Electoral Geography and Conflict: Examining the Redistricting through Violence in Kenya

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Abstract

Politicians may use violence to alter the composition of the electorate either by suppressing turnout or by permanently displacing voters. This paper argues that politicians are more likely to use violent redistricting where it can sway electoral results and when their opponents supporters are less likely to return if displaced by violence. I explore the relationship between electoral geography and violence in Kenya's Rift Valley Province during the crisis that followed Kenya's disputed 2007 general election. Using the proportion of migrants in a neighborhood as one proxy for residents' propensity to relocate, I show that more violence occurred in electorally pivotal localities as well as in localities that were both electorally pivotal and contained more migrants.

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1 Introduction

Elections are associated with conflict in several new democracies. Using violence in electoral campaigns is at least as old as democracy itself.[1] Scholarly interest in the relationship between electoral politics and violence has increased as a larger number of developing countries have become democracies. Violence is sometimes an *alternative* to holding fair elections in new democracies and post-conflict settings (Snyder 2000, Wantchekon 2004, Dunning 2011, Brancati and Snyder 2013, Hafner-Burton, Hyde and Jablonski 2014). A separate line of research, rather than studying how violence is used to prevent elections, demonstrates that violence and the capacity to create violence have *electoral* benefits when elections occur.

Politicians may benefit electorally from violence that shapes citizens' voting preferences even when people are not forced to support a specific candidate. Wantchekon (1999) presents a model in which some voters vote strategically for the political party with the highest capacity to cause violence because they prefer peace to voting for the party whose policies they most prefer. Wilkinson (2004) argues that ethnic violence emphasizes ethnicity as a wedge issue that unites members of an ethnic group with disparate interests. He argues that upper caste Hindu politicians foment Hindu-Muslim riots to solidify the support of lower caste Hindus in localities where political competition is high. Vaishnav (2012) shows that Indian candidates' capacity to engage in violence is inherently desirable to voters because criminal candidates are credible defenders of communal interests in that context. Rather than altering citizens' preferences, candidates may use violence to alter the composition of the electorate by selectively suppressing turnout rates. Robinson and Torvik (2009) argue that existing models of voting and distributive politics, predicting that candidates will spend money to purchase the support of "swing voters," ignore the possibility of coercion. They argue that absent strong institutions that can punish perpetrators of violence, politicians will use violence to suppress the turnout of swing voters when such voters' support is both necessary and

[1] In the late Roman Republic politicians hired armed gangs to disrupt their opponents campaigns in annual elections to several public offices (Holland 2003).

costly. Collier and Vicente (2012) argue that poor and unpopular candidates are most likely to use violence to suppress the turnout of unaligned voters because public disapproval of violence makes intimidation costly for candidates.

Besides suppressing turnout, politicians may also alter the composition of the electorate by inducing non-supporters to leave the electoral constituency permanently. Klopp (2001), argues that Kenyan politicians used the ethnic clashes that took place in the 1990s to expel potential opponents and secure their electoral areas, effectively "gerrymandering by moving people" (see also Médard (1996) and Kagwanja (1998).) Violent redistricting has also occurred in recent Zimbabwean elections (Solidarity Peace Trust 2013). In one of the most notable incidents of politically-motivated displacement, the Mugabe government razed informal settlements in several urban areas during Operation Murambatsvina (Clean-Up) to remove likely opposition party supporters (Bratton and Masunungure 2007).[2]

Relatively little research is on elections and violence explores the conditions under which politicians are more likely to engage in violent redistricting. In this paper, I argue that violent redistricting is more likely to occur where displacing voters can sway electoral outcomes and where voters differ in their propensity to relocate. If the geographic distribution of political support is uneven across areas, we will observe higher levels of violence in areas of an electoral district that are pivotal. Pivotal localities are those whose inclusion or exclusion from a given parliamentary jurisdiction would most alter the outcome of parliamentary races. Also, if politicians use violence to alter constituency demography, I argue that we ought to observe more violence in pivotal areas whose residents are less likely to return after having been displaced.

I investigate the incidence of violence and displacement in approximately 700 localities in Kenya's Rift Valley Province during the crisis that followed the 2007 general election. During

[2]In the context of a civil war, Steele (2011) also examines the relationship between voting patterns and displacement. She argues that in Columbia combatants who seek to control territory use voting patterns to *identify* potential opponents in contexts where there are few ascriptive markers of political allegiance. A key distinction between the argument in this paper and that presented by Steele (2011) is that I consider contexts in which politicians can easily guess peoples' political allegiances.

this three month period approximately 1,100 people were killed and 350,000 displaced because of their ethnic identity, partisan affiliations, and participation in protests. Violent clashes occurred in this area both before and after elections during the 1990s. Although ethnicity has been politically salient in Kenya since before independence, it was only after the re-introduction of multi-party politics that violence and forced migration occurred in this region on a large scale.

I find that the placement of electoral boundaries affects the local-level incidence of violence. The violence occurred in locations that contributed the most to the overall electoral competitiveness of their parliamentary constituency in the 2002 parliamentary election. These findings are robust to controlling for ethnic diversity, electoral competitiveness, and several other correlates of violence. There is also a positive interaction between a location's electoral pivotalness and the proportion of the population who are migrants, my proxy for opponents' propensity to return. This finding suggests that that the presence of migrants is especially problematic when they are more likely to sway elections.

Redistricting through violence is the most undertheorized way in which politicians can use violence to alter electoral outcomes, and this paper offers an account of the conditions under which they are likely to do so. Also, because political parties are poorly institutionalized in Kenya, this paper focuses on a decentralized form of redistricting that is rarely considered by the literature on the determinants of partisan or pro-incumbent gerrymanders (Galderisi 2005). Because it makes more sense to use violence to alter electoral constituencies in places with single-member first-past-the-post systems, the findings presented here further suggest that majoritarian electoral systems might not be suited to places where the population is segregated by political preferences and ethnicity. Therefore, this paper contributes to debates on the appropriateness of majoritarian institutions in ethnically divided societies (e.g. Reilly (2001), Horowitz (2002), Lijphart (2004), & Selway and Templeman (2012)).

The paper proceeds as follows. The following section presents a theory of conditions under which politicians will use violence to change electoral outcomes. Section 3 gives a brief historical

account of election-related violence in Kenya. Section 4 describes my empirical strategy, and Section 5 presents the main findings.

2 Violence and Electoral Geography

In this section, I describe the conditions under which politicians and their supporters are most likely to engage in violent redistricting within a country. I then describe the scope conditions under which we ought to observe violent redistricting.

If politicians and their supporters consider the potential outcome of future electoral contests when perpetrating violent acts, it should be the case they target those they expect are unlikely to support them in future electoral contests. If candidates with a capacity to carry out violence face opponents concentrated in certain areas, we ought to observe violence in (and displacement of opponents from) locations in which voters might influence the outcome of parliamentary elections. Therefore, violent expulsions are most likely to occur in locations that are pivotal, where voters can *influence* the outcome of parliamentary races (*Hypothesis 1*).

Exclusionary violence makes the most sense when the new demographic patterns it creates can be sustained. Therefore, if changing local demography is a primary objective of some perpetrators of violence, it ought to be the case that perpetrators of violent redistricting will target those with the lowest propensity to return (*Hypothesis 2*). Peoples' propensity to return once displaced varies considerably. Evidence from the former Yugoslavia and Colombia suggests that people with better outside options are most likely to remain permanently displaced (Engel and Ibez 2007, Kondylis 2008). In Kenya, individuals who do not own land have been less likely to return to their homes.

In addition, if perpetrators of violence are attempting to create winnable seats, migrants are more likely to be targeted in competitive electoral environments. Specifically, the incidence of violence will be highest in locations where residents can influence electoral outcomes *and* where opponents have a low propensity to return (*Hypothesis 3*).

In the empirical analysis that follows, I focus on migrants who, because they are more likely to have social ties elsewhere, have a lower propensity to return once displaced.[3] Jha (2009), argues that societies in which members of some ethnic groups ("non-locals") have relatively better outside options than others ("locals") are more likely to experience ethnic violence because perpetrators of violence can gain more by targeting "non-locals," who are more easily permanently expelled from an area. Although I focus on recent migrants, other characteristics, such as landlessness, may decrease the likelihood that a displaced person would return.

This paper explores whether electoral boundaries affect where violence occurs within one country. However, country-level variables, which are present in several new democracies, make it more likely that politicians will use violence to alter electoral geography. Redistricting through violence is more likely to occur where there is inequality across political groups in their capacity to use violence to displace their opponents or their propensity to remain displaced. Wilkinson (2004) notes that local Hindu-Muslim violence is more likely to occur when state-level politicians have an incentive to use law enforcement to stem riots. A low probability that perpetrators of violence will face formal sanctions makes *all* types of political violence more likely. In addition, violence is more likely to be used to arrange boundaries absent well-institutionalized parties and a regular process for revising the boundaries of electoral areas.

3 Political Violence and Ethnicity in Kenya

The section below describes the historical context for my empirical analysis of violent redistricting. I first describe the historical processes that produced ethnic geography and political alignments that preceded this political crisis in Rift Valley Province. I then describe the relationship between elections and political violence in Kenya. Finally, I explain why the construction of electoral areas in Kenya has been politically contentious.

[3] In the empirical analysis that follows, migrants are defined as people born outside of their district of residence in 1999.

3.1 The Historical Origins of Electoral Geography

Settlement patterns in Kenya have been greatly influenced by two closely-related colonial-era policies: the creation of ethnically exclusive "native" reserve areas and the alienation of land to European settlers.[4] The native reserves were designed to be ethnically exclusive and field administrators worked hard to expel "non-native" trespassers from the native reserves (Okoth-Ogendo 1991, Médard 1999). The creation of ethnically homogenous reserve areas suited both British administrators' normative belief that tribe and territory ought to coincide as well as the policy imperative to acquire land for European settlers. By the end of the colonial period, about half of the agricultural land in the country had been transferred to Europeans (Okoth-Ogendo 1991, Sorrensen 1968). Africans who did not work on European farms or in urban areas had to live in native reserves. These policies established a social norm that ethnicity is the primary aspect of identity that confers a right to reside (Médard 1999). In addition, both the impact of land alienation and the demand for arable land created by overcrowding on the reserves were distributed unevenly across ethnic groups.

In many African countries, the approach of the end of colonial rule caused contention over which groups would benefit most from independence. In Kenya the main political question of the terminal colonial period was how land alienated to Europeans would be allocated. Members of small ethnic groups feared that, without constitutional safeguards, both land in their native reserves and land they claimed in alienated areas in both Rift Valley and Coast provinces would be taken over by "invaders" from larger ethnic groups whose members had a higher demand for arable land (Anderson 2005). Of particular concern to both African politicians and the colonial authorities was the migration of Kikuyus, Kenya's most populous ethnic group, to the Rift Valley. Worried about both migration and their post-independence political careers, ethnic minority politicians from the Coast and Rift Valley provinces successfully negotiated for a federal constitution in which re-

[4]Land alienation took a different form on Kenya's coast due to the colonial government's decision to acknowledge only the property rights of Arab and Swahili landlords who were the subjects of the Sultan of Zanzibar in the "Ten-Mile Strip."

gional assemblies were granted the power to decide who would be settled on formerly alienated land. These federal arrangements were swiftly undermined by Kenya's first president, Jomo Kenyatta, an ethnic Kikuyu (Bates 1989, Gertzel 1970). The Kenyatta government also adopted a policy of market-based land allocation – the "willing buyer, willing seller" policy – which has been characterized by some scholars and politicians as a conspiracy of the rich against the poor and of the Kikuyu against other ethnic groups (ole Kantai 2004, Leo 1984, Oucho 2002, Njonjo 1978, Leys 1974).

Although ethnicity and land were contentious issues under President Jomo Kenyatta and his Kalenjin successor, Daniel arap Moi, these issues became more politically salient when multi-party politics was introduced after twenty-two years of single party rule. Prominent politicians affiliated with the ruling single party, the Kenya African National Union (KANU), in both Rift Valley and Coast provinces made several inflammatory statements calling for an ethnically exclusive form of federalism, in which all Kenyans would return to their "home" regions. In Rift Valley Province politicians called for the restoration of the area to members of the KAMATUSA (Kalenjin, Maasai, Turkana and Samburu) ethnic groups.

3.2 Democratization and Violence in Kenya

Both before and shortly after the 1992 and 1997 general elections, many prominent politicians from the Rift Valley and Coast organized ethnic clashes designed to expel persons seen as both "foreigners" and likely opposition voters. From 1991 to 1997, election-related ethnic clashes caused at least 2,000 deaths and displaced 400,000 people, some of whom still remain unable to return to their homes (Human Rights Watch 2002). These clashes were politically advantageous for both national and local politicians. The violence helped bolster President Daniel arap Moi's case that political liberalization would lead to chaos. Politicians, such as William ole Ntimama, Kipkalya Kones, and Julius Sunkuli, who were most responsible for ethnic clashes represented constituencies in which "foreigners" could influence electoral outcomes(Rutten 2001*b*, Kagwanja 1998, Klopp 2001).

After retaining power in both 1992 and 1997, KANU was eventually voted out in 2002 by a broad based political alliance. This governing coalition was short-lived, eventually splitting up over the presidential ambitions of several leaders. A contentious constitutional referendum in 2005 helped resurrect an old political alignment in the Rift Valley. The Kalenjin and the Kikuyu communities were divided by allegiance to two presidential candidates – the Orange Democratic Movement's Raila Odinga and President Mwai Kibaki's Party of National Unity (PNU) respectively.[5]

On December 30th 2007, Mwai Kibaki, the incumbent, was hastily sworn in as president after a long and contentious vote-tallying process. The opposition, Orange Democratic Movement (ODM), election observers and some NGOs argued that serious irregularities affected the presidential election. These allegations of fraud instigated a political crisis in which approximately 1,100 people were killed and 350,000 displaced from several parts of the country (Kenya National Commission on Human Rights 2008). Many people were victimized because of their ethnic identity; however, other kinds of violence occurred during the post-election period, including violent protests in opposition strongholds, a brutal police response to those protests, and, once the police had lost control, opportunistic violence by criminals. Although the causes and forms of the post-election violence nationwide were varied, in Rift Valley Province, the ethnic and partisan correlates of the violence were similar to those of earlier periods. First, in both clashes of the 1990s and of 2007/08, perpetrators of violence openly expressed a desire to send members of the Kikuyu and Kisii ethnic groups "home" and made statements indicating that their victims were being targeted for *both* their ethnicity and their political support for an opposing party (Kenya National Commission on Human Rights 2008).

In addition, violence was coordinated in some localities; and there is evidence that violence was planned *before* the election results were announced in some places (Government of Kenya

[5]Although members of ethnic groups other than the Kikuyu and Kalenjin were involved in violence in the Rift Valley, both as victims and perpetrators, I mention these two groups because members of other groups divided their allegiance across the main political parties (Bratton and Kimenyi 2008, Gibson and Long 2009).

2008, Kamungi 2009). Where violence was organized, it was characterized by localized centralization; prominent persons coordinated young men to attack neighborhoods and settlements.[6] As in previous episodes of violence, many of those most clearly associated with funding and coordinating the violence were local councilors and current or former members of parliament. Finally, violence and displacement were greater in localities with a history of ethnic violence.

3.3 Electoral Boundaries and Political Competition

Determining electoral boundaries is politically fraught in most democracies, but both history and political institutions make the demarcation of electoral boundaries especially contentious in Kenya. Members of parliament are elected using single member district plurality. Candidates go to extraordinary lengths to win seats because the benefits of office-holding are considerable and get larger every year. A cross-national study of legislators' salaries in Commonwealth countries in 2005 shows that Kenyan MPs were *by far* the best compensated legislators relative to GDP or other professional salaries (Behnke, Hamilton, Pagnac and Terrazas 2007). Kenyan MPs have access to an increasing number of discretionary funds that are directly or indirectly within their control.

Before the political crisis studied in this paper, Kenyan politicians could not *legally* change constituency boundaries to suit themselves. Constituency boundaries largely reflected a colonial-era boundary creation process in which constituencies were created within districts that represented "communities of interest," specifically ethnic groups (Great Britain. Kenya Constituency Boundary Commission 1962).[7] The electoral boundaries in place in 2007-08 were last modified in 1996 when the former ruling party (KANU) was still dominant. The 1996 revision of constituency boundaries increased the number of seats in areas supporting the governing party, but they also privileged

[6]The political violence was less one-sided in the 1990s than in 2007/08. In the 1990s, many of those complicit in the violence were chiefs and other civil servants and the security forces turned a blind eye. Whereas in 2007/08 the Kikuyu militia-sect *Mungiki* engaged in retaliatory attacks against opposition supporters, primarily Luos and Kalenjins in Kikuyu-majority parts of the Rift Valley (Human Rights Watch 2008, Kenya National Commission on Human Rights 2008).

[7]As a consequence, voters in densely populated areas continue to be under-represented (Barkan, Densham and Ruston 2006).

powerful individuals with close ties to the president (Rutten 2001*a*, Aywa and Grignon 2001).

Increased political competition at the national level after 1997 made it even harder for current and prospective MPs to lobby for their own electoral areas. The independence constitution mandated a boundary review in 2006, but this process failed because political parties could not agree.[8] In the period after the 2007/08 crisis, the delimitation of electoral boundaries was a protracted and highly controversial process. Politicians used both peaceful and violent means to ensure that the new constituency boundaries increased the representation of their own ethnic group.[9]

4 Empirical Strategy

I study the relationship between electoral geography and conflict in approximately 700 localities in Kenya's Rift Valley Province.[10] All outcomes are measured for administrative units called *locations*. Locations have an average an average population of 9,000 in the study region. Locations are the second smallest administrative unit in Kenya. Each location falls entirely within a district – the principle administrative jurisdiction – and a constituency – an electoral jurisdiction represented by a single Member of Parliament.[11] I describe my measures of the incidence of violence, electoral geography and local ethnic composition below.

4.1 Measuring Violence

The main variable of interest measures the number of people from each location in camps for internally displaced persons (*Number of IDPs*). These data come from an IDP profiling exercise

[8] See Battle Lines Drawn over New Constituencies Plan, *The Standard* (Nairobi), July 22, 2007

[9] The initial report of the Independent Electoral Boundaries Commission (IEBC) describes contention over constituency boundaries (IEBC 2012). Several ethnic groups challenged the demarcation of boundaries and their requests for judicial review were combined into a single case at the High Court (Cottrel-Ghai, Ghai, SingOei and Wanyoike 2012). The location of electoral boundaries also led to violence in parts of northern Kenya (Carrier and Kochore 2014).

[10] The study area excludes Samburu and Turkana districts. Although serious interethnic violence frequently occurs in these areas, the quality of electoral and other data is low.

[11] Summary statistics for other location-level variables can be found in Table A.1 in Appendix A.

carried out by the Kenya Red Cross and International Organization for Migration in March and April 2008, which collected data on roughly 75,600 IDPs in camps. Measuring violence at a highly disaggregated level is difficult and, as a consequence, most available measures are flawed. The IDP profiling exercise excludes IDPs who settled outside of camps, either staying with relatives or renting their own accommodation. However, IDPs who reside outside of camps are likely to be wealthier or have closer social ties outside of their location of origin and, therefore, IDPs in urban and in more recently settled areas are likely to be underrepresented.

To supplement the data on displaced persons' location of origin, I use satellite images of fires as a proxy for violent events. Data on fires come from daily images taken by two NASA satellites over the five weeks following the election (December 27, 2007 to January 31, 2008) and over the same period from 2002 to 2006 (NASA/University of Maryland 2002).[12] The burning of dwellings has traditionally been associated with exclusionary ethnic violence in the Rift Valley. The overall incidence of fires was higher in these five weeks in 2007/08 than in any of the previous five years. Figure 1 plots the count of fires each day after the election in 2007/08 and an average count of fires in the same five weeks for the previous five years. As Figure 1 shows, not only was fire incidence greater in 2007/08 than in earlier periods, but there were more fires in the immediate aftermath of the election. In 2007/08 fires occurred in unusual areas and were more likely to occur in Rift Valley Province, a fact noted by others (UNOSAT 2008, Anderson and Lochery 2008, Harris 2012). These spatial patterns are illustrated in Figure 2, which maps the location of fires across these five weeks in 2007/08 (in dark red) and 2006/07 (in light blue). Finally, many locations in Rift Valley Province in which ethnic violence had occurred before 2007 experienced a higher incidence of fires in 2007/08 and overall fire incidence was higher in 2007/08 than in the same period in the

[12]The active fire observations were generated in two stages. First, the satellites observe and record specific frequencies indicative of infra-red radiation. These thermal anomalies are fires but may also be emissions of hot gas or volcanic activity (Campbell 2007). Pixels on the satellite images are classified as containing an active fire using an algorithm developed and validated by Giglio, Descloitresa, Justice and Kaufman (2003), which considers the temperature of an area, the temperature of surrounding areas, and other factors. No fires will be observed in an area if it lies under cloud cover. However, as these events occur during the dry season, it is unlikely that many fires are missed and cloud cover is unlikely to be correlated with any of the explanatory variables of interest here.

preceding five years.

[Figure 1 about here]

[Figure 2 about here]

Although many fires observed by the satellite represent violent events, it is worth discussing what types of violence are captured here and what may have been omitted. Certain kinds of violence, such as police brutality or violent crime, are not represented. In Rift Valley Province fires are more likely to represent violent events. Data on criminal cases pending trial or under investigation for offenses committed during the post-election period indicate that cases involving arson were the most common case in Rift Valley Province; 89% of the 736 police cases in Rift Valley Province are for arson, as compared to 18% of 53 cases and 3% of 33 cases in Western and Nyanza Provinces respectively (Kenya Police). Locations that experienced inter-ethnic violence in the 1990s, as recorded in a government report (*The Akiwumi Report*), had a greater number of internally displaced persons originating from those locations (Government of Kenya 1999).

Because fires occur every year around this time, in some locations due to the nature of the landscape or agricultural practices, I minimize the problem of counting false-positives – recorded fires unrelated to post-election violence – by controlling for fires over the same five weeks in the previous five years. False negatives – election-related fires unobserved by the satellite – are also a possibility. To understand which instances of violence are under-represented by the fires data and which election-related fires may not be observed, I spoke to chiefs and other bureaucrats in Kericho and Trans Nzoia in August 2008 to get a sense of what they thought were the most violent locations. My impression, though it is not a systematic one, is that fires are more likely to be observed if there are several dwellings concentrated together.

4.2 Measuring Electoral Geography

To evaluate the likely effect of suppressing the votes in a specific administrative location (or of excluding certain locations from the constituency), we need a measure of the extent to which the political preferences of voters in a locality correlate with the preferences of voters in other localities within the same parliamentary constituency.

I measure the degree to which their presence in the location changes voting patterns in the constituency by comparing electoral competitiveness in the constituency with and without the votes cast in that location. A location's *Contribution to Constituency Competitiveness* is defined as the absolute value of the difference between the margin of victory in a parliamentary constituency excluding votes cast in a location and the margin of victory in the constituency. For location i, electoral influence is measured as follows:

$$Contribution\ to\ Constituency\ Competitiveness_i = |(p'_{1i} - p'_{2i}) - (p_1 - p_2)|$$

where p_1 and p_2 are the percent of the vote won by the first and second parliamentary candidates in a constituency respectively and p'_{1i} and p'_{2i} denote the vote share that would be won by the first and second candidates if votes from location i were not counted. If politicians and their supporters use violence to change electoral outcomes, there will be more violence in areas that contribute to the competitiveness of the constituency to a greater extent. I consider the absolute size of the change in competitiveness and not its direction because it is not clear whether leading or trailing candidates are more likely to engage in violence.

To measure the electoral competitiveness of each location and the degree to which voters in that location influenced constituency-level outcomes, I use voting data at the level of the polling station for a previous election. To measure voting patterns at this disaggregated level, I created a map

of approximately 17,500 polling stations.[13] I use data from 2002 because the results of the 2007 elections remain in dispute.[14] Clearly, no two elections are the same; national partisan coalitions and candidates' qualities change from one election to another.

4.3 Measuring Ethnic Composition

Our discussion has focused on how voting patterns may affect the local-level incidence of violence. However, because ethnic identity is highly correlated with partisanship I control for local ethnic composition. Because ethnic demography is politically sensitive, the Kenyan government has not released data on local ethnic composition since 1962. I use data from the 2006 Voter Register to measure local ethnic composition. The Register, which was publicly available, contains the names of registered voters and their polling station. Names in Kenya are associated with particular ethnic groups and are used socially as a gauge of ethnic identity. To match names to groups I calculated the probability that a person with that surname fell into an administrative location in which a group is over 90% of the population in 1962. Section B.2 in Appendix B discusses the construction and validity of this measure.

5 Findings

I use the simple linear specification below to estimate the relationship between electoral geography and violence.

$$Y_j = \beta_0 + \beta_1 Contribution\ to\ Constituency\ Competitiveness_j + \beta_2 Prop.\ Migrants_j$$
$$+\beta_3 Contribution\ to\ Competitiveness_j \times Prop.\ Migrants_j + \mathbf{X}_j\gamma + \epsilon_j$$

[13] See Section B.1 in Appendix B for details on constructing this dataset.

[14] Although electoral returns were available for parliamentary elections in 1997, the returns from 1997 are far less complete and credible than those for 2002.

where X_j is a vector of other variables correlated with violence and conflict-related displacement including: electoral competitiveness, area, population, altitude, average rainfall, proximity to a major road, land type, ethnic fractionalization, and the proportion of people living below the poverty line. Constructing these variables is described in Appendix B Section B.3.

Table 1 shows OLS regressions in which the log of the *No. of IDPs* is the outcome variable. Consistent with *Hypothesis 1*, more displaced persons come from electorally pivotal areas (Table 1). A standard deviation increase in a location's *Contribution to Constituency Competitiveness* (0.02) increases the number of IDPs in that location by 19% (Table 1, Column 1).

[Table 1 about here]

My measure of residents' likely propensity to return upon displacement is the proportion of people who were lifetime migrants in 1999, that is the share of people in the location who were born outside the district according to the 1999 Census. Contrary to *Hypothesis 2*, there is no relationship between the proportion of lifetime migrants (*Prop. Migrants*) and the incidence of displacement in that location (Table 1). A possible reason for this finding is that *Prop. Migrants* is highly correlated with whether a location falls in an area once alienated to European settlers (*Prop. Alienated*), a variable positively correlated with conflict-related displacement.

The evidence supports the claim that political violence most changes future electoral outcomes where residents have a lower propensity to return once displaced (*Hypothesis 3*). Table 1, Columns 3 shows a positive and statistically significant interaction between *Contribution to Constituency Competitiveness* and *Prop. Migrants*. This positive interaction is illustrated in Figure 3 which plots the coefficient and 95% confidence interval on *Contribution to Constituency Competitiveness* and shows that the effect of *Contribution to Constituency Competitiveness* increases as the share of migrants in a location increases.

It is worth considering reasons whether migrants might be targets for violence for reasons other than their electoral behavior. Internal migration by members of different ethnic groups may stand

in as a proxy for ethnic diversity.[15] Therefore, all regressions control for the ethnic fractionalization of a location.[16] In addition, internal migration may cause hostility where members of one group claim to be indigenous to an area. In their review of electoral violence in Africa, Straus and Taylor (2012) argue that violence occurs when politically important groups have disputes over local resources and one of those groups claims to be indigenous. On this account, migrants are targets for violence not because they have greater exit options, but because they inspire greater animus. However, arguments that focus on the special hostility that migrants may engender cannot fully account for the positive interaction between the share of migrants living in an area and electoral pivotalness.

I control for several correlates of *Contribution to Constituency Competitiveness* that could contribute to the incidence of conflict. Consistent with Wilkinson's (2004) findings on Hindu-Muslim violence in India, electoral competition within locations is associated with a higher incidence of conflict-related displacement. I control for urbanness in all models because people living in urban areas may be more mobile and often have different political preferences. If urban locations are dropped from the analysis, the main findings remain substantively the same (Table 2).

[Table 2 about here]

Electorally-pivotal locations may not share the demography of constituencies they are embedded in because they contain government-sponsored settlement schemes. Some authors have argued that settlement schemes are associated with violence because of grievances regarding the unjust location of land or because the land rights of residents are politicized (Government of

[15] Although the proportion of migrants in an area is correlated with ethnic diversity, many migrants moved to areas that were already ethnically heteregenous. Some violence-affected districts with high rates of post-colonial migration are little more diverse now than they were upon independence. Nakuru and Trans Nzoia districts had an ethnic fractionalization values in 1962 of 0.64 and 0.63 respectively and of 0.61 and 0.67 in 1989. (Kenya. Central Bureau of Statistics. Office of the Vice President. Ministry of Planning and National Development 1994, Republic of Kenya. Ministry of Agriculture and Rural Development 1964) The Kalenjin are counted as one group in the figures above although Kalenjin subgroups were recorded separately in the 1962 census.

[16] Controlling for a different dimension of ethnic demography, the geographic segregation of ethnic groups in a location, leaves the main results substantively the same (Table A.2, Appendix A).

Kenya 1999, Kanyinga 2000, Oucho 2002, Anderson and Lochery 2008, Boone 2014). To control for this possibility, I created a map of settlement schemes to control for whether a location contained a settlement scheme before 2007.[17] Controlling for other predictors of conflict, there is no evidence that conflict-related displacement is higher in locations containing a settlement scheme.

I've shown that the incidence of violence is affected by the geographic distribution of preferences. However, ethnicity and political preferences go together and it may be the case that locations with voting patterns different from those in the constituency in which such locations belong have a different ethnic composition. These locations may be more ethnically diverse. Besides controlling *Ethnic Fractionalization*, I measure how the ethnic diversity of a *constituency* would change if all voters from a location were removed from the constituency. For location i in a constituency demographic differences are measured :

$$Contribution\ to\ Constituency\ Ethnic\ Diversity_i = \sum_{j=1}^{N} s_j^2 - \sum_{j=1}^{N} s_{ji}'^2$$

where there are N ethnic groups in the constituency, s_j is the share of population of constituency belonging to group j and s'_{ji} is the share of the population in the constituency belonging to group j once the population of location i is excluded. This measure takes on a high value if the location is an ethnic enclave or if it is an especially diverse area embedded in a homogenous rural constituency.

Column 3 in Table 1 controls for *Contribution to Constituency Ethnic Diversity* and shows that conflict-related displacement is higher in locations that add to the ethnic diversity of the parliamentary constituency. Once this variable is included, the effect of *Contribution to Constituency Competitiveness* declines because of the close correlation of ethnicity and voting behavior. However, pivotalness remains a positive and statistically significant predictor of conflict-related displacement. The fact that the *Log. No. of IDPs* is higher in locations that increase the ethnic diversity

[17] Details on constructing the map of settlement schemes are in Appendix B, Section B.3.

of a constituency adds support to the claim that the boundaries of parliamentary constituencies affected where political violence occurs.

One way to evaluate whether parliamentary boundaries matter for where violence occurs is to focus on an election for which parliamentary jurisdictions are irrelevant – the presidency. Although Kenyans frequently support the same political party in presidential and parliamentary elections, voters sometimes split tickets. Therefore, we should expect that local electoral geography affects violence in parliamentary races but not in presidential ones. To evaluate this claim, I construct a measure that is identical to *Contribution to Constituency Competitiveness* for presidential elections in 2002. A comparison of Columns 3 and 4 in Table 1 demonstrates that the degree to which voters are pivotal in predicting which presidential candidate "wins" a parliamentary constituency is not positively correlated with conflict related displacement. This is the case although *Contribution to Constituency Competitiveness* and *Contribution to Constituency Competitiveness (Pres.)* are closely correlated ($\rho = 0.66$).

My second measure of local-level violence is the total brightness temperature (in degrees Kelvin) of the fires in a location over the five weeks following the election (*Log. Fire Brightness*). I use *Log. Fire Brightness* rather than a count of the number of fires because it allows for the estimation of a linear model.[18] Table 3 presents OLS regressions in which the outcome is *Fire Brightness*. Besides the controls in Table 1, these models control for variables that affect fire incidence, such as the average brightness temperature over the same five weeks in the previous five years, *Log. Average Rainfall*, *Prop. Forest*, and *Prop. Rangeland*.

[Table 3 about here]

Although the processes that cause arson differ from those that cause displacement, the results on *Log. Fire Brightness* are similar to those on *Log. Number of IDPs*. Although a location's *Contribution to Constituency Competitiveness* in its parent constituency has no statistically significant

[18]Table A.3 in Appendix A shows the results of poisson regressions in which the count of fires is the dependent variable and the main results are the same.

effect on fire incidence, the findings on *Ethnic Fractionalization*, *Winner Margin of Victory* and the interaction between *Contribution to Constituency Competitiveness* and *Prop. Migrants* are similar to the regressions on the *Log. No. of IDPs* (Table 3, Columns 1-3). As in the results on conflict-related displacement, presidential elections do not predict fire incidence at the local level (Table 3, Column 4).

6 Conclusion

Redistricting is one of several ways in which politicians may use violence to alter electoral outcomes, including directly coercing voters into supporting candidates they otherwise would not, indirectly altering voters' political preferences, and leaving voter preferences unaltered while suppressing turnout. This paper contributes to research on violent electoral strategies by examining the conditions under which violent redistricting is likely to occur. Politicians are more likely to use violence to gerrymander constituencies where members of political or ethnic groups vary in the degree to which they can be permanently displaced from an area and where legal alternatives to redistricting are unavailable. This theory leads to three observable implications. First, if politicians' supporters are geographically segregated, we ought to observe greater violence in electorally pivotal areas. Second, there will be more violence in areas where residents have a low propensity to return. Finally, electoral pivotalness will interact positively with residents' propensity to return.

I find that violence and population displacement during Kenya's post-election crisis occurred to a greater extent in locations that are pivotal to electoral outcomes; locations where redistricting would shift parliamentary results in their corresponding constituency to a greater degree. In addition, there is a positive interaction between the percentage of the proportion of the population who are migrants and the degree to which a location is pivotal. This evidence is, of necessity, indirect as the politicians involved prefer to view post-election violence as spontaneous and are unlikely to admit to the importance of constituency-level concerns if they discuss it.

Because the causes of the post-election crisis in Kenya are varied and complex, I demonstrate that my findings are robust by controlling for other common correlates of violence, including local ethnic diversity, local ethnic segregation, and local political competition. Moving from voting patterns to ethnic demography, the effect of the interaction between electoral pivoltalness and the proportion of the population who are migrants, decreases in size but remains statistically significant when the degree to which a location contributes to the ethnic diversity of a constituency is controlled for. The finding that there is more violence in locations which contribute to the ethnic diversity of a constituency further confirms that constituency-level politics affects where ethnic violence occurs.

This paper also has policy implications for institutional design in ethnically divided societies. Major changes in electoral law – such as an increase in the proportionality of the electoral system – are relatively rare events. However, smaller electoral reforms may reduce politicians' incentives to use violence to alter the composition of the electorate. It may make sense to allow people to vote outside their place of residence where political violence is likely to occur. Policymakers already consider how electoral rules affect the voting rights of the internally displaced (e.g. Grace and Mooney (2009)). However, the argument presented here suggests that election management bodies should be particularly concerned about displaced peoples' access to the polls in ethnically diverse places where one group has a greater capacity to relocate.

Figure 1: Fires by Day (December 27, 2007 to January 31, 2008)

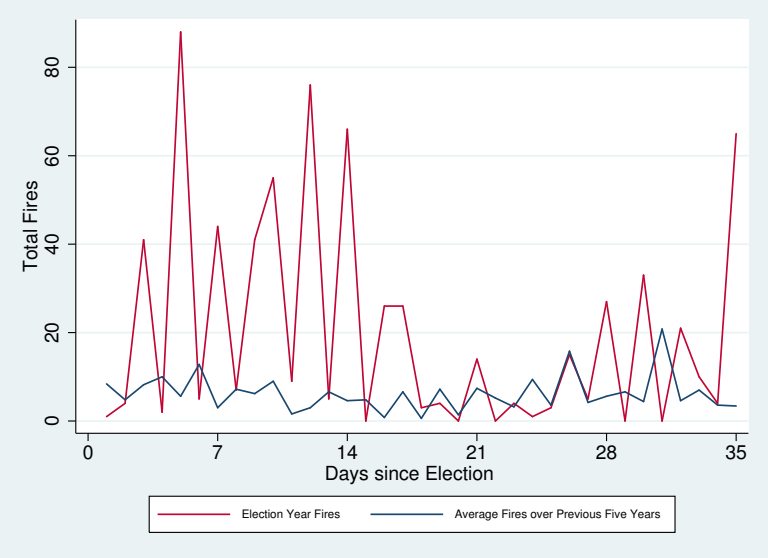

Figure 2: Fire Incidence from December 27th to January 31st in 2006/07 and 2007/08

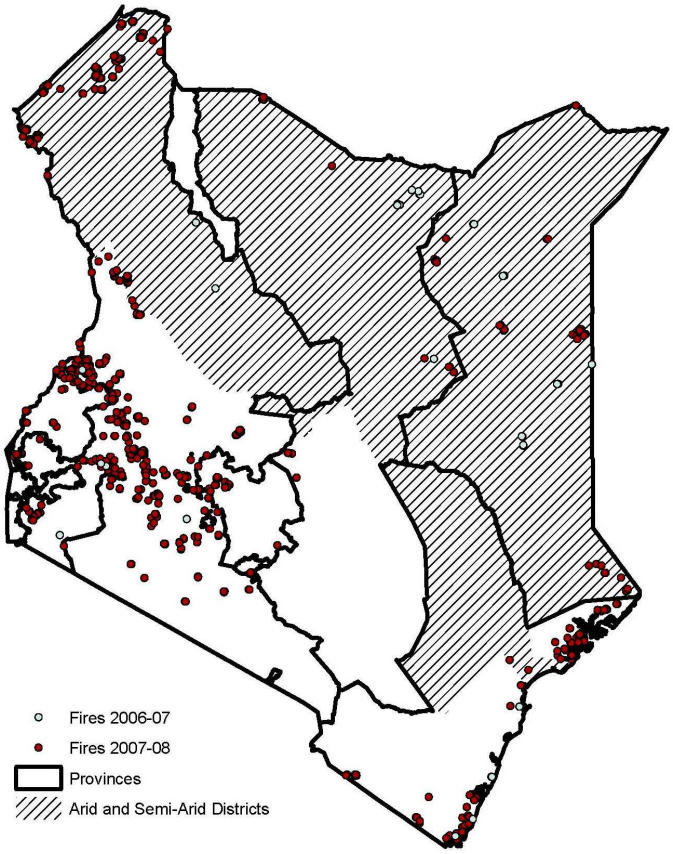

Table 1: *Log. Number of IDPs* from a Location

	[1]	[2]	[3]	[4]
Contribution to Constituency Competitiveness	8.91**	-5.55	-4.24	
	(4.00)	(6.22)	(6.22)	
Prop. Migrants	-0.11	-1.00	-0.90	-0.51
	(0.56)	(0.63)	(0.63)	(0.64)
Contribution x Prop. Migrants		54.09***	37.65**	
		(17.86)	(19.11)	
Contribution to Constituency Ethnic Diversity			8.13**	8.22**
			(3.44)	(3.69)
Contribution to Constituency Competitiveness (Pres.)				5.11
				(6.90)
Contribution (Pres.) x Prop. Migrants				12.41
				(20.28)
Margin of Victory	-0.99***	-1.00***	-0.91***	-0.88***
	(0.25)	(0.25)	(0.25)	(0.25)
Ethnic Fractionalization	1.31***	1.24***	0.93***	0.92***
	(0.32)	(0.32)	(0.34)	(0.35)
Alienated Area (1934)	1.41***	1.44***	1.49***	1.47***
	(0.16)	(0.16)	(0.16)	(0.16)
Urban Area	0.14	0.05	0.03	0.08
	(0.21)	(0.21)	(0.21)	(0.21)
Settlement Scheme	-0.39	-0.38	-0.38	-0.38
	(0.25)	(0.25)	(0.25)	(0.25)
Poverty Index	-1.58**	-1.68**	-1.63**	-1.57**
	(0.70)	(0.70)	(0.70)	(0.70)
Log. Distance to Road	-0.15***	-0.15***	-0.15***	-0.14***
	(0.05)	(0.05)	(0.05)	(0.05)
Log. Population	0.54***	0.55***	0.57***	0.53***
	(0.12)	(0.12)	(0.12)	(0.12)
Log. Area	-0.15***	-0.14**	-0.13**	-0.13**
	(0.06)	(0.06)	(0.06)	(0.06)
Intercept	1.14**	1.35***	1.26**	1.17**
	(0.49)	(0.50)	(0.50)	(0.50)
N	677	677	677	677
Adjusted R^2	0.36	0.37	0.38	0.38

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3: Interaction between Migration and Electoral Influence

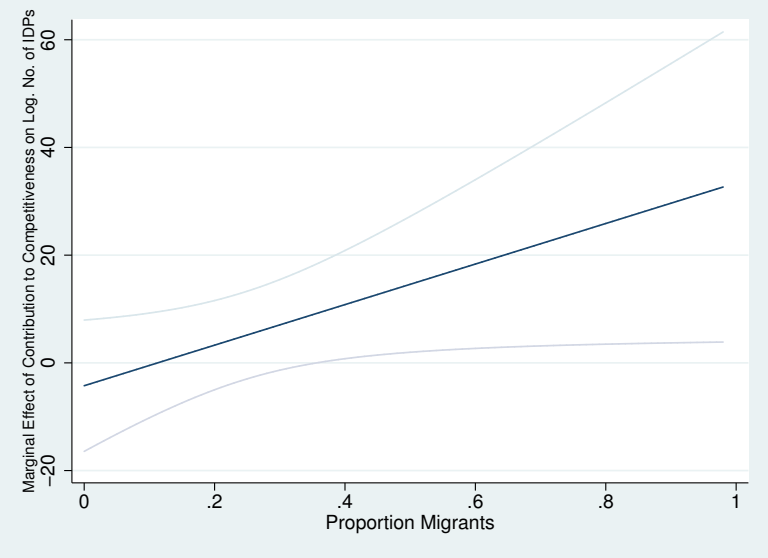

Table 2: Rural Locations Only

	[1]	[2]	[3]	[4]
Contribution to Constituency Competitiveness	5.53	-12.62*	-12.59*	
	(4.74)	(6.98)	(6.98)	
Prop. Migrants	1.10*	-0.54	-0.56	0.60
	(0.58)	(0.74)	(0.74)	(0.70)
Contribution x Prop. Migrants		125.04***	123.44***	
		(35.56)	(35.68)	
Contribution to Constituency Ethnic Diversity			3.27	1.71
			(5.49)	(5.72)
Contribution to Constituency Competitiveness (Pres.)				4.14
				(7.25)
Contribution (Pres.) x Prop. Migrants				32.85
				(29.61)
Margin of Victory	-0.50**	-0.59**	-0.58**	-0.52**
	(0.25)	(0.24)	(0.24)	(0.24)
Ethnic Fractionalization	1.13***	1.09***	0.98***	1.01***
	(0.32)	(0.32)	(0.36)	(0.36)
Alienated Area (1934)	1.21***	1.21***	1.23***	1.22***
	(0.17)	(0.17)	(0.17)	(0.17)
Settlement Scheme	-0.48**	-0.45*	-0.45*	-0.46*
	(0.24)	(0.24)	(0.24)	(0.24)
Poverty Index	-1.29*	-1.45**	-1.44**	-1.28*
	(0.72)	(0.71)	(0.71)	(0.72)
Log. Distance to Road	-0.12**	-0.13**	-0.12**	-0.11**
	(0.05)	(0.05)	(0.05)	(0.05)
Log. Population	0.52***	0.49***	0.49***	0.48***
	(0.13)	(0.13)	(0.13)	(0.13)
Log. Area	-0.09	-0.10*	-0.10*	-0.09
	(0.06)	(0.06)	(0.06)	(0.06)
Intercept	0.50	0.97*	0.95*	0.61
	(0.49)	(0.50)	(0.50)	(0.50)
N	587	587	587	587
Adjusted R^2	0.32	0.34	0.34	0.33

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Election Year *Log. Fire Brightness (K)* in Location

	[1]	[2]	[3]	[4]
Contribution to Constituency Competitiveness	-2.26	-18.32**	-18.66**	
	(5.23)	(8.21)	(8.25)	
Prop. Migrants	-0.58	-1.55*	-1.57*	-1.05
	(0.74)	(0.83)	(0.83)	(0.84)
Contribution x Prop. Migrants		59.80**	63.82**	
		(23.61)	(25.35)	
Contribution to Constituency Ethnic Diversity			-1.98	-2.02
			(4.52)	(4.88)
Contribution to Constituency Competitiveness (Pres.)				-5.37
				(9.14)
Contribution (Pres.) x Prop. Migrants				32.20
				(27.10)
Margin of Victory	0.01	0.02	-0.01	-0.02
	(0.33)	(0.33)	(0.33)	(0.33)
Ethnic Fractionalization	1.11***	1.03**	1.10**	1.13**
	(0.43)	(0.43)	(0.46)	(0.46)
Alienated Area (1934)	0.84***	0.87***	0.86***	0.85***
	(0.22)	(0.22)	(0.22)	(0.22)
Urban Area	0.00	-0.08	-0.08	-0.03
	(0.28)	(0.28)	(0.28)	(0.28)
Settlement Scheme	-1.54***	-1.53***	-1.53***	-1.53***
	(0.33)	(0.33)	(0.33)	(0.33)
Poverty Index	-1.74*	-1.90**	-1.91**	-1.86**
	(0.92)	(0.92)	(0.92)	(0.93)
Log. Distance to Road	-0.20***	-0.21***	-0.21***	-0.19***
	(0.07)	(0.07)	(0.07)	(0.07)
Log. Population	-0.02	-0.03	-0.04	-0.11
	(0.18)	(0.18)	(0.18)	(0.19)
Log. Area	0.47***	0.52***	0.52***	0.51***
	(0.13)	(0.13)	(0.13)	(0.13)
Log. Five-Year Fire Brightness Average	0.33***	0.32***	0.32***	0.33***
	(0.04)	(0.04)	(0.04)	(0.04)
Prop. Rangeland	-0.29	-0.33	-0.35	-0.42
	(0.73)	(0.73)	(0.73)	(0.74)
Forest PC	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log. Rainfall	0.81**	0.95**	0.95**	0.85**
	(0.38)	(0.38)	(0.39)	(0.39)
Intercept	-4.03**	-4.49**	-4.49**	-4.10**
	(1.99)	(1.99)	(1.99)	(1.99)
N	677	677	677	677
Adjusted R^2	0.23	0.24	0.24	0.23

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Supporting Information Appendix

A Extra Tables

Table A.1: Descriptive Statistics

Variable	*Mean*	*SD*	*N*
No. of IDPs from Location in Camps	85.1	502.8	719
Election Year Fires	0.43	1.59	719
Five Year Fire Average	0.13	0.47	719
Election Year Fire Brightness (K)	142.4	528.7	719
Five-Year Fire Brightness	43.0	156.6	719
Ethnic Fractionalization	0.24	0.23	717
Margin of Victory	0.37	0.26	716
Proportion Migrant	0.20	0.17	719
Contribution to Constituency Competitiveness	0.02	0.02	680
Contribution to Constituency Competitiveness (Pres.)	0.01	0.02	717
Contribution to Constituency Ethnic Diversity	0.00	0.02	717
Urban	0.13	0.33	719
Alienated Area	0.38	0.48	719
Settlement Scheme	0.07	0.25	719
Headcount Poverty Index	0.48	0.09	716
Distance to Major Road (km)	12.0	12.3	719
Population in 1999	8.9	9.3	719
Area in 1999 (km^2)	129.4	200.5	719
Proportion Rangeland	0.08	0.14	719
Proportion Forest	29.7	30.9	719
Average Monthly Rainfall (mm)	101.6	29.8	719

Table A.2: IDP – Including Ethnic Segregation

	[1]	[2]	[3]	[4]
Contribution to Constituency Competitiveness	9.21**	-5.72	-4.43	
	(4.00)	(6.20)	(6.20)	
Prop. Migrants	-0.05	-0.97	-0.87	-0.50
	(0.56)	(0.63)	(0.63)	(0.64)
Contribution x Prop. Migrants		55.94***	39.76**	
		(17.83)	(19.08)	
Contribution to Constituency Ethnic Diversity			7.99**	7.83**
			(3.43)	(3.69)
Contribution to Constituency Competitiveness (Pres.)				4.80
				(6.88)
Contribution (Pres.) x Prop. Migrants				15.87
				(20.29)
Margin of Victory	-0.93***	-0.93***	-0.84***	-0.82***
	(0.25)	(0.25)	(0.25)	(0.25)
Ethnic Fractionalization	1.17***	1.08***	0.78**	0.78**
	(0.33)	(0.33)	(0.35)	(0.35)
Alienated Area (1934)	1.38***	1.41***	1.46***	1.44***
	(0.16)	(0.16)	(0.17)	(0.17)
Urban Area	0.17	0.07	0.06	0.10
	(0.21)	(0.21)	(0.21)	(0.21)
Settlement Scheme	-0.38	-0.37	-0.38	-0.37
	(0.25)	(0.25)	(0.25)	(0.25)
Poverty Index	-1.50**	-1.59**	-1.55**	-1.49**
	(0.70)	(0.70)	(0.69)	(0.70)
Log. Distance to Road	-0.14***	-0.14***	-0.14**	-0.13**
	(0.05)	(0.05)	(0.05)	(0.05)
Log. Population	0.52***	0.53***	0.55***	0.52***
	(0.12)	(0.12)	(0.12)	(0.12)
Log. Area	-0.17***	-0.15***	-0.14**	-0.15**
	(0.06)	(0.06)	(0.06)	(0.06)
Segregation (Theil's Index)	1.81**	1.94**	1.90**	1.94**
	(0.90)	(0.90)	(0.89)	(0.90)
Intercept	1.04**	1.25**	1.16**	1.08**
	(0.49)	(0.50)	(0.50)	(0.50)
N	677	677	677	677
Adjusted R^2	0.37	0.38	0.38	0.38

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Count of Fires (Poisson)

	[1]	[2]	[3]	[4]
Contribution to Constituency Competitiveness	4.67	-10.11	-9.97	
	(3.25)	(6.37)	(6.40)	
Prop. Migrants	-1.73***	-2.72***	-2.74***	-2.31***
	(0.60)	(0.71)	(0.71)	(0.75)
Contribution x Prop. Migrants		49.06***	47.78***	
		(16.12)	(17.04)	
Contribution to Constituency Ethnic Diversity			0.62	-0.08
			(2.66)	(2.72)
Contribution to Constituency Competitiveness (Pres.)				-0.28
				(6.44)
Contribution (Pres.) x Prop. Migrants				27.83
				(19.24)
Margin of Victory	-0.53*	-0.56**	-0.55*	-0.49*
	(0.28)	(0.28)	(0.29)	(0.28)
Ethnic Fractionalization	1.30***	1.21***	1.19***	1.24***
	(0.33)	(0.33)	(0.35)	(0.35)
Alienated Area (1934)	1.74***	1.83***	1.84***	1.76***
	(0.20)	(0.20)	(0.21)	(0.21)
Urban Area	-0.12	-0.20	-0.20	-0.17
	(0.16)	(0.17)	(0.17)	(0.17)
Settlement Scheme	-1.90***	-1.90***	-1.90***	-1.89***
	(0.42)	(0.42)	(0.42)	(0.42)
Poverty Index	-1.49*	-1.49*	-1.49*	-1.64**
	(0.84)	(0.82)	(0.82)	(0.82)
Log. Distance to Road	-0.21***	-0.21***	-0.21***	-0.21***
	(0.05)	(0.05)	(0.05)	(0.05)
Log. Population	-0.32**	-0.33**	-0.33**	-0.39***
	(0.13)	(0.14)	(0.14)	(0.14)
Log. Area	0.91***	0.98***	0.98***	0.94***
	(0.11)	(0.11)	(0.11)	(0.11)
Log. Five-Year Fire Brightness Average	0.37***	0.37***	0.37***	0.40***
	(0.05)	(0.05)	(0.05)	(0.05)
Prop. Rangeland	-0.63	-0.78	-0.77	-0.69
	(0.55)	(0.56)	(0.56)	(0.55)
Prop. Forest	-0.01**	-0.01**	-0.01**	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Log. Rainfall	0.64**	0.72**	0.70**	0.61**
	(0.29)	(0.29)	(0.30)	(0.29)
Intercept	-6.86***	-7.13***	-7.08***	-6.51***
	(1.54)	(1.54)	(1.56)	(1.55)
N	677	677	677	677
AIC				

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Data Appendix

B.1 Polling Stations and Electoral Returns

Frequent changes in administrative jurisdictions that are uncoordinated across administrative agencies present a major challenge to measuring local-level electoral outcomes. I use polling stations to construct local-level aggregates because they are fixed points in space. I created a map of polling stations drawing on two sources. First, I acquired large scale paper maps (on a scale of 1:50,000 or larger) covering 175 local authorities from the Electoral Commission of Kenya in 2007. These paper maps were constructed by the Electoral Commission for administrative purposes and, at that time, the Electoral Commission was a more credible source of data on both electoral and administrative boundaries than other government agencies. These maps were georeferenced, and the polling stations were plotted from these maps. Because many polling stations are primary schools, I also used data from a survey of schools done by the Ministry of Education. The final dataset covers 97% of the 14,000 polling stations in existence in 2002 and 83% of the 21,000 polling stations in the 2006 Voter Register.

B.2 Estimates of Local Ethnic Composition

Given the unavailability of disaggregated census data on ethnic composition, I construct estimates of ethnic composition at the location level in 2006 by using the 2006 Voter Register and location-level data from the 1962 census. Names in Kenya are associated with particular ethnic groups and are used socially as a gauge of ethnic identity. [19]

To match names to groups, one would like to calculate the probability that a person is a member of each ethnic group (g_i) given their last name ($P(g_i|Name)$). However, it is not possible to calculate this probability given the data [20]Instead, I calculate the probability that a person having that name falls into an ethnically homogenous administrative location in 1962 and then use these probabilities to match names to groups.

For each of the approximately 500,000 unique name strings in the register I calculate the probability that a person holding it is resident in a location (s_i) where members of ethnic group g_i were a *supermajority* in 1962 ($P(s_i|Name)$). This probability is calculated for each of the groups in the dataset and names were matched to groups where this probability is highest.

The probability that a person with some name is resident in an area s where group g has a supermajority is

$$P(s_i|Name) = \frac{n_s}{n}$$

[19]A few other studies use voter registers and match names to groups including Field, Levinson, Pande and Visaria (2008) in Ahmedabad, India.

[20]Enos (2010) takes this more direct approach, using Bayes' Rule to update the initial probability that a person with a surname is of a race based on the racial demographics of the census block in which they are resident. However, this method could not be used here because he takes initial probability that a name belongs to some racial group from a list of surname counts by race published by the U.S. Census Bureau, and there is no such list for Kenyan names. There is no way of calculating $P(Name|g_i)$.

where n is the number of registered voters with the last name and n_s is the number of registered voters with that name in area s.

Supermajority areas are defined using the 1962 census, which is the last period for which fine-grained data on ethnic composition is available. Because this ethnicity data was in tabular form, I constructed a map of local-level units in 1962 (Republic of Kenya 1964).

To match names to groups, it is necessary to choose both a threshold for what counts as a supermajority area and a rule for assigning names to groups. I use a conservative threshold of 90%. Using this rule, there are 310 supermajority locations, comprising 73% of all locations. I matched names to these groups Embu, Kalenjin, Kikuyu, Kamba, Luhya, Luo, Maasai, Mbeere, Meru, Mijikenda, Orma, Pokomo, Taita, Teso, and Tharaka. Groups were matched to names with the highest value of $P(s_i|Name)$ only if this probability was over three times larger than the probability for the group with the second highest probability to reduce the possibility of misclassifying ethnically ambiguous names.

One way in which to evaluate the method I use to match names to groups is to examine some relatively common Kenyan names. Figure B.1 plots $P(s_i|Name)$ for each of the ethnic groups in the dataset for some sample names. Some names that Kenyans typically associate with particular groups are well-matched in the dataset , for example, the names Oluoch and Simiyu (See Figure B.1). This method also distinguishes between names associated with particular groups but which sound very similar (See the plots for the names Bosire and Chesire and Ndegwa and Ndwiga). As is desirable, a name like Mohammed, which is held by Kenyans with a Muslim heritage from many ethnic groups, shows no peak in $P(s_i|Mohammed)$ and would remain unmatched. However, although the rules I chose are supposed to throw out ethnically ambiguous names like Mohammed, it will create matches if names are *shared* but some groups have a larger population and a greater propensity to use that name. The name Maina, which is matched with the Kikuyu by the rules I adopted, is also known as a Luhya, Kisii and Kalenjin name. However, there are few names like this.

B.3 Other Variables

- Data on *Area*, and *Population*, and *Proportion Migrants* come from the 1999 Census.
- *Proportion Migrants* is the share of the population in a district that was born outside the district as defined in 1999. Data come from the 1999 Census.
- *Distance to a Major Road* was calculated from a map of major roads (International Livestock Research Institute (ILRI) 2007).
- *Poverty Headcount Index* is the proportion of the population in a location who are underneath the poverty line. The data come from the Kenyan National Bureau of Statistics (KNBS).
- *Settlement Scheme* equals 1 if a settlement scheme covers over 30% of the area of a location. This variable was constructed using a map of settlement schemes. A map was created using a list of settlement schemes created before 2007 I acquired from the Kenya Ministry of Lands and Settlement, and maps of settlement schemes produced by the Settlement Fund

Trustees (Survey of Kenya 1965, Rutter 1971). Additional settlement schemes were found using a map of cadastral boundaries in 1964 and the U.S. Geological Survey (USGS) board on geographic names (BGN).

- *Alienated Area* equals 1 if over 30% of a location is classified as alienated to Europeans in the Carter Land Commission Report (Kenya Land Commission 1934).

- Variables measuring landcover in a location (e.g. *Urban* and *Proportion Rangeland*) were created using remote sensed data on landcover (Department of Resource Surveys and Remote Sensing (DRSRS). Ministry of Environment and Natural Resources 2003).

- *Average Monthly Rainfall* in a location was estimated using monthly rainfall data for 48 rainfall stations across Kenya from 1988 to 2007, obtained from the Kenya Meteorological Department. Location-level rainfall estimates were generated in ArcGIS using spatial interpolation.

Figure B.1: Sample Names