

# Evidence of consumer response to energy efficiency rating disclosure

Reporting on research: Does Voluntary Disclosure Create a Green Lemon Problem? Energy-Efficiency Ratings and House Prices

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# ACT Energy Efficiency Rating (EER) Disclosure Program

- Mandatory disclosure vs. voluntary disclosure
  - *Longest running mandatory disclosure program in the world*
  - *Covers both properties for sale and for lease*
  - *EER has to be disclosed in advertising information*
- *How do consumers' respond to the EER?*
  - *Sales?*
  - *Rentals?*
  - *Are particular energy efficient features valued?*

# Research Approach

**1. A comprehensive hedonic model** was used to estimate the effect of the Energy Efficiency Rating on the residential rental value and the sales prices.

- The implicit prices of property attributes and the effect of EERs on sale prices and rents can be found using a hedonic regression of the following functional form:

- $$P_{it} = \alpha_i + \sum_{j=1}^J \beta_j X_{jit} + \sum_{k=1}^K \delta_i SU_i + \sum_{t=1}^T \gamma_i C_t + \sum_{l=1}^L \theta_i E_{it} + \mu_{it},$$
  
(1)

- where

- $P_{it}$  is the sale or rental price of the property (the natural log of the sale price or the log of the weekly rent in Australian dollars),
- $X_{jit}$  is a vector of variables representing area and physical characteristics,
- $\beta_j$  are the parameters to be estimated and  $SU_i$  is a set of indicator variables controlling for suburb-level unobserved heterogeneity.
- $C_t$  contains time-fixed effects for each quarterly observation, and  $u_{it}$  is a random error and stochastic disturbance term that is assumed to be normally distributed with a mean of zero and a variance of  $\sigma_2$ .
- The variables of interest are captured using a set of indicator variables for EERs with parameters  $\vartheta_i$  to allow for non-linear variations in the effects of energy efficiency on prices.

**2. 2-stage Heckman model** - to account for the possibility that non-disclosure of EER information, particularly in the rental market, is systematic rather than random

- Stage 1:  $D = \alpha + \sum \beta_i X_i + u$
- Stage 2:  $P_{it} = \alpha_i + \sum_{j=1}^J \beta_j X_{jit} + \sum_{k=1}^K \delta_i SU_i + \sum_{t=1}^T \gamma_i C_t + \sum_{l=1}^L \theta_i E_{it} + \varepsilon_{it}$
- $D = \begin{cases} 1 = \text{EER is disclosed} \\ 0 = \text{EER is not disclosed} \end{cases}$
- Here,  $X_i$  represents a vector of regressors used to predict the characteristics that lead to non-disclosure

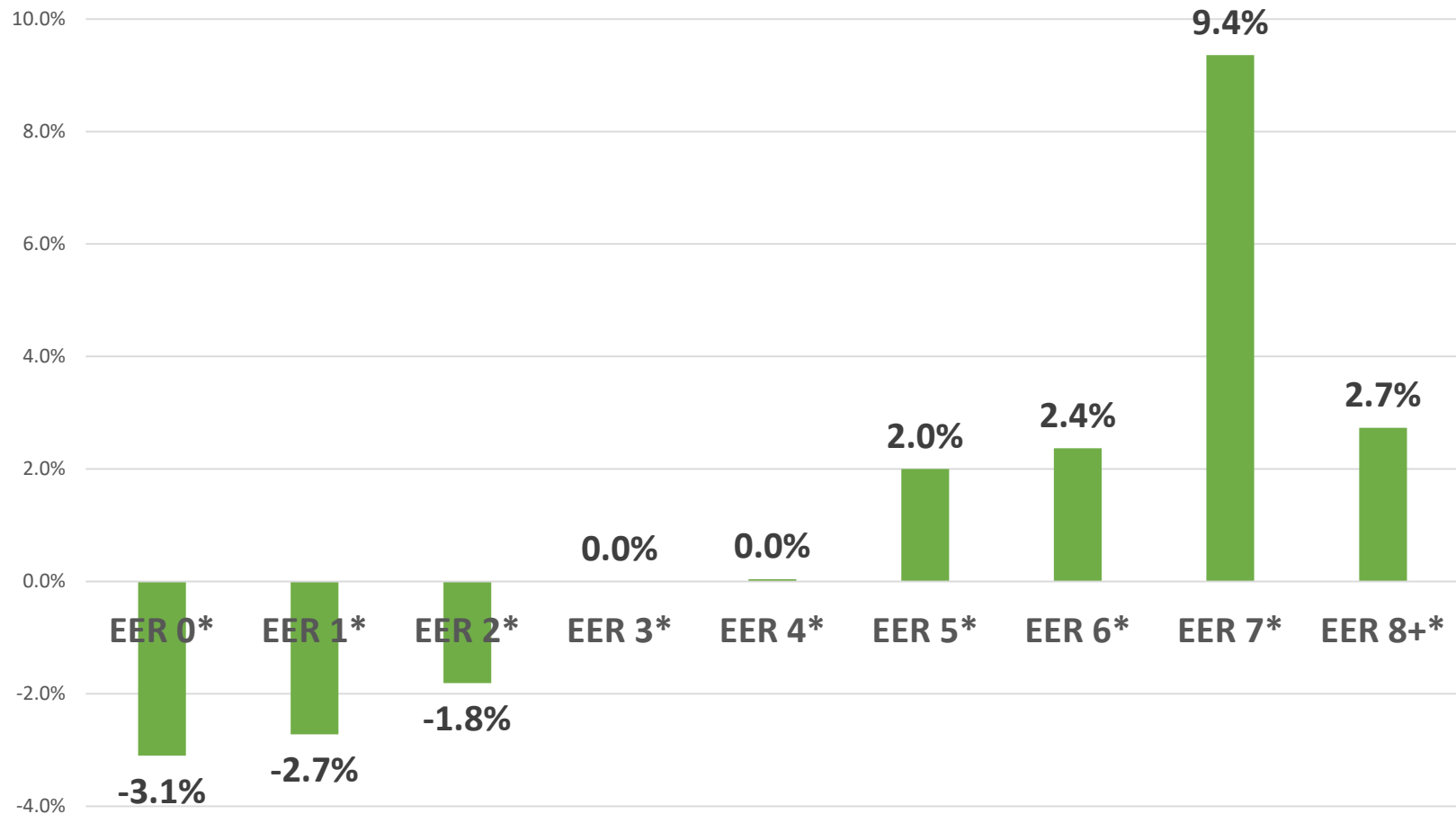
# Data

- Data acquired through the Australian Property Monitor
  - Sales transactions 31,061
  - Rental transaction 67,607
  - Between Jan 2011 – Dec 2016
  - Unique property information not generally available
  - Data mining of property descriptions
  - Disclosure of EER ratings

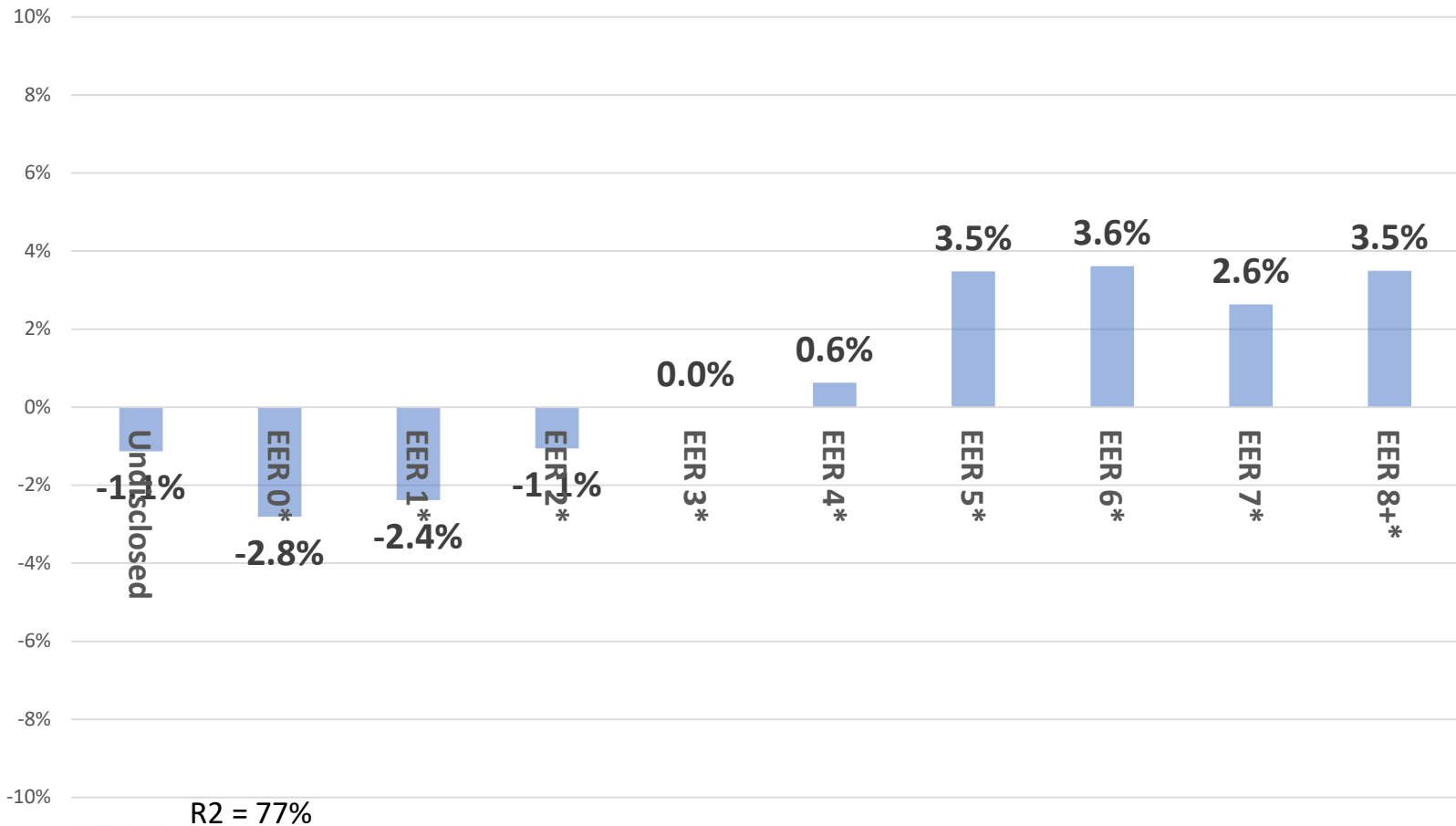
# Summary Statistics

EER	No. of Sales Transactions		No. of Rental Transactions	
Not Disclosed	244	1%	48,576	68.2%
0	1,664	5%	5,629	7.9%
1	5,705	16%	968	1.4%
2	6,223	17%	1,233	1.7%
3	4,386	12%	1,252	1.8%
4	5,515	15%	2,859	4.0%
5	5,393	15%	4,684	6.6%
6	6,174	17%	5,268	7.4%
7	247	1%	516	0.7%
8	93	0%	199	0.3%
9	10	0%	26	0.0%
10	0	0%	5	0.0%

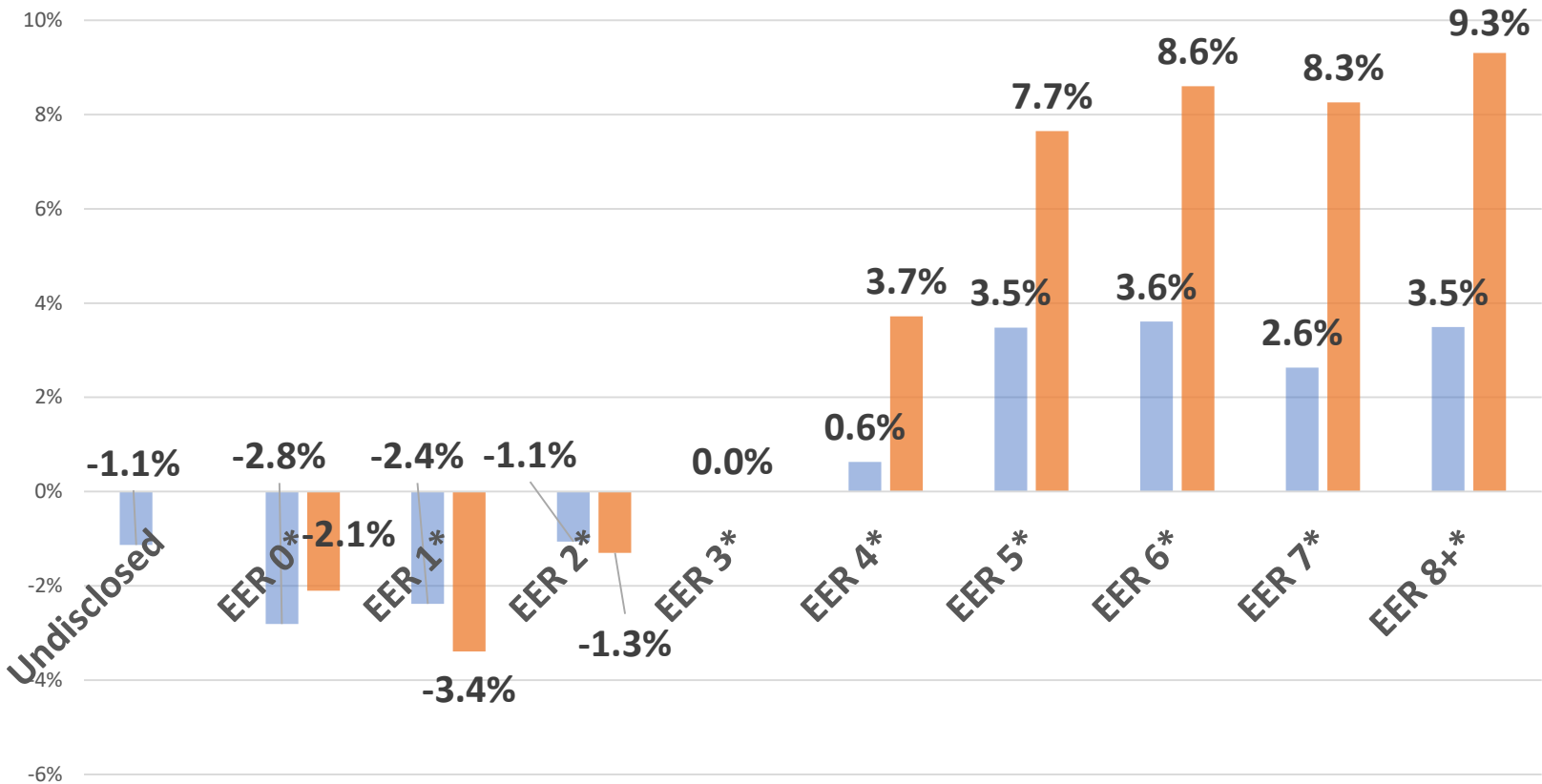
# Analysis of the Sales market



# Results: Analysis of the Rental Market



# Comparison if non-disclosure removed





# Analysis of Individual Dwelling Features

Results	Sales Analysis	Rental Analysis
Observations	31,015	59,336
Solar PV	+1.9%	+5%
Solar hot water	+0.9%	+2%
Heating Gas	-1.5%	-1%
HG - Central	+0.6%	+1%
Heating Elec	-4.5%	-4%
HE - Central	+2%	+2%
Heating slab	+10%	+10%
Reverse Cycle	+5%	+2%
Double Glazing	+10%	+9%
Insulation	+3%	+2%

# Conclusion

- Capitalisation of EER and individual features in the home
  - Sales
  - Rentals
- Loop-holes have potentially created a quasi-voluntary reporting in the rental market
  - Which may lead to moral hazard/asymmetric information / suppression of EE information

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- Published – *Energy Economics*
  - <https://www.sciencedirect.com/science/article/pii/S014098831830166X>
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