



Does voluntary disclosure create a green lemon problem? Energy-efficiency ratings and house prices

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ABSTRACT

This paper seeks to elucidate whether high levels of non-disclosure lead to adverse market outcomes in the form of the well-known lemons problem. It also empirically tests whether energy-efficiency ratings (EERs) are reflected in both housing sales prices and rents in the Australian Capital Territory, the only Australian housing market with mandatory ratings for all dwellings at point of sale or lease. Using a comprehensive dataset of sale and lease transactions during the period 2011–2016, a hedonic framework is applied. The analysis confirms that both the reported energy-efficiency levels and other sustainability-related characteristics that are not part of the formal rating assessment influence the pricing of both sales and rental transactions. Characteristics such as heating and cooling systems and the presence of solar power generators are significantly reflected in rents and sales prices, as tenants and buyers are likely to estimate their expected utility costs based on the EER. It is also shown that the option of leaving the EER of a rental property unreported presents a moral hazard for landlords of sub-standard properties, in that the likelihood of EER disclosure increases in line with the number of energy-efficient features of a property as revealed in the marketing material. The analysis also reveals that socio-economically disadvantaged areas suffer from disproportionately higher levels of EER non-disclosure, potentially constituting a ‘double disadvantage’ of non-disclosure and low-energy efficiency dwelling stock. From a market and asset-pricing perspective, it thus seems preferable to extend the requirement to obtain and present a valid EER to the rental market.

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1. Introduction

Many countries have adopted mandatory disclosure of energy-efficiency levels, principally to raise awareness of the environmental and cost implications of energy use, and to move real estate markets towards a more sustainable building stock. The residential market is of crucial concern to policymakers, not only because it contains the vast majority of buildings, but also because decision-making in this market is subject to non-market decision criteria and hence potentially driven more by household lifestyle choices than by cost considerations. This contrasts with, for example, the commercial real estate sector, in which cost considerations and income generation are major drivers in decision-making, making the pursuit of efficiency gains more likely. Within the residential market, the rental sector has recently received increased attention as a result of specific concerns in relation to this market compared with the owner-occupied sector. For example, the split-incentive problem has been identified as a major obstacle to upgrading the rental stock. This problem arises because landlords have

no incentive to invest in the energy efficiency of their dwellings if tenants are responsible for energy costs, which is the case in many countries, including Australia and various countries in Europe and Asia. There is no simple solution to the split-incentive problem. Including average energy costs in the rent, for example, creates a different set of problems, notably excessive energy consumption as tenants are able to ‘socialise’ the excess cost, as discussed by [Levinson and Niemann \(2004\)](#), with equally detrimental economic and environmental outcomes.

To identify the effects of energy-efficiency disclosure, both voluntary and mandatory, this study examines sales and rental transactions (31,061 and 67,607 transactions, respectively) in the Australian housing market over a five-year period, using detailed information on property characteristics in the Australian Capital Territory (ACT). This is the first study in Australia to examine both property sales transactions and the rental market with regard to pricing and time on market. The rental analysis examines the implications of limited disclosure and investigates whether particular features of dwellings encourage rating disclosure. This has important implications, both in Australia and internationally, for policymakers responsible for deciding whether environmental rating schemes in the built environment should be implemented and, if so, whether they should be mandatory or voluntary. This study attempts to answer these questions empirically by exploiting

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a unique quasi-experimental setting in the ACT, where energy-efficiency disclosure is mandatory and nearly universally implemented in the property sales market, but is de facto voluntary in the rental housing market. By comparing pricing and other market outcomes for the residential sales and rental markets in the ACT, the effect of mandatory versus voluntary disclosure can be estimated. A further pertinent feature of this study is access to detailed information about property characteristics and marketing material in the ACT, enabling the construction of a proxy measure for energy-efficiency characteristics that can be used to investigate the factors leading to non-disclosure and suppression by landlords of information regarding energy efficiency. Finally, this study also contributes to the debate on the social equity dimension of domestic energy efficiency by analysing whether poorer neighbourhoods and households are adversely affected by insufficient provision of information and a low supply of affordable energy-efficient stock.

2. Energy-efficiency disclosure in the Australian property market

Building energy consumption is responsible for a significant proportion of emissions globally. An expanding population and increased appetite for housing in Australia mean that energy use will continue to escalate in this country. Climate-related environmental change will lead to rising temperatures and a greater incidence of extreme weather events (periods of hot and cold weather, more cyclonic activity, higher rainfall, and stronger winds) in Australia, further increasing the demand for energy to meet comfort requirements and expectations. Currently, Australia's National Greenhouse Gas Inventory indicates that per capita emissions are reducing; however, Australia's population is rapidly increasing, hitting 24 million in 2016 and continuing to rise by one person every minute and 24 s (ABS, 2016; Coleman, 2017). Further, between 1990 and 2016, emissions related to electricity consumption demonstrated the highest level of growth, at 49.2%, although there is no direct relationship with housing energy use (Commonwealth of Australia, 2016; Patel & Woodley, 2016). A study by the Commonwealth of Australia (2008) examining residential energy use predicted that between 1990 and 2020, the number of occupied residential buildings will increase by 61%. Further exacerbated by consumption habits that are increasing the average dwelling size, this will result in an increase in residential floor area of 145%. When considered from an energy-consumption perspective, this equates to a 56% increase in residential energy consumption (Commonwealth of Australia, 2008). To counteract the challenges posed by an increasing population and high-energy use dwellings, both existing and new dwellings must become more energy efficient.

For Australia to meet its emissions targets, substantial efforts are required to minimise energy consumption, particularly in the residential sector, which has been identified as a primary source of energy consumption and emissions. Currently, the lack of consideration given to improving energy efficiency in existing residential stock, which comprises the bulk of housing in Australia, is rendering efforts to minimise energy consumption in residential buildings inadequate to meet the required targets (Dalton et al., 2008). The majority of current schemes focus on new dwellings, which comprise only approximately 2.3% of housing stock, or those undergoing substantial renovation or extension (ABS, 2015). These properties are captured through the National Construction Code, which requires a modelled thermal-performance assessment and a minimum six-star rating under the Nationwide House Energy Rating Scheme (NatHERS), and by the BASIX program for new homes in New South Wales. However, ratings systems for existing housing stock have experienced limited uptake in Australia. In 2010, the Queensland Government introduced a “sustainability declaration”, to be provided at the point of sale; however, this scheme was retracted in 2012 as a result of poor uptake. The only scheme addressing existing dwellings that is currently operating in Australia is

the ACT's mandatory disclosure program, one of the longest running residential disclosure programs globally.

The ACT's mandatory energy-efficiency disclosure scheme for dwellings for sale or lease was developed in response to the finding that ACT households are among the largest energy consumers per capita in Australia, likely due to the weather extremes in the ACT (DEWHA, 2008; Pitt and Sherry, 2014). The legislated requirement is to have an energy-efficiency rating (EER) for dwellings to determine the thermal performance of the dwelling; this EER then has to be displayed through any media and advertising associated with the property transaction, be it the sale or leasing of a dwelling. The requirement to disclose a property's EER has been in place for rental properties advertised for lease since 1997 through the Residential Tenancy Act (1997), and for properties advertised for sale since 1999, later revised under the Civil Law Act (2003) (Sale of Residential Property). Not displaying the EER at point of sale is deemed an offence, incurring a fine. An offence can comprise an EER not disclosed on the advertisement; or the provision of an EER statement which is found to be false or misleading. Further on receiving the EER statement for the property the prospective purchaser is required to certify in writing that they have received it, should the vendor fail to comply with the provision there is a further penalty where the vendor is liable to the purchaser of 0.5% of the purchase price. Consequently, the penalty for not disclosing the EER statement in a property for sale is financially detrimental to the vendor (Civil Law Act, 2003). The Residential Tenancy Act (1997) has similar penalties associated, however, has a number of elements that create loopholes where the disclosure of the EER can be eluded. Firstly, if the dwelling does not have an existing energy efficiency rating for the dwelling, there is no requirement to display. Secondly, “Subsection (1) does not apply if the person has a reasonable excuse”, subsection 1 being the requirement to publish an EER in advertisements for lease of the premises (pg 12). The current EER system is modelled on the NatHERS system, which requires a thermal-performance assessment of the building, excluding appliances, predominantly using first-generation NatHERS software for assessments of existing dwellings. This is one of the longest running energy-efficiency disclosure programs; Energy Performance Certificate (EPC) ratings in Europe were only enacted in or after 2007 for residential properties.

An Australia-wide study found that the ACT had the highest level of energy-efficiency improvements to existing owner-occupied dwellings (Australian Bureau of Statistics, 2011), likely as a result of the ACT's mandatory disclosure requirements, which had by this time been in effect for more than a decade. Further, an earlier study found that the EER influenced sales prices, identifying that for each half-star improvement in the EER, house prices increased by 1.23% in 2005 and 1.91% in 2006 (Australian Bureau of Statistics, 2008). These results suggest that the mandatory disclosure program is influencing housing-related behaviour in the ACT: owner occupiers are increasing the energy efficiency of their dwellings, and purchasers are demonstrating that they perceive value in the EER through higher purchase prices. However, residential rental properties, which comprise 30.9% of properties in the ACT, typically underperform compared with owner-occupied stock in terms of energy efficiency, and investment by landlords in energy-efficiency improvements is limited (ABS, 2011; Pitt and Sherry, 2014). In addition, the EERs of rental properties are significantly less likely to be disclosed than those of properties advertised for sale. This is likely a result of the original legislation relating to EERs in the Residential Tenancies Act 1997 (Division 2.2 11A, p. 10), which states that the disclosure of an EER in an advertisement is only required for an *existing* rating. Lee and Wang found that while at least 58.4% of dwellings advertised for rent had an EER, only 37.5% of rental listings displayed an EER, with higher ratings more likely to be disclosed. Adding to the problem, policing of non-disclosure in the rental market has been lax, constituting only a letter (which is often not even sent) reminding agents of their obligations (Lee and Wang, 2010). Consequently, the energy efficiency of

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