ASSESSING ANCHORING AND MENTAL-ACCOUNTING IN THE BUYERS OF REAL ESTATE ASSETS

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ABSTRACT

The real estate market is similar to stock markets in one aspect. Financial markets and real estate markets have irrational participants and under incomplete information, these participants get affected by the heuristics also. In our study, we have chosen real estate markets to study the two heuristics/cognitions inter-relation and connection. One is anchoring bias and another is mental accounting. The questionnaire is administered to real estate buyers/potential buyers by using a purposive and snowball sampling method. The logistic regression technique was used to find the connection between anchoring and the mental-accounting bias of the real estate buyers/potential buyers. The results show that the change in probability of happening of anchoring bias can be explained by mental accounting. This showcase the simultaneous existence of these two behavioral biases in home-buyers that validate the view that human mind depends on heuristics/cognitions to maximize their expected utility in an uncertain environment.

Keywords: Anchoring, Cognition, Heuristics, Mental Accounting, Real Estate Buyers.

INTRODUCTION

The real estate sector in India has become a US$120 billion business in 2017 from US$14 billion in 2007. The sector has seen a CAGR of 30% over these years owing to the increase in demand and investment from international clients in commercial spaces and the ever-growing size of retail customers. Even the relaxed legal framework has helped the sector to grow (Sahni, 2007). The real estate sector is receiving FDI that has increased the transparency in the dealings and the price discovery has been more efficient as compared to the past, as the developers are now cautiously meeting the due diligence standards in terms of accounting standards and management practices. Restoration of faith has been the outcome and the backlashes, the sector has seen in the form of delayed and stuck projects and significantly fewer returns on investments (in single digits or even negative), has to be dealt with to attract the new buyers to motivate them to purchase.

Purchase decisions of property are often very complex as the information that is needed to support decisions is asymmetrical. This is attributed to the nature of house property as it has its value derived from the land and the construction material used to make it, that are hard to observe in value terms (Stroebel, 2012). Moreover, the transaction for the house properties does not happen so often and hence the information related to its sale price does not available to the market with ease. This makes buyers rely on the information that is too old or not as relevant. The buyer's purchase decisions are dependent on two factors. One is the macro factors like interest rates, exchange rates, disposable income, economic status, and outlook, etc. that

influence buyer's decision to invest in real estate (Wan, 2009) and the others are micro factors that are firms specific and buyers specific. One of the buyer specific micro factors is consumer behavior (Mavrodiy, 2005) that determines how a buyer would react to a situation be it macro or micro. This idea was first given by Simon (1955) about the dependence of the decision-making process on external (environment) and internal (human) factors that lead to a new concept known as limited or bounded rationality. Irrationality is the precursor and a reason behind this behavior as the theory narrated by Kahneman & Tversky (1979), Shefrin and Statman (1994), Shiller (1995) and Shleifer (2000) points out that in the event of uncertainty humans tend to make inconsistent and irrational decisions that translate into less efficient decision making.

For every home buyer, the money that they invest in their house is the biggest portion of their investment in their portfolio of assets. As the stakes are high the perfect judgment is required related to the purchase. In this case, the information asymmetry influences and propagates behavioral anomalies in the home buyer's decision-making process (Anglin and Wiebe, 2013). The behavioral anomalies or heuristics, namely, anchoring bias and mental accounting apart from the other biases have been studied and mentioned by Kahneman and Tversky (1979) in their notable work on behavioral biases and decision making. The focus of this paper is on dwelling the connection or link between anchoring bias, mental accounting and the real estate retail customer's investment decisions. The past studies discuss that anchoring makes the housing customers pay more for their investment and the benefit of the higher price goes to the developer as a seller of the property (Northcraft and Neale, 1987; Ariely, Loewenstein, Prelec, 2003; Simonson & Drolet, 2004). Mental accounting also affects investment decisions in real estate. The home buyer separates the investment in property from the other assets in the portfolio and that creates a bias while selling. Seiler (2012) demonstrated that there is a statistically significant willingness to sell the real estate held as a part of the portfolio if the portfolio value goes up, against the case in which the real estate is held in isolation. Our purpose is to showcase the effect of mental accounting on the buy-side of the transaction done by the real estate investor who wants to keep it in their portfolio of assets.

The price that buyers want to pay for the property depends on its physical attributes and also on the behavioral characteristics of the buyer. The physical attributes are quantifiable and hence can be translated to their monetary value, but behavioral attributes and characters are abstract and hence the difficulties to get the value out of such qualities. Not much research has been done on the behavioral aspects of the real estate retail investors and this study will fill this gap in the literature by giving an understanding of the connection between behavioral biases such as mental accounting and anchoring and the investment decision of the non-commercial property buyers.

Review of Literature

The rule of thumb or heuristics has been used by the person to make their decisions simpler in uncertain and complex situations. The idea of heuristics was first put up by Simon (1955) where he argued about the limited rationality of individuals while taking decisions in an uncertain environment. Later on, this field of bounded or limited rationality was heavily researched to find out how appropriate decisions can be made in a complex environment (Goldstein and Gigerenzer, 2008). Carrying forward the work on behavioral biases Kahneman and Tversky (1974, 79) in their laboratory setup experiment came up with a conclusion that

individuals are affected by different biases while taking decisions that compromise the quality of decision making and limits rationality. But this was only the experimental setup that was away from the market dynamics.

Behavioral finance is the study of the impact of heuristics, the cognitive errors in judgment and the emotions on the decision-making process of the individual Barberis and Thaler, (2003). Shiller (1993) connected behavior finance with the explanation of human behavior, Sewell (2005), conceptualizes the behavioral finance theory and found its influence on the market. Not only heuristics but the prospect theory (Kahneman and Tversky, 1979) also explain the irrational behavior of individuals. As per Shiller, 1999 the prospect theory is built on the premise of maximizing a weighted sum of utilities when the weights are not as same as probabilities and utility function is a value function.

Our focus is on anchoring and mental accounting, where anchoring is a major heuristic defined by Kahneman and Tversky, 1979 and mental accounting comes from the prospect theory. Anchoring is the one behavioral bias that has been studied first by Slovic (1967) in which they studied the preference reversals. Tversky and Kahenman (1974) in their work on judgment under heuristics came up with the concepts of anchoring and adjustment heuristics. In their paper, they demonstrated the bias of individuals towards an initial value and then taking a biased decision to fulfill their goal.

Anchoring bias is studied in the number of the phenomenon by the researchers like by asking the individuals about the freezing point of vodka (Epley and Gilovich, 2001) or annual mean temperature of Germany (Mussweiler and Englich, 2005). All these were research experiments away from the real world. However, real-world notable work has been done on valuation and purchase decision (Mussweiler et al., 2000), and forecasting (Critcher and Gilovich, 2008). There have been studies in real estate also like Beracha (2014) studied the impact of behavioral biases on investment decision of housing buyer and Bokhari (2011) studied how loss aversion and anchoring impacts real estate pricing. Also, Leung (2013) studied the same two biases by taking different data set in a different period. All researches showed that anchoring effects and influences house prices. There is a need felt to study the anchoring into the realm of buyers as well.

Mental accounting is the compartmentalization of the cost and benefits associated with a decision of an Individual in which they differentiate and keep the parts of their consumption and the expenditure in the separate mental accounts that follows heuristics (Thaler, 1985). This bias limits the interchangeability of money and gives rise to the inefficiency in deriving utility from an arbitrage opportunity. For the housing market, if the buyers possess this bias it may lead to an inefficient investment as well as illiquid investment and would limit the buyer to get the benefit from another opportunity. Understanding and finding out the depth of this fallacy in Indian housing customers is therefore important in potential and existing buyers.

Research Gap

In the paper by Pandey (2018) the behavioral biases were investigated. The focus of their paper was on to determine the existence of heuristic biases and the bias drawn from the prospect theory given by Kahneman and Tversky (1979). Our paper goes beyond this literature by investigating the two behavioral biases: anchoring and mental accounting in the home buyers and to establish the connection between them and to find out the reason for this connection. For the

study, our sample will be collected from the home buyers or the potential investors/consumer at home or any other property.

METHODOLOGY AND DATA

Sampling

Our target population for the study is the people using real estate as an investment or may use it in the future. Data is collected from the Gurgaon and NCR region. The questionnaire on the email was sent to more than 500 potential respondents in which 105 responded and shared their responses. The data is collected from the salaried person as well as from those who are in business. Half of the respondents were the people into academics, but few of them were also from another profession. The purposive and snowball sampling method was administered on the sample for data collection in Table 1.

Table1 THE DEMOGRAPHIC PROFILE OF THE RESPONDENTS			
		Number of Respondents (out of 105)	**Percentage**
Gender	Male	69	65.7
	Female	56	34.3
Income	Less than Rs.50000	17	16.3
	Rs.50000 to Rs.100000	47	45.2
	Rs.100000 to Rs.200000	23	22.1
	More than Rs.200000	17	16.3
Age	Less than 30 years	13	12.4
	30 to 40 years	54	51.4
	40 to 50 years	27	25.7
	More than 50 years	11	10.5
Marital Status	Married	87	82.9
	Unmarried	18	17.1
Nature of Employment	Business	5	4.8
	Service	53	50.5
	Professional	29	27.6
	Others	18	17.1

Data were collected by using a close-ended and structured questionnaire containing two parts. In the first part, the demographic details of the respondent were collected. In the second part of the questionnaire, the respondents were asked to answer questions on a Likert scale, with 5 indicating a high level of agreement and 1 indicating a low level of agreement. Questionnaires were self-administered by the respondents.

Model

To identify the connect of behavioral biases, anchoring and mental accounting of the buyers in the real estate we have applied logistic regression by taking anchoring as dependent and mental accounting as an independent variable. The logistic regression model is used as anchoring and mental accounting data has only binary outcomes.

The logit model is shown below:

$Ln(p/1-p) = b0 + b1x1 + b2x2 + b3x3 + \ldots + box$

Here p is the probability of an event. The ratio of p by 1-p indicates the odds of the happening of an event.

In this model, any increase in the value of b1, b2 (beta coefficient), etc will increase the probability of an increase in the dependent variable under test and vice-versa.

This means if the value of the beta coefficient is more than one then the odds of the happening of an even have increased. If the value of the beta coefficient is less than one then the odds of the happening of an event have decreased.

So in this context logistic regression technique is used to predict the dependent variable when the independent variable is known. It means if the respondent has been affected by mental accounting bias then what will be the probability that he/she will have anchoring bias also in his/her behavior. The answer lies in the logistic regression. Here the normality of the independent variables in logistic regression is not a constraint to conduct it.

Data Analysis

On running the logistic regression between anchoring as a dependent variable and mental accounting as an independent variable we received these statistics as shown in the Table 2.

Table 2 DEPENDENT VARIABLE ANCHORING BIAS			
Variable	**Wald statistic**	**Significance**	**Odds (coefficient)**
Mental accounting	7.695	0.006[**]	1.399
Constant	0.166	0.683	0.167

[**]Significant at 5% level.

Wald test is a way to find out whether the predictor variables in a model are significant. In the out model, Wald statistic (which is also known as Wald chi-squared) is 7.695 and is significant. In the model, the hypothesis is that states:

H_1:   *Removing mental accounting as a predictor variable will affect the model fit.*

As the error term is 0.006 well below the threshold level of 0.05, we reject the null hypothesis which states that removing mental accounting as a predictor variable will not affect the model fitness and accept the alternate hypothesis. The above analysis shows we accept the importance of mental accounting as a predictor variable and its ability to make the model more fit to carry out a meaningful analysis.

On running logistic regression between anchoring and mental accounting bias we get coefficient of the predictor variable mental accounting in home buyers as 1.399 that signifies a

unit change in the predictor variable will increase the odds of having anchoring effect in the home buyers. That means the probability of anchoring effect in home buyers will increase by the factor 1.399.

One means to find out the performance of the logistic regression model is to access its predictive ability. This is measured by comparing its predictions with the observed outcomes in the data sample. The classification table, Table-3, for the calibration and validation samples of home buyers having anchoring bias provides a measure of discriminative efficiency of the logistic regression model in Table 3.

Table 3 CLASSIFICATION TABLE OF PREDICTED VS. OBSERVED OUTCOMES OF THE LOGISTIC REGRESSION MODEL FOR HOME BUYERS HAVING ANCHORING BIAS					
			Predicted Outcome (Anchoring)		
		N	**With Bias**	**Without Bias**	% Correct
Observed Outcome	Calibration Sample	105			
With Bias			80	0	100
Without Bias			25	0	0
				Overall	76.2
Observed Outcome	Validation Sample	105			
With Bias			80	0	100
Without Bias			25	0	0
				Overall	76.2

Table 3 indicates that the logistic regression model classifies the majority of homebuyers in both the samples. Roughly 23.8% (25) of homebuyers in the sample who are predicted to have bias fail to do so in both calibration as well as validation model. Also, it clear from the table-3 that the overall accuracy of the model has been the same for both the models (76.2%) depicting no improvement over the predicted model.

To test the frequency of bias and no-bias statistically different from each other which means to find out whether there is an equal probability of having a bias and no bias we have to test the null hypothesis. The null hypothesis will be:

H0: the equal probability of bias and no bias as an outcome.

On running the test of significance we get the result as seen on Table 4.

Table 4 TEST OF SIGNIFICANCE FOR DIFFERENTIATION OF OUTCOME			
	Base Model		
Variable	**Wald Statistic**	**Significance**	**Coefficient**
Constant	25.77	0.000**	1.163

**Significant at 5% level.

As shown in Table 4 by Wald's test in this case we are rejecting the null hypothesis that there is an equal number of people within sampling variability in the biased vs. non-biased outcomes. Therefore the outcomes are statistically different from each other.

Now to test the overall significance of the model or the predictive capacity of the model we have to run the Omnibus test of significance. The hypothesis will be that there is some predictive power in the model when we run the model with the inclusion of the independent variable which is important for model viability in Table 5.

Hypothesis: The model has predictive power.

Table 5 TEST OF PREDICTIVE POWER OF THE MODEL			
	Observed Model		
Variable	**Chi-Square**	**Significance**	**df**
Constant	7,581	0.000**	1

**Significant at 5% level.

Table 5 shows that the model is significant with a chi-square statistic of 7.581 (significant at 5%) and one degree of freedom. This simply shows that we reject the null hypothesis and accept the alternative hypothesis that states the model has predictive power. Other estimates are Nagelkarke R-squared which is similar to R-squared in linear regression and is also known as pseudo-R-squared. Its value in our model is 0.105 that shows 10.05% of the variance in anchoring as a dependent variable is accounted for by the independent variable which is mental accounting bias.

DISCUSSION

This study used logistic regression for the examination of anchoring and mental accounting bias in the home buyers. The study used a questionnaire containing two factors having items to test the behavioral aspects of home buyers. The logistic regression results were able to find out a connection between heuristic bias (anchoring) and the bias that came from the prospect theory (mental accounting). Through our result, we are successful to find out that one bias in the home buyer's behavior can predict the occurrence of another bias. Anchoring bias which is heuristic bias comes from the gut feeling of the individual and is an integral part of the Indian real estate investor (Das and Sharma, 2013). Prospect theory (Kahneman & Tversky, 1979) assumes that the gains and losses are valued differently by the individuals. Mental accounting is an extension of this concept that talks about the compartmentalization of transactions in the human brain as cost and benefits and limits the human ability to make a decision and lessens the chances of deriving benefits of arbitrage.

If we look at anchoring and mental accounting simultaneously in the context of a home buyer and assume that the person is affected by both at the same time then under their definition both the biases are connected. This connection is due to the dependence of each one of them on the utility function of the home buyer that maximizes the value of transaction when it is influenced by both the biases simultaneously. The above-mentioned statement has been proved by our results also as it is shown that any change in mental accounting bias of a home buyer affects the probability of occurrence of anchoring bias also in the individual. This ascertains the presence of both of the biases and their effect on the other which may be due to the home buyers' effort to maximize their utility ends them up in the trap of these two biases as heuristics are frequently used to make successful choices (Mousavi & Gigerenzer 2014). Future work may be drawn from the above findings.

CONCLUSION

The real game lies in the financial markets (Wood, 1995). But it is not the stock markets only that are affected by the heuristics and other behavioral biases. The real estate markets also tend to get influenced by the irrationality of the human mind and this study has made an effort to draw a line towards connecting two behavioral biases that inflict the process of decision making of the home buyers. This study is unique as it has attempted to connect two behavioral biases anchoring and mental accounting present in the home buyers. The application of logistic regression on the data collected from the home buyers proved the presence of anchoring and mental accounting bias and further, explained how and why one bias may influence the presence of the other for an individual who wants to maximize his/her value in the transaction. Another set of biases/heuristics like overconfidence, herding behavior, home bias, risk-averseness of the home buyers/investors can be tested with the different data and demographics to improve the facets of connection of the two biases investigated and discussed in this research.

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