The Value of Democracy:
Evidence from Road Building in Kenya

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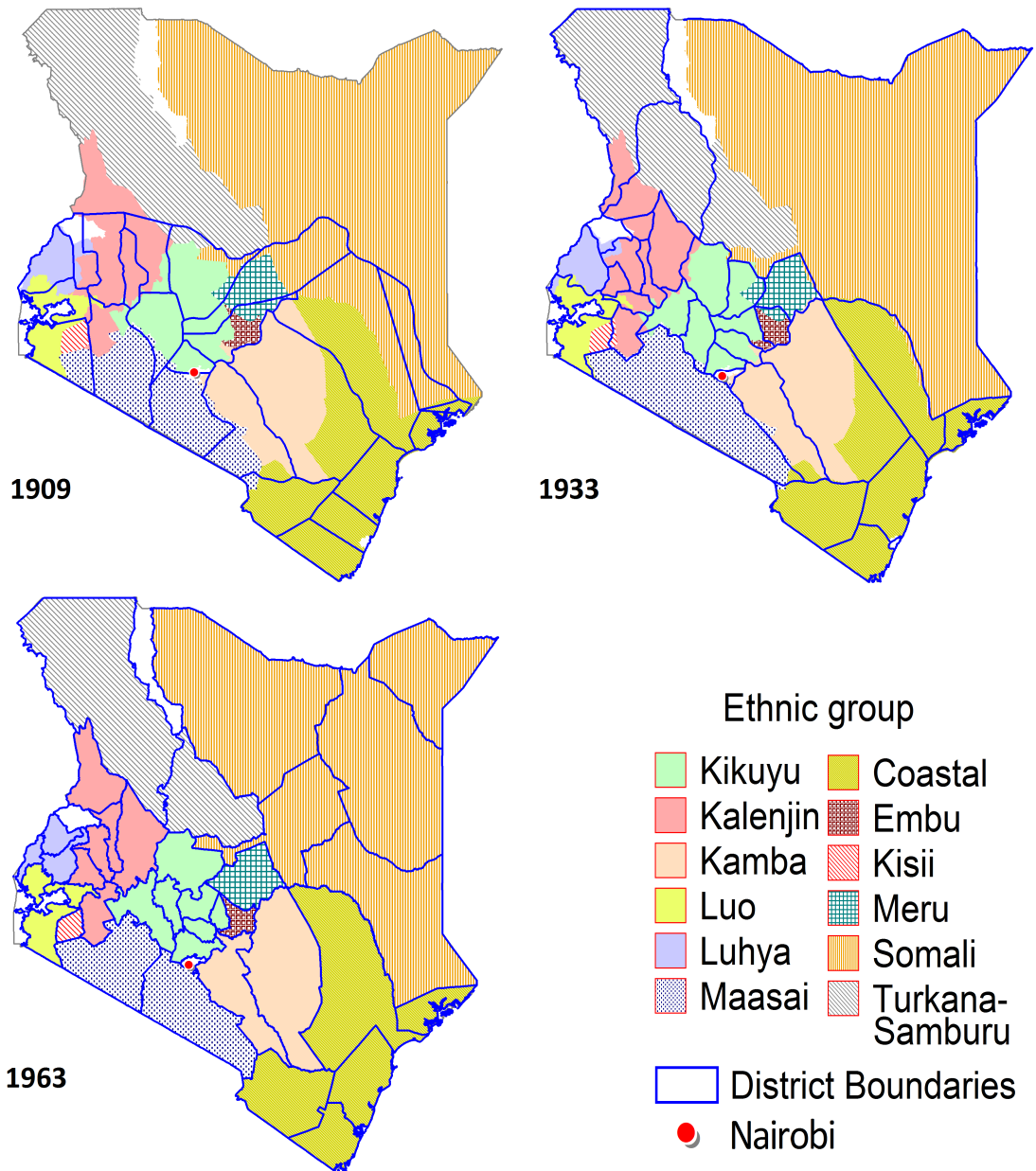Edward Miguel (UC Berleley and IGC)
Ameet Morjaria (Harvard and IGC)
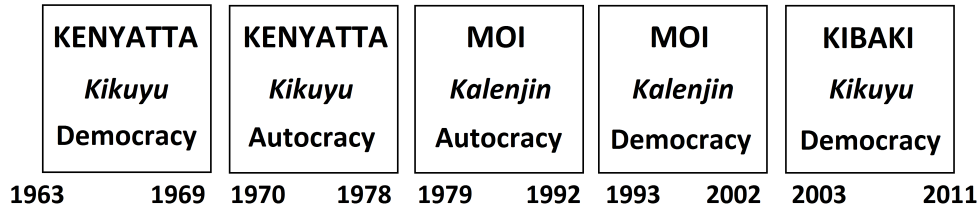Gerard Padro I Miquel (LSE and IGC)

Introduction

- ▶ In this paper we do two things:

  1. Quantify the extent of ethnic favoritism
  2. Determine whether institutional change affects it

Appendix Figure 1: Evolving District Boundaries and Ethnic Composition in British Kenya

1909

1933

1963

Ethnic group

|	
Kikuyu	Coastal
Kalenjin	Embu
Kamba	Kisii
Luo	Meru
Luhya	Somali
Maasai	Turkana-Samburu

District Boundaries

● Nairobi

Notes: These figures show the ethnic composition at the district level in British Kenya, using the 1962 *Population Census*, and the evolution of district boundaries for selected years = [1909, 1933, 1963]. A district d is defined as belonging to ethnic group e if more than 50% of the district population is from ethnic group e. There are three districts with no majoritarian group: Nairobi, Mombasa and Trans-Nzoia. The 1963 district boundaries (N = 41) are used in all our analysis. Nairobi is the capital city. See Online Data Appendix for data sources.

Figure 2: History Timeline of Political and Leadership Transitions

| **KENYATTA**	**KENYATTA**	**MOI**	**MOI**	**KIBAKI**
Kikuyu	*Kikuyu*	*Kalenjin*	*Kalenjin*	*Kikuyu*
Democracy	**Autocracy**	**Autocracy**	**Democracy**	**Democracy**
1963 — 1969	1970 — 1978	1979 — 1992	1993 — 2002	2003 — 2011

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 1: Evolution of Political Regimes in Sub-Saharan Africa, 1963-2011
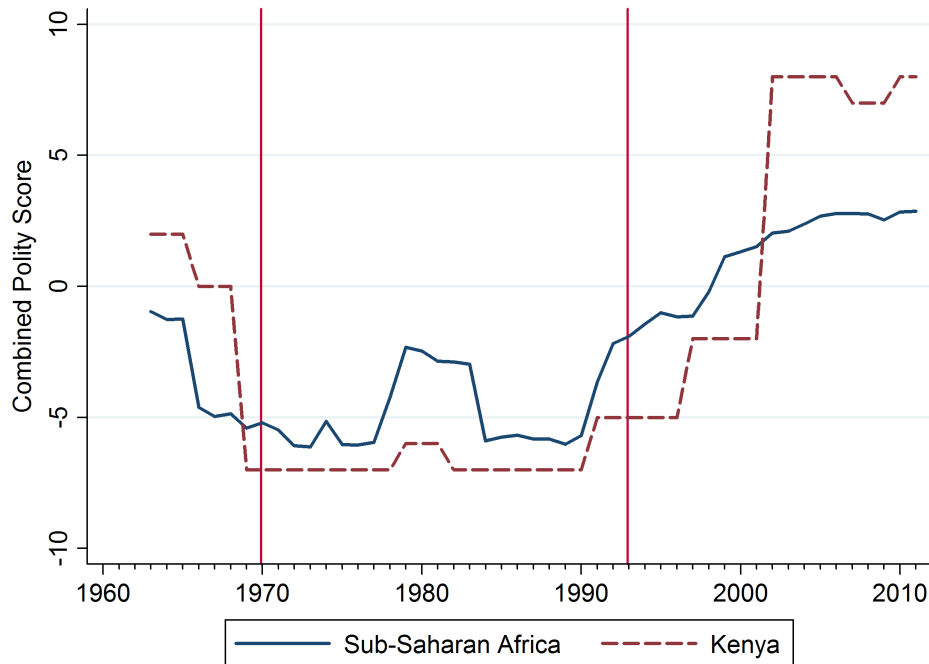
Notes: This figure plots the revised combined polity score for Sub-Saharan Africa (average) and Kenya. Polity IV defines three regime categories: *autocracies* (-10 to -6), *anocracies* (-5 to +5) and *democracies* (+6 to +10). The vertical lines represent regime changes in Kenya: December 1969 is the 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 7: Evolution of GDP per capita growth in Sub-Saharan Africa, 1963-2011
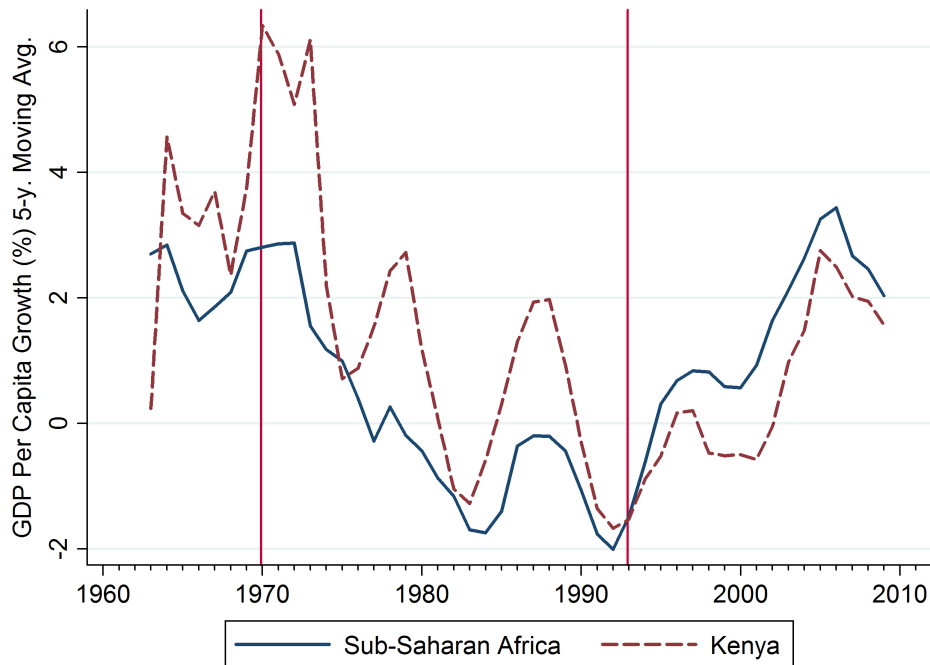
Notes: This figure plots GDP per capita growth (%) for Sub-Saharan Africa (average) and Kenya. We take a 5-year moving average to smooth fluctuations. The vertical lines represent regime changes in Kenya: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. See Online Data Appendix for data sources.

Figure 3: Evolution of Kenya's Paved Road Network for Selected Years, 1969-2002

(a) Actual Network
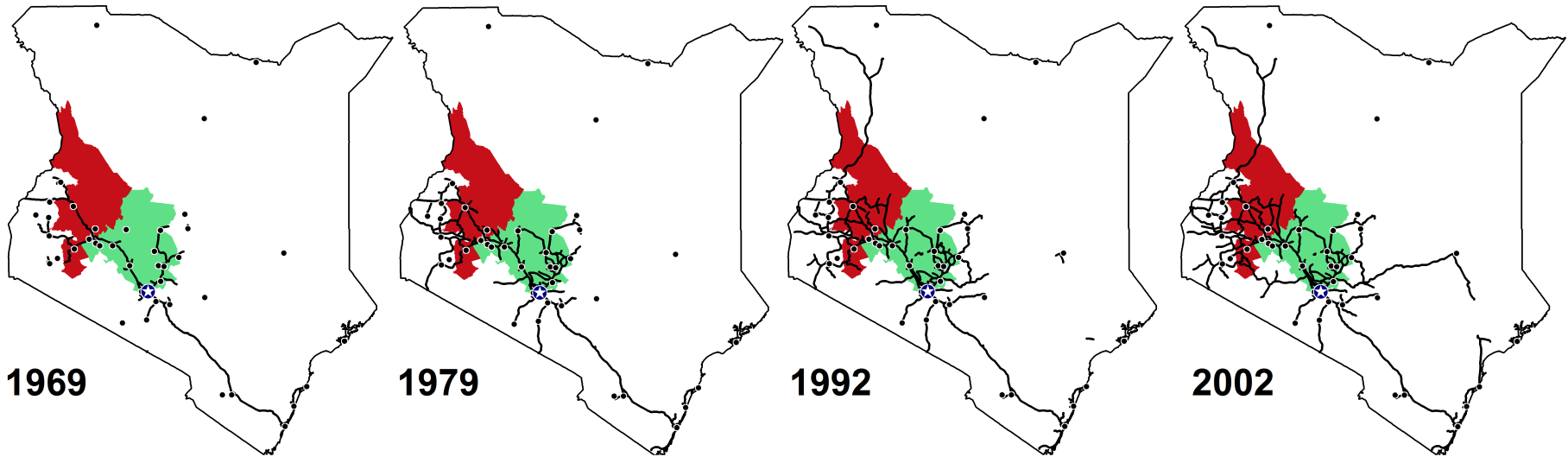
(b) Counterfactual Network Based on Population and Distance (Market Potential)

Paved Road   Kikuyu Areas   Kalenjin Areas   Nairobi   City (1962)
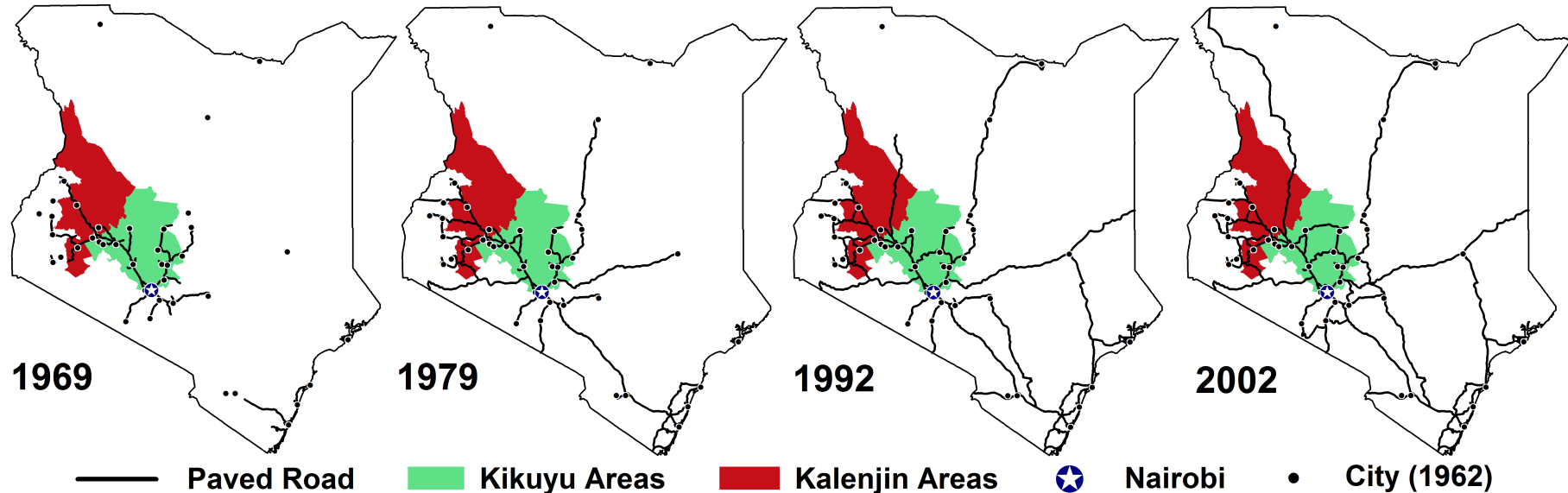
Notes: These figures show the evolution of Kenya's actual and counterfactual paved road networks for selected years = [1969, 1979, 1992, 2002]. The counterfactual network sequentially paves the unpaved bilateral connections with the highest market potential (based on population and distance). Years for 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.

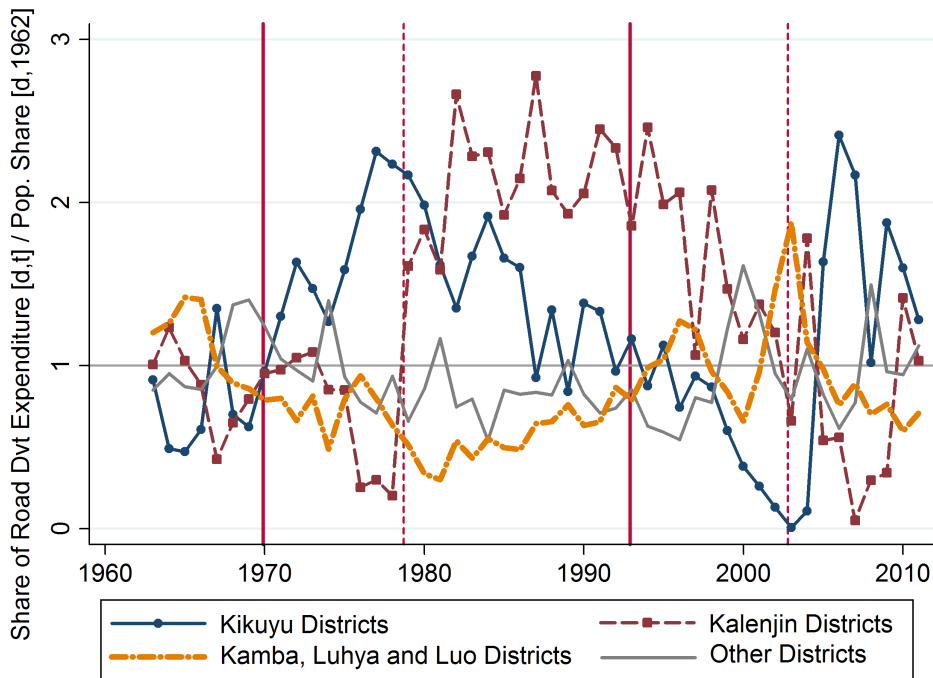Figure 4: Road Investment in Coethnic and Non-Coethnic Districts, 1963-2011
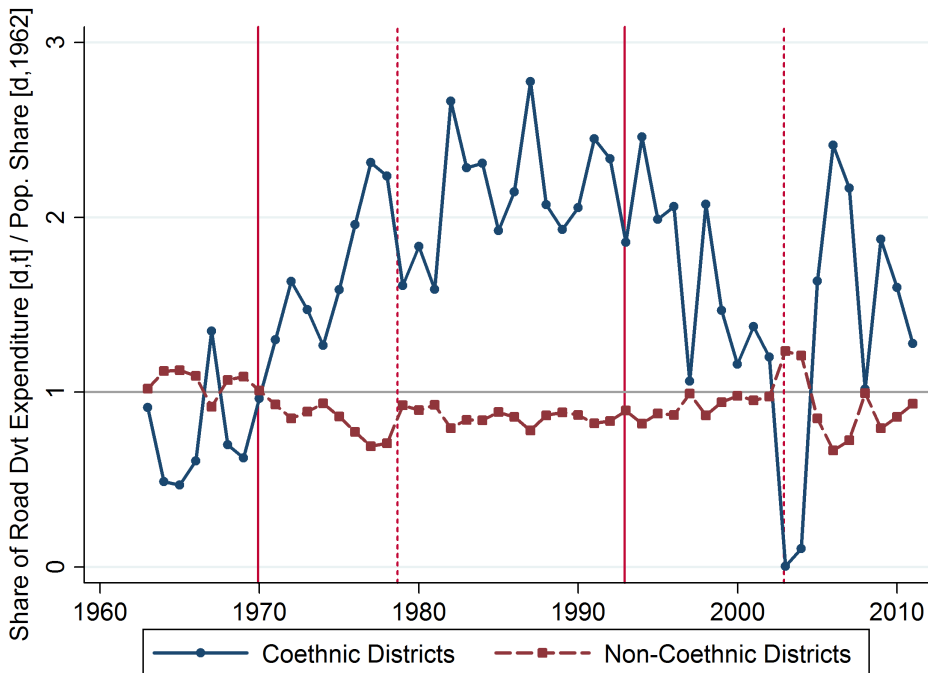
Notes: This figure plots the ratio of the share of road development expenditure in year t to the share of population in 1962 for coethnic and non-coethnic districts d. A district d is defined as coethnic if more than 50% of its population is from the ethnic group of the president at time t. The two vertical 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
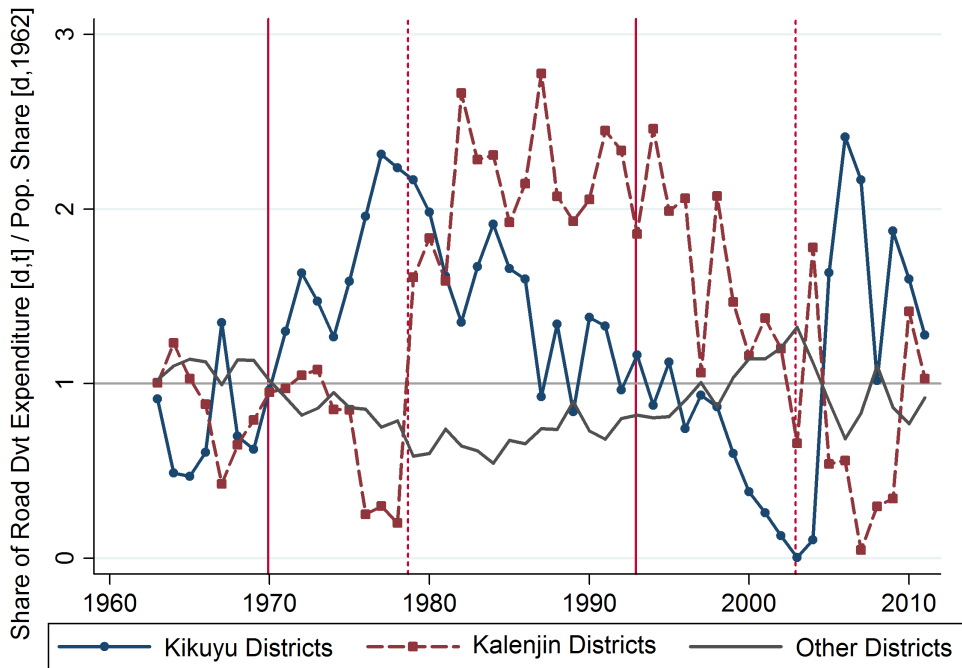
Notes: This figure plots the ratio of the share of road development expenditure in year t to the share of population in 1962 for coethnic and non-coethnic districts d. Coethnic districts are as defined in figure 3, except they are now disaggregate into the two different leading groups. The president 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.

Appendix Figure 2: Road Expenditure in Kikuyu, Kalenjin, Kamba, Luhya, Luo 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 defined as in figure 3, except they are now disaggregated into the two different leading groups (Kikuyu and Kalenjin). The president is Kikuyu during 1963-1978, Kalenjin during 1978-2002 and Kikuyu during 2002-2011. Non-coethnic districts are now disaggregated into the swing groups (Kamba, Luhya and Luo) and the other groups. A district is defined as Kikuyu (Kalenjin, Kamba, Luhya and Luo) if more than 50% of its population is Kikuyu (Kalenjin, Kamba, Luhya and Luo respectively). There are 7 Kikuyu districts, 6 Kalenjin districts, 2 Kamba districts, 3 Luhya districts and 3 Luo districts. 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.

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

| Dependent Variable:	Share of road development expenditure [d,t]				
	Population share [d,1962]				
	(1)	(2)	(3)	(4)	(5)
Panel A:					
Coethnic District Indicator [d,t]	0.97***	0.96***	0.96***	1.02***	0.97**
	(0.36)	(0.35)	(0.35)	(0.35)	(0.38)
Panel B:					
Coethnic District Indicator [d,t]	1.57***	1.62***	1.64***	1.74***	1.56***
	(0.49)	(0.49)	(0.49)	(0.49)	(0.51)
Coethnic District Indicator [d,t]	-1.11*	-1.24*	-1.27**	-1.32**	-1.08*
x Democracy Indicator [t]	(0.61)	(0.63)	(0.63)	(0.63)	(0.59)
F-test [*p-value*]	1.07	0.76	0.73	0.90	1.22
Coethnic + Coethnic x Democracy = 0	*[0.31]*	*[0.39]*	*[0.40]*	*[0.35]*	*[0.28]*
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 1%. *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

Dependent Variable:	Share of paved road construction [d,t]				
	Population share [d,1962]				
	(1)	(2)	(3)	(4)	(5)
Panel A:					
Coethnic District Indicator [d,t]	1.91**	1.94*	2.20*	3.24*	3.96
	(0.94)	(0.99)	(1.09)	(1.72)	(2.38)
Panel B:					
Coethnic District Indicator [d,t]	3.00**	3.03**	3.19**	3.90**	3.34
	(1.23)	(1.26)	(1.33)	(1.76)	(2.38)
Coethnic District Indicator [d,t]	-3.55**	-3.61**	-3.45**	-2.71*	-3.22**
x Democracy Indicator [t]	(1.38)	(1.36)	(1.32)	(1.46)	(1.49)
F-test [*p-value*]	0.44	0.49	0.10	0.34	0.00
Coethnic + Coethnic x Democracy = 0	*[0.51]*	*[0.49]*	*[0.75]*	*[0.56]*	*[0.97]*
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 1%. *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.

Figure 6: Ethnic Favoritism and Political Regimes in Kenya, 1963-2011
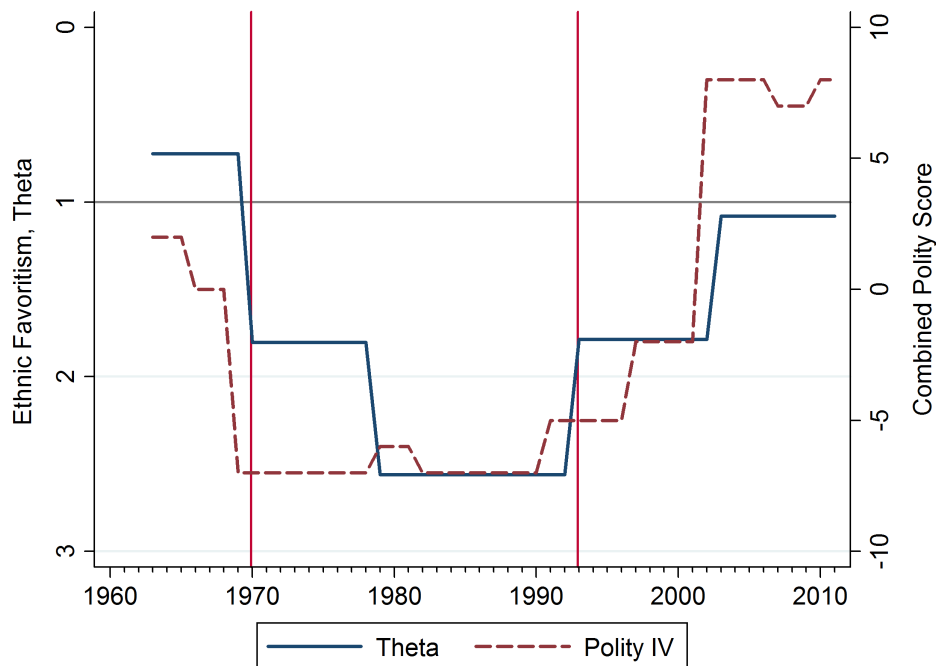
Notes: This figure plots *theta*, our estimate of ethnic favoritism, and the revised combined polity score for Kenya annually from 1963 to 2011. The two vertical solid lines represent political transitions: December 1969 is the transition from democracy to autocracy, while December 1992 is the return of democracy. Source: authors' calculations and *Polity IV Project, Political Regime Characteristics and Transitions, 1800-2011*. See Online Data Appendix for data sources.

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

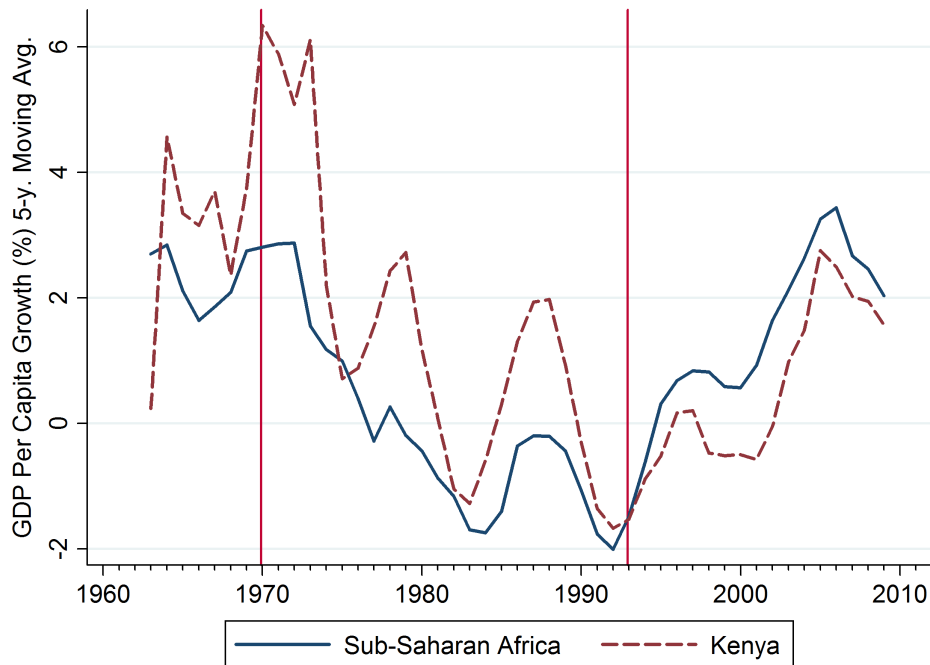| Dependent Variable:	Share of road dvt. expenditure [d,t] / Pop. share [d,1962]		Ethnic share of cabinet [e,t] / Pop. share [e,1962]		Share of road dvt. expenditure [d,t] / Pop. share [d,1962]	
	Table 1 Col.(4)					
	(1)	(2)	(3)	(4)	(5)	(6)
Coethnic (District [d,t] *or* Group [e,t]) Indicator	1.72***	2.60***	0.64***	1.08***	1.71***	1.74***
	(0.49)	(0.71)	(0.13)	(0.31)	(0.49)	(0.49)
Coethnic (District [d,t] *or* Group [e,t]) Indicator x Democracy Indicator [t]	-1.32**	-1.63**	0.02	0.03	-1.30**	-1.35**
	(0.62)	(0.68)	(0.28)	(0.29)	(0.64)	(0.63)
VP-Coethnic (District [d,t] *or* Group [e,t]) Indicator		1.46**		0.94**		
		(0.61)		(0.34)		
VP-Coethnic (District [d,t] *or* Group [e,t]) Indicator x Democracy Indicator [t]		-1.44**		-0.64		
		(0.61)		(0.38)		
Kamba-Luhya-Luo District [d,1962] Indicator x Democracy Indicator [t]					0.20	
					(0.44)	
Non-Majoritarian District [d,1962] Indicator x Democracy Indicator [t]						0.23
						(0.63)
F-test, Coethnic [*p-value*]	0.90	2.49	5.87**	216.4***	0.89	0.81
Coethnic + Coethnic x Democracy = 0	[0.35]	[0.12]	[0.03]	[0.00]	[0.35]	[0.37]
F-test, VP-Coethnic [*p-value*]		0.00		2.73		
VP-Coethnic + VP-Coethnic x Democracy = 0		[0.98]		[0.12]		
Observations	2009	2009	169	169	2009	2009
Year and (District *or* Group) Fixed Effects	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	N	N

Notes: Columns (1)-(2) and (5)-(6): OLS regressions using expenditure data on 41 districts annually from 1963 to 2011 [d,t]. Columns (3)-(4): OLS regressions using data on all elections from 1963 to 2011, for 13 ethnic groups [e,t]. 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. *Democracy Indicator [t]* is an indicator variable whose value is one if year t is a multi-party year. *Coethnic Group Indicator [e,t]* is an indicator variable whose value is one if the president at time t belongs to ethnic group e. *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. *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. *Kamba-Luhya-Luo District [d,1962] Indicator* is an indicator variable whose value is one if more than 50% of the population of district d is Kamba, Luhya or Luo according to the 1962 population census. There are 7 Kikuyu districts, 6 Kalenjin districts, 2 Kamba districts, 3 Luhya districts and 3 Luo districts. *Non-Majoritarian District [d,1962] Indicator* is an indicator variable whose value is one if more the main ethnic group of district d accounts for less than 80% of the total population of that district. 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) and (5)-(6) 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 3: Road Building Counterfactual based on
Market Potential, Ethnicity and Democratic Change in Kenya

Dependent Variable:	Share of paved road construction [d,t]		
	Population share [d,1962]		
Counterfactual:	Population	Distance	Population and Distance (Market Potential)
	(1)	(2)	(3)
Panel A:			
Coethnic District Indicator [d,t]	0.22	-0.56	0.67
	(0.44)	(1.21)	(1.03)
Panel B:			
Coethnic District Indicator [d,t]	0.20	-0.57	0.34
	(0.52)	(1.14)	(1.08)
Coethnic District Indicator [d,t]	0.08	0.05	1.38
x Democracy Indicator [t]	(1.38)	(1.34)	(2.24)
F-test [*p-value*]	0.05	0.08	0.64
Coethnic + Coethnic x Democracy = 0	*[0.82]*	*[0.78]*	*[0.43]*
Observations	410	410	410
Year and District Fixed effects	Y	Y	Y
Controls x Trend	Y	Y	Y

Notes: OLS regressions using counterfactual 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 1%. The counterfactual network sequentially paves the unpaved bilateral connections of cities (i, j) with the highest value first. We use 42 cities in Kenya and 7 border cities in neighboring countries in 1962. There are thus $42*41/2 + 42*7 = 1155$ potential bilateral connections. In column (1), the counterfactual is based on population P only. We maximize $P_i + P_j$ to obtain the ranking of the connections. In column (2), the counterfactual is based on distance D only. We minimize $D_{i,j}$ to obtain the ranking of the connections. In column (3), the counterfactual is based on both population P and distance D, hence market potential. We maximize $(P_i + P_j)/D_{i,j}$ to obtain the ranking of the connections. *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 (1)-(3) 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.

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

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

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

Conclusion

▶ Presidential power has often been built on an ethnic base

▶ To engender such support President's may favor co-ethnics

▶ Don't do this because they value utility of co-ethnics but rather because it is a cheap way of staying in power – can tax the many and favor the few

▶ Across the 1963-2011 period we find that districts which share ethnicity of the president

  ▶ receive twice as much expenditure on roads
  ▶ have four times the length of paved roads built

▶ Concrete evidence of ethnic favoritism which has been blamed for many of Africa's ills

Conclusion

▶ Mutiparty democracy constrains the ability of the executive to engage in such favoritism → for both road expenditure and paved road length the propensity to favor co-ethnics dissapears during periods of multiparty democracy

▶ Democracy, though the constraints it imposes on the executive, is in effect forcing the President to share more evenly across ethnic groups

▶ This move toward democracy in the 90s is common to Sub-Saharan Africa and the rest of the world

▶ Is it possible that democracy ameliorates the relationship between ethnic fractionalization and growth?

Conclusion

▶ Removing severe ethnic biases in public spending may be a factor in explaining why economic growth and multiparty democracy have coincided in Africa

▶ Closer examination of what happened in Kenya suggests civil society very important

▶ From 1992 onwards, not only a bit more open political system, but many more NGOs and free journalism

▶ Interesting to see how common is this among different episodes of transition, and how this affects specific government policies