# Who lobbies and why? Evidence from EPA power sector regulations

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April 2017

# Overview

What we do:

- Link energy producers to lobbying and EPA model forecasts
- Gives us firm-level panel data on lobbying and regulatory impacts
- We (will) use plausibly exogenous variation in firms to estimate how firm-level regulatory impacts affect firm lobbying behavior

Why:

- **Political economy:** Billions spent each year on lobbying, but not much is known about why. One challenge is that the effects of policies are hard to measure (especially ex ante).
- **Environmental economics:** Power sector regulations are critical for public health and climate change mitigation. Often a gap between theory and practice.

# Research Questions

1. When regulations are expected to change the NPV of a firm's plants, how does the **magnitude and sign** of the impacts affect a firm's decision to lobby?
2. How does the degree of policy **uncertainty** affect the firm's decision to lobby?
3. How does the **distribution of impacts within a firm** affect its decision to lobby?
4. Is there any evidence of **information transmission** to the regulator?

# Lobbying

**Broad definition:** Communicating directly with government officials for the purpose of changing policy

Two measures:

1. **Public comments**
    - Submitted to the EPA regarding proposed rules
    - Anyone can submit via online portal or mail
    - EPA receives millions of comments on major regulations

2. **Federal filings**
    - Record spending by firms on lobbying contracts
    - Filed with SOPR under the Lobbying Disclosure Act
    - Over $3 billion per year total spending

# Regulatory Impacts

**Definition:** Firm-level changes in expected revenue, generation, or costs associated with ownership of *existing* power plants due to EPA rulemaking (ex-ante)

Measure:

- **EPA Integrated Planning Model (IPM) output**
  - When the EPA makes a regulatory change (a *Rule*), under the Administrative Procedures Act it must first publish a *Proposal* and accept public comment.
  - The EPA is required to provide a cost-benefit analysis at each stage
  - For six major rules, the EPA has used a detailed model of the electricity sector to forecast the effects of the rule.
  - We link these forecasts to firms that own plants (the EPA does not do this)

# Regulations

## Clean Air Interstate Rule, 2004 (CAIR)

- Addressed interstate transmission of fine PM and ozone. Required 28 eastern states to reduce SO2 and NOx emissions.

## Cross-State Air Pollution Rule, 2010 (CSAPR)

- Replacement of CAIR, which was vacated by the US Court of Appeals in 2008.

## Mercury and Air Toxics Standards, 2011 (MATS)

- Addressed hazardous air pollutant (mercury, arsenic, etc) emissions from the electricity sector. Implemented national emissions standards for coal- and oil-fired power plants. Replacement of Clean Air Mercury Rule, which was vacated by the US Court of Appeals in 2008.

## Clean Power Plan for New Sources, 2012 (CPP - New)

- Addressed CO2 emissions from new power plants. Set limit on maximum amount of CO2 per unit of electricity generated from a newly built power plant. Limit was approximately that of a new natural gas plant.

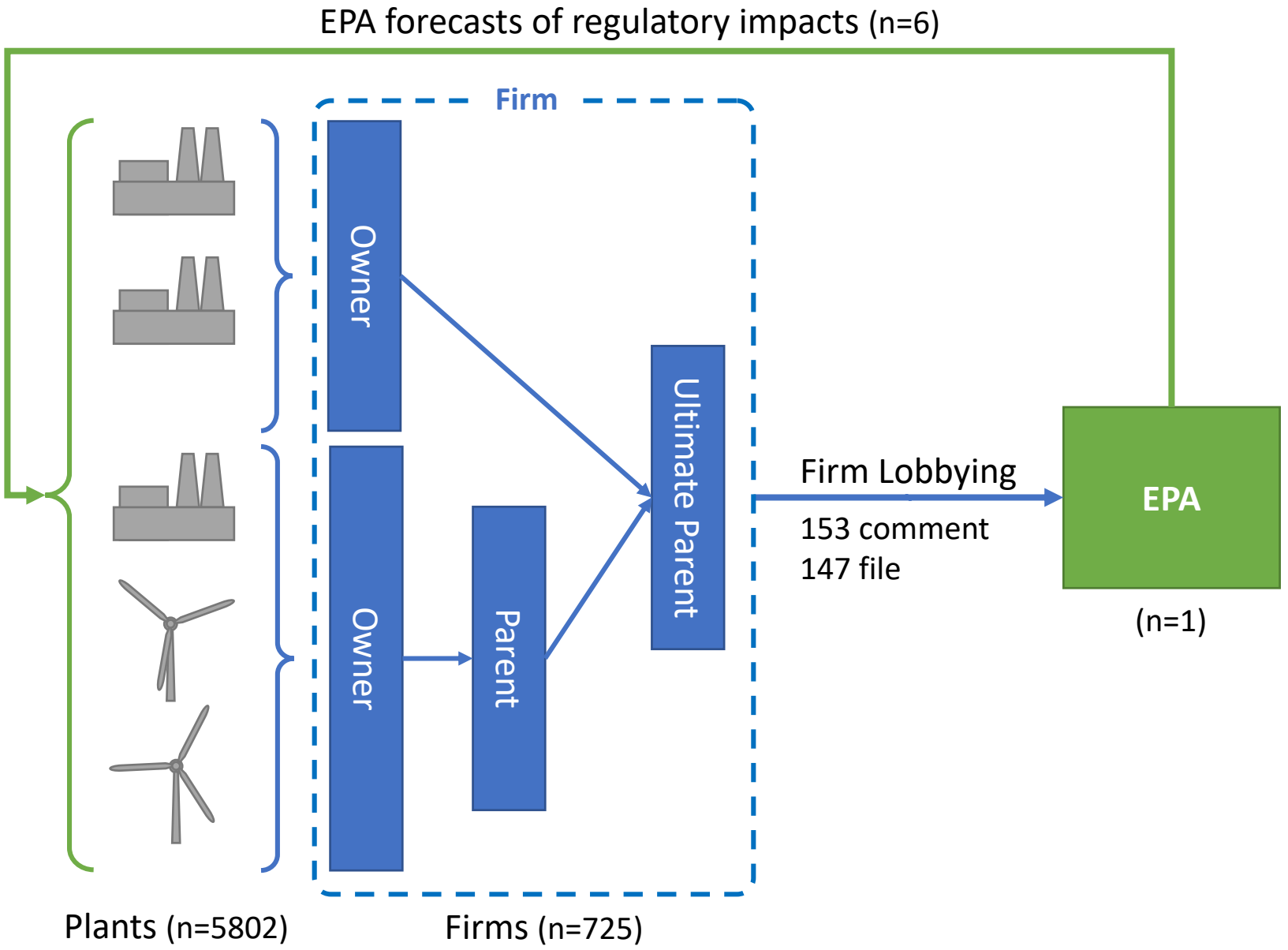
## Clean Power Plan, 2014 (CPP)

- Addressed CO2 emissions from new and existing power plants. Subsumed the original CPP.

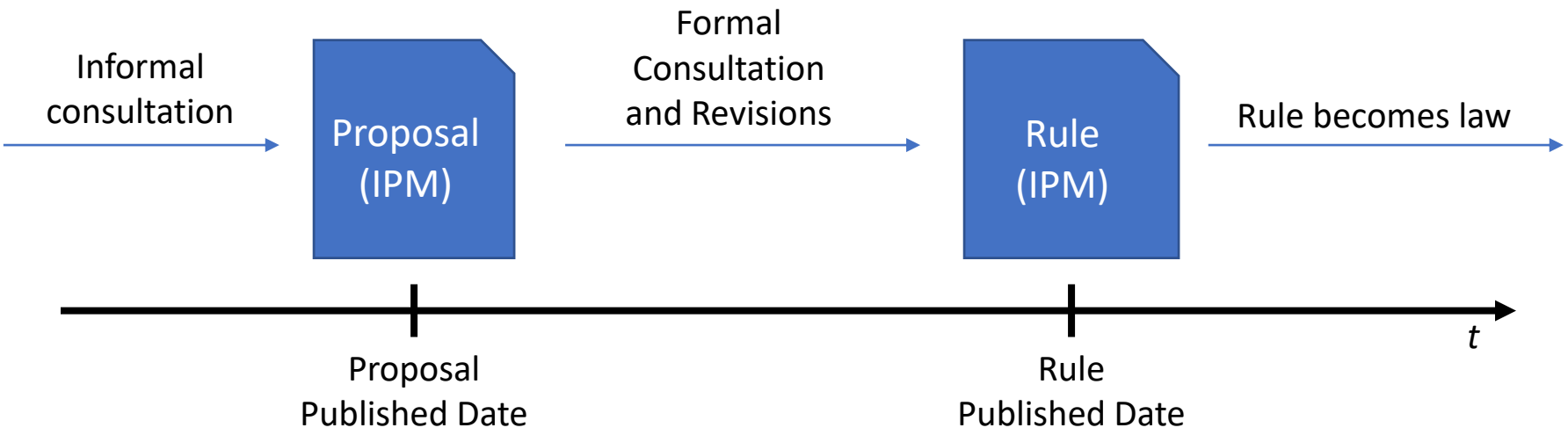
## Cross-State Air Pollution Rule Update, 2015 (CSAPR Update)

- Addressed interstate transmission of ozone. Original CSAPR addressed 1997 ozone NAAQS and 1997 and 2006 PM NAAQS. This update added the 2008 ozone NAAQS to the CSAPR.

# Structure of the Data



# Structure of the Data




EPA Docket on www.regulations.gov


Federal Filings (quarterly or twice-annually)

# Identification

Main concerns:

1. Lobbying affects policy outcomes
2. Firms anticipate policies

Identification comes from:

1. **Legal constraints on the EPA** (generally can only set targets for states or classes of plant – cannot target specific firms)
2. **Firm structure is slow and expensive to change**

Basically, after controlling for the EPA's degrees of freedom there is still a lot of variation between firms because of:

- **Heterogeneity within types of plants**
- **Different portfolios of plants at the firm level**
- **Variation in regional market structure**

We take this as exogenous

# Data

# Data

Plants:

- EIA and EPA data with detailed plant characteristics and ownership
- (basically) the universe of US electricity generating plants

Firms:

- Parents and Mergers & Acquisitions from Thomson Reuters Capital IQ
- All Energy and Utilities + subsidiaries of US Public companies

Forecasts:

- EPA Integrated Planning Model (IPM) runs

Comments:

- Downloaded from federal rulemaking portal (regulations.gov)

LDA Filings:

- Cleaned data provided by the Center for Responsive Politics (opensecrets.org)

# EPA's Integrated Planning Model

IPM: An (almost) general equilibrium model of (almost) every plant

- Used to forecast plant production and costs for near and distant future
- Similar plants in the same region are aggregated to representative model units (Fossil Fuel plants each receive a unique unit)
- Generation, input prices, and inter-regional transmission are all endogenous and carefully modelled. Projected demand is fixed.
- Solved as a linear cost minimization problem (millions of variables and constraints)
- We don't have the model, just the raw input and output for selected 'runs'
- Run output is a panel of estimated model unit production and costs
- Multiple runs are generated for each Proposal and Rule to explore different scenarios (including a status-quo baseline)

# IPM Present Values

Estimating plant Net Present Value for an IPM run:

1. Need to 'parse' the output (link real plants to model units)
2. Need to compute plant revenues (surprisingly difficult)
   - Prices vary with time and region.
   - We reconstruct the competitive dispatch curve from plant marginal costs
   - Set plant MW according to capacity, with two exceptions:
     - Wind and Solar generate year round
     - Impose constraint that low cost plants cannot generate for less time than high-cost plants
   - Use stepwise maximum marginal cost as price curve
3. Compute present value by summing discounted plant forecasts (discount rate = 0.1)

# Linking

Plants → CapIQ:

- Company name and EIA ownership information

IPM → EPA NEEDS database:

- Plant characteristics (with smoothing)

NEEDS → CapIQ:

- Company name and EIA ownership information

Comments → CapIQ:

- Company name in comment title

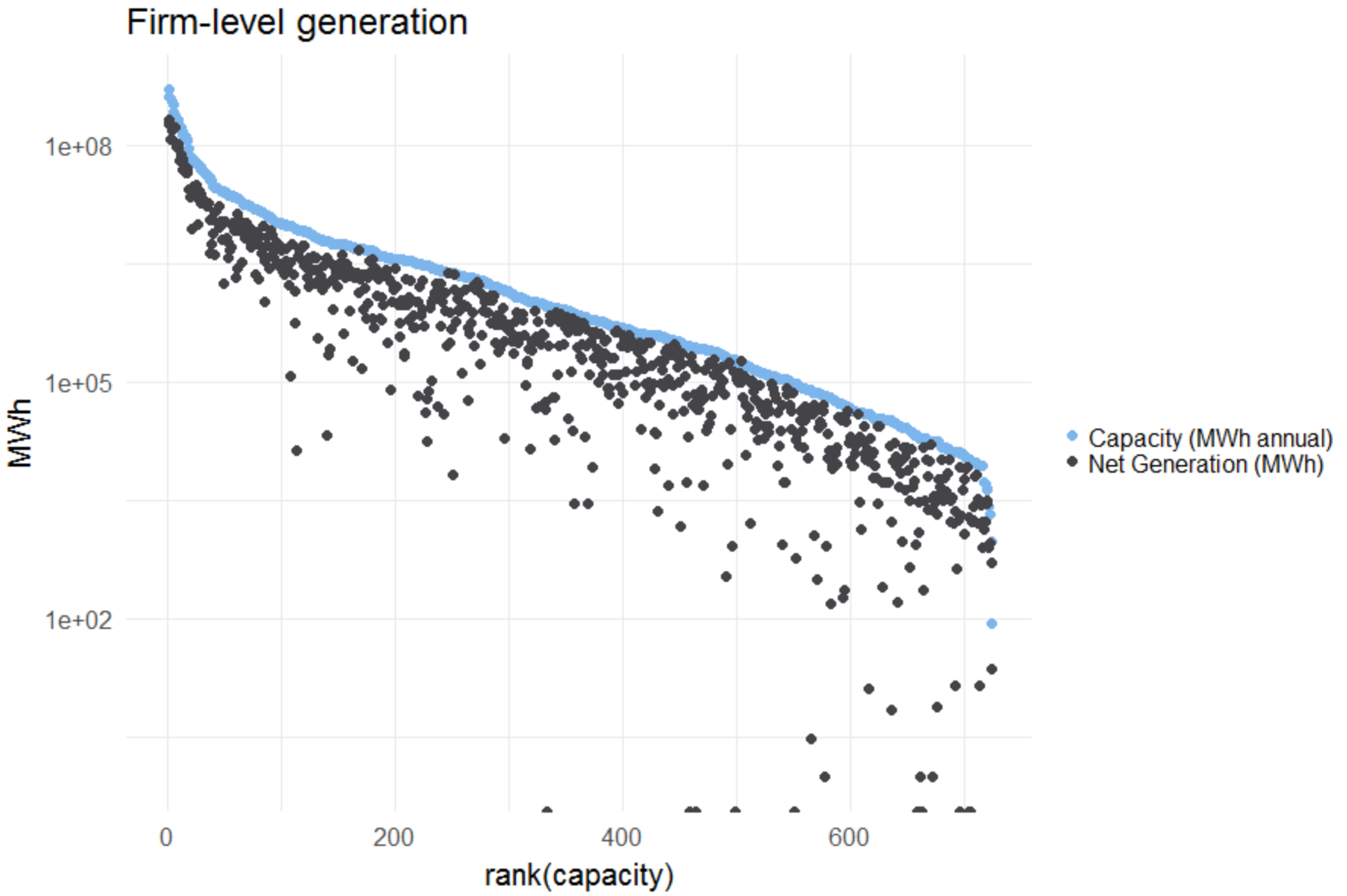
LDA Filings → CapIQ:

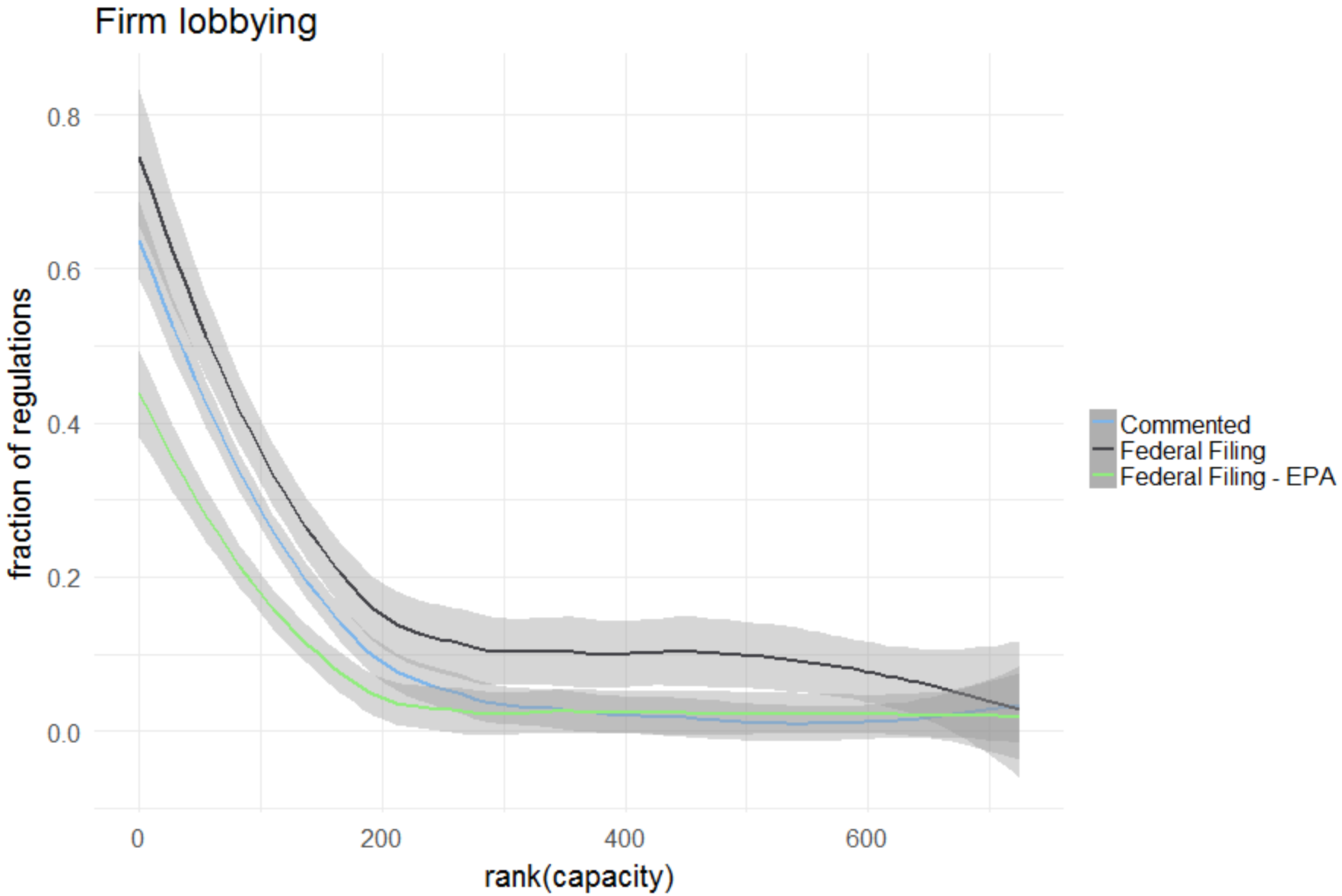
- Company name

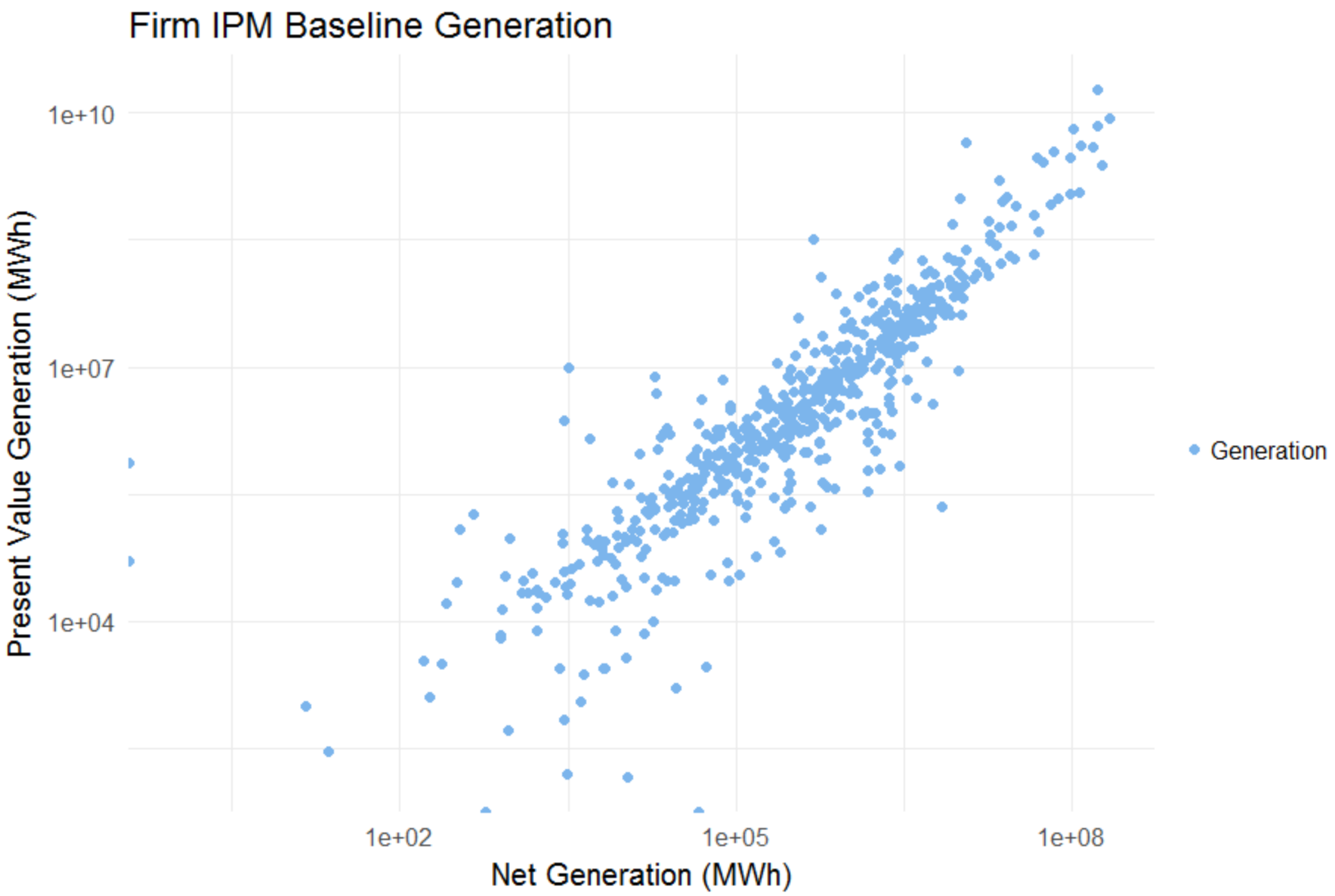
# Summary Statistics

# Summary stats by regulation

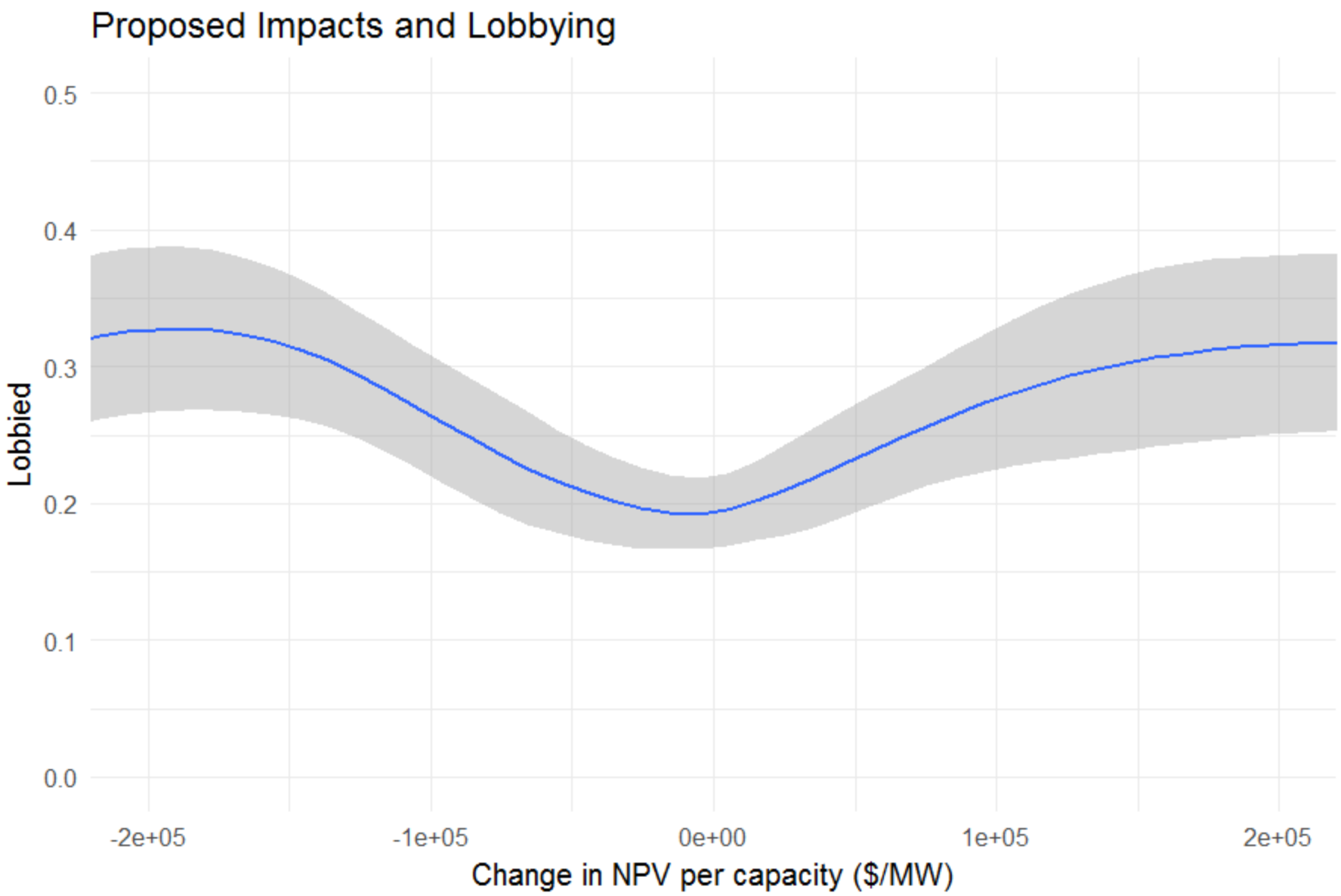
| | Rule | | | | | |
|---|---|---|---|---|---|---|
| | CAIR | CSAPR | MATS | CPP - New | CPP | CSAPR Update |
| Year | 2004 | 2010 | 2011 | 2012 | 2014 | 2015 |
| Matched Companies | 360 | 442 | 445 | 444 | 524 | 572 |
| Lobbying | | | | | | |
| Total Comments | 1,486 | 43,029 | 729,201 | 2,682,626 | 4,385,309 | 15,505 |
| Unique Comments | 1,473 | 3,992 | 16,966 | 14,862 | 34,455 | 221 |
| Commenting Companies | 39 | 83 | 76 | 36 | 112 | 39 |
| Filing companies | 82 | 105 | 104 | 105 | 108 | 103 |
| Lobbying Spending (mill.) | | | | | | |
| EPA Only | 34 | 42 | 43 | 50 | 50 | 43 |
| Energy and Mining (in Year) | $187 | $454 | $397 | $381 | $349 | $328 |
| Matched Companies | $184 | $390 | $322 | $602 | $431 | $189 |


Firm-level generation
1e+08
1e+05
1e+02
MWh
0
200
400
600
rank(capacity)
Capacity (MWh annual)
Net Generation (MWh)


Firm lobbying
fraction of regulations
0.8
0.6
0.4
0.2
0.0
0
200
400
600
rank(capacity)
Commented
Federal Filing
Federal Filing - EPA


Firm IPM Baseline Generation
Present Value Generation (MWh)
1e+10
1e+07
1e+04
1e+02
1e+05
1e+08
Net Generation (MWh)
Generation

# Results


Proposed Impacts and Lobbying
Lobbied
0.5
0.4
0.3
0.2
0.1
0.0
-2e+05
-1e+05
0e+00
1e+05
2e+05
Change in NPV per capacity ($/MW)

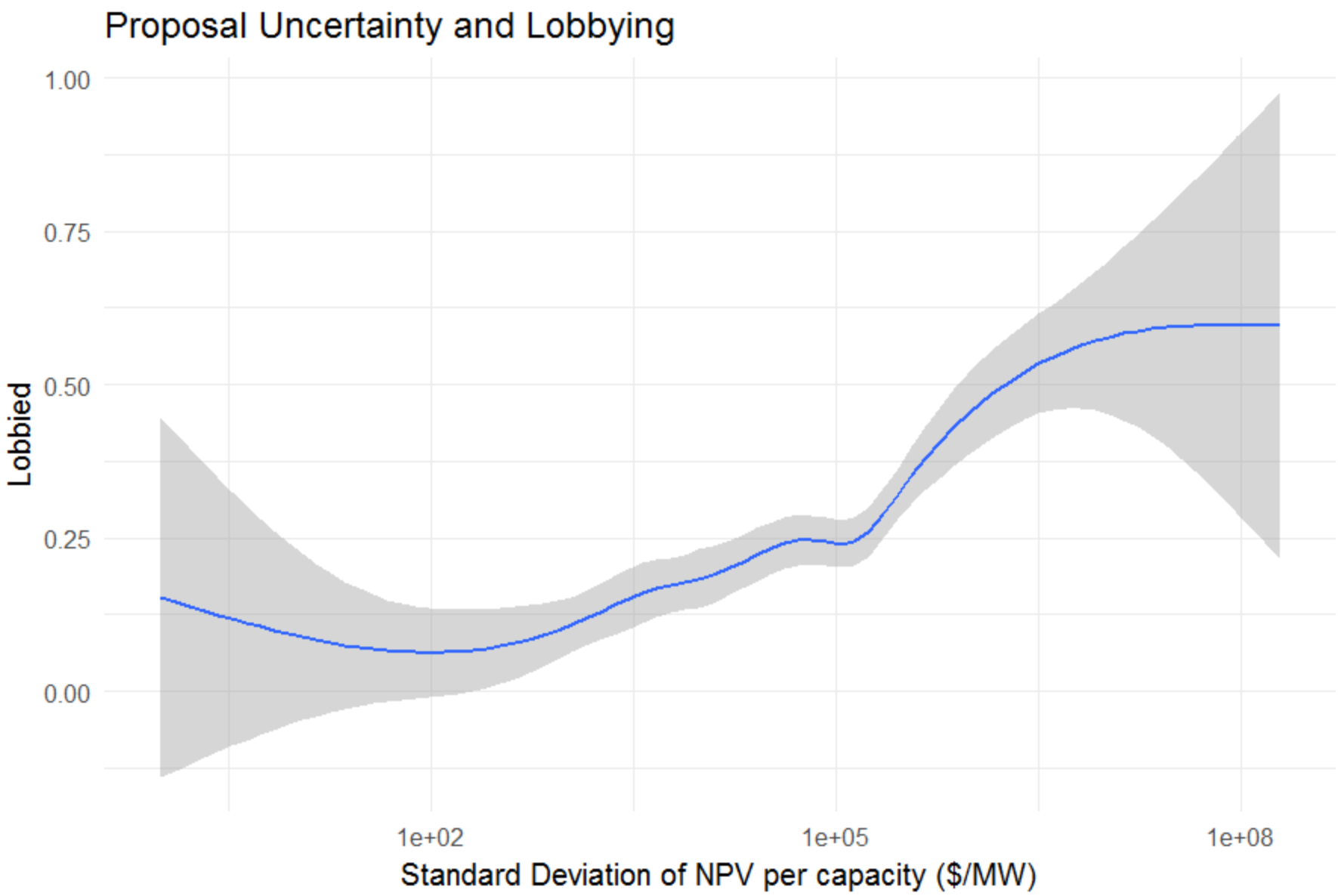

Proposal Uncertainty and Lobbying
1.00
0.75
0.50
0.25
0.00
Lobbied
1e+02
1e+05
1e+08
Standard Deviation of NPV per capacity ($/MW)

Table 1: Proposal Impacts, Uncertainty, and Lobbying

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $\frac{\Delta Profit}{Capacity}$ | -0.021 | | -0.186 | -0.142 | -0.342** | -0.192 |
| | (0.166) | | (0.168) | (0.187) | (0.144) | (0.156) |
| $(\frac{\Delta Profit}{Capacity})^2$ | 4.436*** | | 2.010 | 2.892* | -0.005 | -0.303 |
| | (1.354) | | (1.434) | (1.483) | (1.246) | (1.287) |
| $ln(\frac{SDProfit}{Capacity})$ | | 0.030*** | 0.028*** | 0.020*** | 0.017*** | -0.005 |
| | | (0.005) | (0.006) | (0.007) | (0.005) | (0.007) |
| Company FE | | | | | X | X |
| Regulation FE | | | | X | | X |
| $R^2$ | 0.009 | 0.023 | 0.026 | 0.039 | 0.018 | 0.080 |
| $N$ | 1313 | 1313 | 1313 | 1313 | 1313 | 1313 |

Notes: Results of a linear probability model of companies' lobbying responses to EPA rule proposals. Dependent variable is an indicator for whether the company lobbied the EPA. The first two rows show the quadratic effect of the predicted change in profits in mill. dollars per MW of power capacity. The third row shows the standard deviation in profits across all proposals (for a given rule) in dollars per MW of power capacity.

## Summary

- We link plants, firms, lobbying, and EPA forecasts of regulatory impacts to examine how firms choose whether to lobby base on their expected outcome from the rule

- We find that firms are more likely to lobby when :
  1. The regulation is projected to reduce their profits
  2. The regulation is projected to increase their profits (maybe)
  3. The regulation impact is uncertain (maybe)

- Still working on other questions, and thinking about identification. Feedback/ideas appreciated.

Thanks

# Structure of the Data