Original Article

Is there Herding Behavior in the Indonesia Stock Market during the COVID-19 Pandemic?

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Abstract: This study investigates the signs of herding behavior during the COVID-19 pandemic in the Indonesian Stock Exchange. Various studies found no herding in Indonesian stock markets during the COVID-19 pandemic, but we believe those studies have a limited methodology to capture the herding behavior. We believe that herding appears in a short time during the pandemic period, so we have to reexamine the existence of herding behavior using sectoral stock indexes rather than the stock market-wide index (IHSG) and using the rolling regression technique to capture the possibilities of herding that might be existing during short window period in COVID-19 pandemic time. This study uses a model Chang et al. suggested (2000). Variables such as return dispersion (CSAD), absolute market return, and market squared return are employed in the analysis. We use the closing price of 715 stocks, nine sectoral stock indexes in IDX, and the closing price of IHSG from January 2, 2020, until April 30, 2021. The results show that herding cannot be found in the full sample of the market-wide stock index (IHSG) and sectoral indexes. The rolling regression indicates that herding was found for several days from January 2020 to December 2021. In conclusion,

Keywords: herding behavior; cross-sectional absolute deviation (CSAD); rolling regression; COVID-19; sectoral stock indexes.

1. Introduction

Herding comes from the word herd, meaning a group (Wardani, 2021). Generally, herding behavior can be interpreted as follow-up behavior. A person behaves following others in action, following most people's general trend. The history of herding dates to Kynes' idea in 1936 that humans are animal social and have basic animal instincts. Such instincts follow the same direction as the herd. Herding or jumping on the bandwagon can be found in various aspects of life. We tend to wear clothes that are popular today, eat in places that most people eat, and even gather in places that many people visit. In the investment world, herding behavior is seen in the behavior of investors in making investment decisions. Investors are stuck jumping on the bandwagon with other investors' decisions without fundamental or technical analysis, being irrational in making investment decisions. As a human being, being different itself becomes a

very difficult thing to do, especially in a panic condition. FOMO, fear of missing out (the psychology of traders who are afraid of missing out), will increase anxiety and decrease a person's rationality in stock transactions.

Herding behavior is a topic of discussion in the science of behavioral finance, an approach to determining investor behavior. It is necessary to analyze the herding behavior of investors since herding behavior can lead to future crises (Johansen & Sornette, 2000). Unnatural herding behavior can cause the stock price to exceed the normal price. Stock return volatility worsens due to investors' herding behavior (Bikhchandani & Sharma, 2001). Various financial literature states that in the capital market, there is an efficient market hypothesis expressed by Fama in 1970. A market is efficient if it describes complete information at a given moment. The hypothesis of an efficient market forms a classical financial theory that reveals that investors behave rationally. Rational investors analyze to maximize utility. According to Suresh (2013), there are two ways of analysis carried out by investors: technical and fundamental. Fundamental analysis refers to the utilization of certain financial information of related companies in predicting the future growth prospects of a particular company. Meanwhile, technical analysis focuses on implementing historical trading data and current financial news to measure future stock movement indicators (Usman, 2016).

The behavior of investors is not as described in the classical financial theory. Investors can act irrationally. The COVID-19 pandemic that occurred almost worldwide resulted in a drastic decline in stock price indices, including the Indonesian stock market. The Indonesia Stock Exchange Composite Stock Price Index experienced a drastic decline because many investors sold their shares. This event indicates that the Efficient Market Hypothesis does not apply to these conditions. The government announced two positive cases of COVID-19 in Indonesia in March 2020, which caused trading on the stock exchange to drop significantly. Financial markets have a negative impact both internally and externally. The JCI situation reached its lowest point on March 24, 2020, a decrease of 37.49% from the end of 2019 (mediaindonesia.com). Stock market investors have reacted unfavorably quickly once the COVID-19 case was first made public on March 2, 2020. For several days, the composite stock price index (JCI) experienced steep declines back-to-back. Because the index dropped by 5% in a single day, the government instituted a trading moratorium (the index was suspended for 30 minutes).

Table 1. Halt Trading Stocks during the COVID-19 Pandemic

Date	Time	IHSG
March 12th, 2020	15.33 WIB	4,895.74
March 13th, 2020	09.15 WIB	4,650.58
March 17th, 2020	15.02 WIB	4,456.09
March 19th, 2020	09.37 WIB	4,113.64
March 23th, 2020	14.52 WIB	3,985.07
March 30th, 2020	10.20 WIB	4,318.29
September 10th, 2020	10.36 WIB	4,891.87

Source: https://katadata.co.id/safrezifitra/finansial

Table 1 shows that trading has been halted seven times since the pandemic began. The peak of the decline in the JCI occurred on March 24, 2020. JCI closed at 3,937. Investors tend not to do fundamental and technical analysis during the COVID-19 period. Investor fears of a plunge in stock prices have resulted in more investors following the market consensus (Sihombing, 2021). When the stock market fluctuates significantly, investors ignore personal beliefs and follow other investors (Marietza et al., 2015). According to behavioral finance theory, emergency situations affect investors' psychology and behavior, which significantly impacts stock prices (He et al., 2020). The phenomenon in the stock market during the pandemic makes it interesting to see if investor behavior shows any indication of herding behavior during the pandemic.

Changes in investor behavior are influenced by psychological aspects that can change decision-making. This concept is called "behavioral finance" (Hudson & Muradoglu, 2021). The concept of behavioral finance can explain why the market is inefficient. Behavioral finance suggests that investors mimic the actions of others, especially during periods of turbulence, fear, uncertainty, and panic (Dhall & Singh, 2020). Investors do not always think rationally because they often act irrationally in the capital market based on judgments influenced by emotions, subjectivity, and other psychological factors. Herding behavior is the behavior of investors who follow market consensus without conducting fundamental analysis (Gunawan et al., 2011). In another sense, when the stock price falls, the investor sells the stock because it follows other investors selling the stock. Research on herding behavior has been carried out a lot, but no one has seen herding behavior in the sectoral index on the Indonesia Stock Exchange during the pandemic. This study analyzed herding behavior at the industry level for two reasons. First, based on the results of previous studies, it is stated that investors are generally faced with the same problem of making investment decisions and that investors tend to observe the trading of other investors at the industry level (Bikhchandani & Sharma, 2001; Bui et al., 2018; Dhall & Singh, 2020). Second, industrial indices consist of various stocks, so this approach is appropriate to see the herding

behavior in the industrial sector (Dhall & Singh, 2020). This study used Cross Sectional Absolute Deviation (CSAD), popularized by Chang et al. (2000), to see the occurrence of herding behavior. The results show that even though herding cannot be found in the full sample of the market-wide stock index (IHSG) and sectoral indexes, the rolling regression indicates that there was herding found on several days from January 2020 to December 2021.

2. Materials and Methods

Herding behavior is identified as an investor's tendency to mimic the behavior of other investors (Dhall & Singh, 2020). Previous research has stated that intensive herding behavior will cause extreme stock movements in the stock market (Haridas & Uchil, 2020). Researchers Espinosa-Méndez and Arias (2021) mentioned that the COVID-19 pandemic increased herding behavior in European stock markets. Besides that, Wu et al. (2020) found no herding behavior in the Shanghai and Shenzhen stock markets during the COVID-19 pandemic. Research conducted by Wardani (2021) shows that in 2020 there was no herding behavior in LQ-45 stocks. Research by Sihombing (2021) also shows no herding during the COVID period of February – June 2020. During times of crisis, Asian markets show the occurrence of herding behavior, in contrast to the American market which shows no occurrence of herding behavior. Several studies on herding behavior in investors have shown the occurrence of herding in several markets (Marietza et al., 2015). Research shows that herding behavior occurs during times of crisis in the Italian market. The COVID-19 pandemic has created a lot of uncertainty. The pandemic has weakened market performance, and stock market participants are experiencing panic (Dhall & Singh, 2020).

During this pandemic, market conditions are stressful due to decreased economic activities and financial markets experiencing significant price movements. Gunawan et al. (2011) state market stress conditions cause herding behavior in Indonesia. The results of this study show different things from the research of Wardani (2021) and Sihombing (2021), which indicates that there was no herding during the COVID period of February–June 2020. Investors will be more sensitive to bad news than to good news. In market conditions marked by uncertainty, fear, and anxiety, investors feel that market information is more accurate than the information they have. Hence, herding is better than walking alone in the dark (Aharon, 2021). During the COVID-19 pandemic, there was panic in the stock market, which could cause high volatility and low returns. From these conditions, researchers have assumed that herding behavior tends to occur during the COVID-19 pandemic rather than normal market conditions. This study investigates the occurrence of herding in sectoral indices and the market.

This study is determined as qualitative descriptive research that analyzes herding investors in the sectoral index of the stock market industry in Indonesia in 2020–2021. The data sample is extracted from the Indonesia stock exchange page. This study examines the herding behavior using the daily closing prices of stocks that constitute the sectoral indices of BEI. This stock calculation uses 2 index groups applied by the stock exchange, namely the JASICA index stock group in the period January 2, 2020-AApril 30, 2021, and the IDX-IC index stock group (IDX Industrial Classification) on May 3, 2021-December 30, 2021. It is because the IDX has a new policy in 2021 to change the JASICA index to the IDX Industrial Classification.

Table 2. Sectoral Indices of BEI on January 2 2020 – April 30 2021

No.	Industry/Sector	No. of Companies
1.	AGRI	24
2.	MINING	47
3.	BASIC-IND	80
4.	MISC-IND	54
5.	CONSUMER	63
6.	PROPERTY	97
7.	INSFRASTRUC	80
8.	FINANCE	93
9.	TRADE	178
10.	IHSG	716

Table 3. Sectoral Indices of BEI on Mei 3, 2021 – December 30, 2021

No.	Industry/Sector	No. of Companies
1.	IDXENERGY	68
2.	IDXBASIC	94
3.	IDXINDUST	56
4.	IDXNONCYC	95

5	IDXCYLIC	127
6.	IDXHEALTH	23
7.	IDXFINANCE	112
8.	IDXPROPERT	80
9.	IDXTECHNO	22
10.	IDXINFRA	56
11.	IDXTRANS	30
12.	IHSG	763

In the first stage, this study calculates the daily individual stock returns from each stock used as the research sample. The formula for calculating individual stock returns is as follows:

$$Ri, t = \frac{Pt - Pt-1}{Pt-1}, \tag{1}$$

The second stage calculates each stock's daily stock market return used as the research sample. The formula for calculating stock market returns is as follows:

$$(|Rm, t|) = \frac{Pi,t - Pi(t-1)}{Pi(t-1)}, \tag{2}$$

$$(Rm, t)^2 = \left(\frac{Pi,t - Pi(t-1)}{Pi(t-1)}\right) 2, \tag{3}$$

The third stage in this analysis method is to calculate the total average value of each stock return's Cross-Sectional Absolute Deviation (CSAD) daily with the daily stock market return in the same period t. It can be concluded that the CSAD calculation is as follows:

$$CSAD_t = \frac{1}{N} \sum_{i=1}^{N} |Ri, t - Rm, t|, \tag{4}$$

To detect the presence of herding behavior, one can use multiple linear regression. The regression equation model uses three variables, namely the stock return dispersion value ($CSAD_t$) as a dependent variable, the absolute market return ($R_{m,t}$), and the squared market return ($R^2_{m,t}$) as independent variables. The formula is as follows:

$$CSAD_t = \alpha + \gamma_1 (|R_{m,t}|) + \gamma_2 (R^2_{m,t}) + \varepsilon_t, \tag{5}$$

This herding behavior will cause the relationship between CSAD and market returns (R^2_{mt}), which was originally linear, to become non-linear. The non-linear relationship has implications for a statistically significant negative R2mt coefficient ($\gamma_2 < 0$). The negative and significant coefficient γ_2 ($\gamma_2 < 0$) indicates that herding behavior occurs on the stock exchange, which is reflected in the declining CSAD value (Chang et al., 2000). Herding behavior will be detected if the variable coefficient $R^2_{m,t}$ is negative and significant at 5% significance. We used the rolling regression technique to capture the possibilities of herding that might exist during the COVID-19 pandemic. Rolling regressions are one of the most basic models for analyzing how variables change over time. Rolling regressions estimate model parameters using a fixed time window over the entire data set.

3. Results and Discussion

Table 4 and 5 provides descriptive statistics of $CSAD_t$ of each industry for the whole sample data. Table 4 shows that the maximum value of CSAD is found in IDX Techno. The normality test shows that almost a series of market returns and CSAD are normal because of their J-B coefficients <0,05.

Table 4. Daily CSAD Descriptive Statistics, January 2, 2020-April 30, 2021

Indices	Mean	Std. Deviation	J-B	Obs.
AGRI	0.020595	0.010243	0.000000	324
MINING	0.017627	0.018028	0.000000	324
BASIC-IND	0.027142	0.007829	0.000000	324
MISC-IND	0.026629	0.008867	0.000000	324
CONSUMER	0.019842	0.007273	0.000000	324
PROPERTY	0.022182	0.006134	0.251387	324

INFRASTRUC	0.025071	0.006311	0.000000	324
FINANCE	0.025433	0.007029	0.000000	324
TRADE	0.024594	0.006716	0.000000	324
ALL (IHSG)	0.023179	0.007463	0.000000	324

Note: This table reports the mean, standard deviation, J-B and cross-sectional absolute deviation (CSAD) observations over the sample period for all industries.

Table 5. Daily CSAD Descriptive Statistics, May 3th – December 30, 2021

Indices	Mean	Std. Deviation	J-B	Obs.
IDXENERGY	0.016956	0.013658	0.000000	165
IDXBASIC	0.022035	0.012758	0.050629	165
IDXINDUST	0.000231	0.000474	0.000000	165
IDXNONCYC	0.017843	0.010054	0.014094	165
IDXCYCLIC	0.021755	0.005992	0.170421	165
IDXHEALTH	0.017580	0.011156	0.001486	165
IDXFINANCE	0.023555	0.005712	0.000020	165
IDXPROPERT	0.020992	0.005255	0.000000	165
IDXTECHNO	0.035839	0.022911	0.000030	165
IDXINFRA	0.023137	0.005543	0.035643	165
IDXTRANS	0.028764	0.009409	0.006594	165
ALL (IHSG)	0.021835	0.002420	0.000155	165

Note: This table reports the mean, standard deviation, J-B and cross-sectional absolute deviation (CSAD) observations over the sample period for all industries.

Tables 6 and 7 indicate the regression results show no evidence of herding behavior in stocks during the observation period in the Indonesian stock market. Indices showed that the value of the coefficient ($R^2_{m,t}$) is negative. It shows herding behavior in some sectors, but not significantly (0.05%). Herding behavior is detected when the variable coefficient $R^2_{m,t}$ is negative and significant at 5% significance. It shows that the absence of herding behavior significantly occurred at the sectoral level in the Indonesian stock market during the observation period. As a result, no evidence of herding employing the benchmark model for the entire sample period for all sectors.

Table 6. Result of Regression Analysis from January 2nd, 2020 – April, 30th 2021

Indices	Coefficient			Probability	
	c	$(\|R_{m,t}\|)$	$(R^2_{m,t})$	$(\|R_{m,t}\|)$	(R^2m,t)
AGRI	0.012567	0.535687	2.034562	0.0000	0.0059
MINING	0.013743	0.511361	-9.415508	0.0204	0.0326
BASIC-IND	0.020306	0.564369	-3.867711	0.0000	0.0000
MISC-IND	0.014422	0.031474	14.84552	0.0024	0.0000
CONSUMER	0.014240	0.486012	-1.211094	0.0000	0.0000
PROPERTY	0.015115	0.774008	-8.967637	0.0000	0.0000
INFRASTRUC	0.019491	0.545913	-4.964160	0.0000	0.0000
FINANCE	0.021424	0.338109	-0.962526	0.0000	0.0066
TRADE	0.019405	0.565513	4.391134	0.0000	0.0402
ALL (IHSG)	0.017619	0.485406	2.054576	0.0000	0.0000

Note: This table reports the coefficient and probability over the sample period for all industries.

Table 7. Result of Regression Analysis from May 3th – December 30th, 2021

Indices	Coefficient			Probability	
	c	$(\|R_{m,t}\|)$	$(R^2_{m,t})$	$(\|R_{m,t}\|)$	$(R^2_{m,t})$
IDXENERGY	0.017852	0.184706	-13.21880	0.3803	0.0024
IDXBASIC	0.023134	-0.557023	26.43236	0.0866	0.0152
IDXINDUST	0.018337	0.334944	6.665643	0.0000	0.0001

IDXNONCYC	0.016800	-0.162339	25.34941	0.6878	0.1801
IDXCYCLIC	0.016670	0.828237	-15.65907	0.00008	0.1749
IDXHEALTH	0.013538	0.580006	-3.591390	0.0022	0.1696
IDXFINANCE	0.020868	0.171753	13.59416	0.3630	0.0911
IDXPROPERT	0.017711	0.375872	6.059886	0.0043	0.2210
IDXTECHNO	0.023071	0.593154	1.181392	0.0000	0.1372
IDXINFRA	0.021344	0.019616	14.07182	0.8968	0.0103
IDXTRANS	0.023339	0.312836	8.161582	0.0619	0.0677
ALL (IHSG)	0.019961	0.300040	1.910512	0.0005	0.6794

Note: This table reports the coefficient and probability over the sample period for all industries.

We believe that herding appears quickly during the pandemic, so we must reexamine the existence of herding behavior using sectoral stock indexes rather than the stock market-wide index (IHSG).
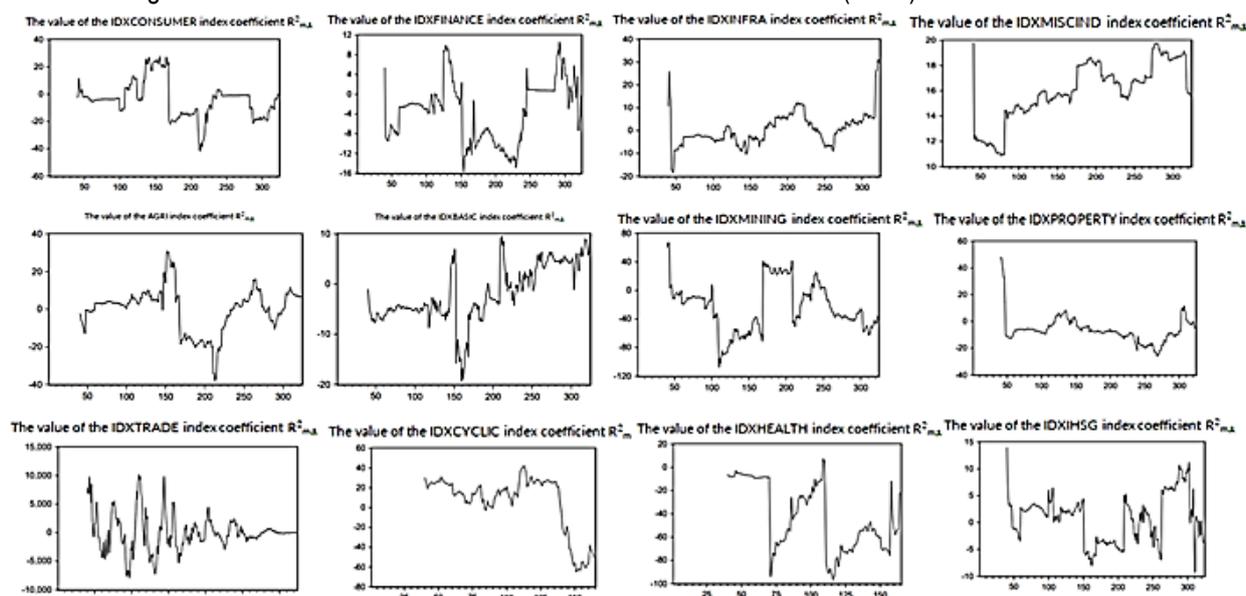
Figure 1. The value of the Coefficient $R^2_{m,t}$

Figure 1 shows that herding cannot be found in the full sample of the market-wide stock index (IHSG) and sectoral indexes. The rolling regression indicates that herding was found for several days from January 2020 to December 2021. From the rolling regression analysis, all sectoral indices show negative coefficient values and p-value below 0.05 on certain days. It means evidence of herding for the entire sample period for all sectors. The PROPERTY, FINANCE, and MINING sectors showed the highest herding rate among other industrial sectors. The property sector indicated herding for 113 days, the finance sector for 109 days, and the mining sector for 108 days, based on 324 observations. Rolling regression showed that herding tends to occur at the beginning of the COVID-19 pandemic announced by WHO.

4. Conclusions

This study examines the herding behavior in the Indonesia stock market during the COVID-19 pandemic. We argued that pandemic turmoil causes market conditions and panic among market participants. Using daily data from the national stock exchange (BEI), we deployed different models to investigate the industry herding behavior among investors during the COVID-19 pandemic. Using the different models proposed by Chang et al. (2000), we examined herding behavior in January 2020 – December 2021. Our article's results for the whole sample in COVID-19 pandemic showed that herding behavior occurred in all sectors. At first, we used regression analysis to look at herding, and the result was that herding did not happen. Then we used rolling regression to see the possibility of herding. Its results show that herding occurs in all industrial sectors. Herding behavior has strong evidence for property, finance, and mining.

Therefore, our findings are consistent with Dhall & Singh (2020), who recently tested the herding behavior in the Indian stock market at the industrial sector level. The results show that herding occurs at the sectoral level. This study's results align with Arjoon et al. (2020), which conducted a study to find herding behavior on the Singapore Stock Exchange. The results show a herding behavior among investors in the country. Research conducted by Bui et al. (2018) also showed the same thing: the occurrence of herding behavior on the Vietnam Stock Exchange. This study is different from Wardani's (2021) research, which shows that in 2020 there was no herding behavior in LQ-45 stocks.

Research by Sihombing (2021) also shows no herding during the COVID period from February to June 2020. In line with research by Wu et al. (2020), which did not find herding behavior in two Chinese stock markets (Shanghai and Shenzhen) during the COVID-19 pandemic.

This article has some implications for investors, policymakers, and market regulators during a market instability like the COVID-19 epidemic. Market participants should consider the influence of herding in selecting assets to value financial assets fairly. Individual investors can make more informed and wise financial decisions during the COVID-19 epidemic by understanding herding behavior at the industry level. Market participants are influenced by herding behavior to invest in risky securities, which could increase market volatility. Investors are assisted in choosing hazardous investments by readily available, high-quality information. This study also aids regulators in reducing volatility and restoring efficiency to the stock market. The market regulator can impose several measures, such as maintaining orderly trading and settlement, restricting positions, and increasing margins, to prevent volatility in the market during a situation of panic and terror, like the COVID-19 pandemic. We have investigated the presence of herding behavior using the measure proposed by Chang et al. (2000) and used close price as a proxy variable to observe the herding behavior. Future researchers could use another proxy variable to detect herding in the stock market.

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