

The Distribution of Power: Decentralization and Favoritism in Public Infrastructure

Catherine Wolfram¹ Susanna Berkouwer² Felipe Vial³
Eric Hsu⁴ Oliver Kim⁵ Edward Miguel⁶

(r) *The order of authors' names has been randomized*

¹MIT Sloan School of Management and NBER

²The Wharton School, University of Pennsylvania and NBER

³Uber Technologies

⁴Y-RISE, Yale University

⁵Department of Economics, UC Berkeley

⁶Department of Economics, UC Berkeley and NBER

June 2024

Motivation: Political favoritism and public investment

- ▶ By biasing public investment away from the economically optimal allocation, political favoritism may harm long-term economic development

Africa – Easterly and Levine 1997; Herbst 2000; Michalopoulos and Papaioannou 2016;

U.S. – Alesina, Baqir, Easterly 1999; Dixit and Londregan 1996; Snyder 1990; Ferejohn 1974

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- ▶ Hodler and Raschky (2014) study 126 countries between 1992–2009:
“Regional favoritism is not just common in some ethnically fractionalized sub-Saharan African countries, but is a more widespread phenomenon.”

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- ▶ Researchers often assume or create a benchmark allocation against which to measure bias
 - ▶ Governments can have a wide range of reasonable efficiency, equity, or other objectives that are unobserved to the researcher
 - ▶ Correlations between investment and political alignment can arise for a host of reasons (legitimate or coincidental)

This paper: The allocation of **electricity grid expansion**

Kenya's Rural Electrification Authority (REA) Strategic Plan

- ▶ Launched in 2008
- ▶ Goal: Connect all schools, health centers, markets to electricity

Kenya's Last Mile Connectivity Project (LMCP):

- ▶ **\$788 million project** launched in 2016
- ▶ Goal: Connect all Kenyan households to electricity
- ▶ Electricity access increased from 25% in 2009 to 70% in 2019

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Expansion of electricity featured prominently in winning coalition's **2013** and **2017** national election campaigns

Hon. Temporary Deputy Speaker,

I want to talk about fair distribution of power. As a country, we do not have enough power. However, there are some areas that are more equal than others. It is important that Kenya Power does not have political patronage so that it can distribute power without fear or favour. We will definitely move on to the next level if that happens. We have talked about developing this economy and that can only happen if those things are put in place.

Robert Mbui, Opposition Member of Parliament
Kenyan parliamentary debates
Nairobi, July 10 2013

To quantify favoritism we leverage an institutional feature

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Last Mile Connectivity Program Q & A

Q: What criteria was used to choose transformers?

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Last Mile Connectivity Program Q & A

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Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation in any particular direction?

Decentralization: a possible constraint on favoritism?

- ▶ **Definition:** Moving political power from the executive to regional governments (in the context of democratic institutions)
- ▶ Proposed as a constraint to presidential power and political favoritism: lower conflict, reduced corruption

Tiebout 1956; Barkan and Chegge 1989; Fisman and Gatti 2002; Brancati 2008; Opalo 2014; Hassan 2020

Kenyan democratization and decentralization reforms

- ▶ 2003 Constituency Development Fund (CDF) Act:
 - ▶ Equitable allocation of public funds across constituencies
 - ▶ Transparent: allocations are public
 - ▶ Locally-elected Members of Parliament (MPs) manage CDF funds

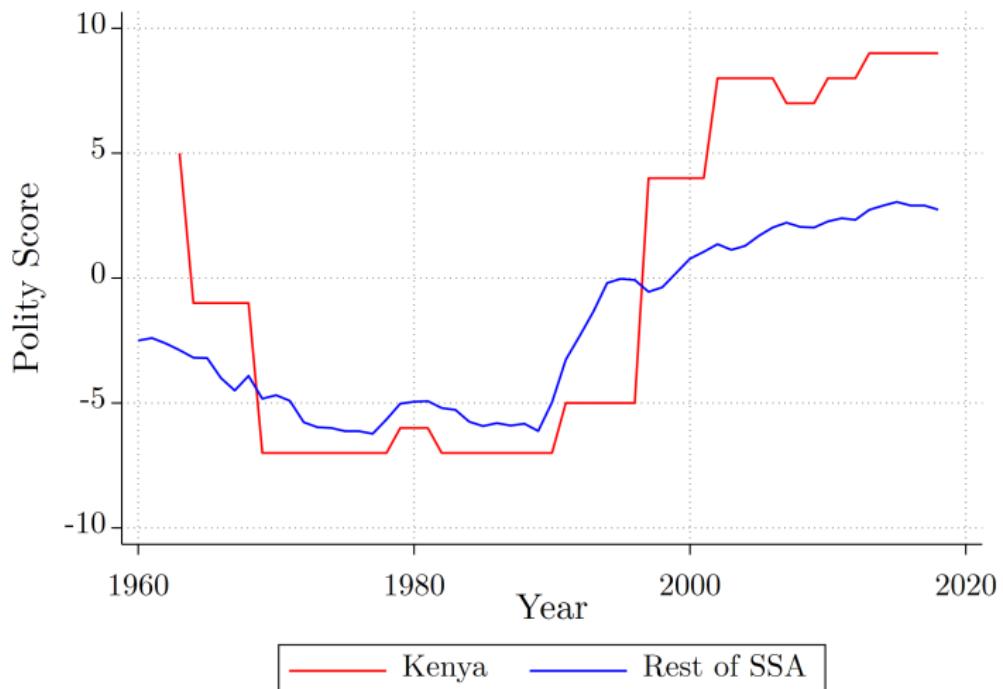
Kenyan democratization and decentralization reforms

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- ▶ 2010 Constitution:
 - ▶ Creation of 47 counties with popularly elected county governments
 - ▶ *“the promotion of the core democratic principles of transparency, public participation in governance, and accountability have been further emphasized in the CDF context as part of the revised Constitution of Kenya (2010)”* (UN & GOPAC, 2022)

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 - ▶ *"the promotion of the core democratic principles of transparency, public participation in governance, and accountability have been further emphasized in the CDF context as part of the revised Constitution of Kenya (2010)"* (UN & GOPAC, 2022)
- ▶ “Arguably Africa’s strongest parliament” (Opalo, 2014)
- ▶ Kenya’s “biggest political transformation since independence” (Cheeseman, Lynch, and Willis, 2016)

Decentralization reforms have coincided with significant improvements in Kenya's polity score



Source: Center for Systemic Peace

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This paper's research questions

Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation in any particular direction?

Research Question 2: If so, why did favoritism persist despite decentralization efforts?

Detailed data allow careful analysis and precise estimates

- ▶ Universe of 7 million geo-tagged electricity meters
- ▶ Repeated cross-section of construction progress
(electrical designs, pole placement, LV line stringing, meter activation)

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- ▶ Universe of 7 million geo-tagged electricity meters
- ▶ Repeated cross-section of construction progress
(electrical designs, pole placement, LV line stringing, meter activation)
- ▶ Ward-level electoral data on 2013 and 2017 presidential and parliamentary elections (1,450 wards, ~29,000 people each)
- ▶ Annual CDF allocations for each constituency

Preview of results: Nationwide allocation

1. Constituencies that voted pro-government in the preceding election saw more construction than their CDF share while opposition constituencies received less

Preview of results: Nationwide allocation

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2. Pro-government constituencies received 46% more LMCP sites and 35% more household connections than opposition constituencies, relative to their CDF shares

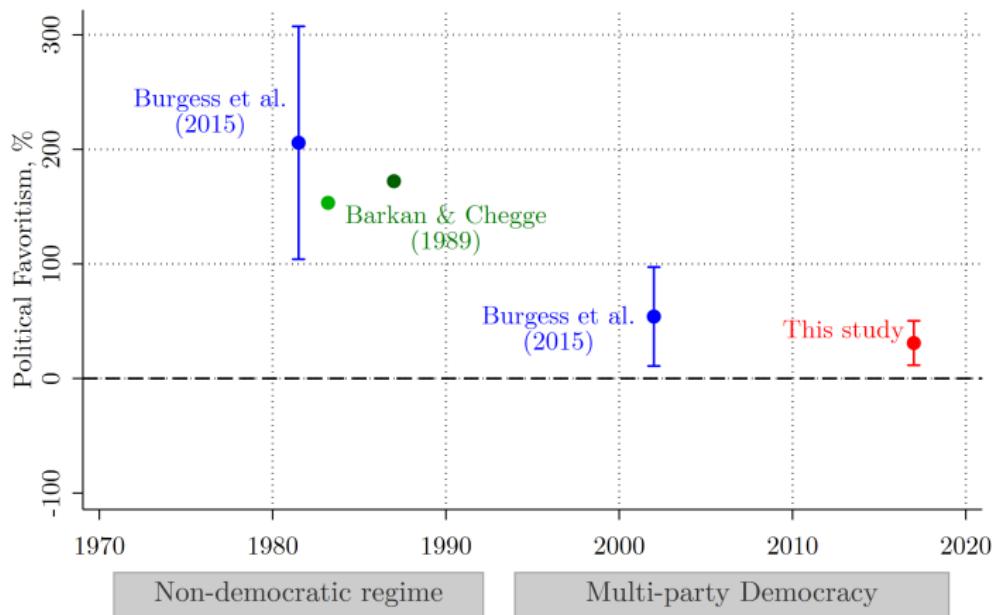
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 - ▶ Among geographically bordering wards only
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 - ▶ LASSO selection of controls
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4. **Timing:** prior to 2017 presidential election (rather than reward after)
5. **Targeting:** core areas (rather than swing voters)

Favoritism is significantly more subdued than in previous decades:



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How did some favoritism persist despite decentralization?

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How did some favoritism persist despite decentralization?

1. Did members of parliament exert favoritism?
 - ▶ No favoritism by MPs towards wards that voted for them (const FE)
 - ▶ No favoritism by government-aligned MPs (using close-election RD)
2. Instead: Central executive continued to exert favoritism
 - ▶ Evidence of favoritism driven by phases of the program that were centrally-controlled: transformer construction and LMCP site selection
 - ▶ No favoritism in on-the-ground construction and metering

Limitations of decentralization in parastatal sectors:

- ▶ Parastatals are more easily captured by central governments who wish to exert favoritism for political gain
- ▶ Local governments lack institutional and technical capacity for complex technologies
- ▶ Coordination useful for network infrastructure (roads, IT, etc.)
- ▶ Cost minimization during renewables integration

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Decentralization may be more effective in different sectors: agriculture, health care (Savage and Lumbasi, 2016)

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Results: Allocation by national officials

Results: Decentralization and favoritism

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Political Context

- ▶ 1978–2002: President Arap Moi
- ▶ 2002–2013: President Mwai Kibaki (Kikuyu)
 - ▶ 2003: MPs pass CDF act to constrain favoritism
 - ▶ 75% of funds allocated equally across all constituencies
 - ▶ 25% of funds allocated according to poverty index

Political Context

- ▶ 1978–2002: President Arap Moi
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 - ▶ **August 2017:** Re-elected
 - ▶ 2011–2018: Partnership with Kalenjin running mate William Ruto
 - ▶ 2013 and 2017: Appoints new Kenya Power MDs (both Kalenjin)
 - ▶ 2015: Announces LMCP

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 - ▶ 2015: Announces LMCP
- ▶ Raila Odinga (Luo): opposition leader in 2007, 2013, 2017 elections

Electrification was a widely advertised, politicized program

In March 2017 (5 months before the August 2017 election) incumbent President Kenyatta states:

"To begin the walk towards industrialisation, we needed to drastically improve and expand our infrastructure, and to increase access to electricity and diversify our energy sources... In 2013, we promised to provide access to electricity for 70% of all households by the end of 2017. Today, we have connected an additional 3.7 million new homes to electricity. We have more than doubled the total number of connections made since independence."

Electrification was a widely advertised, politicized program



Electrification in Kenya

- ▶ 2008: Rural Electrification Authority (REA) Strategic Plan
 - ▶ Goal: Connect all schools, health facilities, markets, etc. to the national grid
 - ▶ Mass construction of **electrical transformers** in rural villages

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Electrical transformers in rural villages



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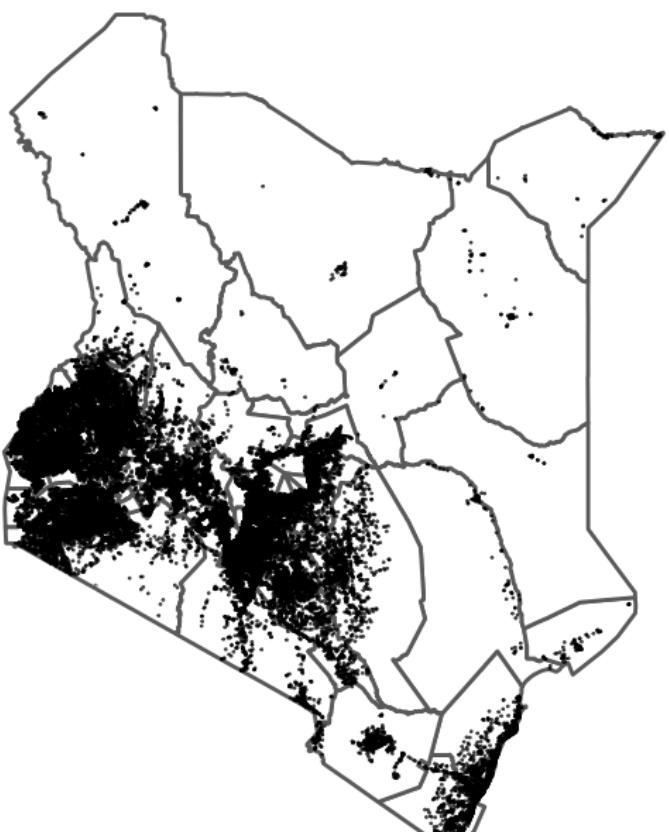
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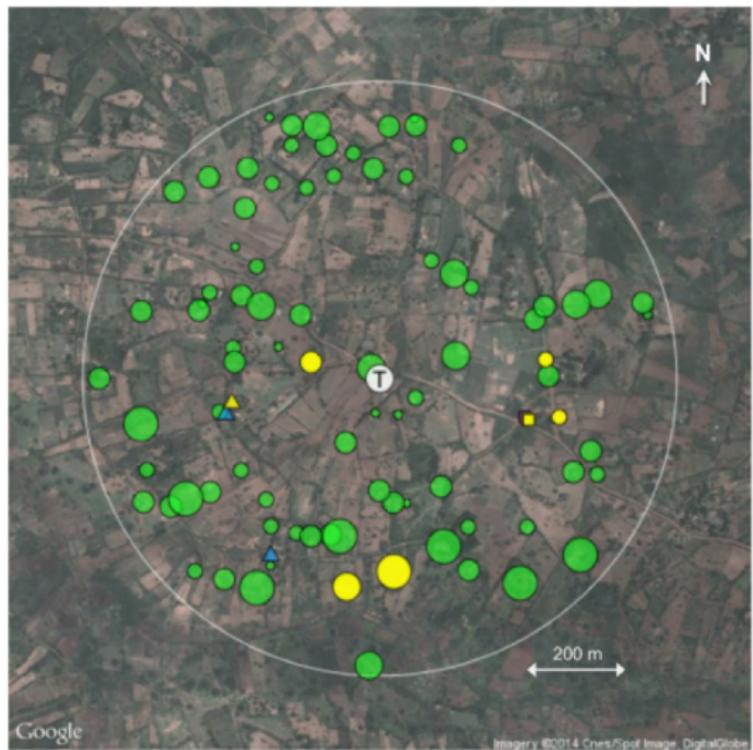
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Nationwide distribution of electrical transformers (~60K)



2013: millions unconnected HH's <600m of a transformer



Legend

- ① Transformer
- Surveyed households
- Surveyed electrified households

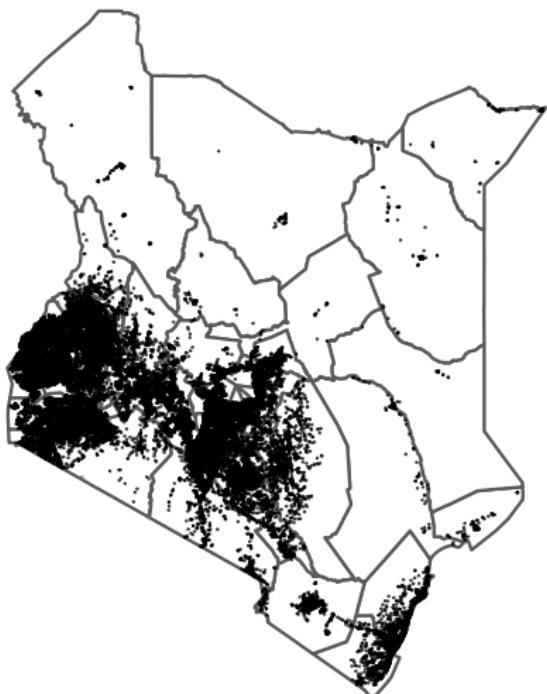
Source: Lee et al. (2015)

Electrification in Kenya

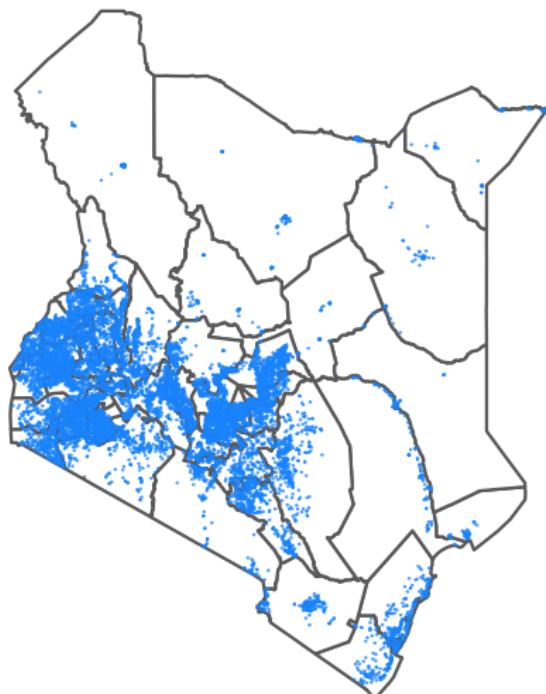
- ▶ 2008: Rural Electrification Authority (REA) Strategic Plan
 - ▶ Goal: Connect all schools, health facilities, markets, etc. to the national grid
 - ▶ Mass construction of **electrical transformers** in rural villages
- ▶ 2016: Launch of Last Mile Connectivity Project (LMCP)
 - ▶ >7,000 transformers nationwide selected for “maximization”: mass electrification of all households within 600m of existing transformer
 - ▶ Increase in electricity access from 25% in 2009 to 70% in 2019

LMCP transformers distributed nationwide

All transformers (~60,000)



LMCP transformers (~7,000)



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Maximization is a very visible and popular activity



How was transformer construction allocated (2008-2015)?

Evans Bulimo Akula, Opposition Member of Parliament:

"Mr. Speaker, Sir, how many projects is the Ministry supposed to do in every constituency per year? For the last eight years, they have done only 11 projects."

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"Mr. Speaker, Sir, how many projects is the Ministry supposed to do in every constituency per year? For the last eight years, they have done only 11 projects."

Charles Keter, Assistant Minister for Energy and Petroleum:

"Currently, we are using the CDF formula. The hon. Member will realise that in this financial year, he will get over Kshs15 million and we are doing about five projects. In the last financial year, he also got the same amount of money, that is, Kshs15 million which did three projects. Right now, the Ministry of Energy allocates funds using the CDF formula."

Hon. Temporary Deputy Speaker,

I want to talk about fair distribution of power. As a country, we do not have enough power. However, there are some areas that are more equal than others. It is important that Kenya Power does not have political patronage so that it can distribute power without fear or favour. We will definitely move on to the next level if that happens. We have talked about developing this economy and that can only happen if those things are put in place.

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How were transformers selected for LMCP (2015-2000)?

The screenshot shows a website header for 'kplc.co.ke'. The top bar includes back and forward navigation, a search icon, and the URL 'kplc.co.ke/content/item/1694/last-mile-connectivity-program-q---a'. Below this is a blue navigation bar with icons for home (a house), Kenya Power, Customer Service, Investor Relations, and Public Information.

Home > Media Center > Press Releases > Last Mile Connectivity Program Q & A

Last Mile Connectivity Program Q & A

Q: What criteria was used to choose transformers?

A: The selection of the 5320 distribution transformers for the first phase was done using the CDF distribution formula and hence a few in each constituencies were selected. This was done in spirit of “equitable distribution of resources”. This has also been applied to the subsequent phases.

Kenya Power political capture criticized by opposition MPs

MP Kagiri, Laikipia County (2023):

“KPLC handles a very high budget burden. This is caused by... investment in political pet projects like the Last Mile Connectivity”

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Senator Olekina, Narok County (2022):

“The Last Mile was only brought to some villages... If you go to Narok County, there are certain areas which are pre-dominated by one ethnic group where even a simple grass-thatched house has electricity. However, on the other part which is pre-dominantly by the people who are the indigenous of that area, there is no electricity. We are calling for proper management of debt.”

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Senator Ogolla, Homa Bay County (2023):

"The story of the Last Mile Project could be one of the worst rip-offs we have had among the major projects in this country... It only leaves us with the conclusion that this was a scandal."

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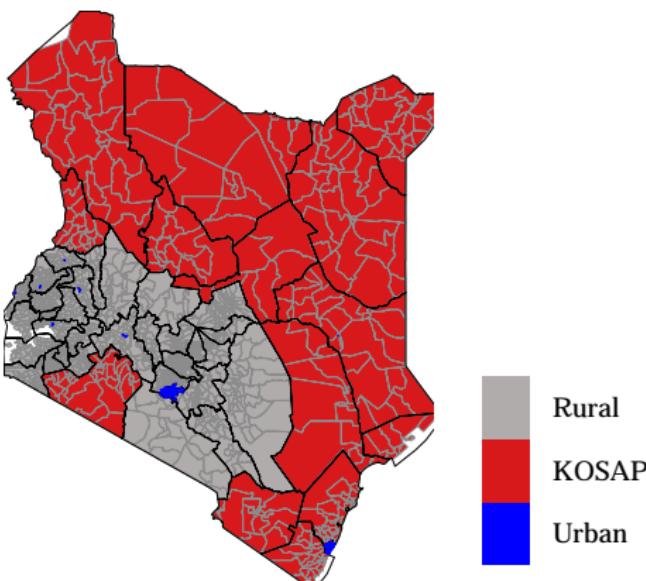
Results: Allocation by national officials

Results: Decentralization and favoritism

Discussion

LMCP targeted rural Kenya: not urban or sparse areas

- ▶ **Urban:** Mombasa, Nairobi, or wards with similar or higher population density ($>3,500/\text{km}^2$)
- ▶ **Sparse:** targeted by 'KOSAP' off-grid electrification project (usually $<20/\text{km}^2$)
- ▶ Regressions are not sensitive to sample definition



Three key sources of data

1. Electricity network data (source: Kenya Power)

- ▶ Universe of 7.4 million nationwide **electricity meters**, geo-tagged
- ▶ Universe of 62,271 nationwide **transformers**, geo-tagged
- ▶ List of 11,934 LMCP transformers
- ▶ Construction progress data for 6,524 LMCP transformers spanning 975 wards and 118 weeks

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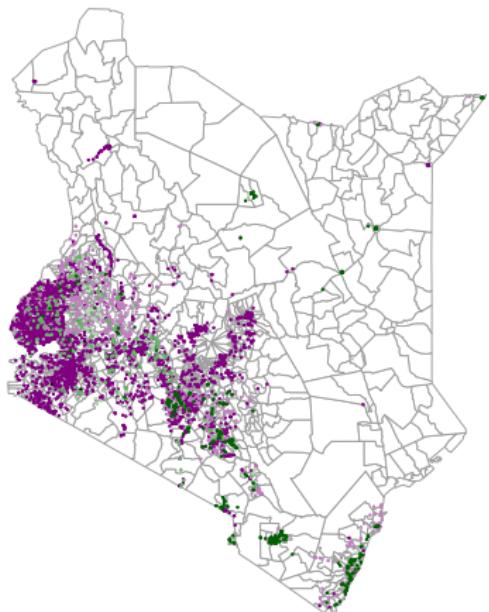
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Nationwide construction progress

May 2017



- No Construction
- Designs Approved
- Poles Erected

- Stringing Completed
- Metering in Progress
- Metering Complete

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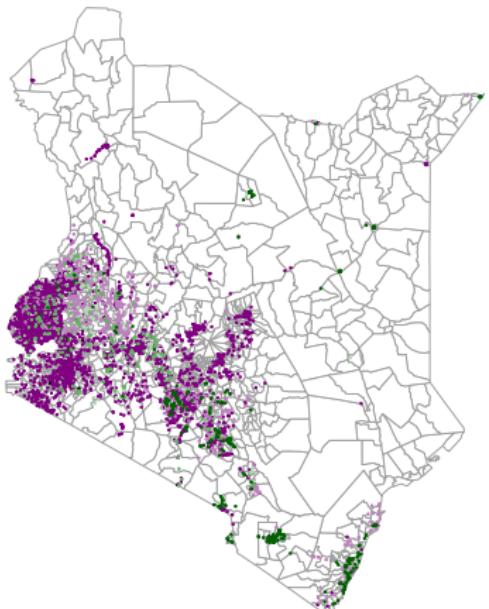
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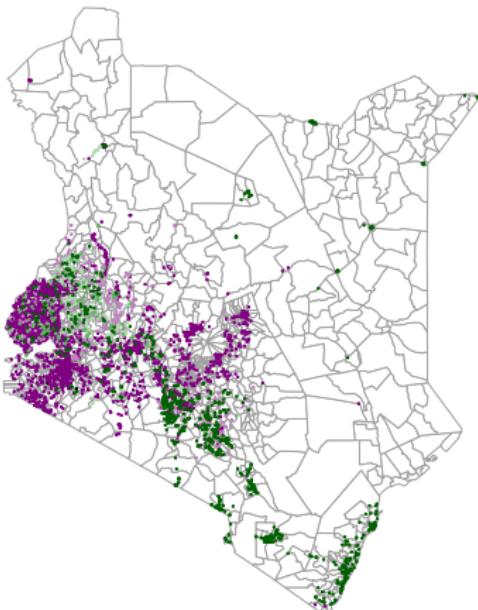
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Nationwide construction progress

May 2017



October 2017



- No Construction
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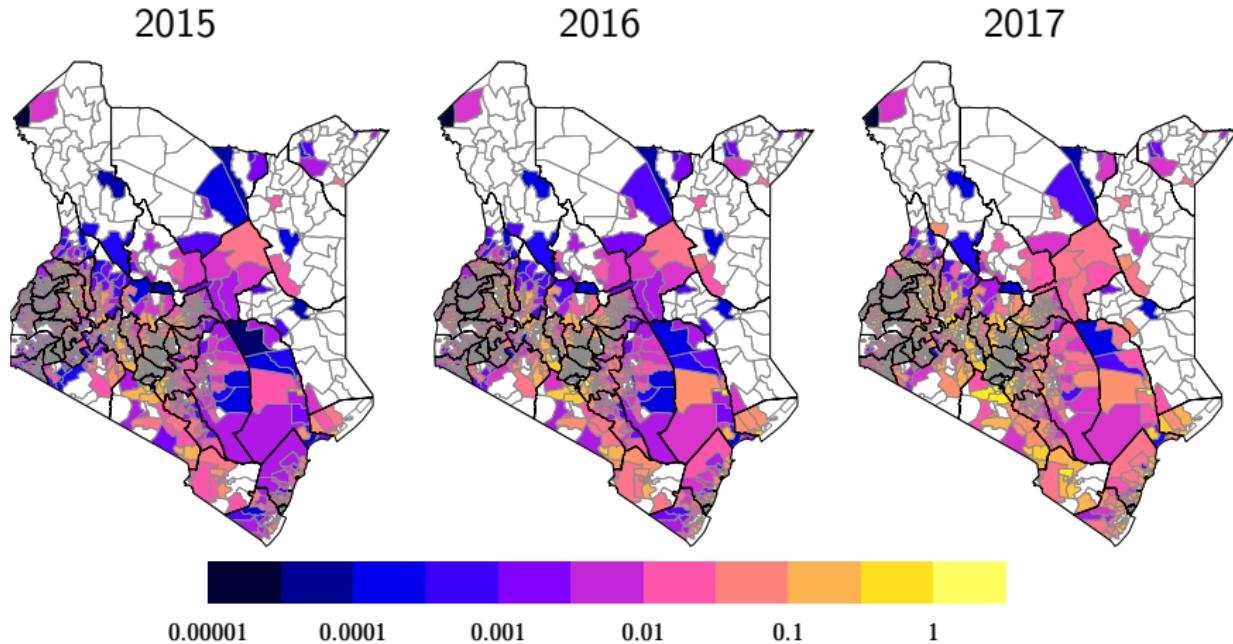
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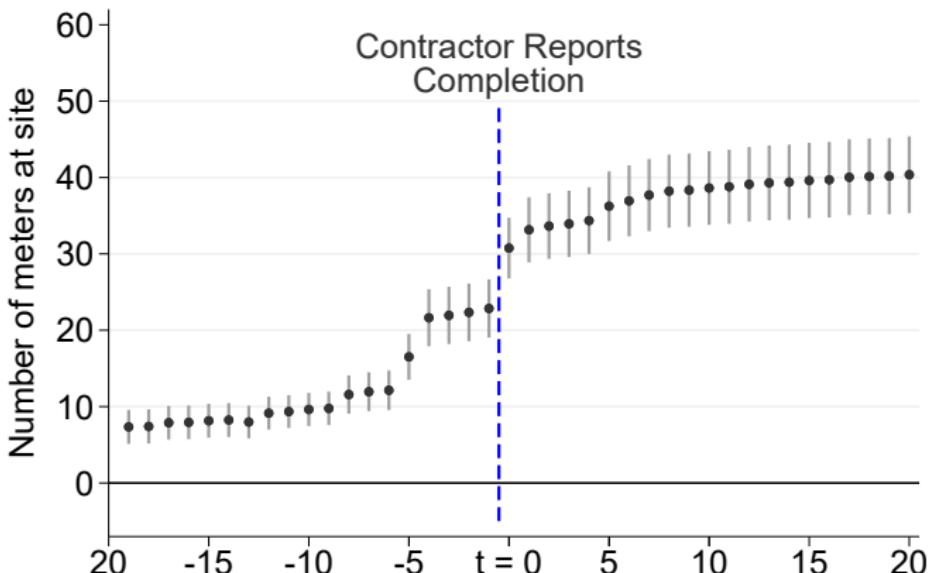
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Residential electricity meters per household



Timing of contractor reports and meter activations (two distinct datasets) line up well

Kenya Power database shows 30-50 new meters in months after contractor reports completion



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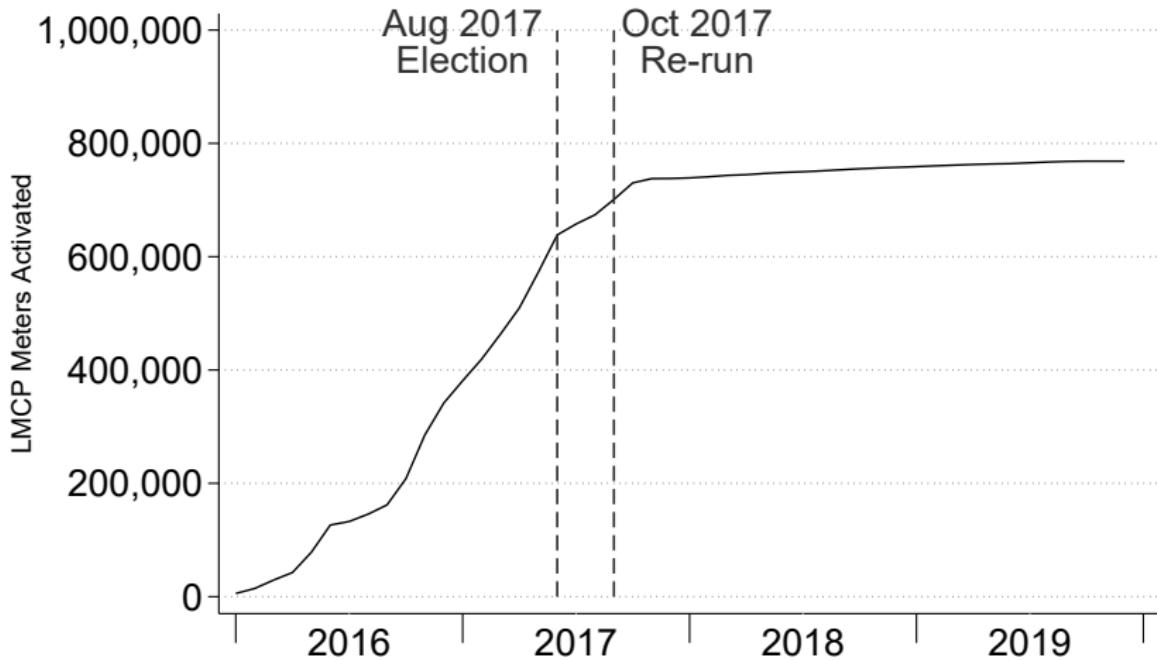
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Household electricity meters activated around election



Data (2): Electoral data

1. Electricity network data

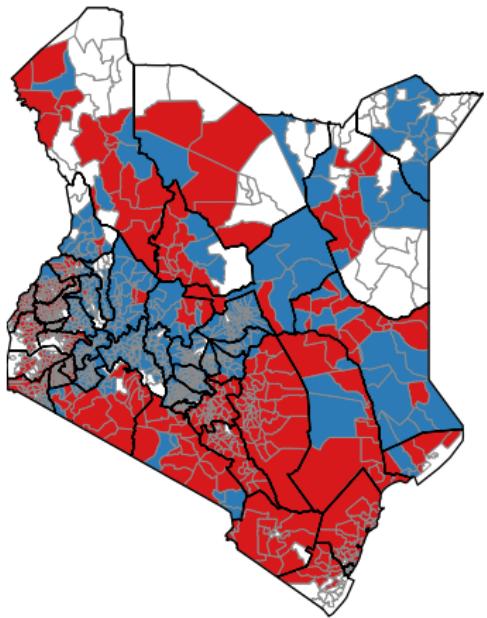
- ▶ Universe of 7.4 million nationwide **electricity meters**, geo-tagged
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2. **Electoral data for 1,296 (out of 1,450) wards**

- ▶ 2013 and 2017 presidential **election data**
- ▶ 2013 parliamentary election data

Ward-level electoral outcomes: 2013 presidential election

All wards



Opposition
Kenyatta

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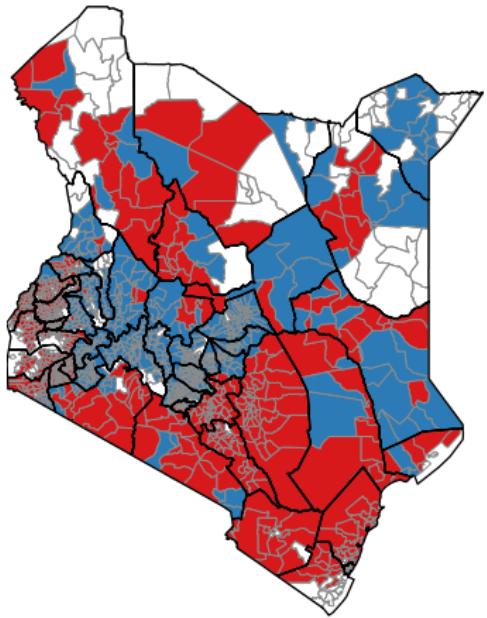
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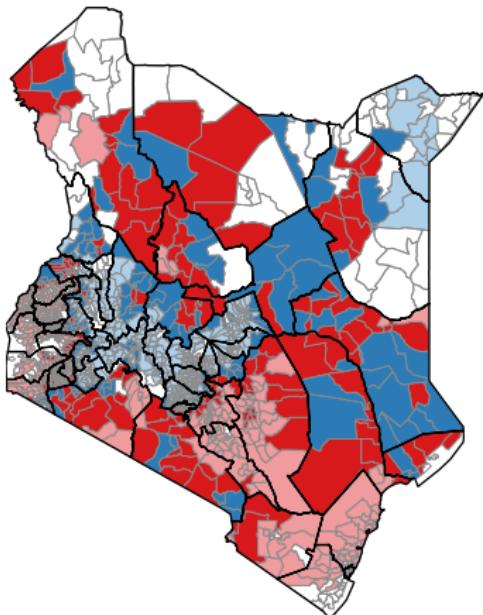
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Ward-level electoral outcomes: 2013 presidential election

All wards



Highlighting adjacent wards



Opposition
Kenyatta

Data (3): Administrative data

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2. Electoral data for 1,296 out of 1,450 wards

- ▶ 2013 and 2017 presidential **election data**
- ▶ 2013 MP election data

3. **Administrative data**

- ▶ Annual realized CDF allocations for each constituency
- ▶ Socioeconomic controls from 2009 Census
- ▶ Nationwide roll-out of M-PESA agents
- ▶ Geographic controls (e.g land gradient)

Studying the 4 stages of rural electrification

$$\frac{\# \text{ LMCP household electricity meters}}{100,000 \text{ households}} =$$

$$\left(\frac{\text{Total } \# \text{ transformers}}{100,000 \text{ households}} \right)$$

$$\cdot \left(\frac{\# \text{ LMCP transformer}}{\text{Total } \# \text{ transformers}} \right)$$

$$\cdot \left(\frac{\# \text{ LMCP transformers with LV construction}}{\# \text{ LMCP transformers}} \right)$$

$$\cdot \left(\frac{\# \text{ LMCP household electricity meters}}{\# \text{ LMCP transformers with LV construction}} \right)$$

Studying the 4 stages of rural electrification

$$\frac{\# \text{ LMCP household electricity meters}}{100,000 \text{ households}} =$$

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- ▶ Marginal
- ▶ Cumulative

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Naive estimates of favoritism in household connections

- ▶ Wards that voted pro-Kenyatta in the 2013 election saw 3,000 (22%) more electricity meters per 100,000 households

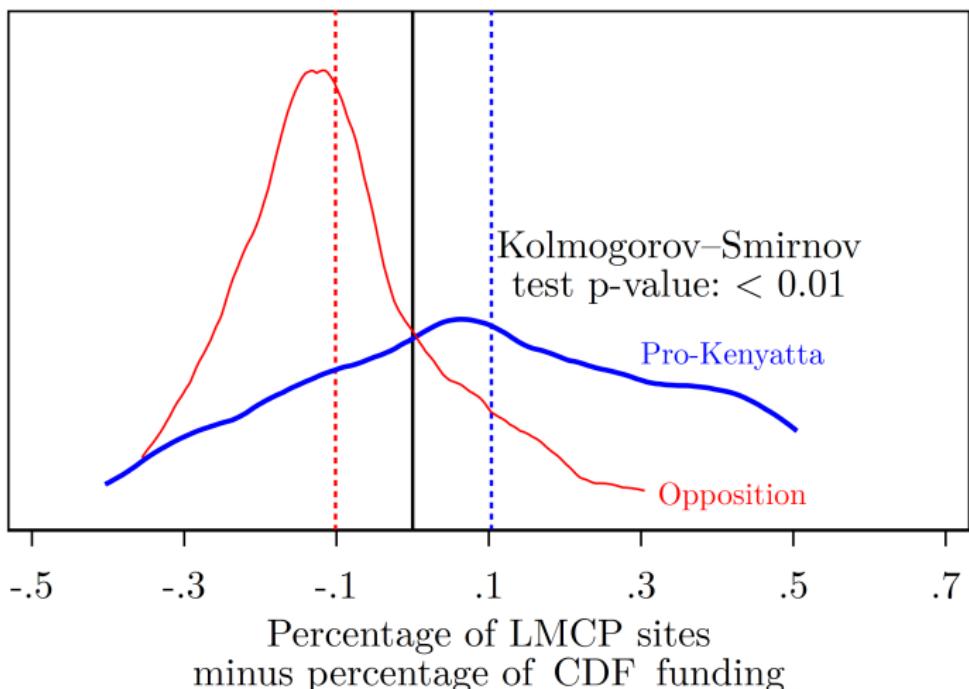
	In absolute terms		
	(1)	(2)	(3)
Voted pro-govt in 2013	3188*** (1008)	3092*** (1159)	3613*** (805)
Observations	911	911	911
Opposition Mean	14444	14444	14444
Effect Size (%)	22	21	25
Controls	None	SES	LASSO
Sample	Wards	Wards	Wards

Biased allocation in LMCP sites relative to CDF rule

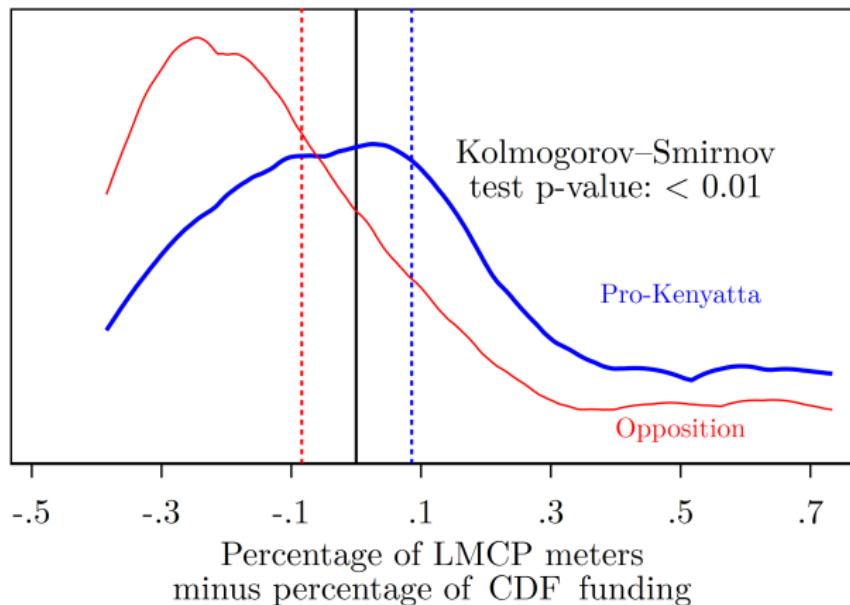
- ▶ For each constituency: [share of LMCP sites] minus [share of CDF funds]
- ▶ Values >0 imply more LMCP sites than CDF share

Biased allocation in LMCP sites relative to CDF rule

- ▶ For each constituency: [share of LMCP sites] minus [share of CDF funds]
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Biased allocation in LMCP meters relative to CDF rule



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This paper's research questions

Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation?

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This paper's research questions

Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation? **Yes**

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This paper's research questions

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... In any particular direction?

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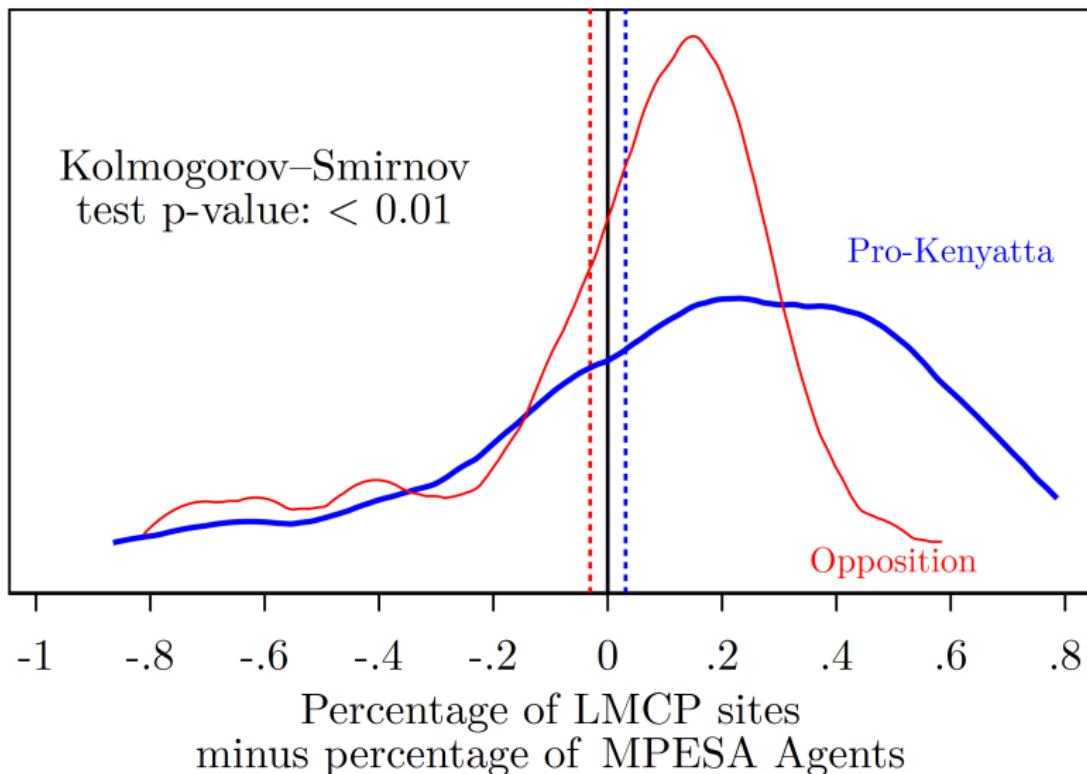
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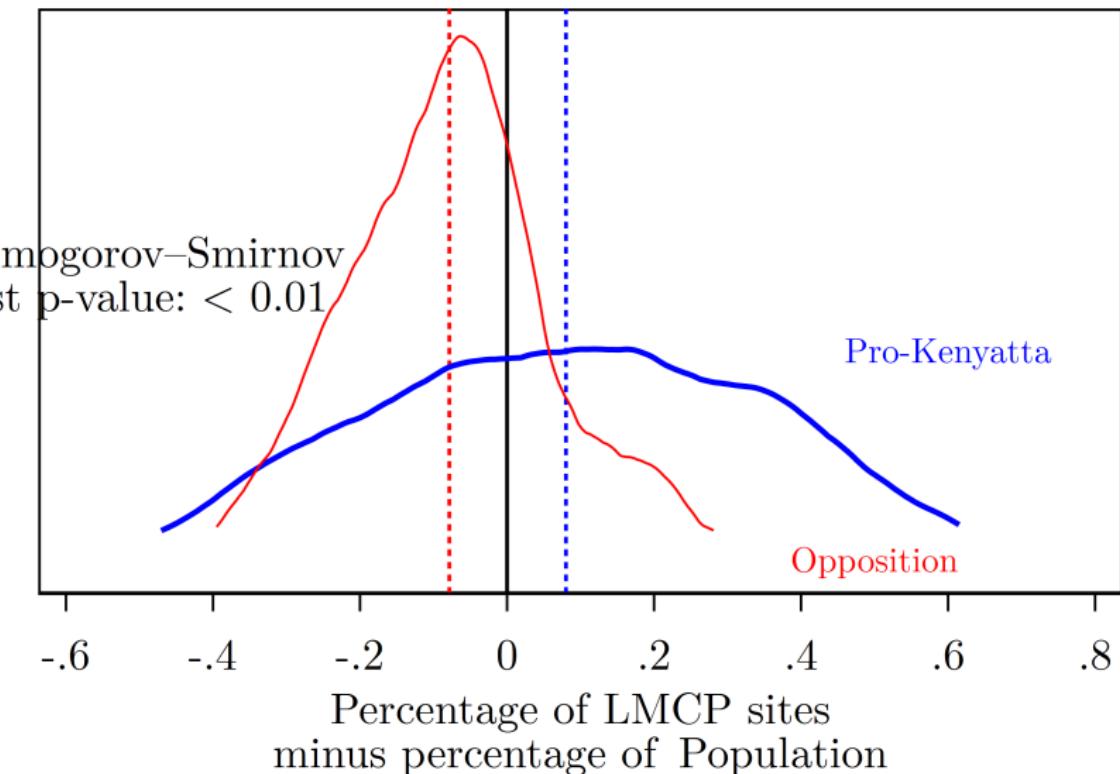
This paper's research questions

Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation? **Yes**
... In any particular direction? **Yes**
... In a way that cannot be explained by other factors?

Result 2: Favoritism relative to economic activity



Result 2: Favoritism relative to population



Favoritism in LMCP sites

Wards that voted pro-Kenyatta in the 2013 election saw

- ▶ 46% more LMCP sites

	In absolute terms			Relative to CDF Allocation		
	(1)	(2)	(3)	(4)	(5)	(6)
Voted pro-govt in 2013	50.6*** (10.6)	62.6*** (11.2)	58.7*** (8.13)	69.4*** (18.4)	63.7*** (19.4)	63.4*** (12.1)
Observations	911	911	911	196	196	196
Opposition Mean	149	149	149	151	151	151
Effect Size (%)	34	42	39	46	42	42
Controls	None	SES	LASSO	None	SES	LASSO
Sample	Wards	Wards	Wards	Consts	Consts	Consts

Favoritism in household connections

Wards that voted pro-Kenyatta in the 2013 election saw

- ▶ 46% more LMCP sites
- ▶ 35% more electricity meters per 100,000 households

	In absolute terms			Relative to CDF Allocation		
	(1)	(2)	(3)	(4)	(5)	(6)
Voted pro-govt in 2013	3188*** (1008)	3092*** (1159)	3613*** (805)	5639** (2062)	5285** (2364)	5045*** (1609)
Observations	911	911	911	196	196	196
Opposition Mean	14444	14444	14444	16299	16299	16299
Effect Size (%)	22	21	25	35	32	31
Controls	None	SES	LASSO	None	SES	LASSO
Sample	Wards	Wards	Wards	Consts	Consts	Consts

No swing targeting: mostly avoiding opposition core

- ▶ Core: >75% of voteshare (approx. 45%)
- ▶ Swing: 50-75% of voteshare (approx. 5%)
- ▶ Omitted category: Opposition Core wards

	(1)	(2)	(3)
Pro-Government Core (δ_1)	3609*** (1098)	4013*** (1235)	4543*** (928)
Pro-Government Swing (δ_2)	4315** (1963)	2845 (2272)	2928* (1613)
Pro-Opposition Swing (δ_3)	2686* (1530)	2889** (1401)	2538** (1258)
Observations	911	911	911
Pro-Opposition Core Mean	14095	14095	14095
$p\text{-val } \delta_1 = \delta_2$.72	.62	.34
Controls	None	SES	LASSO
Sample	Wards	Wards	Wards

Summary of findings: Favoritism in the LMCP

- ▶ The allocation of LMCP sites and household connections deviated from the CDF allocation

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How did favoritism persist despite Kenya's major constitutional reforms in 2003 and 2010?

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How did favoritism persist despite Kenya's major constitutional reforms in 2003 and 2010?

Two key possibilities:

- ▶ Decentralization delegated power to local governments and politicians, who continued pro-government favoritism

How did favoritism persist despite Kenya's major constitutional reforms in 2003 and 2010?

Two key possibilities:

- ▶ Decentralization delegated power to local governments and politicians, who continued pro-government favoritism
- ▶ Decentralization did not empower local politicians in practice: power and resources remained concentrated with national leaders

Decomposing the stages of construction

$$\frac{\# \text{ LMCP household electricity meters}}{100,000 \text{ households}} =$$

$$\begin{aligned} & \left(\frac{\text{Total } \# \text{ transformers}}{100,000 \text{ households}} \right) \\ & \cdot \left(\frac{\# \text{ LMCP transformer}}{\text{Total } \# \text{ transformers}} \right) \\ & \cdot \left(\frac{\# \text{ LMCP transformers with LV construction}}{\# \text{ LMCP transformers}} \right) \\ & \cdot \left(\frac{\# \text{ LMCP household electricity meters}}{\# \text{ LMCP transformers with LV construction}} \right) \end{aligned}$$

Decomposing the stages of construction

- ▶ **Marginal** and **cumulative** effects
- ▶ Rich controls (estimates similar when using no controls, ‘double LASSO’ selected covariates, no weighting, adjacent wards only)

LMCP							
	Pre-existing Transformers	Site Selection	Construction	Meters			
Voted pro-govt in 2013	108*** (41.3)	.0539*** (.0178)	62.6*** (11.2)	-.0428 (.0415)	27.1*** (10.2)	-5.34 (11.1)	3092*** (1159)
Observations	911	910	911	587	587	882	911
Opposition Mean	644.3	0.3	148.7	0.5	83.1	125.1	14443.6
Treatment Effect (%)	16.8	21.2	42.1	-8.0	32.6	-4.3	21.4
Analysis		Marg.	Cumul.	Marg.	Cumul.	Marg.	Cumul.

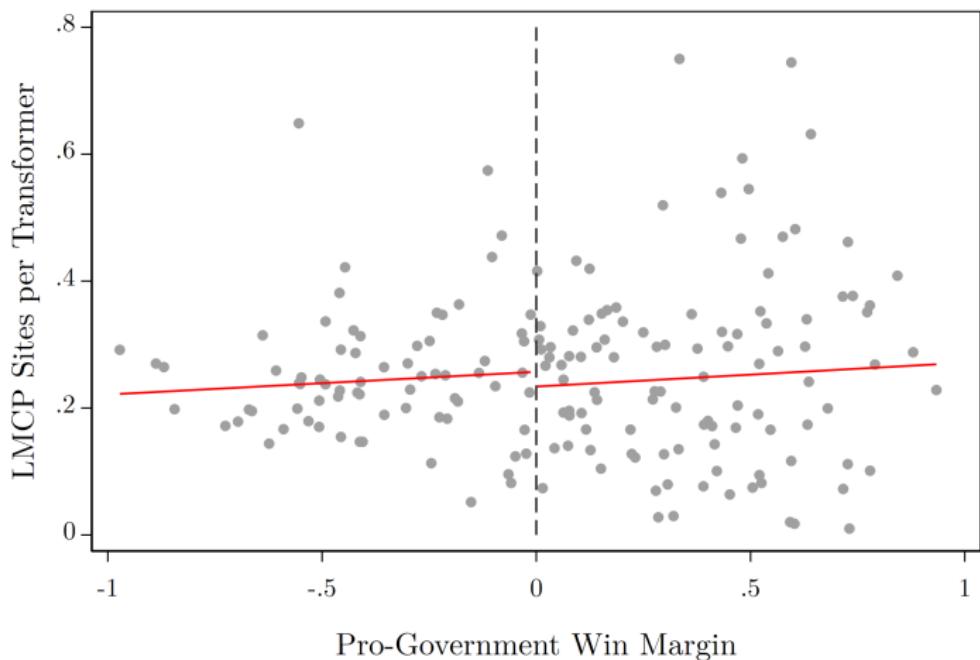
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- ▶ **Transformer placement and site selection:** assigned **centrally** (in Nairobi) with heavy government involvement
- ▶ **Construction and meter activation:** **managed locally**

Does construction favor wards whose MPs is govt-aligned?

- ▶ Close-election Regression Discontinuity (RD) design



Did MPs favor wards that voted for them?

- ▶ MPs are elected by constituency: approx. 5 wards per constituency
- ▶ Regressions include constituency fixed effects
- ▶ Ward-level alignment with MP has no measurable impact
- ▶ Echoes Harris & Posner (2019): MPs little impact on CDF projects

	Pre-existing Transformers	LMCP					
		Site Selection		Construction		Meters	
		(1)	(2)	(3)	(4)	(5)	(6)
Voted pro-govt in 2013	143 (111)	-.022 (.0376)	13.5 (26.6)	-.0908 (.0633)	-17.5 (17)	-17.8 (27.6)	1205 (1700)
Voted pro-MP in 2013	-42.3 (31.3)	.0237* (.0142)	1.43 (8.78)	.00613 (.0326)	.49 (8.63)	-6.39 (10.2)	-150 (777)
Observations	731	730	731	478	478	706	731
Opposition Mean	644.3	0.3	148.7	0.5	83.1	125.1	14443.6
Treatment Effect (%)	22.2	-8.7	9.0	-16.9	-21.1	-14.2	8.3
MP Effect (%)	-6.6	9.3	1.0	1.1	0.6	-5.1	-1.0
Analysis		Marg.	Cumul.	Marg.	Cumul.	Marg.	Cumul.

Understanding decentralization in national sectors

- ▶ High turnover of MPs in Kenyan elections often inhibits the development of specialized expertise; in practice the legislature often defers to the executive branch on technical matters (Opalo, 2022)
- ▶ Widespread agreement that “a lack of skills, knowledge and experience of the county governments, their staff and possibly also the MPs... is the main challenge for a devolved electrification governance” (Volkert and Klagge, 2022)

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- ▶ Legal mechanisms allow the national government to claim functions that fall under a local government’s mandate (Hassan, 2020)
- ▶ Continued political capture of parastatals: Kibaki and Kenyatta appointed co-ethnics as Kenya Power MDs

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- ▶ Continued political capture of parastatals: Kibaki and Kenyatta appointed co-ethnics as Kenya Power MDs
- ▶ Larger independent system operators (ISOs) that pool many generation sources can better minimize costs in wholesale electricity markets (Cicala, 2022)

Central tensions in the decentralization of certain sectors

More difficult to implement in centrally managed sectors

- ▶ National leaders may want to retain control due to electoral incentives or financially motivated corruption

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There may be welfare gains from operating centralized parastatals

- ▶ MPs and county governments lack technological expertise
- ▶ Natural monopoly
- ▶ Networks
- ▶ Efficiency

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Persistent centralized management creates vulnerability

- ▶ Scope for political capture by central government (recall Kenya Power MDs still appointed by the president!)

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Persistent centralized management creates vulnerability

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These concerns apply across infrastructure: electricity, roads, IT, etc.

Decentralization can improve outcomes in certain sectors

"The National Treasury should rationalize the national Government budgets for devolved functions such as health, agriculture (crop, livestock, and fisheries development), water, irrigation, sanitation, and regional development, and the funds transferred to the county governments. It is an irony that the Ministries continue getting huge allocations when those functions have already been devolved to the counties. We request that should be reversed and money due to counties be given to them."

Charles Reubenson Kibiru, Independent Member of Parliament
Kenyan parliamentary debates
Nairobi, 21 December 2021

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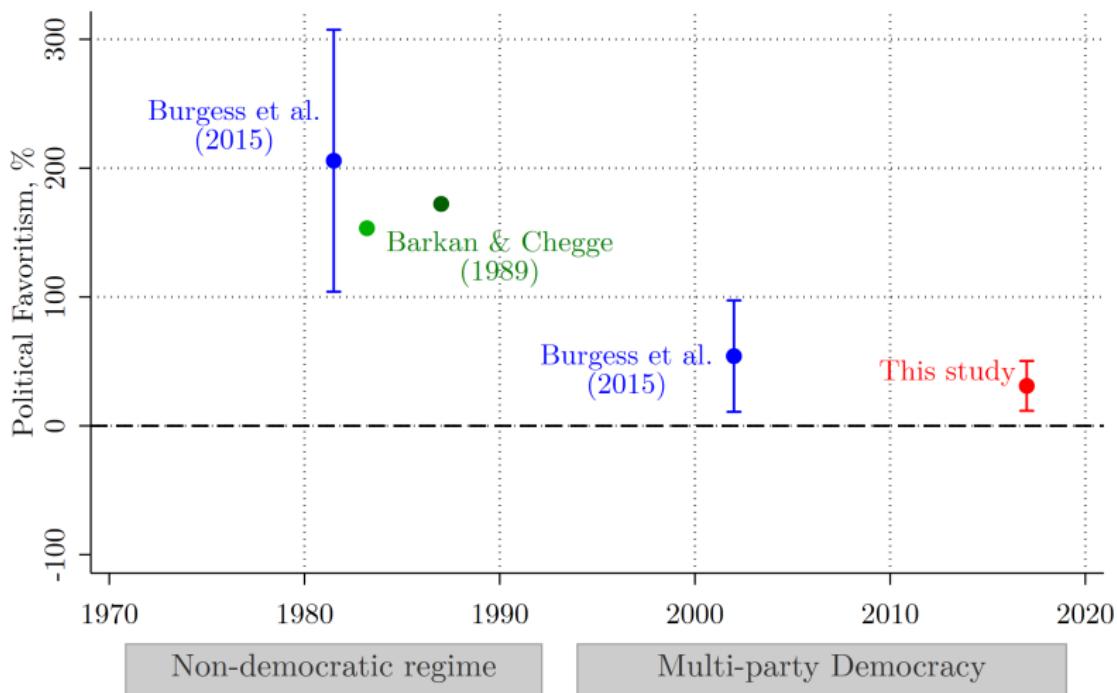
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Conclusion

We quantify favoritism relative to a simple and transparent allocation rule that had been agreed upon by opposing political parties

- ▶ Context: Nationwide Kenyan infrastructure project (electrification)
- ▶ We find significant deviations from the rule: +35–46% more sites and electricity meters than allocated in pro-government areas
- ▶ Deviations cannot be rationalized by socio-economic concerns

Kenya has seen significant reductions in political favoritism



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Why did favoritism persist despite decentralization reforms in '03-'10?

- ▶ No favoritism exerted by MPs towards wards that voted for them
- ▶ No favoritism towards govt-aligned MPs
- ▶ LMCP favoritism driven by phases of the program controlled centrally (transformer construction and LMCP site selection)