

ASSESSING THE IMPACT OF SUSTAINABILITY-RELATED FEATURES ON RESIDENTIAL PROPERTY PRICE

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ABSTRACT

Problem/Purpose – The paper assesses the impact of sustainability-related features on the house sales price and listing periods. This paper also aims to investigate whether there is an increasing house price for the properties with recorded sustainability-related features in the repeated sales.

Design/methodology/approach – This paper is based on the analysis of the repeated transaction sales for Kelso, a top-selling suburb with the highest number of sales transactions in Townsville, Australia from 2004-2014, and compares the level of sustainability-related features to property sales price and listing periods.

Findings – The results show that among 215 houses with repeated sales, there are only 22 houses that have recorded sustainability-related features. These 22 houses have shorter listing periods from years 2011 to 2013 and a slightly higher percentage change in the repeated sales price from 2010 (with second sales happened in more than 6 years' timeframe) compared to the other houses without recorded sustainability-related features.

Research limitations – As this research only focused on one particular suburb within this region, analysis of longer sales periods and more suburbs will increase the validity of the results.

Takeaway for practice – The findings are likely to be applicable to residential properties and will inform valuers to take sustainability-related features into consideration in the valuation of their client houses. This paper could provide empirical evidence to support real estate agents to communicate sustainability-related features to potential buyers/sellers to put forward sustainability-related features for getting the highest selling price.

Originality/value – This paper focuses on the effect of sustainability-related features on the repeated sales data of Kelso (a suburb in Townsville, Australia). All houses are located in the same suburb which eliminates potential location premium or discount factors in housing price determinants.

Keywords: residential property, house prices, repeated-sales, sustainability-related features

INTRODUCTION

A series of sustainability discussions have arisen since early 1960s (International Institute for Sustainable Development 2007). Through almost three decades of efforts, sustainable development was commonly-accepted in the definition of “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” in Brundtland Report 1987 (World Commission on Environment and Development 1987). These global efforts and discussions together highlight that a sustainability strategy is essential in managing social, economic and environmental dimensions (Wang & Sarkis 2013). Critically, this “triple bottom line” concept argued that sustainability can only be achieved by balancing these three dimensions (Xue 2013).

This resulted in the increasing awareness and interests from practitioners and policy makers on the way to implement sustainable housing (Huang & Yin 2015). Different countries, including Australia, Germany and United Kingdom, had introduced new residential construction standards to enhance the level of sustainability in both design and construction stages. However, these standards are being considered as the minimum standards for builders and investors in constructing the property and there is lack of evidence in showing that builders and investors see the needs for investing much beyond these minimum regulations. In this case, various governments have tried market voluntary approaches to improve the energy efficiency and sustainability of housing stock, such as the Photovoltaic Rebate Program introduced by Australian Government in 2000s (Macintosh & Wilkinson 2011).

The implementation of different efforts is particularly important to enhance the sustainability in the property sector which is facing challenges by rapid urbanisation (Huang & Yin 2015). However, the property market actors, such as buyers, sellers, valuers and real estate agents are not fully supporting sustainability initiatives as there is a lack of financial justification on the economic value of these sustainability elements.

Therefore, it will be beneficial to have a closer look on the trends of the house's selling price in the current property market, for investigating a potential relationship between sustainability awareness and house price. The aim of this paper is to investigate the existence of the increment on house price for properties with recorded sustainability-related features in the repeated-sales transaction. This paper is based on the analysis of the repeated transaction sales for Kelso, a suburb in Townsville, Australia, from 2004 – 2014. It compares the level of recorded sustainability-related features in relation to the changes in property sales price and listing periods. The result could potentially provide empirical evidence to support real estate agents to communicate sustainability-related features to potential buyers/sellers. Valuers could potentially include these features in the valuation process.

SUSTAINABLE HOUSING – CODES, REGULATIONS AND SCHEMES

Different kind of building codes and regulations are required to set minimum requirements for the construction of property. The policies introduced in this section address sustainability issues, aiming to 'improve' the design, construction and operation of houses (Dong & Wilkinson 2007).

In the United Kingdom (UK), the Code for Sustainable Homes was introduced in 2007 to enhance the sustainable housing practice for new homes from 2008. This code was linked to Energy Performance Certificates (EPCs), which were required for the sale of all new homes to provide buyers with information in the area of energy and/or carbon performance of the houses (Department for Communities and Local Government 2006; Watts, Jentsch & James 2011).

In Germany, two types of Energy Certificates are compulsory to be provided at the point of sale or lease:

- (a) Demand Certificate covers the energy efficiency aspects of the building, including thermal efficiency, furnace (central heater) and windows efficiency;
- (b) Usage Certificate covers the actual energy usage, such as heating demand, hot water demand and losses by the local water heating system, of a house in the past three years.

(Bryant & Eves 2012; Schettler-Köhle & Kunkel 2010)

Following European countries lead on the sustainability approaches on residential property, specifically focusing on the area of energy efficiency, Australia introduced codes and regulations in relation to sustainability.

The Australian National Construction Code (NCC) introduced minimum standards for building energy efficiency for detached housing (Volume Two of NCC - Class 1 and Class 10 Buildings) in 2003, requiring a three star energy rating according to the Nationwide House Energy Rating Scheme (NatHERS) (ABCB 2010a). This measure relates to the thermal efficiency of the building envelope, that is, how much mechanical energy is required to be pumped into or out of the building in order to maintain comfortable temperatures for occupants. In 2006, the minimum energy efficiency requirements were extended to five stars, and included multi-residential buildings as well as detached housing (ABCB 2010b). The minimum standards were extended again in 2010 (to 6 stars) (NSW Government 2010).

Although the Australian NCC provides minimum guidelines and requires certain performance standards to be met, there are questions as to whether the regulations are delivering good practice. The findings of a national review on the energy efficiency requirements, commissioned by the Australian Government, revealed numerous issues of non-compliance with the regulated energy performance requirements and lack of best practice in the Australian housing industry (State of South Australia 2014).

In terms of state government efforts, Mandatory Disclosure had been introduced in Australian Capital Territory (ACT) and Queensland. It was believed that Mandatory Disclosure may increase public awareness in the area of housing sustainability.

The ACT introduced a form of Mandatory Disclosure as early as 1999, requiring homeowners to obtain an Energy Efficiency Rating (EER), which relates to the space heating and cooling requirements of the house, and to disclose this EER in the sales contract (Lee & Wang 2009). The intent of this regulation was to gauge

the decision making process and whether sellers would consider ways to improve energy efficiency (Youngson 2012).

The Queensland State Government introduced the *Building and Other Legislation Amendment Bill 2009* to enact mandatory disclosure relating to certain environmental features of residential properties at the point of sale (Bryant & Eves 2012). The resultant Sustainability Declaration, which came into force in January 2010, was a checklist that identified a property's social and environmental sustainability features into four key aspects: energy, water, access and safety (Department of Infrastructure and Planning 2010; Eves & Bryant 2011).

The requirement for a Sustainability Declaration was rescinded by a change of government in June 2012. A survey conducted in 2011, before the rescindment of Sustainability Declaration, perceived that the option for sellers to leave some of the sections of the Declaration blank created a disincentive for sellers to complete the whole Sustainability Declaration. The sellers were unwilling to complete the Sustainability Declaration as they perceived they would be liable for the inaccurate information provided (even if this was unintentional). This survey confirmed the government decision for rescinding Sustainability Declaration as its application was not practical and did not fulfil the objective of passing information about sustainability features to future home buyers (Bryant & Eves 2012).

Other than the Mandatory Disclosure, another initiative introduced by the Queensland Government was the Solar Bonus Scheme, known as the Queensland feed-in tariff (FIT), in July 2008. The Solar Bonus Scheme pays households for the surplus electricity generated from household solar photovoltaic (PV) systems that exported to the Queensland electricity grid. The purposes of introducing this scheme were to encourage energy efficiency and stimulate sustainability measures (Zahedi 2010). Customers who applied for this scheme before 10 July 2012 were offered AUD\$0.44 per kWh, while those who registered after 10 July 2012 are offered AUD\$0.08 per kWh (Queensland Government 2015). The dramatic reduction in the FIT may have discouraged some homeowners from installing PV systems however other homeowners may still be encouraged to install PV system to reduce their electricity bills despite lower payments for excess generation.

However, the efforts of these regulations, codes and schemes are not well integrated into the property market. A study of the ACT market in 2010 showed that there was a poor compliance rate (37.54%) in the Australian real estate market (i.e. the EER was not included in property advertisements) and that compliance was greater for higher star rated houses when regulation for those ratings was increased (e.g. when regulation was increased from 3 to 5 stars in 2006) (Lee & Wang 2010).

This hints that sustainability is seldom considered as a major factor in residential property purchasing decision making. There is some evidence from the past that environmental factors are not considered as important as the location factor (Whipple 2006). This is further supported by Reed and Wilkinson (2007) who found that the financial aspect is the most significant factor for house purchase decision making. These studies strongly suggested that buyers were unaware of sustainability measures.

RESEARCH METHODOLOGY

This paper is based on the analysis of the repeated sales transaction for Kelso, a suburb in Townsville, Australia from 2004-2014, and compares the level of recorded sustainability-related features to property sales price and listing periods. As the Australian Government started to introduce minimum standards of three star energy rating for new dwellings in 2003, this paper will analyse the sales transactions which occurred after 2003 to reduce the chance of price fluctuation before and after the new regulation. Townsville is ranked as the fourth most sustainable city in Australia based on consideration of issues of biodiversity, employment, transport and health (Australian Conservation Foundation 2010). With the increasing focusing on sustainability measures, Townsville is being selected in this paper.

Kelso, a suburb located south-west from Townsville City (refer to Figure 1), was chosen as the study area due to the following reasons:

- The suburb is one of the five largest suburbs in Townsville by population
- The suburb is Townsville's top-selling suburb with the highest number of housing sales transactions and repeated-sales over the period of 2004-2014

- The suburb is one of the top three suburbs with the highest median price growth over the period of 2008-2012
- The housing age is very similar across the suburb, having been developed from 1974 until 2012
- Park/recreation areas are well distributed throughout the suburb



Figure 1: Location of Kelso (Google Map 2015)

As shown in Figure 1, Kelso is a suburb along Riverway Drive in Townsville, with an area of approximately 5km². This particular suburb is the only suburb along Riverway Drive with homes backing onto the Ross River (RP Data 2015).

All residential property sales for the period January 2004 to August 2014 were obtained from RPData, a global property services provider, with the site address <http://www.corelogic.com.au>. These sales transactions were collected on the basis of freestanding residential property, i.e. houses. Neither townhouses nor units were being included in this paper.

These sales data were further filtered into repeated-sales data, which resulted in 221 houses with 515 sales transactions from the period of 2004-2014. Extra manual search had been carried out on all houses to determine the existence of the sustainability-related features on the property, such as size of solar panel and watering systems. This was carried out by looking into the real estate advertisements (from RP Data) of selected properties to identify the property features. Some of the properties had no advertisements being recorded in the RP Data and hence be classified as properties without recorded sustainability-related features. There is possibility that these properties do have sustainability-related features but not being recorded in the database.

Repeated-sales transactions with more than 100% change in price per year were considered as outliers and were not be included in the analysis. As a result, there were 22 houses with 50 sales transactions classified as properties with recorded sustainability-related features; 193 houses with 448 sales transactions classified as properties without recorded sustainability-related features. In other words, six houses and 17 sales transactions had been eliminated after considering on the repeated-sales transactions with more than 100% change in price per year.

These sales data were analysed to discover the changes in sales price and listing periods based on two categories: properties with recorded sustainability-related features and properties without recorded sustainability-related features. Only one suburb, Kelso, was selected in this study due to the relatively similar

socio-economic nature of the location which eliminates locational and service differences that can influence residential property prices and price movements.

RESULTS AND DISCUSSIONS

Property Sales

The median house price is important to indicate the trend and condition of the property market. Figure 2 shows the median house price over the period of 2005-2014 in Kelso and Townsville City. It shows that in these 10 years, the median price for residential property market in Kelso followed the trend in Townsville City. This means that the property market in Kelso follows a similar property cycle in Townsville.

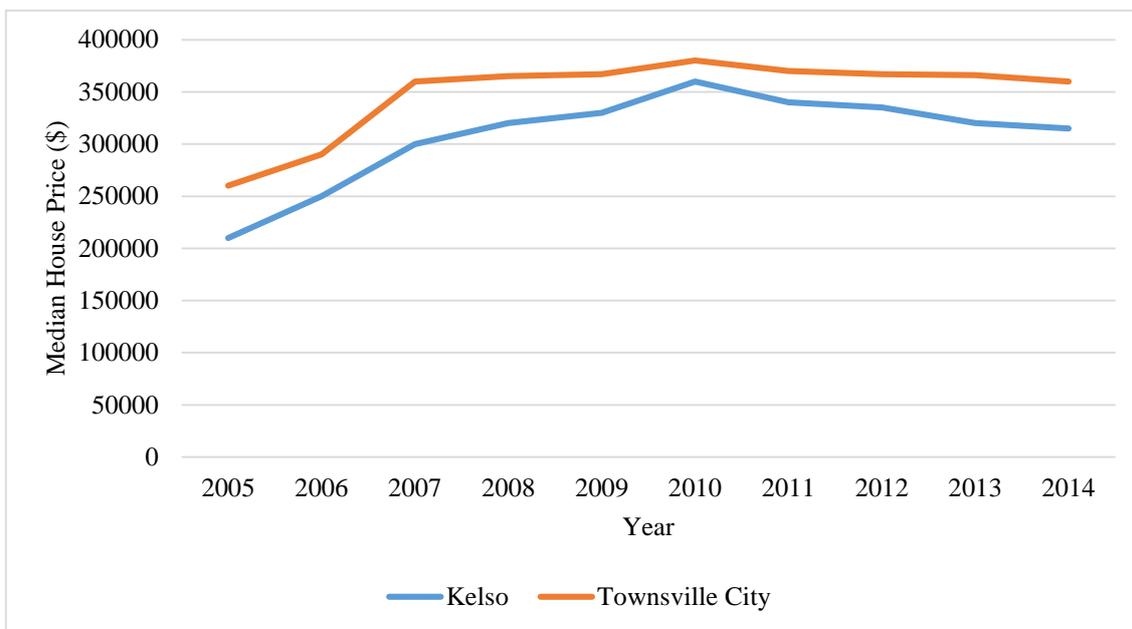


Figure 2: Median House Price of Kelso and Townsville: 2005-2014 (RP Data 2015)

As shown in Figure 2, there was an approximately 19% price growth per year on Kelso's median house price from 2005 to 2007. This trend slowly decreased to 6% price growth per year from 2007 to 2010. Starting from 2010, Kelso's median house price decreased by 3% per year until 2014. The decrease in Kelso's median house price growth from 19% to 6% might be influenced by the Global Financial Crisis (GFC) which started in 2008.

Repeated-Sales: Changes in Property Price

According to Figure 2, the peak period of the house price in the period 2005-2014 occurred in year 2010. Therefore, the repeated-sales analysis had been analysed based on the periods before 2010 and after 2010. This is to ensure the precision on the analysis of the changes in property price which occur in either boom period (pre-2010) or trough period (post-2010). If a property had sales transactions that occurred under two different periods, the year of the second sales transaction, i.e. the most recent period, was counted instead of the first year. Table 1 shows the changes in the repeated sales price in the period of pre-2010 and post-2010.

Table 1: Repeated-sales: Price Changes Per Year

Period	Time frame between repeated sales (Year)	Property with recorded sustainability-related features (%change/year)	Property without recorded sustainability-related features (%change/year)
Pre-2010 (2004-2009)	0.1 – 1	4%	25%
	1.1 – 2	25%	16%
	2.1 – 3	14%	14%
	3.1 – 4	33%	16%
	4.1 – 5	-	14%
	5.1 – 6	6%	16%
	6.1 – 7	-	-
	7.1 – 8	-	-
	8.1 – 9	-	-
Post-2010 (2010-2014)	0.1 – 1	-	-
	1.1 – 2	-3%	5%
	2.1 – 3	4%	-1%
	3.1 – 4	-1%	1%
	4.1 – 5	-1%	6%
	5.1 – 6	1%	2%
	6.1 – 7	9%	5%
	7.1 – 8	8%	7%
	8.1 – 9	4%	11%

As shown in Table 1, the percentage of house price changes per year is more stable in post-2010 period in both categories of properties with and without sustainability-related features. Property with sustainability-related features had greater price increment in the period of pre-2010 compared to post-2010.

Overall, the house price increment in a property without sustainability-related features is higher than the property with sustainability-related features. This might be attributed to the large number of sales transactions of properties without recorded sustainability-related features compared with properties with recorded sustainability-related features. This further indicates that the property industry, including real estate agents and property investors, did not recognise the importance of sustainability features. There is also the possibility that the real estate agents may not have recognised or recorded sustainability-related features in properties. Real estate agents may not have realised some features including greywater system and rainwater tank are considered as sustainability-related features. This indicates the incomplete information distribution in the housing industry.

Repeated-Sales: Property Listing Period

This section of the paper tracks residential property listings of property with repeated-sales over the period of January 2004 to August 2014. Average listing periods were tracked in terms of number of days to determine housing trends in relation to residential property stock being offered for sale. Individual sales transactions had been classified according to the year on which sales occurred. Table 2 shows the median property size and median house price of the properties with sustainability-related features and properties without sustainability-related features.

Table 2: Median Property Size and Median House Price: 2004-2014

Year	Median Property Size (m ²)		Median House Price (\$)	
	Property with recorded sustainability-related features	Property without recorded sustainability-related features	Property with recorded sustainability-related features	Property without recorded sustainability-related features
2004	2,005	748	235,000	182,500
2005	809	730	238,000	212,000
2006	3,306	789	418,000	249,000
2007	3,397	733	358,500	308,500
2008	4,359	810	495,000	300,000
2009	4,533	722	454,000	312,500
2010		794		317,500
2011	1,954	856	430,000	270,000
2012	3,878	782	470,000	267,500
2013	2,038	679	475,000	282,000
2014		804		269,500

In relation to the median property size, the property size of properties with recorded sustainability-related features is greater than the properties without recorded sustainability features. The median house price of properties with sustainability-related features is at least 10% higher than the median house price of properties without sustainability-related features. From these results, it indicates that property size is one of the determinants on house price. This also indicates that a property with recorded sustainability-related features, which provided solar panel and/or irrigation watering systems, is much more expensive to buy than property without sustainability-related features. It is difficult to determine whether this is just a reflection of the cost of adding these features.

A further analysis on the length of listing periods (number of days) could provide a clearer picture on the property trends. Figure 3 shows the details of the average listing periods, i.e. average days to sell a property, in the two property classifications (properties with recorded sustainability-related features and properties without recorded sustainability-related features) throughout the study period. Although it would be expected that houses with cheaper prices would have shorter listing periods, this has not always been the case in the Kelso property market.

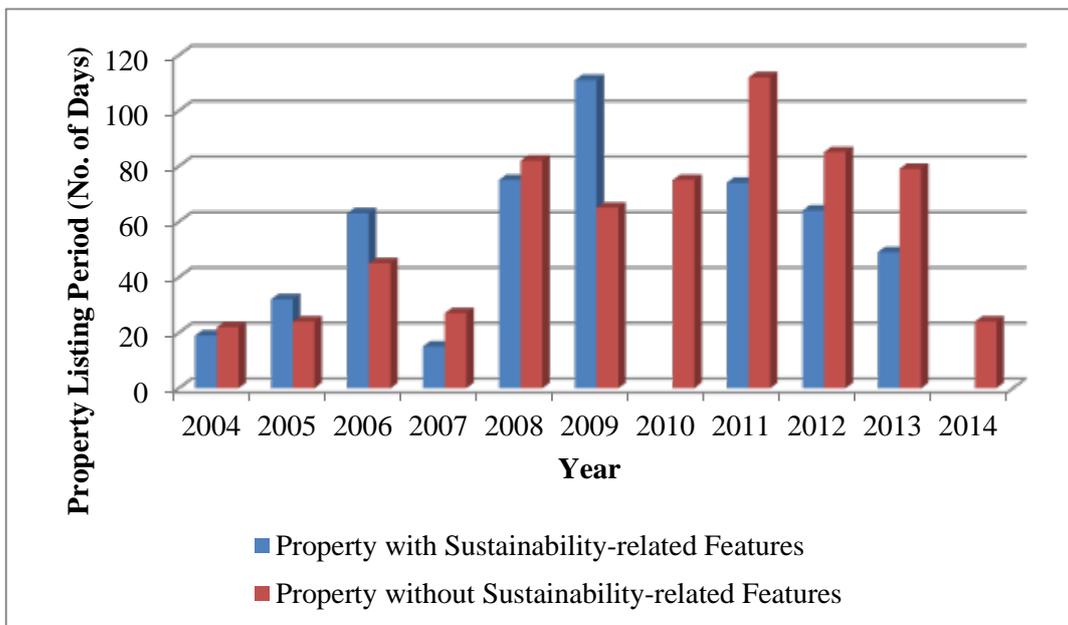


Figure 3: Property Listing Period

As shown in Figure 3, there is no property with sustainability-related features being listed in the market in the years 2010 and 2014. Therefore, these two years have been eliminated in this analysis. The listing period of a property with sustainability features is longer than the property without sustainability features from 2005-2006 and 2009. As shown in Table 2, the median house size and house price of property with sustainability-related features are much larger than the property without sustainability-related features. This can be attributed to the longer listing period due to the lack of interest from the property buyers towards property with sustainably-related features.

However, the listing trend from 2011 to 2013 indicated that properties with sustainability-related features have shorter listing period than properties without sustainability-related features. This suggests a possibility that the government effort, such as the introduction of Queensland FIT in 2008, or other factors, may have increased the market awareness on the value of investing in property with sustainability-related features.

CONCLUSION

This study has provided empirical evidence that the residential property sector may pay limited attention to sustainability-related features of residential properties. However, this is limited by the sample size and the available real estate advertisements in the real estate database (RP Data). In the case study suburb, less than 10% of houses with repeated-sales transactions incorporated sustainability-related features in the housing design, construction and operation. The percentage of house price change per year in the repeated sales on the property with sustainability-related features was much lower than the property without sustainability-related features. Price may still be the most dominant factor for the property investors. As properties with sustainability-related features have a higher selling price, this could hinder property investors from investing too much of their capital into the property. However, from 2011 onwards, there is increasing awareness on the sustainability as the listing period of property with sustainability-related features is shorter than the property without sustainability-related features in the similar location. Although the awareness on sustainable housing construction in the property market has been limited in the past, this study suggests that there is an increasing trend in residential property investors on placing value on properties with sustainability features. Further studies, such as interviews with real estate agents, need to be carried out to provide more solid justification on the real estate markets' opinion on sustainability.

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