

**“Green Expectations:
Climate Change and Homeowner Valuation of Dwelling Sustainability”
by **Milind Goel****

Discussion by Christophe Spaenjers (CU Boulder)

SFS Cavalcade
21 May 2025

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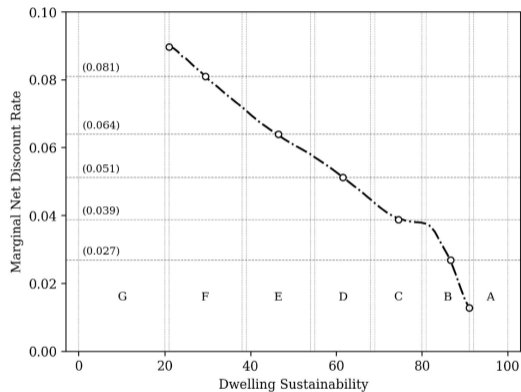
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- ▶ Energy-efficient houses are more expensive than energy-inefficient houses—but they are also different on other dimensions (cf. *infra*)

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- ▶ Energy-efficient houses are more expensive than energy-inefficient houses—but they are also different on other dimensions (cf. *infra*)
- ▶ This paper recovers discount rates from (i) expected future marginal savings associated with improvements in efficiency, and (ii) price premia associated with higher efficiency levels, using data on millions of houses

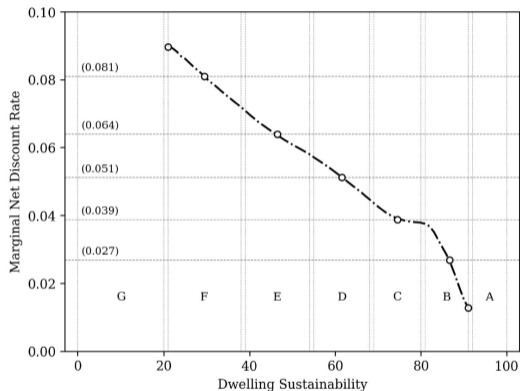
Main finding

Figure 1: Marginal net discount rates



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- ▶ “Homeowners accept lower returns for greener dwellings”
- ▶ “This cross-sectional variation in discount rates [...] highlights the economic significance of preference heterogeneity.”

Overview of discussion

1. This paper in context of existing literature
2. Are estimated price premia only reflecting differences in energy efficiency?
3. Does variation in discount rates imply heterogeneity in preferences?

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TABLE 4—IV ESTIMATION OF THE EFFECT OF RELATIVE FUEL PRICE ON RELATIVE TRANSACTION PRICE

Dependent variable	First stage (fuel price)	2SLS (sales price)
Fuel price IV	1.092 (0.0267)	
Fuel price		-2,730.5 (940.0)
<i>F</i> -statistic	849.0	
<i>R</i> ²	0.886	
Unit FE	Yes	Yes
Geographic area × year FE	Yes	Yes
Oil linear trend	Yes	Yes
Age FE	Yes	Yes
Observations	528,642	528,642
Implied discount-rate infinite time horizon		3.5%

(A) Myers, AEJ Policy, 2019

Table 7. Capitalization of Annual Savings from Less Observable Energy Efficiency

	(1)	(2)
Annual savings	18.9558*** (5.3484)	22.8409*** (8.4594)
Discount rate	.056	.046
Discount rate 95% CI	[.023, .088]	[.011, .081]
Control for other audit measures?	No	Yes
<i>R</i> -squared	.108	.137
Observations	3,938	2,173

Note. The dependent variable is the change in price in \$10,000 units. Standard errors are clustered at the residence level. Specifications include sale year fixed effects and year built group fixed effects, where the year built groups are < 1999, 1999, 2000, etc.

(B) Cassidy, JAERE, 2023

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- ▶ Contribution of this paper is to estimate discount rate over the whole cross-section of properties/homeowners?

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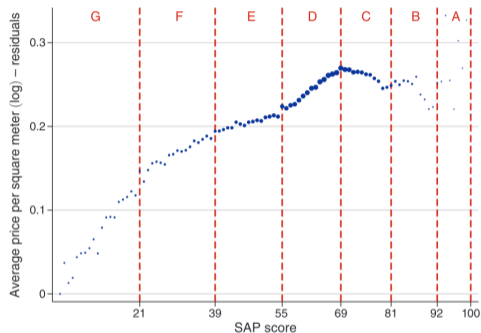
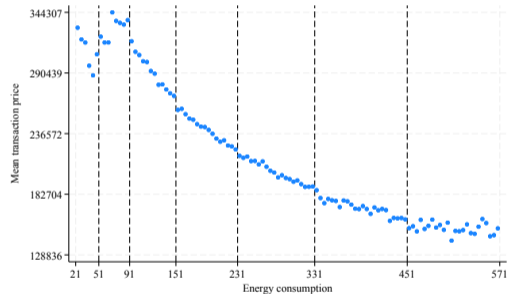


FIGURE 4. PRICE PER SQUARE METER (LOG) RESIDUALS BY SAP SCORE

(A) Sejas-Portillo et al., AEJ Policy, 2025



(B) Lu & Spaenjers, Real Estate Economics, 2025

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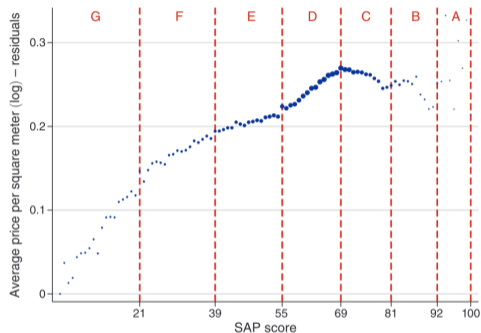
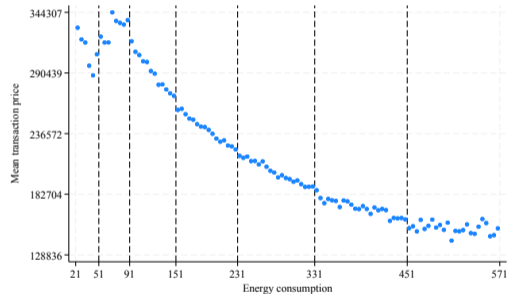


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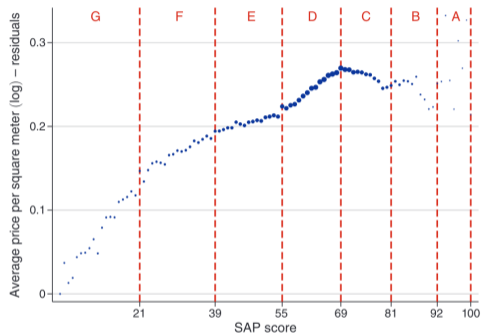
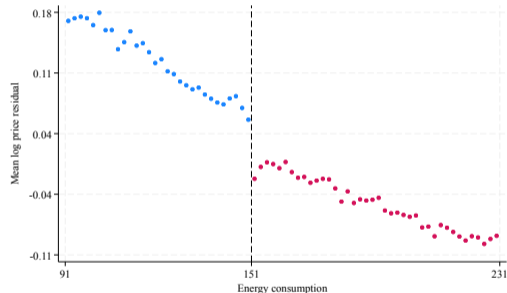


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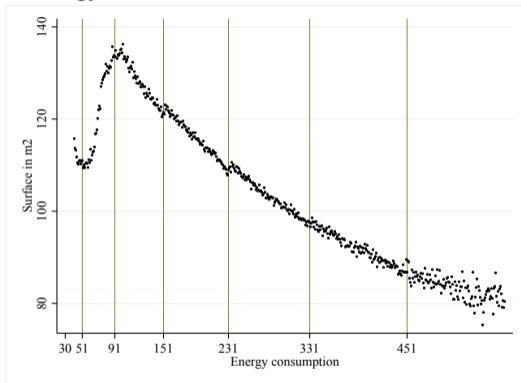
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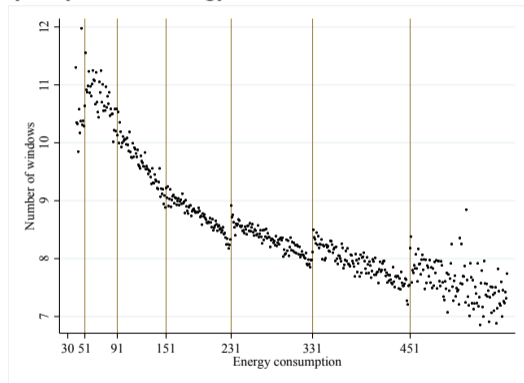
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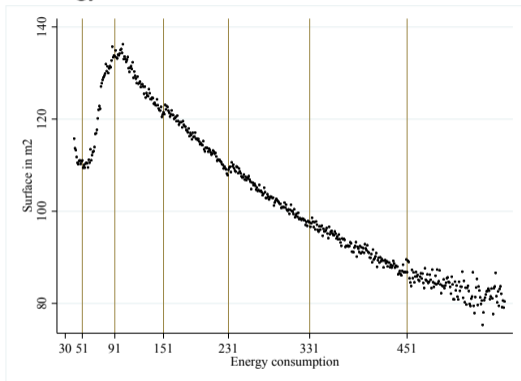
(A) Surface



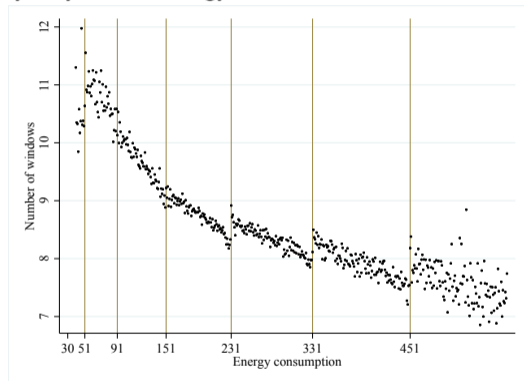
(B) Number of windows

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(A) Surface



(B) Number of windows

- ▶ How do you convince readers that your controls pick up all relevant (i.e. utility-bearing) differences in characteristics?

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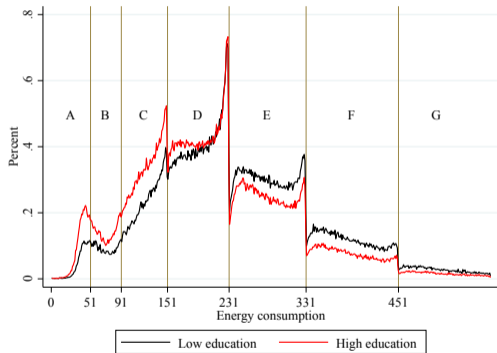
- ▶ Not sure that I'm reassured by additional analysis meant “to rule out that unobserved dwelling characteristics may be driving the energy premium”
- ▶ For example, premium persists—and is even larger—in sample of new properties: “This suggests that retrofit value does not drive the energy premium”
- ▶ But energy-inefficient new houses are very different from energy-efficient ones.

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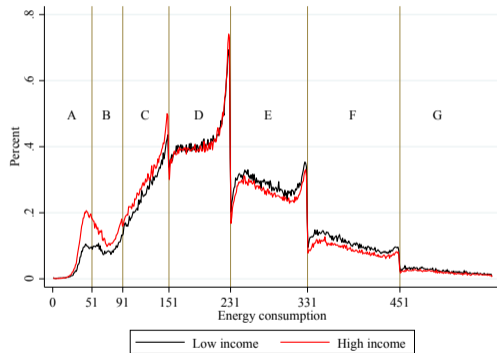
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- ▶ Sorting on unobservables may be different in different areas



(A) Low vs. high education



(B) Low vs. high income

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- ▶ Low-rated properties more different in colder regions?

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- ▶ Conclusion is that homeowners accept lower returns for greener dwellings?
- ▶ Or instead lower expected returns for *further* improvements to *already-relatively-green* buildings?
- ▶ Note that discount rate reflects rate used to discount marginal energy savings from a marginal improvement in the sustainability rating

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- ▶ Differences in capital constraints leading to differences in estimated discount rates?

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- ▶ Results suggest substantial variation in relevant (marginal) discount rates—potentially indicating preference heterogeneity
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- ▶ I'm impressed—but not fully convinced (yet)