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Heuristic and Herding Bias on Property Investment Decision

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Abstract

Behavioral finance is the development of science which combines psychological and financial science. This studies the relation of emotional and cognitive deviation, thus affecting individual behavior. The decision made based on estimation that have been made, however was influenced by cognitive behavior associated to the individual. The effect of cognitive causes investment decision that is made investors will be irrational as heuristic and herding behavior. Heuristic is a decision behavior based on information that they have. Herding is a behavior that imitate other persons, not by conviction or information that they holds. Therefore, the purpose of the research is to analyze whether heuristic-driven bias or herding behavior influences property investment decision. The sample study was 100 prospective investors or investors in Surabaya. This data is analyzed using SEM Partial Least Square (PLS). The results showed that heuristic behavior (representativeness, anchoring, gambler's fallacy, and availability bias) significantly influences the investment decision. On the other hand, overconfidence and herding did not significantly influence the investment decision.. Both bias heuristic and herding behavior more inclined to occur on men compare to women. While the representativeness, anchoring, overconfidence, gambler's fallacy and herding are dominated by experienced investors than inexperienced investors.

Keywords: Heuristic, Herding, Behavior Finance, Investment Decision

1. Introduction

Traditional financial theory about Efficient Market Hypothesis (EMH) assumes that investors are rational. They will make a rational decision to follow financial basic rules based which are investment strategy and risk-return consideration from all available information [1]. However, EMH failed to explain behavior in market [2]. Investors sometimes make investment decisions that follow their psychological factor such as emotion, feeling, mood, fantasy and sentimental [3], therefore the result of decision be bias. Thus, doing research about investors' behavior in property sector is needed, due to weak-form efficient real estate market condition.

Property is a financial product. It is offered in market as one of investors' choice of diversification portfolio financial product. However, real estate market has a lack of liquidity higher than equity and bond markets. The collecting cost, processing information, as well as real estate trading costs are higher than trading cost of stocks and bonds. Therefore, directly or indirectly, cognitive factors and psychological factors of investors will influence investment decision-making process in those markets. Investors tend to behave irrationally in decision process [4]. Cognitive aspects and bias on investor psychology associated with what is trusted and what is chosen. Therefore, behavioral finance theory as a model of cognitive psychology research will try to explain the relationship between market and investors' behavior, including in property market [5].

In general, property market in Indonesia has shown a declining development. In first quarter of 2015, average residential property sales were 26.6% based on Bank Indonesia survey in Jakarta, Bogor, Depok, Tangerang and Bekasi (Jabodetabek) also in Bandung and Surabaya. However, limited land in urban areas made developer to change sales strategies type of residential property horizontal to vertical such as more affordable apartment. Because of 50% of Indonesia's population aged under 30 years old, the predicted demand for residential properties is still high. It is expected to realize on a property purchase in short and medium term [6]. Under these conditions, investors will change their cognitive and psychological aspects, so their behavior affect the decisions.

Shiller [7] stated behavioral heuristic or rule of thumb influence investment decision because the decisions are made based on information that they have. Investors tend to use several heuristic to solve complex problems, even if it was implemented properly; heuristic information processing will reduce search time and task completion [8]. Even, Hogarth [9] admits the importance of heuristic, yet experience factor and feedback should reduce bias due to financial behavior.

Another behavior found in research is herding behavior [10]. The behavior tends to mimic actions performed by others. Investors follow decision of others at the time of deciding. Herding can happen to both irrational and rational investors [11] [12] [13]. When property prices increase very fast and are followed by price movements in stock and commodity markets, there will be a speculative bubble. That market is influenced by herding behavior of market participants. Herding is one of key elements behavioral finance. The investors' fault at aggregate level will reflect in asset prices. Whereas, individual investors' behavior do not affect market price at all. Investors who do not act collectively and do not commit same psychological mistakes at the same time will be able to neutralize market situation. Therefore market will still efficient.

This empirical study will examine heuristic and herding behavior's influence to investment decisions by investors [14] [15]. The previous study of behavioral finance more focused on research concepts. Therefore, this study will be analyzed empirically and divided into some analysis. Second section discusses the literature on heuristic and herding behavior. Third section discusses research methods. Fourth section takes up empirical test heuristic and herding behavior's influence to investment decisions making. Investment products selected are residential properties which are landed houses and apartments in Surabaya, East Java, Indonesia. In the analysis part of this research, discussion covers analysis from the result of the empirical test. At the end of this study, there will be conclusion and recommendation for further research.

2. Literature Review

Behavioral finance is a science that studies how humans react and respond over the existing information. They make decisions which can optimize rate of return and by observing risks inherent in it. Attitudes and actions of human beings are a decisive factors in investing [16]. This behavior is not only related to financial and economic theory, also tend to be influenced by psychological factors [17]. The irrational investors' behavior is more influenced by psychological factors that it does not rely on rational thinking. The behavior of financial heuristic and herding effect investors take effect on investment decisions [18].

Heuristic behaviors encourage someone to make decisions in complex situation and uncertain environment. Decision-making is based on information held, with the result that investors make decision irrationally based on mental shortcuts. Heuristic decision consists of availability bias, representativeness, anchoring and adjustment [19]. Furthermore, Le and Doan [18] developed a heuristic theory consisting of availability bias, representativeness, anchoring, overconfidence, and gambler's fallacy.

2.1 Availability Bias

A condition when investors have ease of getting a lot of information that can be called or accessed to make decisions these conditions occurred in recent times [20]. For example, a situation when investors are choosing an investment product. They will be influenced by information availability and public's attention at this time [7] [21], so that there is a significant influence of availability bias behavior against investment decision [18] [22] [23]. In particular, investors do revision of the recommendation from analysts at the time of decision-making. The availability of investment returns results which are positive and negative under financial uncertainty may affect investors' reaction to that event [24].

2.2 Representativeness

Representativeness is a decision based on stereotype [25]. Representativeness is an investor's tendency to make decisions based on his previous experience [26]. Investors who rely on representativeness become too pessimistic about loss in the past and too optimistic about profit in the past. Therefore, investors overreact against a good news and bad news. When a company announced its profit in a row, investors assume profit will rise continually and consider that the company's performance is good. In investors' minds embedded "good company, good investment" [27]. Investors have a tendency to invest in popular properties, that is why representativeness behavior on investors show a positive influence to their investment decisions [22] [23].

2.3 Anchoring

Anchoring is investors' behavior when estimate something based on information that was first obtained. It turns out these estimates are different, but the person's thought remains skewed to the first information that was obtained. Furthermore, anchoring also occurs when investors estimate on something previously unknown, give impact on investors who set a certain standard such as numeric base (anchor) initiation estimate. Investors will adjust the estimation result on above or below the initiation values. Anchoring behaviour causes investors becoming overestimate their skill and against their opinion, so that the chosen decisions could be wrong [27]. The behavior has a positive influence to investment decision [23].

2.4 Overconfidence

Overconfidence is a person who is too confident of his ability to predict something, to achieve success, which is influenced by his mood and optimism [28]. Investors are certain that their knowledge is accurate; therefore his prediction is right compare to his actual condition. Factors that affect overconfidence are illusion of knowledge and illusion of control [29]. Illusion of knowledge related to availability of information, the more information that are available, it does not necessary leads to better knowledge. Investors do not necessary have the capability and experience to interpret that information. Illusion of control is investors tendency who can confidently control the situation. Overconfidence behavior is different from overestimate. Investors who have more ability and experience are categorized as overestimate, while investors who have less ability and experience, that cause investment decisions less precisely, are called overconfidence. For example, less experienced investors who recently sold properties at higher price tends to be more confident when looking for the next property. As a result, there is a possibility that the investors buy more expensive property or loses a good investment opportunity [30]. Therefore, overconfidence behavior gives positive effect toward investment decision [3] [18]. However, overconfidence behavior does not affect investment decision making [23].

5 2.5 Gambler's Fallacy

Gambler's Fallacy is also known as Monte Carlo Fallacy which is a false belief. If something happens more often than usual during some periods, it will happen less often in the future, or, if something happens less frequently than usual for several periods, it will happen more often in the future [31]. Gambler's Fallacy is usually caused by representative heuristic [32]. Gambler's fallacy behavior has no effect on investment decisions, because investors tend to predict a reversal of particular trends. Even in some situations, investors anticipate market performance that is good or bad [22] [23].

2.6 Herding

In addition to heuristic behavior explanation above, decision-making is also influenced by herding behavior. Herding is derived from the word herd that gives meaning grup or swarm. The initial idea of using the term herding in finance drawn from animal spirit concept. Investors have instinc to follow a large of group or other investorsss to action or decision that will be taken. Herding is an act that has others' behavior than its own information or beliefs [13]. The most common mistake investors make is following majority's investment decisions. That happens because of pressure existence or influence by colleagues or people around. Private investors tend to be influenced by popular analysts's recommendations. Although analysts' choice was bad, investors keep following what is selected by market. Herding behavior has a positive influence to investment decisions [3] [18]. Instead, herding behavior has no effect on investment decisions in Surabaya [23].

Based on the description above, research's hypotheses that can be formed are availability bias, representativeness, anchoring, overconfidence, gambler's fallacy, and herding. Herding behavior takes effect partially significant to residential property investment decision-making.

3. Research Methodology

This study associates to causal research. This research examines relation between two or more variables that are causal. The population of this study was investors in residential property such as landed houses and apartments in Surabaya. From the sampling number population above, is done in purposes sampling way in total 100 respondents [33]. Data collection technique used is distributing reseach questionnaires in the beginning of the research as pre-test as many as 30 respondents to test the validity and reliability of indicators on the questionnaire. After knowing the result had fulfilled the qualification of validity and reliability, conducted data collection up to sample number. Questionnaires are spreaded on investors who can be found in the exhibition spaces, real estate broker offices and developer's offices in Surabaya. This data analysis technique using Partial Least Square (PLS) analysis.

4. Analysis and Discussion

The first part of analysis is a review about respondents' characteristics in terms of gender, age, status, income, education, and job. As for the investment property characteristics are used status of residence, number of property purchases, and purpose of purchasing property in Surabaya.

Table 1. Respondents Characteristics

Respondents Characteristics	Home		Apartment	
	Not Invest	Invest	Not Invest	Invest
Gender:				
Man	4	28	1	22
Woman	4	19	7	15
Age:				
< 25 years	4	3	4	0
25-35 years	4	10	3	7
36-45 years	0	10	0	8
46-55 years	0	18	1	14
>56 years	0	6	0	8
Status:				
Not married	8	20	5	8
Married	0	24	3	27
Divorced	0	3	0	2
Income:				
≤ Rp. 10 millions	7	0	4	0
Rp. 10-25 millions	1	17	2	11
Rp. 25-50 millions	0	20	2	16
≥ Rp. 50 millions	0	10	0	10
Education:				
High School	0	17	3	10
Diploma	1	3	0	4
Bachelor	7	24	5	22
Master/ PhD	0	3	0	1
Job:				
Self-employment	0	29	2	23
Housewife	0	5	0	4
Professional	3	3	3	4
Public/Private Employees	3	8	2	6
Others	2	2	1	0

Table 1 shows 16% of respondents who have never invested property and 84% of respondents who already invest properties. 55% of respondents prefer to invest home and dominated by man, while 45% of respondents were more interested in apartments. The majority 32% of respondents aged 46-55 years, married (54%), with average income Rp. 25 - 50 million (38%), with Bachelor's degree as final educational background (58%) in the field of self-employment jobs (54%).

Table 2. Characteristic Property

Characteristic	Home		Apartment	
	Not Invest	Invest	Not Invest	Invest
Home Status:				
Private Home	0	31	2	31
Rental Home	2	1	1	0
Home Parents	6	15	5	6
How many property owned:				
Nothing	8	0	8	0
1	0	24	0	22
2	0	6	0	2
3+	0	17	0	13

Table 2 shows 64% of respondents already have home to stay, 32% still live with parents or relatives, and the remaining 4% are tenants. Currently 16% of respondents have not yet invested, instead there are 30% of respondents have more than three properties. The second part in this research was to test the influence of availability bias, representativeness, anchoring, overconfidence, gambler's fallacy, and herding behavior affect significantly partially to residential property investment decision making. The first step, it was conducting test

validity and reliability. Convergent validity measures correlation between latent variables with construct, if indicators are tested have a loading value above 0.5 [34]. The result is attached at Table 3. There are four indicators that have value below 0.5, therefore those indicators will be eliminated from the second test.

Table 3. Outer Loading Value Step 1

	Availability Bias	Representativeness	Anchoring	Overconfidence	Gambler's Fallacy	Herding	Investment Decision
Av1	0.493						
Av2	0.828						
Av3	0.574						
Av4	0.661						
R1		0.461					
R2		0.557					
R3		0.759					
R4		0.760					
A1			0.689				
A2			0.673				
A3			0.738				
A4			0.650				
O1				0.808			
O2				0.815			
O3				0.562			
O4				0.319			
O5				0.755			
G1					0.623		
G2					0.395		
G3					0.654		
G4					0.809		
G5					0.562		
H1						0.773	
H2						0.720	
H3						0.763	
H4						0.620	
H5						0.677	
KI1							0.847
KI2							0.861
KI3							0.833
KI4							0.722
KI5							0.734

The convergent validity test results showed four indicators outer loading below 0.5. The behavior of representativeness (R1), overconfidence (O4), gambler's fallacy (G2), and availability bias (AV1) are issued in further data processing for unqualified validity. After being eliminated from first model, conducted re-test, and formed a new convergent validity (Table 4).

Table 4 has shown each indicator that already has values outer loading above 0.5. The indicators have been eligible for use on validity of subsequent analysis, i.e. discriminant validity by looking at the value of AVE that should be above 0.5. The third step is to test the composite reliability between blocks indicator of construct that make it up. Composite reliability shows the value above 0.70. Overall, six of these variables have been eligible because its value is greater than 0.70. It means that variable is reliable.

Table 4. Outer Loading Value Step 2

	Availability Bias	Representativeness	Anchoring	Overconfidence	Gambler's Fallacy	Herding	Investment Decision
Av2	0.830						
Av3	0.609						
Av4	0.723						
R2		0.528					
R3		0.810					
R4		0.752					
A1			0.689				
A2			0.674				
A3			0.737				
A4			0.649				
O1				0.820			
O2				0.815			
O3				0.545			
O5				0.766			
G1					0.610		
G3					0.648		
G4					0.824		
G5					0.602		
H1						0.772	
H2						0.720	
H3						0.763	
H4						0.620	
H5						0.677	
K11							0.844
K12							0.859
K13							0.831
K14							0.726
K15							0.737

Table 5 below shows the AVE value and composite reliability of availability bias, representativeness, anchoring, overconfidence, gambler's fallacy, herding and investment decisions that are larger than specified requirements.

Table 5. Nilai AVE. Composite Reliability, serta R²

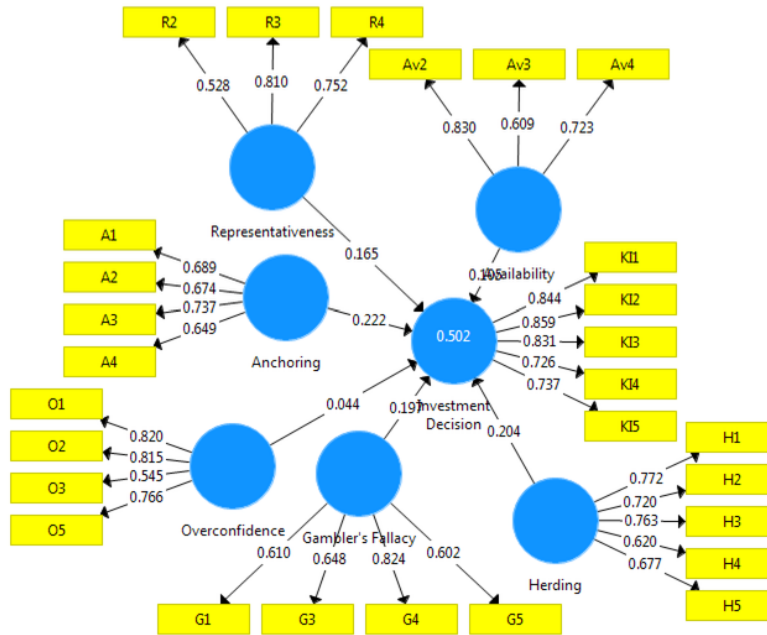
	AVE	Composite Reliability	Cronbachs Alpha
Availability Bias	0.528	0.767	0.584
Representativeness	0.500	0.745	0.520
Anchoring	0.473	0.782	0.633
Overconfidence	0.555	0.830	0.734
Gambler's Fallacy	0.458	0.769	0.613
Herding	0.508	0.837	0.756
Investment Decision	0.642	0.899	0.859
R ² Investment Decision		0.532	

Table 6. t-statistics Value

	t-statistics	Conclusion
Availability Bias → Investment Decision	2.010	Significant, (+)
Representativeness → Investment Decision	3.130	Significant, (+)
Anchoring → Investment Decision	2.984	Significant, (+)
Overconfidence → Investment Decision	0.654	Not Significant
Gambler's Fallacy → Investment Decision	2.669	Significant, (+)
Herding → Investment Decision	1.862	Not Significant

Inner models or structural models using R² value for the dependent latent constructs (Investment Decision) which means that availability bias, representativeness, anchoring, overconfidence, gambler's fallacy, and herding behavior affect of 53.2% on investment decisions, while the rest 46.8% is influenced by others behaviors. Furthermore, a test hypothesis is using value of t-statistic > 1.96 on each variable as shown in Table 6.

Hypothesis test results indicate availability bias, representativeness, anchoring, and the gambler's fallacy behavior affect significantly positive on investment decisions making (t-statistic values > 1.96). This is in line with research [22]. While overconfidence and herding behavior do not affect significantly on investment decision (t-statistic values < 1.96). The results were contrary to [3] [18].



Picture 1. PLS Model

Model of this research analysis:

$$\begin{aligned} \eta_{KI} &= \gamma_{Avi} \xi_{Avi} + \gamma_{Ri} \xi_{Ri} + \gamma_{Ai} \xi_{Ai} + \gamma_{Oi} \xi_{Oi} + \gamma_{Gi} \xi_{Gi} + \gamma_{Hi} \xi_{Hi} + \zeta \\ \eta_{KH} &= 0.221 \gamma_{Ai} + 0.139 \gamma_{Ri} + 0.108 \gamma_{Avi} + 0.028 \gamma_{Oi} + 0.228 \gamma_{Gi} + 0.212 \gamma_{Hi} + \zeta \end{aligned} \quad (1)$$

note:

- η_{KI} : Investment decision
- $\xi_{R}, \xi_{O}, \xi_{A}, \xi_{G}, \xi_{Av}, \xi_{H}$: Regression analysis
- γ_{Av} : Availability Bias
- γ_{R} : Representativeness
- γ_{A} : Anchoring
- γ_{O} : Overconfidence
- γ_{G} : Gambler's Fallacy
- γ_{H} : Herding
- ζ : Error

Table 7 describes each of behavioral variables indicators studied by looking at average value. The difference between high and low average values showed behavior tendency occurred in both investors groups who already invest or not yet invest. This study use difference analysis to confirm that experienced investors and inexperienced investors have different behavior when they were making investment decision.

Table 7. Heuristic dan Herding Behavior Indicators

	Indicators	Mean (Not Invest)	Mean (Invest)	Sig.
Availability Bias				
Av2	I consider information from a close friend or relation as a reliable informant in investment selection	3,94	4,00	.522
Av3	I believe rumors on a particular property developments	3,56	3,54	.813
Av4	I am more confidence investing in property that is promoted by media	3,44	3,37	.584
Representativeness				
R2	I do not invest in property with infamous developer.	3,25	3,73	.000*
R3	I am using past information to determine future investment	3,69	4,05	.000*
R4	I analyze trends to take investment decisions	3,81	3,88	.564
Anchoring				
A1	Information obtained first time determine my investment decisions	3,31	3,39	.597
A2	I rely on previous experience to determine next investment	3,69	3,98	.006*
A3	I tend to set lower price on property purchase longer than property bought recently	2,94	3,43	.001*
A4	I tend to give weight rating greater on property that can show its performance	3,94	3,94	.978
Overconfidence				
O1	I select a profitable investment	3,56	4,04	.000*
O2	My investment decisions is the best	3,56	3,82	.019*
O3	I ignore other information because I believe that I choose a profitable investment	2,13	2,74	.000*
O5	I am very experienced because I often do property sale and purchase	1,81	2,98	.000*
Gambler's Fallacy				
G1	I can anticipate gain or loss when selecting property investment	3,31	3,63	.000*
G3	I am able to anticipate property investment returns on good or bad market condition	3,19	3,57	.014*
G4	Sometimes, It is better to invest if I have strong feeling that surely profit at property selected	3,69	4,11	.277
G5	If anyone else got lucky with an investment property, then I will also experience same thing	3,25	3,58	.406
Herding				
H1	I tend to choose property that is currently popular.	3,69	3,79	.463
H2	I follow friends and relations advice	3,69	3,77	.481
H3	I tend to choose investments purchased by most of society	3,69	3,75	.593
H4	I act quickly replacing investment decisions because of market reaction	3,44	3,25	.166
H5	Buying and selling property by another affect on decision that I make	3,56	3,56	.979

Note: * significance 5%

Table 7 shows the availability bias behavior on investors who are already investing. They have a tendency to believe in information obtained from friends or relatives, while rumors and media are more trusted by investors who have never invested. Representativeness heuristic, anchoring, overconfidence, gambler's fallacy, and herding occur on investors who have already invested. Also proved the existence of some indicators that show a significant difference in two types of investors, such as representativeness behavior related to 43% of investors who were not willing to invest in an unknown developer and use past information to determine future investment.

Investors who have "cause anchoring bias behavior" tend to use past experience to determine their next investment. Also, the use of a lower selling price for old property bought than new property bought. Overconfidence behavior does not significantly affect investment decisions, but four indicators used to measure overconfidence show a significant difference. The results showed that investors who already invest have

overconfidence behavior higher than investors who has not yet invested. A very experienced investor causes the results of the decision making bias. Investment decisions on investors' overconfidence could be wrong, because investors determine sales price too low or purchase price too high. As a result, the investment decisions could be inappropriate. Investors ignore the information, but they are very confident that property chosen definitely give profit and best products. They tend to make decisions based on buy and sell transactions experience that has been done.

Furthermore, gambler's fallacy behavior happens on investors who have been investing is ability to anticipate profit or loss when choosing property investment. They were able to anticipate return on property investment when market conditions neither good nor bad. However, herding behavior is proven to have no effect on decision-making. There is also no difference between two types of investors, although generally more herding behavior occurs on investors who have already invested.

Table 8. Comparison Heuristic and Herding Behavior by Gender

	Mean Man	Mean Woman	Sig.
Availability Bias	3.7218	3.5422	Not significant.
Representativeness	3.9545	3.6933	Significant
Anchoring	3.7491	3.5800	Not Significant
Overconfidence	3.4873	3.1000	Significant
Gambler's Fallacy	3.8491	3.4822	Significant
Herding	3.8145	3.3867	Significant

Table 8 shows the differences between representativeness, overconfidence, gambler's fallacy, and herding behavior of men and women. The behavioral bias occurs more on men than women, in terms of mean value result. Furthermore, availability and anchoring bias behavior do not indicate a difference between those genders.

Table 9. Decision Making Indicators

Indicators	Mean (Not Invest)	Mean (Invest)	Sig.
K11 Buying Decision	3,56	4,01	.049*
K12 Selling Decision	3,50	3,81	.160
K13 Property selection	3,69	3,94	.223
K14 Duration hold the property	3,50	3,63	.591
K15 The number of properties transacted	3,50	3,60	.681

Table 9 shows the mean value of investment decisions on investors who have invested higher than investors who had never invested. The result also showed significant differences in behavior in making purchase decision. Investors who are already investing experience are more brave to take the decision to buy.

5. Conclusion and Recommendations

² This study proves availability bias, representativeness, anchoring, and the gambler's fallacy behavior affects significantly on investment decisions. Experienced investors tend to have bias heuristic and herding higher than inexperienced investors especially in purchasing or buying decision. The overconfidence behavior occurs more frequently on experienced investors even though overconfidence behavior does not affect on investment decision. Herding behavior also does not affect investment decision. There is no differences were found between experienced and inexperienced investors. The study on real estate's behavior needs to be developed. By learning people in the market participants including government, producers and consumers; it will help in decision making; it will help real estate market formation in Indonesia becoming more efficient.

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