The Political Economy of Conservation

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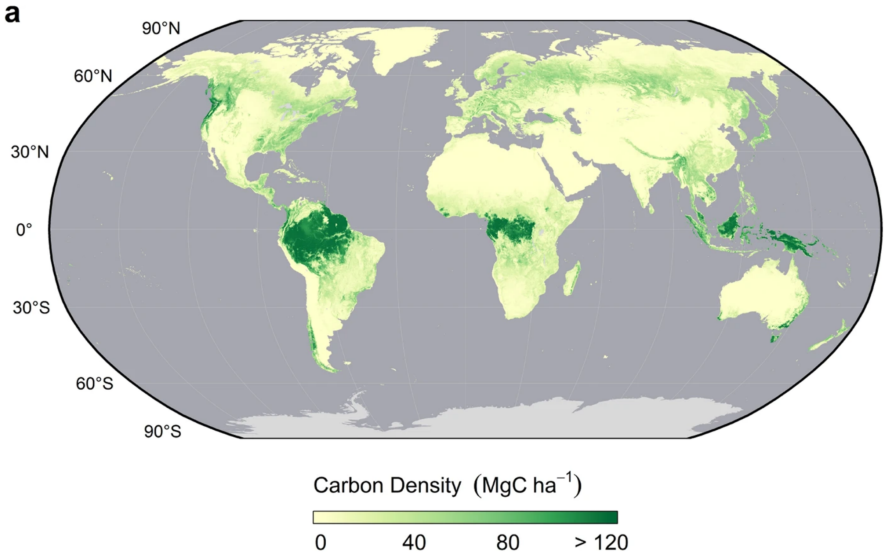
May 7, 2025

Forest conservation protects major carbon stocks (Spawn et al. 2020)



But environmental regulation faces political challenges

New Internationalist

View from Brazil: Agribusiness lobby scuppers climate gains

Lula wants Brazil to be a beacon in the fight against global warming, Leonardo Sakamoto. The powerful lobby that represents agribusiness in...

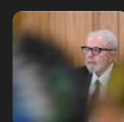
Sep 4, 2023

Mother Jones

Brazil's Lula Made Progress on Deforestation, but "Agribusiness Is Winning"

When Brazilian president Luiz Inácio Lula da Silva took office in January 2023, he inherited environmental protection agencies in shambles and deforestation at...

Nov 29, 2024



But environmental regulation faces political challenges

Mongabay

Indonesia palm oil lobby pushes 1 million hectares of new Sulawesi plantations

A state-owned palm oil company and an industry association have begun early work to push a vast new plantation strategy in Sulawesi,...

Aug 8, 2024

South China Morning Post

Malaysia's palm oil lobby welcomes 'sensible' reprieve from EU deforestation law

The delay gives producers more time to comply with the complex regulations, which were originally set to come into effect on December 30.

Oct 4, 2024

Question

How can environmental regulation navigate political resistance?

This paper

1. Regulatory incidence matters politically
   - Taxes minimize welfare losses from abatement
   - Bans minimize producer losses from abatement

2. Producers resist environmental regulation
   - In Brazil, "taxes" affect marginal and inframarginal producers
   - Producers react with increased lobbying

3. Regulation can account for producer losses
   - In Indonesia, bans target marginal producers
   - As effective as taxes, but half as costly for producers

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Regulatory incidence matters politically

Forest regulation

- Land use model
  - Development (and emissions) for agricultural production
  - Spatial heterogeneity in carbon emissions
- Three regulatory policies
  - Pigouvian taxes
  - Uniform taxes
  - Bans

Plots i of two types

$$L = \{i \mid e_i \leq \pi\}, \quad H = \{i \mid e_i > \pi\}$$

- Low (L) and high (H) conservation value
  - Common private profits $\pi > 0$
  - Heterogeneous carbon stocks e_i
- Social planner develops L but not H

Pigouvian taxes e_i

$$L = \{i \mid e_i \leq \pi\}, \quad H = \{i \mid e_i > \pi\}$$

- Plots L: profits fall to $\pi - e_i$, so lose e_i
- Plots H: profits fall to 0, so lose π (for $\pi < e_i$)

- Achieves first best, but with large losses for producers

Uniform taxes u

$$L = \{i \mid e_i \leq \pi\}, \quad H = \{i \mid e_i > \pi\}$$

- Cannot achieve the first best
  - If $\pi < u$, then no plots develop
  - If $\pi \geq u$, then all plots develop
- Targeting principle applies
  - Worse targeting on emissions, so allocative inefficiency

Bans on H

$$L = \{i \mid e_i \leq \pi\}, \quad H = \{i \mid e_i > \pi\}$$

- Plots L: profits still π, so lose 0
- Plots H: profits fall to 0, so lose π

- Targeting principle applies differently
  - Worse targeting on emissions, but no allocative inefficiency
  - Better targeting on marginality by leaving L alone
  - Minimizes producer profit losses

Producers resist environmental regulation

The Brazilian Amazon

- **PPCDAm** increased environmental enforcement between 2005-2011
  - Enforcing Forest Code for private land (80% rule)
  - Criminalizing deforestation of unclaimed land
- Like a tax, burden proportional to land use
  - And affects both marginal and inframarginal producers
- We measure lobbying responses via campaign donations

Data

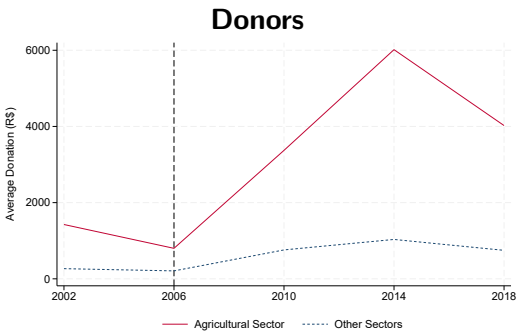
- Universe of (formal) donations
  - Every state and federal election from 2002 to 2018
  - For donors and candidates in Brazil

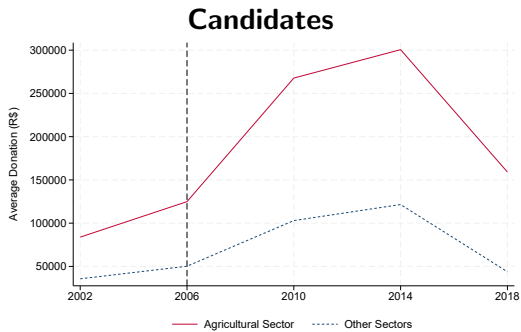
- We identify donors and candidates who likely oppose forest regulation
  - Agricultural firm owners: universe of firm registries (*Receita Federal*)
  - Environmental infractors: universe of environmental violations (*IBAMA*)

Donors and candidates

Group	Total	Ag firm owners	Infractors
Individual donors	57,667	2,763	2,306
Firm donors	33,171	436	1,107
Candidates	10,956	261	452

Lobbying donations over time





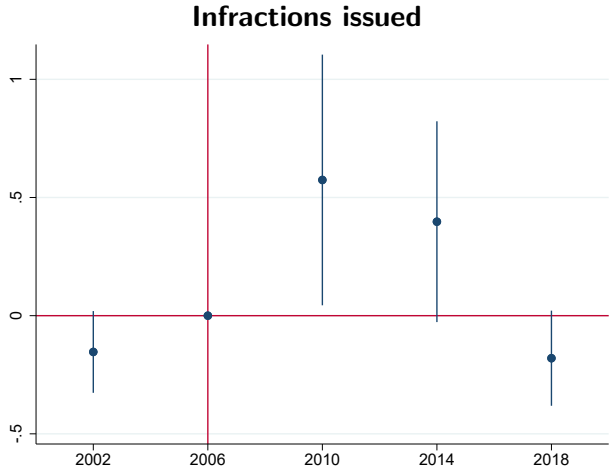
Difference-in-differences

$$y_{it} = \sum_{\tau} \beta_{\tau} Ag_i \times \mathbb{1}\{t = \tau\} + \alpha_i + \gamma_t + \varepsilon_{it}$$

- Agriculture vs. non-agriculture, before vs. after the program

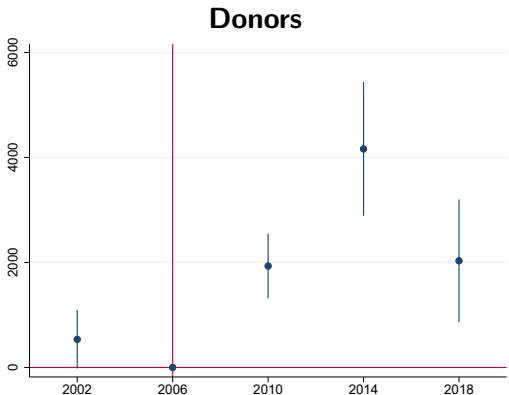
- Individuals i, election years t, fixed effects (α_i, γ_t)
- Errors ε_{it} clustered by i

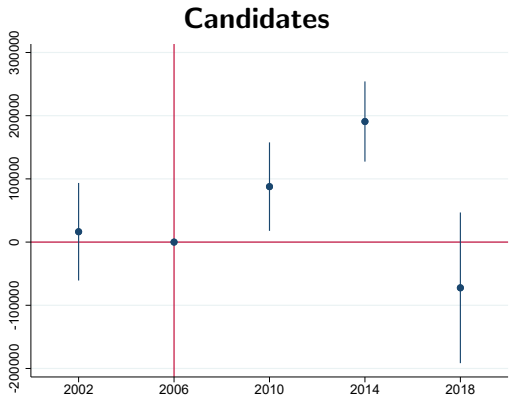
Regulation increased enforcement



DD estimate: 0.31*** (0.12); pre-program mean: 0.1

Regulation increased pro-agriculture lobbying





Especially for agricultural firm owners

Donations from donors	Total	To ag firm owner
$Ag \times Post$ 2006	2,439.66***	1,388.16***
	(372.70)	(218.41)
Pre-program mean	1,113	313.3
Observations	282,628	282,628

Donations to candidates	Total	From ag firm owner
$Ag \times Post$ 2006	112,202.57***	32,603.64***
	(25,717.67)	(3,466.17)
Pre-program mean	201,784	16,241
Observations	2,851	2,851

Regulation increased pro-agriculture voting

	State Congress		**Federal Congress**	
	Votes	Elected	Votes	Elected
$Ag \times Post$ 2006	2,728.26*	0.08*	14,066.34***	0.07
	(1,447.26)	(0.04)	(4,874.77)	(0.06)
Pre-program mean	18,757	0.4	71,741	0.5
Observations	1,784	1,784	483	483

Regulation can account for producer losses

Indonesian palm oil

- Slash-and-burn agriculture on carbon-rich peatlands
  - Significant spatial heterogeneity in carbon stocks
- Ban on deforesting peatlands
  - With peat depth greater than 3 meters

Spatial data

- Plantation acreage from satellite imagery
- Yields from agronomic model
- Distance to market
- Above and belowground carbon stocks

Empirical land use model for plots i

- Revenues r_i per hectare of palm production

$$r_i = \alpha \left(\frac{P}{1-\beta} \right) y_i$$

- Costs c_i per hectare of plantation development

$$c_i = \gamma^0_{g(i)} + \gamma^1_{g(i)} t + \delta^d d_i + \delta^e e_i + \frac{1}{2} \psi n_i + \varepsilon_{it}$$

Plantations n_i

- Profits π_i net of regulation τ_i

$$\pi(n_i) = (r_i - c_i - \tau_i)n_i$$

- Estimating equation from first order condition

$$n_i = \frac{1}{\psi}\left[\alpha\left(\frac{P}{1-\beta}\right)y_i - \gamma^0_{g(i)} - \gamma^1_{g(i)}t - \delta^d d_i - \delta^e e_i - \tau_i - \varepsilon_{it}\right]$$

- Production $q_i = y_i n_i$ given yields y_i

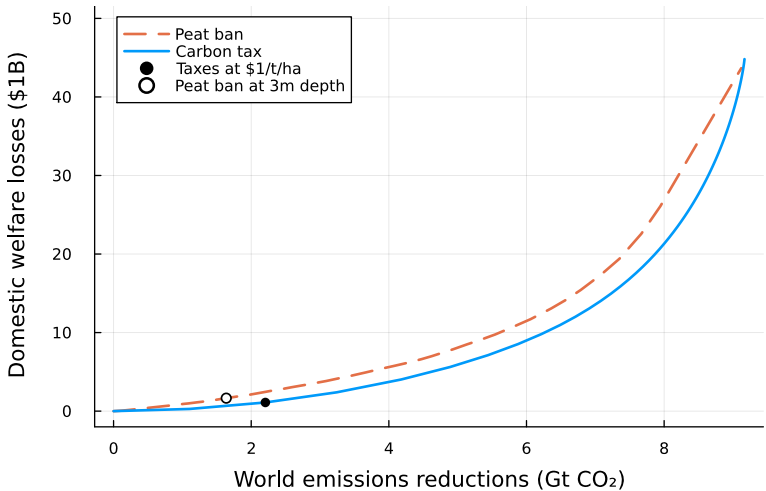
Welfare

- Perfectly elastic demand ($CS = 0$)
- Producer surplus $\pi_i = \frac{1}{2}\psi n_i^2$
- Government revenue $g_i = \tau_i n_i$
- Domestic welfare $W = \frac{1}{\alpha}\sum_i \pi_i + \sum_i g_i$
- Global emissions $E = \sum_i \delta e_i n_i$

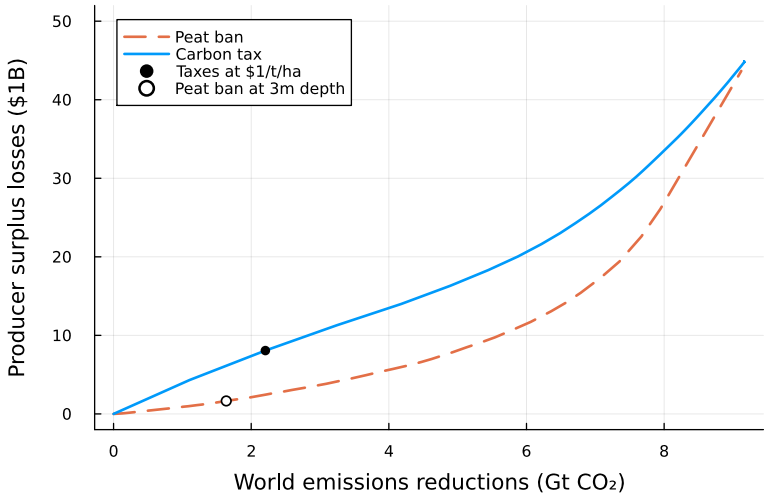
Regulation

1. Bans $\tau_i^{\text{ban}}(b) = B \cdot \mathbb{1}(e_i^{\text{peat}} > b)$ for cutoff b, big B
2. Taxes $\tau_i^{\text{tax}}(t) = te_i$ for tax rate t

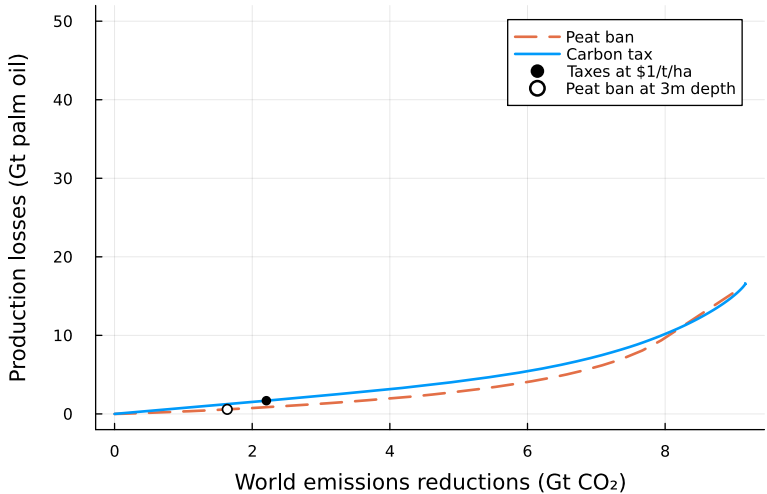
Taxes are more efficient



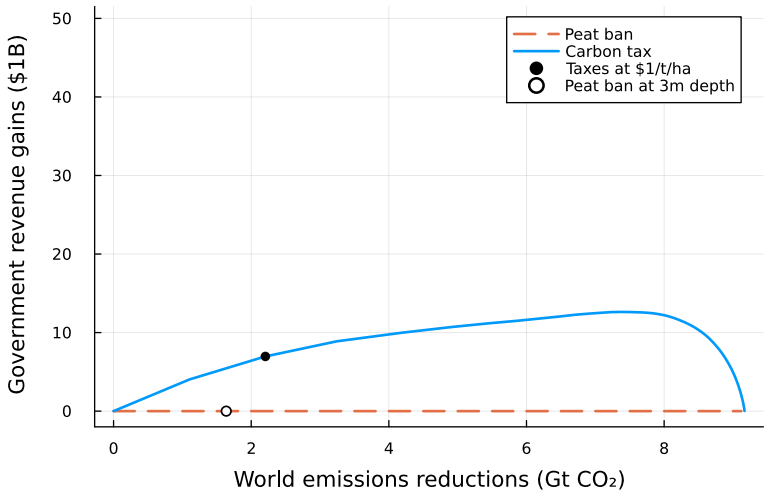
But bans minimize producer surplus losses



Even though production is similar



At the cost of government revenue



Conclusion

Summary

- Environmental regulation induces political resistance
  - Regulation should account for producer losses
- Quantitatively important in Brazil and Indonesia
  - And perhaps in other high-priority conservation zones