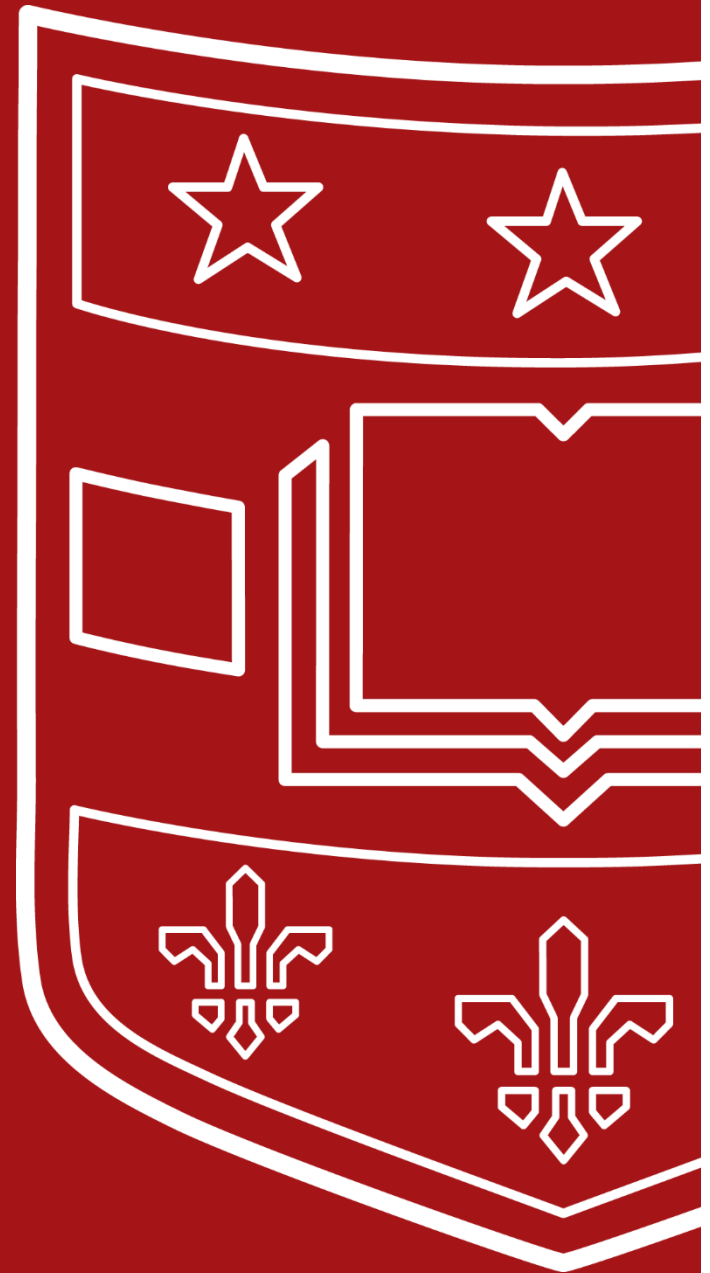


Discussion of Gowrisankaran,
Langer, and Zhang
Stephen P. Ryan



For Joel Waldfogel





What is this paper doing?

- Broad theme: what is the effect of regulatory uncertainty on irreversible firm behavior?
- Every firm faces regulation (safety, environmental, financial, HR, etc.)
- Every firm has irreversible decisions that depend on those regulations
- All regulatory processes are full of uncertainty about timing, enforcement, punishments
- This is a very important question with many applications!

MATS



- Specific setting: Mercury and Air Toxics Standards
- Genesis: 1990 Amendments to the Clean Air Act
- Mercury is really, really bad for humans:
 - The National Research Council estimates that each year about 60,000 children might be born in this country with permanent, irreversible neurological problems because of mercury exposure before birth
- Coal-fired utilities emitted 1/3 (52 tons) of mercury in early 90's
- EPA started a whole series of studies, reports to Congress, deadline extensions, findings, rulings, revisions, lawsuits, petitions, denials, and updates



MATS history (via EPA)

- 1990: CAAA establishes HAPs
- October 94: agreement to finish Utility Air Toxics Study by 1995 (later moved to 1998), issue regulations by 2000
- December 97: Mercury Study Report to Congress
- February 98: Utility Air Toxics Study
- November 98: “appropriate and necessary” to regulate power plants, mercury rules moved to Dec. 15 of 2003/2004
- December 2000: “appropriate and necessary;” law required mercury rule by Dec 15 2003
- January 2004: rule with two pathways:
 - maximum achievable control technology (MACT); 30% reduction by 2008
 - Market-based cap-and-trade (CAT); 70% reduction
- March 2004: supplement to Jan 04 proposal
- April 2004: deadline for final rule extended to March 15, 2005
- March 2005: final Clean Air Mercury Rule; performance standards and two-phase CAT
- February 2008: DC Circuit Court vacates CAMR; EPA promises 2011
- February 2009: Supreme Court denies petition to review Circuit Court’s Decision
- December 2009: Emissions solicitation from all power plants
- March 2011: proposed rule (emissions standards) ...it keeps going until January 31, 2022



Model

- Authors build a model of merchant generator behavior
- Every period, generator can do nothing, install abatement technology, or exit
- Key pieces of this model: profits from product market, costs of abatement and exit, and beliefs about probability of regulation enforcement
- Contribution of the paper is to infer what the probability of enforcement was across different types of units
- How do they do that?



Identification of Beliefs

- Basic idea: some states adopted mercury standards while the federal regulation languished
- For those states, the probability of having a regulation is set to 100%
- Holding everything else fixed, comparing adoption rates between generators in states with and without state regulations will isolate the beliefs about enforcement
 - However: “Second, even in states such as IL and MA where the standards were created as rules issued by the state environmental agency, they were generally developed in tandem with the owners of large coal generators...which led to substantially fewer and weaker judicial challenges. For this reason, we can use the decisions of generators subject to U.S. state enforcement to identify the costs of generator exit and compliance in the absence of policy uncertainty.”



Thoughts: Model

- Squaring up the dynamic oligopoly model:
 - Choices are not really strategic
 - Adoption doesn't change product market competition directly
 - Outside of errors, why would any firms ever adopt early?
 - Beliefs only appear in the penultimate period
- Firms that don't adopt are forced to exit. Why?



Thoughts: Methods and Empirics

- How is the ABOE different than MME?
 - “We could also introduce a perceived kernel meant to capture the short-term dynamics of the industry starting from a given initial state, for example, after a policy or an environmental change. For this, we could consider the average observed transitions from the current moment to the next, over many finite (and short) trajectories that start from the same state; this state describes the initial condition of the industry (see Appendix A for more details).” (Ifrach and Weintraub, page 13-4).
- What role does the AR(1) process play, how is it constructed, and is it consistent with equilibrium outcomes?
- Are the moments used in the approximation sufficient? How good are the in-sample fits?
- Concern about systematic differences in firms in states with state-led regulation versus federal regulation
- Also would like to know what’s going on in the rest of the industry

Thank you!



- This is a very ambitious and important paper
- Regulatory uncertainty is a first-order concern
- I really enjoyed reading and thinking about the paper
- Look forward to teaching it in my PhD IO class