shed new light on long-standing questions in the political economy of African elections. Our analysis suggests that coethnicity alone does not account for the cohesion of most of the persistent electoral blocs and that bloc cohesion can arise from the combination of ethnic and sectoral policy interests.

**Keywords** African politics · Economic geography · Agricultural policy · Agriculture · Party politics · Political cleavage · Development policy

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## Introduction

This paper contributes to a new line of research on interest-based and policy determinants of electoral cleavages that are visible at the national level in African presidential elections. It suggests that there is good reason to rethink long-standing conventional wisdoms about the overriding significance of ethnicity, and the low salience of policy issues, in these elections. We show that there is strong coincidence, or spatial overlap, between *persistent voter blocs* in national elections and the geographic concentration of policy-salient *economic sectors*, and argue that this points to long neglected political economy factors that can play a role in shaping persistent patterns of regional-level bloc voting in African countries. Similar factors may be at work in shaping electoral dynamics in developing countries in other world regions where scholars have tended to discount the electoral salience of economic and sectoral interests.

The explanation of electoral bloc voting that predominates in the literature on African politics focuses on group and individual ethnic identity. Geographically clustered co-ethnic voters are, in most circumstances, expected to vote for co-ethnic candidates.<sup>1</sup> When no coethnic is on the ballot, voters are expected to follow the advice of ethnic leaders who broker opportunistic deals among ethnic groups to support the short-term national-level coalitions that elect presidential candidates. This conventional reasoning does not explain the time-persistent patterns of multiethnic bloc voting at the regional level that we observe in our data. While co-ethnicity surely contributes to electoral bloc cohesion, ethnicity alone cannot explain the geographic extent, multiethnic character, persistence over time, and cohesiveness of the regional electoral clusters that we observe.<sup>2</sup>

In this paper, we propose an alternative theory that incorporates political economy factors. We theorize that policy and political interests that are rooted in blocs' distinctive economic-sectoral profiles contribute to the persistent electoral clustering. Using constituency-level electoral data from post-1990 presidential elections and constituency ethnic profiles, we identify persistent patterns of regional clustering in the presidential vote in the last several election rounds in Kenya, Malawi, and Zambia. The analysis underscores both the over-time persistence of these regional clusters, and the fact that most are multiethnic. For most of the regional blocs, this sectoral profile is defined in terms of specialization in smallholder-based production of particular, relatively high-value crops – i.e. export

<sup>&</sup>lt;sup>1</sup> A large literature attests to the role of ethnicity as an identity that is mobilized in African elections and as a predictor of vote choice. Yet scholars have qualified the "ethnic voter" model or stereotype in many ways. See discussion below.

<sup>&</sup>lt;sup>2</sup> In economic and political geography, subnational regions are generically understood as large geographic units or areas that are defined by geographic, economic, political-administrative, and/or social features that make them distinctive in the context of the national unit as a whole. For such use in African studies, see Bates 1989, 2017; Boone 2024. Operationally, the regions discussed here correspond roughly to first-level (provincial-level) administrative subdivisions of national territories, or to clusters of geographically contiguous second-level and third-level subdivisions (i.e. districts and electoral constituencies) within provinces that constitute economically and geographically distinctive sections ("regions") of the national political economy as a whole.

crops or nationally-traded food crops. We theorize that farmers and workers concentrated in these blocs (along with others whose livelihoods are linked to the sectoral specialization) have distinctive, shared policy interests, and that they are likely to be associated with collective-action facilitating organizations and networks that contribute to coordination around these interests and thus, to electoral mobilization. A logical implication is that political parties and politicians who depend most heavily on votes from these electoral blocs will be inclined to provide regionally targeted policy outputs designed to favor the sectoral interests that are strong within the bloc (Rogowski 1989; Kim 2017, 2020, 2024).

This theory lies at the intersection of sociological models and individual-level models of voting. Sociological models emphasize the impact of social structure and the socio-economic position of voters on voting, and underpin much work on parties and elections in political geography. In African politics, individual-level models generally explain most voting behavior in terms of ethnic identity (and/or identities mobilized by politicians), but some such studies also show that at least some voters are swayed by government performance or policy issues.<sup>3</sup> In this paper, we bring together intuitions from both sociological and individual-level models to advance a sectoral-policy interest based explanation of regional bloc voting. We challenge the common view that sectoral economic policies rarely, if ever, find expression in electoral politics in African countries, and the argument that economic policy interests do not give rise to political cleavages in national electorates (Horowitz 1985, Bleck and van de Walle 2018). In its focus on group-level material interests, our argument resonates with those of historically oriented scholars who have shown that electoral mobilizations can happen around collective political interests, shared grievances, populist appeals, and common livelihood concerns (Cheeseman and Hinfelaar 2008; Lynch 2011; Boone 2014; Gadjanova 2017).

The analysis progresses in six steps. The first presents the theory. The second introduces the data and method. Section three identifies the persistent electoral blocs that we detect using conventional electoral geography methods. Section four, on electoral blocs' production profiles, shows that most electoral blocs have distinctive economic specializations, and justifies using this as grounds for drawing inferences about the sectoral blocs are multiethnic, and that many of the non-coethnic<sup>4</sup> and multiethnic constituencies that lie within the blocs share the sectoral profile that characterizes the electoral bloc as a whole. This provides grounds for arguing

<sup>&</sup>lt;sup>3</sup> Much behavioral research on voting behavior in Africa follows Horowitz 's (1985) influential "ethnic census" model of elections. Yet some important individual-level studies nuance this argument. Voters in some countries take politicians' performance into account (Lindberg and Morrison 2008; Ferree and Horowitz 2010). Lieberman and McClendon (2012) show that voters' socio-economic status can shape their public policy preferences. Ichino and Nathan (2013) show that non-coethnics may vote along with the ethnic majority in their constituency in the hopes of securing club goods for the locality. Many scholars recognize that outside of major party or "ethnic strongholds," ethnic-determinants theories fall short, and that individual-level theories do not explain the formation of short-term winning electoral coalitions at the national level.

<sup>&</sup>lt;sup>4</sup> Non-coethnic constituencies within a persistent electoral bloc are those with a constituency-level ethnic plurality *other than* the one that predominates at the bloc level.

that shared sectoral interests can bridge ethnic distinctions, producing electoral bloc cohesion. The sixth section focuses on mechanisms that can link sectoral interests to voting interests. The literature on agricultural policy in African countries documents many cases in which governments provide multi-year sectoral policies that cater to region and sector specific interests, and we have found evidence of this in our previous work (Boone 2003, 2014; Kim 2018, 2019, 2020, and 2024). Existing work is thus highly suggestive of positive feedback relationships linking sectoral interests, policy, and electoral politics. In this paper, we seek to theorize and help substantiate this line of analysis, and thus to spur further research into the role of sectoral policy and sectoral interests in shaping electoral dynamics in African countries.

The paper makes several contributions to understanding the political economy dynamics and logics of electoral competition in African (and perhaps other developing) countries. Empirically, we provide new evidence of the distinct spatial overlap between persistent, multiethnic electoral blocs, on the one hand, and specialized producer regions, mostly agricultural regions, on the other. In terms of theory-building, our data and analysis suggest that voter interests in African countries can be shaped by the specialized production profiles of the subnational regions they live and work in, and are thus similar to voting patterns observed by political economy theorists working on other world regions (Rogowski 1989; Rickard 2009). For studies of African politics, the multiethnic character of most of the regional electoral blocs challenges the view that cross-ethnic voting is rare or limited to one-off episodes or deal-making, and suggests that shared policy interests can bridge ethnic differences, contributing to the formation of cohesive regional voting blocs. The research also contributes to a richer understanding of electoral dynamics in Kenya, Malawi, and Zambia. Sectoral and regional economic interests may go further in structuring national electorates than earlier work has allowed.

## **Theory of the Causes of Persistent Electoral Blocs**

The geographic concentration of electoral support for particular candidates or parties is a phenomenon observed in many countries that hold elections, albeit at different levels. Scholars in African politics, however, have generally interpreted geographical vote clustering as evidence of ethnic voting at the polling-station, district, or regional level.<sup>5</sup> Socio-economic and sectoral aspects of political geography have rarely been considered as possible sources of influence on voter behavior or regional voting patterns. This lacuna represents an anomaly in the comparative politics literature on Africa, and a possible gap in our understanding of electoral dynamics in African countries.

Large literatures show that in many different times and places in the world, nonuniformity in regional economic profiles, population distribution, settlement patterns, and degrees of integration into a national or the international economy lead to different individual, locality, and region-wide preferences with respect to public

<sup>&</sup>lt;sup>5</sup> Ishiyama (2012: 761) captures the conventional wisdom in reporting "that the geographic concentration of the [ethnic] group best explains general bloc voting.".

policy and public goods (Engerman and Sokoloff 2002; Soifer 2016; Mangonnet et al. 2018) and growth strategies (Baccaro and Pontussen 2016; Asher and Novosad 2017). There is no a priori reason to believe that these influences are absent in Africa. Indeed, high levels of regional inequality and stark heterogeneity and unevenness in patterns of economic development across subnational regions in most African countries should lead us to *expect* that uneven regional development may find expression in politics (Boone et al. 2022).

Regions that are characterized by specialized producer profiles and deep integration into the national and international economy are likely to be home to electorally significant populations whose livelihoods are rooted in these specialized industries. They are likely to have joint interests in a favorable regulatory environment, but what this means in practice may vary by sector in electorally salient ways. Producers in different sectors can be expected to have distinctive and sometimes divergent policy interests on policies that are sector-specific, have uneven or sectorally specific effects, or favor one sector over others (by design or default).<sup>6</sup> Smallholder producers producing high-value, traded commodities, especially export commodities, can be presumed to have heightened demand for and sensitivity to sectorally-specific pricing policies, marketing infrastructure and regulations, tax, inputs, standards and grading systems. Historically in the African countries in which export-crops are produced mainly by smallholders, much that might otherwise be internalized within a large agribusiness operation (e.g., coordinated harvesting times, bulk delivery of time-sensitive inputs, securing credit, storage, quality control, and branding) has been coordinated instead by sectorally specific producer organizations such as cooperatives and/or by the state. In the post-liberalization era (post 1990), producers in prime export-oriented agricultural sectors are networked around sectorally based value chain relationships with buyers, input-providers, and other producers. Producers are likely to be organized within horizontally and vertically structured associations and networks that are nested within national political (administrative) and economic institutions.

Given the geographically uneven distribution of economic activity and high spatial concentration of production of most tradable agricultural commodities in African countries, we should also expect geographic unevenness and spatial clustering in the extent and modes of voter organization, the salience of sectoral policies to electoral behavior, and the presence of sectoral policy interest groups. Certain regional political economies are more likely than others to be associated with strong links between individuals, wider regional sectoral and occupational groups, and national

<sup>&</sup>lt;sup>6</sup> For example, protectionist tariffs that favor domestic market-oriented producers of corn and sugar may impose costs on producers and workers in export sectors like coffee and copper mining. Subsidies or other selective incentives for coffee producers may win out in policy circles over subsidies for sugar producers. Tea farmers may organize to demand the pro-producer regulation that is bestowed on coffee farmers, but may not get it. One presidential candidate may advocate for an increase in the government-regulated producer prices for maize, while another may stump for raising official producer prices for tea. When there is electoral turn-over, sectorally specific policies that favored one sector may go by the way-side in favor of policies that favor another. For cases from Zambia, Kenya, and Ghana, see Bates 1976; Bates 1989; Ochieng 2010; Poulton 2012; Kanyinga and Poulton 2014; and Kim 2020: 365–366. See also Kim 2018, 2019, 2024).

policy-making organizations and actors. These are regions specialized in the production of high-value agricultural commodities of national significance, wherein (a.) producers are linked together in market-oriented organizations and commercial networks that are embedded in district and regional-level units of territorial administration, (b.) producers and other sector actors [crop buyers, processors, input providers, service providers] are linked directly to national administrative and economic bureaucracies, and (c.) economic activity is concentrated in policy-sensitive sectors, wherein government policy decisions are directly attributable to the incumbent party (Harding 2020). In a paper on Malawi, Chinsinga (2011) refers to such zones as "hotspots" of voter mobilization in the national political economy. In such areas, parties and politicians can establish stable power bases. Studies of particular regions and sectors provide cases in point (see discussion below). Regions with mining specializations that are home to unionized mineworker labor forces share these key characteristics: shared occupational interests, embeddedness in occupational organizations and networks, and sensitivity to government policies affecting a geographically concentrated sector of national economic significance (LeBas 2011). Economic interests that are collective, stable, and regionally specific can form the basis of political support for parties (or a succession of parties, where party labels change but the underlying electoral blocs persists) catering to these same political interests.

Much theory and empirical work in comparative political economy suggests that political parties that depend heavily on votes from particular producer and/or sectoral interests are likely to try to provide targeted policy outputs that are intended to favor the sectoral interests of these producers (Rickard 2009, Rogowski 1989, Iversen and Soskice 2019). As part of policy feedback loops, parties themselves may contribute to the organization and mobilization of producers in such sectoral or occupational groups, especially when these groups are regionally concentrated and when political representation at the national level is based on geographic units (Pierson 1993; Rogers 2016). Our theory suggests that African countries are not exempt from this common pattern.

For African countries, ethnic explanations of individual-level voting behavior have been predominant for the last three decades.<sup>7</sup> Scholars are aware that electoral constituencies are not comprised of co-ethnics only, and that within constituencies, non-coethnics may vote with the dominant ethnic group in anticipation of sharing the benefits of "club goods" distributed by an ethnic patron to a local co-ethnic constituency (Ichino and Nathan 2013). While it is widely recognized in the African politics literature that ethnic groups are *also* geographically (regionally) concentrated, existing work tends to focus heavily on the ethnic correlates of geographic voting clusters (bloc voting), while not exploring their economic-geography correlates.<sup>8</sup> This information loss is unfortunate, especially when information on occupational profiles could provide insight into individual and group preferences regarding economic policy. Some scholars have

<sup>&</sup>lt;sup>7</sup> A large literature attests to the role of ethnicity as an identity that is mobilized in African elections and as a predictor of individual vote choice, especially when referring to party strongholds. Even so, scholars have qualified the "ethnic voter" stereotype in many ways, particularly in analyzing the behaviour of voters who lack co-ethnic candidates (in local or national elections), and urban voters. See footnote 3.

<sup>&</sup>lt;sup>8</sup> "African ethnopolitical groups also exhibit the highest degree of territorial concentration in the world" (Mozaffar and Scarrit 1999: 236).

speculated that given the geographic clustering of ethnic groups, ethnicity could be a proxy for, or overlap with political economy interests (Ishiyama 2012), and even economic interests linked to particular agricultural crops (Kasara 2007: 160).<sup>9</sup> Gadjanova (2021) shows that opposition voting can arise from geographically-specific ethnic grievances. In the analysis below, we develop this line of reasoning by linking geographically concentrated voting to electorally salient policy interests.

In analyzing aggregate voting patterns in African countries, earlier work has focused on the ethnically heterogeneous voting coalitions that form at the national level in presidential elections. These cross-ethnic alliances are often described as short-lived "coalitions of convenience" with no robust, enduring policy, programmatic, or ideological basis.<sup>10</sup> In this paper, the focus is on the *regional level*, where multiethnic electoral blocs form and *persist* over several electoral cycles (i.e. over most of the electoral cycles between 1990 and 2018).<sup>11</sup> The persistence over time of these multi-ethnic, regional-level electoral is a phenomenon that has not been identified in earlier work, or explained. In the analysis below, we suggest that the shared policy interests of producers in geographically concentrated, nationally significant economic sectors, and the sustained patterns of government policy activism associated with these key sectors of the national economy, go far in explaining the persistent cohesion of the observed regional electoral blocs. Sociological voting theory would suggest that ethnic identities can either compound or be cross-cut by sectoral policy interests to produce such multiethnic regional voting clusters, and we draw on this intuition in explaining regional bloc voting here.<sup>12</sup>

## **Data and Method**

Gaining analytic traction on our theory of sectoral drivers of bloc cohesion requires adjusting for a myriad of data limitations and constraints. On the electoral geography side, there is little existing analysis of over-time patterns of subnational

<sup>&</sup>lt;sup>9</sup> Sectoral interests may also contribute to the coalescing of politically salient ethnic identities. Politically salient ethnic identities can be constructed around common livelihoods and perceptions of shared economic and political interests (and fears). See Spear and Waller (1993) and Lynch (2011) on the Maasai and Kalenjin in Kenya, respectively, Posner (2005) on Bemba identity in Zambia.

<sup>&</sup>lt;sup>10</sup> See Elischer 2013; s.a. Arriola 2013, Horowitz 2016, Lynch 2014, and Posner 2004a, 2004b. To produce such winning coalitions, candidates campaign outside their personal electoral strongholds, as shown by Horowitz (2016), Lewanika (2023), and others.

<sup>&</sup>lt;sup>11</sup> See below for the operational definition of regional electoral bloc persistence.

<sup>&</sup>lt;sup>12</sup> When sectoral interests are strong, non-coethnics' presumptive "ethnic loyalty" may be cross-cut by their sectoral interests, leading to bloc-aligned voting on the part of non-coethnics. We cannot test this hypothesis directly. One reason for this is that our electoral data are not at the individual level and we cannot match individual voters to preferences. (However, see Kim [2019, 2020, 2024] on Ghana and Kenya, discussed below.) Another, more general, problem with running a "horse-race" test to compare the "ethnic" and the "sectoral policy interest" explanations is that at the constituency-level, the two key variables of interest — ethnic identity of the largest share of constituency members and the constituency's sectoral production profile — are partly correlated. Due to multicollinearity, we cannot run regression models that attempt to disentangle the impact of the ethnic make-up of constituencies from their sectoral specialization. Our argument does not rest on such a horse-race test: we are not arguing that these two hypotheses are directly competing. See also footnote 15.

clustering or dispersion in electoral results in presidential (or other) elections. (See however Boone, Wahman, Kyburz, and Linke [2022], which we draw upon.) This is due to the paucity and spottiness of constituency-level electoral data for most African countries, scholars' difficulty in obtaining data constituency-level boundaries and tracking change and constancy over time, and the general tendency of scholars to eschew electoral geography approaches in favor of national level ("single national constituency") analyses of the individual-level determinants of partisan vote choice.

On sectoral profiles of sub-national regions and drawing inferences about sectoral interests, there are also formidable data and measurement challenges. It is difficult to describe geographic variation in the sectoral make-up of national economies where sub-national GDP statistics, industry surveys, and occupational data are not collected and published by governments. It is also tricky to measure voters' interests in sectoral policy, and to argue that these shape vote choice in presidential elections when voters' preferences are not observed directly. In the study of African elections, there is little pre-existing data that correlates public opinion or voting behavior with the sectoral profiles of constituencies or regions. Afrobarometer (AB) is the most widely used source of public opinion and individual-level voting correlates (and the only source of cross-national data on voter opinion), but it does not collect data on beliefs or preferences regarding agricultural or other sectorally or regionally specific policies,<sup>13</sup> or on the employment attributes of respondents by agricultural subsector. Many scholars have done cross-sectional experimental studies of the effects of government provision of club goods (such as clinics, road segments, or school supplies) to localities on voters' opinions and preferences, but this work is also of limited use for our purposes. Contextual features of localities - such as their sectoral economic profile, relations of production in locally-significant industries and businesses, and proximity to national communications infrastructure - are taken to be invariant across study sites (or study design controls explicitly for these factors). This means that the key variables of interest here are unobserved.

To gain traction on our theory, we turn to three country cases which offer good possibilities for a combined analysis of electoral and economic geography. The three countries featured here — Kenya, Malawi, and Zambia — have continuous histories of multiparty competition since the early 1990s. Because of the existence of relatively high-quality electoral data and open political systems in these countries, they have been the site of much of the country-focused empirical research on electoral dynamics in African countries, and they provide good opportunities for the over-time, electoral geography analysis we employ here. Much existing work on Kenya and Zambia has stressed the ethno- and ethno-linguistic determinants of individual-level vote choice, the formation of national winning coalitions in Presidential elections, and individual MPs' strategies for winning votes. Malawi voting is often taken as a case of ethnicity-driven voting, although some scholars have objected to this characterization of social cleavages in Malawi and stressed the salience of regional cleavages.<sup>14</sup> All three manifest the spatially uneven patterns of primary-sector based economic

<sup>&</sup>lt;sup>13</sup> Poulton 2012: 11; Ferree and Horowitz 2010: 553.

<sup>&</sup>lt;sup>14</sup> See Kaspin 1995; Kalipeni 1997, Ferree and Horowitz 2010: 555; Brazys et al. 2015, and Patel and Wahman 2015. See also McCracken 1968:207.

development that are typical of much of sub-Saharan Africa. The three countries thus constitute a good set of cases for developing and demonstrating the plausibility of an alternative theory of voting dynamics, one that stresses the role of political economy factors related to *sectoral interests* in producing persistent vote clustering at the regional level.<sup>15</sup>

The analysis below leverages the following data. To identify persistent geographic clustering in presidential election results, we used constituency-level electoral results from the 17 presidential elections that have taken place in Kenya, Malawi, and Zambia since the 1990s. (See Appendix 1.)<sup>16</sup> Electoral geography methods as described in the next section are used to identify regional clustering in the results. Using agricultural production data from the Spatial Production Allocation Model (SPAM) 2017, v2.1 (IFPRI 2020), we track the geographic distribution of production of the major domestically traded food crops and export crops for each country, and use this data to describe the production profile of the electoral blocs in a systematic, uniform way across the three countries. SPAM data is produced through the allocation of national or subnational production statistics to grid pixels by a mathematical model that relies on crop-specific suitability information and landcover images (see You et al. 2014). Local population estimates from the European Commission, Joint Research Centre (2015) population grid data make it possible for us to estimate production per capita at constituency level.<sup>17</sup> To describe the ethnic profile of the electoral blocs and the electoral constituencies that comprise them, we employ geolocalized data on ethnic identity of respondents from the Demographic and Health Surveys (DHS). (See Appendix 1.)

Our analytic strategy is to identify persistent electoral blocs, and then to show that co-ethnicity alone cannot explain why constituencies adhere to electoral blocs and thus, cannot explain the geographic extent and persistence of electoral blocs in each country. Combining the electoral data with novel indicators of regional producer (sectoral) profiles, we measure the spatial overlap between regions of crop specialization and the geographic extent of the persistent electoral blocs. Where electoral blocs have "specialized" producer profiles, we infer that sectoral interests are likely to play a role in explaining bloc cohesion. We theorize that producer and sectoral interests embedded in the electoral blocs' distinctive economic profiles are a *source of bloc cohesion*, compounding and/or cross-cutting the logics of ethnic voting.<sup>18</sup> The analysis suggests that an important part of the explanation of bloc

<sup>&</sup>lt;sup>15</sup> These three are among the African countries in which ethnicity is considered to be strongly salient in national politics. See Elischer 2013: 222.

<sup>&</sup>lt;sup>16</sup> We use nearly all available constituency-level election results from the three case countries since the 1990s: 1997, 2002, 2007, 2013, and 2017 in Kenya, 1999, 2004, 2009, 2014, and 2020 in Malawi, and 1991, 1996, 2001, 2006, 2011, 2016, and 2021 in Zambia.

<sup>&</sup>lt;sup>17</sup> See also Schiavina et al., 2019.

<sup>&</sup>lt;sup>18</sup> We do not have individual-level public opinion data or fine-grained data about the spatial distribution of sectoral interests (for e.g., at the polling-station level) that might allow us to arbitrate between ethnicity and sector at the micro level. It is also likely that the utility of such an exercise would be limited: these variables are not fully independent of each other. Over decades and generations, shared sectoral interests may contribute to explaining adherence to, and the political salience of, certain ethnic identities. See also footnote 10.

cohesion is likely to lie in a variable that is unobserved in earlier work on voting in African elections: shared sectoral interests.

## **Identifying Persistent Electoral Blocs**

We begin by showing that there are stable patterns of regional bloc voting in each of the three countries. Operationally, for each country, we used electoral geography methods to determine clusters of constituencies whose vote shares for a given candidate are highly spatially correlated in a single presidential election, and then track these clusters over a series of presidential elections to determine which constituencies "stick together" in most of the elections (i.e. two-thirds or more) for which we have data in the 1990–2021 period. For each of the three countries, this method identifies "persistent electoral blocs," defined as clusters of constituencies that follow the same pattern of voting in presidential elections over time.

The first step is to identify all constituencies nation-wide that have persistently voted similarly over a series of presidential elections. For each country, we create a panel of electoral results that identifies the winning party (or winning candidate) in each constituency over the relevant time period. This reveals the most common voting patterns for each country. For example, in Kenya, 51 constituencies were in sync with the 5-election pattern of DP (1997), NARC (2002), PNU (2007), Kenyatta (2013), Kenyatta (2017) in at least four of these five elections. (See Appendix 1 for details on method, and Appendix 2, Fig. 4 and Table 7 for the voting pattern data and maps.) There are four different voting patterns in Kenya, four in Malawi, and two in Zambia. We consider that a constituency conforms to a voting pattern if it follows that pattern in at least two thirds of the elections included in the analysis.<sup>19</sup> In all three countries, most of the constituencies following the same voting pattern are geographically clustered.

As a second step, to confirm the robustness of these electoral clusters and establish electoral bloc boundaries, we use a standard tool in the electoral geography toolkit—the local Moran's I. This indicator was developed by Anselin (1995) to measure the level of local spatial autocorrelation. For each spatial unit, the local Moran's I provides a value that describes the level of similarity of this unit (for a given variable) to its neighbors.<sup>20</sup> For this paper, using the panel data on presidential vote shares and the associated reference shapefiles, we computed the local Moran's I for each party or candidate. We then identified clusters of constituencies that all return a vote share for their winning party (candidate) that is positively and significantly

<sup>&</sup>lt;sup>19</sup> The  $^{2}$ /<sub>3</sub> threshold corresponds to 4 elections out of 5 in Kenya and Malawi, and 5 elections out of 7 in Zambia.

<sup>&</sup>lt;sup>20</sup> Positive values indicate that there is positive spatial autocorrelation (i.e. a unit with a high (low) value is mostly surrounded by units with a high (low) value). Negative values indicate that there is negative spatial autocorrelation (i.e. a unit with a high (low) value is mostly surrounded by units with a low (high) value). The significance of the level of spatial autocorrelation is also reported. (See Anselin 1995, for a more extensive discussion of the local Moran's I.) In this paper, we use the local Moran's I to identify statistically significant, positive spatial autocorrelation patterns among neighboring constituencies (i.e., constituencies that are geographically adjacent to each other). (See Appendix 1 for details on the method.)

correlated with the vote share generated for the same wining party (candidate) in neighboring constituencies.<sup>21</sup> We compute the local Moran's I for all electoral years available (using the same shapefile for all years). When a constituency is a member of a cluster in at least two thirds of the elections considered, we consider it to be part of a persistent cluster – i.e. a persistent electoral bloc. These persistent electoral blocs each follow one of the most common voting patterns identified above.

Within the persistent electoral blocs identified by the local Moran's I, average constituency vote shares (per bloc, per election) are over 70% for most blocs in most elections (results reported in Table 8 in Appendix 2). Constituencies within persistent electoral blocs are 55% of all constituencies in Kenya (114/209), 58% of the total in Malawi (112/193), and 45% of the total in Zambia (67/149). Constituencies that lie outside the persistent electoral blocs are referred to as "non-bloc constituencies."<sup>22</sup>

Figure 1 displays the persistent electoral blocs at the constituency level. There are four blocs in Kenya (Western, Rift Valley, Central, and Eastern), four blocs in Malawi (Northern, Central, Eastern, and Southern), and two blocs in Zambia (Northern-Copperbelt and Southern). Table 7 in Appendix 2 lists each of the electoral blocs and its associated voting pattern (i.e. the parties/ candidates that bloc constituencies rallied behind in each presidential election included in the analysis).

## **Electoral Blocs' Production Profiles and Regional Sectoral Interests**

Our claim is that most of the persistent electoral blocs arise are associated with nationally significant, regionally-concentrated subsectors of the national economy. Here we describe how we identify agricultural subsectors of national significance and associate those with the production profiles of electoral blocs (and constituencies within blocs). The one non-agricultural sector that figures into the analysis is Zambia's copper mining sector. At the end of this sub-section, we lay out our rationale for linking constituency and electoral bloc production profiles to producer (voter) interests.

Crops of interest in this study are those that contribute a significant share of total agricultural export value, and/or nationally traded, strategic food crops or industrial

<sup>&</sup>lt;sup>21</sup> We are not interested in spatial autocorrelation patterns for parties that do not rank first in constituencies (even though there could be similarities there too, for instance if the vote share of the opposition party is similar across neighboring constituencies).

<sup>&</sup>lt;sup>22</sup> We follow Boone, Wahman, Kyburz, and Linke (2022) in using the local Moran's I to identify persistent electoral voting blocs in these three countries. The 2022 paper identified electoral blocs in all three countries that are essentially the same as those we identify here. The two papers thus serve as a kind of robustness check on each other. Differences in data and in some aspects of the method across the two studies did produce some variation in results. Here, our method included the prior identification of voting patterns, as described above. For the present paper, we also panelized the electoral data by creating a reference constituency shapefile for each country before calculating the Moran's I results, rather than calculating the Moran's I clusters election-by-election, and then determining which constituencies were "bloc members" in two-thirds or more of the elections under consideration. In this paper, we adopted a different interpretation of pro-UNIP constituencies' alignment in Zambia's 1996 presidential election, which was boycotted by UNIP. The 2022 paper counted many Eastern Province constituencies as UNIP constituencies, whereas in this paper, we do not. The present paper also includes more recent elections (Kenya 2017, Malawi 2020, and Zambia 2021). The most significant difference in the results of the two studies is that the Zambia Western and Eastern blocs, detected in the 2022 study, do not appear in the current results.



#### Zambia

**Fig. 1** Persistent electoral blocs in Kenya, Malawi, and Zambia (elections 1990s-2010s). Constituencies belonging to persistent electoral blocs appear in shades of grey on the maps. (See Appendix 1 for details.) Constituencies that appear in white do not belong to any electoral bloc; they are "non-bloc constituencies." The key indicates the total number of constituencies in the shapefile used (see Appendix 1) as well as the total number of constituencies within each persistent electoral bloc. Source: Authors' computations based on electoral data from the Independent Electoral and Boundary Commission of Kenya, the Malawi Electoral Commission, and the Zambia Electoral Commission

crops. They all have high policy salience for this reason. For the export crops, we used international trade data from 1995 to 2019 to identify each country's major agricultural export commodities.<sup>23</sup> (See Appendices 1 and 2 for discussion, descriptive statistics, and notes.) For Kenya, these are coffee and tea. For Malawi, they are tobacco, sugarcane, tea, and cotton. For Zambia, tobacco and sugarcane are leading export crops. All these are included in the analysis below. For nationally traded, strategic food crops, we identified the staple food crops (identifiable by sheer volume of production) that are subject to high levels of government interventionism and activism all along the commodity value chain. Maize is thus included as a "nationally traded food crop" for all three countries.<sup>24</sup> Sugarcane is a food staple produced for sale on the domestic market in Kenva; it is also included. Cotton in both Malawi and Zambia straddles the export and domestic market categories: it is partially exported and partially domestically-transformed and -consumed.<sup>25</sup> It is considered a policy priority in both Malawi and Zambia because of its status as an important smallholder crop and its contribution to export earnings, and is thus included in the analysis. Zambia differs from the other two countries studied here in that it is mostly a mineral exporter. Copper generated 65% of all Zambia exports, on average, for 1995-2019, and is included in this analysis as a nationally significant sector of the economy.<sup>26</sup>

To investigate our claim that the persistent electoral blocs have distinctive economic profiles as regions that produce commodities of national significance, we examine the extent to which production of the commodities identified above is *concentrated* in electoral blocs and in the constituencies that comprise them. The relevant measures are a bloc's contribution to total national output of the given commodity, both in absolute terms (in metric tons, MT) and when taking bloc size into account. We also calculate bloc and constituency *specialization* in these economic activities. The specialization measure indicates whether most constituencies in a bloc are "top producers" (above the 75th percentile of all constituencies) of that commodity.<sup>27</sup> A bloc is considered to be "specialized" in a crop if more than 60 percent of bloc constituencies are "top producers" of that crop. We take *specialization* as the basis upon which we draw inferences about sectoral interests that are shared across constituencies of a bloc. High

<sup>&</sup>lt;sup>23</sup> See Table 9 in Appendix 2. For the agricultural sector, these are crops with average export value of greater than 8 percent of the country's total agricultural export value (except for cotton, which appears in the trade data as a textile sector item). For cotton and flowers, see Appendix 1 and Mwabishi 2022. See US Government, International Trade Administration Country Commercial Guides (yearly) at https://www.trade.gov/country-commercial-guides/[country\_name]-agribusiness.

<sup>&</sup>lt;sup>24</sup> For maize, see Appendix 1.

<sup>&</sup>lt;sup>25</sup> Only 32% of Malawi's total cotton crop was exported in 2009 (Malawi Investment and Trade Centre Portal (https://mitc.mw/trade/index.php/cotton-export-product, accessed 25 August 2023).

<sup>&</sup>lt;sup>26</sup> Agriculture generates 55% and 80% of all exports in Kenya and Malawi, respectively, but only 9% of total exports in Zambia. See Appendix 2, Table 9.

 $<sup>^{27}</sup>$  We use the threshold of 60% of bloc constituencies in order to ensure that a "super majority" of bloc constituencies are top producers of the crop. This criterion gives us an operational definition of "specialization" against which we can compare the empirical results. The upper quartile (top 25%) of the distribution corresponds to 52 constituencies in Kenya (25% of 209 constituencies), 48 in Malawi, and 37 in Zambia. (The share of bloc constituencies that are top producers is displayed in the result tables (below) to allow readers to compare these results to alternative thresholds.).

*specialization* of a bloc (and constituencies within a bloc) suggests that many voters therein have shared interests in policies affecting that sector/commodity.

Using the IFPRI (2020) Spatial Production Allocation Model (SPAM) agricultural production data from 2017, we see that most of the electoral blocs coalesce in producer regions that are specialized in the production of nationally significant commodities. Figure 2 displays the share of national output of each of the agricultural crops of interest (vertical axes) that is produced within each of the persistent electoral blocs (listed on the horizontal axes). This measure indicates whether the production of the crop is *concentrated* in the bloc (irrespective of its size). We see that production of key agricultural commodities can be said to be concentrated in Kenya's Central bloc (arabica coffee, 70%) and Western bloc (sugarcane 74%)<sup>28</sup>; in Malawi's Southern bloc (tea, over 80%) and Central bloc (tobacco, though at only 40% of national production); and in Zambia's Copperbelt-North (sugarcane, almost 60%) and Southern (Maize, about 30%, though a substantially larger share of national output than that of the Copperbelt-North.

Tables 1, 2, and 3 provide a more comprehensive view of the electoral blocs' production profiles (by country). The tables feature our leading measure bloc production profile: share of bloc constituencies that are "top producers" of the crop, or *specialization*. A bloc is "specialized" when at least 60% of bloc constituencies are "top producers" of the crop considered.<sup>29</sup> The tables also report values on a *concentration* measure for each bloc (share of national output), each bloc's share of national output controlling for the bloc's size (*production per areal unit*), and the share of constituencies within the bloc that grow any of the crop (*prevalence*).<sup>30</sup>

#### Kenya

Three of Kenya's four electoral blocs have a "specialized" production profile — that is, each bloc is composed of a large majority of constituencies (>60%) that are top producers of one of Kenya's nationally significant crops (Table 1). Central bloc produces 70% of the national arabica coffee crop, almost all constituencies of the bloc (93.5%) are coffee producers, and 71% of its constituencies are top coffee producers. The Western electoral bloc is highly specialized in sugarcane: It produces 74% of the national crop,

 $<sup>^{28}</sup>$  The Western bloc also contributes the whole production of robusta coffee. However, this crop is grown only in two constituencies in the country.

<sup>&</sup>lt;sup>29</sup> Tables C1, C2, and C3 (in the Online Appendix available in the online data repository cited in Appendix 1) present the specialization measure using alternative specifications (production per capita and production per areal unit ) instead of using solely production in metric tons. In Kenya, the alternative specifications allow us to identify the same blocs as "specialized" as when using the production in metric tons, with the addition of the Central bloc being "specialized" in tea when considering production per capita (Table C1). In Malawi, the alternative specifications allow us to identify the same blocs as "specialized" as when using the production in metric tons (Table C2). In Zambia, the alternative specifications do not lead us to identify any bloc as "specialized", which is consistent with the results using the absolute production (Table C3).

Results are similar across measurements of production. This indicates that our main specialization results are not driven by constituencies with high production but low population (i.e. very mechanized production probably) or by large constituencies (i.e., by a mechanical effect of size).

<sup>&</sup>lt;sup>30</sup> For the size of each bloc as a share of the national territory, see Appendix 1.



**Fig. 2** Blocs' production profile: Share of national production (MT) by bloc, 2017. Panels report bloc crop production (% of nat'l production, in tons). For Zambia's Southern bloc, maize and tobacco indicators overlap (at the 30% level). **Data Source:** IFPRI (2020)

and 84.4% of its constituencies are top producers. For Eastern bloc, although there is no crop of national significance whose production can be said to be "concentrated" in the bloc, five of its of seven constituencies (70%) are top producers of arabica coffee and thus, our "specialization" measure, the bloc can be said to be a "specialized" producer of this crop.<sup>31</sup> Although the Rift Valley electoral bloc as a whole is a major tea producer, and many of its constituencies produce at least some tea, most tea production in the Rift Valley bloc is concentrated in only 11 of its 29 constituencies. By our specialization measure, it is not specialized in this crop.<sup>32</sup> National production of tea in Kenya is almost equally split between the Central electoral bloc (37.7%) and the Rift Valley bloc (42.4%).<sup>33</sup> Maize is produced in all constituencies across each of the electoral blocs, but commercial producers are concentrated in the Rift Valley and Eastern blocs.

Thus, in Kenya, at least three of the four blocs are "specialized" producers in a crop of national significance. The Central and Western electoral blocs are each characterized by a crop specialization that is specific to that bloc (coffee and sugar, respectively).

#### Malawi

In terms of their producer profiles, Malawi's Central and Southern electoral blocs are nearly mirror images of each other (Table 2). Each either specializes in, or is a highly concentrated (i.e. by share of total national output) producer of, one of the country's leading export crops (tobacco and tea, respectively). The Central bloc produces more than a half of Malawi's tobacco, which is grown in almost all of its constituencies, and top tobacco producing constituencies comprise 61.4% of the bloc. The Southern electoral bloc is responsible for over 80% of national tea output; its share of national tea output divided by share of national area (production per areal unit) is 7.9. With 14 of 26 (54%) of Southern bloc constituencies ranked as "top tea producers," the bloc falls short of our 60% threshold for "specialization" by just two constituencies. Eastern bloc is a specialized cotton producer. Fifteen of its 16 electoral constituencies produce at least some cotton, and 13 (81.3%) are "top cotton producers."<sup>34</sup> Meanwhile, all constituencies in all blocs produce at least some maize,

 $<sup>^{31}</sup>$  Although Eastern bloc produces less than 20% of national output of all crops considered in this analysis, it is the second largest producer of arabica coffee (6.6%). Eastern bloc's production *relative to bloc size* is also lower than Central's: its production per areal unit is 5.4 while Central's is 9.2.

<sup>&</sup>lt;sup>32</sup> This contrasts with tea production in the Central bloc, where tea production is more widespread and nearly meets our threshold for "specialization" in tea.

<sup>&</sup>lt;sup>33</sup> The two blocs are also about the same in terms of geographic size, resulting in similar specialization ratios. Yet while 95.7% of constituencies of Central grow tea, only 69% of constituencies of the Rift Valley bloc do so. This indicates that production is concentrated in fewer constituencies in Rift Valley that are, on average, more productive than those in Central. This is exactly what one would expect, given the concentration of very large multinational-owned tea estates in the Rift Valley bloc.

<sup>&</sup>lt;sup>34</sup> As reported above, Malawi's Eastern electoral bloc as a whole produces 22.2% of the national cotton crop. Most of Malawi's cotton is produced outside of the electoral blocs, but the Eastern bloc has a production per areal unit of 2.3, which indicates that it "overperforms" as a cotton producer relative to its land area. The Northern bloc does not have a crop specialization as defined by our specialization measure, and it does not produce the lion's share of any nationally significant crop as discussed above. Sugarcane is produced on two large sugar complexes that are located in two constituencies that are not members of any of Malawi's electoral blocs. On Malawi, see also Mkandawire 1999 and Prowse 2009.

Bloc	Measure	Arabica	Robusta	Maize	Sugarcane	Tea
Central	<ul><li>(a) Specialisation(% top-producing constitu- encies)</li></ul>	71.7	0.0	19.6	0.0	58.7
Central	(b) Concentration of production in bloc	69.7	0.0	17.8	0.0	37.7
Central	(c) Production per areal unit in bloc	9.2	0.0	2.3	0.0	5.0
Central	(d) Prevalence(% producer constituencies)	93.5	0.0	100.0	6.5	95.7
Eastern	<ul><li>(a) Specialisation(% top-producing constitu- encies)</li></ul>	71.4	0.0	57.1	0.0	0.0
Eastern	(b) Concentration of production in bloc	6.6	0.0	5.8	0.0	0.0
Eastern	(c) Production per areal unit in bloc	5.4	0.0	4.8	0.0	0.0
Eastern	(d) Prevalence(% producer constituencies)	100.0	0.0	100.0	0.0	0.0
Rift Valley	<ul> <li>(a) Specialisation(% top-producing constitu- encies)</li> </ul>		0.0	41.4	27.6	37.9
Rift Valley	(b) Concentration of production in bloc	4.5	0.0	20.9	6.4	42.4
Rift Valley	(c) Production per areal unit in bloc	0.6	0.0	2.9	0.9	5.9
Rift Valley	(d) Prevalence(% producer constituencies)	100.0	0.0	100.0	37.9	69.0
Western	(a) Specialisation(% top-producing constitu- encies)	0.0	6.3	12.5	84.4	3.1
Western	(b) Concentration of production in bloc	0.2	100.0	13.5	75.4	2.5
Western	(c) Production per areal unit in bloc	0.1	45.0	6.1	33.9	1.1
Western	(d) Prevalence(% producer constituencies)	18.8	6.3	100.0	93.8	84.4

Table 1 Kenya: Production profile of electoral blocs and of constituencies within blocs

Arabica and Robusta are two varieties of coffee. (a) *Specialization* measure: Share of constituencies of the bloc that are "top producing constituencies", i.e. whose production level is in the upper quartile of the production for the crop considered, (i.e., production strictly greater than the 75th percentile (upper quartile threshold)). Values greater than 60% are indicated in bold. (b) *Concentration* measure: This corresponds to the bloc's share of national output. Values greater than 30% are in bold. (c) *Production per areal unit*: This is computed as the ratio of the bloc's production (in % of national production) to the bloc's size (in % of country area). A production per areal unit of 1 indicates that the bloc produces as much of the crop as would be expected under a nation-wide uniform geographic distribution. Values greater than 1.5 are in bold. (d) *Prevalence*: Share of constituencies of the bloc that have any production level greater than 0). Values greater than 60% are in bold. **Source**: IFPRI 2020; authors' calculations.=

but none is specialized in the commercial production of this crop. Even in the leading producer-constituencies in Central and Northern blocs, only a very small share of the total output makes it to the national market (most is consumed locally without ever entering formal marketing circuits).

#### Zambia

In the case of Zambia, when it comes to bloc production profiles, the agricultural production data that is presented in Table 3 offers more limited leverage. Neither of the two electoral blocs can be said to be "specialized" in the production of a crop

Bloc	Measure	Cotton	Maize	Sugar- cane	Tea	Tobacco
Central	(a) Specialisation(% top-producing constitu- encies)	13.6	54.5	0.0	0.0	61.4
Central	(b) Concentration of production in bloc	9.7	38.5	0.0	0.0	50.7
Central	(c) Production per areal unit in bloc	0.4	1.7	0.0	0.0	2.3
Central	(d) Prevalence(% producer constituencies)	95.5	100.0	0.0	0.0	100.0
Eastern	(a) Specialisation(% top-producing constitu- encies)	81.3	12.5	0.0	0.0	18.8
Eastern	(b) Concentration of production in bloc	22.2	6.7	0.0	0.0	6.2
Eastern	(c) Production per areal unit in bloc	2.3	0.7	0.0	0.0	0.7
Eastern	(d) Prevalence(% producer constituencies)	93.8	100.0	0.0	0.0	100.0
Rift Valley	(a) Specialisation (% top-producing con- stituencies)	11.5	23.1	7.7	0.0	46.2
Rift Valley	(b) Concentration of production in bloc	3.9	11.6	0.0	0.0	18.4
Rift Valley	(c) Production per areal unit in bloc	0.2	0.5	0.0	0.0	0.8
Rift Valley	(d) Prevalence(% producer constituencies)	100.0	100.0	7.7	0.0	100.0
Western	(a) Specialisation(% top-producing constitu- encies)	15.4	19.2	3.8	53.8	0.0
Western	(b) Concentration of production in bloc	5.1	11.7	0.8	81.5	2.3
Western	(c) Production per areal unit in bloc	0.5	1.1	0.1	7.9	0.2
Western	(d) Prevalence(% producer constituencies)	96.2	100.0	3.8	53.8	100.0

Table 2 Malawi: Production Profile of electoral blocs and of constituencies within blocs

For measures and data sources, see Table 1

Table 3 Zambia: Production profile of electoral blocs and of constituencies within blocs

Bloc	Measure	Cotton	Maize	Sugarcane	Tobacco	
N'rn-CB	(a) Specialisation (% top-producing constituencies)	0.0	5.1	59.0	0.0	-
N'rn-CB	(b) Concentration of production in bloc	0.2	11.3	58.3	0.7	
N'rn-CB	(c) Production per areal unit in bloc	0.0	0.5	2.6	0.0	
N'rn-CB	(d) Prevalence(% producer constituencies)	43.6	100.0	64.1	92.3	
Southern	(a) Specialisation (% top-producing constituencies)	51.9	48.1	0.0	37.0	
Southern	(b) Concentration of production in bloc	19.1	28.8	0.0	29.0	
Southern	(c) Production per areal unit in bloc	1.1	1.6	0.0	1.7	
Southern	(d) Prevalence(% producer constituencies)	96.3	100.0	0.0	88.9	

For measures and data sources, see Table 1. N'rn-CB refers to "Northern-Copperbelt."

of national significance as defined by our specialization measure.<sup>35</sup> As explained above, Zambia is first and foremost a mineral exporter. It is also one of sub-Saharan

<sup>&</sup>lt;sup>35</sup> Production of two export crops of national significance (by the share of national output) is concentrated in Eastern Province (i.e. cotton and tobacco), but Eastern Province has not given rise to a "persistent electoral bloc" by the criteria employed in the present analysis. As for sugarcane, we see that the Northern-Copperbelt bloc produces close to 60% of the national sugarcane output and the rest is produced in the non-bloc region (almost all of it coming from one huge estate complex that lies to the west of Lusaka) (USDA-GAIN 2017).

Africa's most urbanized countries. One consequence of these two facts is the national significance of commercial maize production, which feeds mine workers and other urban populations.

Northern-Copperbelt is the region dedicated to the copper industry. As mentioned above, it generates over 70% of all Zambian exports and directly employed about 25% of the national private sector workforce in 2012 (N=90,000). Previous research has documented that at least through the 1990s, a very large share of this workforce hails from Northern Province. Circular migration (annual and over miners' life cycle), urban–rural straddling within households and extended families, and wage remittance flows link the two "halves" of this electoral bloc.

The Southern bloc cannot be considered to be "specialized" in maize production by our specialization measure. However, 48.1% of constituencies in the Southern bloc are "top producers" of maize and 80% produce more than the country's median amount. (descriptive results on medians not shown).<sup>36</sup> Its share of national maize output is 50% higher than its share of national area (production per areal unit). Overall, Southern Province (largely coinciding with the Southern persistent electoral bloc) has the largest concentration of medium and large-scale commercial farms in Zambia (Roth & Smith 1995). The distinctiveness of the production profiles of the Northern-Copperbelt bloc and the Southern bloc is captured in the industry-agriculture distinction.

Inferring voters' interests from the economic profiles of electoral blocs is the next move in the analysis. To do this, we leverage electoral bloc share and constituency share of total national production in metric tons (MT) for each crop. Metric tons per capita, and metric tons divided by bloc area, can tell us how production of a given crop is distributed within a country.<sup>37</sup> We reason that if a constituency produces a great amount of given crop relative to others (i.e., the constituency produces more of the crop than most of the other constituencies nation-wide), then its population is likely to have a strong interest in policies that affect this crop or sector.<sup>38</sup> Where agricultural commodities are produced for the market in large quantities by independent small and medium-scale farmers, it is reasonable to assume that interest in policies affecting that sector are widely distributed across the voter population in the producer region. In Kenya, the commodities listed in Table 1 are produced by small-scale (average holding size less than 5 acres) and medium-scale farmers (landholding size between 5 and 50 acres). Maize is produced on almost all small and medium scale farms in Kenya, with the top 20% of farms by farm-size accounting for the lion's share of maize sold on the national market. In Malawi, tobacco is produced by medium and small-scale farmers. Cotton is also a smallholder crop. Maize is produced by an estimated 97% of

<sup>&</sup>lt;sup>36</sup> By contrast, only a quarter of the constituencies in Northern-Copperbelt produce more than the median amount of maize, and only 5% are top producers.

<sup>&</sup>lt;sup>37</sup> We do not have the price data needed to compare crops in terms of economic value.

<sup>&</sup>lt;sup>38</sup> Producing a large share of a nationally strategic crop (or other commodity), and/or specializing in its production, is likely to give rise to shared producer interests. When a region is an important producing region (by share of national output), we can presume that the government has a policy interest in the region (bloc).

all farms in Malawi, but mostly on a non-commercial basis. In Zambia, maize is produced very widely across the southern half of the country, both on small-scale farms for household consumption and on medium and large-scale commercial farms for sale on the national market. Tobacco and cotton are grown by small- and medium scale Zambian farmers.

There is a strong correspondence between constituency- (bloc-) level production of the important agricultural commodities listed above and "employment in agriculture" for that unit for most crops. Table 10 in Appendix 2 shows that at the constituencylevel, production of coffee, tea, sugar, and maize (in MT) are all significantly associated with agricultural employment (self-employment or as an agricultural worker) in Kenya. The same is true for cotton, maize, and tobacco in Malawi, and for maize in Zambia. Where crops that are important in local economies are produced predominantly by smallholder farmers, we assume that sectoral policy issues — including government-set producer prices and input prices, regulations governing producer and marketing cooperatives, input prices and distribution policies, marketing regulations, etc. — are salient for many voters in that constituency. Their interests are impacted directly. Where plantation/ estate crops predominate, policy matters linked to largescale estate production are likely to engage the interests of constituency/ bloc voters, most obviously around issues of land and labor use. This is certainly the case for tea in Kenya's Rift Valley and Southern Malawi, where tea is grown mostly as a plantation crop on large plantations owned by multinational corporations employing wage labor.<sup>39</sup>

One mining region is considered here, Zambia's Northern-Copperbelt bloc, consists of the geographic locus of the copper mining industry itself and its hinterland, the traditional labor-sending region of Northern Province. The copper mining sector directly employed about 25% of Zambia's national private sector workforce in 2012 (N=90,000). The share of the workforce engaged in this activity would be much larger if we had a measure of indirect employment in mining.<sup>40</sup> It is fairly straightforward to presume that miners (and mining families) have an interest in government policies and programs that affect the mining sector and labor in the mining industry, and indeed this has historically been the case in Zambia (even if the interests of mine workers and owners may not align).

## Multiethnicity, Sectoral Interests, and Bloc Cohesion

The persistent electoral blocs are geographical clusters of constituencies that have voted together in most elections since the 1990s. While it is true that ethnicity and electoral blocs are usually associated, this section shows that ethnicity itself leaves much of the electoral behavior we observed unexplained. Ethnicity alone does not

<sup>&</sup>lt;sup>39</sup> On flower production in Kenya, see Appendix 1.

<sup>&</sup>lt;sup>40</sup> It is generally estimated that each job created by a mining company generates two to four jobs in the local economy (ILO 2012).

Fig. 3 Ethnic composition of constituencies within blocs. The X-axis indicates the names of the blocs and the largest ethnic group in each bloc. Hollow circles denote the share of the bloc's largest ethnic group in each of the bloc's constituencies. Diamonds denote the average of the constituency-level shares of largest ethnic group in bloc. For Zambia, NC = Copperbelt North. Source: Composite data drawn from DHS waves (see Appendix 1). Figure 3 reading note: For Kenya's C(entral)-Kikuyu, for example, the hollow circles along the Y-axis display the share of persons identifying themselves as Kikuyu in each constituency in the Central bloc in Kenya. The distribution ranges from 0 (none of the individuals interviewed in the DHS survey declared being Kikuyu) to 100 (all interviewed individuals declared that they were Kikuyu). The diamond indicates the cross-constituency average for the share of the population declaring themselves to be Kikuyu in the constituencies comprising the Central bloc in Kenya. It is 66%



account for the electoral cohesion of many of the persistent electoral blocs. If this is the case, what holds the multiethnic blocs together? Our claim is that in many cases, the answer lies in shared sectoral interests.

Although all the blocs do indeed have ethnic majorities, the degree of their demographic dominance varies. This point is illustrated in Fig. 3. The largest ethnic group in each persistent electoral bloc is identified on the horizontal axis. The population share of that ethnicity in each constituency is indicated on the vertical axis. Vertically aligned circles represent the constituencies that comprise each of the persistent electoral blocs. It is clear that most of the blocs are home to a number of ethnic minorities.

Figure 3 highlights the fact that the ethnic group that is the majority in at least 50% of constituencies in each bloc is not necessarily the majority in all constituencies of the bloc. In most of the electoral blocs, there are many constituencies within the bloc in which the bloc-level majority is not the constituency-level majority.<sup>41</sup> The least multiethnic bloc by our measures is Kenya's Eastern bloc: all constituencies almost completely Kamba. Of the rest, even those with a strong ethnic profile contain some constituencies in which the bloc majority is *not* the constituency majority. Kenya's Rift Valley bloc, for example, includes four non-Kalenjin majority constituencies. Malawi's Central bloc includes two constituencies in which Chewa are not a majority. All the other persistent electoral blocs are even more strongly multiethnic. Most of the persistent electoral blocs are multi-ethnic across constituencies as well as within them.

Ethnic *plurality* is a lower threshold for qualifying as a "ethnic bloc." By this measure, we see more blocs that could be described as having a leading or predominant ethnic group (considering pluralities of, say, over the 40% threshold). Even so, in most of the electoral blocs, the ethnic majority at the bloc-level is *not even a plurality* at the constituency level in 15% or more of the bloc constituencies (i.e. Kenya Central and Western; Malawi Northern and Southern; Zambia Copperbelt-North and Southern)<sup>42</sup> (See Fig. 3.)

We probed the ethnic explanation of bloc cohesion further by correlating constituency-level vote shares with constituency-level ethnic majority population shares for the persistent electoral blocs in our analysis. Table 11 in Appendix 2 reports the correlation, for each bloc and election year, between constituency-level vote shares for the winning party in the bloc and constituency-level share of the largest ethnic group in the bloc. We see that in most cases, there is a positive and significant correlation between the vote share for the winner and the population share of the bloc's ethnic majority in the constituency, but not always. In most elections in which this *is* the case, the value of the correlation coefficient is far from 1 (1 would be mean that both shares are equal). (Correlation coefficients only indicate that a higher share of the bloc's largest ethnic group is, on average, associated with a larger vote share for the winning party.) Additionally, average vote shares picked up by the local Moran's I are, on average, higher than the population share of the bloc's ethnic majority in the constituency.<sup>43</sup>

 $<sup>^{41}</sup>$  In some cases, even if the group's share of the constituency population falls below 50%, it is still the *plurality* (i.e., the largest group) – in the constituency.

<sup>&</sup>lt;sup>42</sup> In Kenya Central, 35/46 are Kikuyu plurality; in Eastern, all 7 are Kamba plurality; in Rift Valley, 28/29 are Kalenjin plurality; in Western., 20/32 are Luo plurality. In Malawi's Central, all but 1/44 have a Chewa plurality. In Malawi's Eastern bloc, all but 1/16 have a Yao plurality; in Northern, 18/23 have Tumbuka pluralities; in Southern, 18/26 have Lomwe pluralities. In Zambia's Copperbelt-North, 7/39 constituencies do not even have a Bemba plurality; in Southern, 4/27 do not have a Tonga plurality.

<sup>&</sup>lt;sup>43</sup> We treat this as suggestive but not dispositive evidence, given the possibility that turn-out rates vary across ethnic groups.

		Ν	Arabica	Robusta	Maize	Sugarcane	tea
Central - Kikuyu	(a) Specialisation(% top- producing constituencies)	33	72.7	0.0	18.2	0.0	63.6
Central - non- Kikuyu	(a) Specialisation(% top- producing constituencies)	13	69.2	0.0	23.1	0.0	46.2
Rift Valley - Kalenjin	(a) Specialisation(% top- producing constituencies)	24	16.7	0.0	33.3	29.2	45.8
Rift Valley - non- Kalenjin	(a) Specialisation(% top- producing constituencies)	2	0.0	0.0	80.0	20.0	0.0
Western - Luo	(a) Specialisation(% top- producing constituencies)	20	0.0	0.0	20.0	80.0	5.0
Western - non- Luo	(a) Specialisation(% top- producing constituencies)	12	0.0	16.7	0.0	91.7	0.0

Table 4	Kenya: Agricultural	Production Pro	ofile of constitue	encies within	blocs, by	type of	ethnic majority	
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"Top producers" are constituencies whose production level is in the upper quartile of the production for the crop considered, (i.e. production strictly greater than the 75th percentile (upper quartile threshold)). Ethnic profile of constituency defined in terms of majority. Values greater than 50% (of bloc constituencies) are indicated in bold. All constituencies in the Eastern bloc have a Kamba majority, so the Eastern bloc does not appear in this table. For results for Eastern bloc, see Table 1

 Table 5
 Malawi: Agricultural Production Profile of constituencies within blocs, by type of ethnic majority

		Ν	Cotton	Maize	Sugar- cane	Теа	Tobacco
Central - Chewa	(a) Specialisation(% top- producing constituencies)	42	14.3	54.8	0.0	0.0	61.9
Central - non Chewa	(a) Specialisation(% top- producing constituencies)	2	0.0	50.3	0.0	0.0	50.0
Eastern - Yao	(a) Specialisation(% top- producing constituencies)	12	83.3	8.3	0.0	0.0	25.
Eastern - non Yao	(a) Specialisation(% top- producing constituencies)	4	75.0	25.0	0.0	0.0	0.0
Northern - Tumbuka	(a) Specialisation(% top- producing constituencies)	17	17.6	29.4	11.8	0.0	64.7
Northern - non-Tum- buka	(a) Specialisation(% top- producing constituencies)	9	0.0	11.1	0.0	0.0	11.1
Southern - Lomwe	(a) Specialisation(% top- producing constituencies)	15	0.0	13.3	0.0	86.7	0.0
Southern - non Lomwe	(a) Specialisation(% top- producing constituencies)	11	36.4	27.3	9.1	9.1	0.0

For definitions and measurement strategy, see Table 4

Decomposing the blocs along the lines of both ethnicity and crop production (by constituency) shows that many of the non-coethnic<sup>44</sup> and the multiethnic

<sup>&</sup>lt;sup>44</sup> Non-coethnic constituencies within a persistent electoral bloc are those that have a constituency-level ethnic plurality *other than* the one that predominates at the bloc level.

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		Ν	Cotton	Maize	Sugar- cane	Tobacco
Northern-Copperbelt - Bemba	(a) Specialisation(% top-producing constituencies)	22	0.0	4.5	54.5	0.0
Northern-Copperbelt - non-Bemba	(a) Specialisation(% top-producing constituencies)	17	0.0	5.9	64.7	0.0
Southern - Tonga	(a) Specialisation(% top-producing constituencies)	16	50.0	50.0	0.0	37.5
Southern - non- Tonga	(a) Specialisation(% top-producing constituencies)	11	54.5	45.5	0.0	36.4

 Table 6
 Zambia: Agricultural Production Profile of constituencies within blocs, by type of ethnic majority

For definitions and measurement strategy, see Table 4

constituencies that lie within the persistent electoral blocs have *the same the eco-nomic-sectoral profile* as the electoral bloc as a whole. For this part of the analysis, we identified the largest ethnic group within each bloc (i.e. the ethnic plurality at bloc level), and then sorted the bloc constituencies into two categories. "Coethnic constituencies" are those in which the majority group is the same as of the ethnic majority in the bloc as a whole. "Non-coethnic constituencies" are those that *do not* have the same majority group as the bloc as a whole. The three tables that report these results appear below. They consider data for each country and each bloc therein, sorting bloc constituencies that are "top producers" and "producers" of the bloc's leading high value crop into these two groups.<sup>45</sup> The results are as follows.

For Kenya, Table 4 shows that the specialization in coffee (and nearly so, in tea) of the Central bloc is found in both coethnic and non-coethnic constituencies (i.e. Kikuyu-majority and non-Kikuyu majority constituencies). Over 68% of constituencies in each category are "top producers" of coffee. For tea, 60% of constituencies with a Kikuyu majority and 46.2% of constituencies without a Kikuyu majority are top producers. The specialization of Western bloc in sugarcane is found in both coethnic and non-coethnic (Luo majority and non-Luo majority) constituencies.<sup>46</sup> In the case of Rift Valley bloc, tea specialization and ethnic majorities do align: 45% of the Kalenjin majority constituencies are top producers of tea and none of the non-Kalenjin majority constituencies produce any tea.<sup>47</sup> For the Rift Valley bloc, we do not have evidence of "crop interests" contributing to bloc cohesion.<sup>48</sup> In Kenya, two electoral blocs, Central and Western, do provide support for the plausibility of the argument that crop interests contribute to bridging ethnic differences to produce

<sup>&</sup>lt;sup>45</sup> We do not report results for the share of national production in MT produced in these constituency categories because the figures are not comparable across blocs. (Blocs do not have the same crop profiles or distribution of bloc ethnic majority constituencies and non-bloc ethnic majority constituencies.).

<sup>&</sup>lt;sup>46</sup> All constituencies in Eastern have not only Kamba pluralities but also Kamba majorities, so this case is not relevant to the analysis in this section.

<sup>&</sup>lt;sup>47</sup> This result on the prevalence indicator is not shown in Table 4.

<sup>&</sup>lt;sup>48</sup> But land-related interests (and land policy) may indeed do so. See Boone 2011, and Boone et al. 2021.

persistent bloc cohesion. A theory of mechanical ethnic voting would not predict the formation of electoral blocs of this nature. Nor would a theory of shifting and unstable cross-ethnic coalitions.

Malawi results feature in Table 5. We see that the specialization of the Central bloc in tobacco production is found in Chewa majority constituencies and in the one constituency that does not have a Chewa majority or plurality. In the Southern bloc, tea is grown mostly in Lomwe majority constituencies and in one constituency in which does not have a Lomwe majority. In the Eastern bloc, both Yao-majority and non-Yao majority constituencies are specialized in cotton production. In Malawi, the Central, Eastern, and Southern blocs provide some support for our argument about the shared crop interests of constituencies with different ethnic profiles and constituencies that are ethnically mixed.<sup>49</sup>

Zambia results are presented in Table 6. Northern-Copperbelt, as discussed above, is associated with the copper industry, and here sectoral interests clearly bridge ethnic differences. (Bemba is itself a "supra" identity linked to involvement in the mining sector.) In the Southern bloc, although it is not "specialized" in maize production according to the threshold we set in our specialization measure (i.e., 50% of Southern bloc constituencies are top maize producers, but this does not make our 60% threshold), maize is nevertheless a dominant sectoral interest. In Southern, large-scale maize production is found both in Tonga majority and in non-Tonga plurality constituencies. We can say that both of the Zambian persistent electoral blocs offer some support for our argument about sectoral interests bridging ethnic distinctions, contributing to bloc-ness.

This evidence, taken in aggregate, supports our arguments. Ethnicity alone, without productive sector (crop) specialization, does not fully explain the cohesion of most of the persistent electoral blocs in our analysis. Concentration of production of nationally significant commodities is strong in most blocs, and this spans multiethnic groups of constituencies. This supports the plausibility of our argument about the role of sectoral interests in the rise and staying power of the persistent electoral blocs.

## **Discussion: Mechanisms Linking Sectoral and Voting Interests**

Our analysis suggests that both sectoral interests and ethnic interests contribute to electoral bloc persistence and cohesion (i.e., the "electoral strength" of blocs). All but one of the ten persistent electoral blocs identified above are multiethnic. And seven of the

<sup>&</sup>lt;sup>49</sup> In the Northern bloc, 64.7% of Tumbuka-plurality constituencies are top producers of tobacco, but only one of the Northern bloc constituencies without a Tumbuka majority is a top tobacco producer. (Two of the 9 non-Tumbuka constituencies in the Northern bloc produce more tobacco than the non-zero national median.) The remaining non-Tumbuka constituencies do produce some tobacco, but so do all other constituencies in all the four blocs. Neither the producer profile data nor the ethnic profiles data provide grounds for a strong claim about why the Northern bloc holds together as an electoral bloc over time, or why the "top" tobacco-producing constituencies in Northern do not vote together with the Central bloc on the basis of their tobacco interests, as our hypothesis would suggest. Our theory could suggest that a non-observed aspect of regional economic geography could be a source of cohesion. Or, there could be unobserved change over time: perhaps their convergence with Central changes as a function of their level of tobacco production.

ten (7/10) are linked to a primary commodity sector of national significance (as determined by the specialization measure used as a threshold in the analysis above) — i.e. Kenya Central, Western, and Eastern; Malawi, Central, Southern, and Eastern, Zambia's Northern-Copperbelt. Zambia's Southern bloc, where there is a concentration of medium- and large-scale *commercial* maize producers (although our data cannot differentiate between agricultural production units of different sizes), does not quite meet our statistical threshold for inclusion, but could also be considered to be in this group. Within blocs that have distinctive sectoral profiles, ethnic majority constituencies and some of the non-ethnic majority constituencies have the same sectoral profile.

This paper aims to draw out the political implications of this correlation between political and economic geography. We suggest that policy interests linked to these important and regionally concentrated economic sectors contribute to the construction and reproduction over time of the persistent voting blocs, and play an important role in determining their constituency membership (i.e. the geographic extent of the bloc). We theorize that shared policy interests arising from shared sectoral interests contribute to, and thus partially account for, the common voting patterns.<sup>50</sup> Shared sectors interests may go far in explaining bloc membership of constituencies that are not co-ethnic with the bloc's majority ethnic group. At the same time, shared sectoral interests can reinforce co-ethnic voting where the two factors coincide.

Mechanisms that can contribute to this result can be found on both the demand side and the supply side of politics. On the demand side of politics, we suggest that voters whose livelihoods are linked to these sectors, both directly and indirectly, are likely to be supporters of policy that favors, protects, or sustains these particular sectors. When production in an agricultural (or mining) sector of national significance is regionally concentrated, and producers and their families are numerous and dispersed throughout the region, then these sectors can represent solid electoral bases for politicians and parties competing in elections at the national level. Voters are likely to have distinctive and joint policy interests in the sector in question, and presumably, are likely to vote together for the parties and politicians who promise or support the policy in their common need.

On the supply side of politics, crops and extractives that are important to the national economy are targets of state policy activism in all the countries considered here. Such commodities are usually internationally traded products like tea, coffee, tobacco, and copper. Some commercial food crops such as maize are nationally traded and regulated by national buying and selling boards; they are politically sensitive when it comes to food prices and food security.<sup>51</sup> We can presume that politicians and parties who care about re-election are held accountable for sectorally targeted policy making and outcomes in constituencies in which these sectors are

<sup>&</sup>lt;sup>50</sup> What about constituencies that, despite sharing sectoral interests, do not align with a sectorally relevant bloc? Targeted allocation of discretionary goods and services by the ruling party could explain this. For constituencies that are non-contiguous with the bloc, coordination problems may explain this outcome. Such complexities, however, underscore the significance of the observed correlation between sectoral interests and the persistent practice of bloc voting.

<sup>&</sup>lt;sup>51</sup> The link between crop production and particular regional interests is shaped by spatial concentration of production. If a region produces a fairly large amount of a crop that is also cultivated widely across the country, then the significance of this crop in producing *distinctively regional* interests or cleavages will be diminished.

the main sources of their constituents' livelihoods. Politicians (parties) are punished or rewarded in elections according to their performance in supplying such policy. At the same time, favorable sectoral policies or policy concessions can be used to mobilize voters in targeted constituencies. The literature on African elections provides evidence of these kinds of electorally-salient policy linkages in case studies of particular parties, regions, and sectors.<sup>52</sup>

Much previous work on the electoral salience of sectoral agricultural interests and organized mineworkers in African elections contributes to the plausibility of these arguments. For Kenya and Ghana, earlier work by Eun Kyung Kim "examine[d] some nationally important economic (sub)sectors whose policies favor some parts of the economy over others, targeting investment, taxes, and subsidies, trade protections, or regulation. Applying issue ownership theory to two cases-Ghana and Kenya-[she found] that partisan competition leads incumbent governments to pursue policies that help ensure economic gains to their electoral supporters at the expense of the opposition backers' interests" (2019: 956). Political parties offer regionally targeted policies that are designed to benefit voters in their electoral strongholds, and "likely swing voters are those who are in one of the regions of high agricultural specialization - they are likely to swing to the party that supplies policy to that region" (Kim 2018: 39; see also Kim 2024). For Ghana, Osei-Kwame and Taylor (1984: 585) also show a stable electoral cleavage between regions defined in part by ethnicity but also by political economy features dating to the colonial era, the most significant of which is the high concentration of "cocoa landed interests" in the Ashanti region. Many students of Kenyan politics have noted the role of targeted, pro-coffee sectoral policy in mobilizing so-called "Mt. Kenya" electoral constituencies (Kikuyu and Embu-Meru constituencies that make up the Central electoral bloc (e.g. Kanyinga and Poulton 2014). Ochieng (2010) observes a similar dynamic around sugar policy in Western Kenya. Kim (2017) provides strong empirical evidence to support a longstanding line of analysis in the literature on Zambia that traces regional tensions between the Copperbelt constituencies and Southern Zambia to industry-agriculture (urban-rural) policy tensions.<sup>53</sup> On Zambia's Copperbelt, organized mineworkers have historically served as the electoral base for parties of national significance (Bates 1976; LeBas 2011). The link between sectoral policies and electoral politics is perhaps most obvious in cases of the electoral/ partisan mobilization of organized mineworkers.

## Conclusion

Limitations of both data and prior theory in the study of African politics have combined to limit research into how sectoral heterogeneity and sub-nationally salient policy interests may shape electoral behavior, mobilization, and coalition-building in national elections. This has contributed to scholars' tendency to suggest that

<sup>&</sup>lt;sup>52</sup> See Whitfield et al. (2015) Arriola (2013), and a policy literature that points to political and electoral influences on sectoral policy adoption and implementation (e.g. Poulton 2014; Kanyinga and Poulton 2014). For an earlier era, see Beckman 1976 and Cruise O'Brien, 1984.

<sup>&</sup>lt;sup>53</sup> See also Bates 2017.

African presidential elections are determined by shifting and short-term coalitions that are based on elites' manipulation of ethnic identity, and that elections are very low in issue content. This paper serves as a step toward revising this view. We show that there are grounds to expect that voters in persistent regional blocs with strong producer profiles have specific, sectorally based, policy interests. This is especially likely to be the case where electoral constituencies are primarily rural, and smallholder farmers produce most of the bloc's leading crop. The existence of persistent multiethnic electoral blocs is itself suggestive evidence of the salience of producers' policy interests in producing stable patterns of regional bloc voting over time. By factoring sectoral production profiles into the analysis, we offer a plausible explanation for bloc cohesion that incorporates both demographic and economic geography.

## **Appendix 1 Data and Data Treatment**

#### **Electoral Data**

We use nearly all available constituency-level election results from the three case countries since the 1990s: 1997, 2002, 2007, 2013, and 2017 in Kenya, 1999, 2004, 2009, 2014, and 2020 in Malawi, and 1991, 1996, 2001, 2006, 2011, 2016, and 2021 in Zambia. We examine the results for presidential races except for 1999 and 2004 in Malawi that we use parliamentary results due to unavailability. Results from two elections—the Kenyan in 1992 and the Malawian in 1994—are not included in our analysis because either election results or the corresponding constituency shapefile is unavailable. Using the parliamentary data for Malawi should not distort the results since we compare voting patterns across constituencies within each election. We did not use the two by-election results in Zambia that took place after the deaths of the presidents.

*Reference shapefiles.* This is straightforward in Malawi in which the constituency boundaries were not redrawn within the election years considered (1999–2020). In Kenya and Zambia, however, more constituencies have been created in the later elections, mostly through splits in original constituencies. To trace the changes of party support in a constituency, we use the shapefile of the first election in our data as a reference shapefile, which we refer to for information on election records. The constituencies newly created heading into the 2013 elections in Kenya and the 2016 elections in Zambia are matched with their former constituencies in the reference shapefiles by constituency names and centroids.

When an original constituency splits, we pool the results from the daughter constituencies and consider it as a single constituency in all elections. For a few cases where constituency boundaries were newly drawn, we match such constituencies to their original constituencies in which the centroids of the new constituencies are located. However, there are two instances where constituency boundary changes do not correspond to an original constituency—one in Kenya and the other in Zambia. In these cases, we create a unit whose boundaries do not change over time by merging the constituency with another one. As a result, the reference shapefiles for Kenya and Zambia each have one constituency less than the constituencies in the first election considered—i.e., 209 constituencies for the 1997 Kenyan election and 149 for the 1991 Zambian election. *Voting patterns.* To identify these voting patterns, we rank voting sequences according to the number of constituencies that follow each sequence exactly. Starting from the most common voting sequence, we remove any voting sequence that is similar to a more frequent voting sequence in a third or more of the elections considered. We stop the process when the only dissimilar patterns are very infrequent. In Kenya, the most frequent voting patterns are followed by at least 10 constituencies. In Malawi, they are followed by at least 5 constituencies. In Zambia, they are followed by at least 15 constituencies. The local Moran's I is a measure of spatial autocorrelation that allows us to identify positive and statistically electoral clusters among the constituencies that follow the same voting pattern.

Adjacent constituencies. The average constituency has 5.5 adjacent constituencies in the shapefile for Kenya, 4.9 adjacent constituencies in the shapefile for Malawi, and 5.1 adjacent units in the shapefile for Zambia.

*Moran's I neighbors.* In identifying electoral clusters using Moran's I, special considerations may apply to constituencies on the edge border of an electoral bloc that may be adjacent to other constituencies with strongly dissimilar values. This pulls down the statistical significance of the local Moran's I for border constituencies that display voting behavior consistent with that of the other constituencies in the electoral bloc. (That is, relying on Moran's I results alone would lead us to erroneously exclude these border constituencies from the electoral bloc.) Adding these border constituencies to the voting blocs corrects for this issue. On treatment of "neighbor" units when using the Moran's I to identify spatial clustering, see Anselin (1995), Harbers and Ingram (2019) and Boone et al. (2022).

*Bloc Size as* % *of the national territory.* For Kenya, the respective sizes of the blocs (as % of the country's area, using UTM projection) are: Central 7.62%, Eastern 1.2%, Rift Valley 7.1%, and Western 2.2%. For Malawi, The respective sizes of the blocs (as % of the country's area, using UTM projection) are: Central 22.28, % Eastern 9.5%, Northern 24.1%, and Southern: 10.2%. For Zambia, The respective sizes of the blocs (as % of the country's area, using UTM projection) are: Northern-Copperbelt 22.4%, Southern: 17.5%.

#### **Crop Production and Demography**

The Spatial Production Allocation Model (SPAM) data is collected by the International Food Policy Research Institute (IFPRI 2020). The SPAM 2017 v2.1 Sub-Saharan Africa we use is the most recently updated version available. The unit of SPAM data is a 5 arc-minute grid cell, which is about  $9 \times 9$  km at the equator and decreases gradually to the poles according to a cosine function of latitude. We first reproject all constituency shapefiles as well as the IFPRI raster file into the UTM projection for each country, in order to ensure the lowest distortion due to the projection. We compute the area of each constituency (km2), the area of the country (km2), the total production of each crop at constituency-level (sum of production in all the cells located within a constituency), total production of each crop at country-level, and the total population as of 2015 at constituency-level (sum of population in all the cells located within a constituency). Demographic and Health Surveys (DHS) are used to measure demographic characteristics of constituencies. We use the three most recent geolocalized DHS waves for each country: 2003, 2008, and 2014 for Kenya; 2004, 2010, and 2015 for Malawi; and 2007 and 2013 for Zambia. The most recent DHS wave conducted in Zambia (2018–2019) does not include information on ethnic identity of respondents and the waves conducted before 2007 do not provide information on geo-location. Using more than one survey wave ensures no missing values for all the constituencies. We re-weigh observations so that respondents in each wave are weighted according to survey weights and to population at the time of the survey. We use only data on adult respondents.

#### Additional Information on Flowers and Maize

*Flowers in Kenya*. Flower production in Kenya is a highly capital intensive, exportoriented business. It takes place on an archipelago of large commercial estates located within multiple non-contiguous electoral constituencies. The OEC data show that cut flowers make up 13.79%, on average, of yearly agricultural export values in Kenya (1995–2019). Unfortunately, this crop is not included in the SPAM data. Floriculture is a subsector of commercial agriculture that emerged as a significant agribusiness export industry in Kenya in the early 2000s. Production is concentrated on large, wage-labor employing commercial farms in districts and electoral constituencies ringing Nairobi and Naivasha (including Athi River, Karen, Thika), but some newer farms have been created in Laikipia and south of Eldoret (Mwabishi 2022). Although the flower subsector is geographically concentrated within Nairobi's 150–200 km radius, the flowerproducing zone is split between three of Kenya's seven pre-2013 provinces (ie., Central, Eastern, and Rift Valley Province. This spatial distribution is not one that can underpin a geographic bloc voting. Flower production on Kenya is not included in this analysis.

*Maize in Kenya*. Kenya's National Cereals and Produce Board (NCPB) [and the Strategic Reserve] purchases maize directly from farmers in cash and has maintained strategic reserves of maize in a National Granary, for decades. Production for sale on markets (as opposed to household consumption is highly concentrated: only 2% of smallholder farmers ("the relative elite," with 2 to 6 times the amount of land and assets as the non-selling maize producing HH) sell over 50% of marketed maize output (c. 2010). There is concentration of maize surplus production and selling in the hands of relatively few farmers (Kirimi et al. 2011: vi). The NCPB purchases mostly from large-scale farmers (ibid, ix). Domestic prices are highly sensitive to import tariffs, which in 2011 were 50% at the port of Mombasa for sellers from outside of the EAC [since 2005] (ibid, viii.). Maize trades within an annual price band set by the government; grain is released strategically to fight inflation, including around election time.

*Maize in Zambia*. Zambia maize is a nationally traded, state managed commercial crop that is produced on a commercial scale by medium and large scale farmers and subject to extensive state activism on both the input and output side of the commodity chain (Pitcher 2016: 9). It is exported to countries in the southern Africa region in years of grain surplus. In Zambia maize is also a crop produced on small farms for household consumption across much of the country.

Maize in Malawi. Malawi's maize is produced throughout the country (97% of all farms) and is one of Malawi's top two smallholder crops (along with tobacco). Yet in contrast to tobacco, Malawi maize markets are very thin - a very small share of national output is produced for the market. On maize in Malawi, see Jayne et al. 2010: Dorword and Chirwa 2011: Chirwa and Dorward 2013. We admit that maize production and marketing in Malawi corresponds weakly to our concept of a nationally traded food crop. Over 90% of Malawi's maize output is grown for household consumption or traded informally in localized informal exchanges. Of total marketed output, estates produce about  $\frac{1}{3}$ . The other  $\frac{2}{3}$  is supplied by the 2% of Malawi's "smallholder farmers" who produce for the market. Of these smallholders, a very small number of farmers grow over 15 ha of maize. The vast majority of the 2% of smallholder producers who produce for the market farm about 5 ha of maize. (See Jayne et al 2010: 11–12). The government buys very little for the national reserve (less than 10% of national marketed output in 2003–2015), mostly from large estates around Blantyre and Lilongwe. The Government of Malawi does set yearly country-wide producer price bands, provided subsidized inputs to an estimated 50% of households in 2005–2010, imports maize to cover the market in maize-deficit years, and maintains an export ban.

# **Appendix 2 Additional Tables and Figure**

		Election y	/ears					
Kenya	N cons	1997	2002	2007	2013	2017		
Central	46	DP	NARC	PNU	Kenyatta	Kenyatta		
Eastern	7	SDP	NARC	ODM-K	Odinga	Odinga		
Rift Valley	29	KANU	KANU	ODM	Kenyatta	Kenyatta		
Western	32	NDPK	NARC	ODM	Odinga	Odinga		
Malawi		1999	2004	2009	2014	2020		
Central	44	MCP-A	MCP	MCP	MCP	MCP		
Eastern	16	UDF	UDF	MCP	UDF	DPP		
Northern	26	MCP-A	Mgwirizano	DPP	PP	MCP		
Southern	26	UDF	UDF	DPP	DPP	DPP		
Zambia		1991	1996	2001	2006	2011	2016	2021
Northern- Copperbelt	39	MMD	MMD	MMD	PF	PF	PF	PF
Southern	27	MMD	MMD	UPND	UPND	UPND	UPND	UPND

 Table 7
 Persistent electoral blocs (Moran's I): Number of constituencies in persistent electoral blocs and associated parties (or candidates) in each election year

This table presents the voting patterns (of party or candidate name for each election) associated with the persistent electoral blocs. Source: Authors' computations based on electoral data from the Independent Electoral and Boundary Commission of Kenya, the Malawi Electoral Commission, and the Zambia Electoral Commission

	Election years								
Kenya	1997	2002	2007	2013	2017				
Central	84	90	96	94	96				
Eastern	61	67	-	92	91				
Rift Valley	92	71	86	90	89				
Western	84	89	93	94	96				
Malawi	1999	2004	2009	2014	2020				
Central	77	68	62	78	95				
Eastern	84	55	70	63	89				
Northern	83	55	95	61	88				
Southern	74	48	87	82	89				
Zambia	1991	1996	2001	2006	2011	2016	2021		
Northern- Copperbelt	91	81	49	61	78	85	67		
Southern	84	-	73	78	77	95	95		

This table reports the vote share for winning party in clusters identified by the Moran's I in each election. (The vote shares are computed for constituencies that are included in the bloc. In each election, constituencies that were not part of the Moran's I cluster are excluded from the computation.) There is no Moran's I cluster for Eastern Kenya in 2007 and Southern Malawi in 1996, hence no vote share is associated with the cluster

Kenya	% ag. export	% total export	production	
Tea	34.4	19.37	1,505,600	
Cut flowers	13.79	8.17	-	
Coffee	10.64	4.85	54,563	
Sugarcane	-	-	5,122,010	
Maize	-	-	2,962,656	
Agric. total export value	(2,268,452,232)	54.73 (4,144,914,594)	-	
Malawi	% ag. export	% total export	production	
Tobacco	68.19	53.47	120,742	
Sugar(cane)	9.59	7.36	2,517,120	
Tea	8.37	6.45	186,600	
Raw cotton	2.24	1.82	17,640	
Maize	-	-	2,590,283	
Agric. total export value	(753,758,817)	79.52 (947,836,860)	-	
Zambia	% ag. export	% total export	production	
Tobacco	22.99	2	21,974	
Sugar(cane)	22.56	1.7	2,949,274	
Raw cotton*	12.64	1.15	34,316	
Maize	9.76	1.1	1,767,688	
Copper	-	65.35	-	
Agric. total export value	(465,692,251)	8.97 (5,834,319,751)	-	

Table 9Agricultural and mineral sub-sectors of national significance (1995–2019, values in currentUSD)

This table includes (1) crops based on the Harmonized System (HS4), Section ID 1–4 that are classified as agricultural products, (2) raw cotton, and (3) copper articles based on HS2. The column "% ag. export" is the share of each commodity of all agricultural exports (average for 1995–2019 in current USD). The column "% total export" reports the commodity's share of total exports (by value) (i.e. ag. and non-ag exports). The row "Agric. total export value" refers to total agricultural export value, and value as a share of the country's total exports. The average annual total agricultural export values (for 1995–2019) and total export values in current USD are in parentheses. **Source**: Observatory of Economic Complexity (OEC) data for the export values (in current USD) and the FAOSTAT for the production data (in MT).

\* Cotton is classified as a textile sector item. We include this commodity where its export value is greater than 1 percent of the total export value. For flowers and maize, see above and Appendix 1.

Tobacco
0.3***

 Table 10
 Correlation between constituency-level total production and share of population employed in agriculture

Correlation coefficient of constituency-level total crop production (MT) and share of constituency population that works in the agricultural sector (self-employed or agricultural worker). \* indicates that the significance level of the correlation coefficient is <10%, \*\* <5%, \*\*\* <1%. Source: Data on production from IFPRI, 2020; data on share of population in agriculture from DHS (see Appendix 1)

 Table 11
 Correlation between constituency-level vote shares for bloc winner and constituency-level share of the ethnic group that is the majority in the bloc, by bloc and election year

Election years							
Kenya	1997	2002	2007	2013	2017		
Central	0.77***	0.28	0.3**	0.4***	0.45***		
Eastern	0.47	0.3	0.84**	0.98***	0.73*		
Rift Valley	0.62***	0.08	0.71***	0.61***	0.54***		
Western	0.47***	0.68***	0.85***	0.8***	0.87***		
Malawi	1999	2004	2009	2014	2020		
Central	0.29*	0.34**	-0.29	0.73***	0.78***		
Eastern	0.02	-0.62*	0.83***	0.84***	0.49*		
Northern	0.33*	-0.24	0.07	0.2	0.59***		
Southern	0.33	0.04	0.11	0.42*	0.68***		
Zambia	1991	1996	2001	2006	2011	2016	2021
Northen Copperbelt	0.11	-0.25	-0.15	-0.16	-0.01	0.21	0.15
Southern	0.4*	0	0.83***	0.85***	0.89***	0.68***	0.68***

Correlation between the vote share for the party that wins in the bloc (in each election) in constituencies of the bloc and the share of the group that is the bloc majority in the constituency (composite over DHS-wave, the measure does not vary over elections)

The list of bloc winners in each election (i.e. the bloc's voting pattern) is reported in Appendix 2, Table 7. The list of the largest group by bloc is shown in Fig. 3 and discussed in Footnotes 42 and 43

\* indicates that the significance level of the correlation coefficient is < 10%, \*\* < 5%, \*\*\* < 1%



**Fig. 4** Maps of party voting patterns (prior to spatial autocorrelation analysis). Constituencies are shaded according to voting pattern only. See text and Appendix 1 for data and method. Appendix 2, Table 7 lists the political parties (or candidates) associated with each voting pattern. In the Fig. 4 map keys, "Constituencies [x]" indicates the total number of constituencies in the shapefile used to generate the map. Brackets in the next lines indicate the number of constituencies that follow each voting pattern. (For the number of constituencies in the persistent electoral blocs identified using the local Moran's I, see Table 7.) Voting patterns are named after the corresponding persistent electoral blocs. **Source:** Authors' computations based on data from the national electoral commissions

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#### Declarations

**Conflicts of Interest** We confirm that none of us have relevant financial or non-financial competing interests to report. No human subjects research was undertaken for this project. Sources of financial support for this research are listed in the acknowledgements.

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