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Introduction

When do politicians' re-election strategies cause serious environmental damage? This poster argues that for a politician interested in retaining office protecting forested areas is efficient in most years, but giving targeted access to pivotal voters is efficient in election years. I test the theory that competitive elections are associated with higher rates of deforestation using remote sensed satellite data of forest cover and data on national elections.

Mau Forest Preserve: Theory and Reality



- The Mau Forest Reserve experienced over 50% deforestation from 1990-2003
- Nakuru county (top) was almost completely deforested, Narok county (bottom) had a much lower deforestation rate
- Identical in all of the usual variables that drive forest cover loss: population growth, economic activity, climate...

Nakuru county is often pivotal for national elections, Narok is a safe opposition county

Preserve vs Allocate

Politicians choose to allow deforestation when they need an immediate boost to their electoral support.

- Protecting forested land has long-term, diffuse benefits that are
- difficult to attribute to a politician Pollination and pest control
- Erosion control
- Cleaner air and water

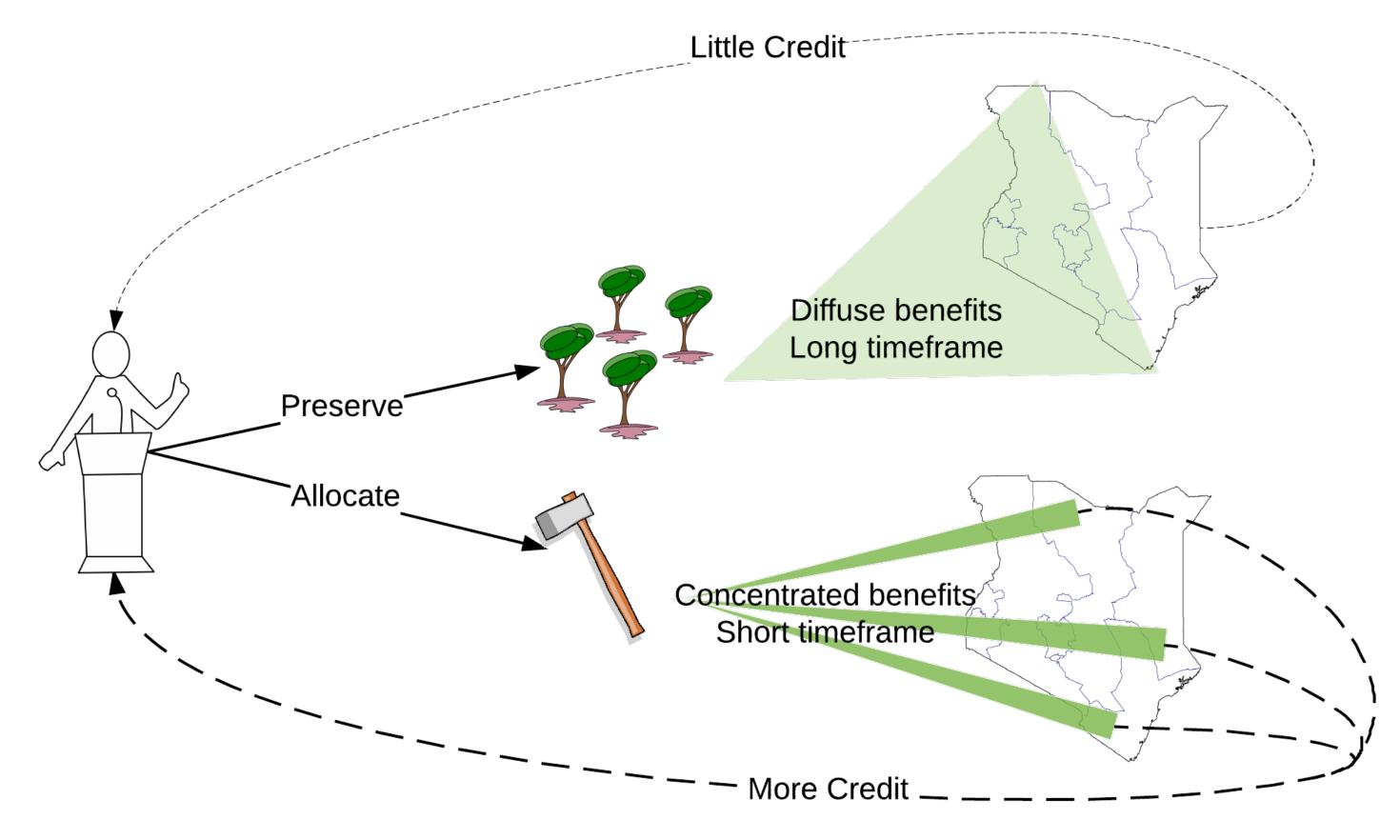
tourism revenue

land has short-term, targetable benefits that are easily attributable.

Allowing exploitation of forested

- Logging revenue
- Land use conversion to crops
- Construction

Politicians face an efficiency tradeoff: preservation is more efficient in the long-run, but allowing exploitation is more efficient if politicians know when they need support or whom they need to target.



Democracies vs Autocracies

- Democrats face a large poorer selectorate who greatly benefit from land allocations
- Autocrats face a small rich selectorate who benefit little from land allocations
- Autocrats with long time horizons should "smooth" their consumption of forests, leading to lower rates of exploitation

Electoral Incentives

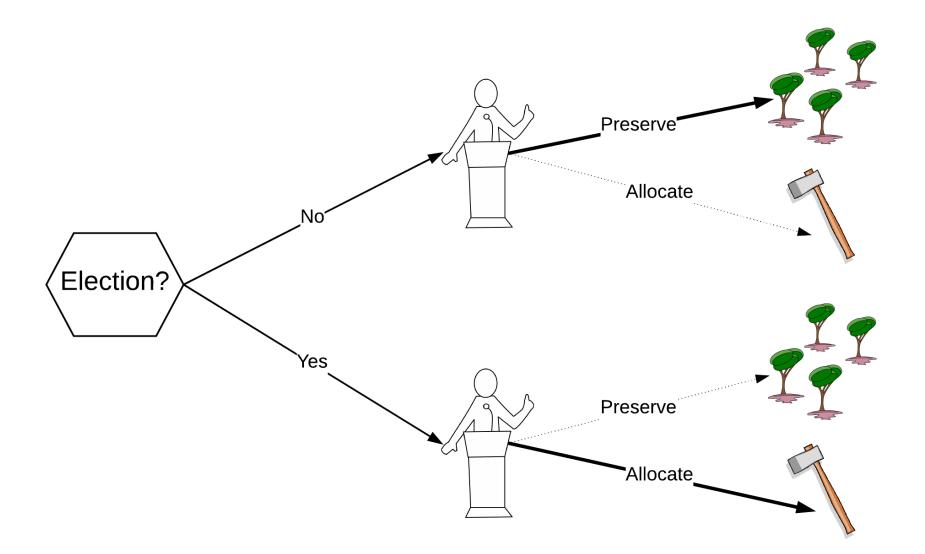
Normal year:

- Public goods are more efficient for generating broad support
- Allocating land in non-election years wastes a valuable resource on unnecessary short-term support

Election year:

horizons are short

- Private goods are more efficient for generating support when targeting is important or time
- Allocating land generates a short-term boost in support among those who get the land



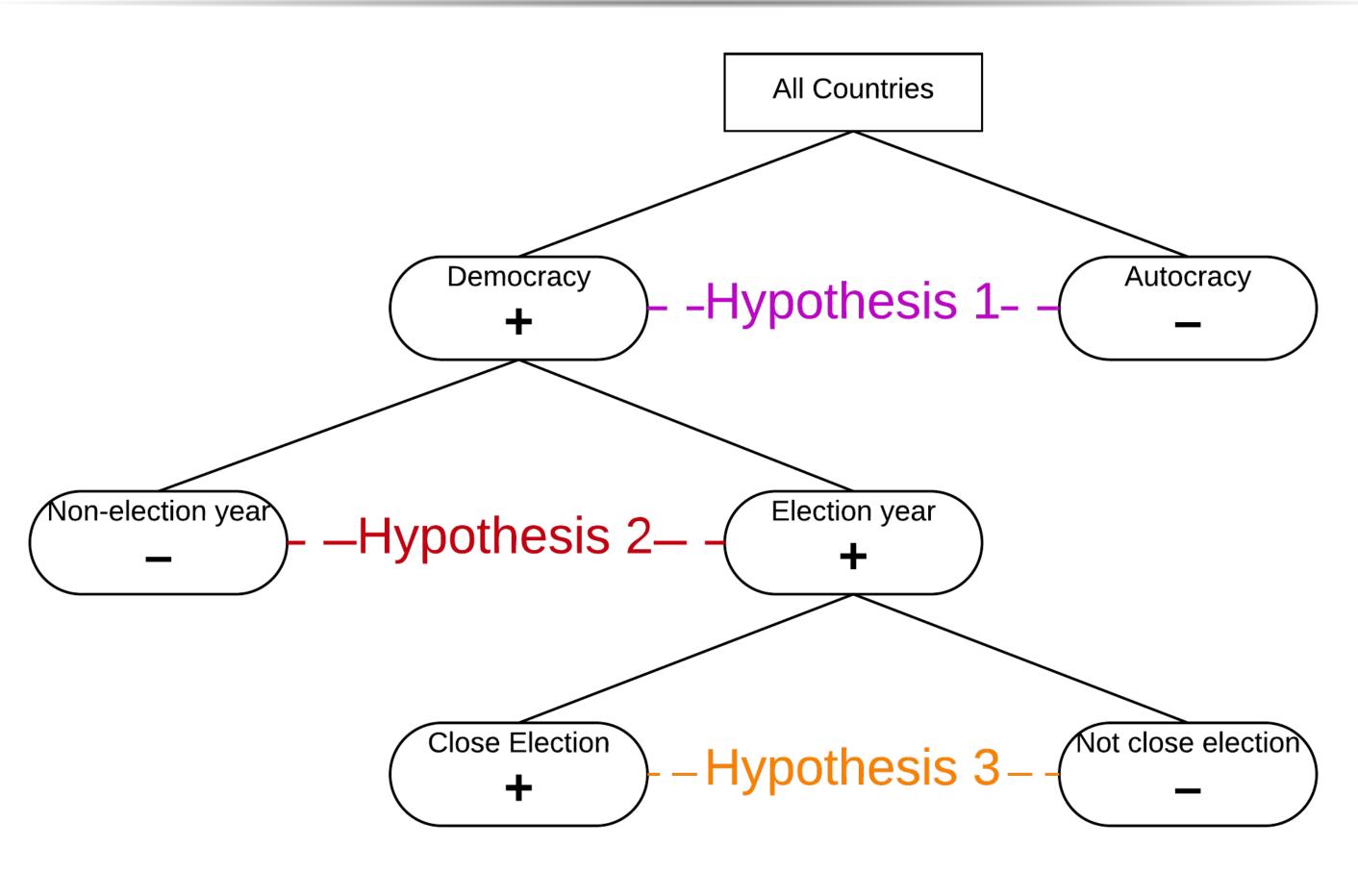
Close election:

- Short time horizons incentivize politicians to use resources now instead of saving them for later
- Targeting key constituencies is more important

Non-competitive election:

- Longer time horizons incentivize some preservation
- Targeting is less important as politicians grow more sure of

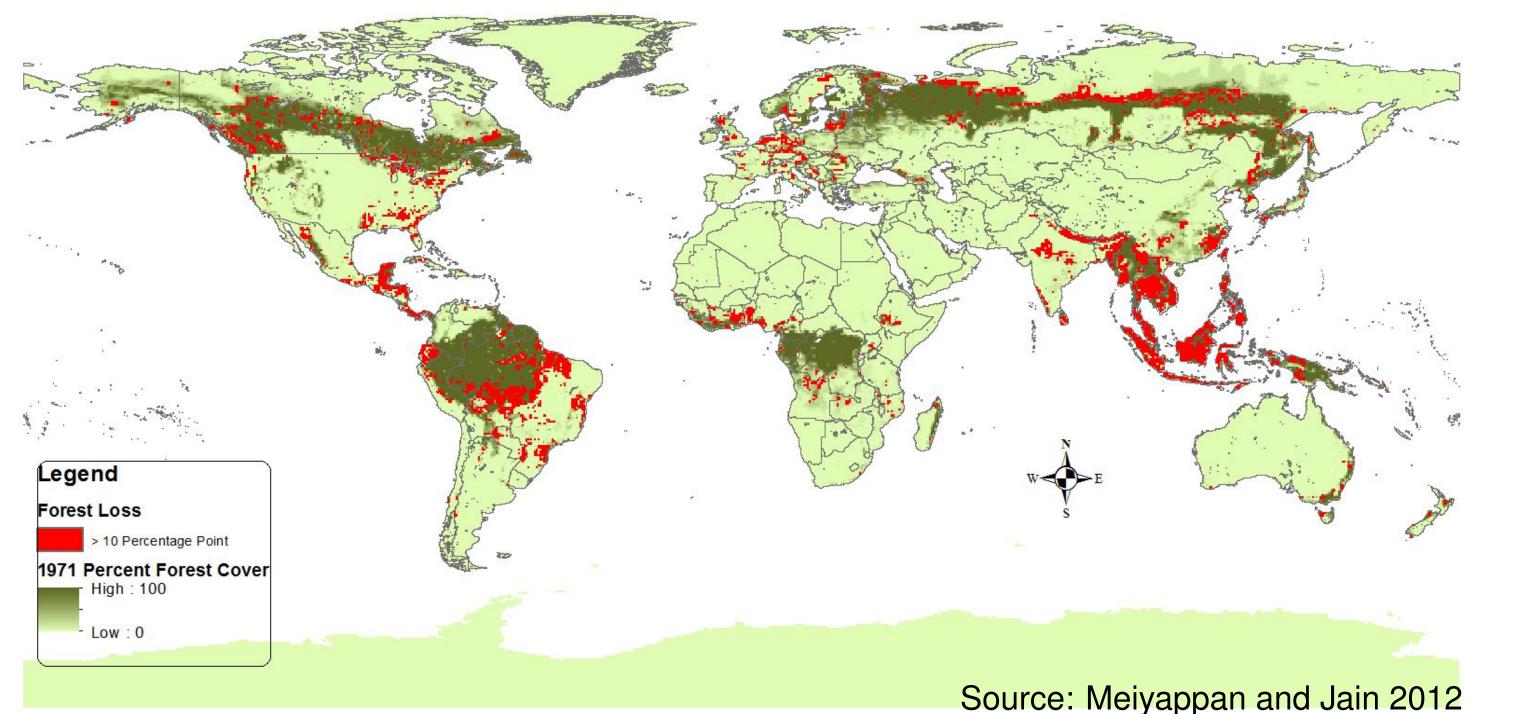
Hypotheses



- H1: Democracies have higher rates of deforestation than autocracies
- H2: Election years have higher rates of deforestation than non-election years
- H3: Close elections have higher rates of deforestation than noncompetitive elections

Data

Forest cover and loss, 1971-2005



Method Specifics

Estimating equation:

 $forest.diff_{it} = \alpha_i + year_t + \alpha_i * year + \beta_1 * DV_{ct} + \gamma * controls_{it} + u_{it}$

- *i indexes observation, t indexes year, c indexes country, γ and $controls_{it}$ are vectors
- Identification strategy: unit + year fixed effects, unit time trends
- DV is first differenced to account for a unit root
- Standard errors are clustered at the country-year level to account for spatial dependence
- Unit time trends partially account for unobserved, slow moving drivers of forest cover change
- EVs and controls are interacted with an indicator of whether there is any forest cover to account for structural zeroes in the first-differenced variable
- The test of Hypothesis 1 includes unit fixed effects, so it estimates the difference between being a democracy and being an autocracy within the same country across different years
- Robust to different specifications of democracy, elections, vote margin, inclusion of controls and different fixed effects, weighting by forest area in a country

• **DV**: percent change in primary forest cover in a $.5^{\circ} \times .5^{\circ}$ plot of land in one year

- Average forest cover change in pixels with forest: -.025
- 2,145,000 pixel-years from 1975-2005
- 40.2% have some forest in 1970
- *EVs*: government type (Boix 2003), election year (DPI, CLEA), margin of victory (DPI, CLEA)
- 6264 country years
- 555 unique elections
- 371 elections with \leq 10% margin of victory

Controls:

- economic size, growth
- population growth
- current level of forest cover unit + year fixed effects, linear unit

1970-2005

some forest

• 34.0% have some forest in 2005

• 17.5% of land was forested in 1970

14.2% of land was forested in 2005

• 99 unique democracies over

• 161 countries, 139 begin with

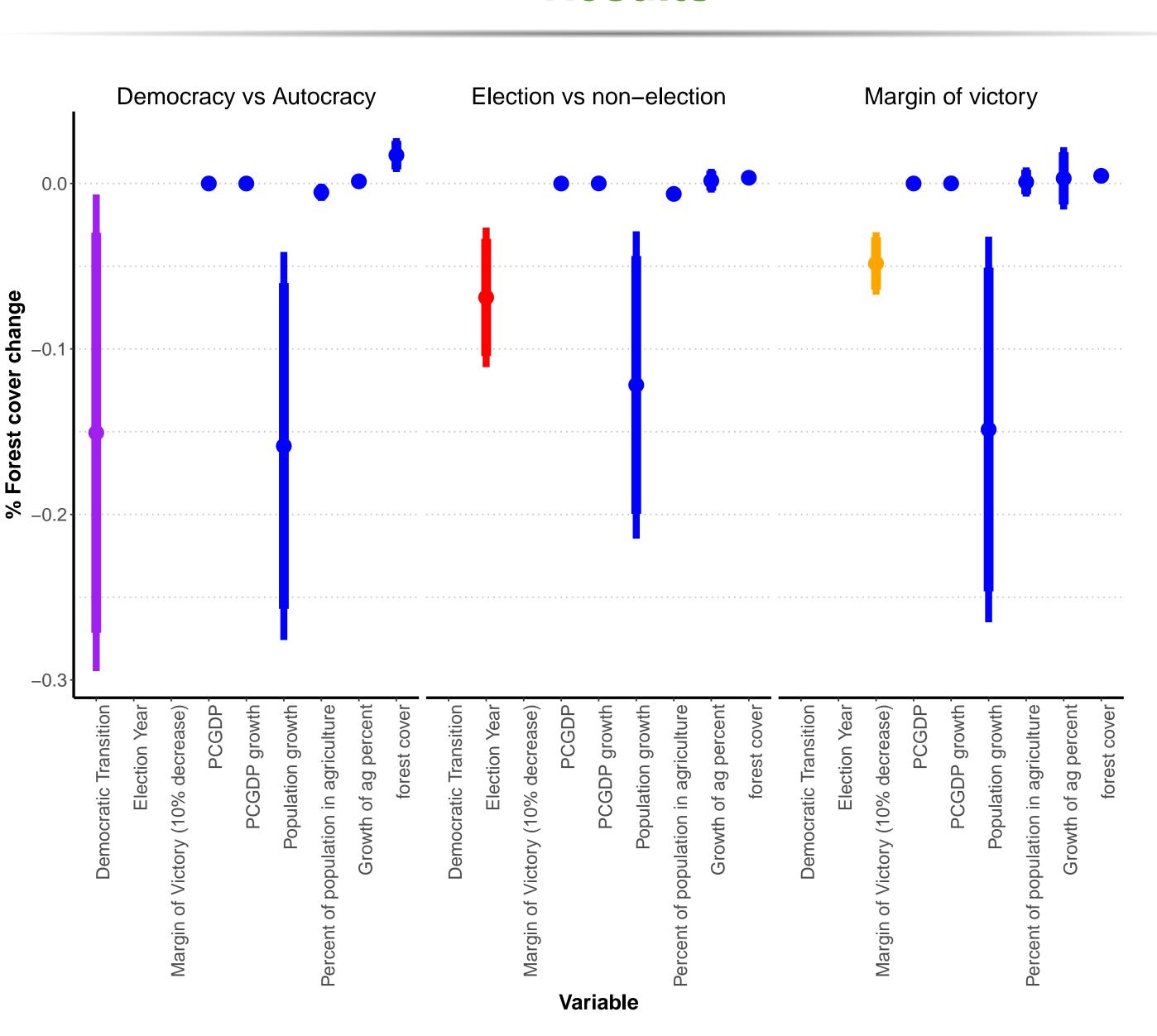
election=100, unopposed=0

Margin of victory is inverted: tied

174 countries, 148 begin with some forest

 agricultural population size, growth trends

Results



Conclusions

- Democratic transitions are associated with higher rates of deforestation
- Among countries that have elections, election years are associated with substantially higher rates of deforestation than non-election years
- Among election years, close elections are associated with higher rates of deforestation than less competitive elections

Extensions and Discussion

Do legislative and executive elections differ in their effect size?

	Dependent variable: forest.diff			
	(1)	(2)	(3)	(4)
Legislative election	-0.070*** (0.019)			
Executive election (10% increase)		-0.066*** (0.025)		
Legislative competition (10% increase)			-0.039*** (0.013)	
Executive competition				-0.046*** (0.013)
Unit-year fixed effects?	Yes	Yes	Yes	Yes
Unit time trends?	Yes	Yes	Yes	Yes
Observations	1,595,339	1,595,339	301,469	142,078
Adjusted R ²	0.172	0.172	0.247	0.203
Residual Std. Error	0.426 (df = 1537429)	0.426 (df = 1537429)	0.345 (df = 250572)	0.407 (df = 106133
Note:			*p<0.1;	**p<0.05; ***p<0.0

Result: legislative and executive elections are statistically indistinguishable. This suggests that there are not heterogeneous treatment effects across electoral systems.

Next Steps:

- Use sub-national variation in electoral competition and high spatial resolution forest cover data to test whether competitive districts have
- higher rates of deforestation than safe districts
- Use high temporal resolution data to examine the timing of electoral deforestation cycles

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