The Indonesian Capital Market Review

Volume 14
Number 2 *July*

Article 4

7-31-2022

Analyzing The Relationship Between Return and Trading Volume in Relation to Cross-Sectional Absolute Deviation (CSAD) In Order to Detect Herding Behavior in Indonesia Emerging Stock Market

Helma Malini
Universitas Tanjungpura, Indonesia, helma.malini@ekonomi.untan.ac.id

Annisa Dipa Sakliana
Universitas Tanjungpura, Indonesia

Recommended Citation

Malini, Helma and Sakliana, Annisa Dipa (2022) "Analyzing The Relationship Between Return and Trading Volume in Relation to Cross-Sectional Absolute Deviation (CSAD) In Order to Detect Herding Behavior in Indonesia Emerging Stock Market," *The Indonesian Capital Market Review*: Vol. 14: No. 2, Article 4.
DOI: 10.21002/icmr.v14i2.1152
Available at: https://scholarhub.ui.ac.id/icmr/vol14/iss2/4

Indonesian Capital Market Review 14 (2022) 121-135

INDONESIAN
CAPITAL MARKET REVIEW

Analyzing The Relationship Between Return and Trading Volume in Relation to Cross-Sectional Absolute Deviation (CSAD) In Order to Detect Herding Behavior in Indonesia Emerging Stock Market

Helma Malini* and Annisa Dipa Sakliana
Universitas Tanjungpura, Pontianak, Indonesia

(Received: November 2021/ Revised: July 2022 / Accepted: November 2022 / Available Online: December 2022)

Investor herding behavior is a primary source of speculative bubbles since it implies that investors make identical trading decisions, which can lead to stock prices deviating from their underlying worth. The goal of this study is to detect herding behavior in the Indonesian stock market between 2016 and 2021. The relationship between return and trading volume, known as Cross Sectional Absolute Deviation, is used to assess herding behavior (CSAD). Time-series regression and quantile regression analysis will be employed as data analytic techniques in this study to investigate herding behavior under various market scenarios. Herding behavior is evident in the Indonesian stock market with low trading volume, high market return, and low market return in quantile 0,95. Herd behavior has both beneficial and harmful consequences during certain investing seasons. The best method to reduce the impact is to strengthen the investor's trading strategy and trading platform.

Keywords: *Herding behavior; return; trading volume; CSAD.*

JEL Classification: C21, D53, D70, D80.

Introduction

Investors are constantly assessing the profit that will be retained by shareholders in the stock market. This is one of the reasons why stock prices fluctuate (Malini & Jais, 2014). The outlook for business conditions is constantly changing, as are the company's future earnings. Purchasing a stock solely because its market price has decreased is not a prudent strategy; instead, concentrate on growth companies at a reasonable price. While a stock's price may fluctuate, it can continue to rise over time if the company is managed well and offers valuable products or services (Ali et al., 2021; Choi & Yoon, 2020; Hsing & Hsieh, 2012).

Prior to making an investment decision, it is critical for investors to be able to analyze stock market fluctuations. Fluctuations refer to the rate at which a stock's price increases or decreases over a specified time period. Increased stock price volatility frequently indicates increased risk and responses earned by investors in estimating future fluctuations. Fluctuations are not always a bad thing, as they can occasionally create entry points for investors. (Prechter Jr, 2001). Market volatility on the downside allows investors who believe markets will perform well in the long run to purchase additional stocks in companies they like at a discount. By

* Corresponding author's email: helma.malini@ekonomi.untan.ac.id

purchasing stocks in this manner, you reduce your average cost per share, which helps your portfolio perform better when markets eventually recover. When a stock appreciates rapidly, the process is identical. Investors can take advantage of this by selling out and reinvesting the proceeds in areas with greater opportunity. Investing during times of market volatility and attractive valuations can provide investors with the opportunity to earn substantial long-term returns (Malini & Suwantono, 2021).

Market fluctuations can be analyzed through different technics and approaches including, technical and fundamental. However, anomalies occurring in the market which deviate from the accuracy of the Efficient Market Hypothesis (Fama, 1991). In the stock market, herd instincts are prevalent throughout society, including the financial sector, where investors follow what they perceive other investors to do rather than relying on their own analysis. The term "herd instinct" refers to unique individuals who are responsible for every decision we make based on our own personal needs and desires. Humans, on the other hand, are perfectly natural to feel like they belong to a group of people who share similar beliefs and behaviors. So, the idea that investors have a proclivity to follow the herd is prevalent in the financial market, particularly when making risky decisions (Zhang et al., 2020).

The herd instinct is a major driver of asset bubbles and market crashes. The late 1990s and early 2000s dotcom bubble is a prime example of herd instincts' impact on the growth and subsequent explosion of an industrial bubble (Bhaduri & Mahapatra, 2013; Garg & Jindal, 2014; Zheng et al., 2015). Due to the unique characteristics of each country, investors can gain access to the capital market by taking advantage of a diverse range of investment opportunities ranging from frontier markets such as Vietnam to sophisticated products in developed markets such as Singapore. Discussing Indonesia alone among other ASEAN countries to the market valuation, the price-to-earnings ratio indicates that member exchanges trade at a discount to developed markets in Asia. As an emerging market, Indonesia stock market has become challenging investment destination for both domestic and international investors due to the potential for substantial returns in the future as a result of ASEAN economic development (Lu & Perron, 2010). The Indonesian stock market remains extremely sensitive to economic sectors, politics, and domestic and international issues (Kim et al., 2014). Additionally, numerous domestic and global events have impacted the Indonesia stock market's performance, including Brexit, the trade war, and the Covid-19 pandemic, which continues to affect a number of countries worldwide. These events have impacted the stock market's price and trading volume, and have prompted investors to behave irrationally out of fear of experiencing a loss.

It is claimed that the presence of herding behavior in a market causes a disturbance in market stability, market instability, a fragile economic system, and excessive volatility. Since herding tendency leads to erroneous asset valuations, it will cause market instability. In terms of its effect on individual market participants, the existence of herding behavior on the market compels investors to diversify their portfolios in order to mitigate non-systemic risk. However, in extreme herding conditions, investors cannot diversify because of the market's high connection.

Studies on herding behavior in Indonesia are increasing. Logically, the increased number of studies resulting into an increase in the amount of information available on the market. Nevertheless, Indonesia stock market is inefficient and remains risky for risk averse investors (Ali et al., 2021; Kholesta, 2019). The significance of this study is that herding behavior is one of the factors that can cause a stock price to deviate from its intrinsic value. In the long run, if investors continue to exhibit herding behavior, it may cause some turbulence in the Indonesia economy, as herding behavior may result in a market crash, as occurred in the United States of America in 1987 (Buallay et al., 2017).

The structure of the paper is as follows: In the introduction, a complete research background is presented in order to determine the research's needs. Followed by a literature study that sheds light on Herding Behavior's empiri-

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

cal gaps. Next is the methodology part, which explains why the author chose cross-sectional absolute deviation, then the results and discussion, and finally the conclusion.

Literature Review

Herding is typically associated with a shared behavioral pattern among individuals, and thus represents human behavior that mimics the actions of others. Numerous studies have demonstrated that both rational and irrational herding behaviors (Hammami & Boujelbene, 2015; Kumar et al., 2016; Rahman & Ermawati, 2020). Additionally, there are various subtypes of herding behavior, including information-based, reputation-based, compensation-based, and fictitious herding forms (Teh & De Bondt, 1997). Herding behavior is frequently viewed as an irrational action on the part of investors. Herding behavior, on the other hand, is based on rational factors. To begin, humans are social beings in their daily lives; they are constantly interacting with other individuals, exchanging information and observing and interpreting one another's behavior. Another reason individuals' herd is that they believe the decision or action they are about to take is incorrect if no one else does the same thing. However, if someone makes a mistake as a result of imitating another's behavior, it will be easier for them to rationalize their error, as everyone else is doing the same thing. Additionally, herding behavior occurs as a result of something related to information (Setiyono, Tandelilin, Hartono, & Hanafi, 2013).

(Choi & Yoon, 2020) investigates the flaws in information that arise in financial markets as a result of a lack of understanding of how an investor should follow the decisions of other investors by testing their decisions. (Choi & Yoon, 2020) discovered that there are variations between investors in various places, with investors in emerging countries (South Korea and Taiwan) having a strong inclination to follow the gang. Meanwhile, there is a trend not to follow a group of other investors in mature stock market classifications, such as in the United States and Hong Kong. Both researchers and experts have paid close attention to herding behavior over the last several decades. Numerous scientific and experimental studies have been conducted to investigate the development and effects of this syndrome on financial markets. The presence of herders can have an effect on asset pricing models because they have an effect on stock price changes and, consequently, on stock return and risk (Rahman & Ermawati, 2020). Traders and investors who follow trends can exacerbate return volatility, allowing financial systems to be invaded and destroyed during a crisis era. Further analysis indicates that herd psychology contributes to market chaos and provides investors with opportunities (Jalal et al, 2020).

On the contrary, a research from (Zheng et al., 2015) showed that Herding behavior is only found when the trading volume is high, but not found during extreme market conditions and asymmetrical market movement. This result indicate that a possibility of herd behavior occurs during large trading volume due to a herd instinct is a type of behavior in which individuals form groups and copy the activities of others. In finance, herding happens when investors follow the mob rather than their own judgment. According to (Garg & Jindal, 2014) this condition could be explained when investing in risky situations, enormous pressure is applied that subtly highlights emotions and compels investors to question their judgment. When investors are unable to organize strategies for reducing tensions and navigating tumultuous markets, they frequently seek guidance and direction from persons they like. However, during this stage of self-strain, connections with other individuals can resemble those with political groups or idol celebrities.

In the framework of social life, humans have a natural inclination to follow other humans. However, because a specific amount of money is at stake, the setting becomes vast and risky in the context of investment. A group of humans with the ability to influence other humans by imitating their behavior and decisions in order to affect market movements. Herding conduct is the inclination to imitate other human behavior when it comes to investing. Human emotions in decision-making, which are influenced

Figure 1 Conceptual Framework

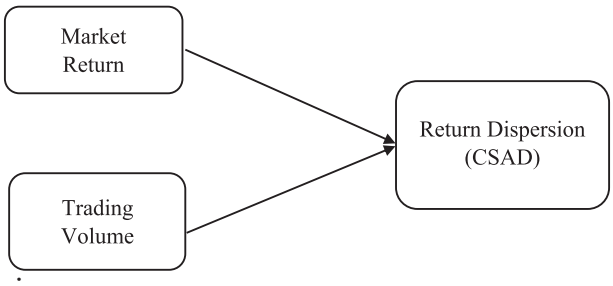

Table 1. Selected Countries

Country	Stock Exchange	Number of Listed Company
Indonesia	Indonesia Composite Index	750

by rationality and irrationality, subsequently influence this copying process. Market defects, reputation, compensation structure, and psychology all affect two different viewpoints on herding behavior. Market defects include significant entrance and exit barriers, a variety of products and services, inaccurate or incomplete information about items and pricing, and a small number of customers and sellers, according to (Huang & Wang, 2017). In the stock market, inadequate information is common since investors do not have perfect or equal understanding of a financial product, and investors do not have uniform talents where a lot of money is at stake (Ali et al., 2021).

In this study, the CSAD approach is employed to examine the relationship between market return and CSAD's ability to identify herding behavior. When herding behavior occurs, investors will choose the same course of action by imitating market mood; as a result, the stock return's departure from the market return will be significantly smaller. When there is a high trading volume, it means that investors are trading more frequently, which could mean that many investors are taking the same action (Kurt Gümüş et al., 2019). This is how herding is detected. The Indonesia Stock Exchange has adopted this conceptual framework to identify herding behavior.

Previous studies contend that herding tendency occurs when stock price volatility is substantial. The usefulness of CSAD will drop in cases of herding behavior. Instead of using the CSAD results to quantify herding behavior, herding behavior will be detected by examining the link between market return and CSAD.

Data and Methodology

Data

Quantitative data were utilized for this study. The secondary data used in this study were gathered using the documentation technique. This is a causal-comparative study that seeks to demonstrate the relationship between the independent variable and the dependent variable. In order to detect herding behavior on the Indonesia Stock Exchange, the author will use daily data from January 2016 to February 2021 (The selection of February 2021 is based on the availability of data, as 2022 data has not yet been published on the Indonesia Stock Exchange) on the closing price and trading volume of stocks listed on the Indonesia Stock Exchange in order to conduct this research. Because herding behavior is thought to be a short-lived phenomenon on the stock market, the author employs daily closing price data to find it.

As for methodology, the data will be acquired using the documentation technique, which entails acquiring the data directly from the research site, such as reference books, regulations, and data pertinent to the study. To collect the data so that the author may proceed with the analysis. The closing price data will be gathered from websites that provide such information, such as Yahoo Finance, Investing.com, and the Indonesia Stock Exchange website.

Data library is also utilized in order to acquire as much information as possible in order to examine the data. In this strategy, the data library is comprised of books, journals, theses, and past research relating to herding behav-

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

Table 2. Operational Definition

Variable	Definition	Scale	Indicator
Absolute market return ($\angle R_{m,t} \angle$)	The absolute value of the difference from daily price of market share at the end of period and the beginning of period on the composite stock index.	Ratio	$\left\|R_{mt}\right\| = \left\|\frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}}\right\|$
Squared market return ($R^2_{m,t}$)	The squared value of the difference from daily price of market share at the end of period and the beginning of period on the composite stock index.	Ratio	$\left(R_{mt}\right)^2 = \left(\frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}}\right)^2$
Trading Volume	Trading volume is the total number of shares that were traded in a given period of time	Ratio	$VMA = \frac{V_1 + V_2 + V_3 + V_4}{n}$
Return disperision (CSAD)	A value which used to measure the degree of dispersion between return on individual assets and market return.	Ratio	$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left\|R_{i,t} - R_{m,t}\right\|$

Source: Journal references

ior. In this research, market return and squared market return are considered as the independent variable. While cross sectional absolute deviation (CSAD) is considered as a dependent variable in order to detect herding behavior.

Thomson Reuters' data stream serves as the source of the data. The sample is comprised of weekday close prices (Mondays to Fridays). Due to the scarcity of data, the sampling period was limited. The data set includes daily closing prices for six selected compliances from January 2016 to May 2021. Daily index data derived from data streams enables us to capture the dynamic evolution of returns and also to comprehend volatility, which can be missed when using monthly observations.

The selection of Indonesia's stock market is based on several factors. First, Indonesia is particularly dominant in emerging-market equities, accounting for the lion's share of total investment with larger companies and partly because they are concentrated in high-growth sectors such as technology. In particular, the Indonesian stock market represents a growing and emerging market in ASEAN, not only in terms of market capitalization but also in terms of the number of listed companies among ASEAN countries. Second, Indonesia's stock markets have been hit by the crisis in a variety of ways, with varying stylized facts indicating their uniqueness in terms of politics, economic situation, GDP level, and culture.

Data Population and Sample

In this study, the population will consist of stocks from companies listed on the Indonesian stock exchange. Therefore, 728 companies constitute the research population for this study. Samples will be collected using the approach of purposive sampling. Purposeful sampling is the sampling strategy in which data sources are collected according to certain criteria. This method was used in order to generate a representative sample of the population for this study. The sample requirements for this study are as follows:

1. A large market capitalization stock According to Indonesia Stock Exchange, market capitalization is categorized based on its size: large market capitalization (>Rp. 5 trillion), medium market capitalization (between Rp. 1 trillion and Rp. 5 trillion), and small market capitalization (<Rp. 1 trillion).
2. The stock that consistently releases its financial report during the research period.
3. The availability of data pertinent to the research period of time.
4. The value of the data for the sample period must be greater than zero.

The reason the author uses a stock with a large market capitalization is due to its contribution to the movement of a country's composite index. Long-term and short-term movements of the composite stock index may be influenced by stocks with large market capitalization, according to a study. Market capitalization could potentially have a short-term effect on macroeconomic fundamentals. In addition to large market capitalization, the availability of data is another condition for the sample. This is because market data from a number of stocks is not available throughout the research period's trading days. Consequently, the sample that

demonstrates the incompleteness in the trade days must be deleted.

After the data of closing price and trading volume are collected, data will be converted into the variable in order to calculate the CSAD. The first step is by calculating the daily individual return of the stock which is used as the sample. Individual return are calculated with the formula as written below:

$$R_{i,t} = \frac{P_{i,t} - P_{i(t-1)}}{P_{it-1}}$$

Where:
$R_{i,t}$: Individual return on the period of t
$P_{i,t}$: Stock price on the period of t
$P_{i,t-1}$: Price of the stock on the previous period

The second step is to calculate the daily market return from the stock market as the sample on this research. Market return are calculated with the formula as written below:

$$R_{m,t} = \frac{P_{i,t} - P_{i(t-1)}}{P_{it-1}}$$

Where:
$R_{m,t}$: Market return on period of t
$P_{i,t}$: Stock price on the period of t
$P_{i,t-1}$: Price of the stock on the previous period

Third step is to calculate the Volume moving average by using 30 days volume-weighted moving average in order to determine whether the trading volume on t day are considered as high or low with the following formula:

$$VMA = \frac{V_1 + V_2 + V_3 + V_n}{n}$$

Where:
V : Volume of share traded
N : Number of data

The next step is to calculate the CSAD from the daily return of each stock from the same period in order to detect herding behavior in the stock market. In this method, it proposes the non-linearity relationship from the degree of equity return dispersion in order to see whether herding behavior exists in the market or not [Chang, Cheng, Khorana, 2000]. The calculation of CSAD are depict in the formula as written below:

$$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right|$$

Where:
$R_{i,t}$: Individual return on t period
$R_{m,t}$: Market return on t period
N : The number of company as the sample

In this research, the time-series regression analysis to detect herding behavior in Indonesia Stock market in relation with the stock market are represented by the equation model as follow:

$$CSAD_t^{DOWN} = \alpha + \gamma_1^{DOWN}\left|R_{m,t}^{DOWN}\right| + \gamma_2^{DOWN}(R_{m,t}^{DOWN})^2 + \varepsilon_t$$

$$CSAD_t^{UP} = \alpha + \gamma_1^{UP}\left|R_{m,t}^{UP}\right| + \gamma_2^{UP}(R_{m,t}^{UP})^2 + \varepsilon_t$$

Where:

$CSAD_t^{DOWN}$: Cross-Sectional Absolute Deviation in t period during bearish market
γ_1^{DOWN} : linear coefficient between CSAD and market return during bearish market
γ_2^{DOWN} : non-linear coefficient between CSAD and market return during bearish market
$R_{m,t}^{DOWN}$: Market return in t period during bearish market
$CSAD_t^{UP}$: Cross-Sectional Absolute Deviation in t period during bullish market
γ_1^{UP} : linear coefficient between CSAD and market return during bullish market
γ_2^{UP} : non-linear coefficient between CSAD and market return during bullish market
$R_{m,t}^{UP}$: Market return in t period during bullish market
α : intercept variable
ε_τ : standard error

Bearish market conditions are represented by the positive market return, while bullish market conditions are represented by the negative market return. When the value of both γ_2^{UP}

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

Table 3. Descriptive Statistics during High Trading Volume

Indonesia	CSAD	ABS_RET	SQR_RET	Observations
Mean	1.977.738	6.883.383	0.090774	736
Median	1.557.000	5.225.000	0.030000	
Std. Dev.	8.698.411	6.608.836	0.233266	
Jarque-Bera	16015751	4.770.556	158798.4	

and γ_2^{DOWN} are negative and significant, it means that there is an existence of herding behavior in the Indonesia Stock Market during bullish and bearish market conditions.

Another regression formula for trading volume also will be used in order to analyze whether herding behavior exists with its relation with trading volume in the stock market. This method has been developed by [Tan, Chiang, Mason, Nelling, 2007] who argues that herding behavior in the stock market may be associated with trading volume. According to Suominen (2001), high trading volume is an evidence of symmetry and transparency, thus improving the quality of information and reducing the chance of herding behavior. Meanwhile, according to [Tan, Chiang, Mason, Nelling, 2007] argue that herding behavior is more prevalent during high trading volume. The regression formulas are depicted as follows.

$$CSAD_t^{V\text{-}HIGH} = \alpha + \gamma_1^{V\text{-}HIGH} \left| R_{m,t}^{V\text{-}HIGH} \right| + \gamma_2^{V\text{-}HIGH} (R_{m,t}^{V\text{-}HIGH})^2 + \varepsilon_t$$

$$CSAD_t^{V\text{-}LOW} = \alpha + \gamma_1^{V\text{-}LOW} \left| R_{m,t}^{V\text{-}LOW} \right| + \gamma_2^{V\text{-}LOW} (R_{m,t}^{V\text{-}LOW})^2 + \varepsilon_t$$

Where:

$CSAD_t^{V\text{-}HIGH}$: Cross-Sectional Absolute Deviation in t period during high trading volume

$\gamma_1^{V\text{-}HIGH}$: linear coefficient between CSAD and market return during high trading volume

$\gamma_2^{V\text{-}HIGH}$: non-linear coefficient between CSAD and market return during high trading volume

$R_{m,t}^{V\text{-}HIGH}$: Market return in t period during high trading volume

$CSAD_t^{V\text{-}LOW}$: Cross-Sectional Absolute Deviation in t period during low trading volume

$\gamma_1^{V\text{-}LOW}$: linear coefficient between CSAD and market return during low trading volume

$\gamma_2^{V\text{-}LOW}$: non-linear coefficient between CSAD and market return during low trading volume

$R_{m,t}^{V\text{-}LOW}$: Market return in t period during low trading volume

α : intercept variable

ε_t : standard error

On the formula above, $R_{m,t}^{V\text{-}HIGH}$ and $R_{m,t}^{V\text{-}LOW}$ refers to the equally-weighted market return at *t* period when during the high and low trading volume. Both variable $CSAD_t^{V\text{-}HIGH}$ and $CSAD_t^{V\text{-}LOW}$ refers to the CSAD during the period when the trading volume is high and low respectively. The trading volume on the day t will be considered high when its value of closing price is greater than the previous 30 days moving average, and will be considered low when its lower than the previous 30 days moving average.

In addition, quantile regression will be used in this research in order to detect herding behavior in various market conditions. Beside that, quantile regression analysis is very useful when there is a heterogeneity in the data distribution and asymmetric [Rahmawati, Widiarti, Novianti, 2011]. Thus, this analysis could also run as the alternative method when the data of the research are not normally distributed

Result and Discussions

Descriptive Statistics

The descriptive statistics of independent variables and dependent variables during high trading volume. According to Table 3, there are a total 736 observations which were taken from January 2016 to May 2021 daily data with the trading volume on Vt is higher than the previous 30-days moving average. According to the table, the CSAD variable during high trading volume has the maximum and minimum

Table 4. Descriptive Statistics during Low Trading Volume

Indonesia	CSAD	ABS_RET	SQR_RET	Observations
Mean	2.136.727	7.390.035	0.130869	564
Median	1.594.500	4.595.000	0.020000	
Std. Dev.	1.007.240	8.752.115	0.528762	
Jarque-Bera	7276602.	21630.59	1582535.	

Table 5. Descriptive Statistics During High Market Return

Indonesia	CSAD	ABS_RET	SQR_RET	Observations
Mean	2.052.885	6.849.155	0.100444	698
Median	1.610.500	4.850.000	0.020000	
Std. Dev.	9.063.709	7.334.061	0.431799	
Jarque-Bera	13705426	54752.13	6247770.	

Table 6. Descriptive Statistics during Low Market Return

Indonesia	CSAD	ABS_RET	SQR_RET	Observations
Mean	2.039.560	7.397.741	0.117126	602
Median	1.538.000	5.015.000	0.030000	
Std. Dev.	9.607.864	7.922.466	0.336048	
Jarque-Bera	8824375.	4.676.578	106023.7	

value by 2368,060 and 0,000000 respectively, and average value by 19,77738 with the standard deviation by 86,98411. For the absolute return (ABS_RET) variable, during high trading volume has the maximum and minimum value by 52,01000 and 0,00000 respectively, average value by 6,883383 with the standard deviation by 6,608836. For the squared return (SQR_RET) variable, during high trading volume has the maximum and minimum value by 2,710000 and 0,00000 respectively, average value by 0,090774 with the standard deviation by 0,233266.

On the other hand, the descriptive statistics result during a low trading volume period. Based on table 4, there are a total of 564 observations taken from January 2016 to May 2021 daily data with the trading volume on *Vt* being lower than the previous 30-days moving average. According to the table, the CSAD variable during low trading volume has the maximum and minimum value by 2404,350 and 0,160000 respectively, and average value by 21,36727 with the standard deviation by 100,7240. For the absolute return (ABS_RET) variable, during low trading volume has the maximum and minimum value by 101,9100 and 0,00000 respectively, average value by 7,390035 with the standard deviation by 8,752115. For the squared return (SQR_RET) variable, during low trading volume has the maximum and minimum value by 10,39000 and 0,00000 respectively, average value by 0,130869 with the standard deviation by 0,528762.

Descriptive statistics result during a high market return period showed in table 5. Based on table 5, there are a total of 698 observations taken from January 2016 to May 2021 daily data with the positive value of market return. According to the table, the CSAD variable during high market return has the maximum and minimum value by 2404,350 and 0,000000 respectively, and average value by 20,52885 with the standard deviation by 90,63709. For the absolute return (ABS_RET) variable, during high market returns the maximum and minimum value by 101,9100 and 0,0000 respectively, average value by 6,849155 with the standard deviation by 7,334061. For the squared return (SQR_RET) variable, during high market return has the maximum and minimum value by 10,39000 and 0,00000 respectively, average value by 0,100444 with the standard deviation by 0,431799.

Table 6 shows the descriptive statistics result during a low market return period. According to table 5, there are a total 602 observations taken from January 2016 to May 2021 daily data with the negative value of market return. The CSAD variable during low market

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

Table 7. Time- Series Regression Result during High Trading Volume

	Variable	Coefficient	Std. Error	t-Statistic	Prob.
Indonesia	ABS_RET	0.279176	1.012785	0.275652	0.7829
	SQR_RET	0.273065	28.69396	0.009516	0.9924
	C	17.83091	5.816055	3.065809	0.0023
	R-squared	0.000478	Mean dependent var		19.77738
	Adjusted R-squared	-0.002250	S.D. dependent var		86.98411
	S.E. of regression	87.08189	Akaike info criterion		11.77564
	Sum squared resid	5558526.	Schwarz criterion		11.79440
	Log likelihood	-4330.437	Hannan-Quinn criter.		11.78288
	F-statistic	0.175161	Durbin-Watson stat		1.981007
	Prob(F-statistic)	0.839357			

Table 8. Time- Series Regression Result during Low Trading Volume

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ABS_RET	1.552554	0.860536	1.804170	0.0717
SQR_RET	-13.07146	14.24367	-0.917703	0.3592
C	11.60449	6.498412	1.785742	0.0747
R-squared	0.007600	Mean dependent var		21.36727
Adjusted R-squared	0.004062	S.D. dependent var		100.7240
S.E. of regression	100.5192	Akaike info criterion		12.06388
Sum squared resid	5668410.	Schwarz criterion		12.08694
Log likelihood	-3399.014	Hannan-Quinn criter.		12.07288
F-statistic	2.148184	Durbin-Watson stat		1.999914
Prob(F-statistic)	0.117655			

return has the maximum and minimum value by 2368,060 and 0,160000 respectively, and average value by 20,39560 with the standard deviation by 96,07864. For the absolute return (ABS_RET) variable, during low market returns the maximum and minimum value by 65,79000 and 0,00000 respectively, and average value by 7,397741 with the standard deviation by 7,922466. For the squared return (SQR_RET) variable, during low market return has the maximum and minimum value by 4,33000 and 0,00000 respectively, and average value by 0,117126 with the standard deviation by 0,336048.

The results in tables 3,4,5, and 6 add credence to the widely held belief that increased risk equals higher reward. During high and low trading hours, as well as market returns based on standard deviation, the Indonesian stock market offers the highest volatility, as well as the highest daily average return. Extreme observations appear to be present in the distributional features of returns. The lowest traded and returned items have the largest kurtosis in the sample. If kurtosis in one country surpasses 3, the returns will have fatter tails than expected from a normally distributed variable. All of the return series are favorably biased, with the exception of the high market return.

Time-Series Regression Analysis

In this research, time-series regression was used to detect the existence of herding behavior in the Indonesia stock market. The Table 7 shows the result of regression analysis in high trading volume.

According to the table, the coefficient of squared market return is positive with the probability of $\alpha > 0,05$. Thus, there is no herding behavior detected during high trading volume since the relationship between squared market return and CSAD is positive and non-significant.

Table 8 shows the result of regression analysis in low trading volume. According to the table, the coefficient of squared market return is negative with the probability of $\alpha > 0,05$. Thus, there is no herding behavior detected during a low trading volume period since the relationship between squared market return and CSAD is negative and non-significant.

Table 9 shows the result of regression analysis in high market return. According to the ta-

Table 9. Time- Series Regression Result during High Market Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ABS_RET	1.557888	0.749955	2.077310	0.0381
SQR_RET	-11.35166	12.737910	-0.891172	0.3731
C	10.99885	5.426045	2.027047	0.0430
R-squared	0.008145	Mean dependent var		20.52885
Adjusted R-squared	0.005291	S.D. dependent var		90.63709
S.E. of regression	90.39699	Akaike info criterion		11.85059
Sum squared resid	5679273.	Schwarz criterion		11.87014
Log likelihood	-4132.855	Hannan-Quinn criter.		11.85815
F-statistic	2.853704	Durbin-Watson stat		2.001115
Prob(F-statistic)	0.058306			

Table 10. Time- Series Regression Result during Low Market Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ABS_RET	0.195071	1.087501	0.179376	0.8577
SQR_RET	1.513104	25.63826	0.059017	0.9530
C	18.77529	6.790153	2.765076	0.0059
R-squared	0.000438	Mean dependent var		20.39560
Adjusted R-squared	-0.002899	S.D. dependent var		96.07864
S.E. of regression	96.21781	Akaike info criterion		11.97608
Sum squared resid	5545462.	Schwarz criterion		11.99801
Log likelihood	-3601.799	Hannan-Quinn criter.		11.98461
F-statistic	0.131330	Durbin-Watson stat		1.991147
Prob(F-statistic)	0.876953			

ble, the coefficient of squared market return is negative with the probability of $\alpha > 0,05$. Thus, it means that there is no herding behavior detected during high market return period since the relationship between squared market return and CSAD is negative and non-significant.

Table 10 shows the result of regression analysis in low market return. According to the table, the coefficient of squared market return is positive with $\alpha > 0,05$. Thus, it means that there is no herding behavior detected during a low market return period since the relationship between squared market return and CSAD is positive and non-significant.

Based on the result above, it shows that there was no herding behavior detected in Indonesia stock market in 2016-2021 during all market conditions; high trading volume, low trading volume, high market return and low market return. This can be seen from the relationship between coefficient of squared market return and CSAD which does not show non-linear relationship. This result which shows that herding behavior is not detected in Indonesia stock market can be caused by the asymmetrical data which makes the assumption of normality data distribution which is not fulfilled. Therefore, quantile regression analysis will be run as the alternative method to detect the existence of herding behavior in Indonesia stock market. Investors with herding behavior prefer to react fast to information because they believe that following the reactions of other investors is the best investing decision. Herding decisions resulting in high transaction costs. Higher transaction costs arise as a result of undistributed information, whereas uninformed investors arise as a result of waiting for other investors to decide.

Quantile Regression Analysis

In this research, quantile regression analysis are done in order to detect herding behavior in Indonesia stock market during various market condition in the extreme lower quantile (t=0,01 and t=0,05), median, and extreme upper quantile (t=0,95 and t=0,99). Previously, a normality test has been run in order to see the normality distribution of the data and the result shows that the normality assumption of the data is not fulfilled during high trading volume, low trading volume, high market return and low market return. Hence, the quantile regression will be run as the alternative analysis method to detect

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

Table 11. Quantile Regression Result during High and Low Trading Volume

Independent Variable	Dependent Variable: CSAD				
	tau: 0,01	tau: 0,05	tau: 0,5	tau: 0,95	tau: 0,99
ABS_RET_VLO	0,758722	0,26077	0,000992	0,122213	-0,149302
	0,0237	0,4521	0,9800	0,1291	0,2376
ABS_RET_VHI	0,465964	0,10251	0,020197	-0,021169	0,481139
	0,1682	0,6151	0,8519	0,907	0,5843
SQR_RET_VLO	-15,95012	-5,93260	-0,170626	-2,011596	-0,162478
	0,0812	0,5947	0,6897	0,0066	0,8898
SQR_RET_VHI	-16,92259	1,63163	0,134493	-3,270263	-26,8328
	0,4454	0,8933	0,9766	0,5871	0,3185
C	-0,536768	7,16666	14,66531	21,82337	28,21478
	0,8280	0,0003	0,0000	0,0000	0,0000

Table 12. Quantile Regression Result during High and Low Market Return

Independent Variable	Dependent Variable: CSAD				
	tau: 0,01	tau: 0,05	tau: 0,5	tau: 0,95	tau: 0,99
ABS_RET_BULL	-0,592369	-0,08957	0,036615	0,526632	0,433154
	0,0705	0,1840	0,4358	0,0410	0,3045
ABS_RET_BEAR	-0,381010	-0,15850	0,025964	0,267317	0,216655
	0,0980	0,0121	0,6534	0,0209	0,9283
SQR_RET_BULL	5,88713	0,81469	-0,829055	-6,117908	-6,088936
	0,0614	0,1925	0,0993	0,0121	0,1572
SQR_RET_BEAR	7,82602	3,86301	-0,362136	-5,008271	-6,323271
	0,0166	0,0000	0,7467	0,0016	0,8559
C	9,263511	10,54296	14,61114	19,42678	28,6937
	0,0000	0,0000	0,0000	0,0000	0,0002

herding behavior in Indonesia Stock market.

The results of quantile regression analysis during high and low trading volume are shown in table 11.

Based on table 11, herding behavior does not exist during high trading volume in extreme lower quantile, median and extreme upper quantile. This can be seen from the non- linear coefficient (g2) between CSAD and squared market return ($R_{m,t}^2$) during high trading volume in extreme lower quantile of 0,01 and 0,05 is non-significant with the coefficient by -16,92259 and 1,631625 respectively, in median quantile is non-significant with the coefficient by 0.134493, and in extreme upper quantile of 0,95 and 0,99 is non-significant with the coefficient by -3.270263 and -26.83280 respectively. However, the result shows that herding behavior does exist during low trading volume in extreme upper quantiles of 0,95.

In the meanwhile based on table 12, herding behavior does exist during low trading volume in extreme upper quantile of 0,95. This can be seen from the non-linear coefficient g2 between CSAD and squared market return ($R_{m,t}^2$) during low trading volume in extreme of 0,95 is significant with the coefficient by -6,117908. Since the coefficient of squared market return is negative and significant, this interprets that herding behavior exists in Indonesia stock market during high market return in the extreme upper quantile of 0,95.

The result from table 12 also shows that herding behavior does exist during low market return in extreme upper quantile of t=0,95. This can be seen from the non-linear coefficient (g2) between CSAD and squared market return (Rm,t2) during low trading volume in extreme of t=0,95 is significant with the coefficient by -5,008271. Since the coefficient of squared market return is negative and significant, this interprets that herding behavior exists in Indonesia stock market during low market return in the extreme upper quantile of t=0,95. Thus, by using quantile regression analysis, it shows that herding behavior is found to exist in Indonesia stock market during low trading period, high market return and low market return, and is not found during high trading period. The relationship between uncertainty and herding behavior are formed by the expectation of rational expectation, the feedback from investor for return

or asset prices fundamentally may be nonlinear. This implies that investor and markets react to uncertainty and lead to the way they react on good and bad news that makes price deviates from the asset's real value. However, investors may not react to information quickly because due to uncertainty that forced them to make decision and under worst case increase uncertainty risk becomes greater.

Conclusion

By assembling the data of daily closing price and trading volume of 42 businesses listed on the Indonesia Stock Market, we attempt to evaluate the existence of herding behavior in terms of high and low trading volume and market return in the Indonesia Stock Market. The Cross-sectional Absolute Deviation from is what we're using (Chang, Cheng, & Khorana, 2000) to detect the relationship between CSAD and squared market return to discover herding behavior Herding behavior is observed in the Indonesia stock market with low trading volume, high market return, and low market return.

According to the findings, herding behavior in the Indonesian stock market impacts during low trading volume days, high market return days, and low market return days. Investors are unable to process the information available and prefer to make their investment decisions based on market consensus. Meanwhile, the absence of herding behavior in high trading volume suggests that investors can digest their data before making investment decisions. To minimize herding behavior among investors and firms listed on the Indonesia Stock Exchange, we recommend that investors conduct individual technical or fundamental analysis. Since, following market consensus will cause the stock price to vary from its original value. Companies, on the other hand, must cultivate a positive image of themselves and maintain their performance under all circumstances in order to ensure investors that the companies' future prospects are profitable.

The second constraint is that this study only looks at the Indonesian stock market and covers a five-years period from 2016 to 2021. Future research could build on this study by adopting various stock markets from other emerging markets as the object of study, adding the study period, and comparing it to the Indonesian stock market to see if herding behavior is present. Finally, this study relies solely on the Cross-Sectional Absolute Deviation (CSAD) approach.(Chang, Cheng, & Khorana, 2000). In comparison there are alternative methods for detecting herding behavior, such as the Cross-Sectional Standard Deviation (CSSD) from (Christie & Huang, 1995) and LSV model. As a result, future study can employ a variety of methodologies in addition to CSAD to detect stock market herding behavior.

In order to foster a positive market sentiment, authorities such as the Ministry of Finance, Bank Indonesia, and Indonesia Stock Exchange should more carefully assess the impact of existing restrictions. This is due to the fact that information continues to exert a substantial influence on the Indonesian stock market. Therefore, a positive disposition may give stability and reduce the likelihood of investors acting irrationally. For Indonesian investors, material must be analyzed independently using technical or fundamental analysis. Following market consensus will produce deviations in the real worth of stock prices. Following market consensus does not guarantee investors a profit, since market consensus can be incorrect. Thus, investors must fully comprehend the significance of fundamental analysis in order to earn a return in a variety of market conditions. Moreover, for companies listed on the Indonesia Stock Exchange to avoid herding behavior, they must create a positive image of their company and maintain their performance in all circumstances in order to reassure investors that the company has a promising future.

This study has limitations, mainly with the absence of industry-specific calculations for herding behavior. It is preferable to calculate each industry because the result will be more precise and the characteristics of each industry are often distinct from one another. Thus, future research should incorporate an investigation of herding behavior by industry.

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

References

Aanwaar, G., Boamah, N. A., & Akotey, J. O. (2020). Investor Herd Behavior in Africa's Emerging and Frontier Market . *International Journal of Economics and Financial Issues*, 194-205.

Adem, A. M., & Sarioglu, S. E. (2020). Analysis of Investors Herding Behavior: An Empirical Study from Istanbul Stock Exchange. *European Journal of Business and Management Research, Vol.5, No.2*, 1-11.

Akinsomi, O., Coksun, Y., & Gupta, R. (2017). Analysis of Herding in REITs of an Emerging Market: The Case of Turkey. *Journal of Real Estate Portfolio Management*, 1-22.

Alrhafynza & Siswanto. (2018). Reaksi Pasar Modal Indonesia Terhadap Peristiwa Politik Nasional (Studi Pada Saham LQ-45 atas Putusan Sidang Kasus Penistaan Agama oleh Gubernur DKI Jakarta, Basuki Tjahja Purnama Tahun 2017). *UNEJ e-Proceeding, ISSN 2686-0783*, 47-57.

Bhaduri, S. N., & Mahapatra, S. D. (2013). Applying an alternative test of herding behavior: A case study of the Indian stock market. *Journal of Asian Economics*, *25*, 43–52.

Bikhchandani, S., & Sharma, S. (2001). Herd Behavior in Financial Market. *IMF Staff Papers, Vol. 47, No.3*, 279-310.

Chang, E. C., Cheng, J. W., & Khorana, A. (2000). An Examination of Herd Behavior in Equity Markets: An International Perspective. *Journal of Banking and Finance, 24*(10), 1651-1679.

Christie, W. G., & Huang, R. D. (1995). Following the Pied Piper: Do Individual Returns Herd around the Market? *Financial Analysts Journal* , 31-37.

Choi, K.-H., & Yoon, S.-M. (2020). Investor Sentiment and Herding Behavior in the Korean Stock Market. *International Journal of Financial Studies*, *8*(2), 34.

Cote, J., & Sanders, D. (1997). Herding behavior: Explanations and implications. *Behavioral Research in Accounting*, *9*.

Devenow, A., & Welch, I. (1996). Rational Herding in Financial Economics. *European Economic Revew*, 603-615.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance, Vol. 25, No. 2, Papers and Proceedings of Twenty Eight Annual Meeting of the American Finance Association New York*, 383-417.

Garg, A., & Jindal, K. (2014). Herding Behavior in an Emerging Stock Market: Empirical Evidence from India. *IUP Journal of Applied Finance*, *20*(2).

Huang, T.-C., & Wang, K.-Y. (2017). Investors' fear and herding behavior: evidence from the Taiwan stock market. *Emerging Markets Finance and Trade*, *53*(10), 2259–2278.

Huang, Q., Zhang, H., Chen, J., & He, M. (2017). Quantile Regression Models and Their Applications: A Review. *Journal of Biometrics & Biostatistics Vol. 8, Issue 3*, 1-6.

Johansen, A., Ledoit, O., & Sornette, D. (2000). Crashes as Critical Point. *International Journal of Theoritical and Applied Finance, Vol.3 No. 2*, 219-255.

Jones, C. P. (2009). *Investments Principles and Concepts* (11th ed.). Asia: John Wiley & Sons Ltd.

Jordan, B. D., Miller, T. W., & Dolvin, S. D. (2015). *Fundamentals of Investments: Valuation and Management 7th edition.* New York: McGraw-Hill Edu.

Kengatharan, L., & Kengatharan, N. (2014). The Influence of Behavioral Factors in Making Investment Decisions and Performance: Study on Investors of Colombo Stock Exchange, Sri Lanka. *Asian of Journal and Accounting, Vol. 6, No. 1*, 1-23.

Lao, P., & Singh, H. (2011). Herding Behavior in the Chinese and Indian Stock Markets. *Journal of Asian Economics, Vol. 22, Issue 6*, 495-506.

Malik, S. U., & Elahi, M. A. (2014). Analysis of Herd Behavior Using Quantile Regression: Evidence from Karachi Stock Exchange (KSE). *Munich Personal RePEC Archieve*, 1-24.

My, T. N., & Truong, H. H. (2011). Herding Behaviour in an Emerging Stock Market:

Empirical Evidence from Vietnam. *Research Journal of Business Management, 5*(2), 51-76.

Nofsinger, J. (2005). *The Psychology of Investing 2nd edition.* New Jearsey: Pearson edu.

Noviliya, H. S., & Prasetiono. (2017). Analisis Pendeteksian Herding Behaviour pada Bursa Saham Emerging dan Developed Market Asia (Negara Indonesia, China, Singapura, dan Jepang) Tahun 2012-2016. *Diponegoro Journal of Management, Vol.6*(No.3), 1-11.

Pasaribu, H. Z., & Sadalia, I. (2018). Anailsis Perilaku Herding Investor Pada Saham LQ-45 di Pasar Modal Indonesia. *TALENTA Conference Series: Local Wisdom, Social and Arts (LWSA), Vol.1, Issue 2*, 104-114.

Pompian, M. M. (2012). *Behavioral Finance and Investors Types: Managing Behavior to Make Better Investors Decisions.* New Jersey: John Wiley & Sons.

Purwanto. (2004). *Pengukuran Kinerja Lingkungan*. Diambil kembali dari http://andietri.tripod.com/

Putra, A. A., Rizkianto, E., & Chalid, D. A. (2017). The Analysis of Herding Behavior in Indonesia and Singapore Stock Market. *11th International Conference on Business and Management Research (ICBMR 2017)*, 197-206.

Prechter Jr, R. R. (2001). Unconscious herding behavior as the psychological basis of inancial market trends and patterns. *The Journal of Psychology and Financial Markets*, *2*(3), 120–125.

Rahmawati, R., Widiarti, & Novianti, P. (2011). Regresi Kuantil. *Prosiding Seminar Nasional Statistika Universotas Diponegoro*, 318-325.

Ramadhan, T., & Mahfud, M. K. (2016). Deteksi Perilaku Herding Pada Pasar Saham Indonesia & Singapura Tahun 2011-2015. *Diponegoro Journal of Management*, 1-9.

Republic, C. S. (2013). *Interview with Professor Meir Statman about Behavioral Finance.* Czech: Newsettler.

Ricciardi, V., & Simon, H. K. (2000). What is Behavioral Finance? *Business, Education & Technology Journal, Vol.2, No.2*, 1-9.

Sarana, J., Soekarni, M., Lestari, E., Rifai, B., Ermawati, T., Yuniarti, P. I., & Negara, S. D. (2008). *Pasar Modal dalam Pembangungan Ekonomi Berkelanjutan.* Jakarta: Pusat Pembangunan Ekonomi Lembaga Ilmu Pengetahuan Indonesia.

Setiyono, Tandelilin, E., Hartono, J., & Hanafi, M. M. (2013). Detecting the Existence of Herding Behavior in Intraday Data: Evidence from Indonesia Stock Exchange. *Gajah Mada International Journal of Business, Vol. 15, No. 1*, 27-44.

Sewell, M. (2007). Behavioural Finance University of Cambridge (Revised April, 2010). *from http://www.behaviouralfinance.net/behavioural-finance.pdf*, 1-13.

Shiller, R. J. (1987). Investor Behavior in the October 1987 Stock Market Crash: Survey Evidence. *National Bureau of Economic Research Working Paper, No. 2446*, 1-41.

Suryawijaya & Setiawan. (1998). Reaksi Pasar Modal Indonesia Terhadap Peristiwa Politik Dalam Negeri (Event Study pada Peristiwa 27 Juli 1996). *Kelola, MM - UGM, Vol.7, No.18*, 137-153.

Tan, L., Chiang, T. C., Mason, J. R., & Nelling, E. (2007). Herding behavior in Chinese stock markets: An examination of A and B shares. *Pacific-Basin Finance Journal*, 61-77.

Trueman, B. (1994). Analyst forecasts and herding behavior. *The Review of Financial Studies*, *7*(1), 97–124.

Vo, X. V., & Phan, D. B. (2016). Herd Behavior in Emerging Equity Markets: Evidence from Vietnam. *Asian J Law Econ; 7 (3)*, 369-383.

Wahyuni, K. T. (2019). Studi Perbandingan Kinerja Portofolio Saham Berdasarkan Kapitalisasi Pasar di Bursa Efek Indonesia dengan Risk Adjusted Return. *Juima, Vol.9, No. 1*, 75-83.Ali, S. E. A., Lai, F.-W., & Shad, M. K. (2021). Investors' risk perception in the context of efficient market hypothesis: A conceptual framework for malaysian and indonesian stock exchange. *SHS Web of Conferences*, *124*, 3002.

Bhaduri, S. N., & Mahapatra, S. D. (2013). Applying an alternative test of herding behavior: A case study of the Indian stock market. *Journal of Asian Economics*, *25*, 43–52.

Buallay, A., Hamdan, A., & Zureigat, Q. (2017).

https://scholarhub.ui.ac.id/icmr/vol14/iss2/4
DOI: 10.21002/icmr.v14i2.1152

Corporate governance and firm performance: evidence from Saudi Arabia. *Australasian Accounting, Business and Finance Journal*, *11*(1), 78–98. https://doi.org/10.14453/aabfj.v11i1.6

Choi, K.-H., & Yoon, S.-M. (2020). Investor Sentiment and Herding Behavior in the Korean Stock Market. *International Journal of Financial Studies*, *8*(2), 34.

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance*, *46*(5), 1575–1617.

Garg, A., & Jindal, K. (2014). Herding Behavior in an Emerging Stock Market: Empirical Evidence from India. *IUP Journal of Applied Finance*, *20*(2).

Hammami, H., & Boujelbene, Y. (2015). Investor Herding Behavior and Its Effect on Stock Market Boom-Bust Cycles. *IUP Journal of Applied Finance*, *21*(1).

Hsing, Y., & Hsieh, W. (2012). Impacts of macroeconomic variables on the stock market index in Poland: new evidence. *Journal of Business Economics and Management*, *13*(2), 334–343.

Huang, T.-C., & Wang, K.-Y. (2017). Investors' fear and herding behavior: evidence from the Taiwan stock market. *Emerging Markets Finance and Trade*, *53*(10), 2259–2278.

Kholesta, A. K. (2019). Weak Form Efficient Market Hypothesis and January Effect; Study Case in LQ45 Index of Indonesia Stock Exchange Market Period 2016-2018. *Jurnal Manajemen Update*, *8*(4).

Kim, J. H., Doucouliagos, H., & Stanley, T. D. (2014). Market efficiency in Asian and Australasian stock markets: A fresh look at the evidence. *Tom D., Market Efficiency in Asian and Australasian Stock Markets: A Fresh Look at the Evidence (November 5, 2014)*.

Kumar, A., Bharti, M., & Bansal, S. (2016). An examination of herding behavior in an emerging economy–A study of Indian stock market. *Global Journal of Management and Business Research*, *16*(5), 1–9.

Kurt Gümüş, G., Gümüş, Y., & Çimen, A. (2019). Herding behaviour in cryptocurrency market: CSSD and CSAD analysis. In *Blockchain Economics and Financial Market Innovation* (pp. 103–114). Springer.

Lu, Y. K., & Perron, P. (2010). Modeling and forecasting stock return volatility using a random level shift model. *Journal of Empirical Finance*, *17*(1), 138–156.

Malini, H. (2019). Efficient market hypothesis and market anomalies of LQ 45 index in Indonesia stock exchange. *Sriwijaya International Journal of Dynamic Economics and Business*, *3*(2), 107–121.

Malini, H., & Jais, M. (2014). The Volatility of Indonesia Shari'ah Capital Market Stock Price Toward Macro Economics Variable. *Indonesian Capital Market Review*.

Malini, H., & Suwantono, E. (2021). Indonesia Stock Exchange Resilience toward Crisis; Study Case of US and China Trade War. *IJEBD International Journal Of Entrepreneurship And Business Development EISSN 2597-4785 PISSN 2597-4750*, *4*(2), 234–240.

Prechter Jr, R. R. (2001). Unconscious herding behavior as the psychological basis of financial market trends and patterns. *The Journal of Psychology and Financial Markets*, *2*(3), 120–125.

Rahman, R. E., & Ermawati, E. (2020). An analysis of herding behavior in the stock market: a case study of the Asean-5 and the United States. *Buletin Ekonomi Moneter Dan Perbankan*, *23*(3), 297–318.

Teh, L. L., & De Bondt, W. F. M. (1997). Herding behavior and stock returns: An exploratory investigation. *Revue Suisse D Economie Politique Et De Statistique*, *133*, 293–324.

Zhang, Y., Lei, L., & Wei, Y. (2020). Forecasting the Chinese stock market volatility with international market volatilities: The role of regime switching. *The North American Journal of Economics and Finance*, *52*, 101145.

Zheng, D., Li, H., & Zhu, X. (2015). Herding behavior in institutional investors: Evidence from China's stock market. *Journal of Multinational Financial Management*, *32*, 59–76.