Investments that Make our Homes Greener: The Role of Regulation

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Summary

- Research question: evaluation of a regulation in UK that requires some rented properties to satisfy minimum energy efficiency standards
  - Energy efficiency—policy target
  - Capex and the financial return, rent, carbon emission
- Importance
  - Major source of energy consumption and carbon emission
  - Underinvestment in energy saving among private rental properties: landlord-tenant agency problem

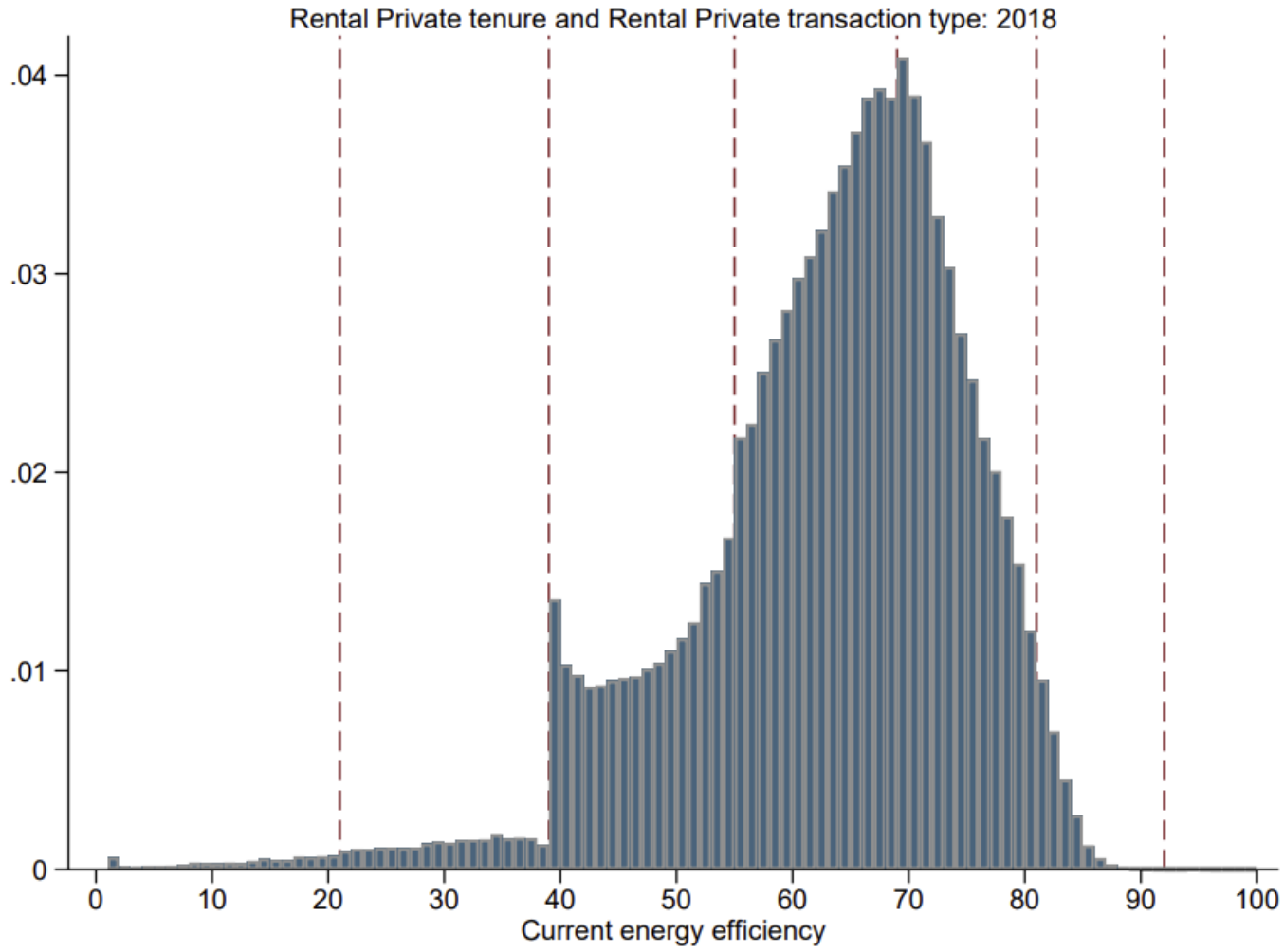
Summary (cont.)

- Universe of Energy Performance Certificates (EPC) records
  - Measure of overall energy efficiency (energy running costs): SAP points
  - Description of the property element—identify retrofits
  - Carbon emission of the property (Environment impact, or EI points)
- Policy intervention
  - Minimum level of energy efficiency (i.e., SAP>=39) for private rental properties
  - Owner-occupied properties not affected
  - Approval date: 2015:03; Implementation date: 2018:04

Summary (cont.)

- Policy compliance: energy efficiency gain
  - Bunching of SAP among rental properties right at 39, only after the policy
  - Conditional on a new SAP, low-score rental properties show a greater energy efficiency improvement than low-score owner-occupied properties
- Investment response
  - Lower capex retrofits (e.g., low-energy LED lighting)
- Rental listing price increase by 1%
  - Can only cover low capex retrofits
- Little/negative improvements in carbon emission
  - Reduction in electricity use: more pecuniary than emission benefits

Bunching around the threshold



10a. Fuel costs – Individual heating systems including micro-CHP

	Fuel kWh/year		Fuel price (Table 12)		Fuel cost £/year	
Space heating - main system 1	(211)	×		× 0.01 =		(240)
Space heating - main system 2	(213)	×		× 0.01 =		(241)
Space heating - secondary	(215)	×		× 0.01 =		(242)
Water heating (electric off-peak tariff)						
High-rate fraction (Table 13, or Appendix F for electric CPSU)				(243)		
Low-rate fraction		1.0 – (243) =		(244)		
High-rate cost	(219) × (243)	×		× 0.01 =		(245)
Low-rate cost	(219) × (244)	×		× 0.01 =		(246)
Water heating cost (other fuel)	(219)	×		× 0.01 =		(247)
(for a DHW-only community scheme use (342a) or (342b) instead of (247)						
Space cooling	(221)	×		× 0.01 =		(248)
Pumps, fans and electric keep-hot	(231)	×		× 0.01 =		(249)
(if off-peak tariff, list each of (230a) to (230g) separately as applicable and apply fuel price according to Table 12a						
Energy for lighting	(232)	×		× 0.01 =		(250)
Additional standing charges (Table 12)						(251)
Energy saving/generation technologies	(233) to (235a) as applicable, repeat line (252) as needed					
<description>	one of (233) to (235a)	×		× 0.01 =		(252)
Appendix Q items: repeat lines (253) and (254) as needed						
<description>, energy saved	one of (236a) etc	×		× 0.01 =		(253)
<description>, energy used	one of (237a) etc	×		× 0.01 =		(254)
Total energy cost			(240)...(242) + (245)...(254) =			(255)

11a. SAP rating – Individual heating systems including micro-CHP

Energy cost deflator (Table 12):	0.42	(256)
Energy cost factor (ECF)	[(255) × (256)] ÷ [(4) + 45.0] =	(257)
SAP rating (Section 13)		(258)

Bunching around the threshold

- Very complicated data-collection procedure and formular
  - Involves log transformation
- Hard to be accurately predicted by landlords
  - Room for appraiser manipulation
- May help explain the gap between SAP and carbon response
  - EI is not the direct target of the policy—no incentive to manipulate
  - Policy implication: design **and enforcement**

Bunching around the threshold

- Some direct evidence may be helpful
  - Higher incidence of bunching if the retrofit involve items easier to be manipulated by nature?
  - Labor market competition of appraisers
  - “Relationship” appraisals?
  - Clustering of bunching among certain appraisers?
- Weaker EI improvements relative to SAP in this case?

Response of rents

- Imperfect pass-through of landlords' capital expenditure
  - Esp those that involve big-ticket items
- Better passthrough: SAP as a (credible) signal?
  - Are SAP disclosed in the listing description?
- More heterogeneity analysis to understand the distributional effect
  - E.g., proxies for landlord and tenants' income level
  - Or by the type of retrofits

Response of rents

- The policy targets properties on the left tail of SAP distribution
  - Presumably, on the left tail of other dimensions as well

- Does investment on energy efficiency crowd out (in) expenditure on other facilities?
  - Hedonic-quality-adjusted rents may be even higher
  - Description in the listing?

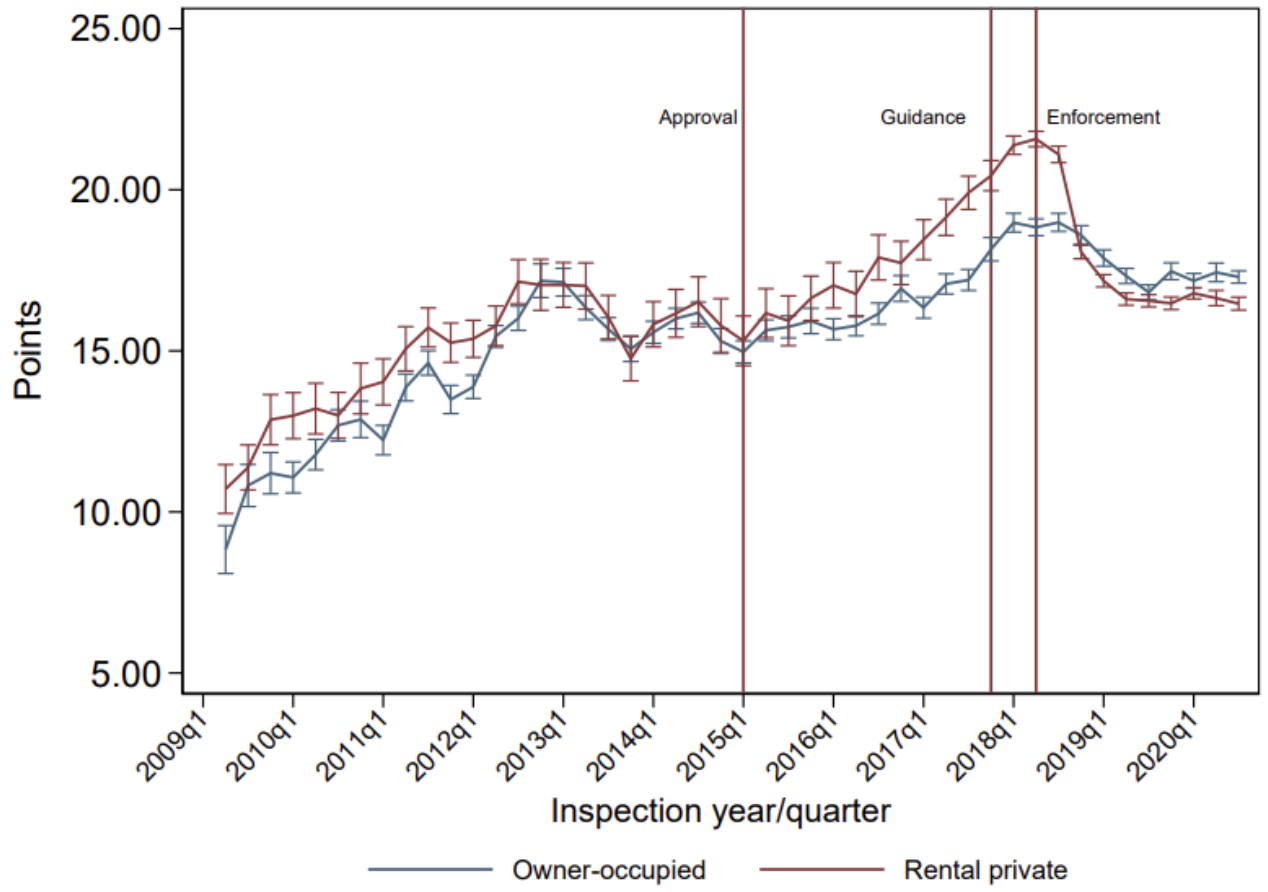
Response of energy efficiency

- Ideally, track the energy efficiency and CO2 emission of the same building overtime
  - SAP and EI observable only in the case of an EPC update
- Main results: intensive margin response
  - Conditional on an EPC update, how does Δ evolve over time
- Extensive margin: treated properties are more likely to perform retrofits after the policy shock
  - Underestimation of the total treatment effect

Response of energy efficiency

- A balanced panel of SAP and EI
  - Fill the scores between two certificates as the value of the previous one
  - Assumption: EPCs are updated in a timely manner
  - Likely to be true for rental properties, but not owner occupied
- An alternative control group:
  - Rental properties with pre-event SAP scores (just) above 39

Response of energy efficiency



Concluding Remarks

- Important paper answering an urgent question
  - Very rich results that offer new insights
- Well-executed and well-written
  - Enjoyed reading this paper and learned a lot!
- Looking forward to seeing the published version on a top journal