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Herding behavior in the indonesia stock exchange around the covid-19 pandemic

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ABSTRACT

This study investigates the occurrence of herding behaviour on the Indonesian Stock Exchange during the COVID-19 pandemic. This study finds that herding action happened exclusively in the Indonesian stock market before the COVID-19 pandemic. In contrast, the herding behaviour in the Indonesian stock market decreased during COVID-19 pandemic. Further tests reveal that the decrease of herding behaviour was even higher when the market experienced extreme market return movements in both directions. All the findings stand when using an alternative proxy for the dependent variable in the robustness tests of this study. The results imply that Indonesian investors are more cautious and logical in their investment decision-making during the COVID-19 pandemic, owing to the certainty of the pandemic's detrimental impacts on the economy and, thus, stock prices.

INTRODUCTION

According to a recent study by Nurcahyono, Hanum, & Sukesti (2021), the COVID-19 pandemic put the Indonesia Stock Exchange (IDX) under heavy pressure. From the announcement of the COVID-19 emergency on March 2, 2020, to March 20, 2020, the composite stock price index (JCI) of the Indonesia Stock Exchange (IDX) dropped by 16% and on March 20, 2020, reached the lowest point for the JCI. The Coronavirus made its first appearance in Wuhan, China, on November 17, 2019. In less than 100 days, the virus infected over one million people and killed over 60,000 people around the world (World Health Organization, 2021). Due to the magnitude and spread, the World Health Organization (WHO) declared COVID-19 a worldwide emergency on February 20, 2020, and later a pandemic on March 11, 2020. Indonesia was declared a COVID-19 emergency on March 2, 2020, after discovering two residents infected with the virus. The news shook the Indonesian stock market significantly.

Due to the economic slowdown, COVID-19 has caused havoc in global financial markets and has had a significant influence on individual financial behaviour, as seen by the company's performance decreases (OECD, 2020). Rational investors will maximize their utility (return and risk trade-off) based on the information available in the market (Bouteska & Regaieg, 2020). Information Cascade is a phenomenon in which numerous people make similar choices sequentially (Bansal, 2020). Investors act rationally, when the stock price declines, the stock will be bought, and vice versa; the stock will be sold if the price stock increases. During market uncertainty and in times of crisis, investors tend to behave irrationally (Wu, Yang, & Zhao, 2020). One irrational behaviour among investors is herding behaviour, whereby investors tend to follow market consensus and other investors' behaviours without examining the economic fundamentals (Banerjee, 1992; Chaffai & Medhioub, 2018; Indārs, Savin, & Lublóy, 2019; Rahayu, Rohman, & Harto, 2021).

This study found evidence of herding behaviour in the Indonesian stock market before the COVID-19 period and none during the COVID-19 period. Furthermore, no herding behaviour in the Indonesia Stock Exchange during the COVID-19 era was found, even under extreme market conditions. According to the findings revealed in our study, participants in the Indonesian stock market were more reasonable in their investment decisions during the COVID-19 period. The result of this study implies that market participants in the Indonesia Stock Exchange do not conduct stock transactions blindly in a herding behaviour fashion to avoid losses or to gain returns during the pandemic period.

There are several ways in which this study contributes to existing literature. Most previous studies on herding behaviour concentrated on developed markets. As a result, there has been limited research

on the impact of COVID-19 on financial behaviour in emerging markets (Wu, et al., 2020). In addition, due to a lack of transparency and unsophisticated infrastructures, emerging markets are experiencing higher investors' psychological instability than developed markets (Luu & Luong, 2020). Our current study explores herding behaviour in the Indonesian stock market. Specifically, this study investigates herding behaviour in the Indonesian stock market before and during the pandemic COVID-19. The study of herding behaviour in equities markets has become a significant field of study for academics and practitioners. The implications from understanding investment behaviour in the Indonesia Stock Exchange surrounding a crisis period can be very beneficial for market participants, stock market operators, and policymakers in fulfilling their respective objectives. Earlier findings lack the observation on herding behaviour beyond the early stage of the COVID-19 pandemic period. This current study contributes to the literature by providing evidence of the impacts of the pandemic in a longer period of observations. By doing so, more thorough evidence on the impact of the COVID-19 pandemic on investors trading activities in the capital market can be obtained. Finally, this study contributes further by investigating the impact of herding behaviour on the extreme changes of the stock market index. Large increases and decreases of the index during the crisis caused by the pandemic may strongly induce investors to either follow market consensus or suppress their ideas on trading.

The remaining paper is organized with Section 1 introduction, Section 2 literature review, Section 3 describing the data and method, Section 4 stating the result, and Section 5 discusses the result, and Section 6 concluding the study.

METHODOLOGY

The stock exchange in Indonesia has existed since 1912. The stock exchange was closed from 1914 to 1918 owing to World War I, and it was closed again in early 1939 due to World War II. In 1977, the Republic of Indonesia's government reopened the capital market. The first issuer, Semen Cibinong, went public, signalled the reopening of the capital market in that year. Trading on the Stock Exchange was sluggish from 1977 until 1987. Until 1987, the total number of issuers was only 24 (Susilo, 2009). The IDX, on the other hand, thrived from 2009 to 2019. During the decade, JCI posted an increase of 198.3%, and in late 2021, there were 750 issuers from 11 industry sectors.

The initial sample of this study consisted of all stocks traded in the IDX from the period of March 3, 2019, to March 3, 2021. The number of companies listed on the IDX as of March 3, 2020, was 713 companies. The final sample that was used in investigating the existence of herding behaviour on the Indonesia Stock Exchange (IDX) in this study counts as many as 487 companies. The following are the results of the sample selection procedure in this study:

Table 1. Sample Selection

No.	Criteria	Total
1.	Stocks listed on the BEI in the period between 3 March 2021 – 3 March 2021	713
2.	IPO during the sample period	(107)
3.	Stock trade suspension	(87)
4.	Stocks with incomplete data	(32)
Total of research samples		487

Estimates of an individual stock's daily return and the daily average market return of individual stocks in the stock market are required to detect evidence of herding behaviours in the IDX. Using data provided on the IDX website, we estimated the average market return of each share in the stock market on a particular day and attained the market return on that day for the stock market. By repeating the procedure, the daily return time series for a certain stock market over a timeframe and herding behaviour could be obtained. Christie & Huang (1995) were among the first to attempt for quantifiying herding behaviour by using a cross-sectional standard deviation of returns (CSSD) metric. The formula for CSSD is as follows:

$$CSSD_t = \sqrt{\frac{\sum_{i=1}^{n}(r_{i,t}-r_{m,t})^2}{n-1}} \quad (1)$$

Where n represents the total company in the portfolio, $r_{i,t}$ refers to the actual stock return of each company i at time t and $r_{m,t}$ shows the cross-sectional average return of n shares at the time of the portfolio. Chang, Cheng, & Khorana (2000), however, noted that if the data has multiple outliers, it may result in biased CSSD. To address these issues, CSSD was modified by substituting the numerator with the absolute value of the difference between individual stock returns and market returns, renaming it cross-sectional absolute deviation of returns (CSAD). This study used CSAD to investigate herding activities in the IDX during the sample period. The formula for estimating CSAD is as follows:

$$CSAD_t = \frac{\sum_{i=1}^{N}|r_{i,t}-R_{m,t}|}{N} \quad (2)$$

where $|.|$ is absolute value

After obtaining the daily CSAD and market return index series, a regression model as in Chang et al. (2000) was employed. The model used to investigate herding behaviour in the Indonesian stock market during the whole sample period is as follows:

$$CSAD_t = \gamma_0 + \gamma_1 R_{m,t} + \gamma_2 |R_{m,t}| + \gamma_3 R_{m,t}^2 + \varepsilon_t \quad (3)$$

Where $R_{m,t}$ is the return on market portfolio at time t, $|R_{m,t}|$ is the absolute value of $R_{m,t}$. Evidence of herding in this equation if γ_3 is negative and significant. The model in Equation (2) was run on the data from March 2, 2019, to March 1, 2021, which are the periods both before and during COVID-19.

We separated the sample period into pre and during COVID-19 sub-periods by using a dummy variable to denote the sub-periods after performing a regression for herding behaviour in the Indonesian stock market for the sample period, as shown below:

$$CSAD_t = \gamma_0 + \gamma_1 R_{m,t} + \gamma_2 |R_{m,t}| + \gamma_3 R_{m,t}^2 + \gamma_4 R_{m,t}^2 * COVID + \varepsilon_t \quad (4)$$

Where $R_{m,t}$ is the return on the market portfolio at time t, $|R_{m,t}|$ is the absolute value of $R_{m,t}$. The earliest time before COVID-19 was March 2, 2020, when COVID-19 was officially declared by the Indonesian government. Therefore, COVID is a dummy variable that takes a value of 1 if the observation period is from March 3, 2020, to March 3, 2021, and zero otherwise. Coefficient γ_3 will be negative if there is an indication of herding behaviour in the IDX prior to COVID-19. If Coefficient γ_4 was also negative, there is an indication that herding behaviour was higher during than before the COVID-19 pandemic.

During the COVID-19 sub-period in the Indonesian stock market, we focused on herding behaviour in extreme market situations. Specifically, we run the regression as follows:

$$CSAD_t = \gamma_0 + \gamma_1 R_{m,t} + \gamma_2 |R_{m,t}| + \gamma_3 R_{m,t}^2 + \gamma_4 R_{m,t}^2 * COVID + \gamma_5 R_{m,t}^2 * COVID * Extreme + \varepsilon_t \quad (5)$$

COVID is the dummy variable that takes the value of 1 for the COVID-19 sub-period as before. Extreme is also a dummy variable that takes the value of 1 during extreme market conditions in the COVID-19 sub-period. Extreme market condition is defined as 5% of the ten highest market returns during extreme conditions and the ten lowest market returns during extreme conditions. Negative coefficient γ_3 provides evidence that there is herding behaviour before the COVID-19 pandemic. Negative coefficient γ_4 provides further evidence that there is an increase in herding behaviour in non-extreme market conditions during the COVID-19 sub-period. Meanwhile, the negative coefficient γ_5 provides evidence that the incident of herding behaviour during the COVID-19 sub-period in extreme market conditions is higher than in non-extreme market conditions.

Finally, we also analysed herding behaviour under the extreme market conditions separately with the following regression:

$$CSAD_t = \gamma_0 + \gamma_1 R_{m,t} + \gamma_2 |R_{m,t}| + \gamma_3 R_{m,t}^2 + \gamma_4 R_{m,t}^2 * COVID + \gamma_5 R_{m,t}^2 * COVID * ExtremeUP + \gamma_6 R_{m,t}^2 * COVID * ExtremeDOWN + \varepsilon_t \quad (6)$$

ExtremeUP and ExtremeDown are dummy variables that take the values of 1 when market returns are extremely high or low in the COVID-19 sub-period, respectively. Market returns were

extremely high (low) when average daily market returns are the highest (the lowest), 5% of average daily market returns during the COVID-19 sub-period. Negative coefficients of γ_3 provide evidence that there is herding behaviour before the COVID-19 sub-period, whereas negative coefficient γ_4 provides evidence that there is an increase in herding behaviour in non-extreme market conditions during the COVID-19 sub-period. More importantly, negative coefficients of γ_5 and γ_6 provide separate evidence that herding behaviour is commonly found in extreme high and low market returns during the COVID-19 sub-period compared to non-extreme market situations.

To analyze the effects of misspecification in estimating the deviation of returns, we also used CSSD for robustness tests. To do so, the aforementioned regression models in this study were also run using CSSD as the dependent variable. All the regression results using CSAD and CSSD were reported in separate tables for comparisons.

RESULT AND DISCUSSION

The Indonesian stock market's results and herding indices are summarized in Table 2. The average daily CSAD score was 2.43, as shown in the table. The lowest value of CSAD was -0.55, and the greatest value was 8.20. CSSD had an average value of 5.52. CSSD had a minimum value of -0.50 and a maximum value of 65.13. The average daily market return is -0.004%. The lowest market return during the period was -6.80% and 9.70% at its highest point. The results are shown in table 2 as follows:

Table 2. Summary Statistics

Variable	Observations	Mean	Std Dev.	Minimum	Maximum
CSAD	487	2.43	0.98	-0.55	8.20
CSSD		5.53	6.12	-0.50	65.13
Market Return		-0.004	1.33	-6.80	9.70

Table 3 displays the herding activity results in Indonesia during the sample period, both in the pre-COVID-19 and during the COVID-19 sub-periods. The coefficient of $R_{m,t}^2$, which indicates the existence of herding activity in the Indonesian market, has a negative sign, but it is not significant at the conventional levels. As a result, the findings indicate no evidence of herding activity among Indonesian investors in the sample period, both before and during the COVID-19 pandemic sub-periods in general.

Table 3. Empirical Results using CSAD for the Total Sample Period

Independent Variable	CSAD			
	Coeff	Std Err.	t	P>|t|
Market Return	0.09	0.028	3.30	0.001
Absolute Market Return	0.59	0.074	7.93	0.000
Squared Market Return	-0.008	0.010	-0.79	0.430
Cons	1.92	0.053	35.83	0.000
Prob > F	0.000			
R-Square	0.320			

The CSSD was used as the dependent variable in the model as in Christie & Huang (1995) to further investigate the existence of the Indonesian stock market's herding behaviour. The result using CSSD can be seen in Table 4, which shows that the $R_{m,t}^2$ coefficient is negative and weakly significantly at the 10% level. The result using CSSD as the dependent variable provides only weak evidence that there was herding activity among Indonesian investors in the sample period. The coefficient γ_3, which shows market return squared on CSAD earlier, indicates the absence of evidence that herding activity occurred during the COVID-19 and COVID-19 periods. While the CSSD result shows that the market return squared is negative and weakly significantly at the 10% level. So, even if there is evidence of herding behaviour on the Indonesia Stock Exchange during the sample period, the evidence is not robust enough to indicate that herding behaviour existed in the market during the COVID-19 epidemic.

Table 4. Empirical Results using CSSD for the Total Sample Period

Independent Variable	CSSD			
	Coeff	Std Err.	t	P>|t|
Market Return	0.40	0.246	1.66	0.098
Absolute Market Return	1.45	0.666	2.18	0.029
Squared Market Return	-0.158	0.087	-1.81	0.071
Cons	4.52	0.386	11.71	0.000
Prob > F		0.05		
R-Square		0.217		

Table 5 shows γ_3, the coefficient of R_m^2 during the COVID-19 period is -0.19, which is negative, and it is significant at the 1% level, indicating convincing evidence of herding behaviour in the stock market before the COVID-19 pandemic. In contrast, γ_4, the coefficient of the dummy interaction between R_m^2 and COVID, that detects changes in herding behaviour during the COVID-19 sub-period, is positive and highly significant at the 1% level. If there is evidence of herding behaviour in the Indonesian stock market, the data indicates that it occurred prior to the COVID-19 Pandemic. More importantly, the positive and significant sign of the coefficient, the dummy interaction of squared market return x COVID, indicating a change of herding behaviour during the COVID-19 pandemic, and a reduced stock market herding behaviour**.**

Table 5. CSAD Before and During COVID-19 Sub-Sample Period

Independent Variable	CSAD			
	Coef	Std. Err.	t	P>|t|
Market Return	0.08	0.02	3.04	0.003
Absolute Market Return	0.66	0.07	8.70	0.000
Squared Market Return	-0.19	0.05	-3.38	0.001
Squared Market Return X COVID	0.17	0.05	3.32	0.001
Cons	1.93	0.06	32.60	0.000
Prob > F		0.000		
R-Square		0.336		

To check the robustness of the findings, we also used CSSD as the dependent variable in the model as proposed by Christie & Huang (1995). The results of the regression equation using CSSD as the dependent variable can be seen in Table 6. The table shows the coefficient of $R_{m,t}^2$, which indicates herding behaviour activity in the period before COVID-19, is still negative and significant at the 1% level. However, the coefficient of squared market return x COVID which indicates the change in herding behaviour activity during the period the COVID-19 pandemic is again positive and significant at the 1% level. The findings using CSSD strengthen the previous findings of CSAD that the herding behaviour in the stock market is evident, and it occurred already before the COVID-19 Pandemic. This herding behaviour, however, was reduced during the COVID-19 pandemic.

Table 6. CSSD Before and During COVID-19 Sub-Sample Period

Independent Variable	**CSSD**			
	Coeff	**Std. Err.**	**t**	**P>|t|**
Market Return	0.26	0.19	1.32	0.188
Absolute Market Return	1.75	0.54	3.20	0.001
Squared Market Return	-1.27	0.40	-3.15	0.002
Squared Market Return X COVID	1.07	0.37	2.89	0.004
Cons	4.53	0.42	10.75	0.000

Independent Variable	**CSSD**			
	Coeff	**Std. Err.**	**t**	**P>|t|**
Prob > F		0.001		
R-Square		0.356		

For deeper analysis, we investigated herding behaviour in the stock market under various conditions, notably in extreme market conditions produced by the COVID-19 epidemic. In other words, this study also explores the changes in herding behaviour during extreme market returns as well as non-extreme market returns during the COVID-19 pandemic. To determine the herding behaviour changes during the extreme market condition, the extreme market was set as a dummy that takes the value of 1 if the daily market returns are the greatest and lowest of 5% among all market returns during the COVID-19 sub-sample period. If investors had increased their herding activities during extreme market movements in the pandemic period, then γ_5, the coefficient of the market return squared x COVID x extreme is negative and significant at the conventional levels.

The results shown in Table 7 use the coefficient γ_3, which indicates the presence of herding behaviour activity before COVID-19 was still negative and significant at the 1% level. Table 7 shows γ_4, the change in the herding activity during non-extreme market movements, and γ_5, the change in the herding activity during extreme market movements during COVID-19 using CSAD as the dependent variable are positive and significant at the 5% and 1% levels respectively. These results suggest that the stock market herding behaviour has existed prior to the COVID-19 pandemic, and it was reduced during non-extreme market movements during the pandemic. These herding activities were further reduced during extreme market movements in the pandemic period.

Table 7. CSAD in Extreme Market Condition

Independent Variable	CSAD			
	Coeff	Std. Err.	t	P>|t|
Market Return	0.08	0.027	3.20	0.001
Absolute Market Return	0.84	0.093	9.07	0.000
Squared Market Return	-0.28	0.065	-4.51	0.000
Squared Market Return X COVID	0.12	0.054	2.22	0.027
Squared Market Return X COVID X Extreme	0.12	0.036	3.28	0.001
Cons	1.89	0.059	31.68	0.000
Prob > F		0.000		
R-Square		0.350		

The robustness of the findings was determined using repeated CSSD analysis as in Christie & Huang (1995). Table 8 further demonstrates that the results are qualitatively similar, indicating no indication of increased herding behaviour in extreme or non-extreme market movements during the pandemic.

Table 8. CSSD in Extreme Market Condition

Independent Variable	CSSD			
	Coef	Std. Err.	t	P>|t|
Market Return	0.30	0.19	1.54	0.124
Absolute Market Return	3.53	0.65	5.40	0.000
Squared Market Return	-2.18	0.44	-4.97	0.000
Squared Market Return X COVID	0.53	0.38	1.41	0.159
Squared Market Return X COVID X Extreme	1.22	0.25	4.74	0.000
Cons	4.15	0.42	9.86	0.000
Prob > F		0.000		
R-Square		0.078		

In the end, we explored the changes in herding behaviour caused by COVID-19 in extreme market conditions separately. In particular, the analysis extended to investigate the changes when the market returns movements were extremely high and low separately. Table 9 and 10 show the empirical results of herding activities during the pandemic period when the Indonesian capital market experienced extreme movements of positive and negative returns using CSAD and CSSD as the dependent variables. If investors had increased their herding activities during positive extreme market movements in the pandemic period, then γ_5 and γ_6, the coefficients of the squared market return x COVID x ExtremeUp and the squared market return x COVID x ExtremeDown are negative and significant at the conventional levels.

Table 9. CSAD in Separate Extreme Market Condition

Independent Variable	CSAD			
	Coeff	Std. Err.	t	P>|t|
Market Return	-0.007	0.039	-0.20	0.844
Absolute Market Return	0.996	0.101	9.81	0.000
Squared Market Return	-0.377	0.067	-5.59	0.000
Squared Market Return X COVID	0.152	0.054	2.80	0.005
Squared Market Return X COVID X ExtremeDown	0.122	0.036	3.39	0.001
Squared Market Return X COVID X ExtremeUp	0.188	0.040	4.61	0.000
Cons	1.846	0.060	30.53	0.000
Prob > F	0.000			
R-Square	0.367			

Table 9 shows that using CSAD as the dependent variables results in the coefficient of γ_3, indicating that there are herding behaviour activities in the period before COVID-19, which was still negative and significant at the 1% level. Table 9 also shows γ_4, the change in the herding activity during non-extreme market returns movements, is positive and insignificant at the conventional levels. During extreme market movements, however, both γ_5 and γ_6 have positive signs and they are significant at the 1% levels. These results suggest that herding behaviour in the stock market existed prior to the COVID-19 pandemic and that these behaviours do not change during non-extreme market movements in the pandemic period. The changes, however, occurred when the market returns movements were extremely high and low. More importantly, the changes during extremely high and low market returns movements resulted from a reduction in herding activities of participants in the stock market.

The findings robustness was determined by repeated analysis using CSSD as in Christie & Huang (1995). Table 10 also shows that the results with CSSD are qualitatively the same, that there was strong evidence for a reduction in herding activities of participants in the stock market when it experienced the highest and lowest market returns movements during the COVID-19 pandemic. During non-extreme market returns movements, however, there is only weak evidence that the herding behaviour is reduced since γ_4 is positive and weakly significant and the 10% Level.

Table 10. CSSD in Separate Extreme Market Condition

Independent Variable	**CSAD**			
	Coef	**Std Err.**	**t**	**P>|t|**
Market Return	-0.24	0.27	-0.87	0.383
Absolute Market Return	4.39	0.71	6.12	0.000
Squared Market Return	-2.72	0.47	-5.71	0.000
Squared Market Return X COVID	0.71	0.38	1.86	0.063
Squared Market Return X COVID X ExtremeDown	1.23	0.25	4.83	0.000
Squared Market Return X COVID X ExtremeUp	1.60	0.28	5.56	0.000
Cons	3.89	0.42	9.09	0.000

Independent Variable	CSAD			
	Coef	Std Err.	t	P>|t|
Prob > F		0.000		
R-Square		0.094		

Discussions

This study finds that herding activity did not occur in the Indonesian stock market for the whole sample period. When the sample period is divided into two sub-sample periods, however, the coefficients of $R_{m,t}^2$, that represent the evidence of herding activity in the Indonesian stock market prior to the COVID-19 pandemic, are always negatives and significant for all tests. The negative and significant coefficients of $R_{m,t}^2$ mean that the Indonesian stock market herding behaviour had occurred before the pandemic, which is a non-crisis period. These findings support the findings in the studies conducted by Javed, Bagh & Razzaq (2017); Arisanti & Asri (2018), Nguyen (2018); Rahayu et al., (2021).

During the COVID-19 pandemic sub-periods, the coefficients of $R_{m,t}^2$ that show indications of herding activity in the Indonesian stock market are always positive and significant. As a result, Indonesian stock market herding behaviour decreases during the COVID-19 pandemic sub-period. Further testing demonstrates that when the market experiences extreme market returns in both directions, the decrease in herding tendency is much greater. Still further, the decrease of herding behaviour during the COVID-19 pandemic sub-periods only occurred when the market experienced extreme market returns movements. All the findings stand when using an alternative proxy for the dependent variable in the robustness tests of this study. The findings that herding activities in the Indonesian stock market decreased during the COVID-19 pandemic sub-period supported earlier studies of Bouri et al. (2021) and Wu et al., (2020).

The research findings, which showed that herding behaviour occurred prior to the introduction of the COVID-19 virus, provide another interpretation of Kahneman and Tversky's Prospect Theory. The prospect theory is regarding the consequences of human decisions whose outcomes are unclear in each situation (Kahneman & Tversky, 1979). According to this theory, investors' actual decisions are influenced by psychological factors that cause them to break from rational decision-making. By nature, stock investing involves uncertainty regarding the results. In the last 10 years, however, the composite stock price index (JCI), which is the reference stock index in Indonesia, increased steadily on a year-to-year basis, resulting in a total increase of 198.3%.

Seeing the unabated trend of the increasing index, Indonesian investors may become negligent and just follow investment decisions taken by the majority in the market. This adopted strategy has resulted in continuous positive results in their stock investments during the decade. In other words, they found that the value of their stock portfolio steadily increased over time. They might conclude that following a strategy that follows investment decisions taken by the majority in the market is the right strategy for that period.

When the COVID-19 virus spread globally, and the government announced a state of emergency, investors in the Indonesian stock market started to act rationally. Indonesian investors seemed very certain that the state of emergency would cause businesses to suffer and, therefore, stock prices to be dropped. In other words, the occurrence of the COVID-19 pandemic was an alarm for Indonesian investors to be more careful in making investment decisions. In addition, the herding behaviour during the COVID-19 period in China is also shown to be lower (Wu et al., 2020). Individual investors in the Chinese stock market are numerous, and their perceptions of COVID-19 varied widely because of the lack of knowledge on the pandemic, implying difficulty in reaching an investment consensus. Individual investors, on the other hand, may reach an agreement more easily during non-pandemic periods due to their general market knowledge. As a result, herding activity during the COVID-19 period may be significantly reduced.

The stock market is increasingly attracting young investors. Millennial investors in Indonesia were growing very rapidly during the pandemic period. Based on the records of the Financial Services Authority, as of December 30, 2020, there were 3.88 million investors. Of these, 54.8% were millennial investors under 30 years old (OJK, 2020). Millennial investors get used to being able to control their financial attitudes from a young age (Onasie & Widoatmodjo, 2020). Millennials set aside their money

to be saved and used for useful things, not just for shopping and fun, the money is saved for needs and responsibilities. One of the reasons for herding behaviour not found throughout the COVID-19 era and within extreme markets could be millennials' financial mentality.

CONCLUSION

This study investigates the presence of herding behaviour among Indonesian stock market participants before and during COVID-19. We used two empirical models of cross-sectional standard deviation (CSSD) and cross-sectional absolute deviation (CSAD) proposed by Christie & Huang (1995) and Chang et al. (2000) during the periods, respectively. This study finds that herding activity occurred in the Indonesian stock market prior to the pandemic. On the contrary, during the COVID-19 pandemic, this study uncovered evidence that herding behaviour was waning in the Indonesian stock market. Further tests revealed that the decrease in the behaviour was even higher when the market experienced extreme market returns movements in both directions. It can be concluded, therefore, investors in the Indonesia Stock Exchange exhibited adverse herding activities during the COVID-19 pandemic. This study's results imply that Indonesian investors were not that rational before the COVID-19 pandemic. Indonesian investors tend to imitate the judgment of others when making decisions. Meanwhile, herding behaviour was greatly decreased under the crisis induced by COVID-19. Due to the likelihood of the pandemic's detrimental impacts on the economy, Indonesian investors became more cautious and logical in making investment decisions during the COVID-19 pandemic.

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