Home Buyer Purchase Criteria and Willingness-to-Pay for Green Amenities: An Exploratory Analysis

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ABSTRACT

Researchers are interested in understanding consumer interest in greening their purchase decisions. This article investigates the demographic, housing and green knowledge variables that influence using green status as a purchase decision criteria. It also analyzes the impact of those same variables on consumers' willingness to pay for green amenities. Results confirm that different variables impact purchase criteria and willingness to pay. Notably, knowledge of green accreditations is an important predictor of both use of green amenities as a purchase criteria and as an influencer of willingness to pay.

KEYWORDS:

Decision Criteria, Willingness to Pay, Decision Making

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There is a growing body of research that acknowledges growing consumer interest in ecologically friendly purchases. This has resulted in many increased attempts to understand green consumers. As early as 1974, Kinnear, Taylor and Ahmed (1974) asked the direct question about "ecologically concerned consumers: who are they" (p.20).

Within the green research field, there has been substantial effort in understanding the impact of increasing environmental concern on the residential real estate market (Encinas, Marmolejo-Duarte, de la Flor, and Aguirre, 2018; Goodwin,2011; Tinker, Kreuter, Burt and Bane, 2006). This research has particularly focussed on evaluating demand for green amenities, as this could allow builders to provide green option that are valued by potential buyers (Gibler and Tyvimaa, 2014; Goodwin,2011; Hoffman, Halman, and Ion, 2006).

Most research has used cross-sectional surveys to develop an understanding of the demand and WTP for green amenities. Very few studies have looked at change in environmental housing demand over time (Aroul and Rodriguez, 2017).

This exploratory paper extends prior research in two ways. First, it attempts to clarify consumer interest in green products by distinguishing between consumer purchase criteria and willingness-to-pay. Second, it extends the work of Aroul and Rodriguez (2017) by using four cross sectional surveys over a nine year period to further understanding of how decision criteria and willingness-to-pay are changing over time.

1. Literature Review

There has been an increasing amount of academic research interest in green property demand and value. The literature notes that this research began in the commercial property environment, but has grown on the residential property market (Ahn and Pearce, 2017; Aroul and Rodriguez, 2017; Gibler and Tyvimaa, 2014).

1.1 Desire for green housing

There is evidence that home ownership status has an impact on desire for green housing amenities. Specifically, Goodwin (2011) found that first time home buyers and buyers of new (to be built) homes have higher levels of desire. Interestingly, current research indicates that home buyers under the age of 40 express lower levels of desire for green amenities, though the reasons are unclear Goodwin (2011).

There is also evidence that income levels impact the desire for green amenities in the home purchase process. Goodwin (2011) found that home buyers with household incomes over $100,000 expressed lower levels of desire. Green certifications are also found to be influential in the house purchase decision (Molina, Donn, Johnstone, and MacGregor, 2021)

1.2 Willingness-to-Pay for green amenities

The desire to have green amenities in a home, however, does not necessarily align with an individual's willingness-to-pay (WTP) for those same amenities. And understanding this WTP is of strategic interest to managers (Breidert, Hahsler and Reutterer, 2006); Hofstetter, Blatter and Miller, 2012). This is important because the concept of value may not translate into a willingness to pay for the valued item. This distinction is important (Rettie, Burchell and Barnham, 2013)

Consumer research has found that WTP can also be influenced by the context price that anchors their perceived value (Dogerlioglu-Demir and Kocas, 2014; Hofetetter, Blatter, and Miller, 2012). Bundling of products, so that they buy more to save (Li and Sokolova, 2016).

In green housing research, willingness-to-pay has begun to take hold as an important variable for research. In their 2018 study of 718 housing units, Encinas et al use cluster analysis to understand the Chilean home buyer's willingness-to-pay for energy efficiency using a life cycle of cost perspective. They found that WTP was influenced by income, age, gender, education and family status. They also found that awareness of environmental issues does not necessarily lead to higher levels of WTP. Instead, they note that subsidies may be required. This is supported by the work of Dagher and Itani (2014)

1.3 Consumer decision making

Marketing research has found that consumers who face a want or need follow a decision making process that includes data collection and evaluation of alternatives prior to making a purchase choice. The more important the purchase decision, the more intensive the consumer decision making process will be (Payne, Bettman, and Johnson 1991).

Key to the data collection stage are two factors: the type of data that will influence the purchase decision and the source of that data. In the evaluation of alternatives stage, the key concerns are the criteria that will be used and the value/weight that is placed on that variable. So, for example, in selecting a house, proximity to schools may be important information to some purchasers and not to others. Some of those who do look at school proximity may consider to be a highly important factor, while for others it may just be seen as a slight benefit. While data collection and evaluation of alternatives are typically described as separate and consecutive stages, on major purchases, it is common for consumers to move back and forth between the stages (Payne, Bettman, and Johnson 1991).

2.0 Data

The data used in this study are from four National Association of Home Builders (NAHB) Housing Trends survey dated 2012, 2015, 2018 and 2020. The survey sample was designed to approximate the U.S. population by region and demographics. This is consistent with data approaches suggested by Miller, Hofstetter, Kromer, and Zhang (2011) and Ahn and Pearce, (2017).

Table 1: Survey Number by Year and Variable

YEAR	CRITERIA	WTP
2012	2019	1255
2015	2269	1403
2018	1984	1156
2020	1432	797

The data includes current homeowners in the U.S. who expect to purchase a new home in the next three years. As such, they are likely in the data collection and/or evaluation of alternatives stages of the home purchase decision making process.

The key variable of analysis in this study was asked in all four surveys over the eight year period: How concerned are you about the impact of your home on the environment? Responses to this question were first divided into two groups: individuals who indicated that the impact on the environment was not a factor in their house purchase decision process (two

responses: Not concerned about the environment or concerned about environment, but not a consideration in house purchase; CRITERIA=0) and those who indicated it would impact their decision (two responses: Want "environment-friendly" home, but would not pay more; or would pay more for "environment-friendly" home; CRITERIA=1).

This allows for between group analysis to highlight differences between those who will collect and consider green data in the purchase of a new home and those who will not.

The group of individual who will consider green data in the purchase of a new home can be further divided into two groups: those who have a willingness to pay for green attributes (response: would pay more for "environment-friendly" home; WTP=1) and those who would not (Want "environment-friendly" home, but would not pay more; WTP=0). This appromates an open ended data co9nstruction (Miller et al, 2011).

This allows for between group analysis to highlight differences between those who express a willingness to pay for green attributes, and those who did not.

The data is best understood as consisting of three categories demographics, housing and green certifications. Demographic data includes age of respondent (AGE), household income (INCOME), a dummy variable for a presence of two adults in the household (COUPLE), and a dummy variable for the presence of any children in the household (KIDS).

The housing category includes factors that explain the respondent as a homeowner. This includes how long they have lived in their current home in years (YEARS IN HOUSE), if they plan on buying a house in the next 12 months or 3 years (WHEN TO BUY), and the number of houses they have owned (# OF HOMES).

The final category focuses on their knowledge of the environment as it relates to residential homes. Specifically, they were asked about their awareness of ten green home certifications/programs: Energy Star (ENERGY STAR), Green Globes (GLOBES), HERS, Indoor AirPLUS (AIRPLUS), and LEED for homes (LEED).

METHODOLOGY AND FINDINGS

To understand the differences between those who consider green attributes in their home purchase decision process (CRITERIA), between group analysis (One-Way ANOVA) was used for each of the four years. Similarly, to understand the differences in Willingness to pay (WTP) between those individuals who did state that green attributes are important to their decision process, between group analysis (One-Way ANOVA) was used for each of the four years. Exhibit 1 provides the results of this analysis.

Table 2: ANOVA RESULTS

	CRITERIA				WTP			
DEMOGRAPHICS	**2012**	**2015**	**2018**	**2020**	**2012**	**2015**	**2018**	**2020**
AGE	+ *		+ ***			-***	-***	
INCOME			-*	+ ***	+ *	+ ***	+ ***	+ ***
COUPLE		-*					+ *	+ **
KIDS						+ *	+ ***	+ **
HOUSING	**2012**	**2015**	**2018**	**2020**	**2012**	**2015**	**2018**	**2020**
YEARS IN HOUSE	+ *	+ *	+ ***					
WHEN TO BUY						-***	-**	-*
# OF HOUSES								
KNOWLEDGE	**2012**	**2015**	**2018**	**2020**	**2012**	**2015**	**2018**	**2020**
ENERGY STAR	NA	NA		+ ***	NA	NA		+ ***
Green Globes	NA	NA		+ *	NA	NA	+ ***	+ ***
HERS	NA	NA		+ **	NA	NA	+ ***	+ ***
Indoor AirPLUS	NA	NA		+ ***	NA	NA	+ ***	+ ***
LEED for Homes	NA	NA		+ ***	NA	NA	+ ***	+ ***
* 90% **95% ***99%								

2.1 Demographics

CRITERIA: There was limited evidence in the findings to indicate that demographics play a strong role in distinguishing whether Green is a decision criteria. In two of the four years, older respondents were more likely to use Green criteria. Income had two conflicting results.

WTP: In contrast, demographics is shown to play a consistent role in determining WTP. Respondents who are willing to pay for green attributes are younger, have higher income, are more likely to be in a dual-adult household, and are more likely to have children in the household.

2.2 Housing

CRITERIA: The analysis indicates that the longer that the respondent has lived in their current home (TIME), they are more likely to use green criteria.

WTP: When the individual plans to buy a home (WHEN) has a significant impact on WTP. Specifically, people who are planning on buying a house in the next 12 months have a higher WTP than those planning on buying in months 13 to 36.

Housing experience (#HOMES) did not significantly either CRITRIA or WTP.

2.3 Green Awareness

CRITERIA: Using green purchase criteria and awareness of green certification/programs showed a significant relationship with the 5 certifications/programs in 2020.

It did not display any significance in 2018. This data was not available in the 2012 and 2015 surveys.

WTP: There is broad significance between awareness of green certifications/programs and WTP.

2. Discussion

This research has found that different consumer characteristics impact a home buyer's inclination to use green criteria and their willingness to pay. Consumer demographics do not significantly impact CRITERIA, but are a significant predictor of WTP.

This research is limited by the eight-year span of the studies. This may not be an adequate length of time to identify trends. Also, the use of multiple cross-sectional surveys approximates longitudinal studies, but does not perfectly duplicate them.

Future research could focus on variables in the purchase criteria category and the importance of green criteria. It could also focus on further differentiating between those people who do care about the environment and willingness to pay a continuous variable rather that a binary variable as in this current study.

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