Smokestacks and the Swamp

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ABFER Corporate Finance Session
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Amazon versus AOC

MSNBC
15 February 2019 ·

Amazon: "A number of state and local politicians have made it clear that they oppose our presence and will not work with us to build the type of relationships that are required to go forward with the project..."

MSNBC.COM

Amazon cancels plans for HQ2 in NYC

Amazon's plans for a campus in Long Island City, Queens were faced with growing opposition ...

Amazon versus AOC

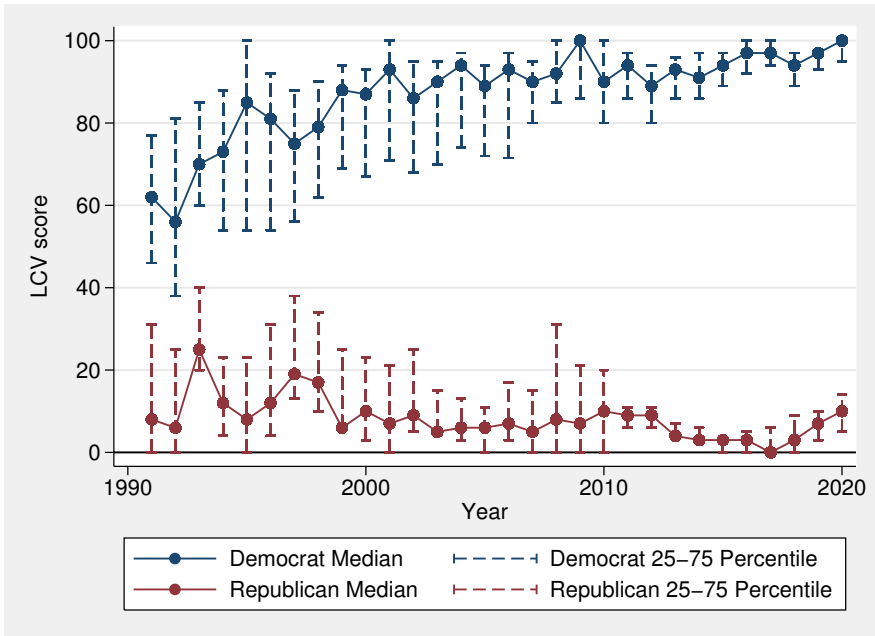
Research Question

- **Do politicians' personal ideologies affect constituent firms?**
  - Theories of politicians' personal ideologies do not examine impact on constituents (Alesina, 1988; List and Sturm, 2006)
  - Empirical literature on politicians' ideologies has ignored firm responses (Lee, Moretti, and Butler, 2004; Ferreira and Gyourko, 2009)
    - Little work on the causal effect of politicians' ideologies on firm outcomes

- **Especially relevant given increased political polarization**
  - News cycles dominated by "The Squad," Freedom Caucus, etc.
  - Literature has focused on *voter* polarization (see, e.g., Boxell, Gentzkow, and Shapiro, 2021)

Our Setting: Plant-Level Emissions

- Most goods-producing firms release toxic emissions
  - Plant-chemical-year emissions, production data
- Environmental issues are politically polarizing



- Federal environmental laws are hard to change
- Firms' environmental profiles are increasingly important to stakeholders

What We Do

- As a proxy for political ideology, we use the *political party* of US House of Representatives candidates
  - Regression discontinuity (RD) design
    - Compare districts marginally won by Democrats vs. Republicans
    - Isolates politicians' preferences from voters' preferences
  - Lee et al. (2004); Lee (2008); Ferreira and Gyourko (2009); Akey (2015); Lueck, Ramos Pastrana, and Torrens (2021)

- We then examine the effects of close Congressional elections on plant-level emissions and production, firm-level financial outcomes, and community health outcomes

What We Find

1. Firm emissions vary with the political party of their representative
   - Significantly *lower* emissions in districts represented by a Democrat
     - No differences in production
     - Higher investment in abatement and recycling
   - Firms *reallocate* emissions between their facilities based on the party affiliation of politicians
2. Real effects
   - Respiratory diseases are lower in areas around plants when district is represented by a Democrat
3. Mechanism (suggestive)
   - Inspections and enforcement by environmental agencies increase when district is represented by a Democrat

Framework

- Why would a firm change its behavior because of the ideology of its representative?
- Assumption: firm managers maximize value
- A handful of possible channels:
  - Money or political favor-trading
  - Political interference (e.g. pushing for more/less enforcement)
  - Firms' catering to voting blocs
  - Omitted variables (credit/procurement/employment, etc.)
- Our results are most consistent with political interference through enforcement
  - Changes in expected enforcement intensity cause firms to re-optimize pollution decisions
  - Results stronger for firms which pollute more ex-ante

Empirical Setting

Data

- We focus on the U.S. House of Representatives from 1991 to 2016
  - 435 districts divided among states every 10 years based on population
  - Biennial election cycle (even-numbered years)
- Main data sources
  - EPA Toxic Release Inventory (TRI) and Pollution Prevention (P2)
    - Emissions at the facility-year-chemical level
    - Plant-level abatement and recycling investment
  - ECHO: Enforcement and Compliance History Online
  - Federal Election Commission: Candidate data, election results
  - Lewis et al. (2013): Congressional district shapefiles
- Other data sources
  - Health data: Center for Medicare and Medicaid Services (CMS)
    - Hospital level data on utilization and payments
  - Ideology measures: League of Conservation Voters (LCV), VoteView

Regression Discontinuity Design

- Our main tests employ a regression discontinuity (RD) design
  - Lee et al. (2004), Ferreira and Gyourko (2009), Akey (2015), etc.
- Our RD tests take two forms:
  1. Local linear OLS regressions
     - The sample is restricted to elections with a margin of 5% or less.

$$Y_{i(jd)ct} = \beta_1 \text{Democrat Win}_{dt} + \theta f(\text{Win Margin}_{dt}) + \delta \text{Democrat Win}_{dt} \times f(\text{Win Margin}_{dt}) + \beta^c + \epsilon_{it}.$$

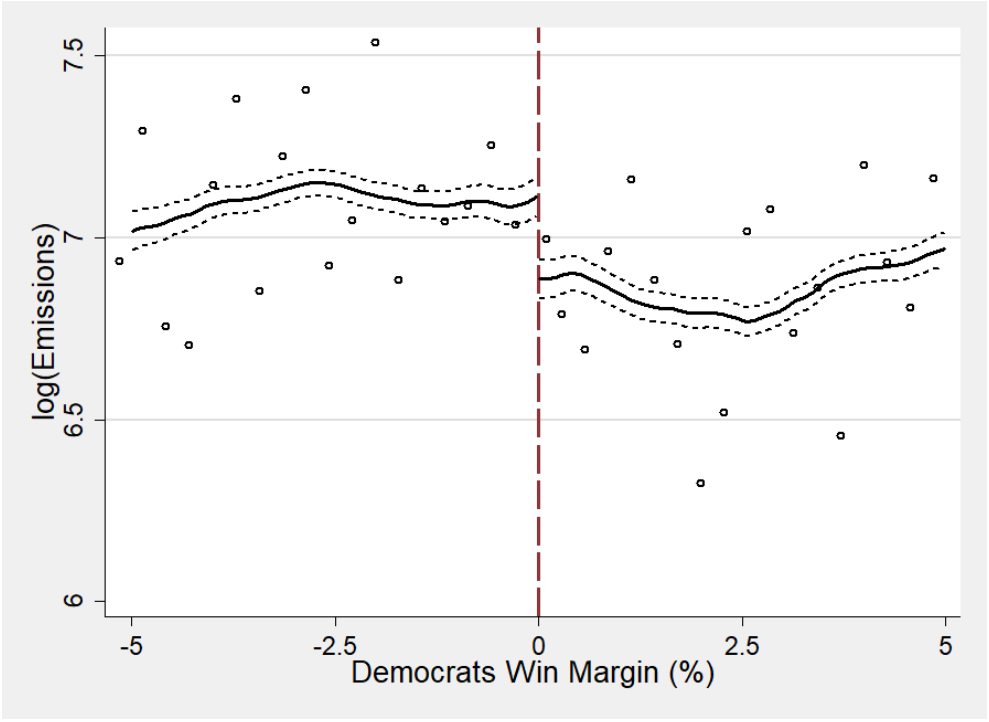
  2. Nonparametric polynomial specifications
     - Calonico et al. (2014) and Cattaneo et al. (2019): construct nonparametric RD tests with an optimally-selected bandwidth

$$Y_{i(jd)t} = \beta_1 \text{Democrat Win}_{dt} + \theta g(\text{Win Margin}_{dt}) + \epsilon_{it}$$

Emissions and Abatement

RD Tests on Emissions

- Main prediction: Lower pollution after a Democrat wins close election



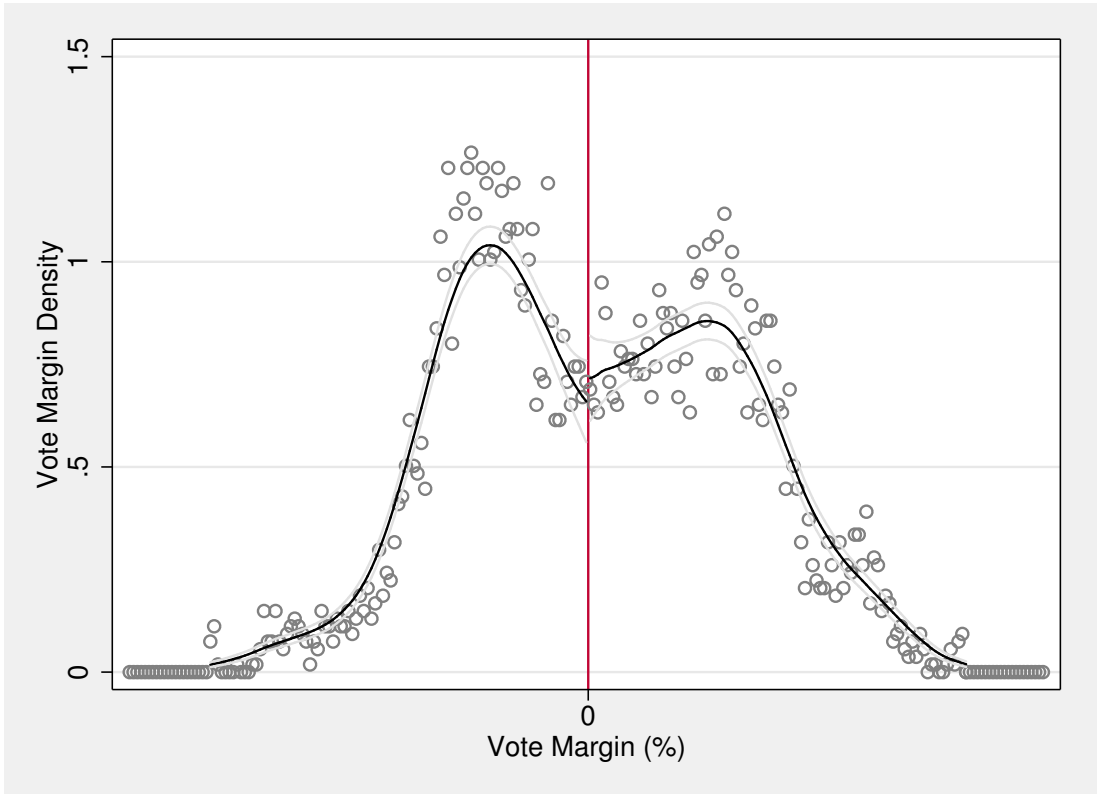
- Pollution is significantly lower in districts represented by a closely-elected Democrat.

RD Tests on Emissions

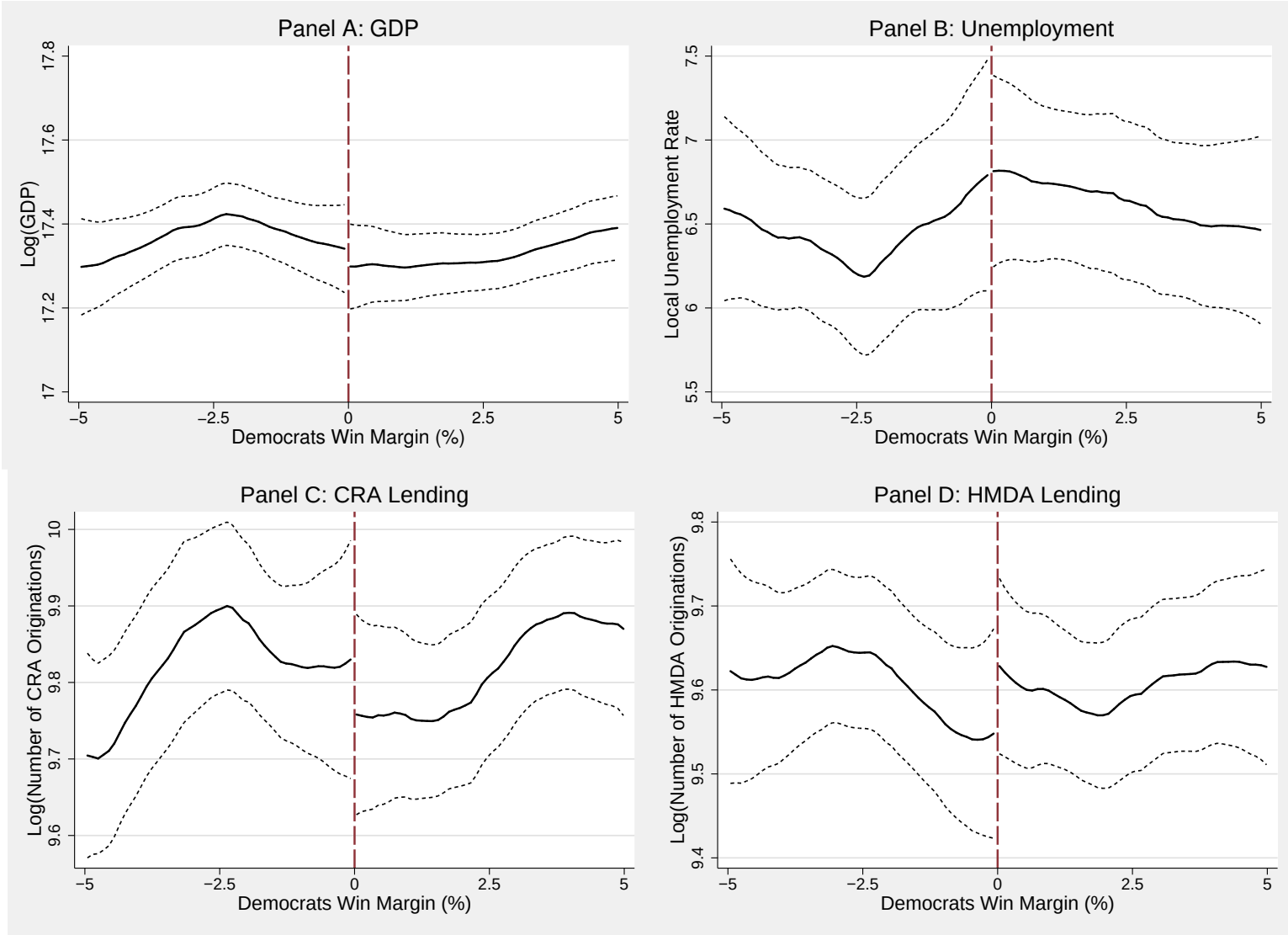
	Dep. Variable: log(Emissions)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Democrat Win	-0.213**	-0.397**	-0.305***	-0.355***	-0.349***	-0.353***	-0.355***
	(0.08)	(0.16)	(0.12)	(0.03)	(0.03)	(0.04)	(0.04)
Method	Local OLS	Local OLS	Local OLS	NP	NP	NP	NP
Polynomial	Zero	Linear	Linear	Linear	Linear	Quadratic	Quadratic
Kernel	–	–	–	Tri.	Epa.	Tri.	Epa.
Chemical FE	No	No	Yes	–	–	–	–
Observations	94,140	94,140	94,111	1,329,508	1,329,508	1,329,508	1,329,508

- Two different RD methods produce similar results

Robustness: McCrary (2008)



Robustness: Covariate Balance

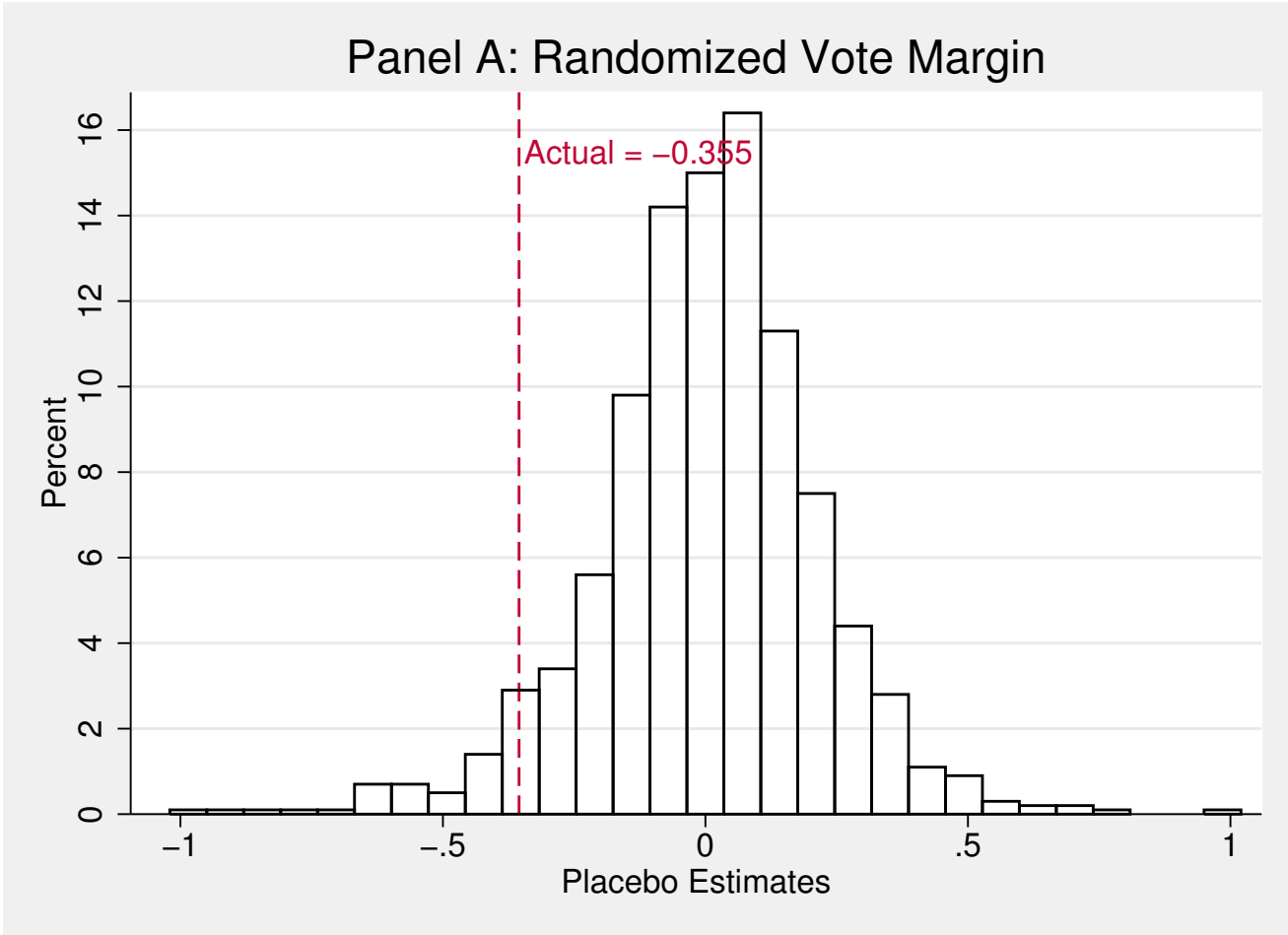


Robustness: RD Tests on Residuals

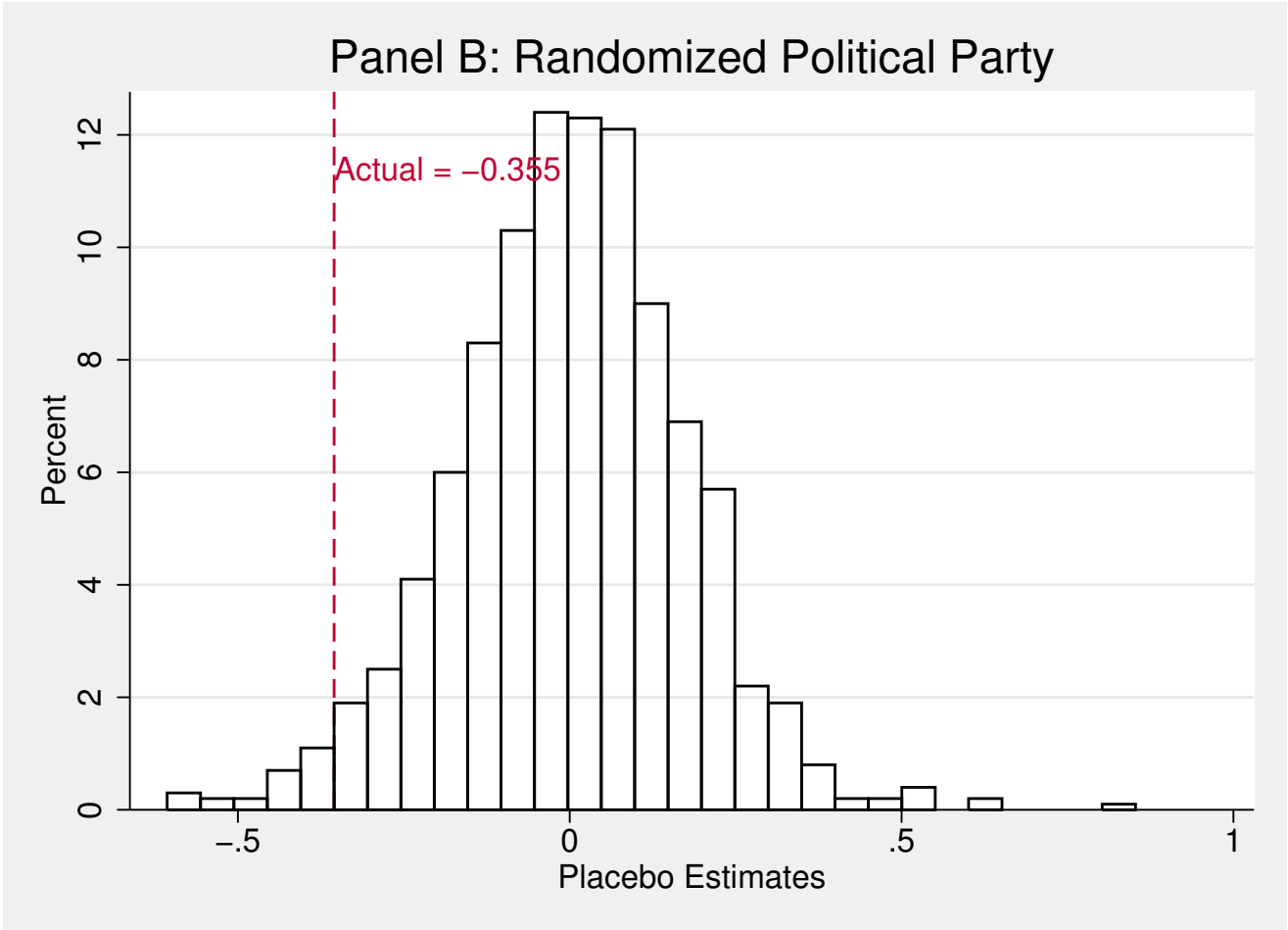
- First, regress emissions on district and state × chemical × year FE (columns 1-2) or firm × chemical × year FE (columns 3-4)
- Then perform RD on residuals
  - Similar to Lowes and Montero (2020)

	Dep. Variable: log(Emissions) Residuals			
	(1)	(2)	(3)	(4)
Democrat Win	-0.145**	-0.031*	-0.034	-0.052***
	(0.07)	(0.02)	(0.07)	(0.02)
Method	Local OLS	NP	Local OLS	NP
Polynomial	Linear	Linear	Linear	Linear
Kernel	–	Tri.	–	Tri.
Chemical FE	Yes	–	Yes	–
Observations	90,555	1,281,479	57,320	811,995

Robustness: Placebo Tests (Randomized Vote Margin)

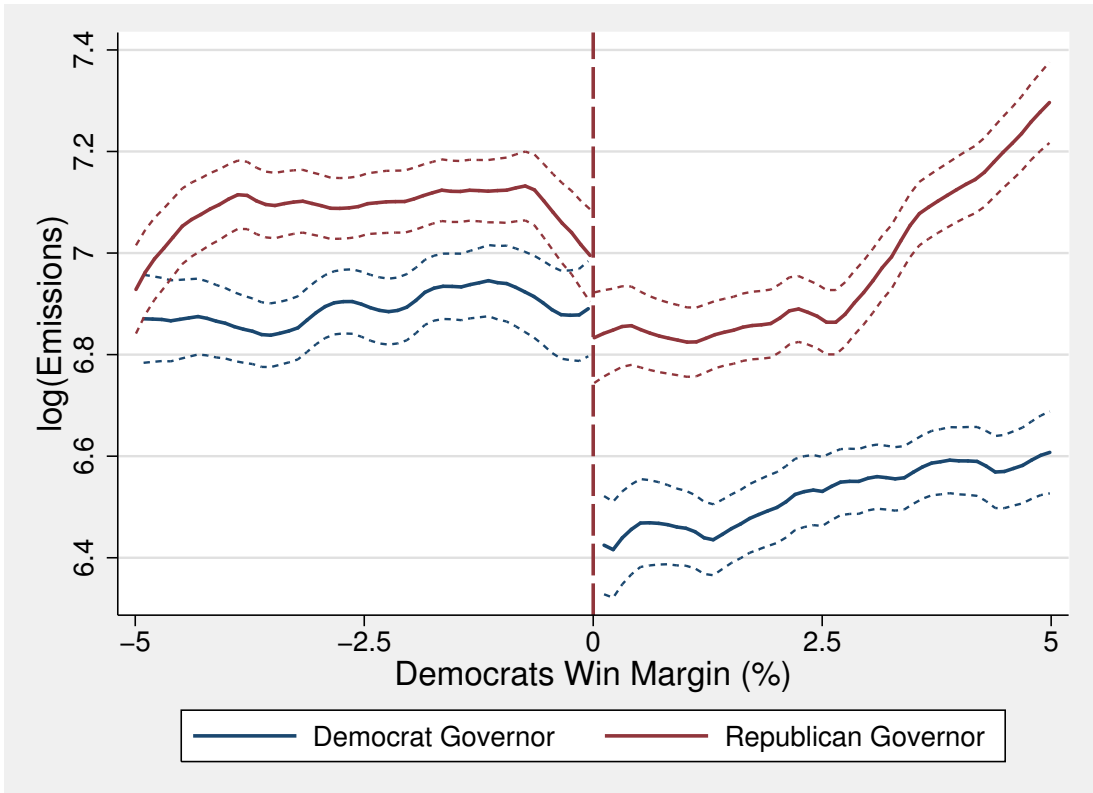


Robustness: Placebo Tests (Randomized Political Party)



Robustness: Are Governors Driving the Effect?

- We would expect results to be stronger under Democratic governors, but they should also exist under Republican governors



Is the Effect Coming from Higher Production?

	log(Cumulative Emissions/Production)	
	(1)	(2)
Democrat Win	-0.093*	-0.057***
	(0.06)	(0.02)
Method	Local OLS	NP
Polynomial	Linear	Linear
Kernel	–	Tri.
Chemical FE	Yes	–
Observations	84,306	1,178,073

- Pollution *per unit of production* falls significantly
- Consistent with Chinese abatement electricty evidence from Buntaine, Greenstone, He, Liu, Wang, and Zhang (2021)
- We also show that plant-level production does not change

Abatement and Recycling Activities

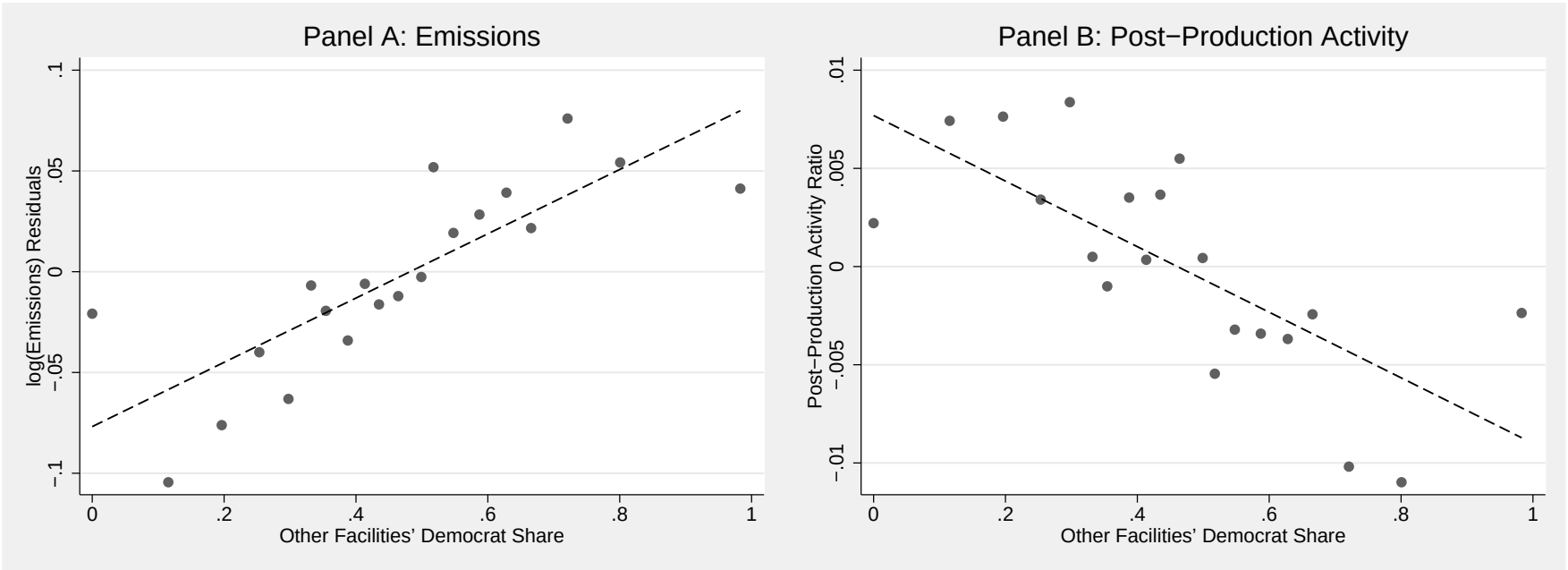
	Log(1+Abatement Activities)		Post-Production Reduction Ratio	
	(1)	(2)	(3)	(4)
Democrat Win	0.033*	0.018***	0.029**	0.023***
	(0.02)	(0.00)	(0.01)	(0.00)
Method	Local OLS	NP	Local OLS	NP
Polynomial	Linear	Linear	Linear	Linear
Kernel	–	Tri.	–	Tri.
Chemical FE	Yes	–	Yes	–
Observations	104,915	1,491,554	102,529	1,438,871

- Close Democrat wins are associated with
  - Higher abatement investment
  - Post-production emissions reduction activity

Reallocation and Firm-Level Effects

Reallocation: Giroud-Mueller Strategy

- Define by *Other Facilities' Democrat Share* the extent to which the firm's other plants are represented by Democrats



- Plants pollute more, recycle less if other plants owned by the same firm have a high Democrat share.

Reallocation: Giroud-Mueller Strategy

	Log(Emissions)			
	(1)	(2)	(3)	(4)
Other Facilities' Democrat Share	0.028**	0.063***		
	(0.01)	(0.01)		
Local Democrat	-0.018*		-0.017*	
	(0.01)		(0.01)	
High Other Facilities' Democrat Share			0.015**	0.027***
			(0.01)	(0.01)
District × Chemical FE	Yes	No	Yes	No
Chemical × Year FE	Yes	No	Yes	No
Facility × Chemical FE	Yes	Yes	Yes	Yes
District × Chemical × Year FE	No	Yes	No	Yes
R-Squared	0.890	0.922	0.890	0.922
Observations	1,128,556	897,686	1,128,556	897,686

- Reallocation result holds even after completely absorbing time-varying factors at the local district level (Columns 2 and 4)

Aggregate Firm Effects: Emissions, COGS, M/B, and Q

	log(Emissions)		log(COGS)		M/B Ratio		Tobin's Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democrat Share	-0.040*		0.048***		-0.132*		-0.022*	
	(0.02)		(0.01)		(0.07)		(0.01)	
Emissions-Weighted Democrat Share		-0.062***		0.037***		-0.139**		-0.020**
		(0.02)		(0.01)		(0.06)		(0.01)
Chemical-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Chemical FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.863	0.864	0.951	0.951	0.519	0.519	0.668	0.668
Observations	189,858	189,858	189,313	189,313	155,413	155,413	162,633	162,633

- Firm-level emissions decreasing in share of Democrat plants
- Firm-level COGS increasing in share of Democrat plants
- Firm-level market-to-book and Tobin's Q decreasing in share of Democrat plants

Real Effects

Real Effects: Respiratory Diseases

- We examine changes in pollution-related health effects
- We expect less respiratory-related hospital visits in areas with a high number of plants when Democrats are elected

	log(Number of Discharges)			log(Total Payments)		
	(1)	(2)	(3)	(4)	(5)	(6)
Democrat Win	0.014	0.007		0.101***	0.021	
	(0.02)	(0.02)		(0.02)	(0.02)	
High Num. Plants	0.325***	0.288***	0.188***	0.350***	0.301***	0.189***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
Democrat Win × High Num. Plants	-0.082***	-0.071**	-0.066**	-0.126***	-0.075**	-0.073**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
ZIP FE	Yes	Yes	No	Yes	Yes	No
Census District FE	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	No	Yes	Yes	No
District × Year FE	No	No	Yes	No	No	Yes
ZIP × District FE	No	No	Yes	No	No	Yes
R-Squared	0.187	0.239	0.273	0.207	0.264	0.299
Observations	60,351	60,349	60,336	60,351	60,349	60,336

Real Effects: Placebo

- We expect no effects for pollution-unrelated diseases

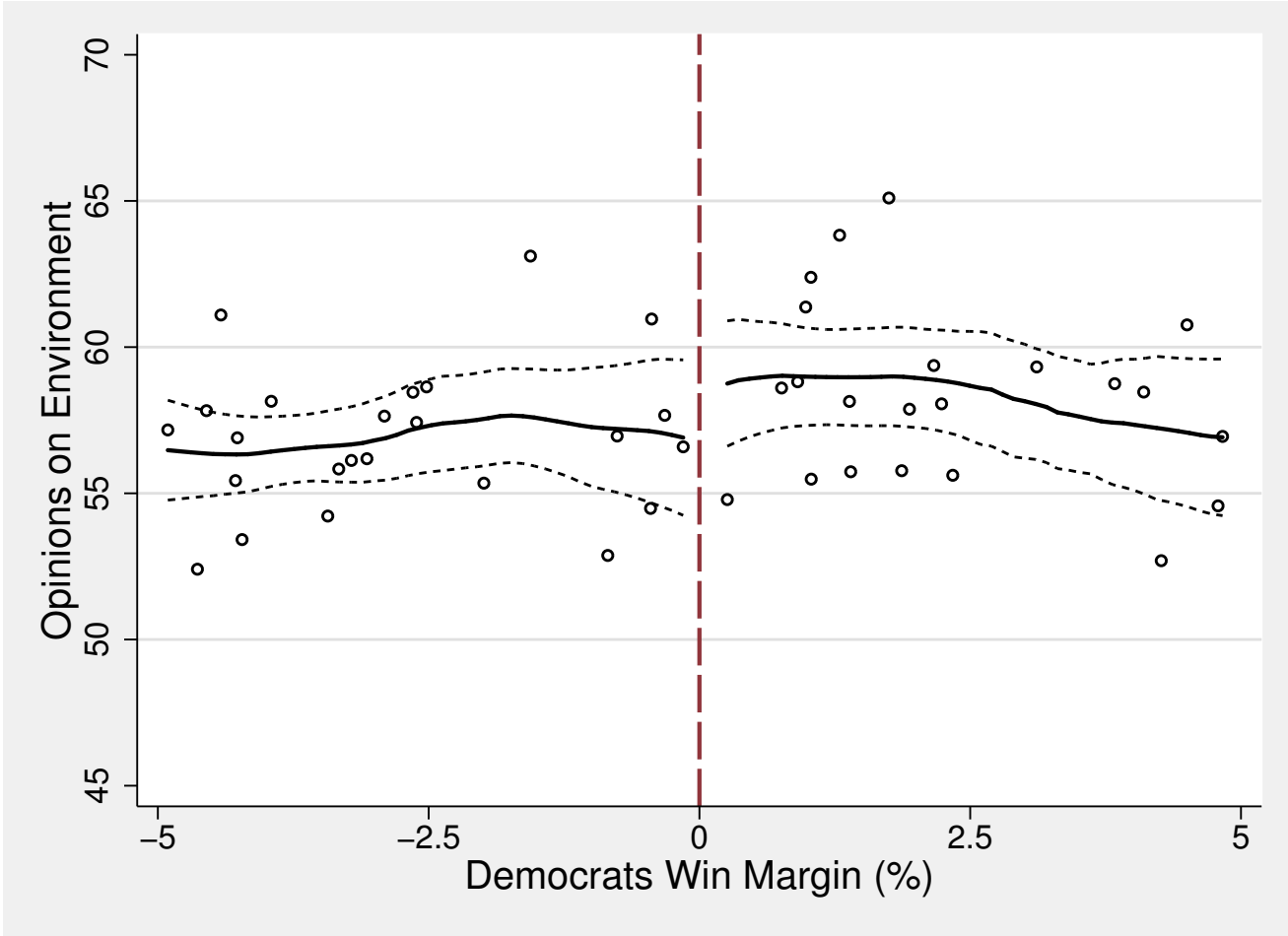
	log(Number of Discharges)			log(Total Payments)		
	(1)	(2)	(3)	(4)	(5)	(6)
Democrat Win	0.023	-0.012		0.131***	-0.041	
	(0.02)	(0.04)		(0.03)	(0.04)	
High Num. Plants	0.212***	0.149***	0.112***	0.259***	0.167***	0.124***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Democrat Win × High Num. Plants	0.035	0.060*	0.004	-0.041	0.053	0.004
	(0.03)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)
ZIP FE	Yes	Yes	No	Yes	Yes	No
Census District FE	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	No	Yes	Yes	No
District × Year FE	No	No	Yes	No	No	Yes
ZIP × District FE	No	No	Yes	No	No	Yes
MDC FE	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.216	0.249	0.275	0.431	0.469	0.493
Observations	28,276	28,273	28,227	28,276	28,273	28,227

Measuring Ideology

Measuring Ideology

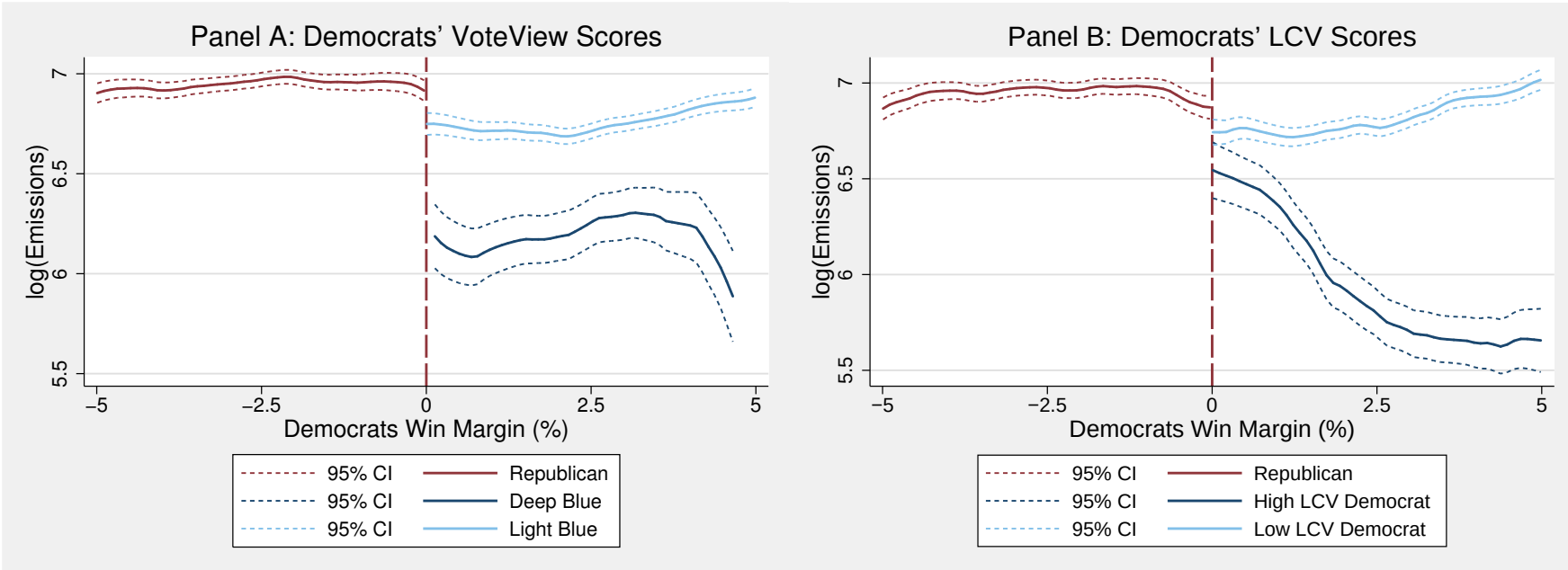
- Goal: identify effect of politicians' ideology on firm outcomes
- Ideology: a candidate's utility differs from the median voter's
  - Due to personal beliefs, career or party incentives, as in Alesina (1988)
- We use party affiliation *as a measure of* ideology. If correct, we should observe
  - Large interparty differences (as from LCV scores)
  - Constituencies not different in terms of climate preferences
  - Some degree of intraparty variation
  - Changes in average emissions when districts switch party
  - Political power amplifies (but does not explain) effect

Ideology: Constituents' Opinion on the Environment



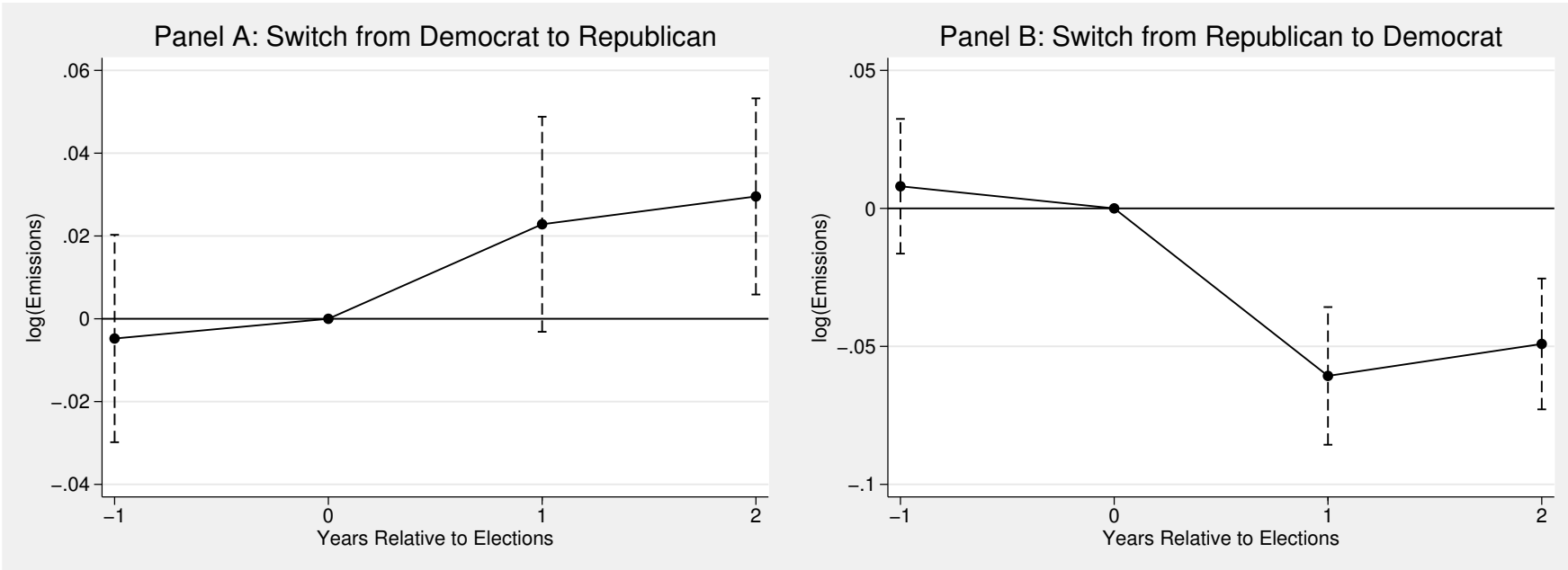
- Data from Yale Climate Opinion Maps, 2020

Ideology: Evidence of *Within-party* Differences



- Results are stronger for liberal versus moderate Democrats (VoteView)
- Results are stronger for greener Democrats (LCV Scores)

Ideology: Switchers



- Higher emissions when district switches from D to R
- Lower emissions when district switches from R to D

Ideology: Political power interactions

- Growing literature on political power and economic outcomes
- Holding power fixed, should see strongest effects for *more ideological* politicians
  - Less environmental engagement → less likely to intervene

	Dep. Variable: log(Emissions)		
	(1)	(2)	(3)
Democrat Win	-0.026**	-0.020*	-0.020*
	(0.01)	(0.01)	(0.01)
Democrat × Chair	0.039	0.017	0.016
	(0.04)	(0.04)	(0.04)
Ideological × Democrat × Chair	-0.143**	-0.168**	-0.222***
	(0.07)	(0.07)	(0.07)
Lower Order Terms	Yes	Yes	Yes
Firm × Chemical × Year FE	Yes	Yes	Yes
Facility × Chemical FE	Yes	Yes	Yes
State × Year FE	No	Yes	No
State × Year × Chemical FE	No	No	Yes
Observations	761,731	761,731	718,698

Mechanism

Mechanism

- Recall, a handful of possible channels:
  1. Political favor-trading
  2. Time-varying enforcement
  3. Catering to voting blocs
  4. Omitted variables (credit/procurement/employment, etc.)

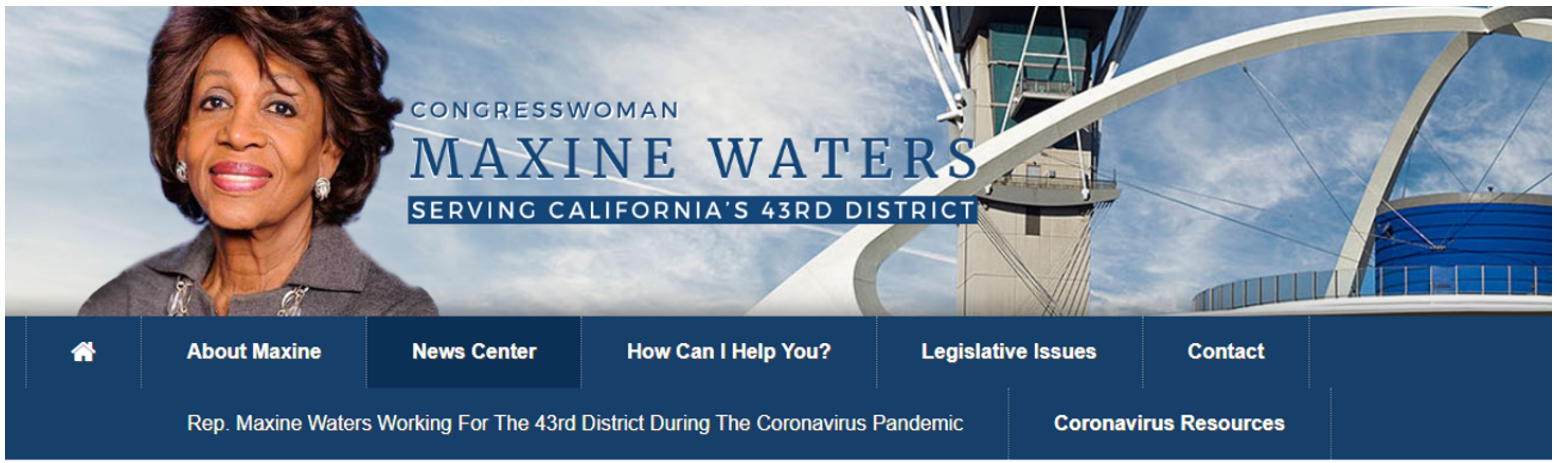
- Existing tests find little support for 3 and 4
  - Voting blocs: no differences in public opinion
  - Omitted variables: robustness tests

- We also find similar effects for politically-unconnected firms
  - Rules out 1 (political favor-trading)

Time-Varying Enforcement

- Trade-off: abatement costs vs. pecuniary and non-pecuniary enforcement costs
  - If Pr(inspection) under R representatives is small, $\mathbb{E}$[benefits to over-pollution] > $\mathbb{E}$[costs]
  - Could be optimal to reduce pollution under D representatives if Pr(inspection) increases
  - Note: To work, *some firms must "over"-pollute under R representatives*
    - We find stronger effects when firms pollute more ex-ante
- We should observe greater inspections but similar formal enforcement actions in districts with just-elected Democrats

Anecdotal Evidence



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Congresswoman Waters Demands Update from CalEPA on Water Quality Issues Facing Residents in the City of Gardena

May 13, 2016 | Press Release

Washington, D.C. *– Congresswoman Maxine Waters (CA-43), Ranking Member of the Financial Services Committee, sent a letter yesterday to Mr. Matthew Rodriquez, Secretary for Environmental Protection at the California Environmental Protection Agency (CalEPA), expressing concerns about water quality issues in the City of Gardena and requesting a written update on these issues on CalEPA letterhead within the next 30 days. The letter follows up on information provided to Congresswoman Waters by Secretary Rodriquez in an email dated March 9, 2016, in response to water quality concerns she had raised previously. The text of the letter follows:*

News Center

Press Releases

Anecdotal Evidence

SOTO CALLS ON WHEELER TO TEST WATER SAFETY IN ST. CLOUD

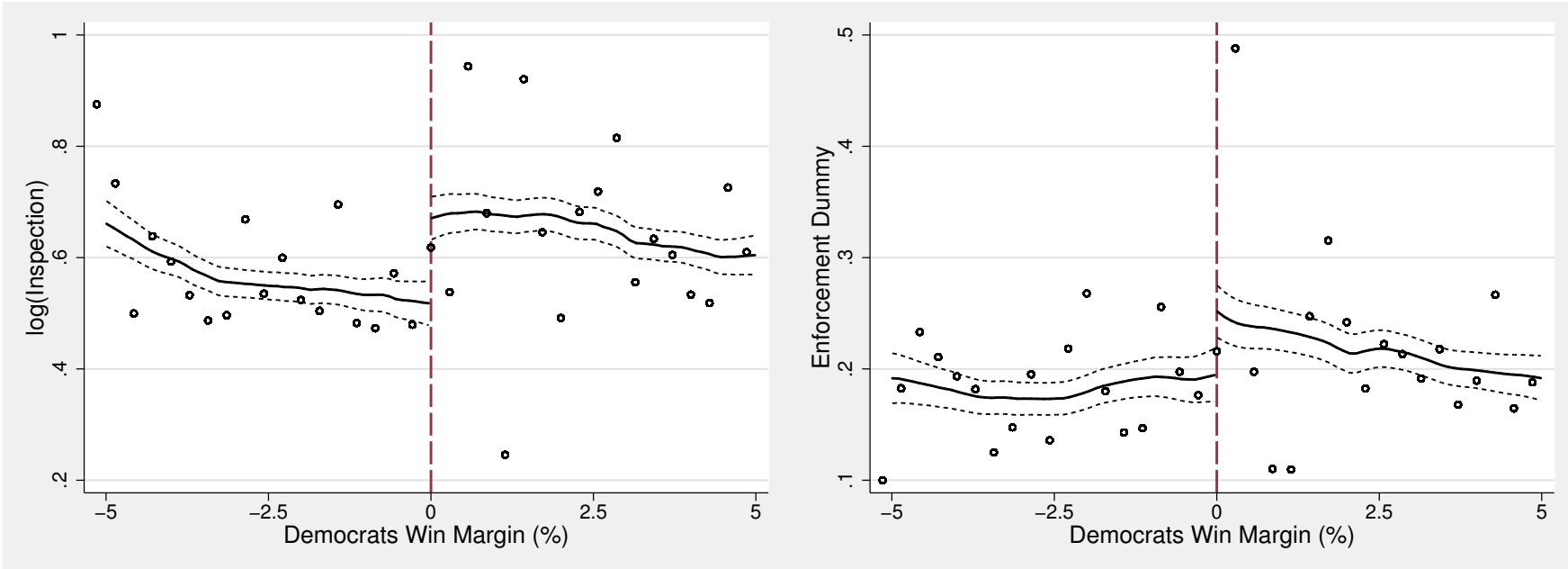
March 2, 2020 Press Release

Rep. Darren Soto (FL-09) asked Administrator Andrew Wheeler if the Environmental Protection Agency can test the safety of water in St. Cloud. The request comes after residents of St. Cloud reported seeing orange and brown sediment in the water coming out of faucets and in other water systems throughout their homes.

The exchange occurred during a hearing for the **House Committee on Energy and Commerce.**

***Rep. Soto asked**, "Can we count on the EPA to come in to test the water in St. Cloud, Florida?"*

Inspections and Enforcement



- Around 20% increase in EPA inspections
- Around 6.8% increase in enforcement actions

Formal and Informal Enforcement

	Enforcement Inspections		Informal Enf. Inspections		Formal Enf. Inspections		Penalties Inspections	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democrat Win	0.050	0.055***	0.058**	0.055***	-0.005	0.009*	-47.603	28.617
	(0.04)	(0.01)	(0.03)	(0.01)	(0.02)	(0.00)	(61.21)	(23.84)
Method	Local OLS	NP	Local OLS	NP	Local OLS	NP	Local OLS	NP
Polynomial	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear
Kernel	–	Tri.	–	Tri.	–	Tri.	–	Tri.
Observations	9,419	132,989	9,419	132,989	9,419	132,989	9,419	132,989

- Conditional on inspections, districts just won by Democrats see an increase in informal *but not formal* enforcement actions
  - Consistent with firms changing emission behavior not to breach limits after Democrat is elected

Conclusions

- Do politicians' ideologies affect firm behavior?
  - Yes!
- Our close-election RD results:
  - Lower pollution, more abatement, and more recycling in areas won by closely-elected Democrats
  - Firm reallocation between plants based on the party affiliation of the politicians
  - Real effects: drop in respiratory diseases in industrial areas
  - In our setting, politicians push their ideology by interfering with the local enforcement of environmental regulations