



Herding Behavior in The Asean Stock Market During The Covid-19 Pandemic

Dewi Rahmayanti¹, Fitri Santi²,
Darus Altin³, Muhammad
Qomaruddin Ridwan⁴, Wan Mohd
Nazdrol⁵

¹Management Program, Faculty
Economic and Bussiness, Universitas
Bengkulu

²Doctotal of Management Program,
Faculty Economic and Bussiness,
Universitas Bengkulu

³Master of Management Program,
Faculty Economic, Universitas
Bangka Belitung

⁴Accounting Program, Faculty
Economic, Universitas Bangka
Belitung

⁵Faculty of Entepreneurship and
Business, Universiti Malaysia
Kelantan

email: dewi_rahmayanti@unib.ac.id¹

Keywords:

*ASEAN Stock Market, Cross-
Sectional Absolute Deviation
(CSAD), COVID-19 Pandemic,
Herding Behavior, Rolling Window
Regression*

ABSTRACT

This study aims to detect indications of herding behavior that occurred in the ASEAN capital market throughout the COVID-19 pandemic. The research spanned from December 31, 2019, to June 30, 2021, encompassing the duration of the COVID-19 pandemic. This research used panel regression and rolling window regression methods on the dependent variable of Cross-Sectional Absolute Deviation (CSAD) to detect indications of herding behavior. This research also employed daily stock return data for all companies on several stock exchanges in five ASEAN countries. The panel regression model was then utilized in the analysis. The panel regression results demonstrated the absence of herding behavior on the stock exchanges in ASEAN. This was evident as the $Rm2$ coefficient consistently revealed a significant positive sign throughout the entire observation period. However, upon re-checking through rolling window regression, it was uncovered that, at some times, herding did occur on the ASEAN stock exchange during the COVID-19 pandemic. Furthermore, the government's policy response by limiting short selling could reduce herding on the stock market. Simultaneously, the government's policy response to the COVID-19 epidemic, proxied by the Stringency Index, apparently heightened investor anxiety and promoted herding behavior. Lastly, the heightened levels of anxiety and volatility experienced during the pandemic (variable IVI) led to a rise in herd behavior among the stock markets of ASEAN countries.

INTRODUCTION

As we all know, the COVID-19 pandemic initially occurred in Wuhan, China, at the end of 2019, which then spread not only throughout Asia but also throughout the world. Initially, this pandemic was responded to in a normal manner, but then, along with the increase in positive cases of COVID-19 and the number of deaths, people began to worry and fear. The effects impact not only health but also all aspects of life, including the declining economy and the emergence of concerns about an economic crisis.

In the uncertain times, the COVID-19 pandemic with many PSBBs (Large-Scale Social Restrictions), lockdowns, and the collapse of the economy, human instinct is to follow the majority. However, why do people follow these instincts? Economic experts say that this is unintelligent. All over the world, everyone was worried about this coronavirus, and when people saw the news in online and offline media, it made them even more anxious. As a result, everywhere, people were buying up and panicking, buying various goods, especially those related to health. At the airport, everyone had their body temperature checked, making health and wellness protocols even stricter. Panic everywhere was the next consequence. In addition to being a health emergency, it had a serious impact on the world economy. Many lost their jobs, supply was disrupted, the economy slowed down, and negative growth occurred. The question that then arises is how bad the economic condition will become. The answer depends on how quickly this pandemic can be controlled and overcome. Even further, now, everything is connected, where globalization connects one to another, including the virus, which first appeared in Wuhan, China, but then spread so quickly globally; the world is becoming a global village; everything that far away has become so close.

The outbreak of the novel coronavirus COVID-19 in January 2020 also triggered a public health emergency of international concern and worsened national health systems around the world. Although the coronavirus crisis had posed a major threat to vulnerable members of society, governments in developed and developing countries were responding with varying degrees of rigor to save lives and reduce the increasing pressure on each

country's health sector. In general, governments have taken various forms of policy, such as school and workplace closures, social distancing measures, and travel restrictions, along with fiscal stimulus packages and aggressive monetary expansion.

Nevertheless, the other side of the pandemic has been an eye-opener for market policymakers, politicians, and financial regulators. In reality, the coronavirus crisis is predicted to give birth to something bigger, i.e., a business cycle recession and a global financial crisis. As a result, stock market investors have succumbed to the growing uncertainty within the economy and financial system and have triggered massive selling of risky assets (Baker et al., 2020b; Ramelli & Wagner, 2020). In periods of financial market anxiety and increasing uncertainty (Schmitt and Westerho, 2017), especially from various dimensions (Avery and Zemsky, 1998), investors tend to imitate the decisions of their peers, namely follow the crowd or herd behavior (Kurz & Kurz -Kim, 2013).

One popular explanation for stock return variability is attributed to changes in stock prices driven by herding behavior by investors. Investor herding behavior is often formed spontaneously and irrationally. In the context of asset pricing, the belief that herding behavior reflects investors' irrational responses (rather than the outcome of rational decision-making) has attracted the attention of many researchers, as it implies that prices may be driven away from their equilibrium values. Through this premise, investors are exposed to herd behavior or movements and are forced to transact at inefficient prices.

Christie and Huang (1995) and Huang and Salmon (2004) define herding behavior as the behavior of investors who ignore their personal analysis or opinions and use the behavior of other investors and market sentiment as the basis for making investment decisions. Investors who are affected by this bias tend not to analyze information before making decisions and only follow the instincts of market flows and the decisions of other, more expert investors. This is what makes herding behavior in the capital market lead to a more negative connotation because if many investors are biased, this can create a big difference between the market price of a share and its fair price.

The findings of previous research that have tried to find the existence of herding behavior in

various countries are diverse, including Indonesia (e.g., Scharfstein & Stein, 1990; Banerjee, 1992; Christie & Huang, 1995; Bikhchandani & Sharma, 2000; Chang, Cheng & Khorana, 2000; Demirer & Lien, 2001; Hwang & Salmon, 2004; Tan, Chiang, Mason & Nelling, 2008; Chiang & Zheng, 2010; Chiang, Li & Tan, 2010; Van Campenhout & Verhestraeten, 2010; Lao & Singh, 2011; Ahsan & Sarkar, 2013; Setiyono, Tandelin, Hartono & Hanafi, 2013; Le & Truong, 2014; Chaffai & Medhioub, 2018). However, none of these previous studies has tried to observe herding behavior during a pandemic or certain global disease outbreak. Most of these studies are more focused on detecting herding behavior during bullish or bearish market periods. For that reason, this study aims to detect indications of herding behavior that occurred in the Indonesian capital market during the COVID-19 pandemic.

This research seeks to find out whether herding behavior occurred during the pandemic, and if so, to what extent did this behavior occur? To answer these questions, this research employed methods developed by Christie and Huang (1995) and Chang et al. (2000), namely Cross-Sectional Absolute Deviation (CSAD) and Cross-Sectional Standard Deviation (CSSD) as herding indicators. These indicators measure the average distance between individual stock returns and market returns and help to ascertain whether investor decisions follow herding features. If investors decide to imitate group behavior in periods of high stock market volatility, individual stock returns become less dispersed around market returns, leading to a decrease in CSAD and CSSD.

First, research on the impact of the pandemic crisis on financial asset valuation is still embryonic (Baker et al., 2020a). Two important exceptions encompass (i) research by Donadelli et al. (2017), who studied whether investor mood driven by news about global dangerous diseases (i.e., SARS, Influenza A (H1N1), Polio, and Ebola) was priced into US pharmaceutical stocks and (ii) a study by Ichev and Marinê (2018), who reported that an increase in perceived risk in US financial markets followed the Ebola outbreak. In relation to COVID-19, recently, Onali (2020) examined COVID-19 cases and COVID-19 deaths in the US stock market and found no impact on US stock market returns. Additionally, Corbet et al. (2020) discovered that the relationship between

the volatility of the Chinese stock market and cryptocurrencies evolved significantly during the pandemic. In line with that, Yarovaya et al. (2020) revealed that COVID-19 did not strengthen herding in the cryptocurrency market. Uddin et al. (2020) also examined the relationship dynamics of Asian financial markets and uncovered a strong positive dependency among the markets studied due to the outbreak of COVID-19. Such rare events provide an opportunity to learn about investor behavior (Wagner, 2020). Hence, the current research aims to fill this gap by considering the Indonesian market during the COVID-19 pandemic. Specifically, the researchers asked whether the recent widespread stock market collapse was associated with the existence of herding behavior in the stock market.

Second, unlike previous research on herding behavior in international stock markets (e.g., Chiang and Zheng, 2010a; Gebka and Wohar, 2013; Lin, 2018; Chen et al., 2019; Yarovaya et al., 2020), this research exploits the possibility that the government's response to the coronavirus pandemic could reduce herding behavior in the Indonesian capital market. From previous studies, such as Kizys, Tzouvanas, and Donadelli (2020), it was revealed that a fiscal stimulus package in the form of providing incentives to companies to temporarily relax employee working hours with public subsidies (in the UK) and contribute to the information set of international investors, it was found to trigger no herding or anti-herding effects potentially. They illustrated this possibility through a time series plot depicting CSAD, CSSD, and the Oxford Government Responsiveness Index, where all these series moved simultaneously, indicating support for the idea that stricter government response to the coronavirus crisis is associated with higher CSAD/CSSD values, thereby lowering the level of herding in the market.

Further, Kizys, Tzouvanas, and Donadelli (2020) studied the effectiveness of short-selling restriction policies on herding behavior imposed by national and supranational regulatory authorities. This effectiveness is informed by the so-called overpricing hypothesis, as proposed by Miller (1977). This hypothesis states that in the presence of restrictions on short-selling and under the assumption of heterogeneous beliefs of investors, stock prices will only reflect the bullish and bearish assessments of investors who currently own the stock. Short sellers, who essentially do not own shares,

are forced out of the market so that their valuation decisions will not affect the price. As a result, prices must rise above the full-information rational-equilibrium level. Although a comprehensive study on the effectiveness of short-selling restrictions during the 2008-2009 Global Financial Crisis conducted by Beber and Pagano (2013) does not provide support for the overpricing hypothesis, research by Kizys et al. (2020) sought to re-examine this hypothesis in the new circumstances arising from the coronavirus pandemic. The study of Kizys et al. (2020) is conceptually similar to that of Bohl et al. (2014), who examined the influence of short selling on herding behavior in stock markets during the 2008-2009 Global Financial Crisis. Bohl et al. (2014) exposed that in France, Germany, and the United Kingdom, where short-selling restrictions were implemented by their respective National Supervisory Bodies, increased absolute value of market returns triggered a disproportionately large increase in return dispersion around market returns compared with rational/fair asset prices. Such an increase in return dispersion is consistent with Miller's overpricing hypothesis. For Indonesia, the IDX has issued a policy to maintain the continuity of a conducive market and fair securities trading, namely temporarily prohibiting short-selling transactions. The policy prohibiting short selling on the IDX is effective Monday (2/3/2020) morning until an undetermined time limit.

Kizys et al. (2020) also unveiled that the Oxford Government Response Stringency Index exerted a positive (i.e., anti-herding) and significant effect on CSAD/CSSD in international stock markets. In line with Avery and Zemsky's (1998) hypothesis, government responses can reduce the multidimensional uncertainty surrounding the coronavirus pandemic, which can effectively limit investors' herding behavior. Moreover, Kizys et al. (2020) found that short-selling restrictions are related to anti-herding behavior in international stock markets. The findings of Kizys et al. (2020) align with Miller's (1977) overpricing hypothesis. In this research, the author attempts to find evidence of the existence of investor herding behavior during the coronavirus crisis in Indonesia from March to June 2020 and see whether the policy response carried out by the Indonesian government could suppress herding behavior in the Indonesian capital market.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Investors' investment decisions cannot be avoided by their psychology. Statman (1995) states that humans are rational for traditional finance and normal thinking for financial behavior. Meanwhile, Shefrin (2005) asserts that the differences between behavioral finance and traditional finance are shown by two issues for asset prices: sentiment and expected utility. This sentiment is a dominant factor in the occurrence of prices in the market for consumer behavior. In comparison, traditional finance states that asset prices are always linked to fundamental risk or time-varying risk aversion. Second, expected utility is to maximize expected utility for traditional finance. On the other hand, behavioral finance proposes that investors do not conform to expected utility theory. One of the initiators of this theory was Kahneman and Tversky (1979), who introduced Prospect Theory. This theory begins by criticizing the Utility Theory, which is most widely used in analyzing investments, especially in risky conditions.

Herding itself comes from the word herd, which means a group. Herding behavior is a psychological condition when investors ignore their personal beliefs and follow the beliefs of most people without thinking (Devenow & Welc, 1996). Herding behavior occurs when investors face uncertain sources of public information and receive unclear signals about the market or company (Kremer & Nautz, 2012 in Maximilian Chandra, 2012). Chang, Cheng, and Khorana (2000) provide four reasons why herding behavior can occur in the capital market: 1.) Investors process the same information; 2.) Investors prefer shares with general characteristics, namely "better known" and "liquid"; 3.) Investment managers tend to follow the transaction steps of other managers to maintain their reputation; 4.) Investment managers follow the share price valuations of other managers.

Furthermore, herding in financial markets is identified as a tendency for investor behavior to follow the actions of other investors. Christie and Huang (1995) define herding behavior as the behavior of investors who ignore their personal analysis or opinions and use the behavior of other investors and market sentiment as the basis for making investment decisions. Investors who are

affected by this bias tend not to analyze information before making decisions and only follow the instincts of market flows and the decisions of other, more expert investors. Hwang and Salmon (2004) state that herding occurs when investors decide to imitate decisions observed by others or the market rather than following their beliefs and information. Such behavior may appear individually rational for a number of reasons, although it may not necessarily lead to efficient markets.

During times of uncertainty, such as the ongoing COVID-19 pandemic characterized by the implementation of Large-Scale Social Restrictions (PSBBs), lockdowns, and economic downturns, it is natural for individuals to conform to the prevailing consensus. Nevertheless, what motivates individuals to adhere to these instincts? Economic experts deem this to be unwise. Globally, individuals expressed concern regarding the coronavirus, and exposure to news through various online and offline media platforms heightened their anxiety. Consequently, individuals across all locations were engaging in widespread purchasing and experiencing heightened anxiety as they acquired a variety of items, particularly those pertaining to health. At the airport, individuals underwent body temperature screenings, thus enhancing the stringency of health and wellness measures. The next result was widespread panic. Not only did it pose a health issue, but it also had a profound effect on the global economy. A significant number of individuals experienced unemployment, there was a disruption in the supply chain, the economy saw a deceleration, and negative economic growth was observed. The question that emerges is to what extent will the economic position deteriorate? The answer hinges on the expeditious containment and resolution of this pandemic. Moreover, in the present context, there exists a comprehensive interconnection wherein globalization facilitates the linkage between various entities, including the virus that initially emerged in Wuhan, China, but rapidly disseminated worldwide. This phenomenon is leading to the emergence of a global village, where geographical distances are diminishing, rendering previously distant entities much closer.

One of the human instincts to deal with a crisis is herd behavior. When people hear information that the shelves of hand sanitizers, masks, or other health-related things in many shops or supermarkets are empty, they panic and buy up,

too. People tend to follow other people's actions, and this is also the case in the capital market. People also tend to react more emotionally and irrationally. When the capital market experiences a breakdown and a run occurs, and people become afraid and anxious that stock prices will continue to fall, they will sell, and massive selling will continue; then, people will see destabilization that will worsen the crisis. Following that, financial authorities begin trying to calm the market so that it would not panic; for example, the central bank will reduce interest rates, the government will maintain liquidity, and others so that stock prices will not fall too far. Then, some investors calm down and decide not to sell. Central banks and governments around the world work to overcome the effects of the pandemic on the economy. Meanwhile, panicking will not help anything.

The occurrence of epidemics and pandemics is a major challenge for public health, where history records that fear and panic are an integral human response to every pandemic event (Bonneux & Van Damme, 2006). Panic behavior during times of disaster and epidemic is a common response to an inability to cope and can ultimately destroy the existing balance. Many times, people develop unexplained behaviors that differ from country to country, from culture to culture. Panic buying/increased buying behavior has been observed during public health emergencies since ancient times. However, a precise psychological explanation for this has not been systematically sought. Therefore, the authors aim to identify possible psychological explanations behind panic buying behavior during times of crisis, such as a pandemic.

Moreover, panic behavior is increasingly occurring in the era of free and fast flow of information, both correct and wrong information, via the internet. All of this increases fear and panic. When there is information that goes viral and is then considered to be something true, people start to follow other people's behavior, and the following behavior occurs. For instance, when information emerged that ginger was an antidote to the COVID-19 virus, it went viral, and everyone flocked to buy ginger; as a result, the price of ginger rose irrationally, exceeding its normal price. Following the behavior of buying ginger is considered rational according to market consensus, even though, in the end, people have to suffer because of price inefficiencies.

Perceptions of scarcity are also closely related to increased panic buying behavior, herding behavior, and hoarding behavior during the pandemic if the shortage concerns basic things, such as health (Wilkins, 2020; Dholakia, 2020; Bonneux & Van Damme, 2006). Panic and herding behaviors also create feelings of insecurity, which ultimately activates other mechanisms for hoarding (Dholakia, 2020).

A perceived sense of loss of control over the environment may be an explanation for panic and follower behavior. During times of crisis, people generally like to control things, which brings them a sense of certainty (Wilkins, 2000). Generally, people do not want to get involved in any debate, and moral insecurity drives them to take action to reduce the anxiety they experience and bring back a sense of control (Yap, 2020). This phenomenon might be explained as a remedial response to reduce fear and worry about losing control over the surrounding environment (Dholakia, 2020). Because of the extraordinary uncertainty that is evident there, people usually anticipate regret if they fail to collect something they consider important while it is still available. Furthermore, people's lack of control over the pandemic creates a desire to have control of at least something necessary during the crisis (Bonneux & Van Damme, 2006).

Herding behavior and panic buying also have a relationship with perceived feelings of insecurity and instability regarding certain situations (Hendrix, 2013). The status of the coronavirus pandemic in 2020 has left society with much uncertainty. People did not know when the epidemic would end; therefore, saving necessities by buying as many as possible and storing them is a shortcut to overcoming feelings of insecurity. Moreover, chaos on the supply side, a condition where products whose supply has previously been normal becomes disrupted during times of crisis, is very often encountered during times of crisis, pandemic outbreaks, or any disaster (Shou, 2013). This also creates feelings of insecurity.

Additionally, as social creatures, people sometimes measure the intensity of a crisis by observing the reactions of people around them, which explains the social learning theory for this phenomenon. In response to panic buying behavior carried out by other people or other investors, people tend to volunteer to buy irrationally

(Dholakia, 2020). It is also described as herd instinct (Wilkins, 2020). Herding behavior is an instinct for survival like a herd of animals; if they follow their herd, there will be a sense of security and survival. This phenomenon can also be linked to similar things that occurred during epidemics and other natural disasters in the past. Stockpiling medicines and vaccines is considered a method of preparation in case of a pandemic (Jennings et al., 2008). Thus, in other words, the general public may start hoarding goods that are necessary for them.

In an emergency or crisis, the primitive parts of the human brain also usually become more prominent and lead them to behave as necessary for survival (Dodgson, 2020). In addition, primitive instinctive behavior has a humanistic expression and poor rational thinking, which could be an important aspect of explaining the phenomenon.

It has been noticed that during crisis outbreaks, people sometimes believe that the government will not be able to control black marketing and provide support to villagers. Lack of trust and anticipation of running out of resources may be responsible for panic buying. They unthinkingly overestimate the risk of harm and underestimate the likelihood of relief (Bonneux & Van Damme, 2006).

Sometimes, people get a threatening perception from media reports that people are making more purchases than before; there is a possibility of a global crisis. At times, the media reports crises in a sensational manner, which creates more panic. Another important factor is the way the virus or pandemic is portrayed on social media or in films, making people more panicked and anxious. People tend to learn from behavior as depicted in social media or films and try to imitate it whenever they are faced with a pandemic (Schell, 1997).

In short, fear of scarcity and loss of control over the environment, insecurity (which can be due to fear), social learning, exacerbating anxiety, and basic primitive human responses are the core factors responsible for the phenomenon of panic buying and herding behavior. Further observations, as well as qualitative studies, are needed to explore the psychological perspective of herding behavior during times of crisis, which in turn will help to find preventive measures in future moments.

In society, there is panic buying various health products such as masks, medicines, sanitizers, and many more. There is something that triggers

such panic buying behavior, and everyone then follows without thinking long about whether what they are doing is rational, appropriate, or not. The Indonesian capital market has also felt a significant impact due to the COVID-19 virus. Since stock prices fell, investors were also affected.

There are several types of investors in the Indonesian capital market. Some institutional investors generally have quite complete and sophisticated resources, knowledge, information, and analytical tools. These institutional investors are usually informed investors. Some individual investors can be divided into two large groups, namely informed investors and uninformed investors or ordinary investors, who do not have many resources and knowledge about stocks and investments. Investors who do not have complete information on the market tend to ignore their decisions and follow the behavior of other investors in the market. In conditions of panic and crisis, they trust other investors who are more knowledgeable and have access to better information than them. This then developed into the basis of herding behavior (Chaffai & Medhioub, 2018; Bikhchandani & Sharma, 2000; Hirshleifer & Hong Teoh, 2003; Scharfstein & Stein, 1990).

As has been seen in various news reports, the COVID-19 pandemic has brought fear to the world community. Fears are not only about health conditions but also about the global economic impact. Investors' increasing concern about economic uncertainty due to COVID-19 is reflected in the sharp decline in capital market indices in various parts of the world. US stock markets recorded their worst performance since Black Monday in 1987, while Germany's DAX index recorded its worst-ever decline. Global stocks have fallen due to uncertainty over the COVID-19 outbreak.

The following is an illustration of how investors' concerns caused a fall in various world exchanges on Monday, March 16, 2020.

The Dow Jones Industrial Average (DJIA), a stock market index of the top 30 companies in the US, fell more than 2,997 points or nearly 13% on Monday. It was the worst single-day loss reported by the Dow since October 19, 1987, also known as Black Monday. The S&P 500, a stock market index of 500 large US-based companies, also slumped to its lowest point since late 2018, down nearly 12%.

This was also the sharpest decline for the S&P since Black Monday. The last half hour of trading saw a significant decline after US President Donald Trump announced that the US economy "may" slide into recession. The US Stock Exchange Authority (SEC) said that the US market will remain open despite the significant fall and speculation that the market may halt trading. To save the slowing economy, the US Federal Reserve cut interest rates to almost zero and pledged to buy billions of dollars worth of government debt. The Federal Reserve typically takes such actions during economic crises. Wall Street shares quickly fell after opening on Monday, triggering an automatic 15-minute halt in trading. The US halted trading with a loss of €2 trillion. Losses continued after trading resumed, with the tech-heavy Nasdaq Composite Index ending the day down 12.3%. Global markets also fell as the sell-off continued.

In China, most of which was hit by the COVID-19 outbreak, the Shanghai Composite Index fell 3.4%, while the Shenzhen Composite Index fell 5.34%. Hong Kong's Hang Seng Index fell more than 4% at the close. A crash in one market triggers a crash in other markets.

The US Market crash particularly affected Australia, whose benchmark stock index fell 9.7% at the end of the trading day. The Australian dollar also weakened against the US dollar.

Oil prices continued to fall, with Brent North Sea oil plunging more than 10% to a four-year low due to falling demand and the ongoing price war between Russia and Saudi Arabia. Global oil prices were below \$30 per barrel - the lowest in four years, all because oil demand has plummeted as many economic activities have stopped and been disrupted due to the coronavirus.

European shares plunged again on Monday on coronavirus concerns. The pan-European STOXX 600 fell 8.7% to its lowest level since 2013 and closed 5.1% lower. The latest decline means the index has lost more than a third of its value since a record high in February. Germany's DAX fell 7.1% earlier on Monday. Just four weeks after its record high, the blue-chip index fell 40% to a five-and-a-half-year low. Never before in its history has Germany's main index fallen so drastically so quickly.

Furthermore, Huang and Salmon (2004) tried to detect the existence of herding behavior in the US and South Korean capital markets. Using

the cross-sectional dispersion technique of the sensitivity of asset factors in a particular market, they attempted to evaluate if there was herding behavior towards certain sectors or styles in the market, including market indices, and critically, they separated herding behavior from general movements in asset returns driven by movements in the asset's fundamentals. They found that herding against the market showed significant and persistent movements independently of market conditions or specific macro factors. They also found evidence of herding in the market portfolio (market index) in both bullish and bearish market conditions. Contrary to popular belief, the Asian Crisis and especially the Russian Crisis reduced herding behavior and were clearly identified as turning points in herding behavior.

Tan, Chiang, Mason, and Nelling (2008) also attempted to examine the existence of herding behavior in China, namely in Chinese A-share and B-share stocks. They disclosed evidence of herding behavior in the Shanghai and Shenzhen A-share markets (domestic individual investors dominated the A-share market) and in the B-share market in both markets (the B-share market was dominated by foreign institutional investors). Herding behavior occurred in both rising market conditions and falling market conditions. The herding behavior carried out by A share investors in the Shanghai stock market was more visible when market conditions rose, trading volume was high, and volatility was high. Similar results also happened in the B share market.

In their study, Chiang and Zheng (2010) detected herding behavior in 18 countries, including Indonesia. They found herding behavior in several developed countries, except in the United States and the stock markets of Asian countries. However, they did not find any herding behavior in the stock markets of Latin American countries. The research results indicated that the dispersion of stock returns in the United States plays an essential role in explaining herding behavior in other countries. The research results also stated that the crisis triggered herding behavior in the country where the crisis originated and produced a contagion effect, spreading the crisis to neighboring countries.

Lao and Singh (2011) analyzed herding behavior in the Chinese and Indian stock markets and revealed herding behavior in both countries.

The research results showed that the level of herding depended on market conditions. In the Chinese market, herding behavior was greater when the market fell and when trading volume was high. However, in India, research results uncovered that herding behavior appeared when market conditions changed. Herding behavior generally occurred when there were large market movements in both markets. However, in relative terms, herding behavior was detected at a lower rate in the Indian stock market compared to the Chinese stock market.

In addition, Chaffai and Medhioub (2018) identified herding behavior in the stock markets of Arab countries that are members of the Islamic Gulf Cooperation Council (GCC). According to research results, herding behavior was only detected during rising market periods and was not detected during falling market periods. The results of this research are similar to results in several other countries, such as China, Japan, and Hong Kong, where stock return performance tends to be the same during down-market periods and different during up-market periods.

On the Dhaka Stock Exchange, Ahsan et al. (2013) researched to prove the existence of herding behavior. They did not find the existence of herding behavior in the period January 2005 to December 2011. The results of this study were different from what they heard from well-known media in Bangladesh. The research results strengthen the belief of investors on the Dhaka Stock Exchange that it is wrong to follow the investment decisions of the crowd so that they are not exposed to herding behavior.

Sewwandi (2016) tried to detect herding behavior on the Colombo Stock Exchange using the Cross-Sectional Absolute Deviation (CSAD) method. They did not find evidence of the existence of herding behavior because the R2mt coefficient was positive and significant. This result differs from what Christie and Huang (1995) found, which is that herding behavior is more common in developing countries.

The existence of herding behavior is also sought in Indonesia. Gunawan et al. (2011), for example, attempted to detect indications of herding behavior in Indonesia and Asia Pacific from 2005 to 2010. They discovered that herding behavior occurred during market stress conditions. Meanwhile,

under normal conditions and very high yields, no indication of herding behavior was detected.

Setiyono, Tandailin, Hartono, and Hanafi (2013) continued efforts to detect the existence of institutional investor herding behavior in the Indonesian stock market using intraday trading data from the Indonesian Stock Exchange (BEI) during rising, falling, and stable market conditions from 2003 to 2005. By using the model of Lakonishok et al. (1992), they found that the average intensity of institutional investors' herding behavior on the IDX was 8.4%. Institutional investors did not appear to direct their trading in stocks with specific characteristics. Most of them followed a positive feedback trading strategy, while others followed a negative feedback trading strategy. Furthermore, they also uncovered that the existence of herding behavior on the IDX did not disrupt stock market prices in the following period.

Furthermore, Ramadhan and Mahfud (2016) endeavored to find evidence of the existence of herding behavior in the Indonesian stock market. In contrast to the two previous studies, they did not find herding behavior in the 2011–2015 period. Thus, they concluded that investors in the Indonesian stock market had behaved rationally in making investment decisions because of the information needed by investors to analyze company conditions and price movements. Shares can be accessed well so that investors use them as the basis for investment analysis. Furthermore, they also inferred that the absence of herding behavior during this period was also due to investors' ability and knowledge to process this information so that it became a basis for analysis in making investment decisions.

Pasaribu and Sadalia (2018) also sought the existence of herding behavior in the LQ-45 Index in the period January 2013 – December 2015. They divided the market conditions during the research into two: falling and rising market conditions. The results showed that they did not find herding behavior in both falling and rising conditions. They denoted that investors in the Indonesian capital market during that period tended to act rationally in making investment decisions.

Based on previous studies, this research first suspects that investor herding occurred on the stock exchanges of ASEAN countries during the

COVID-19 pandemic. This assumption is based on the theory that when a situation enters a crisis, such as a pandemic, people will experience stress and depression. During a crisis, the response that usually arises is the instinct to panic and try to survive. One way to survive is to look at what most investors do. During the COVID-19 pandemic, most investors are worried about the uncertainty of the economic future and the possible risk of an economic crisis because many economic activities have been disrupted. Concern caused many stock exchanges to fall, and investors panicked about selling shares, which became increasingly severe, so the government immediately implemented policies to reduce investor anxiety and panic and increase market liquidity. The success or failure of the policy taken by the government will be seen from the reduction in herding investors. Furthermore, the volatility or standard deviation of stock market returns will decrease.

Second, this research also assumes that the policy of prohibiting short-selling transactions, which has been implemented on various stock exchanges by each authority in each country in response to investors' anxiety due to the impact of COVID-19, could reduce investor herding. By prohibiting short-selling transactions, the risk of volatility felt on the stock exchange due to global and regional market concerns can be reduced. This indicates that by prohibiting short-selling, it is expected that anti-herding will occur on the stock exchange. Kyzys et al.'s (2020) research also found that the implementation of a short-selling prohibition in Europe and several other countries in the world could lower investor herding.

Third, the next hypothesis proposed in this research is related to the level of stringency of the government's response to COVID-19. Stricter government responses such as limiting mobility, lockdowns, closing schools, and working from home are expected to control the spread of COVID-19. If the COVID-19 pandemic can be controlled, it will create a sense of security in the community, and people can return to their activities. The speed of response and the stringency of the response level play a major role in this. For this reason, this research believes that the tightness of the response will reduce market concerns and, ultimately, a calm market will reduce investor herding.

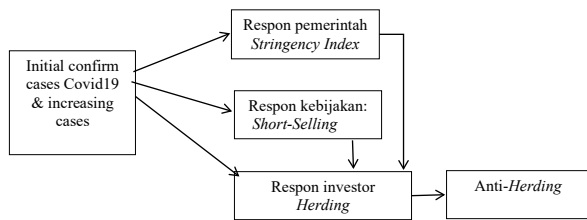


Figure 1. Research Roadmap

RESEARCH METHOD

Much research has been conducted on the investors’ herding behavior in the capital market. The researchers themselves have researched to detect the existence of herding investor behavior in the Indonesian capital market during the COVID-19 pandemic and the impact of the month of Ramadan by taking the observation period 2020 - 2021 for all shares included in the IHSG and JSI.

The results demonstrated no herding behavior during the observation period. Many other previous studies have also been carried out to detect herding behavior in the capital market, such as Chang et al. (2000), Huang and Salmon (2004, Mobarek et al. (2014), Bour et al. (2019), and many more. Of these previous studies, none has looked at herding behavior during the COVID-19 pandemic. From the literature search that the authors carried out using the keyword “herding,” an image of a map of studies that had been carried out regarding herding was obtained, as presented in Figure 2. The map was obtained using the VOSviewer program. From this figure, it can also be seen that there have been no studies on herding that use a pandemic setting, but there have been many studies on herding linked to crises. Pandemics can also lead to crises, so this research is interested in studying them further.



Figure 2. Mapping Previous Research on Herding Using the VOSviewer Program

Therefore, this research aims to examine the existence of herding investors in the capital markets of ASEAN countries and analyze the effects of each government’s policy response to the COVID-19 pandemic. The period taken was at the beginning of the pandemic, from January 2020 to December 2020. Samples that had been listed on the stock exchange from January 2020 until December 2020 were taken from this population. Stock index data on the stock exchanges of each ASEAN country was used as market index data. The data required was daily stock return data and daily index returns, all of which could be obtained on the Indonesia

Stock Exchange website, the www.duniainvestasi.com website, the finance.yahoo.com website, the ThomsonOne Banker database, and the Datastream database. The observation period was on stock exchange trading days starting from January 2, 2020, to December 30, 2020.

Table 1. Research sample

No	Country	Number of Observations (December 31, 2019 – June 30, 2021)
1	Indonesia	392 observations
2	Malaysia	392 observations
3	Philippines	392 observations

No	Country	Number of Observations (December 31, 2019 – June 30, 2021)
4	Thailand	392 observations
5	Singapore	392 observations

Apart from data related to stock and index returns, data were also needed regarding policy information taken by the Indonesian government in response to the COVID-19 pandemic, as well as the effective date of implementation of these policies. The data was labeled Stringency Index. This data was required to observe whether, if investors do herding on the stock exchange, the policy taken by the government could be anti-herding; for data regarding the government's general policy response regarding COVID-19, the Oxford COVID-19 Government Response Tracker (OxCGRT) data was employed, which can be downloaded at: <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>. Systematically, OxCGRT collects information on several different public policy responses that governments have taken to respond to the pandemic across 17 indicators, such as school closures and travel restrictions. Currently, OxCGRT has data from more than 160 countries. This data was also employed to inform the 'Lockdown rollback checklist,' which looks at how close countries are to meeting four of the six World Health Organization (WHO) recommendations for easing lockdowns.

For the first measure of investor herding behavior, this research follows Christie and Huang (1995), who suggest using the Cross-Sectional Standard Deviation (CSSD) method of stock returns to detect investor herding behavior. In more detail, $CSSD_{i,t}$ for share i on day t was obtained using the following formula 1:

$$CSSD_{i,t} = \sqrt{\frac{\sum_{s=0}^{\tau-1} (R_{i,t-s} - R_{m,t-s})^2}{(\tau - 1)}} \quad (1)$$

Where $R_{i,t}$ is the return of stock i on day t , and $R_{m,t}$ is the market return or index return, where the index used is IHSG and the nine sectoral indices on the BEI; $CSSD_{i,t}$ is a dynamic measure of herding behavior in stock i , calculated as the 22-day rolling-window standard deviation ($t=22$) of stock i 's return from the return value of index m on day t .

When investors are herding, during large changes in stock prices and returns, the return of

stock i should deviate less from the return of index m on day t than during a less volatile period. In other words, a small $CSSD_{i,t}$ value indicates strong evidence of herding behavior; in comparison, a large $CSSD_{i,t}$ value denotes evidence of weak herding behavior. For the second measure of herding behavior, the authors follow Chang et al. (2000), which employed Cross-Sectional Absolute Deviation or $CSAD_{i,t}$. This size was calculated using Formula 2 as follows:

$$CSAD_{i,t} = \frac{1}{\tau} \sum_{s=0}^{\tau-1} |(R_{i,t-s} - R_{m,t-s})| \quad (2)$$

Like $CSSD_{i,t}$, $CSAD_{i,t}$ is a dynamic measure of the herding behavior of stock i , calculated as the absolute deviation of the 22-day rolling-window ($t=22$) return of stock i from the return value of index m on day t .

Related to that, Chang et al. (2000) asserted that if there are indications of herding behavior following market sentiment, individual stock returns will cluster around the index return, which causes the deviation value between stock returns and index returns to be small; it indicates that stock returns do not deviate much from index returns.

Furthermore, this research used short-selling limitation variables with dummy variables or DSS (dummy short-selling). Several stock exchange authorities in each ASEAN country have implemented a rule that there should be no short-selling transaction activities to maintain and reduce stock exchange volatility. Data regarding the date of the policy implementation was required, where for days outside the short selling restriction period, they would be coded with a value of 0, and for the period during which each country's stock exchange authority imposed short selling restrictions, it would be assigned a value of 1.

To measure the Stringency Index variable, this research utilized the Oxford COVID-19 Government Response Tracker (OxCGRT) measurement. The Stringency Index (SI) has a value range of 0 to 100. A higher SI value indicates a country with a stricter government response to the COVID-19 pandemic. This SI value varies, indicating the government's response; if the government views that its country is getting worse from COVID-19, the government will implement more stringent policies to control the spread of COVID-19.

The empirical model used in this research is as follows:

$$Y_{i,t} = \alpha_0 + \alpha_1 |R_{m,t}| + \alpha_2 R_{m,t}^2 + \alpha_3 Dss_t + \alpha_4 SI_t + \alpha_5 IVI_t + \varepsilon_{i,t} \quad (3)$$

Where $Y_{i,t}$ is the dependent variable, proxied by CSAD $_{i,t}$ in this study; meanwhile, the independent variable in this research is the absolute value variable of return index m in period t or $|R_{m,t}|$; variable return index squared value in period t or $R_{m,t}^2$; value of the dummy variable short-selling restrictions or Dss_t ; and the variable value of the tightness index in period t or SI_t .

In periods of market stress, the relationship between the variables $Y_{i,t}$ and $R_{m,t}$ will tend to be non-linear (Lux, 1995). If there are no herding investors, the coefficient α_1 should be positive, and the coefficient α_2 is not significant (Mobarek et al., 2014). Investor herding occurs when the α_2 coefficient is negative (Chang et al., 2000), and if the coefficient α_2 is positive, there is anti-herding (Bour et al., 2019). More importantly, if the coefficients α_3 or α_4 are negative (positive), the government's policy response will have the effect of increasing (reducing) herding behavior. In this research model, a control variable for global uncertainty was also included using the proxies of the *implied volatility index*, IVI_t . IVI_t represents the uncertainty felt by more sophisticated derivative market participants in relation to short-term expected market volatility; in other words, it describes investors' "fear gauge" (Whaley, 2000). When fear dominates the market, investors will be more inclined to follow market movements, or investors will tend to herd (Philippas et al., 2013).

Using Cross-Sectional Absolute Deviation (CSAD) of returns as a measure of dispersion, according to Chang et al. (2000), rational asset pricing models predict that not only are equity return dispersions an increasing function of market returns, but also the relationship is linear. If market participants tend to follow aggregate market behavior and ignore their respective previous information during periods of very large price movements, the increasing (or positive) and linear relationship between return dispersion and market returns will no longer apply. On the other hand, the relationship will change to be non-linear, either increasing (positive) or even decreasing (negative). The CSAD model proposed by Chang et al. (2000) builds on this intuition.

The existence of herding behavior indications on a stock exchange will be shown not only by a decrease in the dispersion value (CSAD) but also by the existence of a non-linear relationship between the dispersion value (CSAD) and market returns (Demirer & Lien, 2001). For this reason, non-linear regression analysis was used to measure the relationship between dispersion value (CSAD) and market returns. However, it should be emphasized that CSAD is not a method for detecting herding; rather, herding behavior can be identified through the relationship between CSAD and market returns (Chang et al., 2000).

Furthermore, this research deduces that the policy of prohibiting short-selling transactions on the IDX implemented by the stock exchange regulator has a positive influence on CSAD, or in other words, has an anti-herding impact. This short-selling prohibition is intended to limit volatility or reduce the risk of turmoil in the stock market. Thus, it is expected that the coefficient α_3 in Equation 3 has a significant positive sign.

The $Y_{i,t}$ variable is also thought to respond differently to the level of measurement of the level of stringency of the government's response to the COVID-19 incident. Therefore, this research created the SI variable in Equation 3. The specification of the Equation 3 model would also be tested and checked to meet the requirements for panel regression assumptions.

To test the strength of the findings, this research also carried out a rolling window regression on Equation 3 and looked at the movement of the regression coefficients from Equation 3. There are no provisions regarding the size of the window period used to test the strength of the regression coefficient, but consideration was used to consider the width of the observation period and the reaction time; 50 rolling window observation periods were carried out.

RESULTS AND DISCUSSION

The following describes descriptive statistics of herding from a sample of observational data. Descriptive statistical data is presented in Table

2. For the herding variable proxied by CSAD, it is known to have an average value of 0.0193. This average CSAD figure was quite low. A low CSAD value indicates that the returns from individual assets did not deviate too far from the overall market returns. This denotes that investors ignored the information they had, and their investment decisions were based on market consensus. A low CSAD value suggests a tendency for herding to occur.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Minimum	Maximum	Std Deviation
CSAD	392	0.0193	0.0000	0.9877	0.0212
Rm	392	0.0003	-0.9006	0.1492	0.0114
DSS	392	0.2367	0.0000	1.0000	0.4251
SI	392	60.0284	0.0000	100.0000	24.8766
IVI	392	46.2112	12.1000	88.6900	44.0298

Based on Table 2, the stock index in the five ASEAN countries in the sample showed an average daily return during the observation period during the COVID-19 pandemic of 0.0003 and a standard deviation of 0.0114. The minimum market return value was -0.9006 (negative), indicating that in a depressed market situation during the pandemic, stock market returns could fall very deeply, and during the pandemic, the maximum market return reached 0.1492.

Data Panel Regression Results to Test Herding Behavior in the ASEAN Stock Market

The empirical model used in this research is as follows:

$$Y_{i,t} = \alpha_0 + \alpha_1 R_{m,t} + \alpha_2 R_{m,t}^2 + \alpha_3 Dss_t + \alpha_4 SI_t + \alpha_5 IVI_t + \varepsilon_{i,t} \quad (4)$$

Y is a herding variable proxied by CSAD.

As mentioned previously, herding behavior can be concluded to occur if the coefficient of the squared market return variable (namely α_2) shows

The Stringency Index (SI) variable revealed that the average level of fear in countries summarized in the capital markets of several ASEAN countries was around 58.03. This index exposes a high level of fear of death and the government's response to the COVID-19 pandemic. A high SI index value indicates the strictness of government policy regarding handling COVID-19 in developing countries during the pandemic. The SI number lies between 0 and 100.

The control variable for global uncertainty in this study was proxied by the implied volatility index, IVIt. IVIt represents the uncertainty felt by more sophisticated derivative market participants regarding short-term expected market volatility, or in other words, describes investors' "fear gauge" (Whaley, 2000). The mean IVI was 60.0284, meaning that the market was operating at quite high-risk conditions, with a maximum value reaching 88.69 and a minimum of 12.1. When fear dominates the market, investors will be more inclined to follow market movements, or investors will tend to herd (Philippas et al., 2013). If the IVI value is above 20, the market is in a state of panic or volatility. The highest value was 88, indicating that during the COVID-19 pandemic, there has been market turmoil and panic, which has increased market volatility.

a negative and significant sign.

The complete regression results are summarized in Table 3 below.

Table 3. Panel Regression Results on Equation 3

Dependent Variable: CSAD

Method: Panel Least Squares

Sample (adjusted): 1/01/2020 until 6/30/2021

Periods included: 391

Cross-sections included: 5

Total panel (balanced) observations: 1455

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	0.0142	0.0002	73.1403	0.0000
ABSRM	0.4186	0.0119	35.1957	0.0000
RM2	0.6705	0.0189	35.3423	0.0000
DSS	0.0040	0.0003	15.4855	0.0000
SI	-0.0004	0.0000	-14.7046	0.0000
IVI	-0.2518	0.0032	79.1177	0.0000
Effects specification: Cross-section fixed (dummy variables)				
Root MSE	0.014526		R-squared	0.530499
Mean dependent var	0.019308		Adjusted R-squared	0.529156
S.D. dependent var	0.021200		S.E. of regression	0.014547
Akaike info criterion	-5.619919		Sum squared resid	2.144927
Schwarz criterion	-5.598593		Log-likelihood	28596.05
Hannan-Quinn criteria	-5.612706		F-statistic	394.9276
Durbin-Watson stat	1.710210		Prob(F-statistic)	0.000000

From the regression results, it can be seen that the squared market return coefficient or RM2 disclosed a significant positive sign. This suggests that overall, there was no herding on the five ASEAN stock exchanges observed. However, this was still being tested further to see the possibility of herding occurring at the level of each country through rolling window regression.

Furthermore, from Table 3, the Short Selling (DSS) dummy variable revealed a significant positive sign, meaning that when exchange authorities in ASEAN countries impose restrictions on short-selling transactions, it appears that this will increase the CSAD figure or reduce herding behavior in the stock market. In other words, this policy can help reduce herding in the stock market. For the SI (Stringency Index) variable, the regression results showed a negative and significant effect. This denotes that if the atmosphere of the COVID-19 pandemic, which has encouraged the government

to adopt a policy of tightening mobility and taking several steps to overcome and reduce the number of people infected with COVID-19 and overcome its economic impact, is getting worse and strictness is being increased, this means that COVID-19 is getting worse. Thus, this causes increased public and investor anxiety, thereby encouraging increased herding behavior, which increasingly smaller CSAD characterizes.

The variable IVI (implied volatility index) from the regression results in Table 3 also exhibited a significant negative sign. The higher the global volatility index, the more investors' anxiety will increase, which ultimately encourages them to herd (reduce CSAD). Global volatility has indeed increased during the pandemic. The pandemic has caused many shocks, not only from the health aspect but also from the economic aspect, giving rise to increasing uncertainty and ultimately giving rise to market anxiety. Anxiety and stress in facing increased volatility encourage herding in the stock market. IVI represents the uncertainty felt by more sophisticated derivative market participants regarding short-term expected market volatility, or in other words, describes investors' "fear gauge" (Whaley, 2000). When fear dominates the market, investors will be more inclined to follow market movements, or investors will tend to herd (Philippas et al., 2013). The results of this research succeeded in showing that IVI has a negative effect on CSAD (increasing herding on the stock market).

Rolling Window Regression Results for Robustness Check on Findings of Herding Behavior in the ASEAN Stock Market

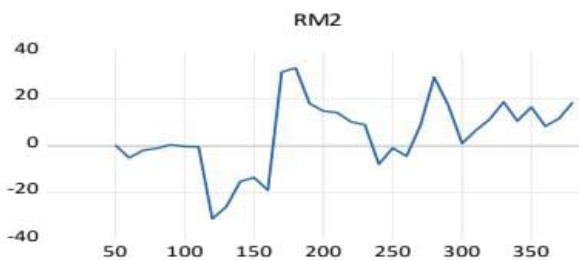
To test the strength of the findings regarding herding behavior, characterized by a negative market return coefficient, this research conducted a rolling window regression on Equation 3, and the movement of the regression coefficient of the squared market return variable from Equation 3 was looked at. There are no provisions regarding the size of the window period used to test the strength of the regression coefficient, but consideration was used to consider the width of the observation period and the length of the reaction so that a rolling window period of 50 trading days was carried out and repeated every subsequent day. Then, a negative market return variable coefficient indicates that herding occurred in that period. The

coefficient results of the market return variable for each ASEAN country sampled are presented in Figure 3.

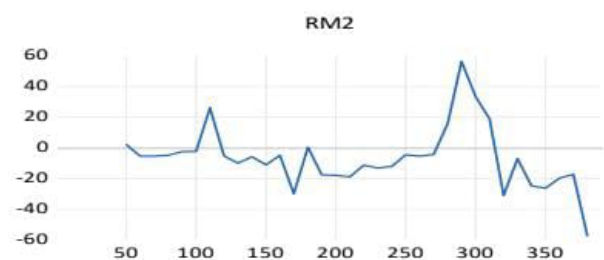
From Figure 3, it can be seen that each ASEAN country showed herding at certain points in time during the observation period. This was indicated by the presence of a negative RM2 coefficient on the coefficient graph. For Indonesia, for example, the RM2 coefficient was found to be negative at the 50th to 60th observation point, observation points to 110 to 170, and observation points around 250. For Malaysia, it can be seen that the RM2 coefficient had more negative values at many observation points. When compared to the five countries, the rolling regression coefficient graph for the squared market return variable with the most negative values was Malaysia, followed by Indonesia. From the graph for the five countries, it can also be seen that herding did occur (although not at all observed times), but it was not the same between countries. Both the timing and magnitude of herding were heterogeneous.

At the end of 2019, the world was shocked by the emergence of the COVID-19 outbreak, which started in Wuhan, China. The COVID-19 pandemic then spread to almost all countries in the

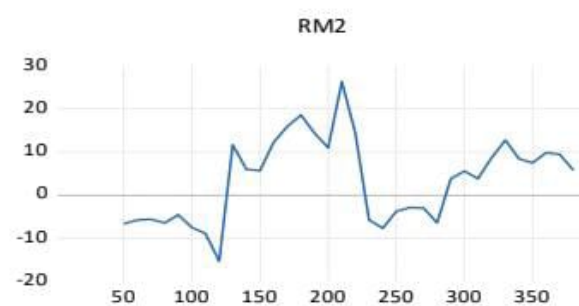
world, including ASEAN countries. World health conditions, including ASEAN countries, were deteriorating, people were becoming stressed and panicking, and there were restrictions on mobility and even lockdowns everywhere. The threat of crisis was becoming real, not only a world health crisis but also a world economic crisis. When things enter a crisis, such as a pandemic, people will experience stress and depression. The government's policy to increase mobility restrictions to curb the spread of the virus has actually made people increasingly anxious, which has been taken as a signal of the worsening pandemic. When a crisis occurs, the response that usually arises is the instinct to panic and try to survive. One way to survive is to look at what most investors do. During the COVID-19 pandemic, most investors were worried about the uncertainty of the economic future due to the COVID-19 pandemic and the possible risk of an economic crisis because many economic activities have been disrupted. Concern caused many stock markets to fall and investors to panic sell shares; as a result, massive herding behavior emerged in various markets, including the stock market. The results of this research indicate that herding behavior occurred in the stock market in several ASEAN countries as a sample.



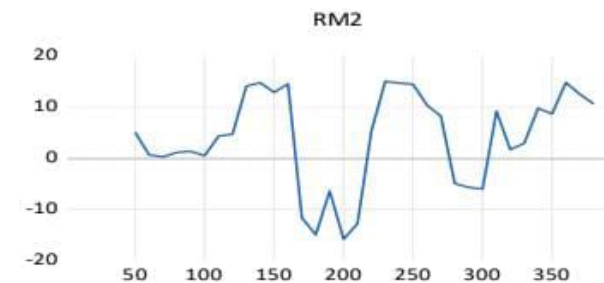
a. Indonesia



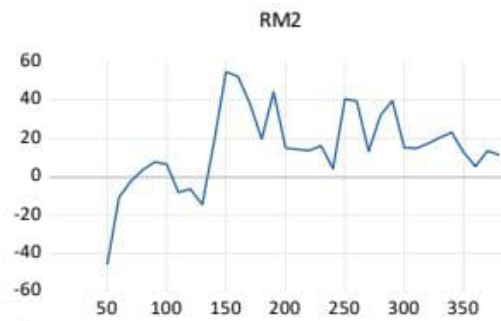
b. Malaysia



c. Filipina



d. Thailand



e. Singapura

Figure 3. Rolling Regression Coefficient for the Squared Market Return Variable (RM2) in Each ASEAN Country

The government then implemented many policies to reduce the negative impact of this pandemic, lower investor anxiety and panic, and increase market liquidity. The success or failure of the policy taken by the government will be seen from the reduction in herding investors. One of the policies taken to curb the rate of herding is the policy to prohibit and limit short selling. This policy is intended to reduce volatility, which can trigger market panic. The findings of this research indicate that the policy of limiting and stopping short selling could reduce herding (or become anti-herding).

Aside from implementing a policy of limiting and eliminating short selling, the government was also trying to reduce the rate of spread of the virus. In this research, researchers took the Stringency Index (SI) variable to show the stringency of the government's response to the pandemic. The higher the Stringency Index number, the more stringent the country's efforts to suppress the spread of the virus in that country. This research also found that the SI coefficient was negative and significant. This suggests that this policy actually triggers increased public anxiety and stress, which ultimately increases herding on the stock market.

CONCLUSION

Several conclusions can be drawn from this research.

First, this research succeeded in detecting the existence of herding behavior on the stock exchanges of ASEAN countries during the COVID-19 pandemic. The magnitude and timing of this herding behavior varied between each ASEAN stock market. When things enter a crisis, such as a pandemic, people will experience stress and depression. During a crisis, the response that

usually arises is the instinct to panic and try to survive. One way to survive is to look at what most investors do. During the COVID-19 pandemic, most investors were worried about the uncertainty of the economic future due to the COVID-19 pandemic and the possible risk of an economic crisis because many economic activities have been disrupted. Concern caused many stock exchanges to fall, and investors panic selling of shares, which became increasingly severe. As such, the government immediately took policies to reduce investor anxiety and panic and increase market liquidity. The success or failure of the policy taken by the government will be seen from the reduction in herding investors. Furthermore, the volatility or standard deviation of stock market returns will decrease.

Second, this research found that the policy of prohibiting short-selling transactions, which has been implemented on various stock exchanges by each authority in their respective countries in response to investors' anxiety due to the impact of COVID-19, could reduce investor herding. By prohibiting short-selling transactions, the risk of volatility felt on the stock exchange due to global and regional market concerns could be lowered. This denotes that by prohibiting short-selling, anti-herding occurred on the stock exchange.

Third, this research revealed that the level of strictness in the government's response to COVID-19 actually increased herding behavior. The stricter the government's response (such as limiting mobility, lockdowns, closing schools, and working from home, which is expected to control the spread of COVID-19), it turned out that the public understood that the pandemic situation was getting worse, and this made the investing community more anxious, thereby encouraging

herding behavior. Although the initial hope was that if the government tightened its policy response to COVID-19, it could reduce and control the rate of COVID-19; however, this was interpreted differently by investors. Initially, if COVID-19 can be controlled, it will create a sense of security in the community, and people can return to normal activities. Unfortunately, the speed of response and the strictness of the government's response to the pandemic were perceived differently by the public and increased market concerns and herding. Nevertheless, initially, the response was expected with increasingly stringent SI to calm the market and reduce investor herding.

For further research, the researchers can increase the research period because the pandemic was still not over until this manuscript was written, and government policies were still rolling out to help the economy survive the COVID-19 pandemic crisis. It is good as a comparison because herding behavior is generally the result of market concerns that trigger survival instincts, so it would be better if researchers used not only samples of the COVID-19 crisis but also samples of crises in other forms. The differences in crisis psychology are also interesting to test for further research; the psychology of the COVID-19 pandemic crisis will undoubtedly be different from the psychology of the 2008 or 1998 monetary crises.

REFERENCE

- Ahsan, A. F. M., & Sarkar, A. H. (2013). Herding in Dhaka Stock Exchange. *Journal of Applied Business and Economics*, 14(2): 11-19.
- Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: cases or fatalities? *Research in International Business and Finance*, 54. doi: <https://doi.org/10.1016/j.ribaf.2020.101249>. Available at: <https://www.sciencedirect.com/science/article/pii/S0275531920304141?via%3Dihub>
- Baker, S. R., Bloom, N., Davis, S. J., & Terry, S. J. (2020b). Covid-induced economic uncertainty. Working Paper 26983, National Bureau of Economic Research.
- Banerjee, A. V. (1992). A Simple Model of Herd Behaviour. *Quarterly Journal of Economics*, 107(3): 797-817.
- Bansal, T. (2020). Behavioral Finance and COVID-19: Cognitive Errors that Determine the Financial Future. Available at SSRN 3595749.
- Bouri, E., Gupta, R., & Roubaud, D. (2019). Herding behaviour in cryptocurrencies. *Finance Research Letters*, 29: 216-221.
- Beber, A., & Pagano, M. (2013). Short-selling bans around the world: Evidence from the 2007-09 crisis. *The Journal of Finance*, 68(1):343-381.
- Bikhchandani, S., & Sharma, S. (2000). Herd Behavior in Financial Markets. *IMF Staff Papers*, 47(3): 279-310.
- Bohl, M. T., Klein, A. C., & Siklos, P. L. (2014). Short-selling bans and institutional investors' herding behaviour: Evidence from the global financial crisis. *International Review of Financial Analysis*, 33:262-269.
- Bouri, E., Gupta, R., & Roubaud, D. (2019). Herding behaviour in cryptocurrencies. *Finance Research Letters*, 29:216-221.
- Bonneux, L., & Van Damme, W. (2006). An iatrogenic pandemic of panic. *BMJ*, 332 (7544): 786-788. <http://doi.org/10.1136/bmj.332.7544.786>.
- Buhai, S. (2005). Quantile Regression: Overview and Selected Applications. *Ad Astra*, 4(2005), 1-17.
- Chaffai, M., & Medhioub, I. (2018). Herding Behavior in Islamic GCC Stock Market: A Daily Analysis. *International Journal of Islamic and Middle Eastern Finance and Management*, 11(2): 182-193. doi:<https://doi.org/10.1108/IMEFM-08-2017-0220>
- Chang, E. C., Cheng, J. W., & Khorana, A. (2000). An Examination of Herd Behaviour in Equity Markets: An International Perspective. *Journal of Banking and Finance*, 24: 1651-1679.
- Chiang, T. C., Li, J., & Tan, L. J. (2010). Empirical Investigation of Herding Behavior in Chinese Stock Markets: Evidence from Quantile Regression Analysis. *Global Finance Journal*, 21(1): 111-124.
- Chiang, T. C., & Zheng, D. (2010). An Empirical Analysis of Herd Behavior in Global Stock Markets. *Journal of Banking and Finance*, 34: 1911-1921.
- Christie, W. G., & Huang, R. G. (1995). Following the Pied Piper: Do Individual Returns Herd around the Market? *Financial Analyst Journal*, 51(4): 31-37.
- Demirer, R., & Lien, D. (2001, January). A New Measure to Test Herd Formation in Equity Markets. In *Financial Management Association International Annual Meeting*.
- Dholakia, U. (2020). Why are we panic buying during the coronavirus pandemic? *Science Behind Behaviour*. <https://www.psychologytoday.com/sg/blog/the-science-behindbehavior/202003/why-are-we-panic-buying-during-the-coronavirus-pandemic>.
- Dodgson, L. (2020). A human behavior expert explains 4 psychological reasons why people are panic buying items in bulk during the coronavirus pandemic. *Insider*. <https://www.insider.com/why-people-are-panic-buying-items-in-bulk-during-the-coronavirus-pandemic>.

- panic-bulk-buying-during-the-coronaviruspandemic-2020-3.
- Gebka, B. & Wohar, M. E. (2013). International herding: Does it differ across sectors? *Journal of International Financial Markets, Institutions and Money*, 23: 55 - 84.
- Gunawan; Wijayanto, H.; Achsani, N. A., & Rahman, L. O. A. (2011). Pendeteksian Perilaku Herding Pada Pasar Saham Indonesia dan Asia Pasifik. *Forum Statistika dan Komputasi*, 16(2): 16-23.
- Hendrix, C., & Brinkman, H.J. (2013). Food insecurity and conflict dynamics. *Causal Link. Complex Feedbacks. Stab*, 2 (2), e26. <http://doi.org/10.5334/sta.bm>.
- Hirshleifer, D., & Hong Teoh, S. (2003). Herd Behaviour and Cascading in Capital Markets: A Review and Synthesis. *Financial Management*, 9(1), 25-66.
- Hwang, S., & Salmon, M. (2004). Market Stress and Herding. *Journal of Empirical Finance*, 11(4): 585-616.
- Ichev, R. & Marinč, M. (2018). Stock prices and geographic proximity of information: Evidence from the ebola outbreak. *International Review of Financial Analysis*, 56:153-166.
- Jennings, L.C., Monto, A.S., Chan, P.K., Szucs, T.D., & Nicholson, K.G. (2008). Stockpiling prepandemic influenza vaccines: a new cornerstone of pandemic preparedness plans. *Lancet Infect. Dis.* 8 (10): 650-658.
- Kizys, R., Tzouvanas, P., & Donadelli, M. (2020). From COVID-19 herd immunity to investor herding in international stock markets: The role of government and regulatory restrictions. Available at SSRN 3597354.
- Koenker, R. and Bassett, G. (1978). Regression Quantiles. *Econometrica*, 46:33-50.
- Kurz, C., & Kurz-Kim, J.-R. (2013). What determines the dynamics of absolute excess returns on stock markets? *Economics Letters*, 118(2):342 - 346.
- Lakonishok, J., Shleifer, A., & Vishny, R. W. (1992). The Impact of Institutional Trading on Stock Prices. *Journal of Financial Economics*, 32(1): 23-43.
- Lao, P., & Singh, H. (2011). Herding Behaviour in the Chinese and Indian Stock Markets. *Journal of Asian Economics*, 22(6): 495-506.
- Le, U. M., & Truong, H. N. (2014). An Exploratory Study of Herd Behaviour in Vietnamese Stock Market: A New Method. *Asian Journal of Finance and Accounting*, 6(1): 464-475.
- Lux, T. (1995). Herd Behaviour, Bubbles and Crashes. *The Economic Journal*, 105 (431): 881-896.
- Malkiel, B. G., & Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, 25(2): 383-417.
- Mobarek, A., Mollah, S., and Keasey, K. (2014). A cross-country analysis of herd behavior in Europe. *Journal of International Financial Markets, Institutions and Money*, 32: 107-127
- Onali, E. (2020). Covid-19 and stock market volatility. Available at SSRN 3571453.
- Pasaribu, H. Z., & Sadalia, I. (2018). Analisis Perilaku Hearing Investor Pada Saham LQ-45 di Pasar Modal Indonesia. Paper presented at the Talenta Conference Series: Local Wisdom, Social, and Arts (LWSA).
- Philippas, N., Economou, F., Babalos, V., & Kostakis, A. (2013). Herding behavior in REITs: Novel tests and the role of financial crisis. *International Review of Financial Analysis*, 29: 166 - 174.
- Ramadhan, T., & Mahfud, M. K. (2016). Deteksi Perilaku Herding Pada Pasar Saham Indonesia & Singapura Tahun 2011-2015. *Diponegoro Journal of Management*, 5(2): 1-9.
- Ramelli, S. and Wagner, A. F. (2020). Feverish stock price reactions to COVID-19. *Swiss Finance Institute Research Paper Series 20-12*, Swiss Finance Institute.
- Scharfstein, D. S., & Stein, J. C. (1990). Herd Behaviour and Investment. *American Economic Review*, 80: 465-479.
- Schell, H. (1997). Outburst! A chilling true story about emerging-virus narratives and pandemic social

- change. *Configurations*, 5 (1), 93–133.
- Schmitt, N., & Westerho, F. (2017). Herding behaviour and volatility clustering in financial markets. *Quantitative Finance*, 17(8):1187-1203.
- Setiyono, Tandeilin, E., Hartono, J., & Hanafi, M. M. (2013). Detecting the Existence of Herding Behavior in Intraday Data: Evidence from the Indonesia Stock Exchange. *Gadjah Mada International Journal of Business*, 15(1): 27-44.
- Sewwandi. (2016). Herding in Colombo Stock Exchange. *EPRA International Journal of Multidisciplinary Research*, 2(3): 182-186.
- Shou, B., Xiong, H., & Shen., X.M. (2013). Consumer Panic Buying and Quota Policy under Supply Disruptions. City University of Hong Kong: Hong Kong Working paper.
- Tan, L., Chiang, T. C., Mason, J. R., & Nelling, E. (2008). Herding Behaviour in Chinese Stock Markets: An Examination of A and B Shares. *Pacific-Basin Finance Journal*, 16 (1-2): 61-77.
- Uddin, G. S., Yahya, M., Goswami, G. G., Ahmed, A., & Lucey, B. M. (2020). Stock market contagion of COVID-19 in emerging economies. Available at SSRN 3573333.
- Van Campenhout, G., & Verhestraeten, J. F. (2010, November). Herding Behavior among Financial Analysts: A Literature Review. Hub Research Paper 2010/39.
- Wagner, A. F. (2020). What the stock market tells us about the post-COVID-19 world. *Nature Human Behaviour*, 4: 440. <https://doi.org/10.1038/s41562-020-0869-y>
- Whaley, R. E. (2000). The investor fear gauge. *The Journal of Portfolio Management*, 26 (3):12-17.
- Wilkens, J. (2020). Why We Hoard: Fear at Root of Panic-Buying, Psychologists Say. *The San Diego Union-Tribune*. <https://www.sandiegouniontribune.com/news/health/story/2020-03-22/hoard-fear-panic-buying-psychology>.
- Yap, J.A. (2020). Coronavirus: why people are panic buying loo roll and how to stop it. *Conversation* [Online]. Available from. <https://theconversation.com/coronaviruswhy-people-are-panic-buying-loo-roll-and-how-to-stop-it-133115>
- Yarovaya, L., Matkovskyy, R., & Jalan, A. (2020). The Effects of 'Black Swan' Event (COVID-19) on Herding Behavior in Cryptocurrency Markets: Evidence from Cryptocurrency USD, EUR, JPY and KRW Markets. Available at SSRN 3586511.
- Zaremba, A., Kizys, R., Aharon, D. Y., & Demir, E. (2020). Infected Markets: Novel Coronavirus, Government Interventions, and Stock Return Volatility around the Globe. *Finance Research Letters*, 101597. <https://doi.org/10.1016/j.frl.2020.101597>