The Distribution of Power: Decentralization and Favoritism in Energy Infrastructure

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October 2024

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  Min 2019; Briggs 2021; Mahadevan 2024
- By biasing public investment away from the optimum, political favoritism may harm economic development and electrification efforts
  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

Decentralization: a possible constraint on favoritism?

- **Definition:** Moving political power from the executive to democratic regional governments, e.g.:
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- Successes in agriculture, health, education, etc.

Decentralization has been a global driver of democratization

COMMENTARY SADA

Jordan's Quest for Decentralization

Amid low enthusiasm for local elections intended to decentralize governance in Jordan, Islamists and their tribal allies have gained political ground.

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Next year's election will also mark the first time Indonesians vote for a president, national parliament and, later the same year, governors and assemblies for all 38 provinces. Under Suharto's self-proclaimed "New Order" regime, provincial leaders were appointed from Jakarta. Decentralization — allowing provinces to elect their own leaders, set their own fiscal policy and keep more of their revenue from natural resources — was one of the key demands fueling earlier drives for separatism.

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not the most successful reform of Ukraine – video message by Daniel Popescu

News & Events

Decentralisation was one of the most, if not the most successful reform of Ukraine

Kenyan democratization and decentralization reforms

- 2003 Constituency Development Fund (CDF) Act:
  - Equitable allocation of public funds (CDF funds) across constituencies using a pre-agreed formula (75% equal, 25% poverty index)
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- "Arguably Africa's strongest parliament" (Opalo, 2014)
- Kenya's "biggest political transformation since independence" (Cheeseman, Lynch, and Willis, 2016)

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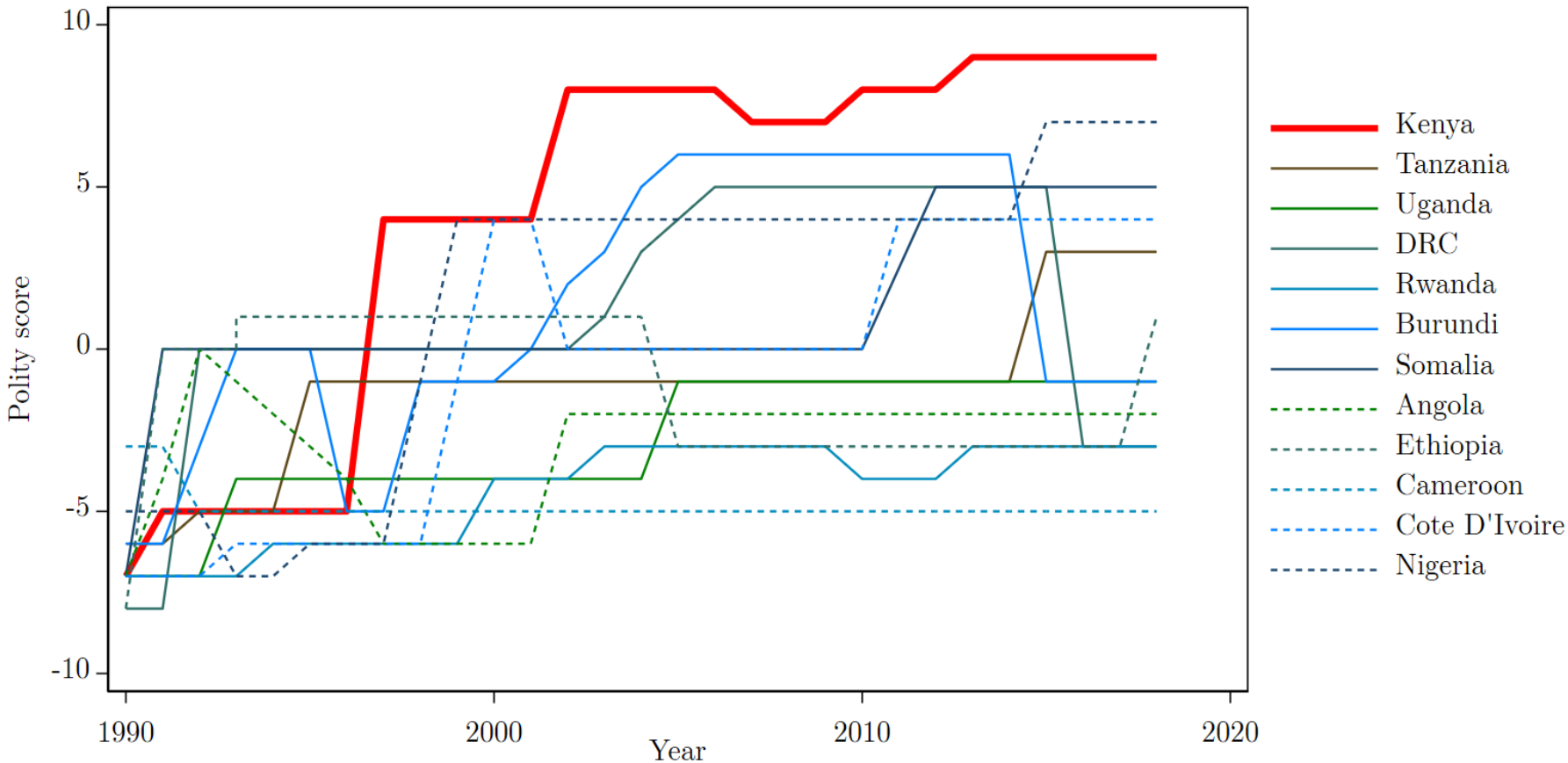

Kenya decarbonization efforts

- 90% of power generation is renewable (hydropower, geothermal, wind)
- *Badilisha Bulb*: campaign launched 2013, exchanged 1mn+ incandescents for CFLs
- *Pika na Power*: campaign launched 2017 to expand electric cooking (fairs, videos on cooking)
- *e-cooking tariff*: lower electricity tariffs enacted in 2023

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

Estimating favoritism in electrification (2008–2020)

- **We leverage a unique institutional feature:**
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Last Mile Connectivity Program Q & A

Q: What criteria was used to choose transformers?

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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 it deviated in a way that is consistent with favoritism, why did favoritism persist despite decentralization efforts?

Detailed data allow careful analysis and precise estimates

- Universe of 7+ million geo-tagged electricity meters and 40,000+ electrical substations
  (GPS, meter activation dates)

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- Annual CDF allocations for each constituency

Preview of results: Nationwide allocation

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3. **Timing:** prior to 2017 presidential election (rather than reward after)
4. **Targeting:** core areas (rather than swing voters)

How did favoritism persist despite decentralization?

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2. Did the central executive continue to hold power and exert favoritism?
   - Favoritism driven by phases of the program that were centrally-controlled: transformer construction and LMCP site selection

Limitations of decentralization in energy sector:

Benefits of centralized management:

- Energy sector requires central coordination of network, renewables siting, generation
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Decentralization may be more effective in different sectors: agriculture, education, health care

This talk

Political Context: Parastatal under presidential control

- 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

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  - **August 2017**: Re-elected
- 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."

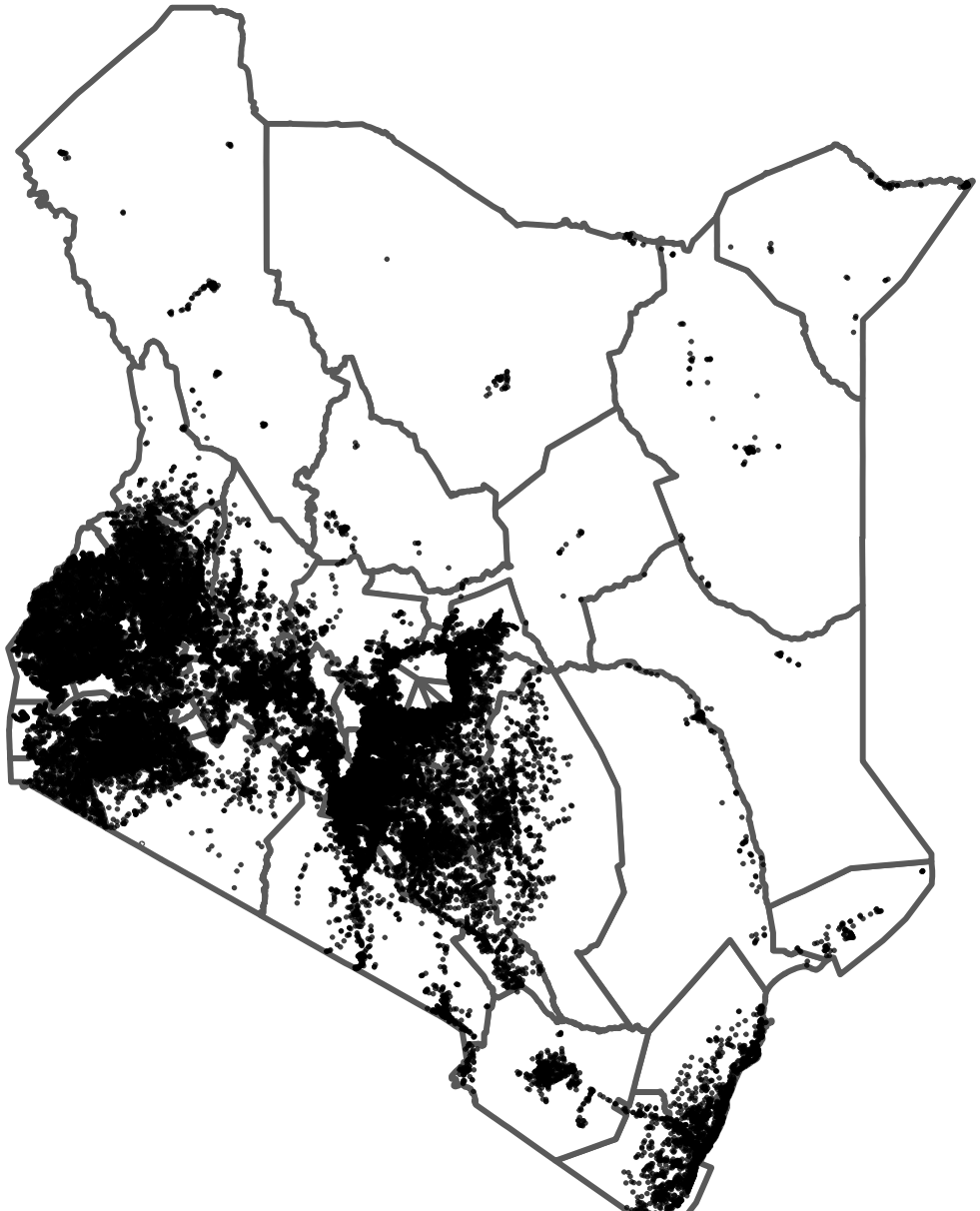
Electrification was a widely advertised, politicized program

Electrification in Kenya

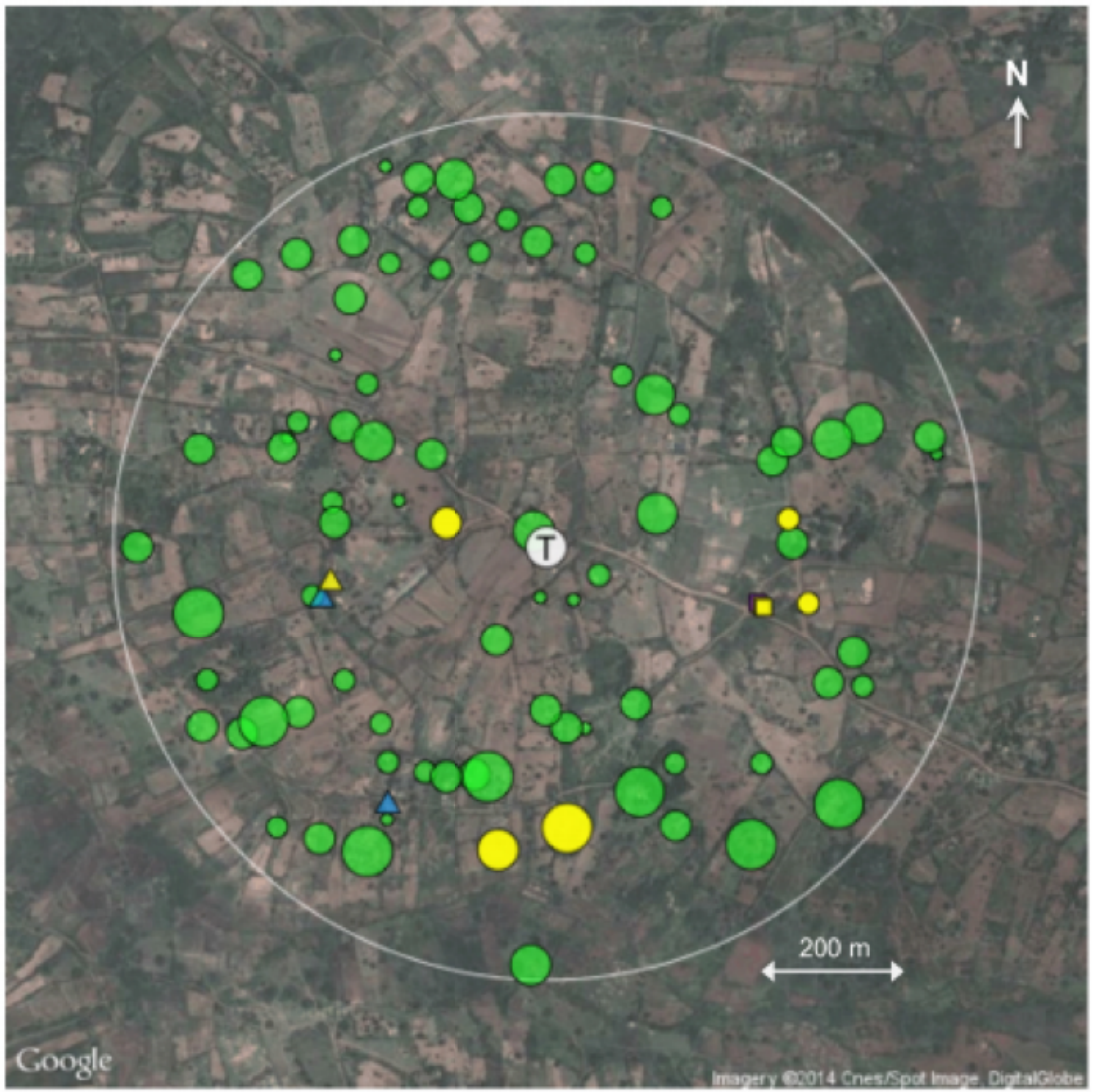
1. Mass construction of **electrical transformers** in rural villages
   - Goal: Connect all schools, health facilities, markets, etc. to the national grid
   - Part of Rural Electrification Authority (REA) Strategic Plan (2008)

Electrical transformers in rural villages

Nationwide distribution of transformers in 2016 (∼60K)



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



Legend

- T Transformer
- Surveyed households
- Surveyed electrified households

Source: Lee et al. (2015)

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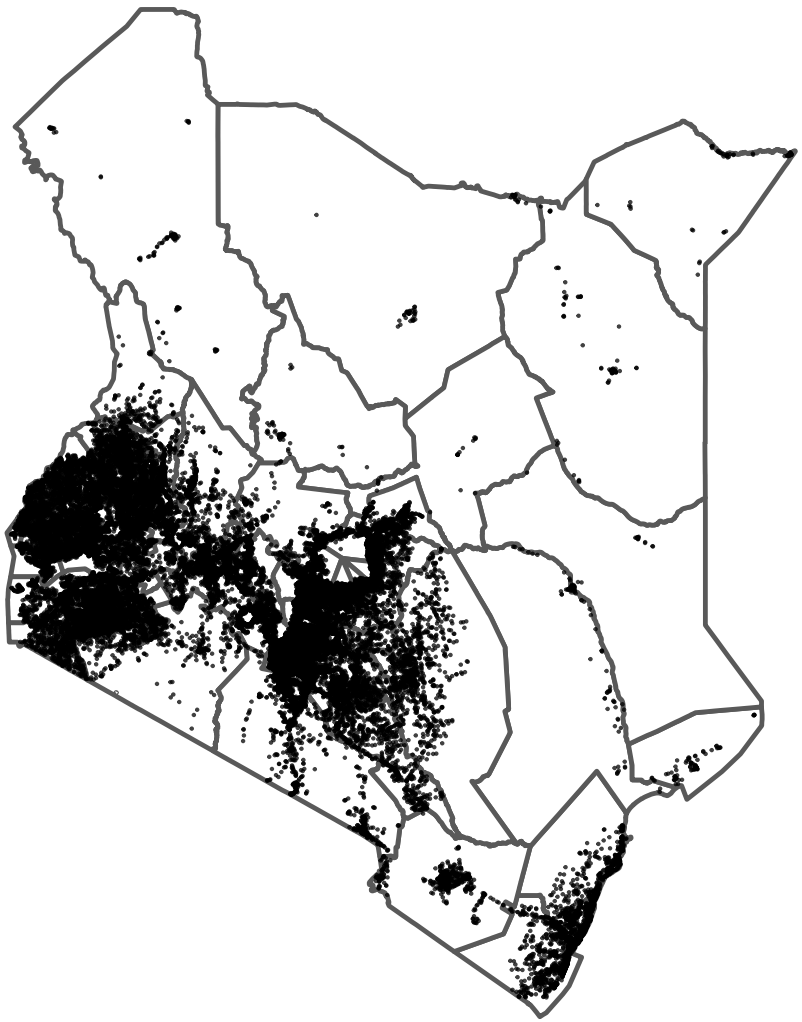
   - Goal: Connect all schools, health facilities, markets, etc. to the national grid
   - Mass construction of **electrical transformers** in rural villages

2. 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)



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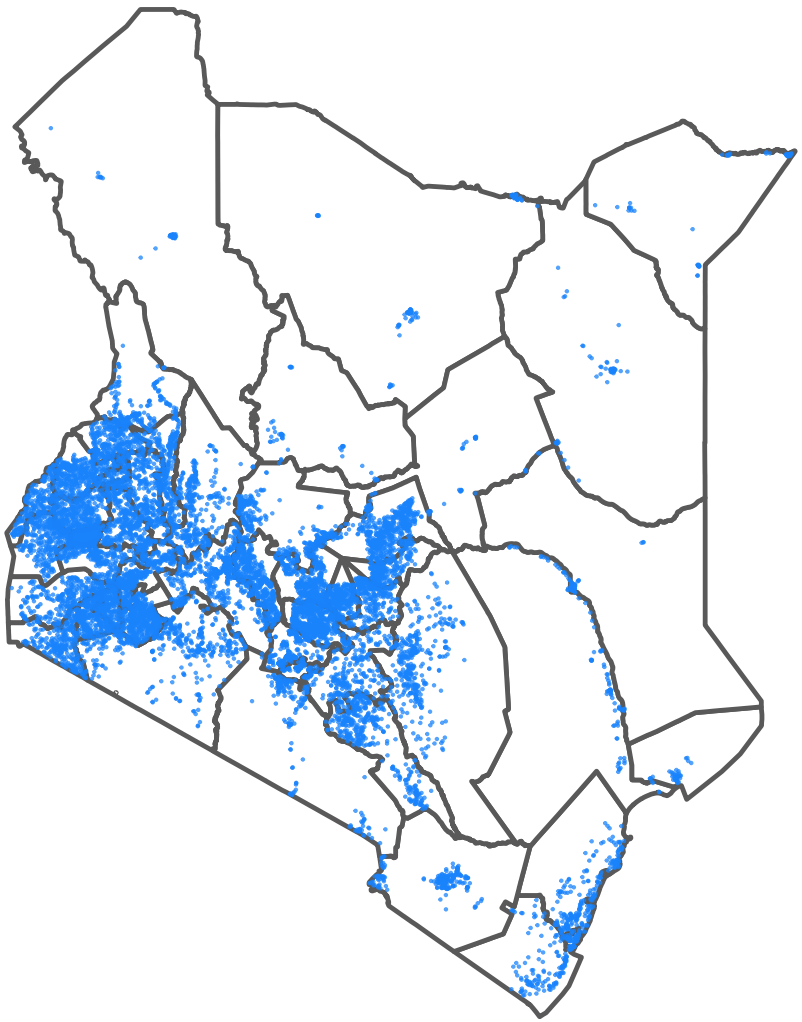

Electrification is a very visible and popular activity

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

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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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."

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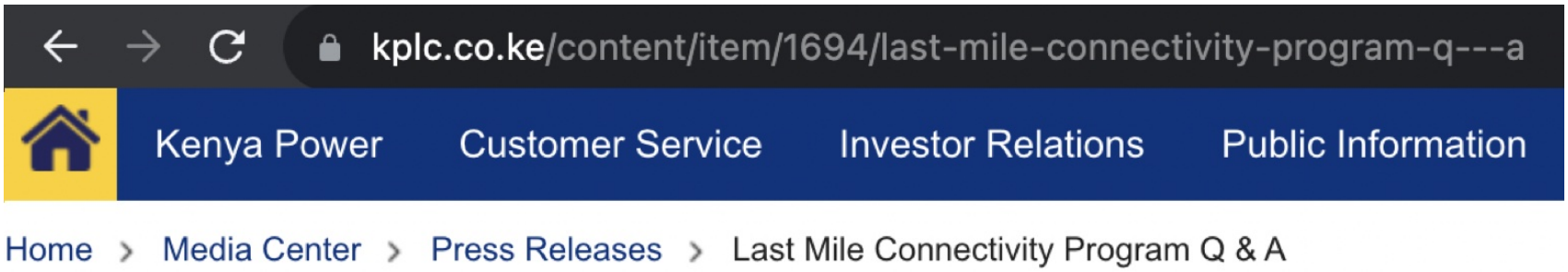
How were transformers selected for LMCP (2015-2000)?



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Kenya Power political capture criticized by opposition MPs

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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."

This talk

Kenya's political and electrical structures

	2009	2019
Wards	1,050	1,450
Constituencies	210	290
Counties	n/a	47

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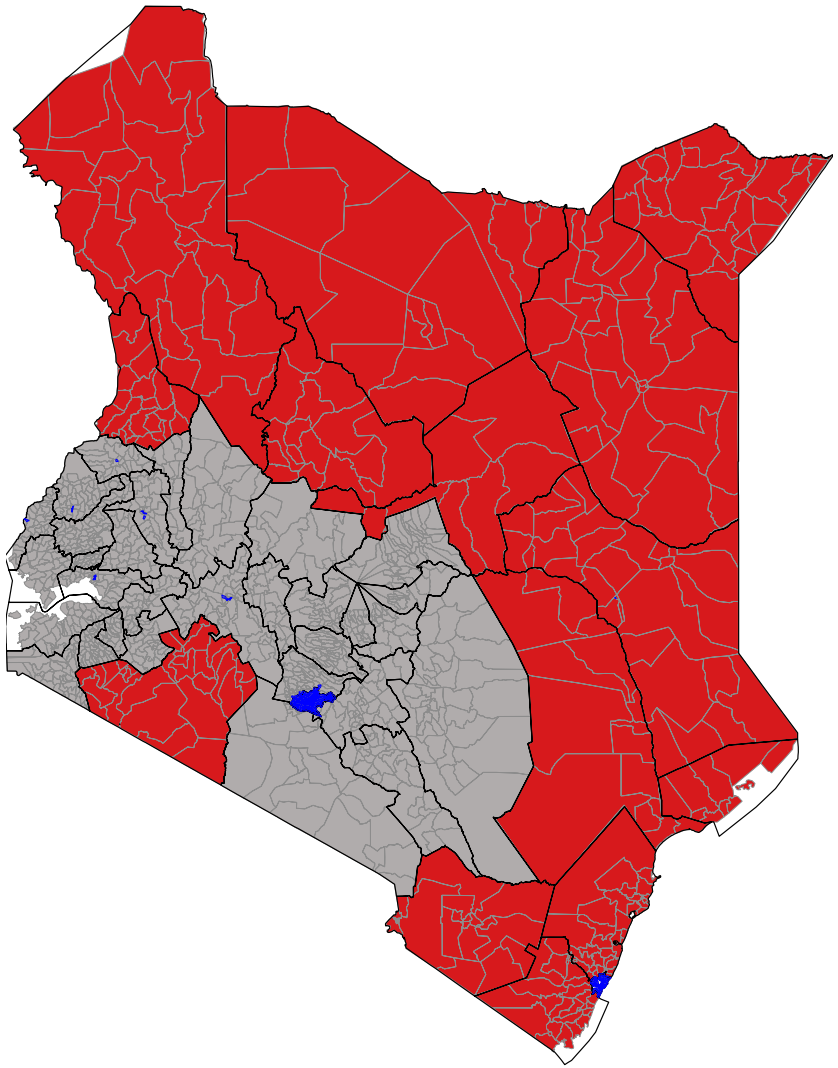
Counties	n/a	47
Population (millions)	38.6	47.6
Households using grid electricity as main lighting	22.7%	50.4%
Households using solar panels as main lighting	1.6%	19.3%
Electricity meters (millions)	1.3	7.1
Residential electricity meters (millions)	1.0	6.7
Electrical transformers	30,000	62,271

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

LMCP targeted **rural** Kenya: not urban or sparse areas



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- **Sparse:** targeted by 'KOSAP' off-grid electrification project (usually <20/km2)

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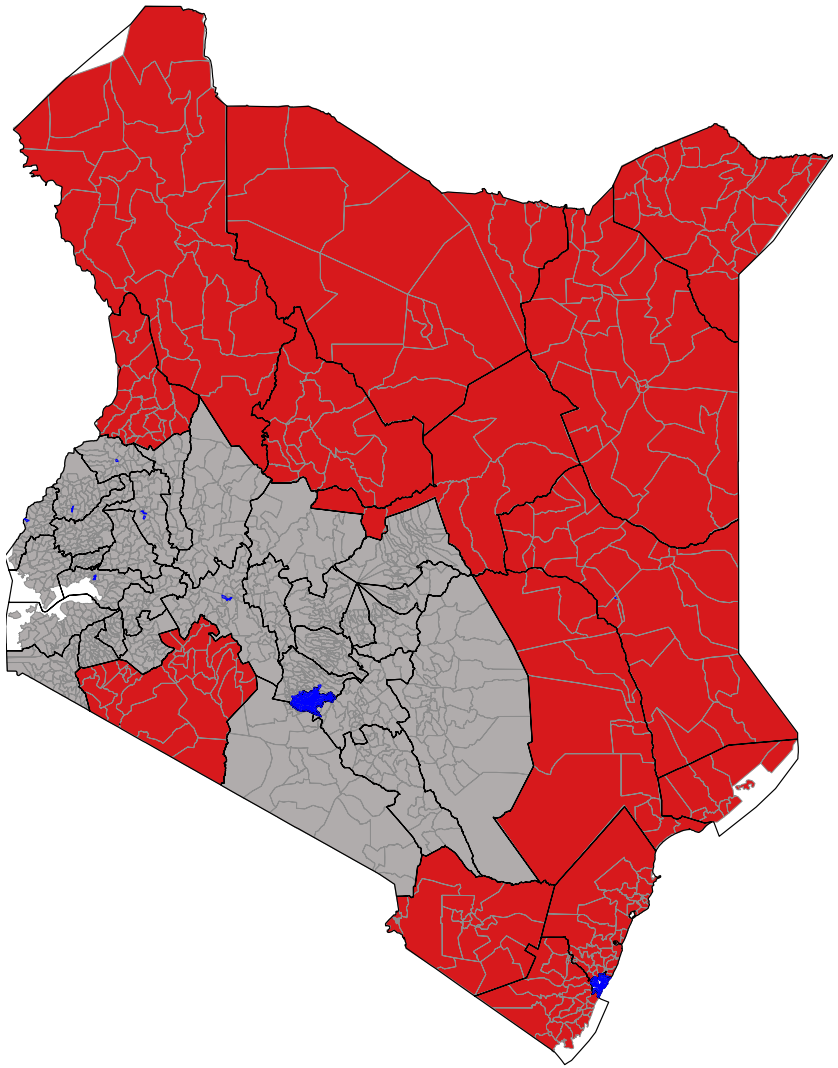

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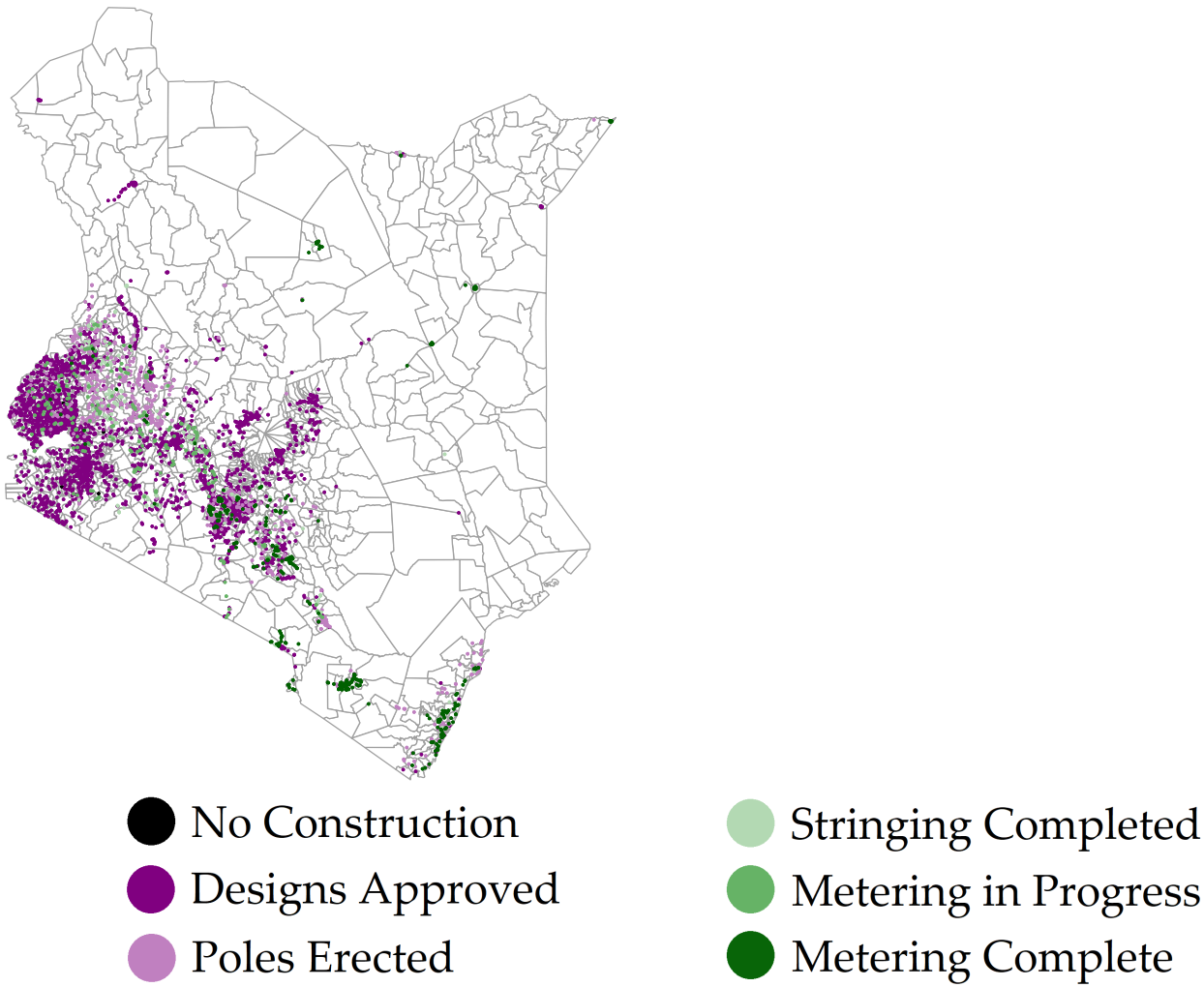
Nationwide construction progress at LMCP sites

(data source: contractor progress reports)

May 2017



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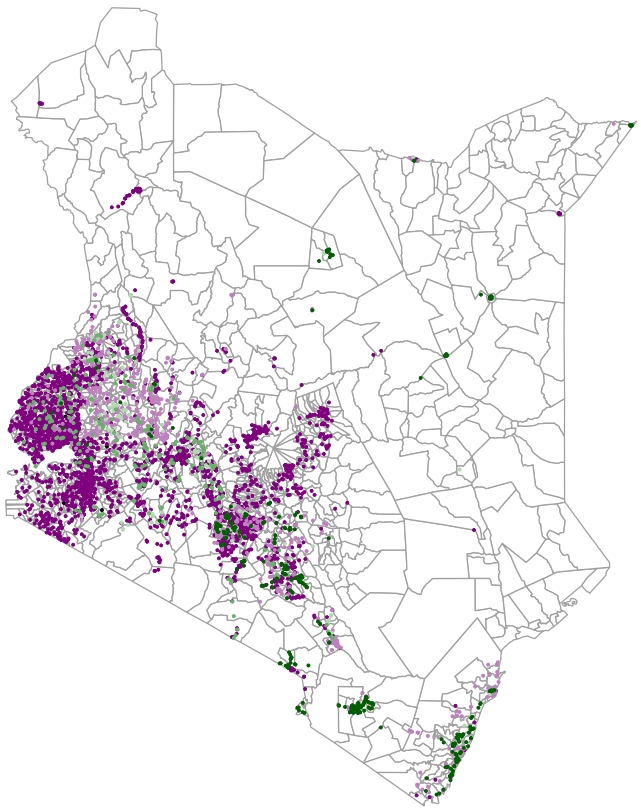
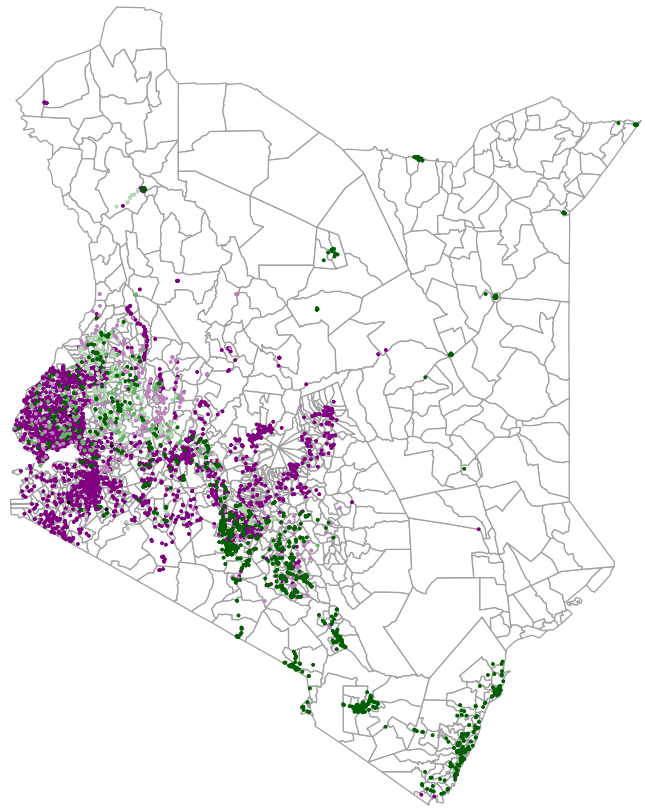


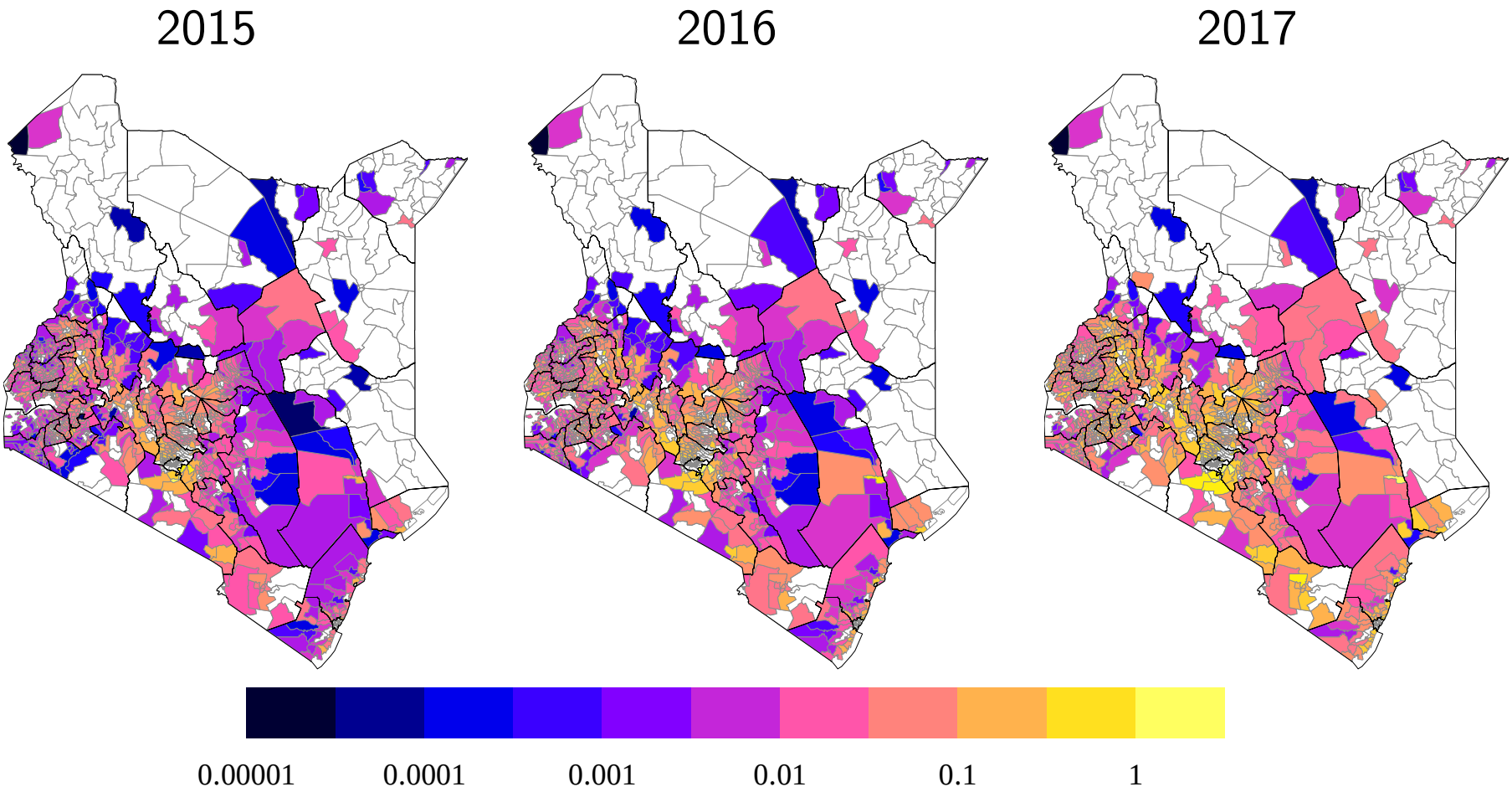
October 2017



No Construction
Designs Approved
Poles Erected
Stringing Completed
Metering in Progress
Metering Complete

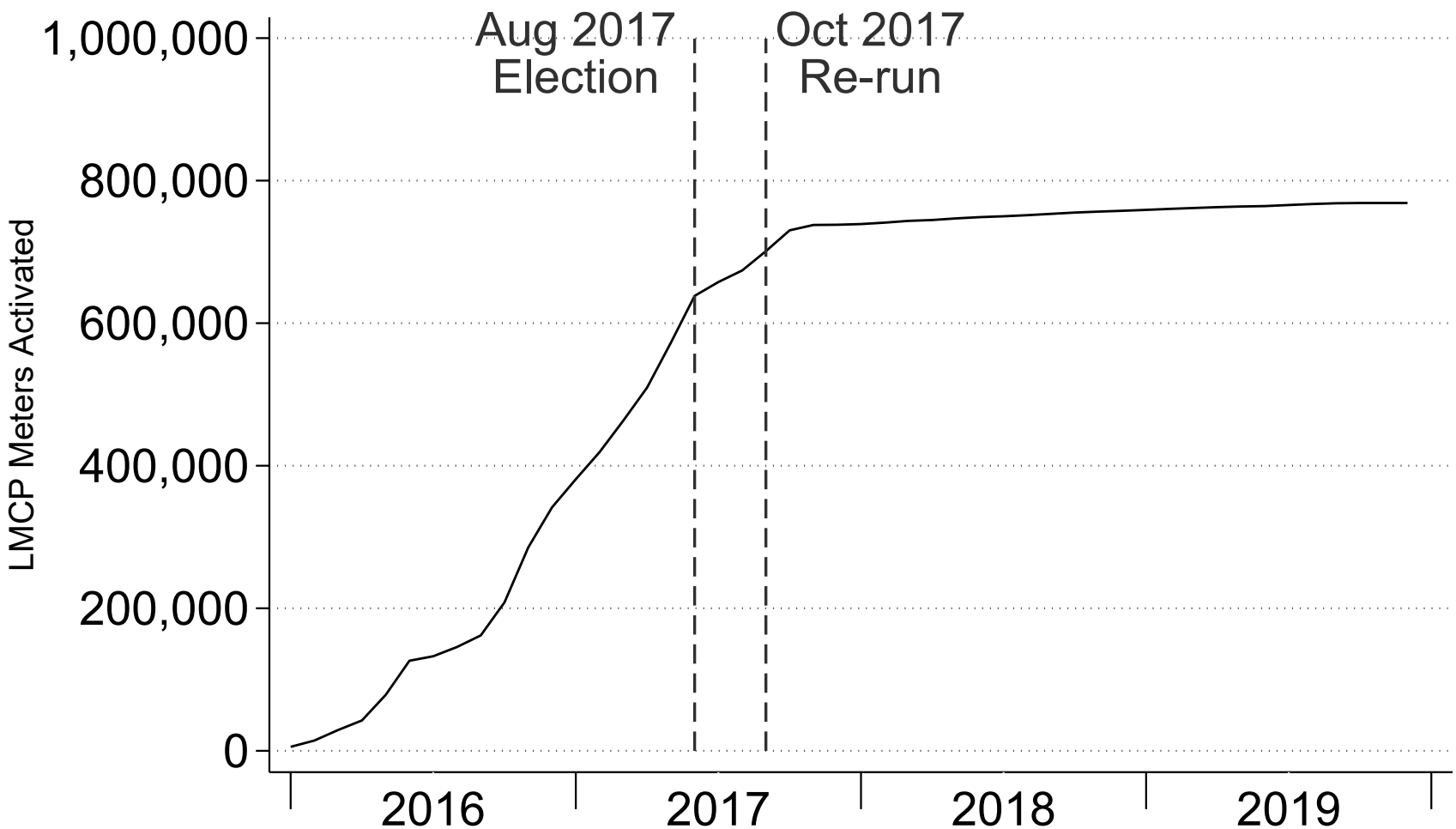
Huge increase in household electricity access

Residential electricity meters per household *(data source: Kenya Power)*



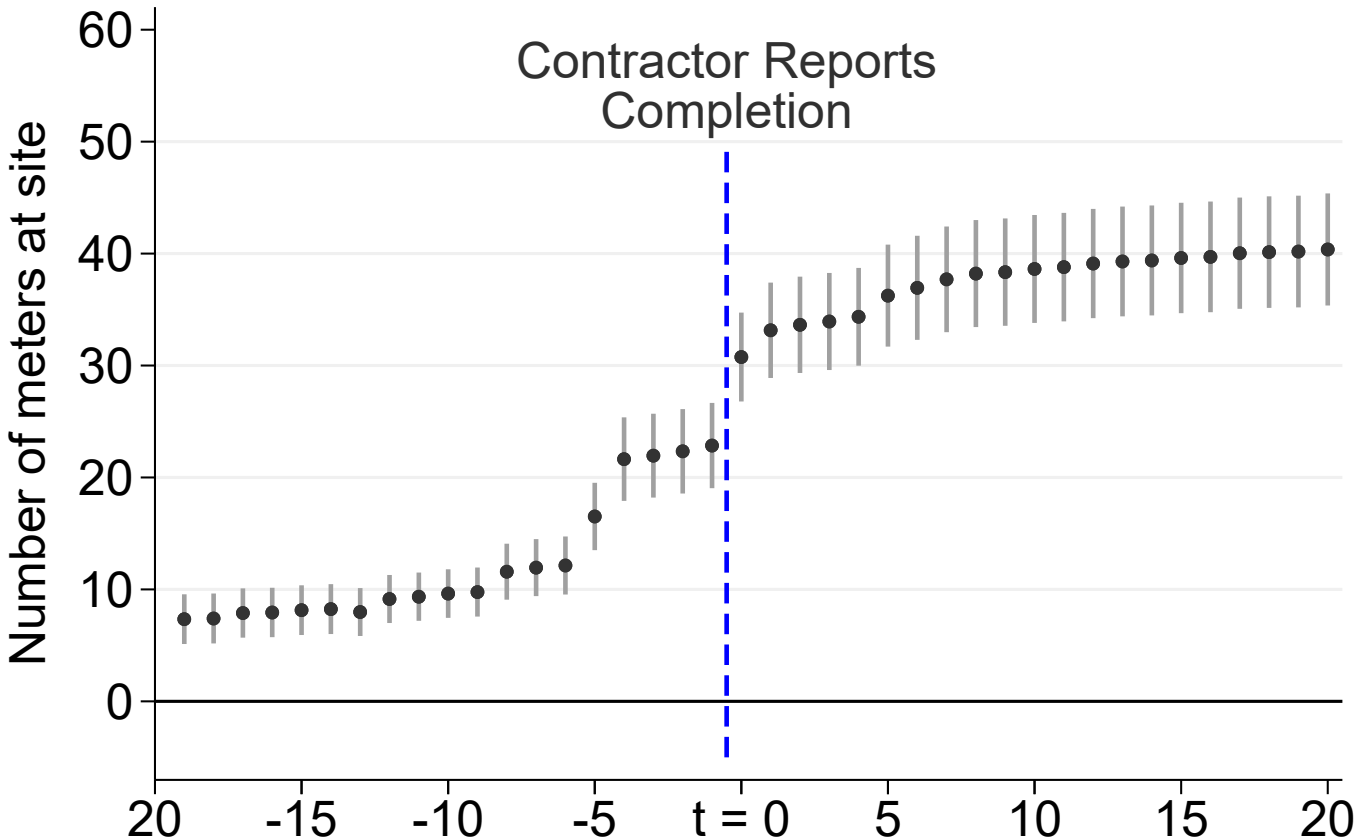
Household electricity meters activated around election

(data source: Kenya Power)



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



Studying the 4 stages of rural electrification

	Stage	Implementer
1	Expand transformer network	Rural Electrification Authority
2	From network, select LMCP transformers	Kenya Power and MPs
3	Construction among LMCP transformers	Regional contractors
4	Metering at constructed sites	Local Kenya Power officers

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- Stages 1 and 2 were conducted in Nairobi
- Stages 2 and 3 were managed regionally/locally

Studying the 4 stages of rural electrification

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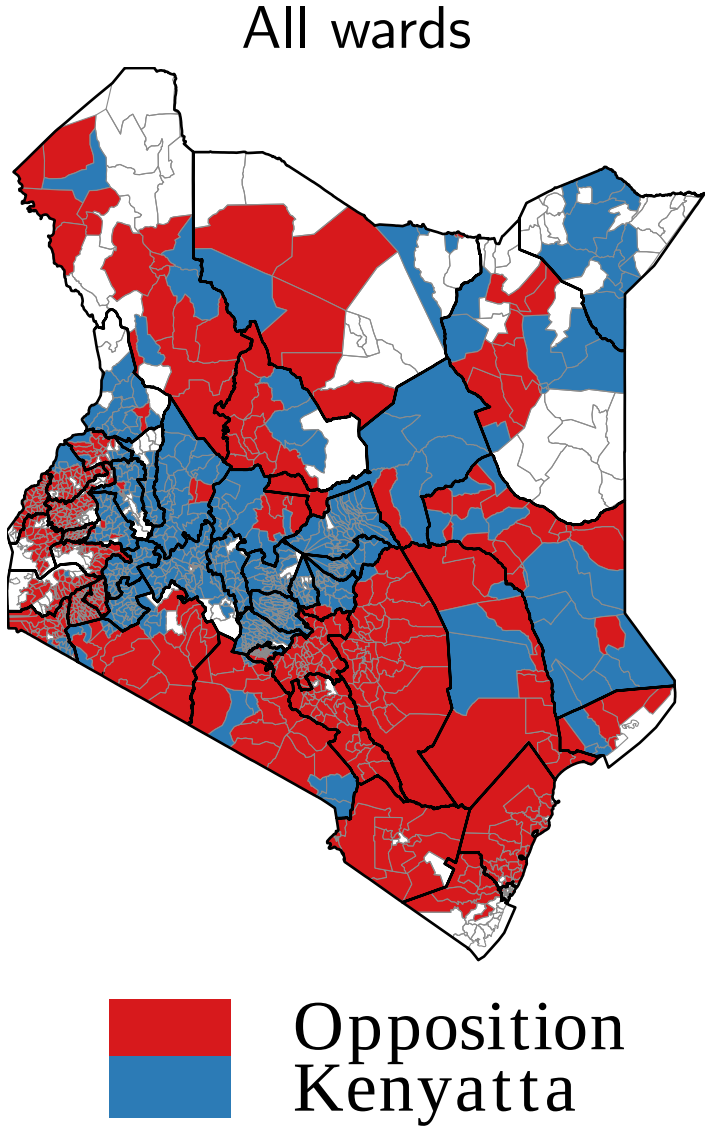
- Marginal
- Cumulative

Data (2): Electoral data

1. Electricity network data
   - 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

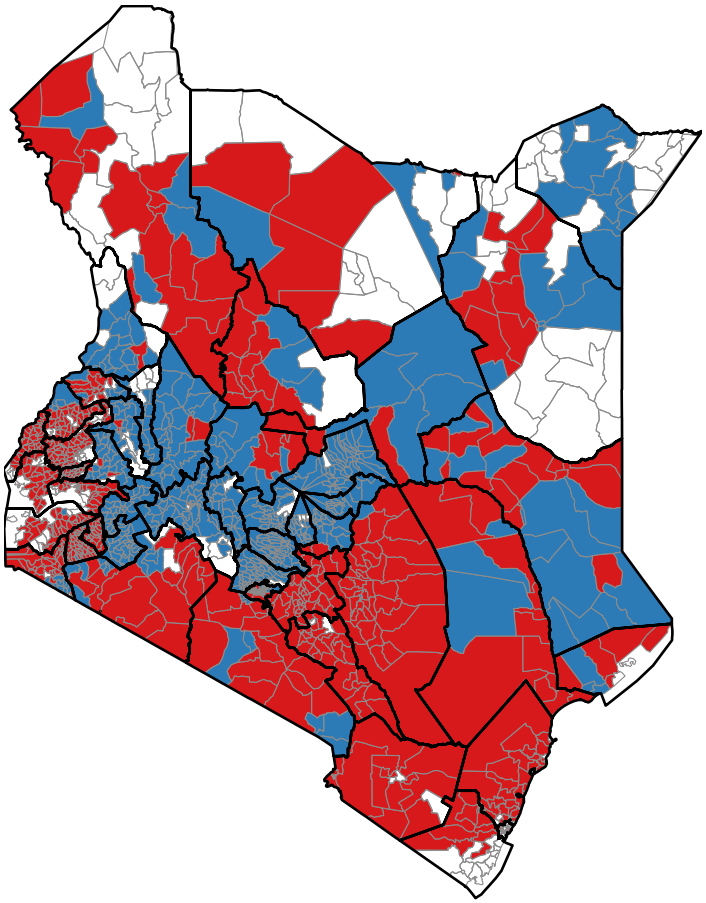
2. **Electoral data for 1,296 (out of 1,450) wards**
   - 2013 and 2017 presidential **election data**
   - 2013 parliamentary election data

Ward-level electoral outcomes: 2013 presidential election

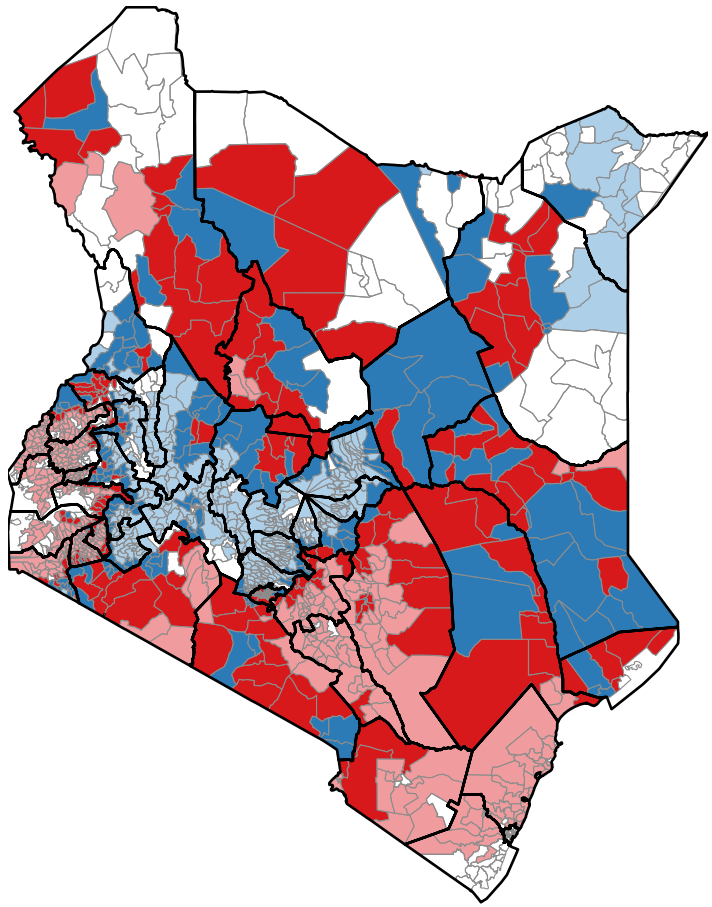


Ward-level electoral outcomes: 2013 presidential election

All wards



Highlighting adjacent wards



Opposition
Kenyatta

Data (3): Administrative data

1. Electricity network 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)

This talk

Introduction

Background

Data

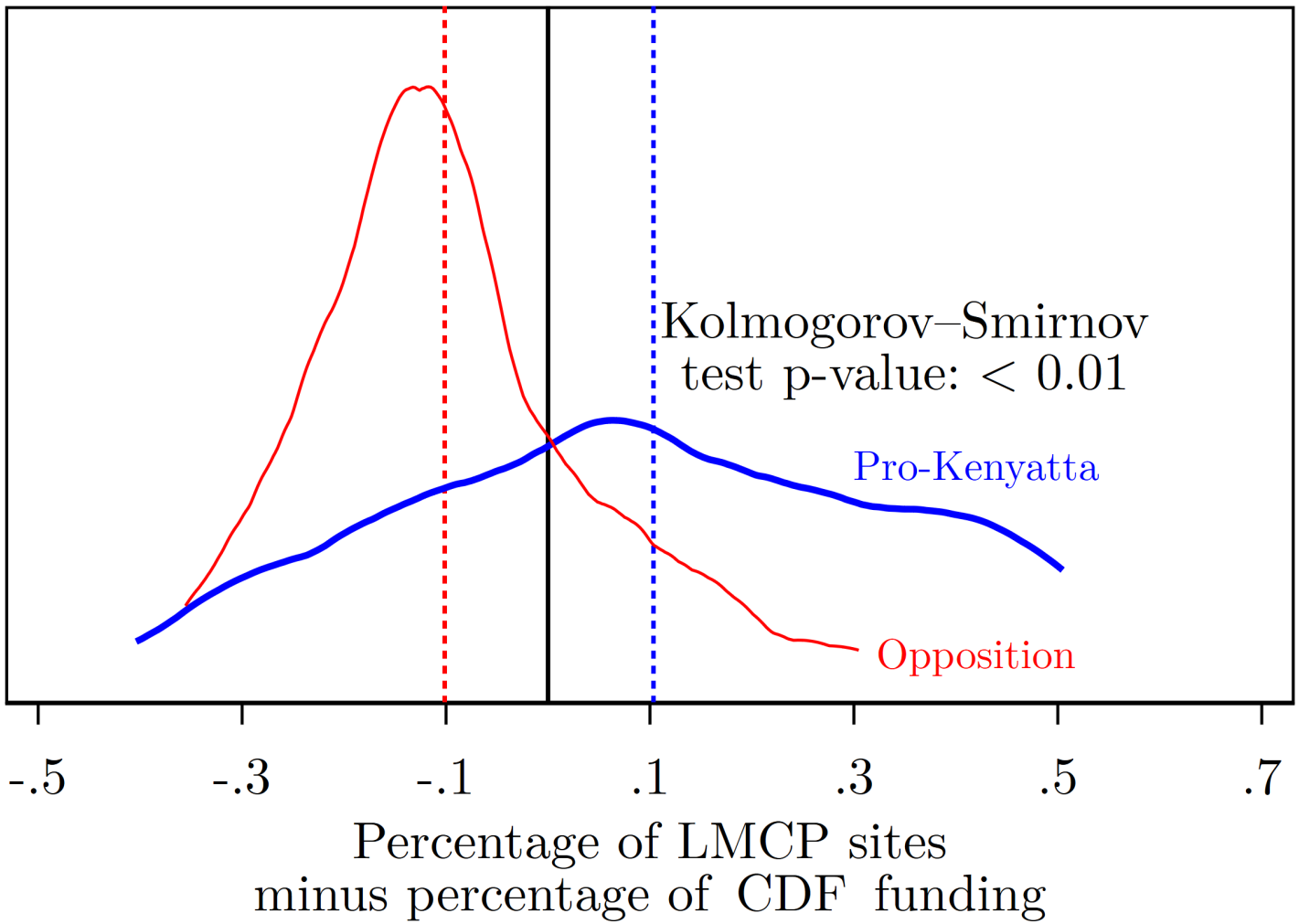
Results: Allocation by national officials

Results: Decentralization and favoritism

Discussion

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



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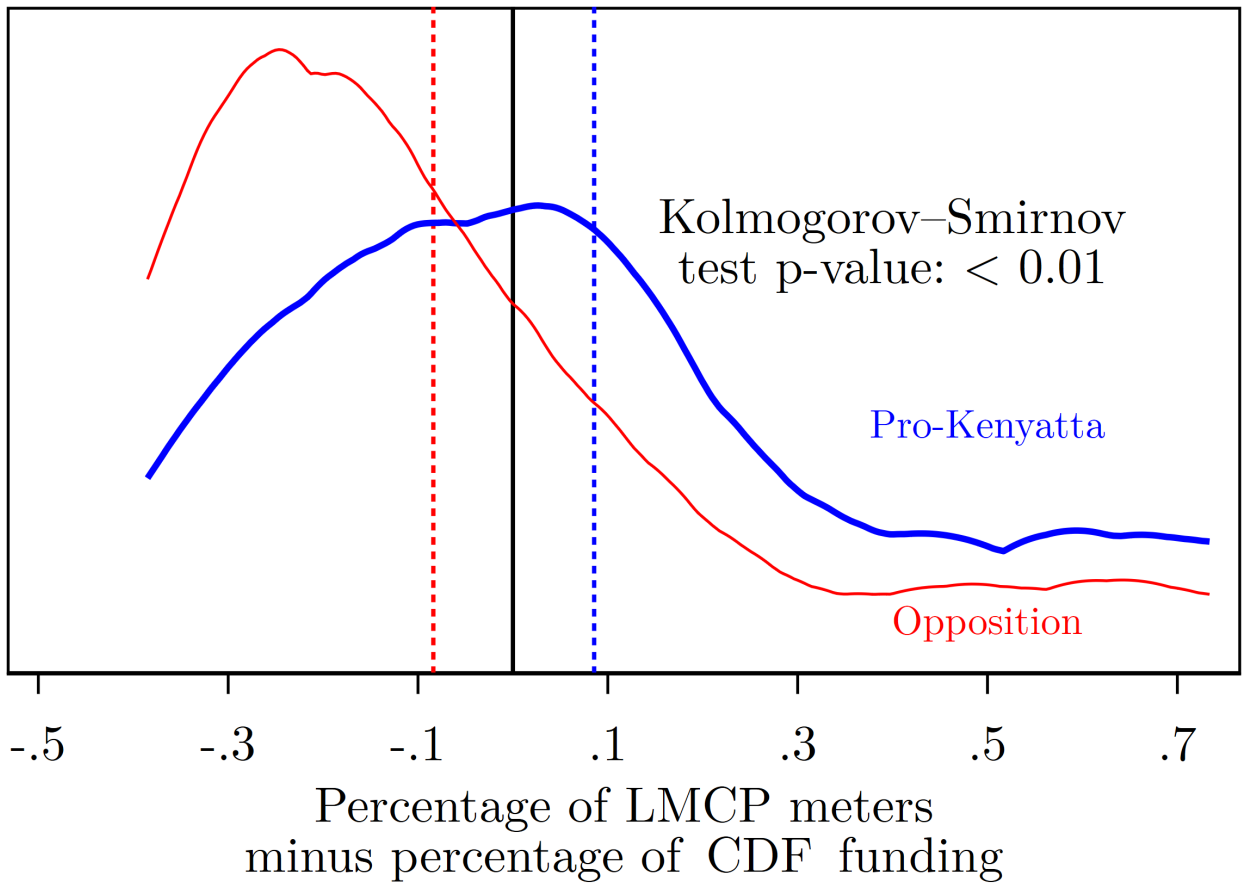

This paper's research questions

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

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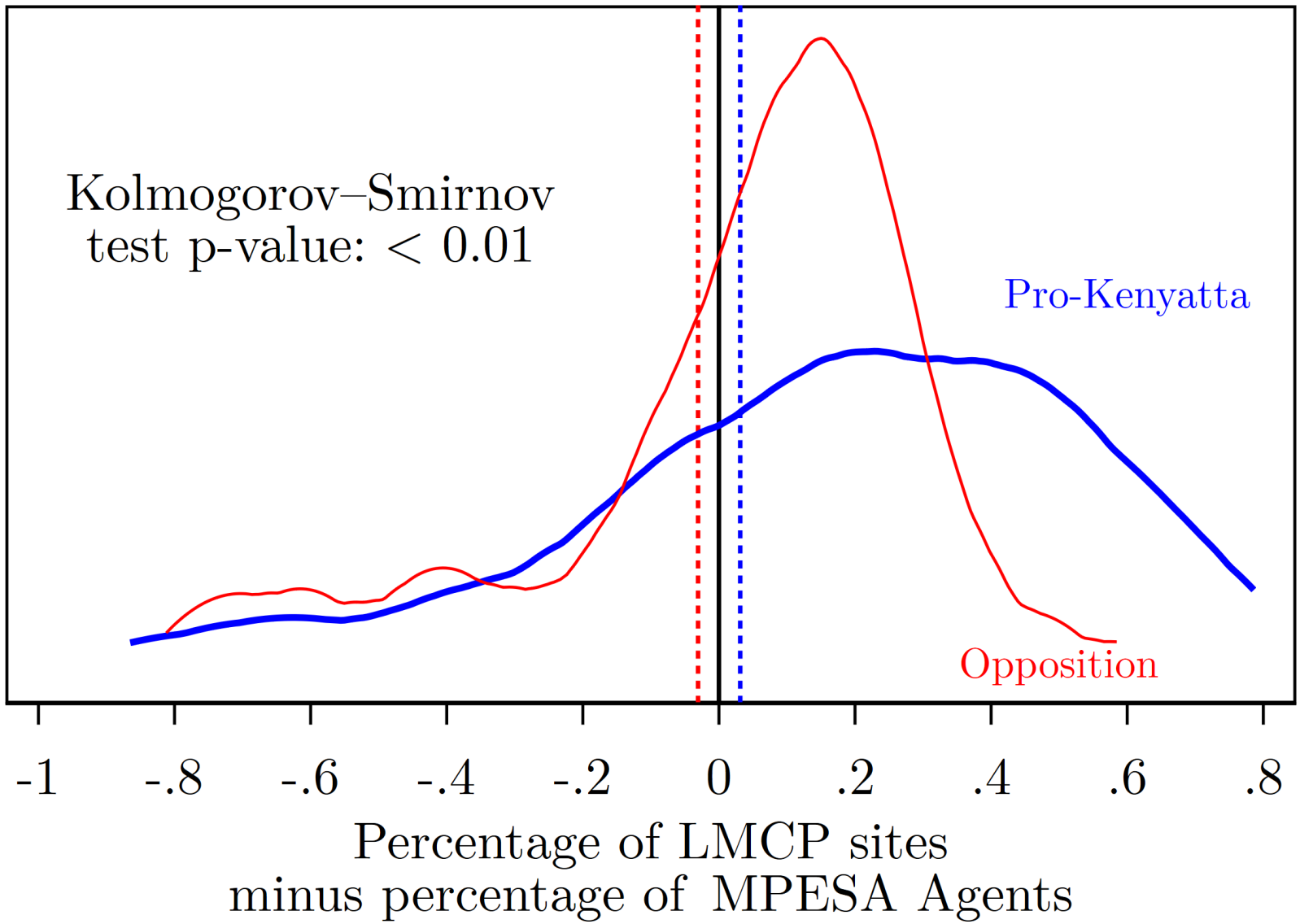
Research Question 1: Did the allocation of electrification projects deviate from the CDF allocation? **Yes**

... In any particular direction? **Yes, favoring the ruling party**

... In a way that cannot be explained by other factors?

Result 2: Favoritism relative to economic activity



More LMCP sites in pro-government areas

Even when using LASSO to control flexibly for a host of variables, wards that voted pro-Kenyatta in the 2013 election saw:

- 42-46% more LMCP sites

	In absolute terms			Relative to CDF Allocation		
	(1)	(2)	(3)	(4)	(5)	(6)
Voted pro-govt in 2013	50.6***	62.6***	58.7***	69.4***	63.7***	63.4***
	(10.6)	(11.2)	(8.13)	(18.4)	(19.4)	(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

More household connections in pro-government areas

Even when using LASSO to control flexibly for a host of variables, wards that voted pro-Kenyatta in the 2013 election saw:

- 42-46% more LMCP sites
- 31-35% 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***	3092***	3613***	5639**	5285**	5045***
	(1008)	(1159)	(805)	(2062)	(2364)	(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

Summary of findings: Favoritism in the LMCP

- The allocation of LMCP sites and household connections deviated from the CDF allocation
- This deviation follows political alignment
- The bias cannot be explained by population, economic growth, or other observables

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Summary of findings: Favoritism in the LMCP

- The allocation of LMCP sites and household connections deviated from the CDF allocation
- This deviation follows political alignment
- The bias cannot be explained by population, economic growth, or other observables
- **Timing:** Construction ramped up before the 2017 presidential election
- **Targeting:** Less construction in core opposition areas

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

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- Core: >75% of voteshare (approx. 45%)
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	(1)	(2)	(3)
Pro-Government Core (δ_1)	3609***	4013***	4543***
	(1098)	(1235)	(928)
Pro-Government Swing (δ_2)	4315**	2845	2928*
	(1963)	(2272)	(1613)
Pro-Opposition Swing (δ_3)	2686*	2889**	2538**
	(1530)	(1401)	(1258)
Observations	911	911	911
Pro-Opposition Core Mean	14095	14095	14095
p-val $\delta_1 = \delta_2$	.72	.62	.34
Controls	None	SES	LASSO
Sample	Wards	Wards	Wards

This talk

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

MPs do not exert favoritism within their constituencies

- MPs are elected by constituency: approx. 5 wards per constituency
- Regressions include constituency fixed effects

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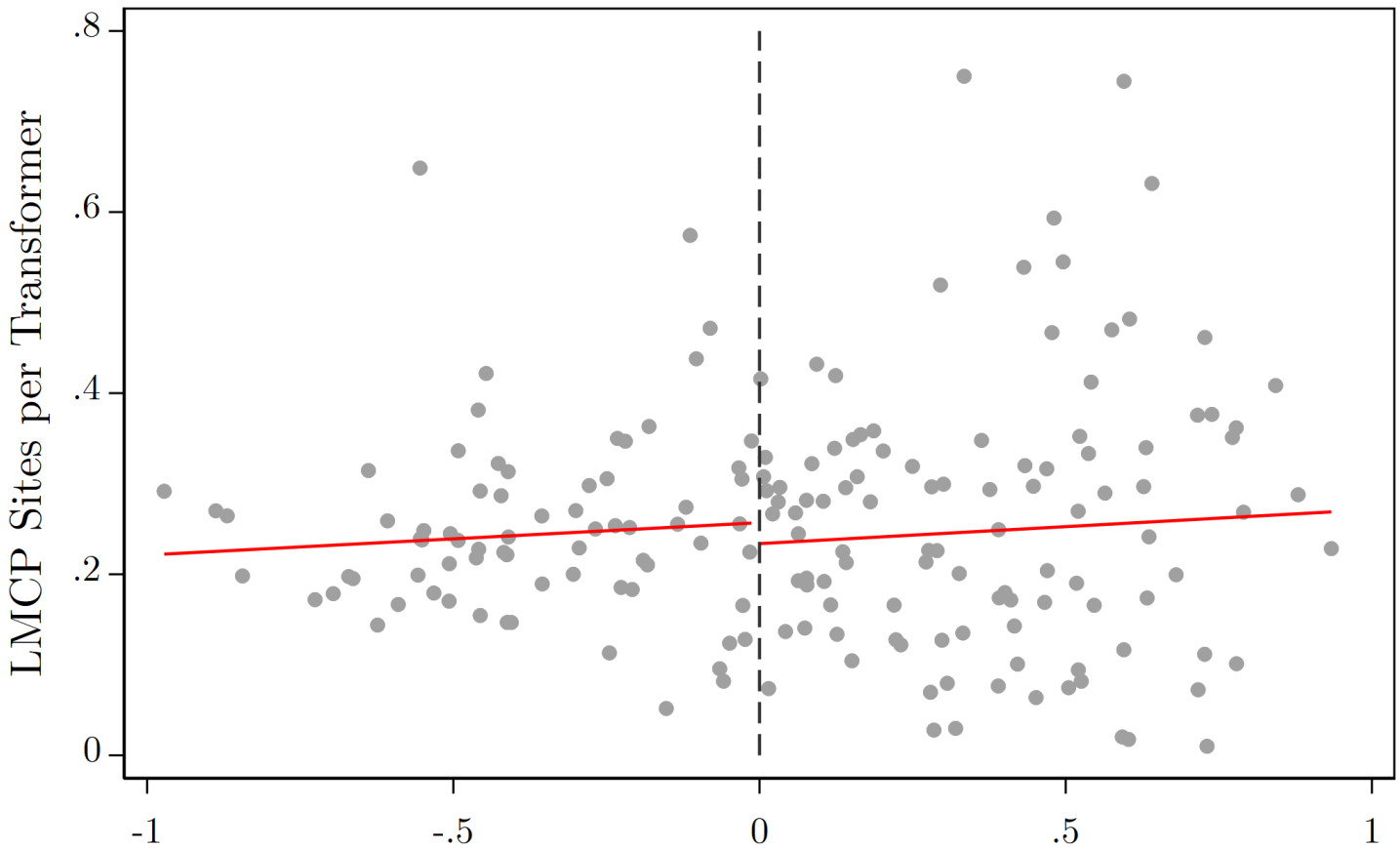
- Regressions include constituency fixed effects
- Ward-level alignment with MP has no measurable impact

		LMCP					
	Pre-existing Transformers	Site Selection		Construction		Meters	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Voted pro-govt in 2013	143	-.022	13.5	-.0908	-17.5	-17.8	1205
	(111)	(.0376)	(26.6)	(.0633)	(17)	(27.6)	(1700)
Voted pro-MP in 2013	-42.3	.0237*	1.43	.00613	.49	-6.39	-150
	(31.3)	(.0142)	(8.78)	(.0326)	(8.63)	(10.2)	(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.

Constituencies with pro-government MPs do not benefit disproportionately

- Close-election Regression Discontinuity (RD) design
- Constituencies with government-aligned MPs do not benefit disproportionately



Decomposing the stages of construction

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- Marginal
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Decomposing the stages of construction

- **Marginal** and **cumulative** effects at each stage
- 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***	.0539***	62.6***	-.0428	27.1***	-5.34	3092***
	(41.3)	(.0178)	(11.2)	(.0415)	(10.2)	(11.1)	(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**

The limitations of decentralization in the energy sector

- **Lack of MP expertise:** 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)
- **Lack of county government expertise:** 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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- **Government mandate:** Legal mechanisms allow the national government to claim functions that fall under a local government's mandate (Hassan, 2020)
- **Continued political capture:** Kibaki and Kenyatta appointed co-ethnics as Kenya Power MDs

The benefits of centralization in the energy sector

- Renewables generation is often geographically constrained: benefits from nationwide optimization (Kenya: 10% increase in generation from wind farm in far northern Lake Turkana)
- Larger independent system operator (ISO) can minimize costs (Martinot, 2016; Cicala, 2022)

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- Pool technical expertise
- More efficient management: crucial for financially constrained utilities facing pressures (Burgess et al., 2020; Blimpo and Cosgrove-Davies, 2019; Kojima and Trimble, 2016; Fried and Lagakos, 2023)

This talk

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)
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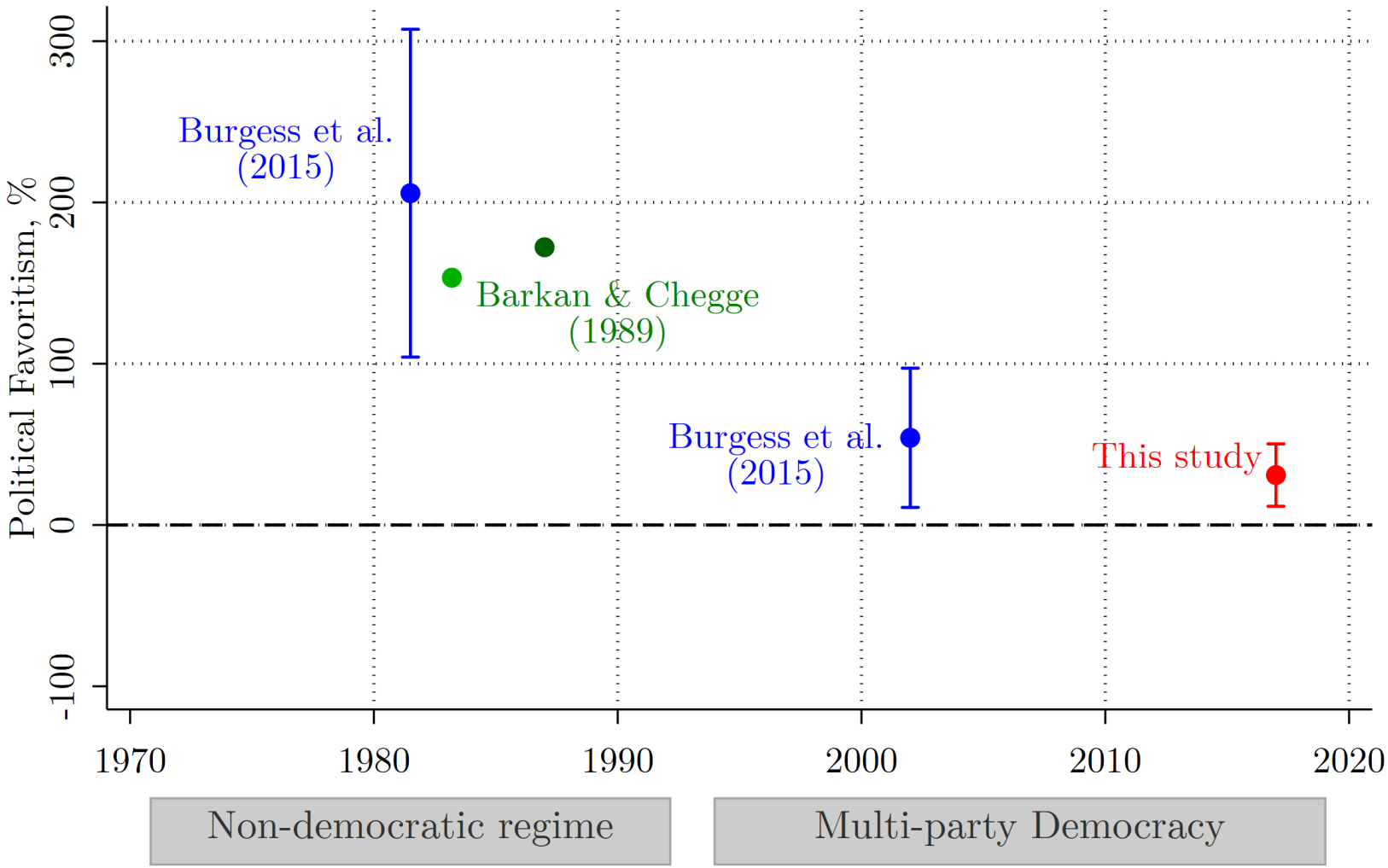
Kenya has seen significant reductions in political favoritism



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

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- No favoritism towards govt-aligned MPs
- No favoritism in locally managed parts of LMCP
- LMCP favoritism driven by phases of the program controlled centrally

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

Central tensions in the decentralization of the energy sector

Decentralization is more difficult to implement:

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- Natural monopoly, networks efficiency
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- 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!)