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THE VALUE OF DEMOCRACY:  
EVIDENCE FROM ROAD BUILDING IN KENYA

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**ABSTRACT**

Ethnic favoritism is seen as antithetical to development. This paper provides credible quantification of the extent of ethnic favoritism using data on road building in Kenyan districts across the 1963-2011 period. Guided by a model it then examines whether the transition in and out of democracy under the same president constrains or exacerbates ethnic favoritism. Across the 1963 to 2011 period, we find strong evidence of ethnic favoritism: districts that share the ethnicity of the president receive twice as much expenditure on roads and have four times the length of paved roads built. This favoritism disappears during periods of democracy.

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An online appendix is available at:  
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# 1 Introduction

Ethnic favoritism refers to a situation where coethnics benefit from patronage and public policy decisions, and thus receive a disproportionate share of public resources, when members of their ethnic group control the government. It has been argued by historians, political scientists, and economists that this phenomenon has hampered the economic performance of many countries, particularly in Africa (Bates 1983; Mamdani, 1996; Easterly and Levine 1997; Herbst, 2000; Posner, 2005; Franck and Ranier, 2012).<sup>1</sup> In fact, the widespread belief among citizens that ethnic favoritism is prevalent can “poison” local political culture and make the phenomenon self-sustaining (see Horowitz’s 1985; Esman 1994; Fearon 1999; La Porta et al 1999; Wamwere 2003; Chandra 2004; Padró i Miquel 2007; Caselli and Coleman 2013).<sup>2</sup> According to several of these accounts, ethnic favoritism ultimately emerges because weak political institutions are unable to constrain governments from discriminating among citizens. Therefore, to understand the recent political and economic performance of many African countries, it is crucially important to determine to what extent ethnic favoritism is prevalent, and whether the emergence (or in many cases, re-emergence) of democracy has helped mitigate it.

In this paper we make two contributions. First, we quantify the extent of ethnic favoritism in public resource allocation in a representative African country for the post-independence period. Second, we examine whether the transition into and out of multiparty democracy affects the extent of ethnic favoritism.

These issues have been difficult to address so far due to a number of factors. To begin with, it is challenging to determine which ethnic group is getting what share of public expenditure. This problem is particularly acute in Africa where government statistical agencies have been underfunded for decades, where data on the allocation of government spending is typically patchy at best and where, even when the data does exist, there is a reluctance to release disaggregated data that could allow the populace to uncover evidence of ethnic favoritism. Moreover, estimation of ethnic bias requires observing what happens with public expenditure when there are switches of the ethnic group in power. In many African countries this is difficult given the long tenures of post-independence leaders and the fact that particular ethnic groups have tended to be

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<sup>1</sup>Easterly and Levine (1997) present econometric evidence evidence that ethnic diversity is negatively associated with economic growth. Mamdani (1996) argues that nation creation by colonists in Africa left tribal allegiances largely intact which, in turn, made countries difficult to govern in the post-colonial world. Herbst (2000) points to improper design of national borders leading to ethnic strife and the inability of African countries to develop the necessary fiscal capacity to support economic development. For other recent studies linking ethnic composition with economic performance, see for instance Alesina et al 2003; Alesina and La Ferrara 2005; Alesina et al 2012; Miguel and Gugerty 2005; Nunn and Wantchekon 2011; Michalopoulos and Papaioannou 2011.

<sup>2</sup>Horowitz’s (1985) voluminous scholarly work highlights that ethnicity is a powerful force in the politics of divided societies and observes that these have profound effects on the prospects for democracy, economic development and the distribution of public goods. Specifically, Esman (1994) observes that “when an ethnic group gains control of the state, important economic assets are soon transferred to the members of that community”.

dominant for extended periods. Finally, to estimate the impact of institutional changes such as democratization on ethnic favoritism one would ideally observe switches between democracy and autocracy under the same leader, which is far from common.

To address these difficulties we pick an appropriate context: road building across Kenyan districts. This setting is attractive for a number of reasons. First, there is dramatic ethnic segregation across districts in Kenya, which is the result of the design of colonial era borders in the period before Kenya's independence in 1963. Each post-independent district was dominated by a single ethnic group, and this pattern remains stable over time. Therefore we can directly assess, using road spending or road construction by district, whether or not ethnic groups which shared the ethnicity of the president disproportionately benefited from roads.

Second, road expenditure can be directly measured. We have carried out extensive historical archival work to recover road expenditure data at the project level. This has enabled us to construct district level panel data on road expenditure for all 41 Kenyan districts across the entire post-independence period, 1963-2011. In addition, we have constructed a panel of road presence in each of the 41 Kenyan districts using historical maps. We can therefore cross-check the district road expenditure data (from the road projects) with the district road construction data (from the maps). Having this level of detailed data on two independent measures of the same public good is extremely rare in low-income countries, particularly in Sub-Saharan Africa.

Third, roads are the largest single element of public expenditure in Kenya, constituting about 15% of total expenditure over our sample period. This is three times what the Kenyan central government spends on health, education or water. Roads expenditure is centrally allocated and a highly visible form of public investment and thus a prime area for political patronage. Road building, therefore, represents an ideal setting in which to carry out an analysis of ethnic favoritism.<sup>3</sup>

Fourth, the post-independence history of Kenya provides us both with switches in the ethnicity of the president, and switches into and out of multiparty democracy under the same president. During our study period, we observe (i) a transition into autocracy from democracy under the first President of Kenya (Jomo Kenyatta, an ethnic Kikuyu), (ii) a transition from a Kikuyu President to a Kalenjin President (Daniel arap Moi) under an autocratic regime (iii) a transition out of autocracy into democracy under Moi, and (iv) a democratic succession of a Kalenjin President to a Kikuyu President (Mwai Kibaki). These changes both in the ethnicity of the president and in the political regime allow us to identify the effect of political transitions on ethnic favoritism holding the identity of the leader constant.

Fifth, as is apparent in Figure 1, democratic change in Kenya mirrors the pattern

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<sup>3</sup>Furthermore, a new literature (see Michaels 2008; Donaldson 2012; Faber 2012) shows that, by facilitating trade, roads and other forms of transportation infrastructure can boost economic performance. Better connected districts in Kenya might therefore carry a growth advantage.

seen across Sub-Saharan Africa. Kenya, like many African countries, was reasonably democratic post-independence in the 1960s, became autocratic in the 1970s and 1980s, and then returned to democracy in the 1990s and 2000s. Our results for Kenya might thus provide insights into the broader post-independence pattern of economic and political development across Sub-Saharan Africa. For example, if we find that democracy has value in terms of imposing constraints on the executive (which in turn limits ethnic favoritism), then this might help explain why economic growth has been higher in democratic (1960s, 1990s, 2000s) relative to autocratic (1970s, 1980s) periods. We return to a discussion of this issue in the conclusion to this paper.

Our unique set-up therefore allows us to assess whether there is ethnic favoritism in roads investment, to quantify the magnitude of this effect, and to estimate the extent to which favoritism is affected by democratization. To help us interpret our results, we set up a model of centralized presidential public resource allocation across districts. The model shows how the degree of ethnic favoritism is determined by the constraints on executive action that characterize different political regimes. Our empirical results can therefore be directly linked to the magnitude of ethnic favoritism and to the constraints on the executive as captured in the model, providing novel theoretically-grounded quantitative evidence on the extent of these phenomena.

What we find is striking. Across the 1963 to 2011 period, Kenyan districts that share the ethnicity of the president receive twice as much expenditure on roads and have four times the length of paved roads built relative to what would be predicted by their population share. This is unequivocal evidence of an extreme degree of ethnic favoritism. However, these biases are not constant. While in periods of autocracy, coethnic districts receive three times the average expenditure in roads and five times the length of paved roads, both these biases disappear entirely during periods of democracy. Thus, the political regime is an important determinant of ethnic favoritism. We subject these results to several robustness checks and show that they hold both with the project level expenditure data and with the historical map data. Our results are also robust to using different normalizations and measures of coethnicity.

These results suggest that even “imperfect” democratic institutions, like those found in Kenya during the 1960s, 1990s and 2000s, have value by imposing constraints on the executive.<sup>4</sup> A key insight from our theoretical model is that these constraints prevent politicians from taking decisions which, though optimal for the leader concerned, run counter to citizens interests and economic efficiency. In the context of the many African countries where presidential power has an ethnic base, this may translate to lessened favoritism towards coethnics during periods of democracy as political leaders are forced to share public goods across the wider population.

Closer examination of recent Kenyan history sheds light on how the re-emergence

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<sup>4</sup>Indeed, we show that the executive constraint parameter derived from our model (and estimated using our data) moves in parallel with Polity IV measures of constraints on the executive.

of multiparty democracy in the 1990s changed the nature of constraints on Kenyan leaders and altered the allocation of public resources. Multiparty democracy heralded an increase in mass political participation as well a lessening of constraints on popular expression, including by increasingly vocal civil society groups. There was a reduction in press censorship, and an explosion of private print and electronic media. These changes led to far greater scrutiny of the actions of executive authorities starting in the 1990s, which helps make sense of why ethnic favoritism was dramatically reduced during periods of multiparty democracy.

This paper contributes to a small but growing body of studies trying to estimate the extent of ethnic favoritism. Following on Kudamatsu's (2012) work, Frank and Rainer (2012) use the Demographic and Health Surveys to construct retrospective time-varying ethnic-level measures of educational and health attainment for 18 countries. They show that the ethnic identity of the president is correlated with higher coethnic attainment in these dimensions. Kramon and Posner (2012) use a similar technique to focus on the Kenyan case and trace whether the ethnic identity of key ministers matters for education. Hodler and Raschky (2011) use light images from satellites to see whether the birth regions of national leaders are favored when they take power and whether this effect is more muted under democracy versus autocracy.<sup>5</sup> Our paper advances this literature by directly measuring public investment in road building rather than relying on living standard outcomes such as health and education attainment where many factors (beyond public investment) are involved in determining the outcome measure. Developing a framework of presidential allocation of public good across districts allows us to link constraints on the executive with ethnic favoritism. We can derive estimates of these constraints from the model (for different presidential regimes) which we can then compare to the Polity IV constraints on the executive score for Kenya across time. The construction of independent series on road expenditure and road length for all Kenyan districts across the 1963 to 2011 is thus a key contribution of the paper. This data, coupled with changes in presidential ethnicity and in political regime is critical to our ability to determine the extent of ethnic favoritism in road building and whether it is affected by moves into and out of multiparty democracy.

The remainder of the paper is organized as follows. Section 2 provides a theoretical framework. Section 3 presents the historical background on roads and politics in Kenya and the data collected. Section 4 presents the methods, results and discusses and interprets these findings in light of our model and recent Kenyan history. Section 5 concludes and links our results to the broader literature on the effect of ethnic diversity on economic growth.

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<sup>5</sup>Morjaria (2012) looks at whether deforestation and land encroachment in Kenyan forests became more or less pronounced after the return to multi-party democracy in 1992.

## 2 Theoretical Framework

Consider a repeated economy populated by infinitely lived agents that discount the future at rate  $\delta$ . There is a continuum of citizens of size 1. Citizens belong to one of two ethnic groups,  $i \in \{A, B\}$ , and the population share of group  $A$  is  $\pi^A$ . These two groups live in two separate districts, and each group also has an infinitely countable set of potential country presidents. At any point in time, one of these presidents is in power and they are all identical except for their ethnic identity. We thus have two types of presidents,  $j \in \{A, B\}$ . The president in power decides on taxation  $\tau$ , and on the amount of district-specific public goods to be provided. Denote by  $\eta^{ij}$  the per capita public goods expenditure that group  $i$  receives if the president belongs to group  $j$ .

For simplicity, we assume that the president can only charge a lump-sum tax  $\tau$  on all citizens and cannot use taxation to discriminate across groups.<sup>6</sup> The president can direct spending to his preferred district, but is limited by institutional and societal constraints. Following Besley and Persson (2010) we capture these constraints on the executive in a simple way as follows:

$$\eta^{ij} \leq \theta (\pi^A \eta^{Aj} + \pi^B \eta^{Bj}) \quad (1)$$

where  $\theta \in [1, \infty]$  denotes the weakness of constraints on the executive. This formulation ensures that per capita spending in favor of group  $i$  cannot exceed average per capita spending by more than a factor  $\theta$ . If  $\theta = \infty$ , institutions are so weak that they do not constrain the president in any way and all spending can be targeted to one district. At the opposite extreme,  $\theta = 1$  implies that no discrimination across districts is possible.

We assume that electoral institutions are also relatively weak, and the active support of one's coethnics is necessary to keep power.<sup>7</sup> As in Padró i Miquel (2007), we assume that an acting president who receives the support of his ethnic group has strong incumbency advantage and stays in power with probability  $\bar{\gamma}$ . In contrast, if the acting president does not receive coethnic support, he loses power with probability 1. In this case, an open succession follows, and the new ruler belongs to the same ethnic group as the ousted president with probability  $\underline{\gamma}$ , for  $1 > \bar{\gamma} \geq \underline{\gamma} > 0$ . Since transitions are often weakly institutionalized and may involve coups and violence, we assume that in the period while such a transition is being resolved, the state cannot perform its public spending or taxation functions.<sup>8</sup>

<sup>6</sup>We make this assumption for a number of reasons. First, the empirical evidence is mixed on African governments' capacity to effectively discriminate with taxation (see Bates 1981 and Kasara 2007), so this simplifying assumption is a useful benchmark. Moreover,  $\tau$  here includes legal taxes and also indirect ways of extracting rents. The assumption of no tax discrimination is therefore equivalent to assuming that the cost of rent-seeking falls equally on all citizens. For a similar model in which discrimination in taxation is possible, see Padró i Miquel (2007).

<sup>7</sup>To capture a wide variety of political institutions, we do not take a strong stance on what this support means in practice. It can range from ethnic voting for the appropriate candidate to exerting violence in order to deny other ethnic groups the full exercise of their democratic rights.

<sup>8</sup>In this simple formulation, the weakness of electoral rules is captured by  $\bar{\gamma} - \underline{\gamma}$ . A large difference captures a system where the personality of the ruler is very important, as would be the case if the ruling clique can easily manipulate the political contest. If this difference is zero, the mapping between group

We assume that presidents maximize the amount of resources they can extract by being in power. Each period, the amount of resource extraction by a leader of type  $j$  is given by

$$\pi^A (\tau - \eta^{Aj}) + \pi^B (\tau - \eta^{Bj}),$$

which, for each group, takes into account the taxes taken in and the expenditures on public goods. Presidents receive zero utility when out of power and, for simplicity, we assume that once they are ousted they cannot come back to power.

The citizens of group  $i$  pay taxes  $\tau$  and enjoy public expenditure  $\eta^{ij}$ , which gives them the following simple instantaneous utility:

$$R(\eta^{ij}) - \tau,$$

where  $R(\cdot)$  is increasing and concave and satisfies  $R'(0) = \infty$  and  $R'(\infty) = 0$ .<sup>9</sup> Denote by  $\omega_t \in \{A, B\}$  a state variable that captures the ethnic type of the president at time  $t$ .

The timing of the game, given  $\omega_t$ , is as follows:

1. The president announces the policy vector  $P_t = (\tau^{\omega_t}, \eta^{A\omega_t}, \eta^{B\omega_t})$
2. The citizens of group  $\omega_t$  decide whether to support the leader,  $s_t = 1$  or not  $s_t = 0$
3. If  $s_t = 1$ ,  $P_t$  is implemented and payoffs are realized. Next period starts with  $\omega_{t+1} = \omega_t$  with probability  $\bar{\gamma}$ . With probability  $1 - \bar{\gamma}$  the president loses power and the next president is from the other group.
4. If  $s_t = 0$ , the leader is immediately ousted and the transition policy vector  $P = (0, 0, 0)$  is implemented. After the transition, with probability  $\underline{\gamma}$  the new ruler belongs to the same group as the ousted ruler and hence  $\omega_{t+1} = \omega_t$ . With probability  $1 - \underline{\gamma}$  the new president belongs to the other group.

We solve for the Markov Perfect Equilibrium (MPE) of the game. Strategies can therefore only be conditioned on the payoff relevant state variables and past play within the stage game. Note that the only payoff-relevant state variable is  $\omega_t$ .

The following proposition, proven in the appendix, characterizes policy in the unique MPE.

**Proposition 1** *Assume  $\theta < \max\{\frac{1}{\pi^A}, \frac{1}{\pi^B}\}$ . There is a unique MPE in which*

1. (1) is binding for both types of presidents

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power and electoral power is not mediated by the current ruler. For simplicity and to save on notation, we assume that both ethnic groups are symmetric in political terms. This might, of course, not be true in reality and both  $\bar{\gamma}$  and  $\underline{\gamma}$  could differ across groups, capturing differences in their populations, internal structure, or hold on power. Allowing for this will not change any of the results of interest (see Padró i Miquel, 2007).

<sup>9</sup>Note that this formulation implies that the optimal path of public expenditure equalizes expenditures per capita across both districts.



2.  $R'(\eta^{ii}) = R'(\eta^{jj}) = \frac{1}{\theta}$
3.  $\eta^{ji} = \eta^{ii} \frac{1-\theta\pi^i}{\theta\pi^j}$  and  $\eta^{ij} = \eta^{jj} \frac{1-\theta\pi^j}{\theta\pi^i}$

In the unique MPE of the game, the president benefits his own group as much as he can, and he does so in order to be able to increase taxes. Increasing patronage to his group allows him to increase taxes for both groups, and hence the rents he can extract increase. In equilibrium, this logic makes constraint (1) bind. This constraint forces the president to provide public goods to non-coethnics, which reduces his rents. The more patronage he is forced to provide to the other group (i.e., the smaller  $\theta$  is), the less he can appropriate and hence the lower the incentives to manipulate public good provision to his advantage. For this reason, the amount of public goods provided to the president's coethnics is increasing in  $\theta$ .

In the empirical section, we use the fact that (1) is binding in equilibrium to provide empirical estimates of  $\theta$  across different regimes in Kenya's recent political history. There is a direct relationship between our empirical estimates and the constraints on the executive modeled in our framework. For a group A president in power (without loss of generality), we will estimate

$$\beta = \frac{\eta^{AA} - \eta^{BA}}{\pi^A \eta^{AA} + \pi^B \eta^{BA}}$$

which can be rewritten as<sup>10</sup>:

$$\theta = 1 + \beta(1 - \pi^A)$$

## 3 Background and Data

### 3.1 Districts and Ethnicity in Kenya

Kenya's population comprises a mix of more than forty ethnic groups. According to the 1962 Population Census, conducted immediately prior to independence, Kenya's main ethnic groups were the Kikuyu (18.8%), Luo (13.4%), Luhya (12.7%) and Kalenjin (10.8%). The shares of these main ethnic groups have remained very stable since then despite the fact that the national population has increased nearly fivefold (see Appendix Table 1, Panel A).

While these ethnic groups predate the arrival of the British in what is today Kenya, boundaries between them were not clearly delineated and have been described as "fluid" in the pre-colonial period (Sheriff, 1985). Leading up to the British colonial era, there were few centralized political structures in the interior of Kenya. Instead, authority was typically personal and local, often a function of lineage, age and wealth and not of ethnic allegiance (for illustrations, see Herbst (2000) and Mamdani (1996)). The region's new

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<sup>10</sup>The transformation uses the fact that  $\eta^{AA} = \theta(\pi^A \eta^{AA} + \pi^B \eta^{BA})$  and  $\eta^{BA} = \frac{[\pi^A \eta^{AA} + \pi^B \eta^{BA}] - \pi^A \eta^{AA}}{\pi^B}$  to generate the expression  $\beta = \frac{\theta - 1}{\pi^B}$

British rulers, however, imposed the provincial administration model in the early 20th century, a structure that was used throughout colonies of British Africa. The country was divided into provinces, provinces were in turn divided into districts and districts into divisions, and further into locations and sub-locations. The boundaries of these localities were based in part on the economic needs of white settlers, but a second important consideration was the administration's understanding of African ethnic groups.

In the early years of the Colony, districts were clearly defined in racial terms. The "White Highlands", the most suitable land for agriculture, was declared Crown property and reserved for white settlers only, despite their substantial pre-existing African populations. African reserves, on the other hand, were for indigenous Africans. There were restrictive rules on the residential mobility of Africans who were working as hired labor or "squatters" on the land now owned by the whites (land which had previously belonged to them). Further, all Africans had to carry an identification card to travel outside their allotted reserves.

The creation of these administrative units, initially for racial segregation, laid the foundation for ethnic politics in later years. From the early years of the Colony, there was differentiation and targeting of public policies to different districts depending on their agriculture potential and link to trade, which implied differential treatment for the various ethnic groups. As the ethnic dimension became increasingly salient, district borders were redrawn to accommodate the demands of local African chiefs and notables. Boundary commissions were formed to incorporate these evolving views. As we see in Appendix Figure 1, district boundaries in 1909 bear little relation to the 1963 ethnic boundaries at independence. But by 1933 this situation had begun to change. The alignment of interests between the British and local chiefs – both of whom preferred greater district ethnic homogeneity – meant that 1933 district borders now begin to resemble 1963 ethnic boundaries. Things move further in this direction so that by 1963 district and ethnic boundaries tightly coincide (see Appendix Figure 1). At independence, 38 out of 41 districts in Kenya had a single ethnic group constituting more than 50% of the population, and this remains the case up until the present. The only districts that were not dominated by a single ethnic group were Nairobi, Mombasa and Trans-Nzoia; Nairobi and Mombasa were (and are) the two largest cities in Kenya and Trans-Nzoia is a highly urbanized district. Economic opportunities in these agglomerations drew in individuals from many tribes as migrants.

In our analysis, we use the 1963 district boundaries. Districts in Kenya, in effect, serve as stable ethnic markers thus allowing us to precisely assign expenditures or road length to particular ethnic groups. This, in turn enables us to establish whether districts that share the ethnicity of a given president receive more road investment and also to establish whether this bias differs across democratic versus autocratic periods.

## 3.2 Ethnic Politics in Kenya

There was already differentiation and targeting of public policies to different ethnic groups in the colonial period. The Kikuyus had the most prolonged exposure to discriminatory British policies, as large areas of their original homeland was “alienated” to become the “White Highlands” and many were forced into “squatter” status. There was increasing discontent within the Kikuyu group as internal inequalities rose, contributing to support for the so-called “Mau-Mau” uprising against the Europeans as well as against those Africans who worked closely with the colonial authorities (Anderson 2005).

The Mau-Mau uprising brought with it a state of emergency in Kenya and set the stage for Kenya’s independence. Following the Lancaster House Conference in 1960, the Legislative Council was restructured to allow for an African majority as well as to allow for the legal formation of African political parties. In May 1960, the Kenya Africa National Union (KANU) was formed and led by Jomo Kenyatta (an ethnic Kikuyu). Soon after, driven by the fear of Kikuyu and Luo domination, the Kenya Africa Democratic Union (KADU) was formed. KADU was composed largely by members of numerically smaller ethnic groups, and led by Daniel arap Moi, an ethnic Kalenjin. These parties contested in the first post-independence election of 1963. KANU won the election convincingly and in less than two years KADU MPs had all joined KANU, resulting in the temporary end of opposition representation in Parliament.

In the mid-1960s, however, several members of KANU defected to a new left-leaning Luo-led party, the Kenya People’s Union (KPU), which opposed the perceived growing conservatism and pro-Western orientation of Kenyatta and the KANU leadership. However, the anti-communist logic of the Cold War meant that the KPU was banned in 1969, ostensibly on national security grounds. This banning institutionalized the single-party autocracy and it is clearly captured in measures of democratic political institutions such as Polity IV.<sup>11</sup> As shown in Figure 1, the Polity IV score for Kenya falls from 0 to -7 at this point. The banning of KPU also arguably marked the beginning of unchecked Kikuyu political domination (Widner, 1992).

Kenyatta died unexpectedly of natural causes in 1978 and Moi (his former Vice-President, and a Kalenjin) took power, as specified in the Constitution. Moi continued in the footsteps of Kenyatta and further consolidated the one-party state. However, following an attempted coup in 1982 led by Kikuyu officers, he switched from a Kikuyu-Kalenjin coalition to an alliance between Kalenjins, Luhyas and numerically smaller groups, similar to the KADU alliance he had once led. Heads of parastatal enterprises, the military, police and the security apparatus were rapidly replaced with Kalenjins (Widner 1992).

The early 1990s saw an increase in both internal and external pressures for African leaders to introduce democracy, with the end of the Cold War being a catalyst for this

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<sup>11</sup>Recall that polity is on a -10 to +10 scale, with scores below -5 typically considered “autocratic”.

change (Barkan 1994). The suspension of overseas development assistance from the Paris Group of Donors forced Moi to legalize opposition parties, and Kenya held multiparty elections in 1992 for the first time since the 1960s. However, while Moi had amended the constitution to allow for multiparty competition, in parallel he had also successfully consolidated the strength of the Office of the President. His abuse of the state machinery and widespread vote fraud, together with the inability of the opposition to coordinate on a single candidate, handed Moi victory in both the 1992 and the 1997 multiparty elections.

Despite this electoral fraud and abuse of the newly established democratic political institutions, the return to multiparty democracy is widely accepted to have brought significant changes in the nature of Kenyan politics and civil society. The emergence of a freer press, including private ownership of media, the growth of civil society forums and of parliamentary accountability committees, as well as a reduction in blatant human rights abuses by the security apparatus, were all arguably triggered by the emergence of political competition. These trends are not unique to Kenya, as illustrated by the Africa-wide changes in democratic governance in Figure 1. The process put in motion by these civil society changes helped make possible the relatively free national election of 2002, which was won by the opposition for the first time, namely by Mwai Kibaki, an ethnic Kikuyu (under the NARC party), marking the first democratic transition of power in independent Kenya (Posner 2005). Moi himself did not run for President in the 2002 elections, adhering to the constitutional provision barring a third term in office.

Kenya's emerging democracy has been tested since 2002. The social and political salience of ethnicity in Kenya has not diminished. The 2007 general election was tightly fought between the incumbent Kibaki (an ethnic Kikuyu) and Raila Odinga (an ethnic Luo), who was in coalition with leading Kalenjin figures. Leading up to the election, exit polls all pointed to a relatively close but clear Odinga victory, but the electoral results kept Kibaki in power amid credible claims of electoral fraud. This resulted in nearly two months of widespread ethnic violence, with thousands killed and hundreds of thousands displaced from their homes (Gibson and Long 2009).

This brief discussion of recent Kenyan political history shows that, while representative of broader African political trends, the case of Kenya is particularly helpful for our analysis. More specifically, there are two key ingredients that enable us to identify ethnic favoritism and its relationship with multiparty democracy. Firstly, the alternation of power (as illustrated in Figure 2) between Kikuyu and Kalenjin leaders over time allows us to test for ethnic favoritism and quantify its magnitude. In practice, we test for favoritism by estimating whether districts that share the president's ethnicity received more roads investments. Secondly, within ethnic ruling periods there are switches between autocracy and multiparty democracy, allowing us to test whether the existence of democratic institutions (even if imperfect) constrains or exacerbates ethnic favoritism.

### 3.3 Roads Investment Data in Kenya

Road building is the single largest development expenditure item in Kenya's Annual Development Budget.<sup>12</sup> Over the period of study, 1963-2011, new road development budget on average represents 15.2% of the total central government's development budget, compared to figures of 5.5%, 5.7% and 6.5% for expenditures in education, health and water, respectively. Unlike other forms of development expenditure (e.g., schools and water) that derive in large part from local village funding (called *harambee* funding in Swahili), funding for road expenditure is almost entirely provided by the central government. By looking at the distribution of road spending and road construction across districts across time we are thus able to test for ethnic favoritism by the central government.

In theory, the decision-process behind road construction is partially bottom-up. The Provincial and District Commissioners are supposed to pass up requests for projects to the Ministry of Public Works.<sup>13</sup> The Ministry of Public Works handles these requests and prepares a national road building strategy. The Ministry of Finance then oversees and resolves competing claims from the different ministries and actual road projects are then implemented. However, it is important to note that this process takes place under strict oversight exercised by the Office of the President at all stages. In fact, Provincial Commissioners themselves are nominated by the Office of the President, which guarantees their loyalty by rewarding them with wide-ranging authority in their province.<sup>14</sup> Given the high visibility of road projects both in terms of physical infrastructure as well as large financial outlays, it is likely that the president himself took a personal interest in major road projects.

Our main measure of road building is expenditures on new roads annually by district during 1963-2011, obtained from the Kenya National Development budget reports. This is technical data compiled by project engineers that details the expenditure on a comprehensive list of individual road projects on an annual basis (i.e., a paved road from location A to location B through location C, at total cost X). When a road project spans locations in more than one district, we use GIS to understand the layout of the road project and the relative kilometers in each district. We then decompose expenditure across the relevant districts assuming an equal distribution of costs along the construction of the total length of the road (see Appendix 1 for greater detail on the construction of this data series).

A convenient feature of roads is that they are easy to observe on the ground. Our

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<sup>12</sup>Kenya's Total Annual Budget in our study period is composed of the Development Budget and the Recurrent Expenditure. Unfortunately the Recurrent Expenditure is only reported as national aggregates.

<sup>13</sup>The Ministry of Public Works was in charge of planning and building roads from 1963-1978, in 1979-1988 the road portfolio moved to the Ministry of Transport and Communications, and in 2008-2011 a separate Ministry of Roads was created.

<sup>14</sup>As a result, there was disproportionate representation from the president's ethnic group in the share of both provincial and district commissioners in the 1960s, 1970s and 1980s (see Barkan and Chege 1989).

second measure of road investment thus comes from Michelin Maps, which capture the actual physical extent of paved roads. Paved roads account for the majority of road expenditures, and their spread can be reliably tracked across our period. As these maps are made by French engineers in Paris assisted by Michelin offices (mainly gas stations and tire outlets) throughout East Africa, they are an independent non-governmental source of data on road investment. This data should therefore not be affected by the concern that road spending, as reported by the government, might not be accurately reported. It is simply a measure of the physical manifestation of paved roads. Digitization of the Michelin maps thus provides us with an independent check on whether there is ethnic favoritism in road building and whether such favoritism is affected by democracy.

The limitation of this second source of data is the availability of these maps only in some years and only until 2002, resulting in a smaller sample. In particular, maps were produced for the following years: 1961, 1964, 1967, 1969, 1972, 1974, 1979, 1981, 1984, 1987, 1989, 1992 and 2002. In order to use the Michelin Maps to create a GIS dataset, we initially start with a Global GIS map containing contemporary roads. We then use the various maps to recreate the evolution of roads backwards in time. Due to the consistency of legend labels on paved roads, we are able to create a district-year panel dataset of the length of paved roads by splicing the historical road maps with the district boundaries.

Figure 3 depicts the evolution of the road network across key years in Kenya's political history. The year 1964 is the first year the Michelin map is available post-independence and shows the colonial interest in connecting the most agriculturally fertile area of Kenya (the White Highland areas) to Nairobi; the maps of 1969-1979 illustrate the Kenyatta period, 1969 being the end of multiparty democracy and the beginning of the single-party state in Kenya. The year 1979 is immediately after the unexpected death of Kenyatta and the beginning of Moi's (ethnic Kalenjin) single party era. The year 1992 serves to illustrate the end of Moi's single party era and the beginning of multiparty democracy. Finally, 2002 illustrates the stock of road development at the end of Moi's multiparty era.

Comparison of the paved road maps for 1979 and 1992 gives a first visual indication of ethnic favoritism. The paved road network in and around the green Kikuyu districts appears largely frozen between these two years. In contrast the network in and around the pink Kalenjin areas expands dramatically. After 1992, in contrast, the expansion in and around the green and pink areas is much more equal.

Panel A of Appendix Table 2 provides summary statistics for both the main outcomes of interest (road development expenditures per population share, using project data) and the secondary measure (paved road construction per population share, using maps data). Note that the difference in the number of observations is driven by the different data sources: road expenditure data is available every year between 1963-2011, while the

maps are less frequent.

We normalize the road expenditure measure taking into account population. More specifically, the main outcome variable in the analysis is the share of road expenditure received by a district (out of the total national road development budget that year) divided by the population share of the district in the national population (in 1962). This summary statistic has a natural interpretation: a value of one implies that a district received road spending that is exactly proportional to its population.<sup>15</sup> Values greater than (less than) one denote spending that is above (below) the national average. Specifically, a value of two for this measure denotes a district that is receiving twice as much road spending as the national per capita average, while a value of 1.3 denotes expenditures 30% above the national per capita average. To be more precise, let road spending in district  $d$  and year  $t$  be denoted by  $EXP_{dt}$  and district population in 1962 be  $POP_{d,1962}$ , while total national road spending is  $EXP_t$  and national population in 1962 is  $POP_{1962}$ . The main road spending measure can be expressed as:

$$road_{dt} = \frac{\left( \frac{EXP_{dt}}{POP_{d,1962}} \right)}{\left( \frac{EXP_t}{POP_{1962}} \right)}$$

We construct a parallel measure for paved road construction (in km) per capita by district, using a measure of paved road length per capita in the district divided by average paved road length per capita nationally, as an alternative district road outcome. This measure has the same interpretation, with one denoting road construction on par with the national average, and values greater than one denoting additional construction. As a robustness check, we also explore normalizing district road spending by district land area.

In relating these measures of road investment to whether districts are coethnic with the president (as defined by the district's population of the president's ethnic group being above 50%), we control for a number of other factors that may affect the placement of roads. These variables are measured at the district level, including population, area, urbanization rate, formal earnings, formal employment as share of total population, value of cash crops, whether the district lies along the pre-existing Mombasa-Nairobi-Kampala rail and road corridor, whether the district is a national border district, and the distance to Nairobi. All these controls are measured either just at independence or soon after, depending on data availability.<sup>16</sup>

<sup>15</sup>This empirical benchmark lines up with our theoretical model where the optimal path of public expenditure equalizes expenditures per capita across districts. Deviations from this benchmark are therefore interpretable as evidence of ethnic favoritism.

<sup>16</sup>Note that we obtain district population and urbanization rates from the reports of the Population and Housing Census in 1962. District area (sq km) is estimated using GIS tools on the 1963 administrative boundaries. We use the annual Statistical Abstracts of Kenya to reconstruct total district employment (available in 1963) and total district earnings (in 2000 USD, available for 1966) in the formal sector. The Development Plan of Kenya 1964-1970 reports cash crop production (coffee, tea and sisal) at the district level for the year 1964-1965. We then use the 1965 export price in 2000 USD (FAO 2011) to calculate

## 4 Methods and Results

### 4.1 Methods

We seek to estimate the relationship between the ethnicity of the president and public expenditures in districts demographically dominated by his coethnics. In the period under examination, we have Kikuyu presidents (1963-1978 and 2003-2011) and Kalenjin presidents (1979-2002). There are seven Kikuyu dominant districts and six Kalenjin dominant districts, out of 41 in total. We present our results using two approaches, a graphical approach and a regression approach.

In our first approach, we graphically examine how the ratio of a district's share of road spending or road construction relative to its population share (i.e.  $road_{dt}$ ) varies in the post-independence period. We divide districts in two ways. First by whether or not, in a given year, the majority ethnic group in a district is the same as that of the president, as discussed above. This allows us to visually examine whether or not districts that are coethnic with the president receive a higher share of national spending on roads relative to their share in the national population. We are particularly interested in analyzing whether this bias is more or less pronounced in democratic periods relative to autocratic periods. Second, we examine the evolution of ethnic majority of Kikuyu and Kalenjin districts. Since all Kenyan presidents were either ethnic Kikuyu or Kalenjin during the 1963-2011 study period, this allows us to examine what happens to road spending in districts when they shift in and out of being coethnic with the president. A focus here again is on whether being coethnic during autocratic periods results in districts attracting a higher share of road resources relative to democratic periods. This comparison is of particular interest as the transition from democracy to autocracy in 1969 took place under the same president, as did the transition from autocracy to democracy in 1992.

In the regression approach, our main estimating equation takes the following form:

$$road_{dt} = \gamma_d + \alpha_t + \beta(coethnic\ district_{dt}) \\ + \delta(coethnic\ district_{dt} \times democracy_t) + \theta(X_{d1963} \times [t - 1963]) + u_{dt}$$

where the dependent variable is the road spending or road construction measure for year  $t$  and district  $d$  as described above.<sup>17</sup> To capture coethnicity with the president, we use an indicator variable ( $coethnic\ district_{dt}$ ) that takes a value of one for districts where at least 50% of the population has the same ethnic affiliation as the serving president. The  $democracy_t$  term is an indicator variable which takes a value of one during periods

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the district total value of cash crop exports in 1965. We use GIS tools to create: (i) an indicator variable whose value is one if any part of the district is on the Mombasa-Nairobi-Kampala rail and road corridor, (ii) an indicator variable whose value is one if the district borders Uganda or Tanzania, (iii) a variable capturing the Euclidian distance (in km) from each district centroid to Nairobi.

<sup>17</sup>For both spending and construction we have 41 districts as defined by the 1963 district boundaries. For spending we have annual data for 49 years and hence our sample is 2009 observations. For paved road construction there are 11 Michelin maps between 1963 and 2002 and hence 451 observations.



of multiparty democracy (1963-1969 and 2003-2011, see Figure 4).  $X_{d1963}$  is a vector of baseline demographic, economic and geographic variables all obtained in the early to mid 1960s that might affect road spending and construction. We interact these initial conditions with linear time trends  $[t-1963]$  to allow their impact over time to vary across different districts. The regression also controls for district fixed effects ( $\gamma_d$ ), year fixed effects ( $\alpha_t$ ) and standard errors are clustered at the district level.

## 4.2 Results

### 4.2.1 Graphical Analysis

The first results are presented in Figure 4. We plot our average  $road_{dt}$  measure for districts that are coethnic with the president in year  $t$  and for those that are not. The solid vertical lines, in 1969 and 1992, capture regime transitions away from multiparty democracy and back to multiparty democracy, respectively. The broken vertical lines, in 1979 and 2002, capture presidential transitions. Two interesting patterns emerge. The first is that during periods of autocracy (basically, the 1970s and 1980s) the ratio of district share of road expenditures to district share of population is always above one for coethnic districts and below one for non-coethnic districts, which is strongly indicative of ethnic favoritism.<sup>18</sup> The second is that during periods of multiparty democracy (basically, the 1960s, 1990s and 2000s) the ratio is consistently lower and tends to be near one on average for both types of districts, implying little or no favoritism.

Three transitions in Figure 4 are particularly noteworthy. The first is the rapid post-1969 rise of average  $road_{dt}$  from 1 to above 2. Even with the same president in power (Kenyatta), the switch from democracy to autocracy leads to road spending more than doubling in coethnic districts over the course of a few years. The second is that this favoritism is maintained and intensified after 1979, despite the fact that the set of districts that are coethnic with the president is now completely distinct from those pre-1979. The third is that when democracy returns in 1992 the  $road_{dt}$  measure gradually falls from above 2 to around 1 even though the same president (Moi) is in place. Democracy clearly has value in terms of spreading the single biggest component of public expenditures in Kenya more evenly across districts dominated by different ethnic groups. The stark “1-2-1” pattern we observe in presidential coethnic districts as Kenya enters and then exits autocracy is extremely difficult to square with spending being driven mainly by concerns of economic efficiency.

Only two ethnic groups, the Kikuyus and the Kalenjins, produced presidents during the study period. Figure 5 categorizes districts by whether the majority of the district population is Kikuyu, Kalenjin or from another ethnic group. Kikuyu districts receive road spending in line with their population share during the early democratic period.

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<sup>18</sup>Note that the fact that the coethnic line rises to nearly 3 whereas the non-coethnic line falls to only around 0.8 is due to the fact that the bulk of the districts in a given year are not coethnic with the president.

Following the banning of opposition political parties in 1969, road spending concentrates in these districts, rising to more than double that predicted by population share. This trend of favoring Kikuyu districts ends when the Kikuyu president (Kenyatta) dies in 1978. In fact, there is a striking decline in Kikuyu district road funding, and a corresponding increase in Kalenjin road funding timed exactly after Kenyatta’s death in 1978, suggesting that Moi had the authority to rapidly target road resources to his coethnic districts.

The rise in spending on Kalenjin districts is truly meteoric:  $road_{dt}$  rises from around 0.5 pre-1978 to close to 3 post-1978, representing a six-fold increase in relative road spending per capita in these districts. This highly elevated  $road_{dt}$  level is maintained throughout the Moi autocratic period, as the Kikuyu  $road_{dt}$  falls back down towards unity. The return of democracy under Moi in 1992 seems to reduce his ability to maintain this high degree of ethnic favoritism, and the Kalenjin district  $road_{dt}$  measure drifts back down towards unity as democracy gradually strengthens. Diminished favoritism for districts that are coethnic with the president during periods of democracy is also associated with greater spending for the majority of districts in Kenya which are neither majority Kikuyu nor Kalenjin. As Figure 5 demonstrates, the “other” ethnic districts line has a “U-shaped” pattern, being close to unity in the 1960s, then falling below unity in the 1970s and 1980s, and rising back towards unity in the 1990s and 2000s. Democracy seems to have a leveling influence in ensuring that Kenyan districts receive roads resources roughly in line with their share of population irrespective of whether or not they share the ethnicity of the president.

The fact that the majority of districts who are never coethnic with any president across the 1963-2011 period, but which nonetheless contain the bulk (around 85%) of the Kenyan population, get road spending allocations well below the national average during periods of autocracy and at best achieve parity during democratic periods is very difficult to square with any notion that road spending across districts being is being driven by concerns with economic efficiency.<sup>19</sup>

#### 4.2.2 Regression Analysis

In Table 1, we move beyond the graphical analysis and employ the regression framework specified above. In Panel A of Table 1, Column 1 confirms that, for our 1963-2011 period as a whole, there is strong evidence of ethnic favoritism in Kenya. A coefficient of 1 in this specification implies that, on average, districts that are coethnic with the president receive double the amount of roads investment relative to their share in the population. Recall that the districts with a majority Kikuyu or Kalenjin population each account

<sup>19</sup>The investment pattern in autocratic periods where “other” districts consistently receive less road investment than the national average and Kikuyu and Kalenjin districts receive road investment which is significantly above the national average is difficult to square with our theoretical model where the optimal path of public expenditure equalizes expenditures per capita across districts.

for roughly 15% of all Kenyan districts. The coefficient in column 1 implies that, on average, across our period these districts receive roughly 30% of national spending on roads. Given that roads account for approximately one sixth of all central government spending, this represents a highly consequential degree of ethnic bias.

This central result remains robust when we sequentially add controls for demography (district population, area, urbanization rate – column 2), economic activity (district total earnings and employment in the formal sector, value of cash crop production for export – column 3), economic geography (being on the main Mombasa-Nairobi-Kampala corridor, bordering another country, distance to Nairobi – column 4). These controls, which are either time invariant or are measured at the start of our period, are interacted with linear time trends to allow for initial district differences to evolve over time as a function of these differences. These interactions should control for many of the economic factors that might influence where road investments take place in Kenya. Our preferred specification is Column 4, which contains the full set of interactions, and has a nearly identical coefficient estimate to that in column 1, suggesting that ethnic favoritism in road spending is largely orthogonal to the influence of these other factors. In column 5 we observe that the ethnic favoritism result is even robust to including district specific time trends. Regardless of econometric specification, the central result that coethnic districts, on average, receive twice the level of road expenditure between 1963 and 2011 is highly robust.

We next test if ethnic favoritism is affected by whether a national democratic or autocratic regime is in place. In Panel B of Table 1, column 1 indicates that ethnic favoritism in road spending falls significantly during democratic periods. Indeed the  $F$  test at the bottom of the column indicates that there is no significant evidence of ethnic favoritism within periods of democracy in Kenya ( $p$ -value = 0.31). This is the second main result of the paper. Democracy, involving at a minimum some legal competition between political parties, limits the ability of the president to favor coethnics, in effect forcing him to share public resources more evenly across the population. This is equivalent to a drop in  $\theta$  in our theoretical model towards unity. That even imperfect forms of democracy, such as that experienced in Kenya in the 1960s and again post-1992, can reduce ethnic favoritism in this way is a striking finding.

In the remaining columns of Panel B, we see that this second result is robust to sequentially adding in controls for demography (column 2), economic activity (column 3) and economic geography (column 4). The result is also robust to inclusion of district specific time trends (column 5). Across all columns, the  $F$ -test indicates that we cannot reject the hypothesis that ethnic favoritism in road building is absent in Kenya during periods of democracy. The coefficients on  $coethnic_{dt}$  tell us that sharing the ethnicity of the president in autocratic periods raises road favoritism by 157% to 174%. That is, there is almost a three fold increase in road spending in these districts relative to those

that do not share the ethnicity of the president. This can be seen in Figure 4 where our road favoritism measure rises from around 1 in the 1960s to almost 3 in the 1970s and 1980s and then falls back towards 1 in the post-1992 period. The coefficient estimates of -1.08 to -1.32 on the  $(coethnic_{dt} \times democracy_t)$  term captures the near elimination of ethnic favoritism during periods of democracy.

In Table 2 we use our second  $road_{dt}$  measure, the share of paved roads constructed in a district relative to the population share of that district according to the digitized Michelin maps data. Table 2 reproduces all the specifications in Table 1. In Panel A we see that presidential coethnic districts receive between twice and five times the kilometers of paved roads per capita relative to national average. In our preferred specification in column 4, the coefficient is 3.24, implying that coethnic districts have four times the length of paved roads built. Ethnic favoritism as measured by paved road construction is therefore twice as pronounced as that measured by total expenditure on roads. One reason for this might be that paved roads are a highly visible element of road investment. Political leaders may feel that investing in these visible symbols of progress and modernity represent a more viable means of securing the support of their coethnics than investing in less visible elements, such as non-paved tracks or in road maintenance. This pattern points to favoritism towards coethnics of an extreme form, and is once again difficult to square with economic efficiency, especially conditional on the wide array of baseline demographic, geographic and economic characteristics that we include. Our benchmark that per capita road investment should be equalized across district is clear violated by the evidence we see for road spending (Table 1) and paved road construction (Table 2).

In Panel B of Table 2 we see that the tendency to favor coethnic districts with paved roads is again radically diminished during periods of democracy. Indeed, across all the specifications, we find that the reduction in this bias during democratic periods is such that we cannot reject the hypothesis that there is no significant difference in the extent to which paved roads are built between coethnic and non-coethnic districts. In column 4 we see that the coefficient on  $coethnic_{dt}$  is 3.90, implying that in autocratic periods five times the length of paved roads are built in coethnic districts relative to the national average. A coefficient on  $(coethnic_{dt} \times democracy_t)$  of -2.71 implies that this bias is far less pronounced in democratic periods and indeed the  $F$ -test ( $p$ -value = 0.56) confirms that we cannot reject that there was no ethnic favoritism during these periods. The coefficient estimates are similar in the specification with district time trends (column 5) but standard errors rise somewhat.

The degree to which results match up using two independently collected data sets on road expenditure (Table 1) and road building (Table 2) is reassuring. It increases our confidence in the robustness of the two key findings of this paper: there is extensive favoritism towards the president's coethnics in road investment in Kenya, and this

favoritism is eliminated during periods of democracy.

### 4.2.3 Robustness

Table 3 checks the robustness of these results to changes in normalization and in measures of coethnicity. Columns 1 and 2 of Panel A replicate the key results for road expenditure (from column 4 of Table 1). In columns 1 and 2 of Panel B we move to a continuous measure of coethnicity, where we measure the population share of the president's ethnicity in a district, independent of whether or not this represents the majority (>50%) ethnicity. The two main results hold when we do this. In columns 3 and 4 of Panel A we normalize the road expenditure share by the district's area share. It is clear that the two main results are robust to normalizing road expenditure by area share as opposed to population share. In columns 5 through 8, we show that our road building results are robust to using a continuous measure of coethnicity and to normalizing by area share. Across all the results in Table 3, we find that there is strong evidence of ethnic favoritism in road spending and building, and we cannot reject the hypothesis that this favoritism is largely eliminated during periods of democracy.

In Appendix Table 3, we carry out a further battery of robustness checks on our main results on road spending. Column 1 replicates the results from our preferred specification in column 4 of Table 1. In column 2, we see that including our baseline controls on demography, economic activity and economic geography interacted with year fixed effects does not significantly affect our results, although coefficient estimates are less precisely estimated. In column 3 we include an additional control for the number of years that a district has been coethnic with the president, to capture the possible persistence of effects of coethnicity on road favoritism. Our results remain robust to the inclusion of this control. In columns 4 and 5 we compute standard errors that are corrected for spatial clustering (Conley, 1999) using 200 kilometer and 400 kilometer thresholds, respectively. Again the pattern of results seen in column 1 remain robust.

It is informative to break down the results into the five leadership periods seen in Figure 2 – Kenyatta democracy, Kenyatta autocracy, Moi autocracy, Moi democracy, Kibaki democracy. This is needed to check whether what we are observing is a general phenomena, or one related to a particular leadership regime in Kenya. For example, we would want to know whether both early (1960s) and later (1990s, 2000s) democracy were effective in mitigating ethnic favoritism. To look at this, for each of the leadership regimes shown in Figure 2, we regress our road spending favoritism index  $road_{dt}$  on indicators that capture whether a district has a majority (>50%) Kikuyu or Kalenjin population. The comparison districts are those that do not have either of these attributes. The results are reported in Table 4.

The comparison of the coefficients on Kikuyu/Kalenjin indicators across periods of democracy and autocracy when the same Kikuyu or Kalenjin president is in power is

telling. During the Kenyatta democracy period (1963-1969), there is no significant difference between the coefficients on the Kikuyu and Kalenjin indicators ( $p$ -value = 0.70). In the Kenyatta autocracy period (1970-1978) the Kikuyu indicator becomes positive and statistically significant, and the Kikuyu-Kalenjin difference is also statistically significant ( $p$ -value = 0.01). During the Moi autocracy period (1979-1992), things flip round and now the Kalenjin indicator is positive and statistically significant, the Kikuyu indicator is not and the two are marginally significantly different ( $p$ -value = 0.08). With the transition back to democracy during the Moi democracy period (1993-2002), both indicators lose statistical significance, as does the difference between the two ( $p$ -value = 0.14) and this pattern also holds under the Kibaki democracy period (2003-2011,  $p$ -value = 0.33). The results in Table 4 indicate that there is no evidence of ethnic favoritism in either the early (1960s) or later (1990s, 2000s) democratic periods. It is during periods of autocracy that presidents are able to favor coethnics in the allocation of road spending across Kenyan districts.

#### 4.2.4 Extension: Coalition Politics

Our focus has been on the impact of being coethnic with the president on road spending and paved road construction within a district, and on whether this changes under democracy. This makes sense given the nature of politics in many Sub-Saharan African countries, where presidents traditionally enjoy considerable personal decision-making authority. However, it is possible that other members of the president’s cabinet also influence where road investment takes place. This introduces a set of related but distinct issues pertaining to inter-ethnic coalition formation. While a full treatment of these issues is beyond the scope of this paper, and does not feature in our theoretical model in section 2, we use our data to explore whether considering coalition politics significantly changes any of our main conclusions.

We assembled a data set that codes the ethnicity of each cabinet member for each of the thirteen central government cabinets between 1963 and 2011 (see Appendix Table 1). In an exhaustive set of regressions, we tested whether districts that are coethnic with the Public Works minister, or with ministers holding the most important cabinet portfolios (e.g., Finance, Home) receive more road spending but cannot reject the hypothesis that the effect is zero (not shown). This appears to be further confirmation of the overriding power of presidents in post-independence Kenya.

However, in column 2 of Table 5 we show the one exception: we find that districts that are coethnic with the vice president do have road expenditures significantly above the national average. A coefficient of 1.46 on the  $VP-coethnic_{dt}$  measure tells us that during autocratic periods, districts receive two and a half times the average amount of road expenditure relative to their population share, a large effect. The coefficient of -1.42 on  $(VP-coethnic_{dt} \times democracy)$  implies that this ethnic favoritism is non-existent

during periods of democracy, as is also confirmed by the *F-test* in column 2. What is also interesting in column 2 is that, during autocratic periods, districts that are coethnic with the president receive three and half times the amount of road expenditure relative to districts that are neither coethnic with the president or vice president. This finding confirms that the president has been the dominant force in allocating road spending, but also shows that the vice president (who throughout the post-independence period was never of the same ethnicity as the president) is able, to a more limited extent, to skew resources towards districts that share his ethnicity. The fact that both these forms of favoritism largely disappear during democratic periods suggest that democracy ties the hands of both top executives, the president and the vice president. In other words, our main results on ethnic favoritism and the leveling effect of democracy are robust to also considering the ethnic group of the vice president.

It is often argued that the typical way coalition politics play out in African politics is in cabinet formation. In columns 3 and 4 of Table 5 we explore this possibility. To do so, we exploit our data set on the ethnicity of all cabinet ministers for election years between 1963 and 2011 (see Appendix Table 1). The dependent variable is the cabinet share of each ethnic group in year  $t$  divided by its population share in 1962. An index higher than one means that an ethnic group is receiving more cabinet positions than its national ethnic population share would predict. We then regress this index on a district indicator which equals one if it is coethnic with the serving president, as well as its interaction with the democracy indicator. We include ethnic group and time fixed effects, as well as an ethnic group time trend. In column 3 of Table 5 we find that the president's ethnic group receives 64% more cabinet posts relative to what would be predicted by its national population share. Therefore, Kenyan presidents do favor their ethnic group with cabinet positions. When we interact the group indicator with  $democracy_t$ , however, we find no effect, indicating that the propensity to favor coethnics with cabinet positions is not attenuated during periods of democracy. In column 4 we see that the ethnic groups of both the president and vice president are favored with cabinet positions but that once again that neither is affected by democracy. This is informative in two respects. First, there is indeed a propensity for presidents and vice-presidents to “stuff” the cabinet with coethnics. Second, this tendency is not checked by the arrival of democracy, which suggests that the road favoritism effects across autocratic and democratic periods we are estimating are unlikely to be driven by changes in cabinet composition.

These findings line up well with Francois, Rainer and Trebbi (2012), who argue that cabinets in Africa are surprisingly representative of the underlying national population even under autocratic regimes. They argue that allocating key cabinet posts to ethnic groups that are not coethnic with the president may help to reduce the threat of revolutions from outsiders and of coups from insiders. Despite the largesse shown by the president in allocating cabinet posts to ethnic groups other than his own, what our

results show is that it has primarily been the president (and to some extent the vice president) who retains the power to allocate public roads resources in Kenya, and it is democracy that ultimately constrains that power, rather than any shift toward a more representative cabinet.

### 4.3 Interpretation

In our model,  $\theta$  captures the ability of the executive to discriminate across ethnic groups. If  $\theta = 1$  then all ethnic groups receive a public good allocation equal to the average per capita allocation and ethnic favoritism is therefore eliminated. If  $\theta = \infty$ , then the executive is unconstrained as regards the extent to which public good allocation to his ethnic group can exceed the average allocation. By transforming the different  $\beta$  coefficient estimates from Table 4 into the analogous values of  $\theta$  from our theoretical model – namely,  $\theta = 1 + \beta(1 - \pi^A)$  – we can trace the evolution of  $\theta$  across the five periods shown in Figure 2: Kenyatta democracy, Kenyatta autocracy, Moi autocracy, Moi democracy, and Kibaki democracy.<sup>20</sup> The results from doing this are presented graphically in Figure 6. We also include the Polity IV score for Kenya from Figure 1 in this figure.<sup>21</sup>

There is a remarkable correspondence between these two measures over time. The early democratic period in the 1960s was characterized by relative democratic freedoms, and essentially no evidence of ethnic favoritism towards President Kenyatta’s Kikuyu ethnic group, with the estimated  $\theta$  near 1. However, there is a sharp increase in  $\theta$  after 1970, when multiparty democracy was abandoned, with  $\theta$  moving higher towards a value of 2. Polity scores move in tandem dropping precipitously around 1970, signalling a collapse in democratic freedoms, and staying low until the early 1990s.  $\theta$  moves even higher during the rule of President Moi’s single-party rule (1979-1992), reaching 2.5, implying that the president’s coethnic districts received a staggering two and half times more road funds on average than other groups. However,  $\theta$  moves back towards 1 when democracy was restored in late 1991 and ends up nearly equal to 1, indicating that there is effectively no ethnic favoritism in the most recent period, which is the most democratic on record for post-independence Kenya. Polity scores also rise sharply in the early 1990s, signalling a return to democratic freedoms, and actually, by the 2000s, achieve levels which exceed those seen in the 1960s. Figure 6 thus indicates that, during the autocratic 1970s and 1980s, presidents are less constrained in their ability to skew road spending towards coethnic districts relative to the democratic 1960s, 1990s and 2000s. The value of democracy lies in its ability to tie the hands of presidents so that they cannot allocate public resources in a way seems inconsistent with economic

<sup>20</sup> $\pi^A$  captures the population share of the ethnic group which is coethnic with the serving president. This value varies across periods as the president’s ethnicity changes.

<sup>21</sup>Note that the  $\theta$  score is presented with a reverse axis to facilitate comparison with the democracy score.



efficiency.

The co-movement of  $\theta$  and the polity measure of democracy in Figure 6 begs the question of what underlies the changes in  $\theta$ . Digging into the various components of the polity measure (and its effect on triggering other changes in society) can shed some light into the institutional changes occurring in Kenya during its political transitions.<sup>22</sup> Closer examination of Figure 6 reveals that the combined polity score decreased from 0 to -7 in the transition out of democracy during Kenyatta’s leadership. Almost all sub-components of the score changed at that time: competitiveness and openness of executive recruitment worsened (there was only one party now, whose leader was chosen for life), constraints on the chief executive weakened (the Office of the President could generally bypass parliament), regulation of political participation became restrictive (participation was restricted to life members of the single-party and civil society was heavily repressed) and competitiveness of participation was eliminated (there was only one candidate for the executive seat). It is little wonder that presidents under this regime felt free to allocate resources largely as they wished.

The repeal of the constitution and the political institutional change of 1991 (when Moi allowed multiparty democracy) led the combined polity score to improve from -7 to -5 and up to -2 in 1997 as parties were allowed to compete and KANU’s tight grip on civil society gradually loosened (this process increased scores on both regulation and competitiveness of political participation). This movement from -7 to -2 represents a very significant improvement in fundamental democratic freedoms.<sup>23</sup> After the democratic presidential transition of 2002 other components of the polity score improve and push the overall polity sharply higher to around 8 which is in the fully democratic range but below the scores one would observe in mature democracies. Our estimated  $\theta$  matches this path: from 1992 to 2002, the estimated  $\theta$  equals 1.75 but this drops to 1.08 after 2002. 1.75 represents a significant increase in constraints on the executive relative to the Moi autocratic years ( $\theta = 2.56$ ) but falls short of the more fully constrained post 2002 setting ( $\theta = 1.08$ ) where ethnic favoritism has effectively been eliminated.

It is important to note that the development of Kenya’s civil society played a key role in the institutional evolution that began in the early 1990s. A simple plot of the Freedom House *Freedom of the Press Index* reveals that both press freedom and broadcast freedom jumped from “not free” to “partly free” when the switch to multiparty politics occurred (not shown). Indeed, the period since 1990 saw an increase in independent weekly

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<sup>22</sup>The combined polity score is computed by subtracting the polity AUTOC score from the DEMOC score, the resulting scale ranges from +10 (strongly democratic) to -10 (strongly autocratic). Each of the two components have their sub-components. AUTOC and DEMOC are constructed additively on a eleven-point scale. Further, the individual sub-components are weighted differently and are derived from coding the following 5 sub-components (i) the competitiveness of political participation (ii) regulation of participation, (iii) the openness and (iv) competitiveness of executive recruitment and (v) constraints on the chief executive (see the Data Appendix for further details).

<sup>23</sup>Kenya during this period is classified by polity as an “anocracy” which is political regime akin to a limited democracy.

magazines that often took anti-government stances. Similarly, in the early 1990s several influential private newspapers, including the *The Nation* and *The Standard*, emerged. This active opposition media survived the aggressive reaction of the Moi regime thanks to widespread societal support, as well as Western donor protests against governmental abuse.

Broadcast media on the other hand remained more firmly in the government's grip, at least at first. While the *Kenya Broadcasting Company* was officially semi-autonomous, the Office of the President retained considerable editorial control. Its main competitor, the *Kenya Television Network*, also suffered from constant interference from the State. Independent commercial broadcasting did not emerge in Kenya during this early period, as more than 20 TV broadcast applications submitted between 1985-1995 were rejected. The situation was similar for radio, a major source of information for the rural majority, which saw no independent radio licenses granted until 1996.

The period since 1998, however, saw the government end direct censorship of the media, and by 2000, Kenya had nine private TV stations and 19 radio stations. While state harassment has not totally disappeared (libel cases are common and harassment of journalists and editors still occurs) it is undeniable that the media has become much freer since the early 1990s.

Beyond the vital emergence of private media, several other aspects of civil society helped to challenge the executive's absolute authority. The number of non-governmental organizations (NGO) grew rapidly in the 1990s. While Kenyan law does not allow international donors to fund opposition political parties, they could fund governance-focused civil society organizations (e.g. USAID funded "pro-democracy" NGOs that in practice had strong opposition leanings). Western bilateral agencies and foundations also increasingly side-stepped the government in terms of resource allocation and distribution, and by the late 1990s, Kenya had the highest concentration of NGOs per capita in Sub-Saharan Africa. The churches (often in tandem with NGOs) also played a crucial role in giving voice to the need for impartial conduct of elections and voter registration reforms in the 1990s.

A freer press and a stronger civil society, together with Western pressure, made Moi realize that he had to accommodate demands for further openness. This brought about three key reforms in 1997, the so-called Inter-Parliamentary Parties Group (IPPG) reforms. The IPPG reforms reduced state internal security powers (e.g. preventative detention) and amended the Public Order, Broadcasting, and Societies Acts.<sup>24</sup> The reform package also contained amendments to electoral rules, explicitly classifying falsification of voter registration, destruction, and sale of voting cards, as criminal offenses. The final

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<sup>24</sup>Reduced state authority implied an end to preventative detention and sedition laws. The Public Orders Act was amended to remove the need for a license before meetings, replacing it with a need to notify the police (three days before). The Broadcasting Act was also changed to provide free airtime to all parties and to promote a balanced show of opinions. The Societies Act was amended to require the registrar to respond reasonably to all requests for voter registration within 120 days.

years of the Moi regime also saw a rise in the power of parliament, with constitutional amendments that increased its independence from the executive branch.

All in all, key political institutional changes in the early 1990s set the stage for the emergence of an active civil society and a freer press which became strong proponents of further institutional change that ultimately curtailed the machinery of Moi's autocratic state and allowed for a push towards a more democratic Kenya. This evolution has continued since Moi stepped down in late 2002. A new constitution was ratified by voters in 2010 which altered the division of powers between the central government and newly created (and popularly elected) county governments, as well as consolidating a more independent judiciary. Nowadays, Kenya's increasingly well-informed, educated, and connected population is consistently politically engaged. Parliamentary debates are increasingly shown on national TV and discussion forums are held to allow for civil society feedback. Misguided public investments and corruption remain widespread but are more regularly brought to light by the press (Wrong 2009).

It is hardly surprising that the practice of ethnic favoritism in public resource allocation is now much more difficult to carry out than in the past. Ethnic divisions have not disappeared, and they remain highly politically salient, as tragically demonstrated in the post-election violence in 2007/2008. However, tight scrutiny from a free press, a vocal civil society and an independent parliament all severely curtail the ability of the executive to blatantly discriminate between different districts in choosing where to place roads projects. This is succinctly captured in our estimated  $\theta = 1.08$  for the post-2002 period.

## 5 Conclusion

For ethnic favoritism to be a viable political strategy the president must be able to manipulate the allocation of public expenditure with few constraints. Ethnic favoritism and weak controls on the chief executive thus go hand in hand. As democracy becomes consolidated in many low-income countries, including many in Sub-Saharan Africa, not only does political competition become better regulated, but the constraints on executive action are also strengthened due to the scrutiny that parliament and civil society are able to exercise. In this paper we examine this logic in detail by asking two empirical questions. First, can we detect quantitative evidence of ethnic favoritism in an African country? Second, does the transition into and out of democracy under the same leader exacerbate or constrain this ethnic favoritism?

Though many of Africa's ills have been blamed on ethnic favoritism, it has been surprisingly difficult to find concrete evidence of this behavior, mostly due to lack of data. Therefore, to address these questions we construct two new datasets through the geographic coding of road project data and through the innovative use of historical maps. We are helped in this respect by the fact that each Kenyan district is dominated by a

particular ethnic group, which allows us to precisely assign expenditures or road length to ethnic groups. In answering the second question, we are helped by the fact that there have been multiple switches of power between leaders of different ethnic groups in Kenya and, within each ethnic regime, switches between democracy and autocracy.

There are two main empirical results. First, central government investments in roads across Kenyan districts have been subject to a very high degree of ethnic favoritism, with districts coethnic to the President receiving three times the average expenditure in roads and five times the length of paved roads during periods of autocracy. Second, that both these biases disappear entirely during periods of multiparty democracy.

As we discuss in the introduction, numerous scholars link ethnic favoritism to poor economic outcomes. Taking this link as given, we would expect that in periods of democracy, when we estimate ethnic favoritism to be non-existent, the economic performance of Kenya should be better than in periods of autocracy, when we find ethnic favoritism to be highly pronounced. Figure 7 suggests that this is the case. Per capita growth rates in Kenya fell towards zero during autocratic periods (1970s, 1980s). This was also the case in the rest of Sub-Saharan Africa. In contrast, per capita growth rates were positive during democratic periods (1960s, 1990s and 2000s) both in Kenya and in Sub-Saharan Africa as a whole. What is also striking in Figure 7 is that the collapse in growth (in the early 1970s) coincides with the spread of autocracy across Africa whereas the return to growth (for both Kenya and Sub-Saharan Africa) begins the early 1990s precisely when democracy is spreading across the continent (see Figure 1).

In a speculative exercise, we conclude by exploring whether democracy does appear to mitigate the negative effects of ethnic divisions on economic performance. We follow an influential article, Easterly and Levine (1997), which attributes much of the poor economic performance seen in Sub-Saharan Africa up until the end of the 1980s to the political frictions and economic mismanagement associated with ethnic fractionalization. More specifically, we take a second look at the data to see if the cross-country correlation between ethnic fractionalization and growth that Easterly and Levine (1997) uncover varies as a function of the spread of democracy.

The results are presented in Table 6. In column 1, we replicate the key result from Easterly and Levine (1997) using data from the 1960s to the 1980s for the whole world. More specifically we find, as they established, that ethnic diversity is negatively associated with economic growth. Column 2 extends the Easterly-Levine data set to the 2000s and shows that this relationship is weaker when the whole period is taken into account. In column 3 we test whether the association between ethnic fractionalization and economic growth varies with the presence of democracy. The results are striking: while the negative, statistically significant, relationship still holds for autocracies, there is no association between ethnic fractionalization and economic growth in democracies. Column 4 shows that if we restrict the sample to Africa not only does this continue to

be the case but the interaction between ethnic fractionalization and democracy also becomes positive and statistically significant, suggesting that democracy serves to largely eliminate the negative growth effects of ethnic diversity, thus paralleling our findings for Kenya.

Obviously, these results should not be taken as causal, since democratization is clearly correlated with other important changes and is far from randomly assigned. Nonetheless, we view these patterns as thought-provoking, and as suggestive of the relevance of our empirical results beyond ethnic favoritism in Kenya. Ethnic divisions appear to contribute to poor economic policies (and consequently contribute to poor economic performance) when political institutions are sufficiently weak that politicians can exploit ethnic fractionalization for their own benefit. Yet ethnic divisions cease to be a salient problem for economic performance under democracy. These results are consistent with a view that democracy helps countries limit downside political risk.

The findings also highlight some useful avenues for future research. First, while we find that multiparty democracy dampens ethnic favoritism, it is not clear which particular institutional dimension is most critical for this result. Is this simply a consequence of heightened electoral competition, or are the strong civil society and free press that simultaneously took root in Kenya also important? Second, it is important to consider the relevance of the observability of the public good in question for our results. Roads are highly salient and observable investments, and this is relevant in at least two ways. On the one hand, roads are prime targets for favoritism, because it is easy for a politician to point to them and take credit for them. On the other hand, it is also easy for opposition parliamentarians, the media and civil society groups to spot blatant imbalances in the allocation of these large infrastructure investments, which might make the allocation of roads particularly sensitive to democratic reform. The lower degree of observability for some other public investments, such as those in education or health, might lead them to be less responsive to the institutional changes wrought by democratization.

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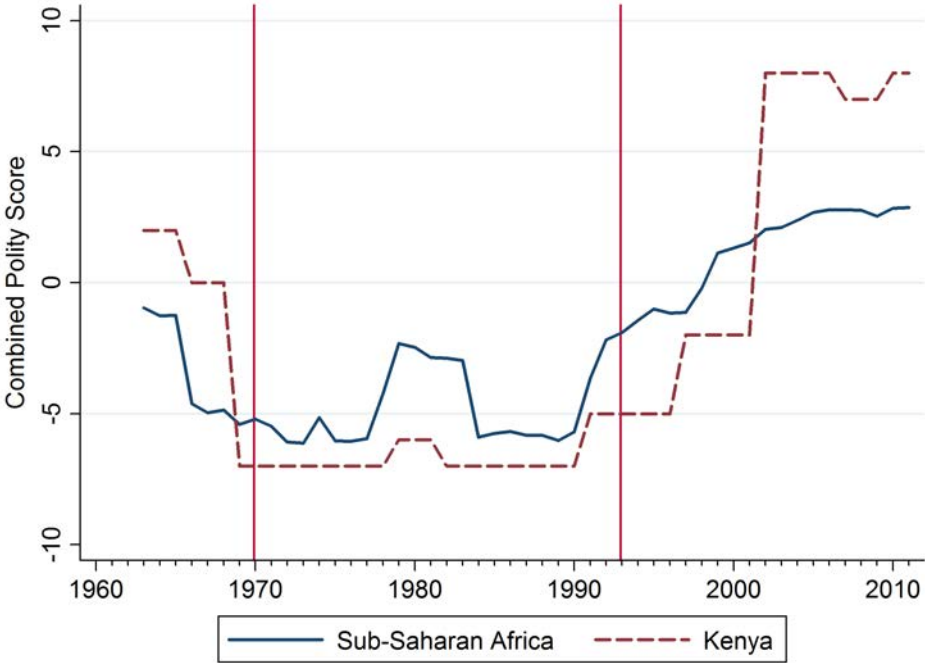
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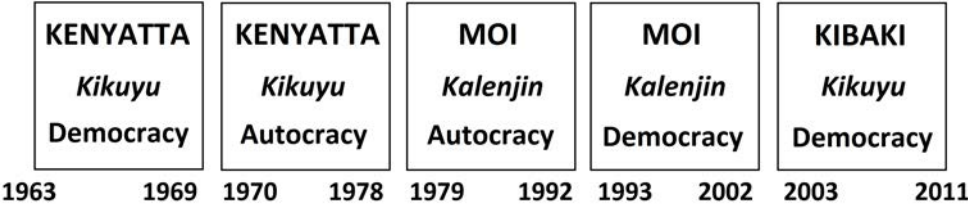
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Figure 1: Evolution of Political Regimes in Sub-Saharan Africa, 1963-2011



Notes: This figure plots the revised combined polity score for Sub-Saharan Africa (average) and Kenya. Polity IV defines three regime categories: *autocracies* (-10 to -6), *anocracies* (-5 to +5) and *democracies* (+6 to +10). The vertical lines represent regime changes in Kenya: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. Source: authors' calculations and *Polity IV Project, Political Regime Characteristics and Transitions, 1800-2011*. See Online Data Appendix for data sources.

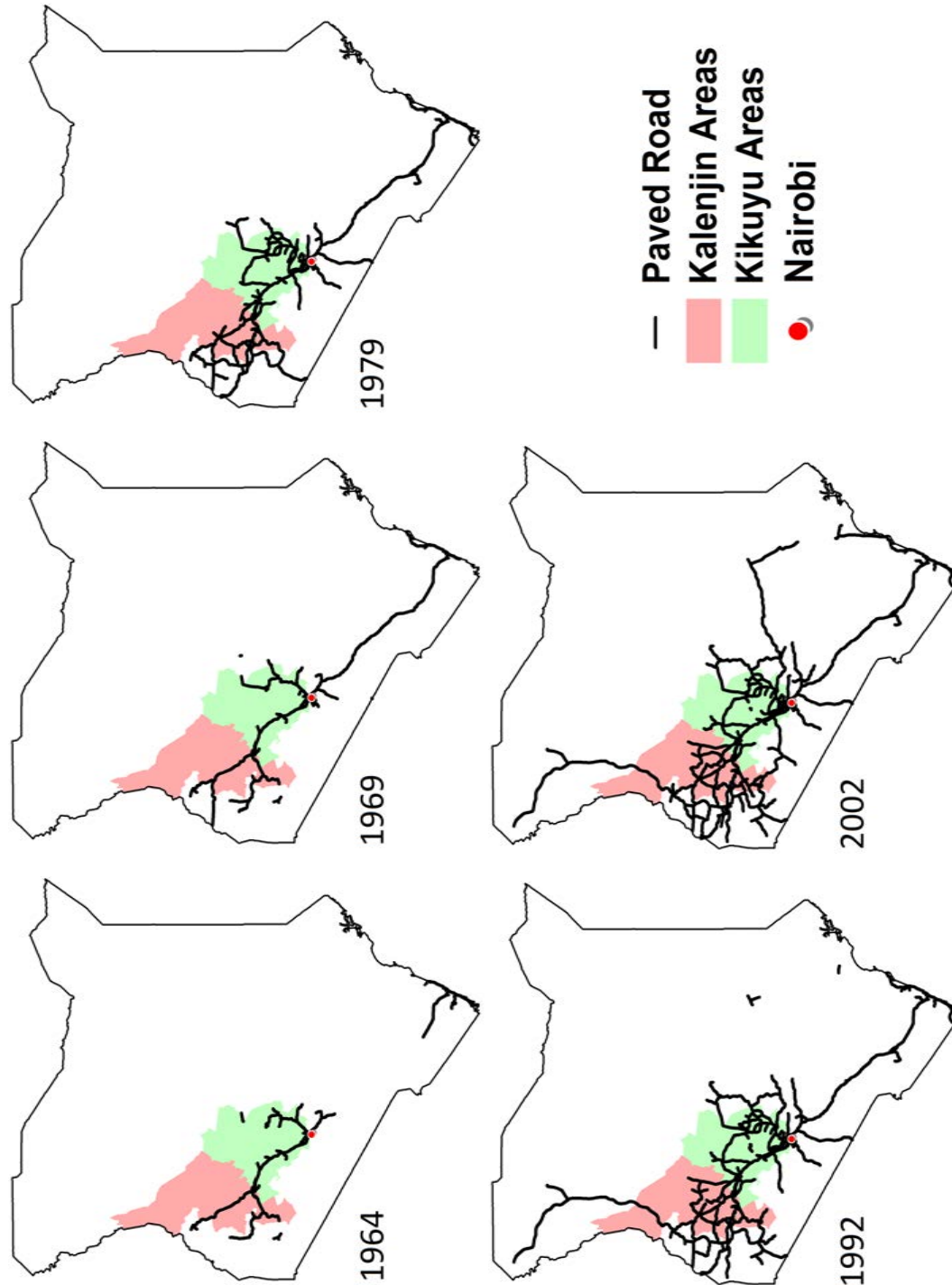
Figure 2: History Timeline of Political and Leadership Transitions



Notes: This figure shows the history timeline of political transitions and leadership transitions. Political transitions: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. Leadership transitions: from Kenyatta (Kikuyu) to Moi (Kalenjin) in August 1978, and from Moi (Kalenjin) to Kibaki (Kikuyu) in December 2002.

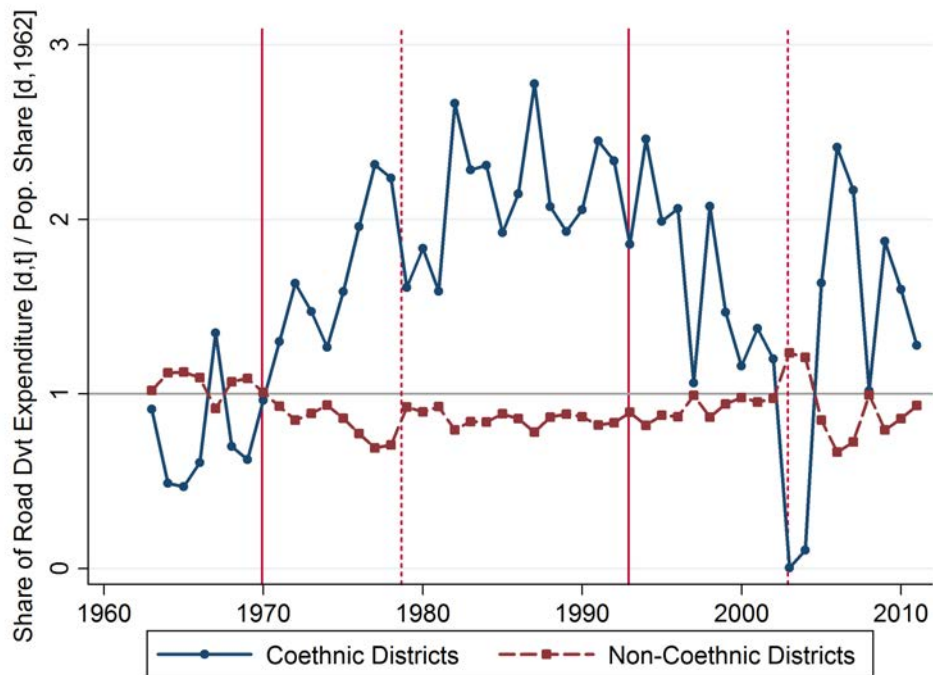


Figure 3: Evolution of Kenya's Paved Road Network for Selected Years, 1964-2002



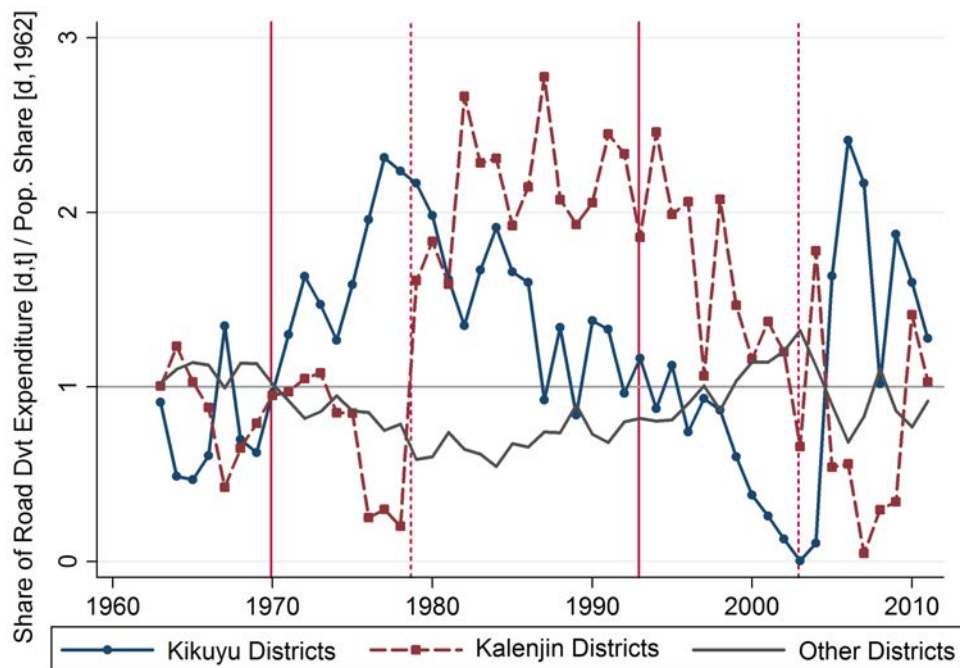
Notes: These figures show the evolution of Kenya's paved road network for selected years = [1964, 1969, 1979, 1992, 2002]. The year 1964 is the first year for which we have GIS data after Kenya became independent in December 1963. Years for political transitions: December 1969 is the transition from democracy to autocracy, and December 1992 is the return of democracy. Years for leadership transitions: from Kenyatta (Kikuyu) to Moi (Kalenjin) in August 1978 (we only have maps for 1979), and from Moi (Kalenjin) to Kibaki (Kikuyu) in December 2002. We have no data post 2002. Nairobi is the capital city. All the road maps are layered on top of ethnic demographics - we illustrate the two coethnic areas, the Kikuyu and Kalenjin districts. The coethnic districts are defined as districts whose the ethnicity of the president is more than 50% of the population. See Appendix Table 2 and Online Data Appendix for data sources.

Figure 4: Road Investment in Coethnic and Non-Coethnic Districts, 1963-2011



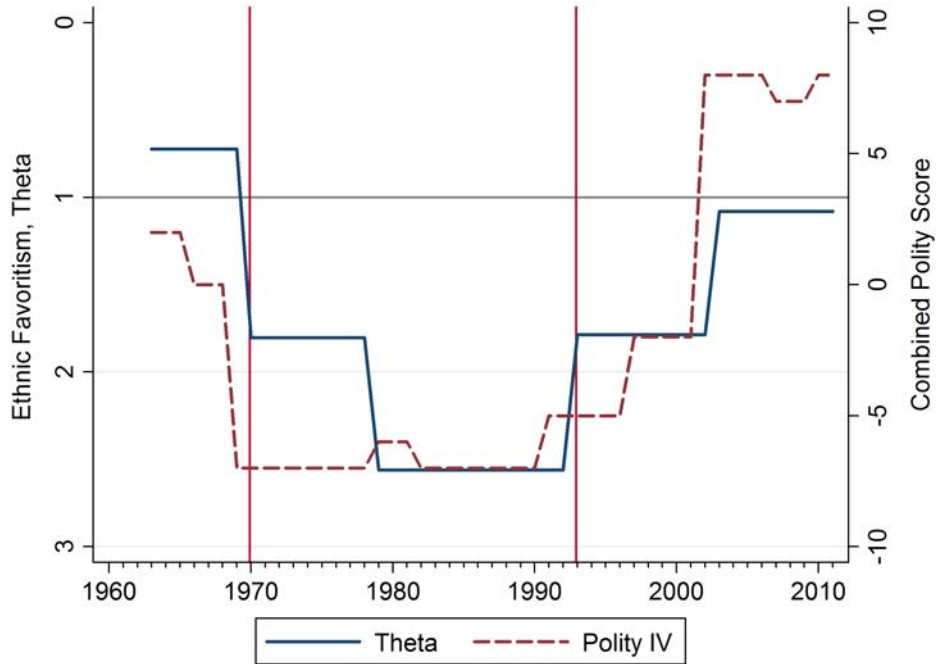
Notes: This figure plots the ratio of the share of road development expenditure in year  $t$  to the share of population in 1962 for coethnic and non-coethnic districts  $d$ . A district  $d$  is defined as coethnic if more than 50% of its population is from the ethnic group of the president at time  $t$ . The two vertical solid lines represent political transitions: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. The two vertical dotted lines represent leadership transitions: from Kenyatta (Kikuyu) to Moi (Kalenjin) in August 1978, and from Moi (Kalenjin) to Kibaki (Kikuyu) in December 2002. See Appendix Table 2 and Online Data Appendix for data sources.

Figure 5: Road Investment in Kikuyu, Kalenjin and Other Districts, 1963-2011



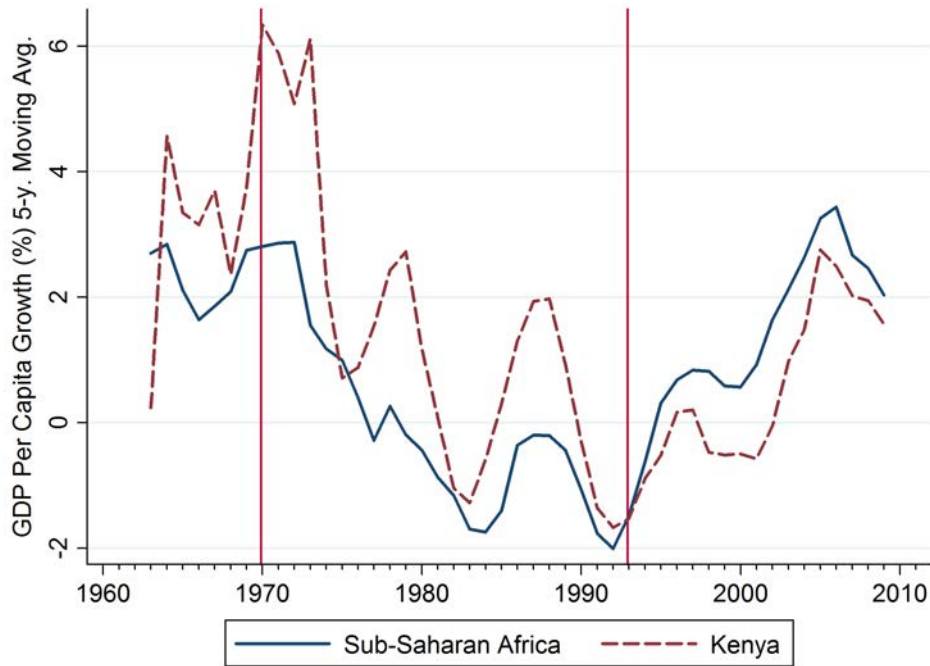
Notes: This figure plots the ratio of the share of road development expenditure in year  $t$  to the share of population in 1962 for coethnic and non-coethnic districts  $d$ . Coethnic districts are as defined in figure 3, except they are now disaggregate into the two different leading groups. The president is Kikuyu during 1963-1978, Kalenjin during 1978-2002 and Kikuyu during 2002-2011. A district is defined as Kikuyu (Kalenjin) if more than 50% of its population is Kikuyu (Kalenjin). The vertical lines represent political transitions, while the vertical dotted lines represent leadership transitions (see figure 3). See Appendix Table 2 and Online Data Appendix for data sources.

Figure 6: Ethnic Favoritism and Political Regimes in Kenya, 1963-2011



Notes: This figure plots *theta*, our estimate of ethnic favoritism, and the revised combined polity score for Kenya annually from 1963 to 2011. The two vertical solid lines represent political transitions: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. Source: authors' calculations and *Polity IV Project, Political Regime Characteristics and Transitions, 1800-2011*. See Online Data Appendix for data sources.

Figure 7: Evolution of GDP per capita growth in Sub-Saharan Africa, 1963-2011



Notes: This figure plots GDP per capita growth (%) for Sub-Saharan Africa (average) and Kenya. We take a 5-year moving average to smooth fluctuations. The vertical lines represent regime changes in Kenya: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. See Online Data Appendix for data sources.

**Table 1: Road Expenditure, Ethnicity and Democratic Change in Kenya, 1963-2011**

<i>Dependent Variable:</i>	Share of road development expenditure [d,t]				
	(1)	(2)	(3)	(4)	(5)
	Population share [d,1962]				
<b>Panel A:</b>					
Coethnic District Indicator [d,t]	0.97*** (0.36)	0.96*** (0.35)	0.96*** (0.35)	1.02*** (0.35)	0.97** (0.38)
<b>Panel B:</b>					
Coethnic District Indicator [d,t]	1.57*** (0.49)	1.62*** (0.49)	1.64*** (0.49)	1.74*** (0.49)	1.56*** (0.51)
Coethnic District Indicator [d,t] x Democracy Indicator [t]	-1.11* (0.61)	-1.24* (0.63)	-1.27** (0.63)	-1.32** (0.63)	-1.08* (0.59)
F-test [ <i>p-value</i> ]	1.07 [0.31]	0.76 [0.39]	0.73 [0.40]	0.90 [0.35]	1.22 [0.28]
Coethnic + Coethnic x Democracy = 0					
Observations	2009	2009	2009	2009	2009
Year and district fixed effects	Y	Y	Y	Y	Y
(Population, area, urbanization rate) x trend	N	Y	Y	Y	N
(Earnings, employment, cash crops) x trend	N	N	Y	Y	N
(Main highway, border, dist.Nairobi) x trend	N	N	N	Y	N
District time trends	N	N	N	N	Y

*Notes:* OLS regressions using data on 41 districts annually from 1963 to 2011. Standard errors corrected for clustering at the district level are reported in parentheses; \*\*\* denotes significance at 1%, \*\* at 5%, and \* at 10%. *Coethnic District Indicator [d,t]* is an indicator variable whose value is one if more than 50% of the population of district *d* is from the ethnic group of the president at time *t*. *Democracy Indicator [t]* is an indicator variable whose value is one if year *t* is a democracy year. The F-test is used to test the null hypothesis of joint equality between a coethnic and a non-coethnic district during democracy. Columns (2)-(4) include controls interacted with a time trend (1963-2011). These controls are: [i] demographic (district population in 1962, district area in sq km, and urbanization rate in 1962), [ii] economic activity (district total earnings in 1966, employment in the formal sector in 1963 and value of cash crop exports in 1965), [iii] economic geography (an indicator variable whose value is one if any part of the district is on the Mombasa-Nairobi-Kampala corridor, an indicator variable whose value is one if the district borders Uganda or Tanzania, and the Euclidean distance in km to Nairobi). See Appendix Table 2 and Online Data Appendix for data sources and construction of variables.

**Table 2: Road Building, Ethnicity and Democratic Change in Kenya, 1964-2002**

<i>Dependent Variable:</i>	Share of paved road construction [d,t]				
	(1)	(2)	(3)	(4)	(5)
	<b>Population share [d,1962]</b>				
<b>Panel A:</b>					
Coethnic District Indicator [d,t]	1.91** (0.94)	1.94* (0.99)	2.20* (1.09)	3.24* (1.72)	3.96 (2.38)
<b>Panel B:</b>					
Coethnic District Indicator [d,t]	3.00** (1.23)	3.03** (1.26)	3.19** (1.33)	3.90** (1.76)	3.34 (2.38)
Coethnic District Indicator [d,t]	-3.55** (1.38)	-3.61** (1.36)	-3.45** (1.32)	-2.71* (1.46)	-3.22** (1.49)
x Democracy Indicator [t]					
F-test [ <i>p-value</i> ]	0.44 [0.51]	0.49 [0.49]	0.10 [0.75]	0.34 [0.56]	0.00 [0.97]
Coethnic + Coethnic x Democracy = 0					
Observations	410	410	410	410	410
Year and district fixed effects	Y	Y	Y	Y	Y
(Population, area, urbanization rate) x trend	N	Y	Y	Y	N
(Earnings, employment, cash crops) x trend	N	N	Y	Y	N
(Main highway, border, dist.Nairobi) x trend	N	N	N	Y	N
District time trends	N	N	N	N	Y

*Notes:* OLS regressions using maps on 41 districts from 1964 to 2002. Maps are only available for years = [1964, 1967, 1969, 1972, 1974, 1979, 1981, 1984, 1987, 1992, 2002]. Standard errors corrected for clustering at the district level are reported in parentheses; \*\*\* denotes significance at 1%, \*\* at 5%, and \* at 10%. *Coethnic District Indicator [d,t]* is an indicator variable whose value is one if more than 50% of the population of district *d* is from the ethnic group of the president at time *t*. *Democracy Indicator [t]* is an indicator variable whose value is one if year *t* is a democracy year. The F-test is used to test the null hypothesis of joint equality between a coethnic district and a non-coethnic district during democracy. Columns (2)-(4) include the same controls as in Table 1 interacted with a time trend (1964-2002). See the footnote of Table 1 for a description of these controls. See Appendix Table 2 and Online Data Appendix for data sources and construction of variables.

**Table 3: Robustness Checks for the Main Specifications**

<i>Dependent Variable:</i>	Share of road dvt exp. [d,t]		Share of road dvt exp. [d,t]		Share of paved road con. [d,t]		Share of paved road con. [d,t]	
	Pop.sh. [d,1962]	(1)	Area sh. [d]	(2)	Pop.sh. [d,1962]	(3)	Area sh. [d]	(4)
		(1)		(2)		(3)		(4)
		(5)		(6)		(7)		(8)
<b>Panel A:</b>								
Coethnic Dist. Indicator [d,t]	1.02*** (0.35)	1.74*** (0.49)	1.84** (0.90)	3.05*** (0.99)	3.24* (1.72)	3.90** (1.76)	4.53*** (1.47)	5.69*** (1.62)
Coethnic Dist. Indicator [d,t] x Democracy Indicator [t]	-1.32** (0.63)	-2.22* (1.29)						
F-test [ <i>p-value</i> ]		0.90 [0.35]		0.52 [0.48]		0.34 [0.56]		0.11 [0.74]
Coethnic + Coethnic x Dem. = 0								
<b>Panel B:</b>								
Coethnic Share [d,t]	1.25*** (0.38)	2.30*** (0.56)	2.34** (1.00)	4.44*** (1.13)	3.68* (1.90)	4.63** (1.97)	4.24** (1.93)	5.81*** (1.73)
Coethnic Share [d,t] x Democracy Indicator [t]	-1.90*** (0.66)	-3.78** (1.45)						
F-test [ <i>p-value</i> ]		0.97 [0.33]		0.28 [0.60]		0.40 [0.53]		0.02 [0.90]
Coethnic + Coethnic x Dem. = 0								
Observations	2009	2009	2009	2009	410	410	410	410

*Notes:* Columns (1)-(4): OLS regressions using road expenditure data (*road dvt. exp.*) on 41 districts annually from 1963 to 2011. Columns (5)-(8): OLS regressions using paved road construction data (*paved road con.*) on 41 districts from 1963 to 2002. Road maps are only available for years = [1964, 1967, 1969, 1972, 1974, 1979, 1981, 1984, 1987, 1992, 2002]. In columns (1)-(2) and (5)-(6) the numerator of the dependent variable is normalized by the population share of the district in 1962 (*Pop.sh.*). In columns (3)-(4) and (7)-(8), the numerator is normalized by the area share of the district (*Area sh.*). All regressions include district and year fixed effects. Standard errors corrected for clustering at the district level are reported in parentheses; \*\*\* denotes significance at 1%, \*\* at 5%, and \* at 10%. *Coethnic Dist. Indicator [d,t]* is an indicator variable whose value is one if more than 50% of the population of district d is from the ethnic group of the president at time t. *Coethnic Share [d,t]* is the population share of the ethnic group of the president in district d at time t. *Democracy Indicator [t]* is an indicator variable whose value is one if year t is a democracy year. The F-test is used to test the null hypothesis of joint equality between a coethnic district and a non-coethnic district during democracy. Columns (1)-(8) include the same controls as in the column (4) of Table 1 interacted with a time trend. See the footnote of Table 1 for a description of these controls. See Appendix Table 2 and Online Data Appendix for data sources and construction of variables.

**Table 4: Leadership, Democratic Changes and Road Expenditure in Kenya, 1963-2011**

<i>Dependent Variable:</i>	Share of road development expenditure [d,t]				
	KENYATTA		MOI		KIBAKI
<i>Leader:</i>	Democracy	Autocracy	Autocracy	Democracy	Democracy
<i>Regime:</i>	1963-1969	1970-1978	1979-1992	1993-2002	2003-2011
	(1)	(2)	(3)	(4)	(5)
Kikuyu District Indicator [d,1962]	-0.44 (0.39)	0.96** (0.39)	0.66 (0.49)	-0.88 (0.57)	0.00 (0.63)
Kalenjin District Indicator [d,1962]	-0.57 (0.41)	-0.17 (0.32)	1.88*** (0.66)	0.70 (1.11)	-0.60 (0.57)
F-test [ <i>p-value</i> ]	0.15 [0.70]	6.92** [0.01]	3.13* [0.08]	2.26 [0.14]	0.99 [0.33]
Kikuyu District - Kalenjin District = 0					
Observations	287	369	574	410	369
Year fixed effects	Y	Y	Y	Y	Y
District fixed effects	-	-	-	-	-

*Notes:* OLS regressions using data on 41 districts annually from 1963 to 2011. Standard errors corrected for clustering at the district level are reported in parentheses; \*\* denotes significance at 1%, \* at 5%, and  $\cdot$  at 10%. The number of observations depends on the number of years of the regime. *Kikuyu (Kalenjin) District Indicator [d,1962]* is an indicator variable whose value is one if more than 50% of the population of district *d* is Kikuyu (Kalenjin) according to the 1962 population census. Non-Kikuyu and non-Kalenjin districts are the omitted group. Unlike previous regressions, we cannot include district fixed effects because *Kikuyu (Kalenjin) District Indicator [d,1962]* does not vary over time. We cannot include the same controls (or district time trends) as in Table 1 because the number of observations significantly decreases when we restrict our analysis to each interval. The F-test is used to test the null hypothesis of joint equality between a Kikuyu district and a Kalenjin district. See Appendix Table 2 and Online Data Appendix for data sources and construction of variables.

**Table 5: Role of the Vice-President and Effects on Cabinet Composition, 1963-2011**

<i>Dependent Variable:</i>	Share of road dvt expenditure [d,t]		Ethnic share of cabinet [e,t]	
	(1)	(2)	(3)	(4)
Coethnic District [d,t]/Group [e,t] Indicator	1.74*** [0.49]	2.62*** [0.71]	0.64*** [0.13]	1.08*** [0.31]
Coethnic District [d,t]/Group [e,t] Indicator x Democracy Indicator [t]	-1.32** [0.63]	-1.63** [0.69]	0.02 [0.28]	0.03 [0.29]
VP-Coethnic District [d,t] / Group [e,t] Indicator		1.46** [0.56]		0.94** [0.34]
VP-Coethnic District [d,t] / Group [e,t] Indicator x Democracy Indicator [t]		-1.42** [0.61]		-0.64 [0.38]
F-test, Coethnic [ <i>p-value</i> ]	0.90 [0.35]	2.64 [0.11]	5.87** [0.03]	216.4*** [0.00]
Coethnic + Coethnic x Democracy = 0		0.00		4.00** [0.05]
F-test, VP-Coethnic [ <i>p-value</i> ]				
VP-Coethnic + VP-Coethnic x Democracy = 0				
Observations	2009	2009	169	169
Year and district/ethnic group fixed effects	Y	Y	Y	Y
Controls	Y	Y	N	N

*Notes:* Columns (1)-(2): OLS regressions using expenditure data on 41 districts annually from 1963 to 2011. Columns (3)-(4): OLS regressions using data on all elections from 1963 to 2011, for 13 ethnic groups. The dependent variable is the ratio of the cabinet share of ethnic group *e* to its population share. Standard errors corrected for clustering at the district/group level are reported in parentheses; \*\*\* denotes significance at 1%, \*\* at 5%, and \* at 10%. *Coethnic District Indicator [d,t]* is an indicator variable whose value is one if more than 50% of the population of district *d* is from the ethnic group of the president at time *t*. *Coethnic Group Indicator [e,t]* is an indicator variable whose value is one if the president at time *t* belongs to ethnic group *e*. *Democracy Indicator [t]* is an indicator variable whose value is one if year *t* is a multi-party year. *VP-Coethnic District Indicator [d,t]* is an indicator variable whose value is one if more than 50% of the population of district *d* is from the ethnic group of the vice-president at time *t*. *VP-Group Indicator [e,t]* is an indicator variable whose value is one if the vice-president at time *t* belongs to ethnic group *e*. The F-tests are used to test the null hypothesis of joint equality between a coethnic district/group and a non-coethnic district/group for the president and the vice-president during a multi-party year. Columns (1)-(2) include the standard controls interacted with a time trend. Columns (3)-(4) include ethnic group time trends. See Appendix Table 2 and Online Data Appendix for data sources and construction of variables.



**Table 6: Economic Growth, Ethnic Diversity and Democratic Change Across Countries, 1960-2010**

<i>Dependent Variable:</i>	<b>Growth of Per Capita Real GDP [c,d]</b>				
	<i>Sample:</i> Decades:	World 1960s-1980s (1)	World 1960s-2000s (2)	World 1960s-2000s (3)	Africa 1960s-2000s (4)
Ethnic [c,1960]		-0.017*** (0.006)	-0.006 (0.005)	-0.015* (0.008)	-0.023* (0.011)
Ethnic [c,1960] x Democracy [c,d]				0.013 (0.009)	0.036** (0.015)
Democracy [c,d]				-0.002 (0.005)	-0.018 (0.012)
F-test [ <i>p-value</i> ]				0.10 [0.76]	0.05 [0.83]
Ethnic + Ethnic x Democracy = 0					
Observations		312	528	500	182
Controls		Y	Y	Y	Y

*Notes:* OLS regressions using GDP data on 110 countries  $c$  for five decades  $d = [1960s, 1970s, 1980s, 1990s, 2000s]$ . The dependent variable, *Growth of Per Capita Real GDP* [c,d], is the average growth rate of real per capita GDP for country  $c$  in decade  $d$ . We use Easterly and Levine's (1997, henceforth cited as EL97) - 1960s, 1970s and 1980s data set and extend it using the Penn World Tables v7.1. *Ethnic [c,1960]* is the index of ethnolinguistic fractionalization of country  $c$  in 1960. This variable was obtained from EL97. *Democracy [c,d]* is an indicator variable whose value is one if country  $c$  is not an autocracy in decade  $d$ , specifically if the average combined polity score for decade  $d$  is strictly less than -5, the threshold defined by Polity IV. Standard errors corrected for clustering at the country level are reported in parentheses; \*\*\* denotes significance at 1%, \*\* at 5%, and \* at 1%. EL97 use Seemingly Unrelated Regressions, while we run OLS regressions and cluster standard errors at the country level, which produces nearly identical results. Columns (1)-(4) include the same controls as in the column (1) of Table IV of EL97 - "Indicator for the 1960s", "Indicator for the 1970s", "Indicator for the 1980s", "Indicator Variable for Sub-Saharan Africa", "Indicator Variable for Latin America and the Caribbean", "Log of Initial Income", "Log of Initial Income) Squared" - with the exception of "Log of Schooling", because of the high number of missing observations, especially for Africa. In columns (4), we run the same regression as in column (3) for 38 Sub-Saharan African countries only. The F-test is used to test the null hypothesis of joint equality between a fractionalized and a non-fractionalized country during democracy. See Online Data Appendix for data sources and construction of variables.