



Home Energy Efficiency and the Mortgage Market

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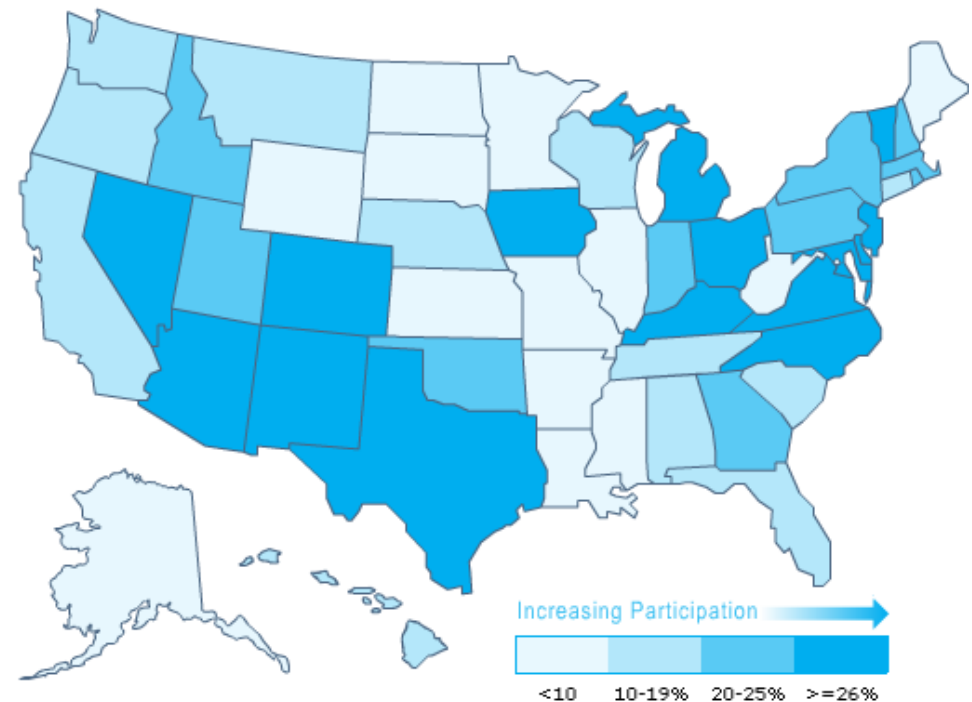


Summary of Presentation

- Background and research questions
- Summary and findings of research
- Overview of needed market components
- Implications for public policy

Background

- Energy is a significant and growing cost of homeownership (~15%)
- Accelerating market adoption of energy-efficient homes, but less accessible for low- to moderate-income homeowners
- Mortgage lending can play an important role in promoting or inhibiting investments in energy efficiency



ENERGY STAR Certified New Homes Market Indices for States

Source: U.S. Environmental Protection Agency

Research Question

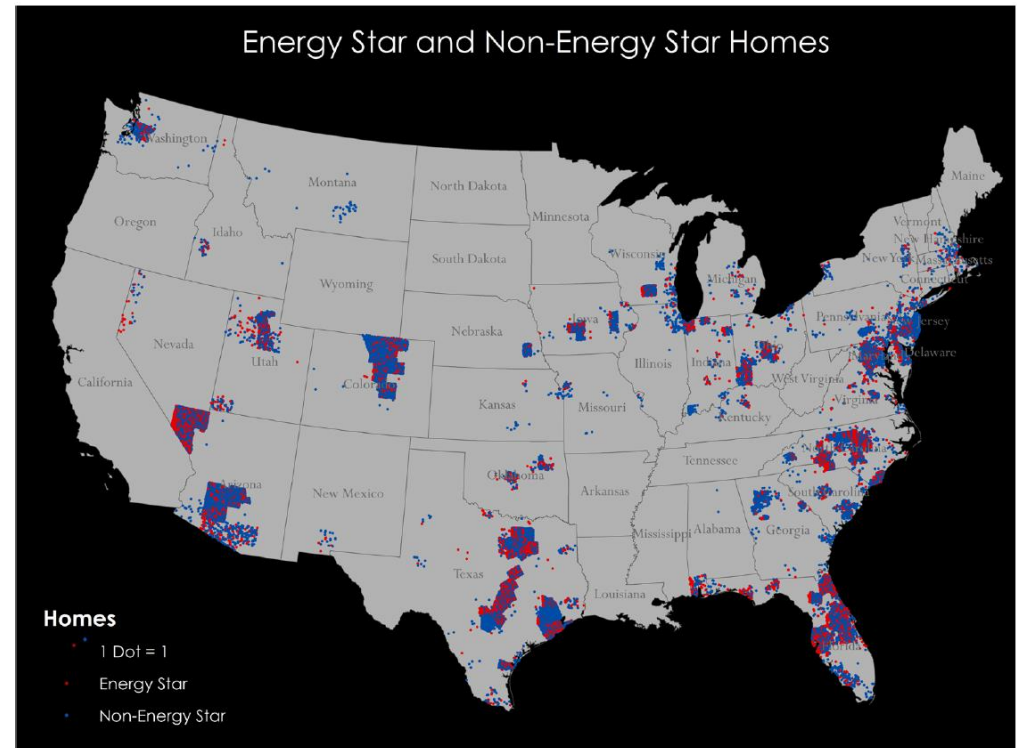
- Is residential energy efficiency associated with lower mortgage default and prepayment risk?

Data Description

- Address database of 200,000+ ENERGY STAR homes
- Matched with CoreLogic database for loan-level information. Restricted to:
 - 30-year fixed-rate mortgages originated between 2002-2012
 - Single-family, owner-occupied homes
 - Some states excluded due to data restrictions
- Yield: 24,944 ENERGY STAR homes
- ~2 control properties randomly selected in the same zip code for each ENERGY STAR home
- Yield: **National sample of 71,000 mortgage loans**

National Sample

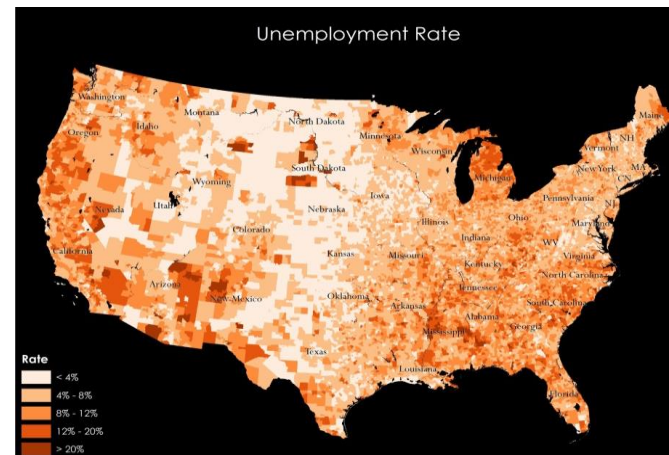
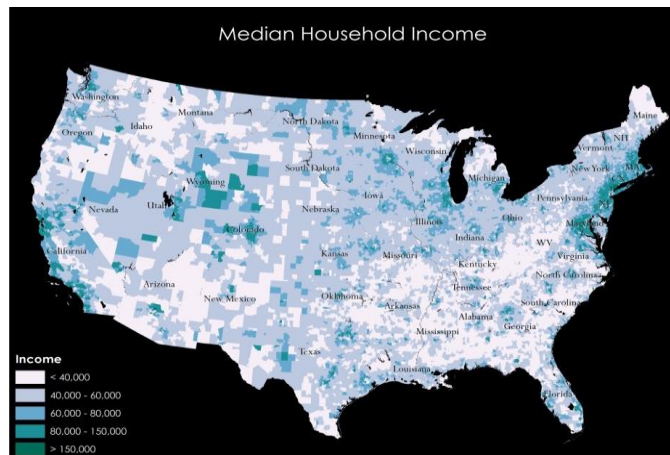
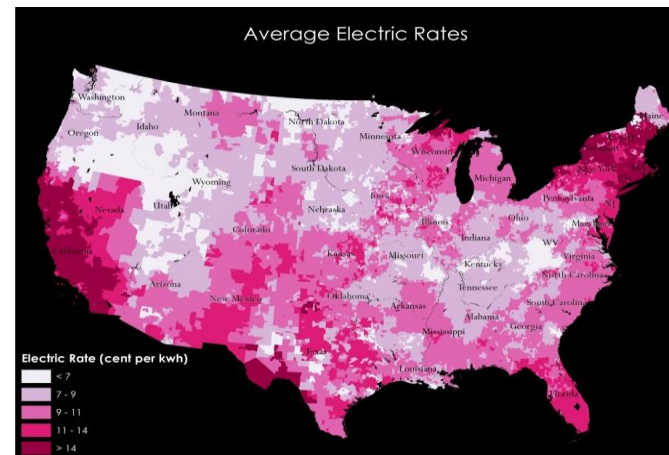
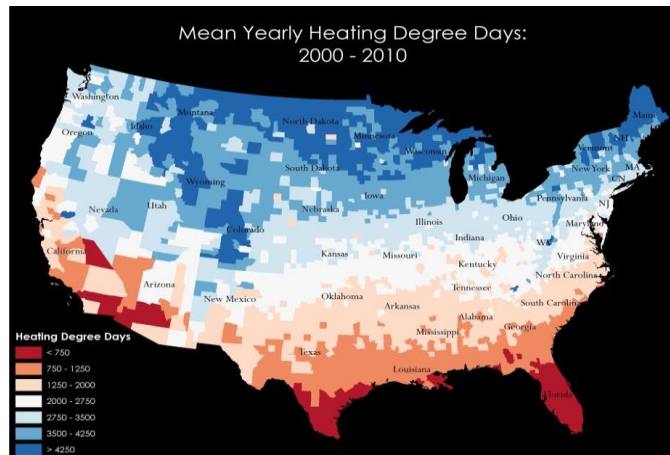
- Draws on loans made in 38 states and D.C.
- Some states (e.g., CA) omitted due to data privacy restrictions, inconsistent addresses, and low market share of HERS-rated homes



Mean Values in the Sample

Variables	ENERGY STAR Homes	Control Group
Sample Size	24,944	46,118
Age of House	4.2	13.2
Area (sq.ft.)	2,283	2,183
Origination LTV	0.93	0.91
FICO Score	705.3	706.1
Time to Default	29.9	30.6
Sale Price	\$221,919	\$218,461

Zip-code Level Variables



The Model

- Study controls for:

- Size of house
- Age of house
- Median neighborhood income*
- Loan-to-value ratio*
- House value relative to the area median value
- Local unemployment rate
- Borrower credit score
- Loan type
- Local weather
- Price of electricity
- State

* Proxies for borrower income

Data Sources: American Community Survey , CoreLogic,
National Climatic Data Center, OpenEnergyInfo

Summary of Findings

- **Default risks are on average 32% lower** on ENERGY STAR homes, controlling for other loan determinants. The more efficient the house, the lower the default risk
- Owners of ENERGY STAR residences **27% less likely to prepay**
- Results are **statistically significant** at a 99.9% confidence level
- Results hold true at a national level, but findings vary greatly by state (reflecting inadequacy of sample size)

Summary of Findings

	BASELINE MODEL		HERS RATING SAMPLE	
	Default	Prepayment	Default	Prepayment
ENERGY STAR Certification	--	--	N/A	N/A
HERS Rating	N/A	N/A	++	++
FICO score	--	++	--	++
Origination Loan-to-Value Ratio	++	--	+	--
Age of the House	--	--	-	--
Loan Type	++	++	++	++
Neighborhood Unemployment Rate	++	--	+	--
Neighborhood Income	++	++	++	+
House value/ Area Median Sale Price	--	++	--	+

Note: ++, -- represent statistically significant results and +, - represent insignificant results

What does this mean for mortgage lending?

- Lenders could include the slightly higher upfront costs in the mortgage, if the monthly savings more than offset those costs.
- Debt-to-income ratios could be adjusted to reflect the lower-than-average monthly operating costs.
- Energy efficiency renovation options could be included in mortgages for existing homes and refinances.

Action Plan

- SAVE Act
- Regulatory action
- White House Task force
- Green MLS/Appraisal Addendum
- Aggressive training and marketing



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