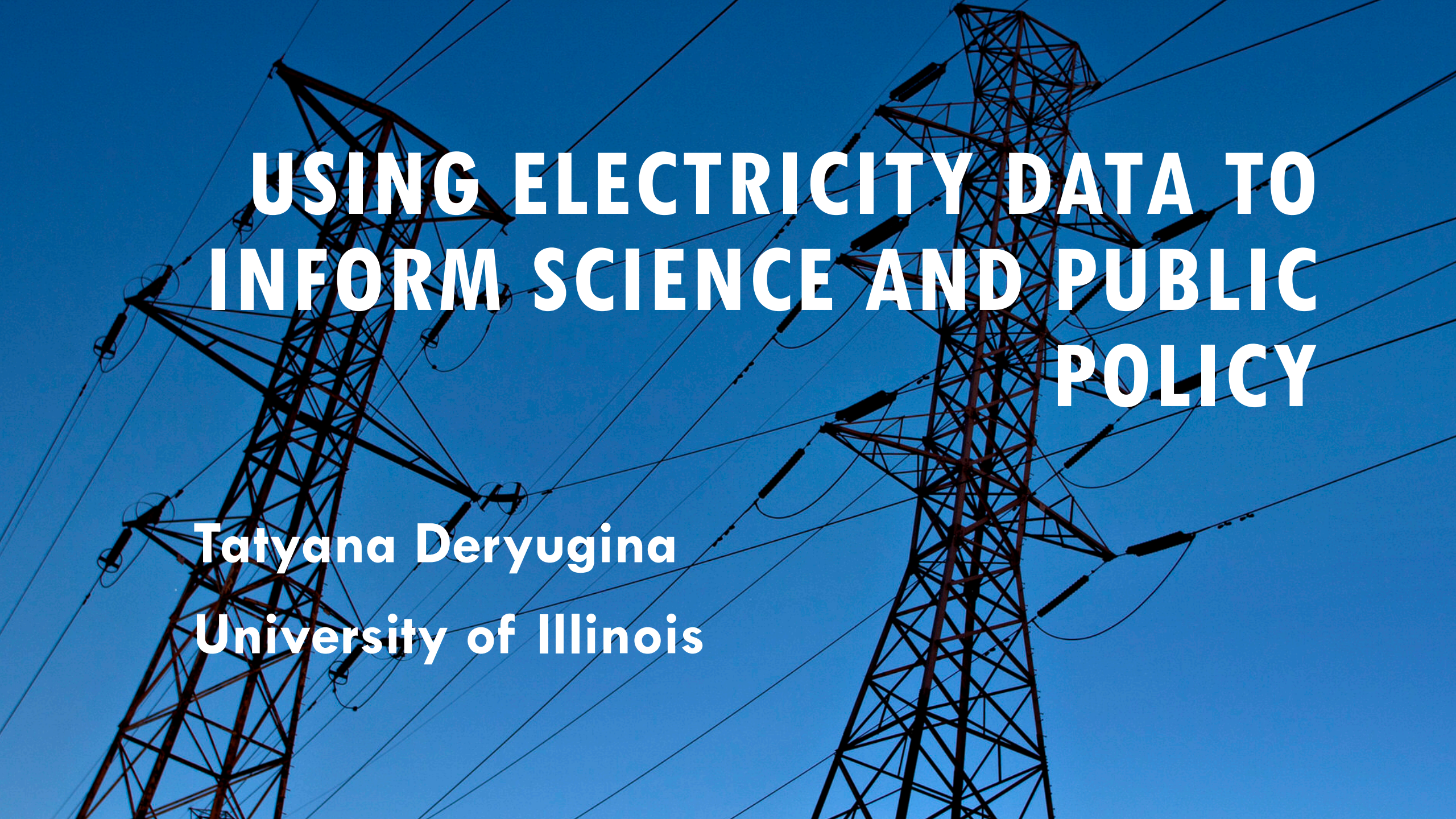


USING ELECTRICITY DATA TO INFORM SCIENCE AND PUBLIC POLICY

Tatyana Deryugina

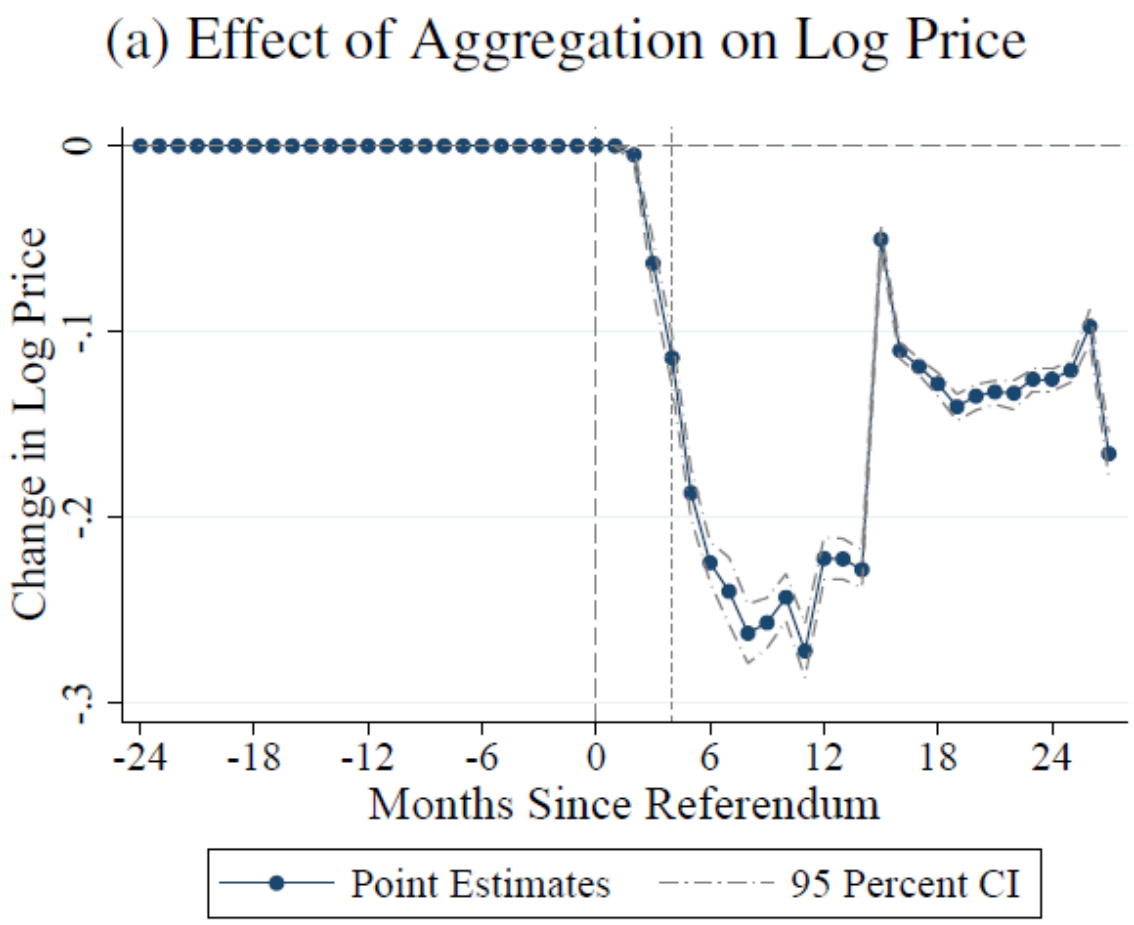
University of Illinois

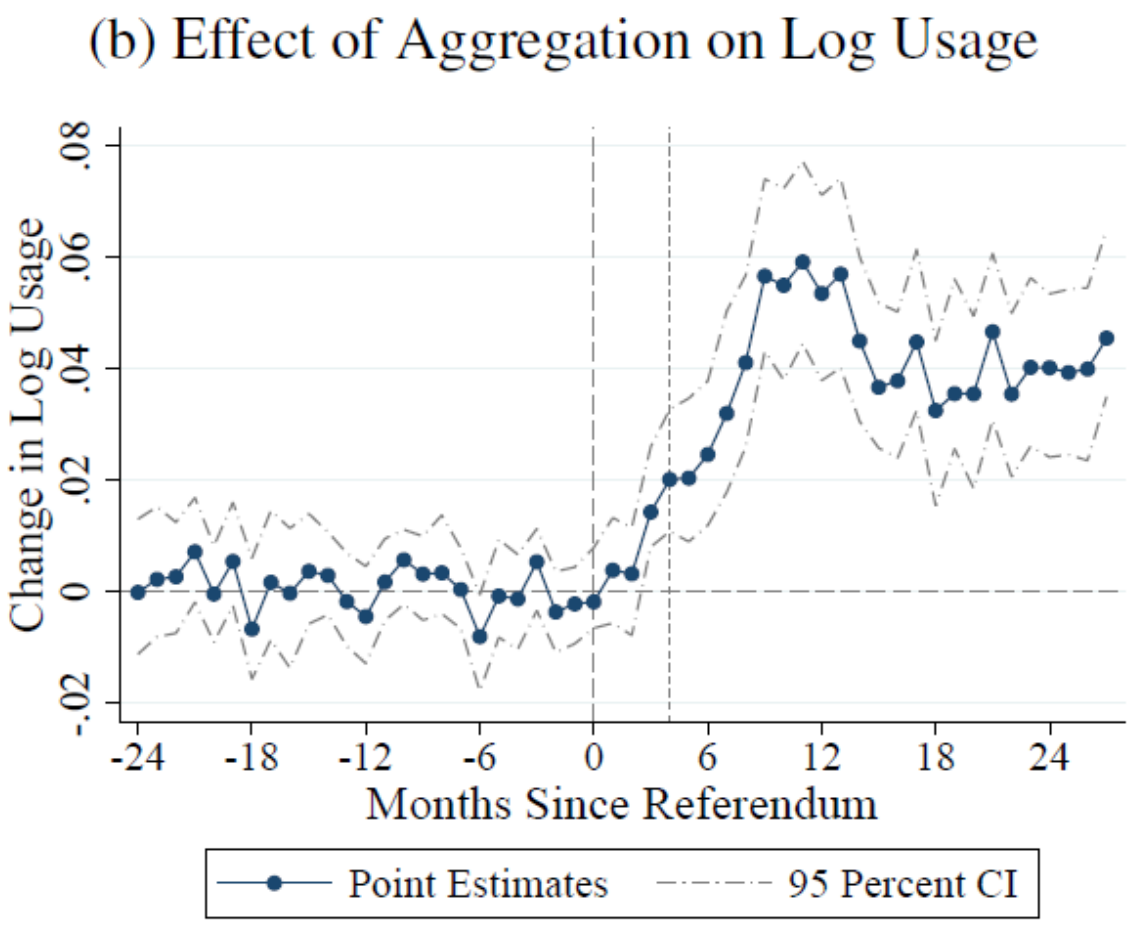
WHAT CAN (RESIDENTIAL) ELECTRICITY DATA TELL US?

1. How does electricity consumption react to price changes in the short run and in the long run?
2. What is the effect of home energy reports and how long does it last?
3. How much energy do building codes actually save?
4. Do subsidies for residential investment in energy efficiency lead to optimal decisions?
5. Why don't consumers switch to cheaper electricity providers?

…and more!

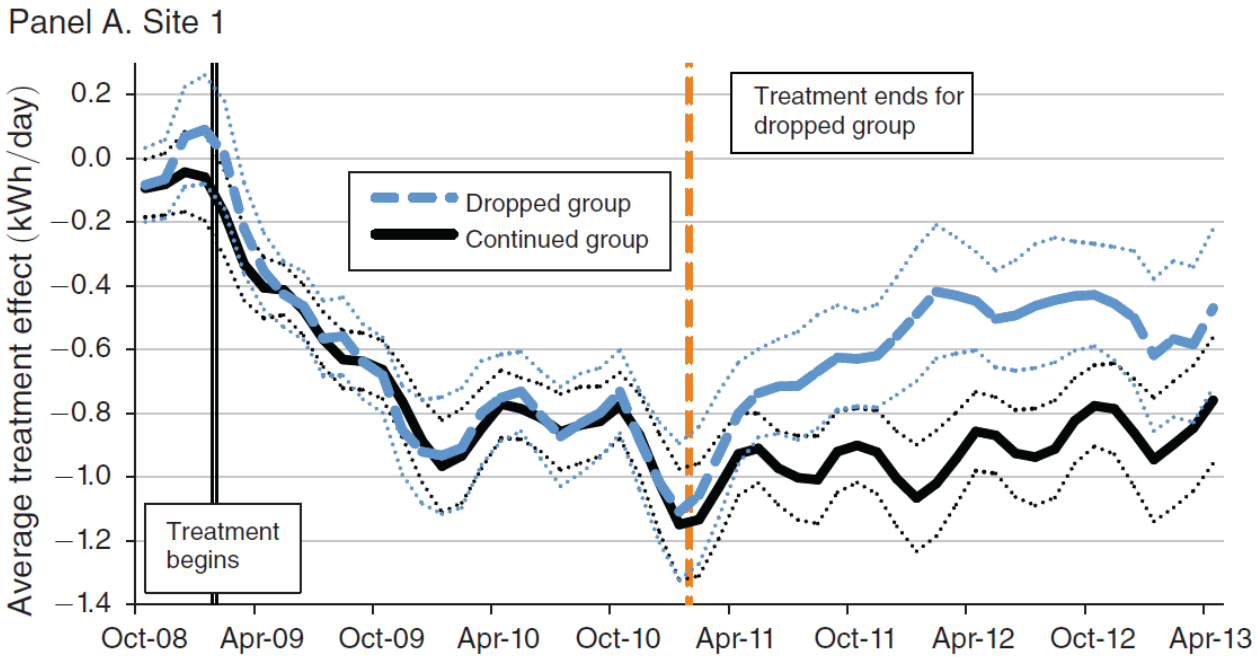
HOW DOES ELECTRICITY USAGE RESPOND TO PRICE CHANGES IN THE SHORT AND LONG RUN?

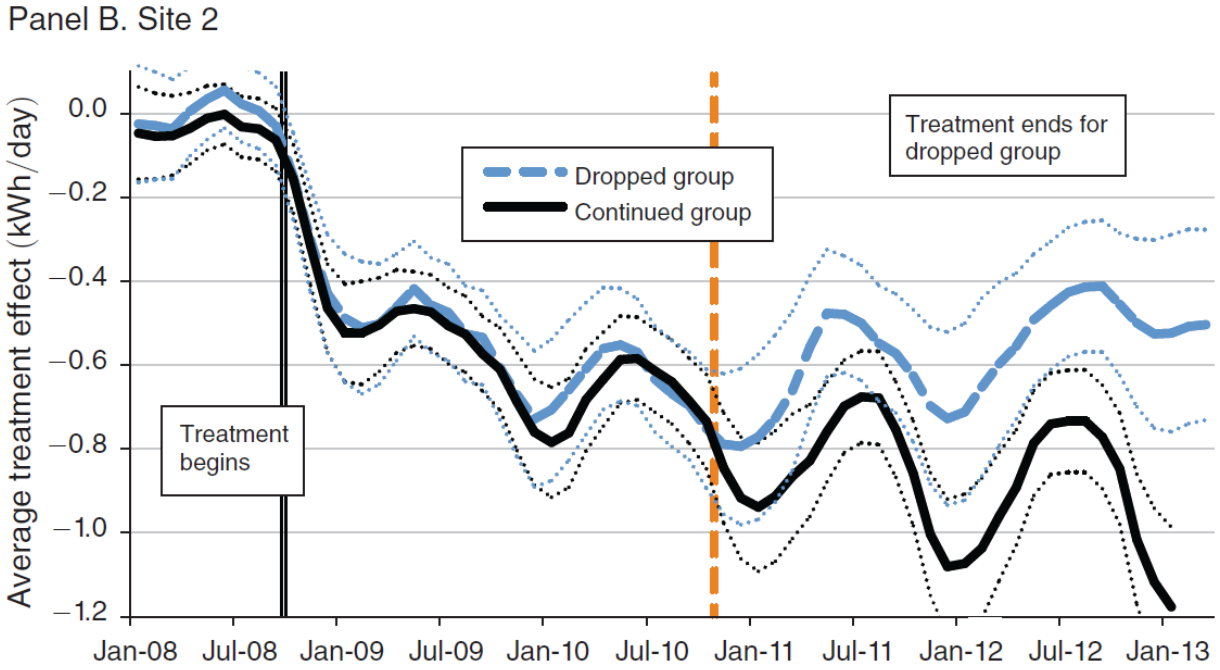




Deryugina, MacKay and Reif (2017 WP): monthly ComEd data at the community level, Illinois

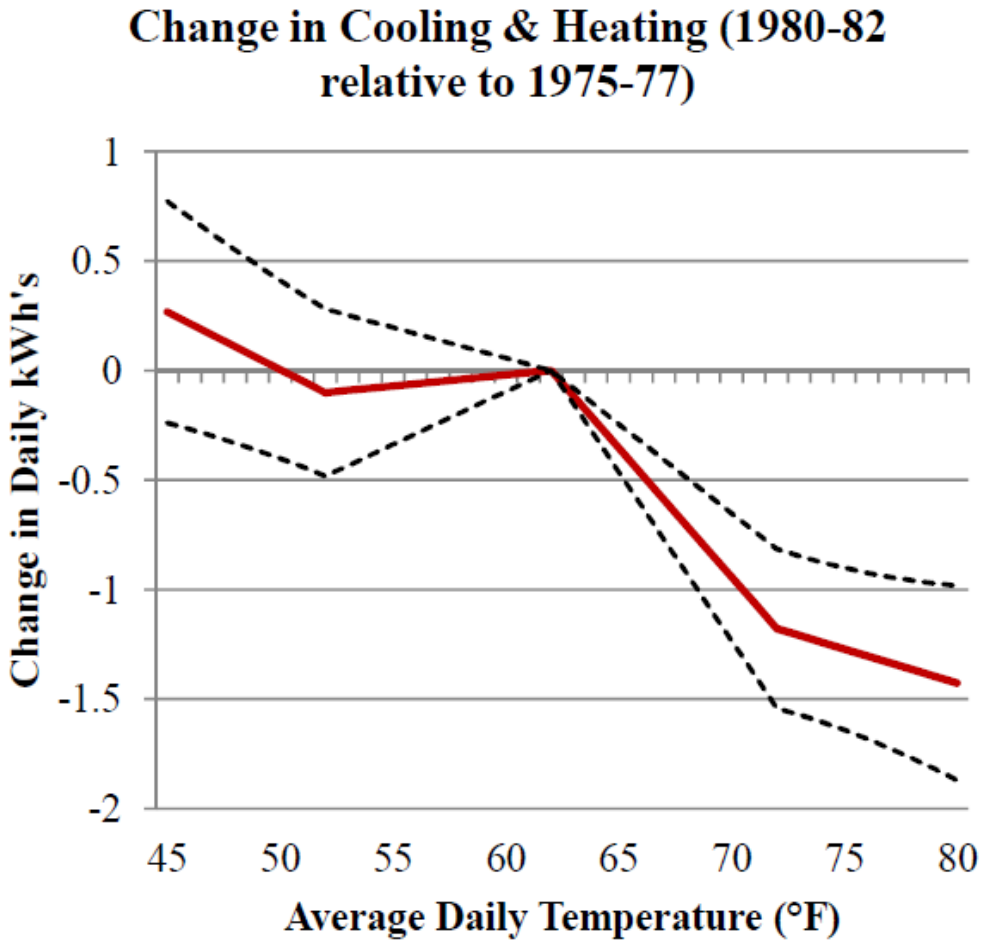
DO HOME ENERGY REPORTS KEEP WORKING EVEN AFTER A HOUSEHOLD STOPS RECEIVING THEM?

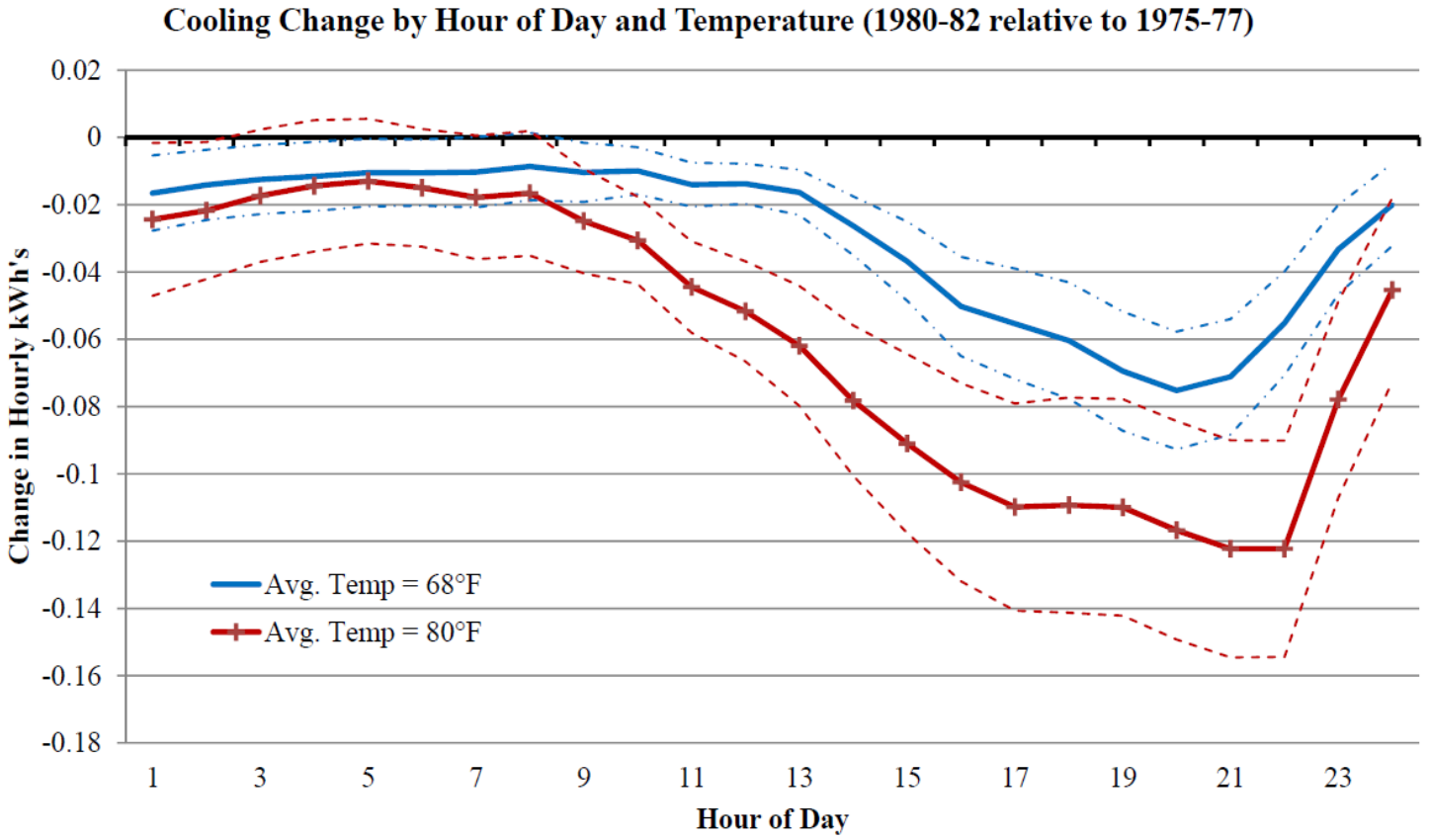




Allcott and Rogers (2014, AER): monthly (Site 1) and hourly (Site 2) household-level data from Opower.

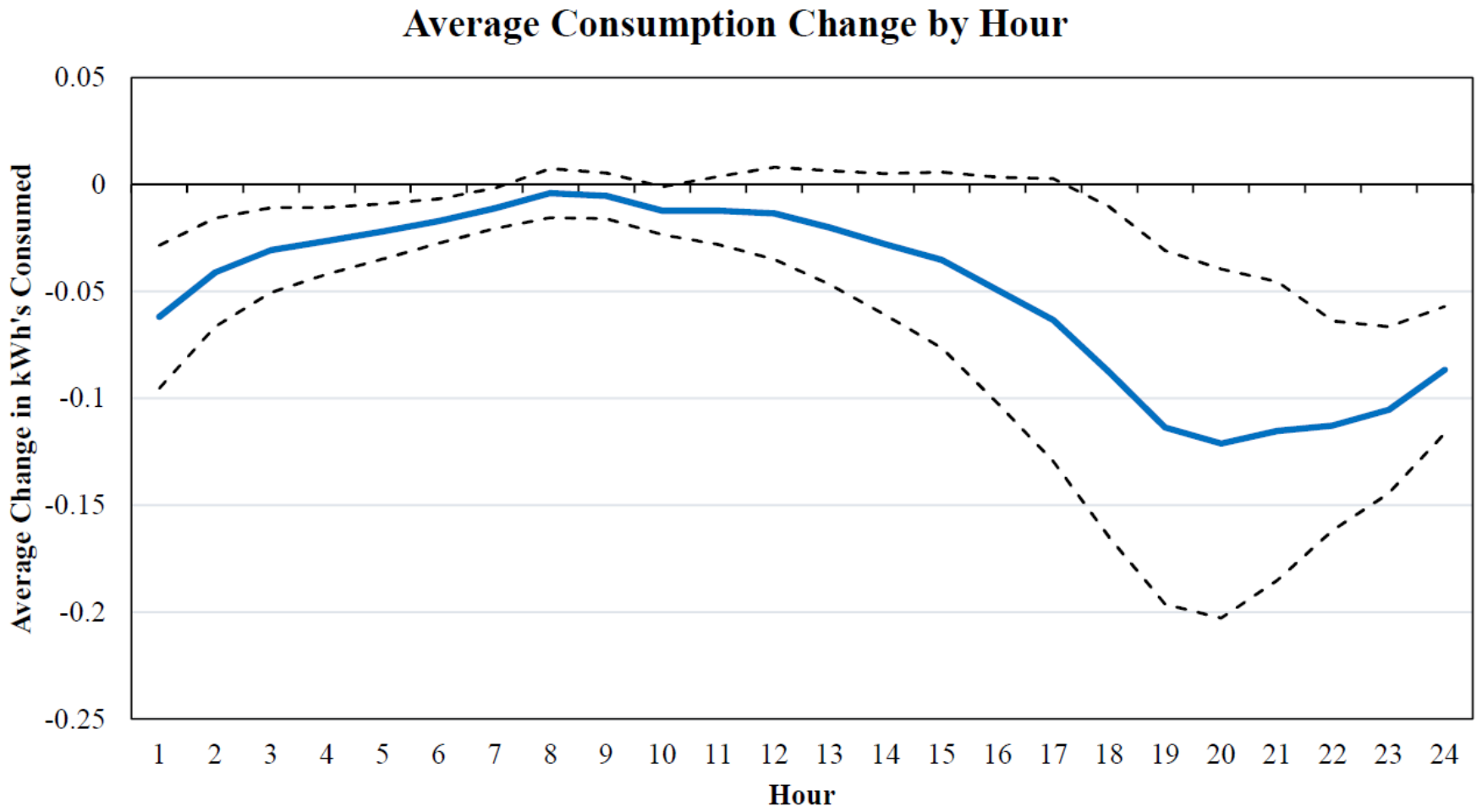
HOW MUCH ENERGY DO BUILDING ENERGY CODES ACTUALLY SAVE?





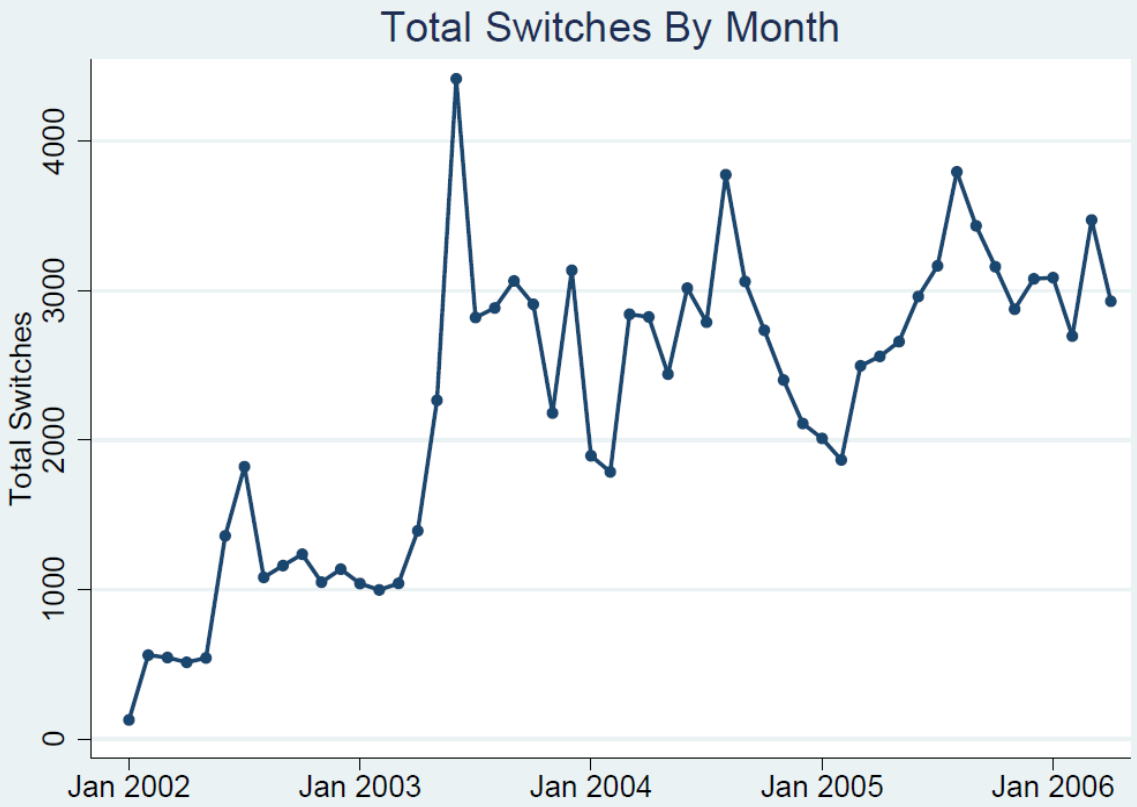
Novan, Smith and Zhou (2017 WP): hourly household-level data from Sacramento Municipal Utility District (SMUD)

DO SUBSIDIES FOR RESIDENTIAL INVESTMENT IN ENERGY EFFICIENCY LEAD TO OPTIMAL DECISIONS?



Novan and Smith (2017): hourly household-level data from SMUD

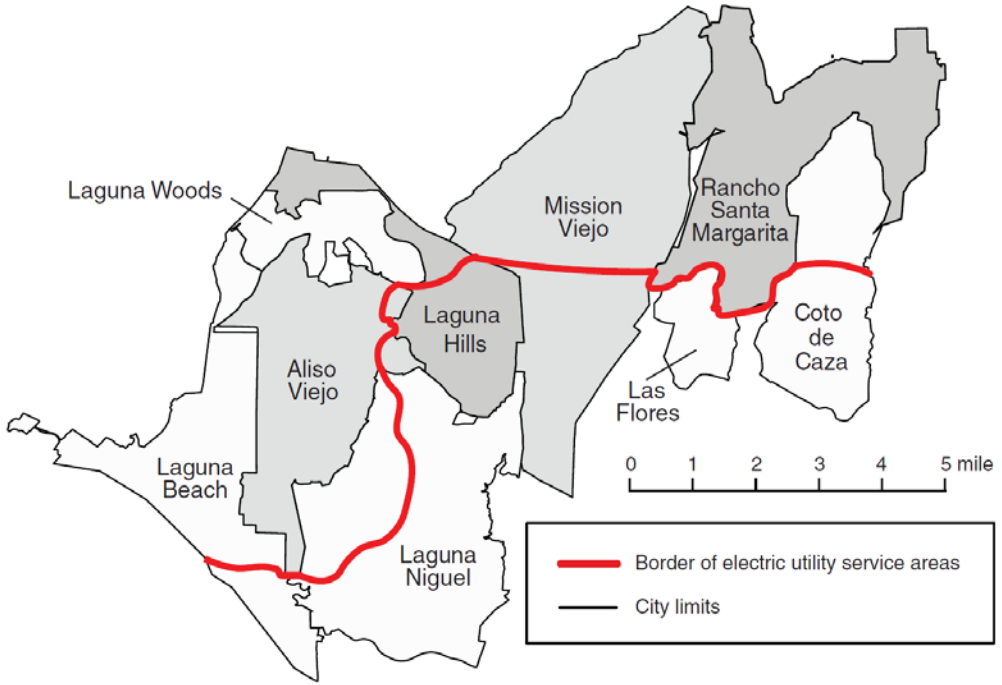
WHY DON'T CONSUMERS SWITCH TO CHEAPER ELECTRICITY PROVIDERS?



	Entrant Brand Effect Relative to Incumbent				
	0%	25%	50%	75%	100%
Fraction Searching					
2%	\$0 (Status Quo)	\$1	\$3	\$6	\$8
25%	\$32	\$50	\$73	\$101	\$133
50%	\$67	\$103	\$149	\$205	\$268
75%	\$101	\$155	\$225	\$309	\$404
100%	\$136	\$208	\$301	\$412	\$539

Hortacsu, Madanizadeh, and Puller (2017): monthly household-level data, Texas

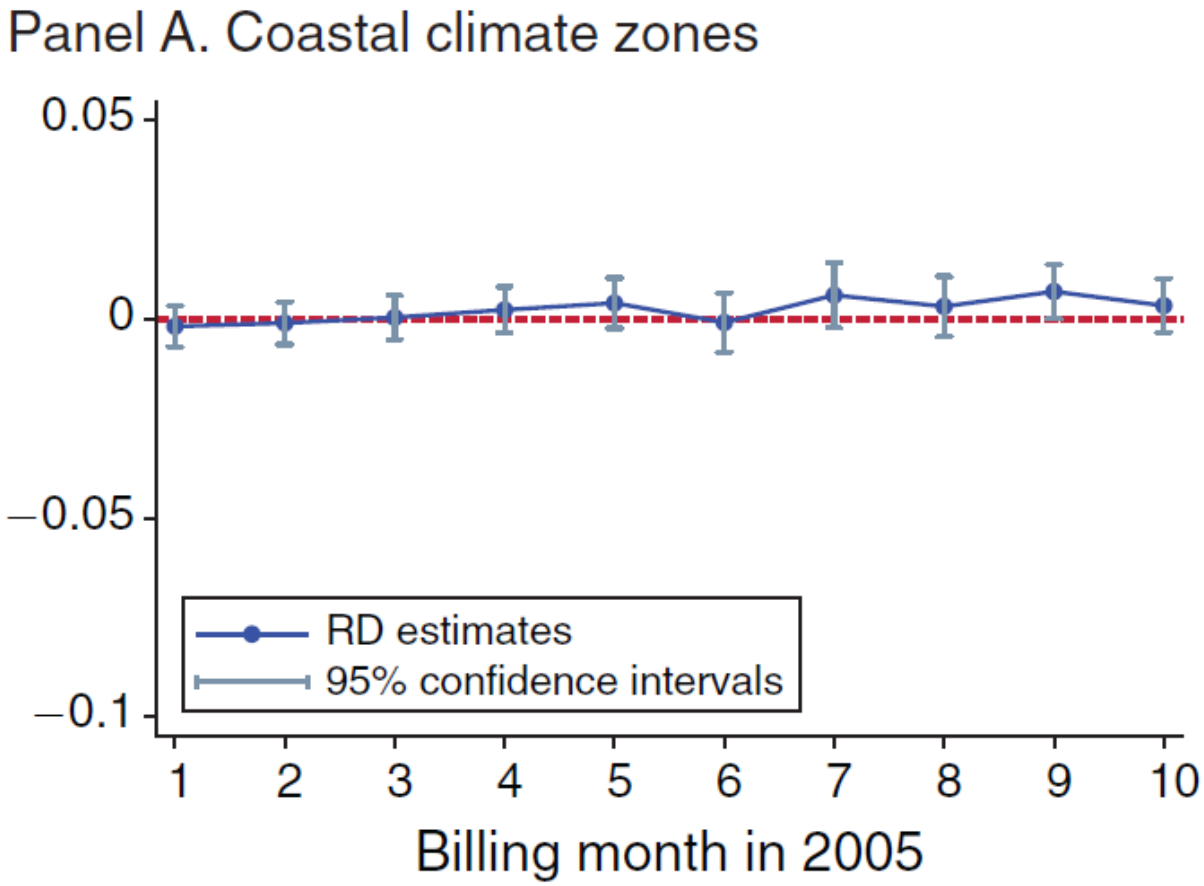
DO CONSUMERS RESPOND TO AVERAGE OR MARGINAL PRICES?

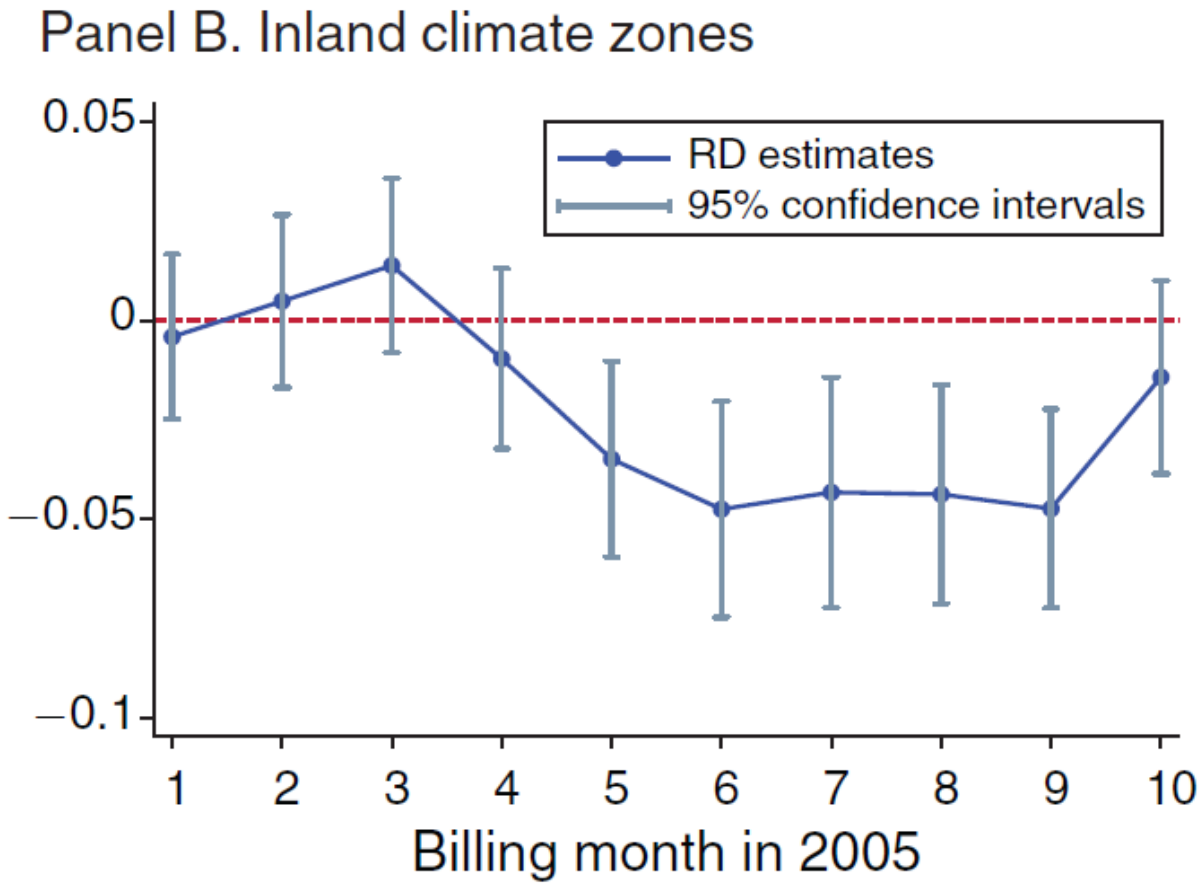


	(1)	(2)
$\Delta \ln(\textit{expected marginal price}_t)$	−0.036	0.004
	(0.004)	(0.012)
$\Delta \ln(\textit{average price}_t)$		−0.056
		(0.015)
$\Delta \ln(\textit{expected marginal price}_{t-1})$	−0.053	0.009
	(0.004)	(0.012)
$\Delta \ln(\textit{average price}_{t-1})$		−0.086
		(0.015)

Ito (2014 AER): monthly household-level data, California

DO REBATES FOR ENERGY SAVINGS WORK?

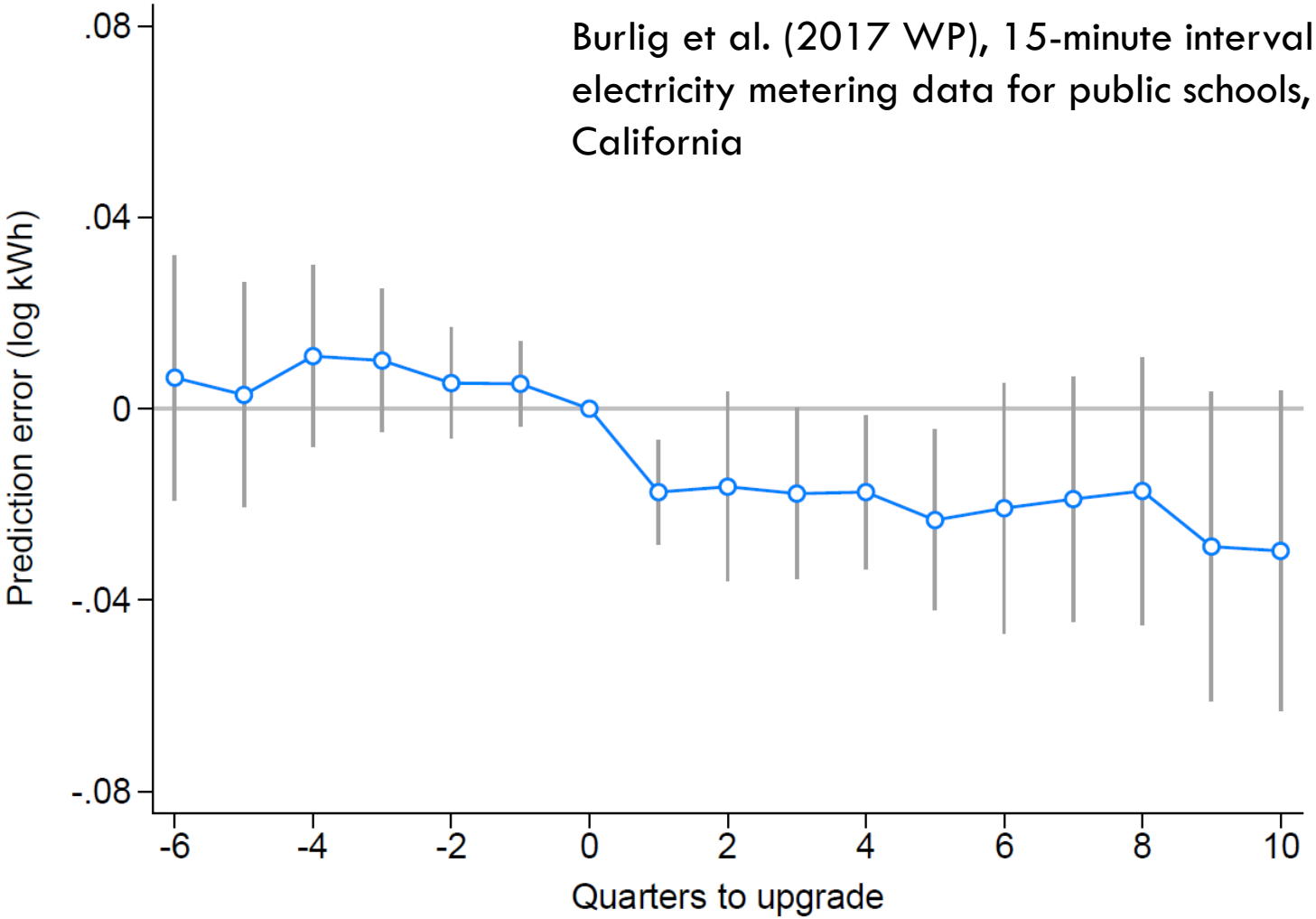




Ito (2015 AEJ: EP): monthly household-level data, California

DO ENERGY EFFICIENCY UPGRADES SAVE AS MUCH ENERGY AS EXPECTED?

Burlig et al. (2017 WP), 15-minute interval electricity metering data for public schools, California



FACILITATING DATA ACCESS FOR RESEARCH PURPOSES: THE CASE OF CALIFORNIA

- California utilities regulated by California Public Utilities Commission (CPUC) are required to provide electricity data to researchers, non-profit educational institutions, and government agencies for research purposes (California Public Utilities Commission (CPUC) Decision 14-05-016).

- PG&E, SDG&E make aggregated (monthly, zip-code-level with at least 100 residential customers) publicly available on their websites.

FACILITATING DATA ACCESS FOR RESEARCH PURPOSES: THE CASE OF CALIFORNIA

- "Authorized third parties" (researchers and government agencies) may request access to more disaggregated data.
  - Including the address, account number, account type, etc., *if necessary*.
  - Must follow stringent data protection protocols and sign non-disclosure agreement.
  - Individual households cannot be identifiable in any published product.

FACILITATING DATA ACCESS FOR RESEARCH PURPOSES: THE CASE OF CALIFORNIA

- Researchers/government agencies must provide the utility with a detailed analysis plan.
  - Including any plans to merge the data with other datasets (e.g., housing prices, demographics).

- Utility only required to provide the minimum amount of data required to answer the research question.
  - e.g., if researchers do not require the exact street address or a particular geographic area for their analysis, these need not be provided.

FACILITATING DATA ACCESS FOR RESEARCH PURPOSES: THE CASE OF CALIFORNIA

Strict confidentiality and data security requirements.

- Researchers who have direct access to data must sign non-disclosure agreement.
- Data must be stored in password-protected offline computer in a locked secure room. Any backups (as agreed on) must be stored in locked cabinet/similarly secure location.
- Organization required to sign off on researcher's behalf.