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Herding Behavior and Decision-Making within the Middle – Class Residential Property Investments

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Keywords: Behavior, herding, social influence, normative influence, information cascade

Abstract

The main purpose of this study is to investigate the causality of the behavioral bias 'herding' that was traced down to both social and normative influences. An experimental method was developed to test 125 participants studying finance. The experiment provides a total of 6 houses in which the participants were instructed to appraise to a value that meets their willingness to purchase. The subjects were treated with social and normative influences and their valuation shifts were observed. In total, three valuations were recorded, labeled 'initial', 'social', and 'normative' valuations respectively. Our findings showed that the undergraduates were susceptible to both social and normative influences. However, further analysis showed that some external factors had a role in causing the herding behavior.

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Herding Behavior and Decision-Making within the Middle– Class Residential Property Investments

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ABSTRACT

The main purpose of this study is to investigate the causality of the behavioral bias 'herding' that was traced down to both social and normative influences. An experimental method was developed to test 125 participants studying finance. The experiment provides a total of 6 houses in which the participants were instructed to appraise to a value that meets their willingness to purchase. The subjects were treated with social and normative influences and their valuation shifts were observed. In total, three valuations were recorded, labeled 'initial', 'social', and 'normative' valuations respectively. Our findings showed that the undergraduates were susceptible to both social and normative influences. However, further analysis showed that some external factors had a role in causing the herding behavior.

Keywords: Behavior; herding; social influence; normative influence; information cascade.

INTRODUCTION

Herding, known as one of the terrors that may cause the bubbles in markets leading to a financial crisis. It is also, however, an effective way of learning which is to copy another person's actions [27]. This behavior becomes a habit, and soon, humans tend to follow one another for a specific purpose at a time, regardless of the cause [30]. Knowing that there is such a behavior, countless attempts were made to better understand the market fluctuations to gain market stability [31] [32].

Traditional financial theories provide the Efficient Market Hypothesis (EMH), Expected Utility Theory (ETU), and the Prospect Theory (PT). All of the traditional theories assume that investors act rationally [21]. The three theories have been key pillars in market predictions, mainly through the perspective of utility. Over half a century the three theories were used, and by the end of the '90s, behavioral finance was a warm topic for researchers in economic instances. Escaping the rational boundary, [17] stated that desire, feelings or the level of courage also has a role in investment decisions. [18] described herding as the most discussed behavioral biases regarding investment decision-making in the real-estate stock market.

The real-estate stock market may be profitable to investors. However, in Surabaya, residential properties were considered as the most profitable investment an individual could make [19]. Investors may consider house investments profitable since they believe land prices continue to grow, but this belief may be a potential cause to market bubbles, leading to the financial crisis. Such investors are classified into two groups, one which seeks property to gain profit, and the other for a first home purchase. [1] stated that younger individuals who purchased homes for the first time tend to be more rational in decision-making. This may be due to the consideration of such a decision as one of the biggest decision of their lives [13]. [12] suggested how individuals would the opinion of others when they have no experience in a field. This emphasizes the importance of information cascade as a possible anchor point to those who have no prior knowledge before decision-making.

There are some but little research that studied the effects of herding in the direct real estate market. [9] suggested the Perception Alignment Hypothesis (PAH) as a possible causal effect of herding through information cascade. [5] suggested an experimental method for participants to appraise residential properties to a value considered as the willingness to pay or purchase.

The experimental method considered social, normative and psychological aspects to herding. Both social and normative aspects influence a decision, whereas the psychological aspect was not due to group effects in the experiment. [8] further support the result, since personality among men

and women around the world does not differ statistically.

This paper attempts to further study the social and normative influences in herding by modifying a previous experimental method, integrating PAH into it using information cascade. The remainder of the paper is organized as follows. The second section provides supporting theories and evidence on experimental design and procedures in the study. The third section reveals the results and discussion, and the fourth section concludes.

Hypothesis Development

This study is based on three key pieces of research. The first literature suggested the Perception Alignment Hypothesis (PAH), which observed the causality of herding through the use of information cascade. The second literature examined the influences of herding that was later narrowed down to social and normative influences. The third and final piece of research provided approaches to models of herding behavior across various instances and one of them classified the role of information cascade in herding.

[28] explained that information cascade was a possible cause of herding. [7] made a model assuming that all decisions made by an individual would be the same with decisions made by prior decision-makers when such information was available. [24] provided two main approaches, which consists of pattern-based approaches, and transmission-based approaches. The first focuses on physical traits, queue models, network topologies and biological flocking, such as the study of herding in flocks of birds. The other branch of herding model was separated into two categories, consisting non – mentalizing and mentalizing models. Information cascade lies within the mentalizing section of the herding model. Further utilization of the Perception Alignment Hypothesis provided three factors as a basis for information cascade, (1) credibility, (2) source of information, and (3) media of information, all of which was used as treatments in both social and normative influences.

The three factors of information cascade must be further elaborated if it is to be measured. Credibility was measured using the trust of Indonesian investors towards the source of information [23]. Trust is then measured using three indicators: (1) responsibility, (2) truthfulness, and (3) reputation [33]. [23] also stated that the source of information was to be separated into two groups, internal relations, and external relations. [11] found that 'Word of Mouth' was the most common and trusted way for Indonesians to receive information. Hence, the three indicators of PAH were used as some limitations to this study.

Social and Normative Influence

The influences that cause herding is derived from information cascade. [4] experimented on social influences on decision-making and found that individuals were susceptible to the words of others when an opinion represents 25% of the majority. Whereas, normative influence is the result of an individual's desire to fulfill the expectations of others within a group. Both influences are related to each other, as norms are derived from social interactions. The normative influence was closely related to reputational herding, which [17] stated that individuals tend to maintain their reputation. This means that they would rather fail as a group over failing by themselves. [26] further confirms this and found that investors herd in the stock market to retain their reputation. In contrast, [2] stated that investors tend to uphold their own opinions when a two-way exchange of information occurs.

Valuation - Willingness to Pay, and Decision-making

The decision-making process of house purchase can be measured by an individual's willingness to pay. The willingness of individuals who want to purchase a house requires a cognitive process, and they are closely related to the anchoring effect and loss aversion effect [5]. Furthermore, they would consider the value of the house and adjusts their judgments by experience or other information until they reach a value that is acceptable to their belief. Of course, the value regarding the house consists of a few things. Such as the objective information related to the house, including land and building area, location, or other information related to fundamental values [6]. Only when an acceptable value is reached will lead to the decision of the purchase.

Herding and the Real Estate Market

From the effects of information cascade and both the social and normative influences, decision-makers may struggle to have multiple types of information thrown at them. An upholding of an individual's personal opinion may occur when an exchange of information occurs. However, [3] also emphasized that the acceptance of such information depends on its level of rationality to their understanding. Young families or individuals tend to be more rational than experienced investors since their motives differ from investors who seek properties only for profit. On the other hand, [16] stated that herding may be the key to the behavioral biases in depicting house price fluctuations.

The Importance of First Home Buyers

Reports show that the Indonesian property sector has hit rock bottom in 2016 [10]. However, the young adults of Indonesia as stated in [19] were still buying and was the main buyers of residential housing in Indonesia. Demands were scarce, and would only move at a slow pace as marketing sales could only be driven by price growth. This may be due to the Indonesian people's preference to use bank loans as a primary payment method in buying houses, while the increase of subsidies in bank loans house prices increases as well, and to the extent which house prices exacerbate risks for households with bank loans but also house builders [20]

The Indonesian government then issued new regulations towards property developers to minimalize risks of foreclosure of bank loans due to the lack of buyers. Some regulations even support home purchase for those with minimum-wage laborers, such as the construction of 1 million landed residential housing across Indonesia (*Program Satu Juta Rumah*). Such plans may be one stepping stone towards raising the demand for residential housing in Indonesia, especially for young adults who represents the majority of residential housing purchase.

With the knowledge homeownership decline, first home buyers are essential to this predicament. Even when first home buyers need a house to live in, their income may still be relatively low, and the amount of loan approved depends on that income, hence determining the house value that can be purchased. This forces the first home buyers to be more rational compared to regular property investors, whose investment stimulus is stronger than their actual need because they have the income to spare [14] [15] [22].

To better understand herding, approaches using the Perception Alignment Hypothesis was used in a controlled investor environment. Through the use of previous experimental methods, and combining it with Perception Alignment Hypothesis, the causality of herding could be traced to both social and normative influences, hence the following hypotheses were developed.

H$_1$: Herding sets the difference between the final and prior valuation due to social influence.

In theory, trust was the key to how an individual may or may not regard the information given to them. This was applied to the Perception Alignment Hypothesis, and the information cascade was used to deliver information to individuals. Hence, Trust was considered and measured on how the credibility of one information may lead to herding [15] [25]. This applies to all sorts of influences that an individual may receive, may it be either social or normative influences.

H$_2$: The Credibility of information moderates herding behavior in investor valuation due to social influence

Normative influence regards an individual's pride and reputation, and such events may lead to them to herd. However, when a two – way interaction (or more) is allowed between individuals, a variety of opinions and information is exchanged and the possibility to herd may decrease. Indeed, the flow of information is unrestricted among the individuals, however, this may lead to the upholding of individual opinions.

H$_3$: Herding sets the difference between the final and prior valuation due to normative influence

Similar to the analysis of credibility on social influence, the same process needed to be done on the normative influence treatment. This is due to both of the influences being a media for the information cascade.

H$_4$: The Credibility of information moderates herding behavior in investor valuation due to normative influence

RESEARCH METHOD

Experiment Design

The design of the experiment neither uses full-factorial nor partially factored experiment. Pre and Post-Experiment were used in this study to test the effects of both social and normative influences. Randomization of experiment participants was done to increase the internal validity of the experiment, by splitting the participants into groups based on their attendance. Other factors to further predict covariance was tested using analysis of covariance (ANCOVA). The main effects of both social and normative influences were tested on the valuations of residential properties.

Prior research indicated that gender groups had effects on herding [15]. In the purpose of finding the causality of herding and minimalizing errors from other variables, blocking was applied to the gender groups. The experience was another problem since previous theories suggested that it affected the decision-making process. Hence, a categorization was made from the beginning to differentiated experienced and non-experienced investors. There was no problem in the experimentation of property developers, however, the postgraduate students were non-homogenous, and

some had already bought several properties when some have not. This predicament led to the decision to use undergraduates who were assumed to have zero experience in house purchase.

The main purpose of the experimental design was to determine the causality of herding, which lies between social and normative influences. The two influences were analyzed using ANCOVA, by testing the main effects of social and normative influences and also adding the covariates such as demography, the credibility of information to improve the internal validity of the experiment result. The model used for the first treatment can be seen in Figure 1, meaning that the initial valuation, demographic factors, and credibility of information were independent variables, whereas the socially influenced information acts as the dependent variable in this model.
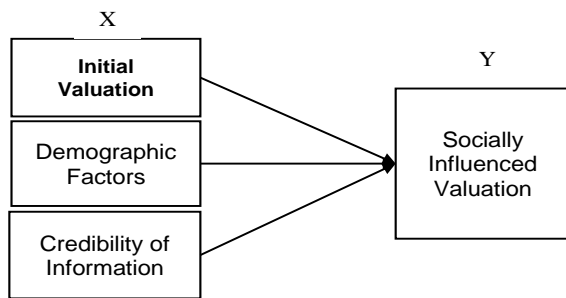

Figure 1. Model for ANCOVA for Socially Influenced Valuation

During the normative induced treatment, it is apparent that participants were previously given social treatment. Norms are derived from social interactions. Thus, the socially influenced valuation was added as another variable that the third valuation depended on.
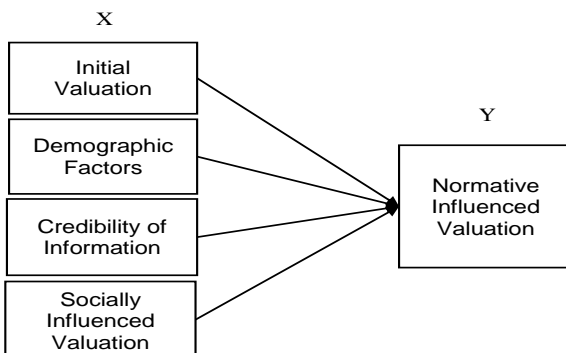

Figure 2. Model for ANCOVA for Normative Influenced Valuation

Dependent Variable

The dependent variables were the second and third valuation of the participants. The second

valuation solely depends on the external flow of information which was the falsified information given to the participants (Socially Influenced Valuation). The third valuation solely depends on the internal flow of information, which occurs when the participants were allowed to discuss their valuations in groups of 4-7 people (Normative Influenced Valuation).

Independent Variable

The independent variable in this experiment was the initial valuation of the participants, it acts as the first untainted values that participants made before getting additional flows of information.

Participants

Purposive sampling was done in this research to test herding in specific groups. In this study, First Home Buyers were the main group to be studied. A pre-experiment was conducted to test how applicable the experiment method was to Indonesians. Acting as a convenient participant group, ten post-graduate students from Petra Christian University (PCU) who were studying for their master's degree were used to represent first home buyers. Ten property developers from a disclosed organization in Surabaya also participated in the pre-experiment to both the applicability of the experimental method, and testing previous theories on how experienced investors were less rational in decision-making. Only after analyzing the comments and results from the pre-experiments, improvements to the method was made, and the main experiment was conducted on 125 undergraduates from PCU. The undergraduates were within the range of 18-34 years, fulfilling the first home buyer criteria. The participant demographics can be seen in Table 1.

Pre-Experiment Procedure

The experimental process attempts to simulate the decision-making process made by the participant valuations of residential properties within the limited amount of time. The experimental instrument included two main parts, consisting of investor data and instructions for the house valuation process. The first part consists of the participant demographic data and their opinions on how credible the people were around them. The second part of the experiment was the valuation process, by giving participants a set of instructions and several brochures of houses. Details of the experimental procedure are as follows:

Table 1. Participant Demographics

Demographics		Developer n=10 (%)	Postgraduate students		Undergraduate students n=125 (%)
			Male n=10 (%)	Female n=10 (%)	
Gender	male	100	100	-	66
	female	-	-	100	34
	Total	**100**	**100**	**100**	**100**
Age	18-24	-	90	70	100
	25-34	30	10	30	-
	35-44	30	-	-	-
	45-54	30	-	-	-
	54-64	10	-	-	-
	Total	**100**	**100**	**100**	**100**
Ethnic	Javanese	40	-	20	2
	Chinese	30	100	80	87
	Batak	20	-	-	-
	Papua	-	-	-	0.8
	Toraja	-	-	-	2
	Manado	-	-	-	1.6
	Ambon	-	-	-	2
	Nusa Tenggara Timur	-	-	-	1.6
	Dayak Manyan	-	-	-	0.8
	Mixed	10	-	-	1.6
	Total	**100**	**100**	**100**	**100**
Income	Low	-	20	40	90
	Lower middle	-	40	20	10
	Upper middle	30	40	40	-
	High	70	-	-	-
	Total	**100**	**100**	**100**	**100**
Education	Junior/senior high school	10	-	-	94
	Diploma	10	-	-	-
	Bachelor degree	60	100	100	6
	Master degree and above	20	-	-	-
	Total	**100**	**100**	**100**	**100**

Source: Author's compilation from statistical data processing

1. Subjects were divided into groups of 5 and given 5 sets of property details for 5-real properties. The details were collected from real-world property websites. Subjects were told that all 5 properties were valued in the region of IDR 1,000,000,000. For the first two properties, the subjects were told the real-world values to give them the sense for likely valuations of the other three properties.

2. For the remaining three properties, the real values were not revealed and subjects were asked to state the initial values that they think suitable for each property.

   For the second part of the experiment, subjects were given falsified information by the instructor's word of mouth. Stating values of the three remaining properties as follows: 25% of the predecessors before them valued house 1 at IDR 950,000,000, 50% of the predecessors before them valued house 2 at IDR 975,000,000, and 75% of the predecessors before them valued house 3 at IDR 900,000,000. The subjects were then allowed to reconsider their valuations and given time to re-evaluate.

3. The third and final part of the experiment allows subject to communicate with each other, and subjects were then asked to place their final valuations for the three remaining houses.

Pre-Experiment Results

The data set of participant valuations were tested using non-parametric tests due to the normality of the data. Wilcoxon's method of comparing means was used to see whether the manipulation affected participant valuations. It was apparent that the participants from both property developers and post-graduate students were susceptible to both influences, and was prone to herd in some cases.

In testing both social and normative influences, the property developers herd only to social influences, which was when the opinion of others represent a majority of the crowd (75%) with a

Table 2. Reliability, Correlation, and Sampling Adequacy Test Results

Panel A: Reliability Test Results								
Participant				**Cronbach Alpha**				
Undergraduates				0.702				

Panel B: Undergraduate Valuation Correlation Coefficient									
	P11	P12	P13	P21	P22	P23	P31	P32	P33
1. P11	1								
2. P12		1							
3. P13			1						
4. P21	.655**			1					
5. P22		.503**			1				
6. P23			.534**			1			
7. P31	.181*			.299**			1		
8. P32		.199*			.387**			1	
9. P33			.352**			.643**			1

Panel C: Sample Adequacy Tests for Factor Analysis		
Participant	**KMO**	*p*-value
Undergraduates	0.629	0.000

p-value <0.05, ** *p*-value <0.01

Source: Author's compilation from statistical data processing

Z score = -2.375, and *p*-value = 0.018. The male post-graduate students succumbed to herding at all levels. Whereas, an all-female post-graduate group revealed that they were not susceptible to herding at all levels.

The checking of manipulation validates how the treatments operate, and it showed effects of the influence towards the test groups. However, some constructs were needed to be revised, such as the gender block. It now stands as a questionable variable towards the results of the valuations. In the purpose of creating a similar situation to real-estate purchase, gender differentiation was removed. Time construct was also closely observed, since different times may also affect the valuation result. The time as to how long the participants had to make a valuation of the residential estates was timed to 5 minutes per session. An additional question checking on the seriousness of participants was also added, questioning who the president of Indonesia was at the current time. Another yes or no question questioning whether the participant knows the instructor beforehand was also added for further validation of the experiment results.

RESULTS AND DISCUSSION

Reliability and Validation

Reliability tests were performed to check whether the participant valuations were reliable. Correlation tests were performed to determine the interaction between the valuations and the treatment effects. A factor analysis was also done to measure the indicators from the credibility factor. Reliability and correlation tests from the valuation process and sampling adequacy test from indicators of credibility can be seen in Table 2.

The notations that were used are as follows:

$P1_i$ = Participant initial valuation
$P2_i$ = Participant valuation after being induced to social influence
$P3_i$ = Participant valuation after being induced to normative influence
P_iS = Falsified property type 'i' valuation
mi_i = Credibility of information as moderator of property type 'i'
i = ith house type

The results from Table 2 showed that the data set is reliable, with the value of Cronbach alpha of 0.702. The correlation tests also showed the relationship between the valuations which will later be used in the analysis of covariance. Bartlett's test also showed that the sample was adequate for credibility factor analysis.

Hypothesis Testing

Normality tests were also done to determine the type of test to be used on the valuation data set. It indicated that a non-parametric test method must be used, and the Wilcoxon method of comparing means was chosen. The statistical test results from the undergraduate valuations can be seen in Table 3.

The results from Table 3 showed that the second and third valuations differ from the initial valuation. However, further tests must be done to

reveal whether the main cause of the herding behavior is due to social and normative influence alone. Aside from the main effects, further analysis of covariance was also done to test the demographic effects to the results. All demographic effects were tested except age since all participants come from the same age group. The data set was normalized and then analyzed using ANCOVA, the result can be seen in Table 4.

Table 3. Hypothesis Test on Undergraduate Valuation

Panel A: Wilcoxon Test on Social Influence			
Variable	**Hypothesis**	**Z**	**_p_-value**
P11 – P21	H1	-8.157	0.000**
P12 – P22	H1	-5.998	0.000**
P13 – P23	H1	-7.958	0.000**
Panel B: Wilcoxon Test on Normative Influence			
Variable	**Hypothesis**	**Z**	_p_-value
P11 – P31	H3	-5.366	0.000**
P12 – P32	H3	-2.812	0.005**
P13 – P33	H3	-4.654	0.000**

Source: Author's compilation from statistical data processing (** significant to alpha <5%)

The results from Table 4 shows that both main effects of the initial valuations and the credibility of information affected the participant valuations on the level of 25% crowd opinion, and at most 50% of the crowd's opinion. However, the interaction effect only showed that the first home buyer's herding behavior was affected by the credibility of information at 50% of the crowd's opinion. It is to be noted that the Levene's test of homogeneity was violated on the analysis of Panel B and Panel C, whereas Panel A had a value of F= 2.435, p-value = .001. On the contrary, the normative influence treatment gave results that support previous theories that suggested first home buyers be rational buyers. The analysis of covariance for the normative-treated valuations can be seen in Table 5.

The results from Table 5 showed that upon further analysis of covariance, the change from the initial valuation to the third valuation was not due to normative influence. The ANCOVA showed that we failed to reject the null hypothesis, meaning that first home buyers may herd due to other external variables that weren't included in this study. Panel B showed that the number of the purchase, as well as ethnic, affected the third valuation. However, it is to be noted that the Levene's test of homogeneity was violated in all cases.

Discussion

The first home buyers were considered as rational buyers in previous studies. The limited-time the participants were given in appraising the

residential properties should allow them to think more rationally. There was a significant change in the willingness to pay for first home buyers when treated with social and normative influences. However, the causes of herding behavior remain unclear.

The results from the socially influenced valuations showed that when at least half of a certain group has voted for the same opinion, first home buyers may follow such information. However, if it is merely a quarter, or over 75% of the crowd's opinion, first home buyers rendered the information to be unbelievable and other variables may be the cause of herding behavior. In the 25% of the crowd's opinion, education of participants was significant and it affected the valuation process. [1] stated that the first home purchase is a very important decision in an individual's life, and in its complexity, means that there will be a tendency for them to use rational systems in their decision-making process. Other possible explanations were the limitation of time in this experiment. In reality, the process of product selection may take a considerable amount of time before it is to be decided.

Previous studies argue that lack of experience may result in herding behavior. [29] stated that experience may affect herding, and mood may affect decision-making. This may explain the result obtained in Table 5. Panel B. Furthermore, most of the results of the proved to be insignificant, this means that there is another variable that may cause the herding behavior, such as the ethnic factor and the number of property purchase in previous events. This means that in certain ethnic groups, experience in property purchase is an important factor towards residential purchase.

CONCLUSION

This study has attempted to further investigate the causality of herding through social and normative influences, using the integration of the Perception Alignment Hypothesis. The experiment results showed that first home buyers were prone to herd, however, the causes were varied. This means that not only social and normative influence affected the herding behavior, but other factors such as education, experience, and ethnicity had a role in herding behavior.

The findings of this study were somewhat aligned with previous research, who stated that first home buyers tend to be more cognitive in decision-making. The first home buyers were prone to herd; however, the causes were varied. Social influences do have an effect on decision-making, while the normative influences do not. This means that the control of social aspects in the society and limitations in ways of communication may indirec-

Table 4. ANCOVA findings in decision-making models of socially influenced valuations

Variable	Sum of Squares 1.	Df	Mean Square	Hypothesis 7.	F	. Sig.
Panel A: Table ANCOVA Social Influence at 25% crowd opinion						
Gender	11. .019	12. 1	13. .019	14.	5. .136	6. .714
Ethnic	18. .027	19. 1	20. .027	21.	2. .189	3. .667
Income	25. .002	26. 1	27. .002	28.	9. .015	0. .904
Education	32. .622	33. 1	34. .622	35.	3. 4.400	. .044**
No of Purchase	39. .000	40. 0	41. .	42.	43. .	44. .
Instructor	46. .174	47. 1	48. .174	49.	0. 1.230	1. .276
P11	53. 85.633	54. 41	55. 2.089	56.	. 14.777	. .000**
Credibility	60. 11.061	61. 25	62. .442	63.	4. 3.130	. .001**
Decision-making model (P11*Credibility)	68. 3.428	69. 18	70. .190	71. H2	2. 1.347	3. .223
Error	75. 4.664	76. 33	77. .141	78.	79.	80.
Total	82. 124	83. 125	84.	85.	86.	87.
Corrected Total	89. 124	90. 124	91.	92.	93.	94.
Panel B: Table ANCOVA Social Influence at 50% crowd opinion						
Gender	97. .108	98. 1	99. .108	100.	01. .699	02. .412
Ethnic	104. .153	105. 1	106. .153	107.	08. .986	09. .331
Income	111. .223	112. 1	113. .1223	114.	15. 1.439	16. .243
Education	118. .008	119. 1	120. .008	121.	22. .051	23. .823
No of Purchase	125. .056	126. 1	127. .056	128.	29. .362	30. .554
Instructor	132. .217	133. 1	134. .217	135.	36. 1.400	37. .249
P12	139. 84.572	140. 49	141. 1.726	142.	3. 11.139	4. .000**
Credibility	146. 8.983	147. 23	148. .391	149.	50. 2.521	1. .016**
Decision-making model (P12*Credibility)	154. 8.743	155. 20	156. .437	157. H2	58. 2.821	9. .009**
Error	161. 3.564	162. 23	163. .155		165.	166.
Total	168. 124	69. 125	170.	171.	172.	173.
Corrected Total	175. 124	76. 124	177.	178.	179.	180.
Panel C: Table ANCOVA Social Influence at 75% crowd opinion						
Gender	183. .399	184. 1	185. .399	186.	87. 1.065	88. .313
Ethnic	190. .041	191. 1	192. .041	193.	94. .109	95. .744
Income	197. .173	198. 1	199. .173	200.	01. .460	02. .504
Education	204. .005	205. 1	206. .005	207.	08. .013	09. .910
No of Purchase	211. .004	212. 1	213. .004	214.	15. .009	16. .924
Instructor	218. .217	219. 1	220. .217	221.	22. .579	23. .454
P13	225. 66.271	226. 42	227. 1.578	228.	29. 4.211	0. .000**
Credibility	232. 11.198	233. 25	234. .448	235.	36. 1.195	37. .335
Decision-making model (P13*Credibility)	240. 5.531	241. 27	242. .205	243. H2	44. .547	45. .933
Error	247. 8.618	248. 23	249. .375		251.	252.
Total	254. 124	55. 125	256.	257.	258.	259.
Corrected Total	261. 124	62. 124	263.	264.	265.	266.

'. Source: Author's compilation from statistical data processing (** Significant to Alpha <5%)

tly support the prevention of market instability. Furthermore, even when the causes of herding remain unclear, the burden remain on the local government who should create counter-intuitive plans to battle market instability. Such as the 'Program Satu Juta Rumah' home subsidy which is relatively new in Indonesia, and its effectiveness in battling market stability and homeownership decline could be studied.

Future research could attempt to improve the separation of social and normative influences. Furthermore, different subjects could also be used for comparison to first home buyers. This study was also limited by one media of communication, which was the 'Word of Mouth'. Gadgets and smartphones may be used as another tool for the information cascade in future experiments. Many internal and external variables that were practically impossible to be applied in a simulation, such as the motivation to house purchase in participants as representatives of real-world buyers.

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Table 5. ANCOVA in decision-making models of normative influenced valuations

Variable	Sum of Squares	271. Df	Mean Square.	Hypothesis	274. F	275. Sig.
Panel A: Table ANCOVA Normative Influence House I						
Gender	278. .387	279. 1	280. .387	281.	282. .495	283. .487
Ethnic	285. .088	286. 1	287. .088	288.	289. .112	290. .740
Income	292. .305	293. 1	294. .305	295.	296. .389	297. .537
Education	299. .402	300. 1	301. .402	302.	303. .514	304. .479
No of Purchase	306. .000	307. 0	308. .	309.	310. .	311. .
Instructor	313. .430	314. 1	315. .430	316.	317. .961	318. .464
P11	320. 38.095	321. 41	322. .929	323.	324. 1.187	325. .310
Credibility	327. 25.061	328. 25	329. 1.002	330.	331. 1.281	332. .252
P21	334. .752	335. 1	336. .752	337.	338. .961	339. .334
Decision-making model (P11*Credibility)	342. 13.256	343. 18	344. .736	345. H4	346. .941	347. .542
Error	349. 25.044	350. 32	351. .783	352.	353.	354.
Total	356. 124	57. 125	358.	359.	360.	361.
Corrected Total	363. 124	64. 124	365.	366.	367.	368.
Panel B: Table ANCOVA Normative Influence House II						
Gender	371. .282	372. 1	373. .282	374.	375. .427	376. .520
Ethnic	378. 5.223	379. 1	380. 5.223	381.	382. 7.895	383. .010**
Income	385. .376	386. 1	387. .376	388.	389. .569	390. .459
Education	392. .001	393. 1	394. .001	395.	396. .001	397. .977
No of Purchase	399. 3.591	400. 1	401. 3.591	402.	403. 5.429	404. .029**
Instructor	406. .550	407. 1	408. .550	409.	410. .831	411. .373
P12	413. 42.248	414. 49	415. .862	416.	417. 1.303	418. .253
Credibility	420. 12.842	421. 23	422. .558	423.	424. .844	425. .656
P22	427. .973	428. 1	429. .973	430.	431. 1.471	432. .238
Decision-making model (P12*Credibility)	435. 23.359	436. 20	437. 1.168	438. H4	439. 1.766	440. .099
Error	442. 14.553	443. 22	444. .661		446.	447.
Total	449. 124	50. 125	451.	452.	453.	454.
Corrected Total	456. 124	57. 124	458.	459.	460.	461.
Panel C: Table ANCOVA Normative Influence House III						
Gender	464. .371	465. 1	466. .371	467.	468. .829	469. .372
Ethnic	471. .684	472. 1	473. .684	474.	475. 1.526	476. .230
Income	478. .755	479. 1	480. .755	481.	482. 1.685	483. .208
Education	485. .270	486. 1	487. .270	488.	489. .602	490. .446
No of Purchase	492. 1.273	493. 1	494. 1.273	495.	496. 2.842	497. .106
Instructor	499. .326	500. 1	501. .326	502.	503. .728	504. .403
P13	506. 20.904	507. 42	508. .498	509.	510. 1.111	511. .405
Credibility	513. 11.865	514. 25	515. .475	516.	517. 1.059	518. .449
P23	520. 1.867	521. 1	522. 1.867	523.	524. 4.166	525. .053
Decision-making model (P13*Credibility)	528. 17.960	529. 27	530. .665	531. H4	532. 1.485	533. .174
Error	535. 9.857	536. 22	537. .448		539.	540.
Total	542. 124	43. 125	544.	545.	546.	547.
Corrected Total	549. 124	50. 124	551.	552.	553.	554.

Source: Author's compilation from statistical data processing (**significant at alpha <5%)

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