Inequality and Climate Change Impacts

Does Economic Inequality Increase Country Emissions?

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Research Puzzle

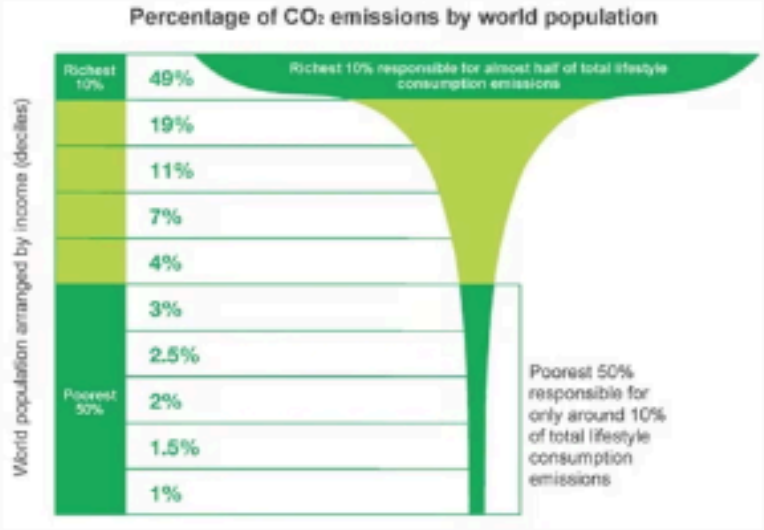
Motivating Question

- Climate Change is an existential global challenge
- Countries and people need to reduce their emissions *yesterday*
- Economic inequality leads to elites having more political power
- National climate policies have a large impact on emissions

Research Question

Motivating Question

- Emissions are unequal within countries
  - Oxfam: The world's richest 1% are responsible for more carbon emissions than the poorest 66%
- **Do more unequal countries do less to mitigate climate change?**



Background and Literature

What we know

- There is wide varition in global emissions
- Much is driven by wealth
  - Wealth -> Consumption -> Emissions
- Generally, people are supportive of climate policies, but pushback from rich elites can hinder climate action

Hypotheses

I derive the following expectations:

- **H1 (Main):** Ceterus paribus, as *Income inequality* increases, *Per Capita carbon emissions* will also increase

Hypotheses

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- **H1 (Main):** Ceterus paribus, as *Income inequality* increases, *Per Capita carbon emissions* will also increase
- **Null Hypothesis** There is no relationship between income inequality and carbon emissions.

Income Inequality - Various Measures

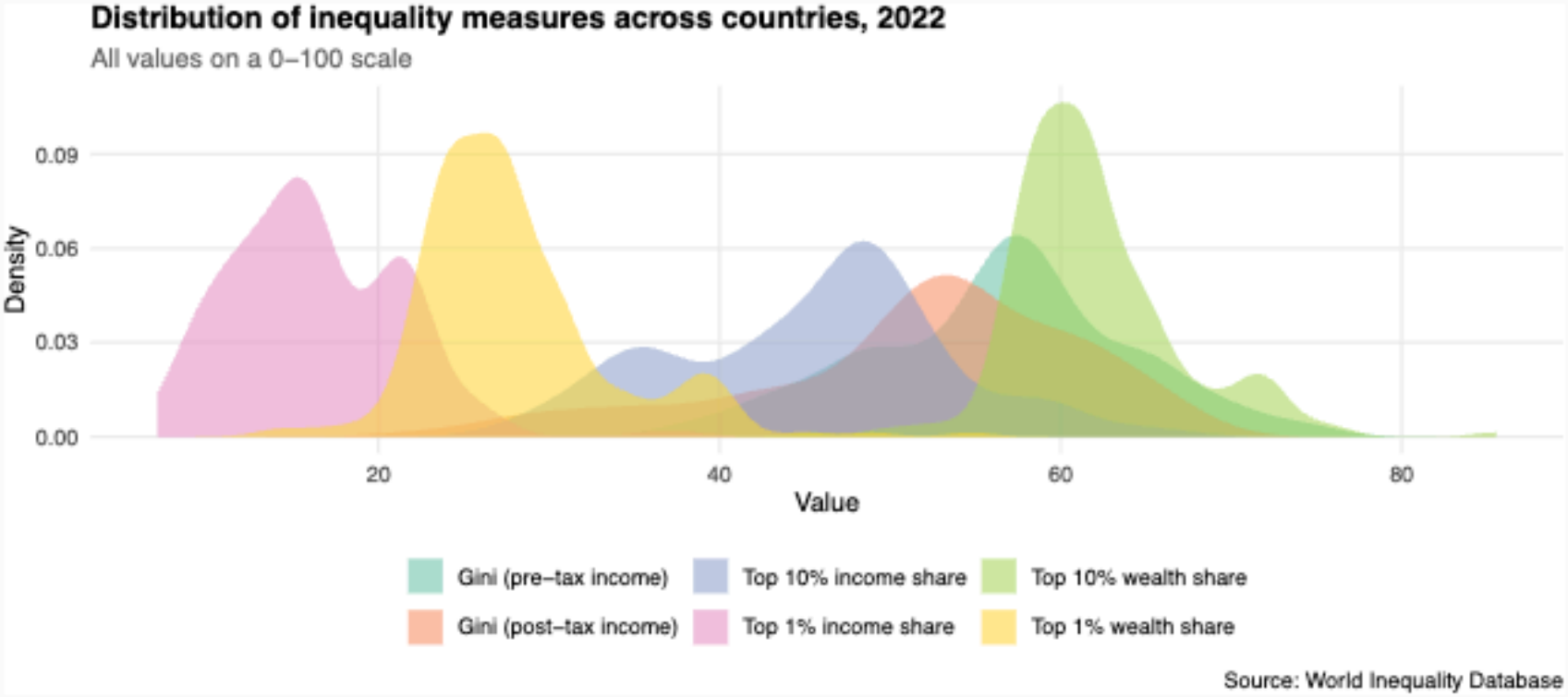


Figure 1

Primary Independent Variable

- Primary IV: Income Inequality - The distribution of wealth within a country
  - Operationalized using the share of income to the top 10% within each country
  - Date from the World Income Database

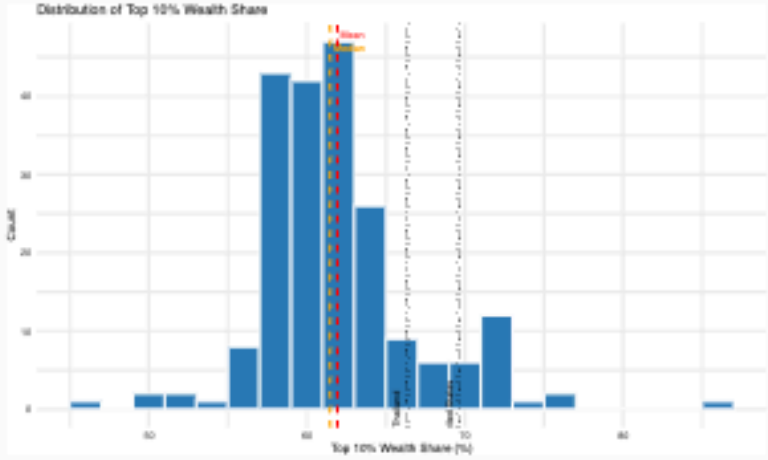
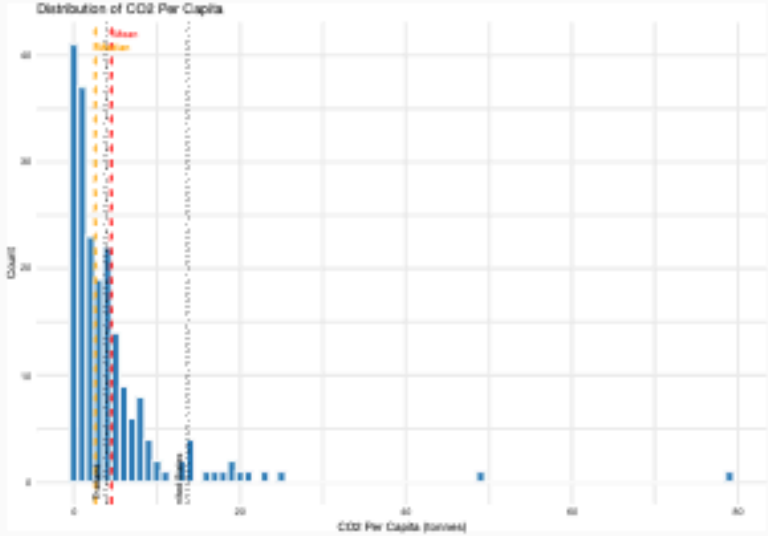


Figure 2

Dependent Variable

Carbon Emissions - The per capita contribution to climate change - Operationalized as CO2 Emissions in metric tons per capita - Data from the world bank

All data are from 2023 or most recent



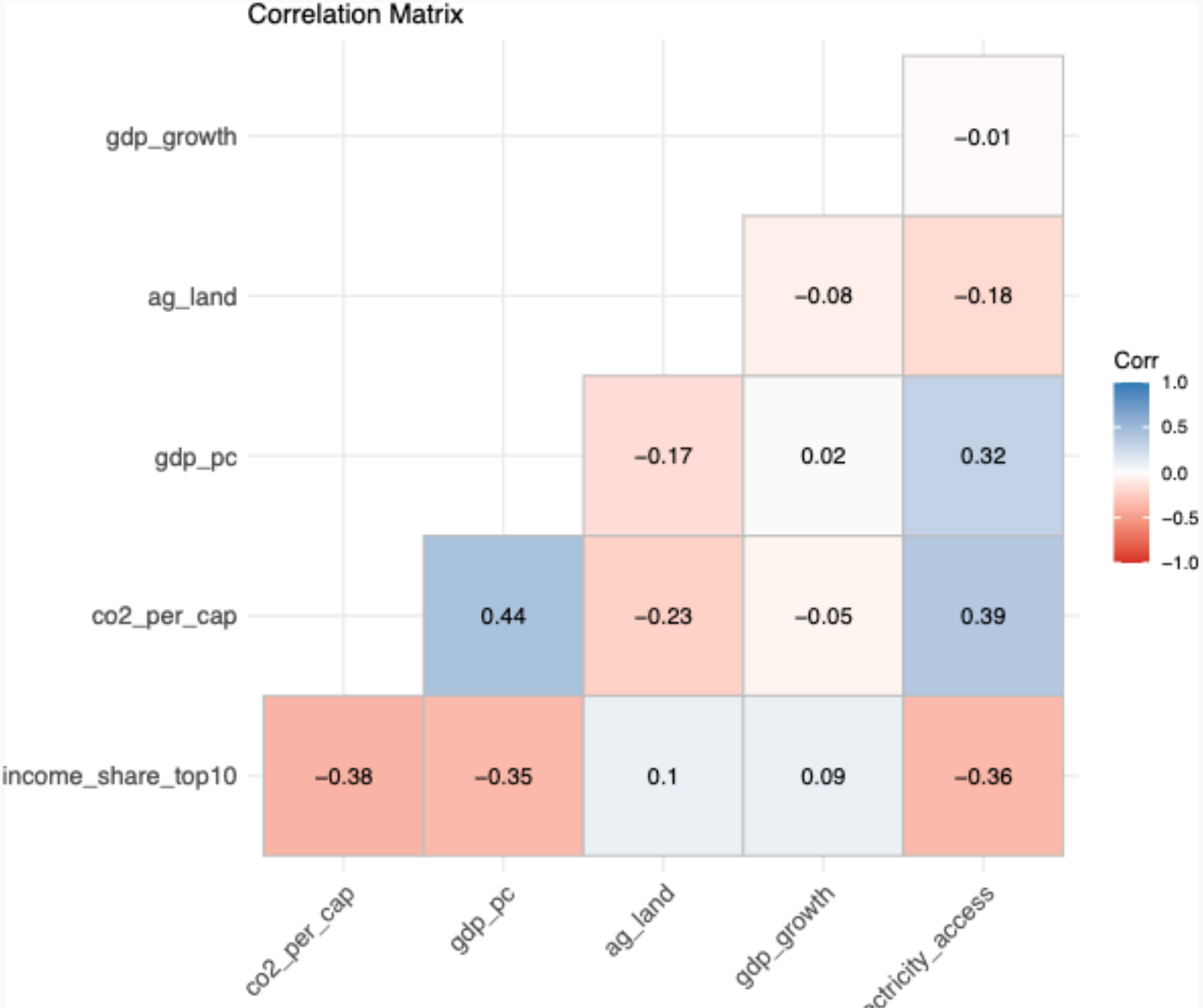
Descriptive Statistics and Controls

Table 1: Summary Statistics

Table 2: Table 1: Descriptive Statistics

Variable	Mean	Median	SD	Min	Max	N
Income Share: Top 10%	28.41	27.45	5.16	19.90	42.70	146
CO2 per Capita (tonnes)	3.91	2.49	4.66	0.00	24.53	201
GDP per Capita (thousands USD)	22.04	7.82	33.47	0.25	256.80	202
Agricultural Land (%)	37.44	38.12	22.57	0.45	86.48	207
GDP Growth (%)	3.42	3.20	6.84	-29.43	75.31	202
Electricity Access (%)	88.07	100.00	22.51	5.40	100.00	213

Correlation Matrix



Initial Scatter Plot

Primary Regression Results

Table 3: OLS Regression — Main Results

	Bivariate	+ GDP Per Capta	Full Model	Add Controls
(Intercept)	10.752***	5.812***	6.325***	1.372
	(1.534)	(1.454)	(1.533)	(1.910)
income_share_top10	−0.255***	−0.129***	−0.121**	−0.075
	(0.053)	(0.048)	(0.048)	(0.047)
gdp_pc		0.079***	0.079***	0.069***
		(0.010)	(0.011)	(0.010)
ag_land			−0.020*	−0.016
			(0.011)	(0.011)
gdp_growth			0.033	0.067
			(0.085)	(0.081)
electricity_access				0.041***
				(0.010)
Num.Obs.	141	140	140	140
R2	0.143	0.411	0.425	0.487
R2 Adj.	0.136	0.402	0.408	0.467

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

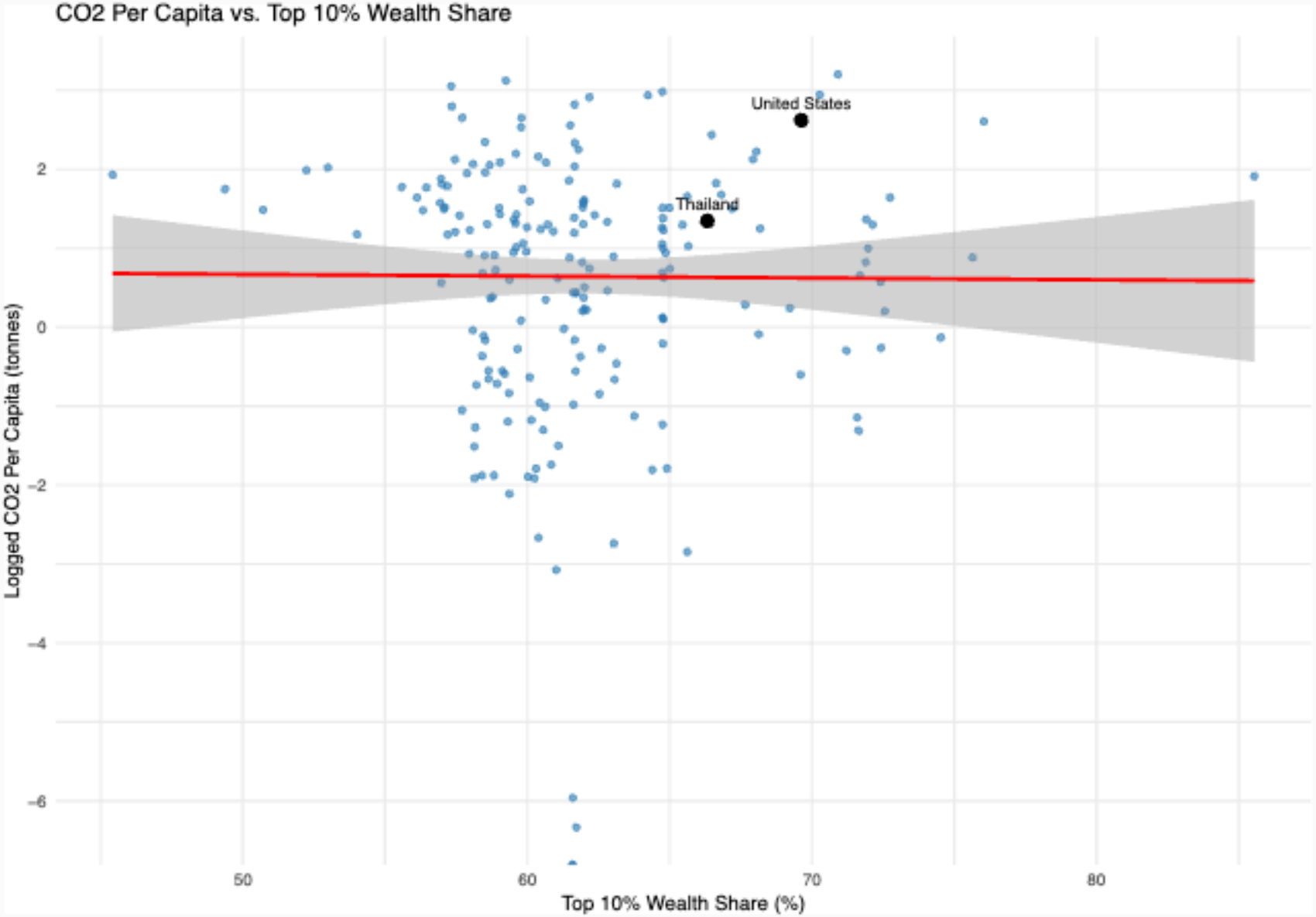
Logged Regression Results

Logging GDP per Capita and CO2 per Capita

	Bivariate	+ GDP Per Capita	+ Land & Growth	+ Electricity
(Intercept)	3.369***	−0.440	−0.796	−2.205***
	(0.635)	(0.493)	(0.529)	(0.570)
Income Share Top 10%	−0.098***	−0.017	−0.014	−0.007
	(0.022)	(0.015)	(0.015)	(0.014)
ln GDP per Capita		0.776***	0.830***	0.595***
		(0.055)	(0.059)	(0.073)
Agricultural Land			−0.002	−0.002
			(0.004)	(0.003)
GDP Growth			0.072***	0.061**
			(0.027)	(0.025)
Electricity Access				0.020***
				(0.004)
Num.Obs.	141	140	140	140
R2	0.126	0.647	0.665	0.714
R2 Adj.	0.120	0.642	0.655	0.704

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Plotting with CO2 Logged



Standardized Regression

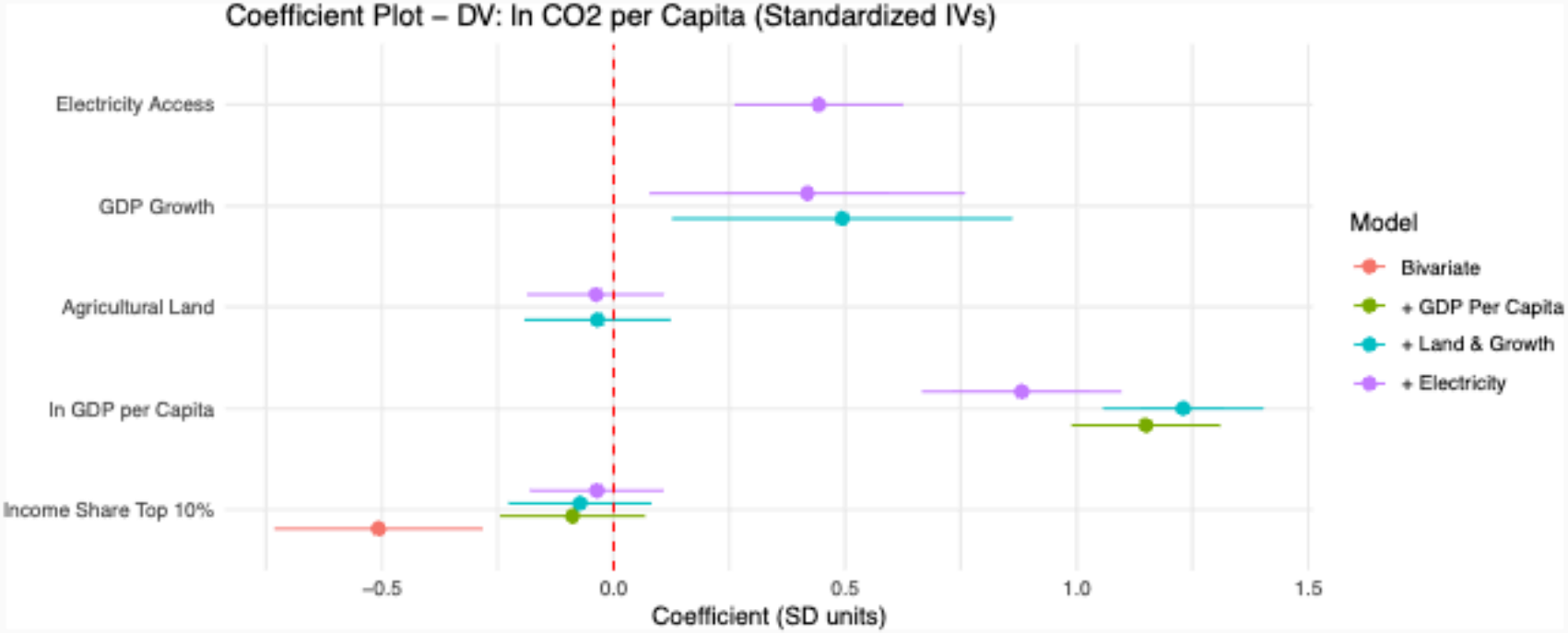


Figure 3: Coefficient Plot

Alternative Measures of Wealth Inequality

Includes all control variables

	Income Share Top 10	Gini (post-tax)	Gini (pre-tax)	Income Share Top 1	Wealth Top 10	Wealth Top 1
Income Share Top 10%	−0.007					
	(0.014)					
Gini (post-tax)		0.015*				
		(0.008)				
Gini (pre-tax)			0.012			
			(0.010)			
Income Share Top 1%				0.016		
				(0.014)		
Wealth Share Top 10%					0.018	
					(0.014)	
Wealth Share Top 1%						0.017
						(0.012)
Num.Obs.	140	186	186	186	186	186
R2	0.714	0.633	0.630	0.629	0.630	0.631
R2 Adj.	0.704	0.623	0.619	0.619	0.620	0.621

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Contributions & Further Research

There does not appear to be a strong relationship between wealth inquality and CO2 Emissions

- Potential Omitted Variable Bias
  - Political Insitutions - Democracies and Interest group systems - ie how elites preferences are heard
  - Oil Dependent Economies
  - Regional Differences
- Could look at climate policy as DV, rather than emissions

Contributions & Further Research

Qualitative Follow-Up

To probe the mechanism, future work should conduct process tracing to better understand if or how economic elites shape climate policy.

- United States as a most crucial case
- Thailand as "typical" case

Case studies of wealthy people/companies in each country

Discussion

Policy Implications

These results suggest wealth inequality is not a meaningful impediment to effective climate policy

Limitations

- One year snapshot
- Country Level of analysis
- Aggrgate Numbers

Thank You

I look forward to your questions

Slides code available on course website