herding

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~~First Home~~First-Home Buyers and Herding Behavior in Surabaya, Indonesia

ABSTRACT

Purposes – This study ~~aimed~~ aims to determine the causality of herding which was traced down to social and normative influences from ~~first home~~first-home buyers represented by undergraduate students.

Design/methodology/approach – The Perception Alignment Hypothesis was used in this experimental research, and was conducted on a sample of 125 undergraduates representing ~~first home buyer~~first-home buyers studying finance. The experiment provides the subjects property brochures in Surabaya to ~~appraise to a value which they~~appraise a value that they see fit for purchase. The subjects were given both social and normative induced treatments separately using ~~a cascade of information~~information cascade, and their valuation shifts were recorded. Their valuations were then divided into three sections under the treatment groups, consisting of initial, 'social', and 'normative' valuations.

Findings – In contrast to previous findings, the results showed that ~~first home buyer~~first-home buyers succumbed to both social and normative influences, causing them to herd. Further analysis of the credibility of information was conducted and it showed that the undergraduates were only prone to social influence, whereas other aspects regarding normative influences must be further researched ~~regarding normative influences~~.

Research Implications – The decline of homeownership on a global scale is concerning, especially when 60% of the market represents young adults under the age of 35. This implies that both the government and property developers may need to enact strict measures to regulate ~~properties purchase~~property purchases.

Originality/value – This is the first experimental study on herding of Surabaya, Indonesia, mainly focusing on human behavior and information cascade. Thus, this study could be a viable

reflection to future policies in Indonesia being made to answer actual demands in the residential market.

Keywords: behavior, herding, social influence, normative influence, information cascade, ~~first home buyer~~irst-home buyers

Introduction

The act of copying one person's action has been an effective way of learning, such as the event when a baby copies her mother's expression for the first time (Seiler, Lane, and Harrison, 2014). Such a term was named herding, its definition is how individuals in a group can act collectively without centralized direction. Smith (1790) described how humans have the tendencies to follow one another for a specific purpose, regardless of the cause. Furthermore, herding has been a topic that attracts researchers studying the financial crisis, some even described herding as one of the possible aspects that caused the financial crisis (Szyszka, 2010). Lan (2014) finds that Chinese residential housing markets tend to herd before a financial crisis. Within the period of the post-financial crisis, there have been countless researchers trying to find a way to better the traditional methods in predicting market fluctuations (Wang, 2013).

Traditional approaches towards predicting market fluctuation have always assumed that investors act rationally in decision-making (Malkiel, 2003). The Efficient Market Hypothesis (EMH), Expected Utility Theory (ETU), and the Prospect Theory (PT) ~~has~~ have been the key methods in predicting the market through utility. The three methods have been able to depict how economic cycles caused risks in investments. However, Keynes (1936) stated that even when investors tried their best at making rational decisions, the mind still surrenders to desire, feelings or simply the level of courage in deciding a risky investment. In the research of behavior in simple games rose those three theories (EMH, ETU, and PT) which were applied to the stock market for over half a century. By the end of the '90s, behavioral finance was a

new topic to be discussed in economic instances. Kumar and Goyal (2015) described herding as the most discussed behavioral biases when it comes to investment decision making in the indirect real estate stock market.

In the year 2016, the Indonesian economy ~~has been~~ was at its lowest since the 1998 crisis, and an economic crisis from one of Asia's leading economic countries could potentially affect the global market, thus methods to avoid it is essential. Now focusing on the direct real estate market, Indonesian residential properties are considered as the most profitable investment an individual could make (Lamudi, 2017). Investors consider house investments to have higher profitability since land prices continue to grow, but this belief may be the potential cause ~~to~~ of the financial crisis or property bubbles. There are two types of possible investors that would be discussed in this paper, one which seeks property to gain profit, and the other for a ~~first home~~first-home purchase. Individuals who purchased homes for the first time may consider such a decision one of the biggest decisions they have ever made (Dreier, 1982). The two perspectives were intriguing to observe since Diaz and Hansz (1997) suggested how individuals would use the opinion of others when they have no experience in a field. In other words, information cascade is crucial to individuals that have no prior knowledge before deciding. Banerjee (1992) proved that information cascade can lead investors to neglect real values and ~~instead follow the market~~follow the market instead.

Creating moments that ~~enables~~ enable groups of people from all sorts of ~~background~~ backgrounds to buy a product is the very essence of marketing. The problem is the market inefficiency and its decline, which Lee and Reed (2014) ~~stated~~ stated, that there was a noticeable decline in homeownership among first-time buyers in many countries, particularly households at the age of fewer than 35 years old. Cribb et al. (2018) further ~~confirm~~ confirmed that ~~those born~~those who were born in the late 1980s had a homeownership rate of 25%, compared with 33% ~~of~~ for ~~those born~~those who were born 5 years earlier. Monico (2013)

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surveyed that f~~irst home buyer~~<u>irst-home buyer</u>~~s,~~ prefer to delay their purchase of residential properties. On top of that, Lamudi (2017) specifies that the most dominant consumers <u>of </u>the Indonesian real estate market varies from 18-34 years old at over 60% of the entire market, while the city of Surabaya contributes the third-highest residential housing purchase after Jakarta and Bekasi in Indonesia. Every business owner around the world would want their product and/or services to be known and used by the public eye for a specific purpose, which implies that there needs to be a better comprehension of herding behavior to achieve market stability.

There were some but few researchers that studied the effect of herding in the direct real estate market. Baddeley (2005) found that herding can be an additional aspect to the traditional theories in depicting the real estate property cycles. Dalko (2016) has suggested the Perception Alignment Hypothesis (PAH), which hypothesized how information cascade may be the cause of herding. ~~Baddeley also (2011)~~<u>Baddeley (2011) also</u> suggested an experimental method through the valuation of residential property representing investor's ~~decision making~~<u>decision-making</u> in property purchase, which was considered as the willingness to pay or purchase. The experiment beforehand was done with the consideration of social, normative and psychological aspects.

Upon the investigation of the three aspects to herding, which considered social, normative and psychological influences, it was apparent that both social and normative influences were important and that psychological influence was not due to group effects in the experiment. Supporting such findings, Cohen (1968) also revealed that personality does not differ statistically between men and women around the world.

This paper attempts to separate the social and normative influences in herding by modifying a previous experimental method and integrating PAH into it. The remainder of this paper is organized as ~~follows.~~<u>follows;</u> ~~The~~<u>the</u> second section presents supporting theories and

experimental design and ~~procedures. The~~procedures, the third section provides results and discussion, and the fourth section concludes.

Literature review

  This study was the result of three strands of research. The first literature examined the applications of herding throughout various instances, and it provided current approaches to modeling herding behavior. The second literature suggests a new approach to herding referred to the Perception Alignment Hypothesis (PAH), which examined the causality of herding through information cascade. The third literature examined the causality of herding in residential real estate associated with social and normative influences.

  Prior studies in the 20th century have found how individuals were affected by others in decision making (Asch, 1955). The research expanded as researchers applied the theory towards trading tasks and found that social pressure does exist in trading as well (Baddeley et al, 2007). In the early 21st century, the efficient market theory had received many critiques, and researchers have since begun to migrate from the traditional economic theories to behavioral finance with herding as one of the key factors of the inefficient market (Sheifler, 2000).

Information Cascade

  As part of the herding behavior, Shiller (2000) explained that information cascade was a possible cause of herding. Banerjee (1992) first created a model based on the assumption that each individual makes the same decision to the prior decision-maker if they were given such a piece of information. Raafat et al. (2009) modeled two main approaches of herding, which were (1) pattern-based approaches, and (2) transmission-based approaches. The first focuses on physical traits, queue models, network topologies and biological flocking in herding. The other branch of the herding model depicts the transmission-based approach to herding, which mainly

consists of non–mentalizing and mentalizing models. This paper focuses on the mentalizing section on the herding model, which consists of rational models of herding, information cascades, social psychology, social influence, and conformity.

The aim of this paper ~~was~~ is to investigate how a controlled experiment can further the understanding of the effects of information cascade towards herding when limiting the investor's surroundings through social and normative influences. The PAH hypothesized that information cascade occurs through three main factors: (1) Credibility, (2) Source of information, and (3) Media of information.

Indonesian people have a specific set of unique characteristics related to PAH. Credibility was measured by the trust of Indonesian investors towards the source of information, which Nielsen (2015) stated as the investor's own relations. It was also found in numerous cases that trust was measurable by the integrity of an individual, and was measured using three aspects: (1) responsibility, (2) truthfulness, and (3) reputation (Wong, 2017). Nielsen stated that the source of information that was to be trusted originated from the investor's relation thus can be separated into two groups of internal relations and external relations. Ho et al. (2016) found that the word of mouth was the most trusted way for Indonesians to receive information. Hence, the three aspects of PAH were used as some limitations in this paper.

Social and Normative Influences

Alongside information cascade, the influences that cause herding is just as important. Asch (1952) conducted an experiment which tested social influence towards the ~~decisions making~~decisions-making, ~~it~~ and it was proven that individuals were susceptible to the words of others when an opinion represents 25% of the majority. Normative influence occurs when the desire of an individual in fulfilling the expectation of others in a group was deemed

necessary. The normative influence was closely related to reputational herding, which Keynes stated that individuals tend to have their reputations untainted when failing because of a decision as a group rather than failing alone. It was further confirmed when Scharfstein and Stein (1990) found out that investors herd in the stock market in order to retain their reputation. In contrast, Anderson and Holt (1996) stated that when information can be exchanged between both sender and receiver, that particular individual will tend to uphold their own opinion.

Herding and the Market Complexity

The emphasis given on herding as a behavioral bias can be seen throughout prior researches. Individuals were susceptible to the opinion of others when making decisions, as seen in multiple research results. However, Anderson and Holt (1996) stated that the acceptance of information gained from others only happens if they think that such information was rational to their understanding. Anderson and Holt (1997) also emphasized that when a two-directional exchange of information occurs, individuals tend to uphold their personal opinions. Demography has a role in segmenting the market, but regardless of age, Hott (2012) stated that herding was a viable behavioral bias in depicting house prices fluctuations when compared to the traditional methods.

Prior researchers have also done multiple analysis of herding behavior in the stock market (Choi, 2013). Olsen (1996) stated that herding causes abnormal returns in investments, hence deepens the intriguing topic of behavioral bias. Lee et al. (2004) found that individual investors were more susceptible to herding behavior, ~~on~~ while on the other hand, institutional investors can still be subdued by informed traders in the Taiwanese stock exchange. Similarly, Caparrelli et al. (2004) confirmed that investors were more likely to herd under extreme market conditions. Some researchers have also analyzed how herding applies to the direct market and has found that herding exists there as well.

Herding and Heuristics

Herding is very closely related to heuristics and is often considered as the same thing, such as anchoring and adjustment. Herding is a type of behavior for an individual to follow the group. In other words, herding is the reaction of how an individual receives some influence (Shiller, 2000). On the other hand, Epley and Gilovich (2006) stated that anchoring and adjustment is the process ~~when~~ where an individual already has a grasp or basic understanding of something and is able to adjust their thoughts on the very same object due to a variety of influences. Epley and Gilovich (2006) also found that adjustments on anchors may be diminished by incentives to engage in effortful thoughts.

Herding behavior itself may be either rational or irrational in concept. In retrospect, traditional theories suggest that investors act rationally by calculating all sorts of information before making a decision. However, investors may also act irrationally, they may buy a residential estate at a given price in hopes of it increasing in the future (Fitzpatrick and McQuinn, 2007). Limiting the type of herding that is discussed in this paper, the author focuses only on the mental, rational model of herding, which focuses on information cascade in relation to the PAH theory.

*F~~irst Home Buyer~~irst-home buyer*s

Young adults or often referred to millennials are currently the main buyers of residential housing in Indonesia; therefore, they can be considered as an influential group in the Indonesian Economy (Lamudi, 2017). However, reports show that the Indonesian property sector is stated as not ready to shine yet, and has hit rock bottom in 2016 (DBSVI, 2017). Demands of the property would only move at a slow pace and marketing sales could only be driven by price growth, rather than volume pick-up due to an oversupply of housing, especially apartments.

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Literature on choosing first home buyers is provided in this section, and is further elaborated in the methodology section, under 'participant'.

This may have resulted in the preference of using bank loans as the primary payment method of buying houses (Lamudi, 2017). Learning from other countries, the increase of subsidies in bank loans also increases the housing price, and the extent to which escalating house prices exacerbates ~~is~~ not only risks faced by households but ~~also house building~~also by house-building (Lee and Reed, 2014).

The Indonesian government has issued new regulations towards property developers in order to suppress foreclosure of bank loans due to the lack of buyers. For example, the Indonesian Government provided regulations that support home purchase for those with minimum-wage laborers, which was the construction of 1 million landed residential housing across Indonesia (*Program Satu Juta Rumah*). Indeed, such plans may be one stepping stone towards raising the demand for residential housing in Indonesia, especially for young adults. This further emphasizes that preventive measures must be taken in times of homeownership decline.

Realizing the decline of homeownership, ~~first home buyer~~first-home buyers are essential to this predicament. Although ~~first home buyer~~first-home buyers need a house to live in, their income may be relatively low, and the amount of loan approved depends on that income, hence determining the house value that can be purchased. Such events lead the ~~first home buyer~~first-home buyers to be more rational than the regular property investors, whose investment stimulus is stronger than their actual need because they have the income to spare (Goss, 2010; Monico, 2013 and Hood, 1999). Anastasia et al. (2018) supported such theories and ~~discusses~~ discussed how younger individuals or families in Indonesia tend to be more rational in ~~decision making~~decision-making.

Valuation, the Decision-making Process, and Cognitive Constraints

The key model to analyze the decision-making process of individuals is by measuring

their willingness to pay to buy houses. The willingness of individuals who want to purchase a house requires a cognitive process, and so they are closely related to the anchoring effect and ~~loss aversion~~loss-aversion effect (Baddeley, 2011). Furthermore, they would consider the value of the house and ~~adjusts~~ adjust 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~~things, such as the objective information related to the house, including land and building area, location, or other information related to fundamental values (Baddeley, 2016). Only when an acceptable value is reached ~~will lead~~will it lead to the decision of the purchase.

Hypothesis Development

The approaches from prior research were modified to our approach to further understand herding. Through the integration of experimental method with limitations from the PAH and the controlled investor environment, this paper attempts to experiment on the behavioral bias called herding. Previous findings show that individuals are susceptible to both social and normative influences. However, none specifies which of them drives individuals whether to ~~herd or not to~~herd or not. Herding is thus influenced by the available alternatives:

H₁: Herding sets the difference between the final and prior valuation due to social influence.

By receiving the social influence after making an initial valuation of how much money the ~~first home buyer~~first-home buyers are willing to pay ~~for buying~~to buy a residential property, it is important to consider ~~how can such information influence them~~how such information can influence them. ~~Especially~~, especially when a majority of people's opinion may be in contrast to their own.

H₂: Socially influenced information moderates herding behavior in investor valuation in the context of social influence

In theory, trust is the key to how an individual may or may not regard the information

given to them. This also applies to the PAH theory, information cascade is the media used to deliver information to ~~individuals, however~~individuals. However, the decision whether to follow the herd solely depends on each individual. Henceforth, measuring trust is considered and measured on how the credibility of one information may lead to herding (Rofiq, 2007; Wong, 2017). This applies to all sorts of influences that an individual may receive, may it be either social or normative influences.

H3:   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~~two-way interaction (or more) is allowed between individuals, a variety of opinions and information is exchanged and the possibility to herd may actually decrease. Indeed, the flow of information is unrestricted among the individuals, however, this may actually lead to the upholding of individual opinions (Anderson and Holt, 1997)

H4:   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~~ needs to be done on the ~~normative influence~~normative-influence treatment. This is due to both of the influences being a media for the information cascade.

H5: The Credibility of information moderates herding behavior in investor valuation due to normative influence

Methodology

Participants

Purposive sampling was done in this research to test herding in specific groups. A pilot

study was conducted within two groups of society to test how applicable the experiment method was to Indonesians. The first ~~pilot test candidate~~pilot-test candidates ~~was~~were 30 people consisting of property developers, with the assumption that they have experience in real estate investments. They were invited to join in the experiment by the use of formal letters sent to the related institutions. The second group was postgraduate students representing ~~first home buyer~~first-home buyers. Only after analyzing the results from the pilot study, improvements to the experimental method was made and further experimentation was conducted on the undergraduates.

The use of undergraduate students came into consideration as a representation of the ~~first home buyer~~first-home buyers to test the Perception Alignment Hypothesis theory. On the other hand, both property developers and postgraduate students already have experience in property investments, whereas the undergraduate students have none. True, this means that external validity may become an issue as the undergraduate students are more homogenous as a population than non-students. However, this does not mean that the results are not to be generalized due to its lack of representation. The use of heterogeneous representatives may increase the external validity of one's results, it may also lead to an inflated "error" variance because background factors would then be ignored (OK, Shanklin and Back, 2008).

Study findings in ~~some literature~~several literatures on the results of students as representatives of consumers are somewhat mixed. Some confirm that students can be reasonable in studying information and is able to follow the decision-making process (Ashton and Kramer, 1980). On the other hand, some also argue that ~~student~~students' results ~~is~~are limited and ~~varies~~varied, because the students as a convenience sample may lack interest in engaging the experiment (Lynch Jr, 1982). Other threats to external validity were the lack of basic knowledge from the ~~participants,~~participants. ~~however~~However, the students that participated in the experiment have all received courses on property appraisal. Generalizability

of research findings derived from the students in an experimental setting to "real-world situations" has been recognized, analyzed and it has its pros and cons in multiple disciplines over the decades (Peterson, 2001). Indeed, there would be some threats to the "~~real world~~real-world situations", however, Lynch (1999) suggested that results from settings with sets of "real" people are less generalizable compared to the results from settings with student participants. Realizing such threats, the students can represent ~~first home buyer~~irst-home buyers, in this case, it is specifically those who are under 25 and who have received higher education.

Without disregarding the external validity threat, internal validity is also considered. ~~Time~~The time of the experiment are factors that came into consideration. The time factor is important since it is important to consider participant fatigue in engaging the experiment, hence every step of the experiment is evaluated on the pilot study. The time regarding when the experiment begins was also considered, since it may render different results at different times of the day. This leads to the decision that the experiment should be ~~done in simultaneously~~done simultaneously for all participants.

Prior research also indicated that gender groups had effects on herding (Mohammadi and Shafi, 2016). ~~In~~For the purpose of minimalizing the errors from other variables, ~~hence~~ blocking was applied to the gender groups in the pilot study. As for the experience factor, the corresponding participants were selected to differentiate experienced real estate investors (developers) and the ~~first home buyer~~irst-home buyers (postgraduate and undergraduate students). As part of the pilot study, 10 samples from each group were taken from the developers and postgraduate students. The developer group consists of an all-male group, and the postgraduate students taken in this experiment consist of both 10 males and 10 female participants. Whereas the main study conducted on the undergraduates consists of 125 people from the finance program and tax accounting program. Participant demographics can be seen

in Table 1.

Table 1. Participant Demographics

Demographics		Developer n=10 (%)	Postgraduate students Male n=10 (%)	Female n=10 (%)	Undergraduate students n=125 (%)
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

Table 2. Participant Demographics (cont'd)

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

Other than gender differentiation, the experience based on residential property transactions was also considered. Participants were asked how many times they have purchased residential properties, and when they last did such transactions. The developers were all experienced in

residential property transactions, whereas most of the ~~students never~~ students have never purchased any ~~kind of a real~~kind of real estate in their lives. Only some postgraduate students had purchased 1 to 2 properties in their lifetime, and none of the undergraduates had purchased any kind of property in their lifetime.

Experiment Design

The main purpose of the experimental design was to determine the causality of herding, which lies between both social and normative influences through the limitations of PAH. The two influences were then analyzed by using moderated regression analysis (MRA) to determine its significance. The model used for the MRA can be seen in Figure 1, meaning that the initial valuation would be untainted, whereas the second and third valuations may differ due to the two influences.
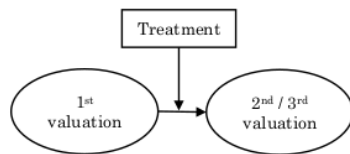
Treatment

1st valuation

2nd / 3rd valuation

Figure 1. Model for Moderated Regression Analysis

Field Code Changed

The experimental process created attempts to simulate the decision-making process made by the ~~participant~~ participants' 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:

1. Subjects were divided into groups of 5 and given 5 sets of property details for 5 real5 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 (asking price from brochures) to give them the sense for likely valuations of the other three properties. The subjects were given brochures of 5 houses, each containing basic information about the houses, which among them are: map marked with property location and all nearby landmarks, facilities, house area, land area, interior designs, house façade, and 3D rendered images.

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 the social influence induced 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 tests normative influences by allowing subject subjects to communicate with each other, and subjects were then asked to place their final valuations for the three remaining houses.

Control Variables

The socially influenced information given to the participants and credibility of information acts as the control variable. The credibility of information from the investor's surroundings was indicated by the three indicators (1) responsibility, (2) trustworthiness and

(3) reputation which was measured with a Likert scale measuring from 1–5, (1) being least certain to (5) most certain.

Time is also controlled at every step of the experiment, the total length of the experiment is scheduled not to last longer than 60 minutes. Following the schedule, each valuation (initial valuation, social treatment-induced valuation, and normative treatment-induced valuation) is limited to 15 minutes per valuation session.

Time as in when the experiment was going to take place required all participants to undergo the same process at the same time. Hundreds of participants ~~when~~ who are willing and able were then scheduled to engage in the experiment within the same ~~time frame 8~~time frame of 8 working hours (8.00 ~~A.M~~A.M. – ~~164~~.00 ~~P.M~~P.M.). This is important, since the cognitive ability is affected throughout the day, and is normally high during the day. Undergraduates, for example, are at their optimal condition in terms of cognitive ability starting from 11 A.M to 9 P.M, reaching its optimal at 11 ~~A.M~~A.M. – ~~131~~.00 ~~P.M~~P.M. ~~in the afternoon~~ (Evans, Kelley and Kelley, 2017).

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 socially influenced information given to the participants. 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.

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.

Pilot Test Results

Through non-parametric tests, it was evident that developers do not herd when subjected to social influence. However, through the analysis of MRA, developers have the tendency to herd when the opinion of others represent a majority of the crowd (75%) with a Z score = -2.375, p-value = 0.018. This proved that the external flow of information can lead to herding when a majority of the crowd wills it. Row H2 shows how the socially influenced information affects the decision of developers, and it was found that under various levels of crowd representations, whether it was 25%, 50%, or 75% had a significant effect to on investor decision. The MRA indicated that the moderating effect of socially influenced information is as follows:

1. Representing 25% of the crowd's opinion gives the significant value of adjusted R^2 = 0.631, F (1.9) = 18.104, p-value = 0.002.

2. Representing 50% of the crowd's opinion gives the significant value of adjusted R^2 = 0.635, F (1.9) = 18.433, p-value = 0.002.

3. Representing 75% of the crowd's opinion gives the significant value of adjusted R^2 = 0.539, F (1.9) = 12.676, p-value = 0.006.

The MRA also indicated that credibility of information was only significant at 75% of the crowd's opinion, with adjusted R^2 = 0.332, F (19) = 5.974, p-value = 0.037. This result was consistent with the first hypothesis, where developers only herd when a majority of the crowd represents a piece of information.

Statistical tests on normative influence towards investor's herding behavior showed that developers do not herd when allowed to discuss results with their co-workers. This result may be a result of a two-directional flow of information since decision-makers tend to retain their opinions in such conditions. The credibility of information was insignificant in all cases within

the third valuation and was consistent with the third hypothesis, which evidently showed developers do not herd due to normative influences. The results revealed that male students were susceptible to both social and normative influence, causing them to herd in all cases. Such an event can be explained by Simonsohn and Ariely (2008) who found evidence that experience has effects on herding behavior, where investors with minimum experience tend to make rash decisions.

The socially influenced information model had significant levels and affected the male postgraduates to herd. Within the male student's valuations, the statistical results were as follows:

1. Representing 25% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.439$, $F(1.9) = 8.840$, p-value $= 0.016$.

2. Representing 50% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.829$, $F(1.9) = 49.413$, p-value < 0.001.

3. Representing 75% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.659$, $F(1.9) = 20.358$, p-value $= 0.001$.

Statistical tests conducted on the female postgraduates revealed results that mirrored the male counterpart. Unlike its counterpart, the female participants were not susceptible to both social and normative influences, hence proving that the females do not herd. Although the socially influenced information model had significant levels and affected the female postgraduates, it was not able to cause them to herd. The statistical results of the female postgraduates were as follows:

1. Representing 25% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.987$, $F(1.9) = 769.365$, p-value < 0.001.

2. Representing 50% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.965$, $F(1.9) = 279.001$, p-value < 0.001.

3. Representing 75% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.990, F(1.9) = 038.869, p\text{-value} < 0.001.$

The reason for this predicament may be explainable by Mohammadi and Shafi (2016) who found evidence that females were less likely to herd alongside their female companions.

Adjustments of the Experimental Procedure

In regards to external validity, the gender block now stands as a questionable variable towards the results of valuations. In the purpose of mimicking real-world situations, gender differentiation cannot be done in real estate purchase situations, adjustments made in the experimental procedure were as follows:

1. The time construct must be asserted, and all the participants must undergo the experiment at the same time and conditions since the different times on the pilot study may affect the results. Both real estate developers and postgraduates were tested under different times and places due to work-related circumstances. The real estate developers were experimented on at 15.00 – 16.00 P.M., whereas the postgraduates at 18.00 – 19.00 P.M.

2. The gender variable was no longer blocked to mimic a real-world situation.

Results

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

      The results from Table 2 indicated that the undergraduate students' valuations were reliable for further testing. Validation of the valuations was represented by the KMO and

Bartlett test, which also indicated that the factor analysis for credibility can be conducted in the undergraduate group.

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
P11	1								
P12		1							
P13			1						
P21	.655**			1					
P22		.503**			1				
P23			.534**			1			
P31	.181*						1		
P32		.199*						1	
P33			.352**						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

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 = Socially influenced property type 'i' valuation

mi_i = Credibility of information as moderator of property type 'i'

i = ith house type

Hypothesis Testing

Participant demographics were also analyzed as covariates using ANCOVA for further checking of internal validity. However, it is to be noted that homogeneity assumptions were violated in the Levene's test, and had a *p*-value>0.05, this means that the variance is equal across groups. Such results may be caused by the unequal sample sizes across the groups, and this means that uncertainty is high in the data set when ~~analyzing~~ analyzed using ANCOVA.

Considering the unique data set, normality tests were also conducted to participant

valuations, and the results indicate a ~~non parametric~~non-parametric test method must be used to test the existing hypotheses. Wilcoxon's method of comparing means was used to test whether the initial valuation differs when participants were subjected to social and normative influences. Moderated Regression Analysis was used once again to test how credibility and socially influenced information may affect participant valuation. The statistical test results from undergraduate valuations can be seen in Table 3.

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: Contrast on Socially Influenced Information

Variable		Sum of Squares	Df	Mean Squared	Hypothesis	F	p-value
P11*P1S	Regression	53.172	1	53.172	H2	92.339	.000
(moderate1)	Residual	70.828	123	.576			
	Total	124	124				
P12*P2S	Regression	31.326	1	31.326	H2	41.578	.000
(moderate2)	Residual	92.674	123	.753			
	Total	124	124				
P13*P3S	Regression	35.328	1	35.328	H2	49.005	.000
(moderate3)	Residual	88.672	123	.721			
	Total	124	124				

Table 3. Hypothesis Test on Undergraduate Valuation (cont'd)

Panel C: Contrast on the credibility of external information

Variable		Sum of Squares	Df	Mean Squared	Hypothesis	F	p-value
P11*INT (mi1)	Regression	15.167	1	15.167	H3	17.142	.000
	Residual	108.833	123	.885			
	Total	124	124				
P12*INT	Regression	6.527	1	6.527	H3	6.834	.010
(mi2)	Residual	117.473	123	.955			
	Total	124	124				
P13*INT (mi3)	Regression	1.615	1	1.615	H3	1.624	0.205
	Residual	122.385	123	.995			
	Total	124	124				

Panel D: Wilcoxon Test on Normative Influence

Variable				Hypothesis	Z	p-value
P11 – P31				H4	-5.366	0.000
P12 – P32				H4	-2.812	0.005
P13 – P33				H4	-4.654	0.000

Panel E: Contrast on the Credibility of Internal Information

Variable		Sum of Squares	Df	Mean Squared	Hypothesis	F	p-value
P11*INT (mi1)	Regression	.202	1	.202	H5	.201	.655
	Residual	123.798	123	1.006			
	Total	124.000	124				
P12*INT	Regression	3.026	1	3.026	H5	3.076	.082
(mi2)	Residual	120.974	123	.984			
	Total	124.000	124				
P13*INT (mi3)	Regression	.546	1	.546	H5	.544	.462
	Residual	123.454	123	1.004			
	Total	124.000	124				

Source: Author's compilation from statistical data processing

The statistical tests revealed that undergraduate students were susceptible to herding

due to social influence as described in panel A of Table 3. Panel B shows that socially influenced information had effects on participant valuations as follows;

1. Representing 25% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.424$, $F(1.123) = 92.339$, p-value $= 0.000$.

2. Representing 50% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.247$, $F(1.123) = 41.578$, p-value $= 0.000$.

3. Representing 75% of the crowd's opinion gives the significant value of adjusted $R^2 = 0.279$, $F(1.123) = 49.005$, p-value $= 0.000$.

The MRA in panel C of Table 3 indicated ~~that credibility~~that the credibility of information is only significant at 25% of the crowd's opinion, at adjusted $R^2 = 0.115$, $F(1.123) = 17.142$, p-value $= 0.000$, and 50% of the crowd's opinion at adjusted $R^2 = 0.045$, $F(1.123) = 6.834$, p-value $= 0.010$. This result was similar to the pilot study, where the experienced developers only herd when a majority of the crowd represents a piece of information. However, a majority of the crowd's opinion (75%) does not change the undergraduate participants' valuation. Such an event may be caused by a lack of experience, causing them unable to process the information given effectively. A second possible reason was the gender differentiation during the pilot study and the actual experiment, the environment provided for the undergraduates was more accurate to the real-world situation by comparison.

Panel D and E of Table 3 shows that the undergraduate students ~~were susceptible~~tend to herd due to normative influence. However, the credibility of information was not significant in causing such events. This may also be caused by the lack of experience in the real estate world, otherwise, it may also be caused by other factors ~~which~~ that belong outside of this study's scope of mentalizing herding. Another possible reason for the result was the existence of a two-way flow of information when the participants were allowed to exchange information. However, previous theories stated that when a two-way information exchange occurs, the

subjects tend to withhold their own opinions. In this case, the valuations of the undergraduates shifted, which was in contrast to the previous theories.

Discussion

*F~~irst Home Buyer~~irst-home buyer*s *and Herding*

In theory, every individual investor is to be considered rational in ~~decision making~~decision-making. Indeed, past reports ~~show~~ have shown evidence that ~~first home buyer~~irst-home buyers tend to be more rational investors. The ~~limited-time~~amount of time the participants were given in deciding the value of the ~~house in which~~house which they are willing to buy should allow them to think rationally. Previous research found that buyers that were doing more than one property ~~transactions~~transaction in a limited time tend to decide rationally (Frederick and Loewenstein, 1999). This was not true for this ~~study~~study as the ~~first home buyer~~irst-home buyers from the results were the exact opposite ~~of previous results~~. It was apparent that even ~~at~~in a limited time, the ~~first home buyer~~irst-home buyers of Surabaya may be irrational in ~~decision making~~decision-making, and were easily influenced. However, Frederick and Loewenstein (1999) also argued that humans are adaptive beings, such as the automated mechanism that allows us to react to what comes to our eyes. This means that a behavioral response is required in even the most basic signals.

Information Cascade and the Influences

The results showed that the ~~first home buyer~~irst-home buyers may not be rational in ~~decision making~~decision-making. Furthermore, the MRA shows that both social and normative induced treatments caused them to herd. This causality was further tested using the credibility of the information. On the social induced treatment, the credibility of information was crucial to the information cascade causality process. On the other hand, the credibility of information was not significant. This means that another factor may be the cause of herding when normative

values are applied in a situation.

Previous results argue that lack of experience could be the result of herding. Shusha and Touny (2016) inferred that experience affects herding, and those ~~which~~ who have minimal experience may make hasty decisions based on their mood. Anastasia et al. (2018) stated that emotional factors may dominate decisions when information is retained from the buyer's spouse, children or friends. In retrospect, some ~~research also argues~~researchers also argued that ~~first home buyer~~irst-home buyers tend to be more rational since they are more interested in homeownership rather than investments (Goss, 2010; Monico, 2013 and Hood, 1999).

The contradicting results from previous researchers may be viable explanations of why normative influence ~~cause~~ causes ~~first home buyer~~irst-home buyers to herd. Assuming ~~first home buyer~~irst-home buyers want to be rational since they lack experience, requiring information from the people around them is an alternative in the decision-making process. Purchasing the first house in anyone's life is a big decision, and young adults may still be unable to make individual decisions, thus are more likely to herd.

Other possible explanations to the contradicting results may be the effects from the media of information chosen in exchanging information with the first-home buyers. It was evident that Indonesians ~~believes~~ believe that the 'word of mouth' was the most viable source of information. Now it is apparent that even when making important decisions such as house purchase, first-home buyers of Surabaya are more likely to herd due to their high beliefs in the exchange of information through 'word of mouth'.

Conclusions, Implications, and Suggestions for Future Study

This paper has attempted to indicate the causality of herding through social influence and normative influence. The integration of Perception Alignment Hypothesis has further focused the causes of herding through its three aspects of credibility, source, and media of

Commented [A7]: In response to Reviewer comments. An extensive discussion was added on the unique traits of Indonesians leading them to herd.

information. The experiment results proved that undergraduates were susceptible to both social and normative influences unless they believe that the majority of a crowd upholds a group opinion. The results also showed that the undergraduates did not believe the internal flow of information amongst themselves, meaning that another variable was the cause of their valuation shifts. On the other hand, undergraduate students have high potential to the herding bias since they lack experience in the real estate world.

The results were somewhat ~~contradicting with~~contradictory to the results of previous researchers, who stated that f~~irst home buyer~~irst-home buyers tend to be more cognitive in decision-making. The results ~~show~~ showed that social and normative influence was evident in herding behavior for the undergraduates in Surabaya. It has been clearly shown that first-time buyers from Surabaya are prone to herd. Unlike previous evidence in other countries, cognitive abilities in first-home purchase may be ignored, and some research even argues that emotions and personal goals may determine decisions.

Furthermore, the results have confirmed that first-time buyers are easily manipulated, therefore, may be considered a threat in market instability. The burden is placed on the local government who should create a counter-intuitive plan or regulation that can provide stability to the market. For example, 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 as the main causes of herding behavior. This study was also limited by one tool, which was the 'word of mouth' as a media for the information cascade. Gadgets and other frequently used media may be used as another tool for the information cascade. There are still many internal and external factors that were practically impossible to be created in a simulation.

Finally, the experimental procedure limited both treatments to the f~~irst home buyer~~irst-

home buyer group, future researchers should try to test it on different subjects for testing replicability. For example, creating a situation where participants can mimic real first-time buyers from all sorts of backgrounds, who ~~should~~ might have an interest in purchasing a house. Such results can be compared to this study to test whether ~~heterogenous~~heterogeneous subjects differ from the student sample. Furthermore, because the f~~irst home buyer~~irst-home buyers were represented by student participants in this study, ~~thus~~ generalization of the results can be applied when the target market of property purchase mainly ~~consist~~ consists of f~~irst home buyer~~irst-home buyers. In this study, it is those who are under 25 and those who have received higher education.

> **Commented [A8]:** In response to Reviewer comments to generalization of the sample to "first home buyers" population.

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