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HERDING BEHAVIOR IN THE ASEAN STOCK MARKET DURING THE COVID-19 PANDEMIC

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ABSTRACT
This study aims to detect indications of herding behavior that occurs in the ASEAN capital market during the COVID-19 Pandemic. The research period will involve the COVID-19 pandemic period, namely December 31, 2019 - June 30, 2021. This study uses panel regression and rolling window regression methods on the dependent variable Cross-Sectional Absolute Deviation (CSAD) to detect indications of herding behavior. This study uses daily stock return data for all companies listed on several stock exchanges in 5 ASEAN countries. The panel regression model is used in the analysis. The results show that from the panel regression results there is no herding behavior on the stock exchange in ASEAN because the Rm2 coefficient was found to be significantly positive for all samples of the observation period, but after being re-checked through rolling window regression, this study found that some time herding did occur on the ASEAN stock exchange during the Covid-19 pandemic. Furthermore, the government's policy response by limiting Short-selling was able to reduce herding in the stock market. Meanwhile, the government's policy response to the Covid-19 pandemic, which was proxied by the Stringency Index, actually increased investor anxiety and encouraged herding behavior. Finally, increased anxiety and volatility during the pandemic (variable IVI) drove herding behavior in ASEAN stock markets.).

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. This pandemic was initially responded to normally, but then along with the increasing number of positive COVID-19 cases and the number of deaths, people began to worry and fear. The resulting effects not only affect the health aspect, but also all aspects of life, including the declining economy and even fears of an economic crisis.

In this time of uncertainty, the Covid-19 pandemic with many PSBB, lockdowns everywhere and the collapse of the economy, human instinct is to follow the majority. But why do people follow that instinct? Economists say that it is not smart. All over the world, everyone is worried about this corona virus, and when we see the news in online and offline media, the news makes us even more anxious. Everywhere people are buying and panic buying various goods, especially those related to health. At the airport, everyone's body temperature is checked, health, health protocols are getting stricter. Panic everywhere is the next consequence. In addition to the health emergency, it has a serious impact on the world economy. Many have lost their jobs, supplies have been disrupted, the economy has slowed down and even experienced negative growth. The question that then arises, how bad will the economic conditions be? The answer depends on how quickly this pandemic can be controlled and overcome. Now everything is connected, globalization connects one with another, including the virus, which first appeared in Wuhan China, can spread so quickly globally; the world becomes a global village; everything that is far away becomes so close.

The outbreak of the novel coronavirus COVID-19 in January 2020 has triggered a public health emergency of international concern, and has strained national health systems around the world. Although the coronavirus crisis has posed a major threat to vulnerable members of society, governments in both developed and developing countries have responded with varying degrees of stringency to save lives and ease the increasing pressure on their respective health sectors. In general, governments have taken a variety of policy measures, such as school and workplace closures, social distancing measures, and travel restrictions, along with aggressive fiscal stimulus packages and monetary expansion.

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

One popular explanation for the variability of stock returns is attributed to changes in stock prices driven by herding behavior by investors. Investor herding behavior is often spontaneous and irrational. In the context of asset pricing, the belief that herding behavior reflects irrational investor responses (rather than the outcome of rational decision making) has attracted much attention from researchers because it implies that prices are likely to 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 Hwang 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 decisions of other more expert investors. That is what makes herding behavior in the capital market more negative because if many investors do this bias, it can create a big difference between the market price of a stock and its fair price.

Various previous research results have tried to find the existence of herding behavior in various countries including Indonesia (Scharfstein & Stein, 1990; Banerjee, 1992; Christie & Huang, 1995; Bikhchandani & Sharma, 2000; Chang *et al*., 2000; Demirer & Lien, 2001; Hwang & Salmon, 2004; Tan

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et al., 2008; Chiang & Zheng, 2010; Chiang, Li & Tan, 2010; Van Campenhout & Verhestraeten, 2010; Lao & Singh, 2011; Ahsan & Sarkar, 2013; Eduardus *et al*., 2013; Le & Truong, 2014; Chaffai & Medhioub, 2018). However, none of these previous studies have tried to observe herding behavior during a pandemic or a global disease outbreak. Most of these studies are more directed at detecting herding behavior during bullish or bearish market periods. This study aims to detect indications of herding behavior that occur in the Indonesian capital market during the COVID-19 Pandemic.

This study attempts to determine whether herding behavior occurs during the pandemic and if so, how far does it exist? To answer these questions, this study plans to use the 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 determine whether investor decisions follow herding features. If investors decide to imitate group behavior during periods of high stock market volatility, then 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 valuations is still in its infancy (Baker *et al*., 2020). Two notable exceptions are (i) the study 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) is priced into US pharmaceutical stocks and (ii) the study by Ichev and Marinĉ (2018), who reported that the Ebola outbreak event was followed by an increase in perceived risk in US financial markets. In relation to COVID-19, Onali (2020) recently examined COVID-19 cases and COVID-19 deaths in the US stock market and found no impact on US stock market returns. In addition, Corbet *et al*. (2020) found that the volatility relationship between the Chinese stock market and cryptocurrencies evolved significantly during the pandemic. Similarly, Yarovaya *et al*. (2020) showed that Covid-19 did not strengthen herding in the cryptocurrency market. Uddin *et al*. (2020) examined the dynamics of the relationship between Asian financial markets and found a strong positive dependence among the studied markets due to the outbreak of COVID-19. Such rare events provide an opportunity to learn about investor behavior (Wagner, 2020). Thus, my current study aims to fill this gap by considering the Indonesian market during the COVID-19 pandemic. Specifically, we ask whether the recent widespread stock market crash is associated with the presence of herding behavior in the stock market.

Second, unlike previous studies on herding behavior in international stock markets (Chiang & Zheng, 2010; Gębka & Wohar, 2013; Lin, 2018; Chen *et al*., 2019; Yarovaya *et al*., 2020), this study exploits the possibility that government responses to the coronavirus pandemic can reduce herding behavior in the Indonesian capital market. Previous studies, for example, Kizys *et al*. (2020) revealed that fiscal stimulus packages in the form of providing incentives to companies to temporarily relax employee working hours with public subsidies (in the UK), and contributing to the information set of international investors, were found to potentially trigger no-herding or anti-herding effects. They illustrate this possibility through a time series plot depicting CSAD, CSSD and the Oxford Government Responsiveness Index where all series move simultaneously, which supports the idea that a stricter government response to the coronavirus crisis is associated with higher CSAD/CSSD values, thereby reducing the level of herding in the market.

Furthermore, Kizys *et al*. (2020) also study the effectiveness of short-selling restrictions imposed by national and supranational regulatory authorities on herding behavior. This effectiveness is informed by the so-called overpricing hypothesis as proposed by Miller (1977). This hypothesis states that, with short-selling restrictions in place, and under the assumption of heterogeneous investor beliefs, stock prices will only reflect the bullish and bearish valuations of investors who currently own stocks. Short-sellers who do not essentially own stocks are forced out of the market, so their valuation decisions will not affect prices. As a result, prices should rise above the full-information rational-equilibrium level. Although a comprehensive study of 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, the study by Kizys *et al*. (2020) attempt to re-examine this hypothesis in the new situation arising from the coronavirus pandemic. The study by Kizys *et al*. (2020) is conceptually similar to Bohl *et al*. (2014), which examined the effect of short-selling

on herding behavior in the stock market during the 2008-2009 Global Financial Crisis. Bohl *et al.* (2014) found that in France, Germany and the UK, where short-selling restrictions were imposed by their respective national regulatory bodies, an increase in the absolute value of market returns led to a disproportionately large increase in return dispersion around market returns compared to 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 in order to maintain the sustainability of a conducive market and fair trading of securities, namely by temporarily prohibiting short-selling transactions. The policy prohibiting short-selling at the IDX is effective Monday (2/3/2020) morning until an undetermined time limit.

Kizys, *et al.* (2020) also found that the Oxford Government Response Stringency Index has a positive impact (i.e., anti-herding) and significant effect on CSAD/CSSD in the international stock market. In line with the hypothesis of Avery and Zemsky (1998), that government responses can reduce multidimensional uncertainty surrounding the coronavirus pandemic, which can effectively limit investor herding behavior. Furthermore, Kizys *et al.* (2020) found that short-selling restrictions are associated with anti-herding behavior in the international stock market. The findings of Kizys *et al.* (2020) are in line with the overpricing hypothesis of Miller (1977). In this study, I will try to find evidence of the existence of investor herding behavior during the coronavirus crisis in Indonesia from March to June 2020, and also see whether the policy response carried out by the Indonesian government is able to suppress herding behavior in the Indonesian capital market.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Investor investment decisions are inseparable from their psychology. Statman (1995) stated that humans are rational for traditional finance and think normally for financial behavior. While Shefrin (2005) stated that the difference between financial behavior and traditional finance is indicated by two issues for asset prices, namely: sentiment and utility expectations. This sentiment is a dominant factor in the occurrence of prices in the market for Consumer Behavior. While Traditional Finance states that asset prices are always associated with fundamental risk or time varying risk aversion. Second, utility expectations, maximize utility expectations for traditional finance. Meanwhile, financial behavior states that investors do not comply with the utility expectation theory. One of the initiators of this theory is Kahneman and Tversky (1979) who introduced the Prospect theory. This theory begins by criticizing the Utility Theory which is most widely used in analyzing investments, especially in risky conditions.

Herding 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 & Welch, 1996). Herding behavior occurs when investors face uncertainty in public information sources and receive unclear signals about the market or company (Kremer & Nautz, 2013 in Chandra, 2012). Chang *et al.* (2000) provide four reasons why herding behavior can occur in the capital market, namely: 1.) Investors process the same information. 2.) Investors prefer stocks with common characteristics, namely "better known" and "liquid". 3.) Investment Managers tend to follow the transaction steps followed by other managers to maintain their reputation. 4.) Investment Managers follow the stock price valuations of other managers.

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

How can Covid-19 trigger the emergence of herd instinct in humans? As we all know, in this time of uncertainty, the Covid-19 pandemic with many PSBB, lockdowns everywhere and the collapse of the economy, human instinct is to follow the majority. But why do people follow this instinct?

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Economic experts say that it is not smart. All over the world, everyone is worried about this corona virus, and when we see the news in online and offline media, the news makes us even more anxious. Everywhere people are buying and panic buying various goods, especially those related to health. At the airport, everyone's body temperature is checked, health, health protocols are getting stricter. Panic everywhere is the next consequence. In addition to the health emergency, it has had a serious impact on the world economy. Many have lost their jobs, supply is disrupted, the economy has slowed down and even experienced negative growth. The question that then arises is, how bad will the economic conditions be? The answer depends on how quickly this pandemic can be controlled and overcome. Now everything is connected, globalization connects one to another, including the virus, which initially appeared in Wuhan China, can spread so quickly globally; the world becomes a global village; everything that is far away becomes so close.

One of the human instincts to deal with a crisis is herd behavior. When we hear information that the shelves of hand sanitizers, masks or other health-related items in many stores or supermarkets are empty, we panic and buy up stocks. We tend to follow the actions of others, as is the case in the capital market. We 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 and fall, they will sell and continue to sell heavily; then we will see destabilization that will worsen the crisis. Then, financial authorities begin to try to calm the market so that it does not panic, for example, the central bank will lower interest rates, that the government will maintain liquidity and so on, 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 are trying to overcome the effects of the pandemic on the economy. Meanwhile, panic will not help anything.

Epidemics and pandemics are major challenges for public health, with history showing that fear and panic are integral human responses to every pandemic (Bonneux & Van Damme, 2006). Panic behavior during times of disaster and epidemic is a common response to the inability to cope and can eventually destroy the existing balance. Often, 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, the exact psychological explanation for it has not been systematically sought. Therefore, we aim to encourage the identification of possible psychological explanations behind panic buying behavior during times of crisis such as pandemics. Panic behavior is increasingly prevalent in the era of free and fast flow of information via the internet, both true and false information. All of this increases fear and panic. When there is one piece of information and it goes viral and is then considered as something true, people start to follow the behavior of others and follower behavior occurs. For example, when during the Covid-19 pandemic, information emerged that ginger was an antidote to the Covid virus, then the information went viral, everyone flocked to buy ginger and the price of ginger rose irrationally beyond its fair price, following the behavior of buying ginger was considered rational according to market consensus, even though in the end people had to suffer because there was price inefficiency.

Scarcity perceptions are also strongly associated with panic buying and follower behavior, and hoarding behavior during a pandemic increases when the scarcity concerns basic necessities such as health (Wilkens, 2020; Dholakia, 2020; Bonneux & Van Damme, 2006). Panic and follower behavior also create feelings of insecurity that ultimately activate other mechanisms for hoarding (Dholakia, 2020).

The perception of loss of control over the environment may explain panic and follower behavior. During times of crisis, people generally like to be in control and this leads them to a sense of certainty (Wilkens, 2000). People generally do not want to engage in any debate, and moral insecurity drives them to take action to reduce their anxiety and regain a sense of control (Yap, 2020). This phenomenon may be explained as a remedial response to reduce fear and anxiety about losing control over the environment (Dholakia, 2020). Because there is extraordinary uncertainty that is clearly visible, people usually anticipate regret if they fail to collect something that is considered important while it is still available. Furthermore, people's lack of control over the pandemic creates a desire to have control over at least something that is needed during the crisis (Bonneux & Van Damme, 2006).

Follower behavior and panic buying are also related to the perception of feelings of insecurity and instability over a particular situation (Hendrix & Brinkman, 2013). The status of the corona pandemic in 2020 has left society with so much uncertainty. People do not know when this outbreak will end, so storing basic necessities by buying as much as possible and storing them is a shortcut to overcome feelings of insecurity. Moreover, the chaos of the supply side, a condition where products that have been in normal supply during times of crisis are disrupted, is very often encountered during times of crisis, pandemic outbreaks, or any disaster (Shou *et al*., 2013). This also creates feelings of insecurity.

As social beings, we sometimes gauge the intensity of a crisis by observing the reactions of those around us, which explains the social learning theory for the phenomenon. In response to panic buying behavior by others or other investors, people tend to voluntarily buy irrationally (Dholakia, 2020). This is also described as herd instinct (Wilkens, 2020). Herding behavior is an instinct to survive like a herd of animals that if they follow their herd, they will feel safe and survive. This phenomenon can also be associated with similar things that happened during epidemics and other natural disasters in the past. Hoarding of medicines and vaccines is considered a method of preparation in case of a pandemic (Jennings *et al*., 2008). So, in other words, the general public may start hoarding goods that are necessary for them.

In times of emergency or crisis, the primitive part of our brain usually becomes more prominent and makes us behave in a way that is necessary for survival (Dodgson, 2020). In addition, primitive instinctive behavior has a humanistic expression and poor rational thinking which could be an important aspect to explain the phenomenon.

It has been observed that during crisis outbreaks, people sometimes believe that the Government will not be able to control black marketing and provide support to the villagers. Lack of trust and anticipation of resource depletion may be responsible for panic buying. They unthinkingly overestimate the risk of harm and underestimate the possibility of ease (Bonneux & Van Damme, 2006).

Sometimes people get a threatening perception from media reports that people are buying more than before; there is a possibility of a global crisis. Sometimes, the media reports the crisis in a sensational way that causes more panic. Another important factor is the way the virus or pandemic is portrayed on social media or in movies that makes people more panic and anxious. People tend to learn from the behaviors depicted in the media or social media or movies and try to imitate them 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, aggravation of anxiety, basic human primitive responses are the core factors responsible for the phenomenon of panic buying or 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 in finding preventive measures in future.

If in society there is panic buying of various health products such as medical devices, masks, medicines, sanitizers and many more. Such panic buying behavior is triggered and everyone then follows without thinking long about whether what is done is rational, right or not. The Indonesian capital market has also felt a significant impact due to the COVID-19 virus. Stock prices have fallen, investors have also been affected.

There are several types of investors in the Indonesian capital market. There are institutional investors who generally have quite complete and sophisticated resources, knowledge, information, and analytical tools, these institutional investors are usually informed investors. There are also individual investors who 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 in the market tend to ignore their own 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 better access to information than they do. This then developed into the basis of herding behavior (Chaffai & Medhioub, 2018; Bikhchandani & Sharma, 2000; Hirshleifer & Hong Teoh, 2003; Scharfstein & Stein, 1990).

As we have seen in various news, the Covid-19 Pandemic has brought fear to the world community. Fear is not only about health conditions but also about the global economic impact. Increasing

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investor concerns about economic uncertainty due to Covid-19 are reflected in the sharp decline in stock market indices in various parts of the world. The US stock market recorded its worst performance since Black Monday in 1987, while the German DAX index recorded a decline throughout history. Global stocks have fallen due to uncertainty over the COVID-19 outbreak.

As an illustration, here is a picture of how investor concerns caused a fall in various world stock exchanges on Monday, March 16, 2020.

The Dow Jones Industrial Average (DJIA), a stock market index of 30 of the top US companies, plunged 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 major US-based companies, plunged to its lowest point since late 2018, down nearly 12%. It was also the sharpest decline for the S&P since Black Monday. The last half hour of trading saw a significant drop after US President Donald Trump announced that the US economy was "likely" sliding into a recession. The US Stock Exchange (SEC) said that US markets would remain open despite the significant drop and speculation that markets could halt trading. To save the slowing economy, the US Federal Reserve cut interest rates to nearly zero and pledged to buy billions of dollars worth of government debt. The Federal Reserve typically takes such action during economic crises. Wall Street stocks quickly fell after the open on Monday, triggering an automatic 15-minute halt in trading. The US halted trading with a €2 trillion loss. The losses continued after trading resumed, with the tech-heavy Nasdaq Composite Index ending the day down 12.3%. Global markets also fell as the selloff continued.

In China, where the COVID-19 outbreak has gripped much of the country, the Shanghai Composite Index fell 3.4% while the Shenzhen Composite Index dropped 5.34%. Hong Kong's Hang Seng Index fell more than 4% at the close. A fall in one market triggers a fall in another.

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

Oil prices continued to fall, with Brent North Sea crude plunging more than 10% to a four-year low, due to falling demand and an ongoing price war between Russia and Saudi Arabia. Global oil prices are now below $30 a barrel - the lowest in four years, all because of the collapse in demand for oil as many economies have been shut down and disrupted by the coronavirus.

European stocks plunged again on Monday on coronavirus fears. 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 has plunged 40% to a five-and-a-half-year low. Never before in its history has Germany's main index fallen so drastically so quickly.

Hwang 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 tried to evaluate if there was herding behavior towards certain sectors or certain styles in the market including market indices and critically they separated herding behavior from general movements in asset returns driven by fundamental movements of the assets. They found that herding towards the market showed significant and persistent movements independently of market conditions or certain macro factors. They found evidence of herding in the market portfolio (market indices) 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 *et al.* (2008) tried to examine the existence of herding behavior in China, namely in Chinese A-share and B-share stocks. They found evidence of herding behavior in the Shanghai A-share and Schenzen stock markets (the A-share market is dominated by domestic individual investors), and also in the B-share market in both markets (the B-share market is dominated by foreign institutional investors). Herding behavior occurs in both rising and falling market conditions. Herding behavior carried out by A-share investors in the Shanghai stock market is more visible when market conditions are rising, trading volume is high, and volatility is high. Similar results also occur in the B-share market.

Chiang and Zheng (2010) tried to detect herding behavior in 18 countries including Indonesia.

They found herding behavior in several developed countries except in the United States and in the stock markets of Asian countries. However, they did not find herding behavior in the stock markets of Latin American countries. The results of the study indicate that the dispersion of stock returns in the United States plays an important role in explaining herding behavior activities in other countries. The results also stated that the crisis triggered herding behavior in the country of origin of the crisis and produced a contagion effect, which spread the crisis to neighboring countries.

Lao and Singh (2011) tried to detect herding behavior in the Chinese and Indian stock markets and found herding behavior in both countries. The results showed that the level of herding depends on market conditions. In the Chinese market, herding behavior is greater when the market falls and when trading volume is high. However, in India, the results showed that herding behavior occurs when market conditions change. Herding behavior generally occurs when there is a large market movement in both markets. However, relatively herding behavior was detected lower in the Indian stock market compared to the Chinese stock market.

Chaffai and Medhioub (2018) tried to detect herding behavior in the stock markets of Arab countries that are members of the Islamic Gulf Cooperation Council (GCC). The results of the study showed that herding behavior was only detected during the uptrend period and was not detected during the downtrend period. The results of this study are similar to the results in several other countries such as China, Japan, and Hong Kong where stock return performance tends to be the same throughout the downtrend period and different during the uptrend period.

Ahsan and Sarkar (2013) conducted a study to prove the existence of herding behavior in Dhaka Stock Exchange. They did not find any herding behavior in the period from January 2005 to December 2011. The results of this study are different from what they heard from the famous media in Bangladesh. The results of the study strengthen the belief of investors in Dhaka Stock Exchange that following the investment decisions of the crowd is wrong so that they are not exposed to herding behavior.

Sewwandi (2016) tried to detect herding behavior in Colombo Stock Exchange using Cross-Sectional Absolute Deviation (CSAD) method. They did not find any evidence of herding behavior because the R2mt coefficient was positive and significant. This result is different from what Christie and Huang (1995) found 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, tried to detect indications of herding behavior in Indonesia and Asia Pacific from 2005 to 2010. They found herding behavior occurred in market stress conditions. Meanwhile, in normal conditions and very high returns, there was no indication of herding behavior.

Eduardus *et al.* (2013) continued their efforts to detect the existence of institutional investor herding behavior in the Indonesian stock market using intraday trading data from the Indonesia Stock Exchange (IDX) during rising, falling and stable market conditions in the period 2003-2005. Using the Lakonishok *et al.* (1992) model, they found that the intensity of the existence of institutional investor herding behavior in the IDX was an average of 8.4 percent. Institutional investors did not seem to direct their trading in stocks with certain characteristics. Most of them followed a positive feedback trading strategy, while others followed a negative feedback trading strategy. Furthermore, they also found that the existence of herding behavior in the IDX did not disrupt stock market prices in the following period.

Ramadhan and Mahfud (2016) tried to find evidence of herding behavior in the Indonesian stock market. Unlike the two previous studies, they did not find herding behavior in the period 2011–2015. Thus, they concluded that investors in the Indonesian stock market have behaved rationally in making their investment decisions because the information needed by investors to analyze company conditions and stock price movements can be accessed well so that investors use it as a basis for investment analysis. Furthermore, they also concluded that the absence of herding behavior in that period was also due to the ability and knowledge of investors in processing the information so that it becomes a basis for analysis in making investment decisions.

Pasaribu and Sadalia (2018) also tried to find the existence of herding behavior in the LQ-45 Index in the period January 2013 - December 2015. They divided the market conditions during the study into two, namely falling market conditions and rising

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market conditions. The results showed that they did not find herding behavior in either falling or rising market conditions. They concluded that investors in the Indonesian Capital Market during that period tended to act rationally in making investment decisions.

First, this study suspects that investor herding occurred in the stock exchanges of ASEAN countries during the Covid-19 pandemic. This assumption is based on the theory that when conditions enter a crisis such as a pandemic, people will experience stress and pressure. During this crisis, the response that usually appears is the instinct to panic and try to survive. One effort to survive is to see what most investors do. During the Covid-19 pandemic, most investors are worried about the uncertainty of the economic future due to the Covid-19 pandemic, and the possible risk of an economic crisis due to the many disrupted economic activities. Concerns have caused many stock exchanges to fall and investors to panic sell stocks that are getting worse so that the government immediately takes policies to reduce investor anxiety and panic and increase market liquidity. The success or failure of the policies taken by the government will be seen from the reduction in investor herding. Furthermore, the volatility or standard deviation of stock market returns will decrease.

Second, this study also suspects that the policy of prohibiting short-selling transactions that has begun to be implemented in various stock exchanges by each authority in each country in response to investor anxiety due to the impact of Covid-19, can reduce investor herding. By prohibiting short-selling transactions, the risk of volatility felt on the stock exchange due to concerns about global and regional markets can be reduced. This means that with the prohibition of short-selling, it is hoped that there will be anti-herding on the stock exchange. Research by Kizys *et al.* (2020) also found that the implementation of the ban on short-selling in Europe and several other countries in the world was able to reduce investor herding.

Third, the next hypothesis proposed in this study is related to the level of strictness of the government's response to Covid-19. The stricter the government's response, for example limiting mobility, lockdown, closing schools and working from home, is expected to be able to control the spread of Covid-19. If Covid can be controlled, it will create a sense of security among the community and the community can return to their activities. The speed of response and the strictness of the response level play a major role in this. This study assumes that the strictness of the response will reduce market concerns and ultimately a calm market will reduce investor herding.

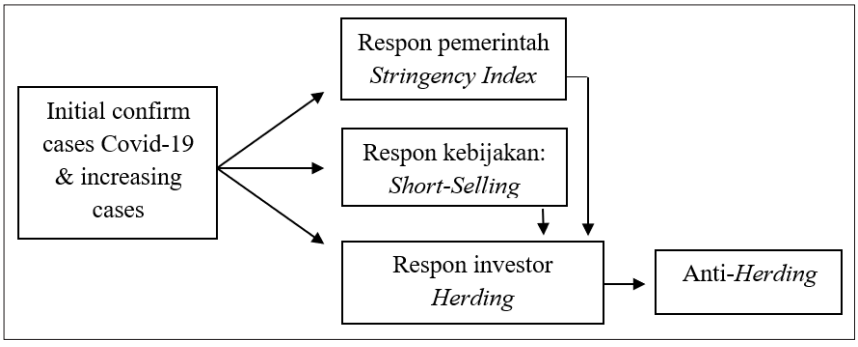

Figure 1. Research Roadmap

RESEARCH METHODS

Research on herding investor behavior in the capital market has been widely conducted. Researchers themselves have conducted research 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 stocks included in the IHSG and JSI. The results showed that there was no herding behavior during the observation period. Other previous studies have also been conducted to detect herding behavior in the capital market, for example Chang et. al (2000), Hwang and Salmon (2004), Mobarek *et al.* (2014), Bouri *et al.* (2019) and many more. From previous studies, none have looked at herding behavior during the Covid-19 pandemic. From the literature search that the author conducted using the keyword herding, a map of studies that have been carried out related to herding was obtained, which is presented in Figure 2. The map was obtained

using the VOSViewer program. From the image, it can also be seen that there have been no studies on herding using a pandemic setting, but there have been many herding studies that are associated with crises. Pandemics can also lead to crises, therefore this study is interested in studying it further.

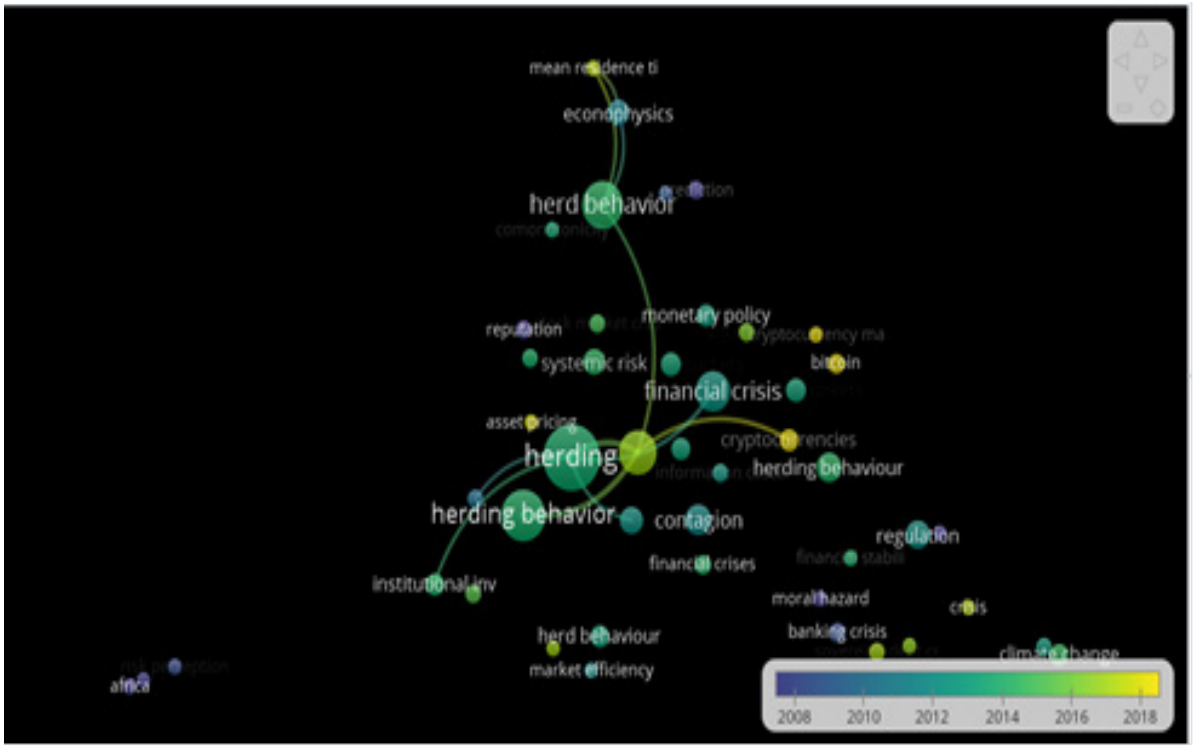

Figure 2. Mapping Previous Research on Herding Using the VOSViewer Program

The purpose of this study is to examine the existence of herding investors in the capital markets of ASEAN countries and to analyze the effects of the policy responses of each Government to the COVID19 pandemic. The period to be taken is at the beginning of the pandemic from January 2020 to December 2020. From this population, samples will be taken that have been listed on the stock exchange since January 2020 continuously until December 2020. Stock index data on the stock exchanges of each ASEAN country will be used as market index data. The data needed is daily stock return data and daily index returns, all of which can be obtained on the Indonesia Stock Exchange page, the website www.duniainvestasi.com, and the website finance.yahoo.com and the ThomsonOne Banker database and the Datastream database. The observation period will be carried out on the stock exchange trading day starting from January 2, 2020 to December 30, 2020.

Table 1. Research Sample

No	Country	Number of Observations
1	Indonesia	329 observations
2	Malaysia	329 observations
3	Philippines	329 observations
4	Thailand	329 observations
5	Singapore	329 observations

In addition to data related to stock returns and index returns, data is also needed related to information on policies taken by the Indonesian government in response to the Covid-19 pandemic and the effective date of the policy. The data is labeled the Stringency Index. This data is needed to observe if there is investor herding on the stock exchange, whether the policies taken by the government can be anti-herding. For data on the government's general policy response to Covid-19, the Oxford COVID-19 Government Response Tracker (OxCGRT) data will be used which can be downloaded at: https://

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www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker. OxCGRT systematically collects information on several different general policy responses that have been taken by governments to respond to the pandemic on 17 indicators such as school closures and travel restrictions. OxCGRT now has data from more than 160 countries. This data is also used 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'.

Herding behavior conducted by investors, this study will follow Christie and Huang (1995), who suggest using the *cross-sectional standard deviation* (CSSD) method of stock returns to detect *investor herd behavior.* In more detail, CSDD $_{i,t}$ for stock i on day t is obtained through 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 is the return of stock i on day t and is the market return or index return, where the index used is the IHSG and 9 sectoral indices on the IDX; $CSSD_{i;t}$ is a dynamic measure of *herding behavior* in stock i, calculated as the *rolling-window standard deviation of* 22 days (t=22) of stock i's return from the return value of index m on day t. When there is investor *herding*, during large changes in stock prices and returns, the return of stock i should be 'less' deviate *from* the return of index m on day t. than during less volatile periods. In other words, a `small' $CSSD_{i;t}$ value indicates strong evidence of *herding behavior; while a large* $CSSD_{i;t}$ value The `large' indicates weak evidence of *herding behavior*. For the second measure of *herding behavior* we will follow Chang *et al.* (2000), who use *the cross-sectional absolute deviation* or $CSSD_{i;t}$. This measure is calculated using formula 2 as follows:

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

Like $CSSD_{i;t}$, $CSAD_{i;t}$ is a dynamic measure of *herding behavior* of stock i, calculated as the absolute deviation of *the rolling-window* 22-day (t= 22) return of stock i from the return value of index m on day t. Chang *et al.* (2000) stated that if there is an indication of *herding behavior* following market sentiment, then individual stock *returns* will cluster around the index *return* , which causes the deviation value between stock *returns and index returns* to be small, meaning that stock *returns* do not deviate much from index *returns* .

This study will use short-selling restriction variables using dummy variables, or DSS (dummy short-selling). The stock exchange authorities in each ASEAN country have implemented no short-selling transaction activities to maintain and reduce stock exchange volatility. Data on the date of implementation of the policy is needed, for days outside the shortselling restriction period will be given a code value of 0, and for the period when the stock exchange authorities of each country impose shortselling restrictions given a value of 1.

To measure the Stringency Index variable, this study will use the Oxford COVID-19 Government Response Tracker (OxCGRT) measurement. The Stringency Index (SI) will have a value of 0 to 100. A higher SI value describes a country with a stricter government response to the Covid-19 pandemic. This SI value will vary to show the government's response, if the government views its country as being increasingly badly hit by Covid-19, the government will implement more stringent policies to control the spread of Covid-19.

The empirical model that will be used in this research is as follows:

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

Where $Y_{i;t}$ is the dependent variable which in this study is proxied by $CSAD_{i;t}$; while the independent variables in this study are the absolute value variable of the return index m in period t or $|R_{m;t}|$; the squared value variable of the return index in period t or $R^2_{m,t}$; the value of the dummy variable of *the short-selling limit* or Dss_t; and the value variable of the tightness index in period t or $SI_{t.}$. In the market stress period, the relationship between the variables $Y_{i;t}$ and $R_{m;t}$ *will tend to be non-linear (*Lux, 1995*). If there is no herding* investor, then the coefficient α_1 should be positive and the coefficient α_2 is insignificant (Mobarek *et al.*, 2014). Investor *herding* occurs when the coefficient α_2 is negative (Chang *et al.*, 2000); and if the coefficient α_2 is positive, then there is *anti-herding* (Bouri *et al.*, 2019). More importantly, if the coefficients α_3 and α_4 are negative (positive), then the government's policy response has an impact on increasing (decreasing) *herding behavior*. This research model also includes a control variable for global uncertainty using the

implied volatility index proxy, IVI$_t$. *IVI*$_t$ represents the uncertainty felt by more sophisticated derivative market participants regarding *short-term expected market volatility*, or in other words, describes the investor's "fear gauge" (Whaley, 2000). When fear dominates the market, investors will be more likely to follow market movements or tend to *herd investors* (Philippas *et al*., 2013).

Using *the cross-sectional absolute deviation* (CSAD) of returns as a measure of dispersion, Chang *et al.* (2000) showed that rational asset pricing models predict not only that *equity return dispersions* are *an increasing function* of market *returns* but also that the relationship is linear. If market participants tend to follow aggregate market behavior and ignore their own prior information during periods of very large price movements, then the increasing (positive) and linear relationship between return dispersion and market returns will no longer apply. Instead, the relationship will change to non-linear, either *increasing* (positive) or even *decreasing* (negative). The CSAD model proposed by Chang *et al.* (2000) is built on this intuition.

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

Furthermore, this study assumes that the policy of prohibiting *short-selling transactions* on the IDX implemented by the stock exchange regulator has a positive effect on CSAD or in other words has an *anti-herding effect. This short-selling* ban is intended to limit volatility or reduce the risk of turmoil in the stock market. Thus, we expect that the coefficient α_3 in equation 3 has a significant positive sign.

$Y_{i;t}$ variable is also thought to respond differently to the level of government response stringency to the Covid-19 incident. For this reason, this study creates the *SI variable* in equation 3. The equation model 3 will also be tested for its specifications and meet the requirements of the panel regression assumptions.

To test the strength of the findings, this study will conduct a Rolling Window regression on equation 3 and will see the movement of the regression coefficients from equation 3. There is no provision on how large the window period is used to test the strength of the regression coefficients, but we use the consideration of the width of the observation period and the duration of the reaction, we will conduct 50 rolling window observation periods.

RESULTS AND DISCUSSION

The following will describe the descriptive statistics of herding from the sample observation data. Descriptive statistical data are 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 is quite low. The low CSAD value indicates that the return of individual assets does not deviate too far from the overall market return. This means that investors ignore the information they have and their investment decisions are based on market consensus. A low CSAD value indicates a tendency for herding to occur.

Table 2. Descriptive Statistics

Variables	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 5 ASEAN countries that were sampled 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 is -0.9006 (negative), which shows

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that in depressed market conditions during the pandemic, stock market returns can fall very deep, and during the pandemic the maximum market return reaches 0.1492.

The Stringency Index (SI) variable shows the average level of fear in countries included in the capital markets of several ASEAN countries in the range of 58.03. This index shows the fear of death and the high government response to the Covid-19 pandemic. A high SI index value indicates the strictness of government policies in handling Covid-19 in developing countries during the pandemic. The SI number is between 0 and 100.

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

Panel Data Regression Results to Test Herding Behavior in ASEAN Stock Markets

The empirical model used in this study is as follows:

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

Y is a herding variable proxied by CSAD. As mentioned in Chapter 3 of Research Methods, herding behavior can be concluded to occur if the coefficient of the squared market return variable (i.e. α_2) shows a negative and significant sign. The complete regression results are presented in Table 3 below.

Table 3. Panel Regression Results on Equation 3

Dependent Variable: CSAD
Method: Panel Least Squares
Sample (adjusted): 1/01/2020 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 variable	0.019308		Adjusted R-squared	0.529156
SD dependent var	0.021200		SE of regression	0.014547
Akaike information criterion	-5.619919		Sum squared residual	2.144927
Black criterion	-5.598593		Log likelihood	28596.05
Hannan-Quinn critter.	-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 shows a significant positive sign, which means that overall there is no herding in the five ASEAN stock

exchanges observed. However, we will still test this further to see the possibility of herding at the level of each country through rolling window regression.

Furthermore, from Table 3, the dummy variable Short Selling (DSS) shows a significant positive sign, this means that when the stock exchange authorities in ASEAN countries impose restrictions on short selling transactions, it will increase the CSAD figure or in other words 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 show a negative and significant effect. This shows that the atmosphere of the Covid pandemic has encouraged the government to take 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, if the atmosphere gets worse and the tightness is increased, meaning that the worse Covid is, it will increase public and investor anxiety, thus encouraging increased herding behavior which is indicated by a smaller CSAD.

The IVI variable (*implied volatility index)* from the regression results in Table 3 also shows a significant negative sign. The higher the global volatility index, the more anxiety investors will experience, which will ultimately encourage them to herd (reduce CSAD). Global volatility has indeed increased during the pandemic. The pandemic has caused many shocks not only in terms of health but also in terms of the economy, causing increasing uncertainty, and ultimately causing market anxiety. Anxiety and stress in the face of increasing volatility encourage herding in the stock market. IVI_t represents the uncertainty felt by more sophisticated derivative market participants regarding *short-term expected market volatility*, or in other words, describes the investor's "fear gauge" (Whaley, 2000). When fear dominates the market, investors will be more likely to follow market movements or tend to engage in investor *herding* (Philippas *et al.*, 2013). The results of this study successfully show that IVI has a negative effect on CSAD (increasing herding in the stock market).

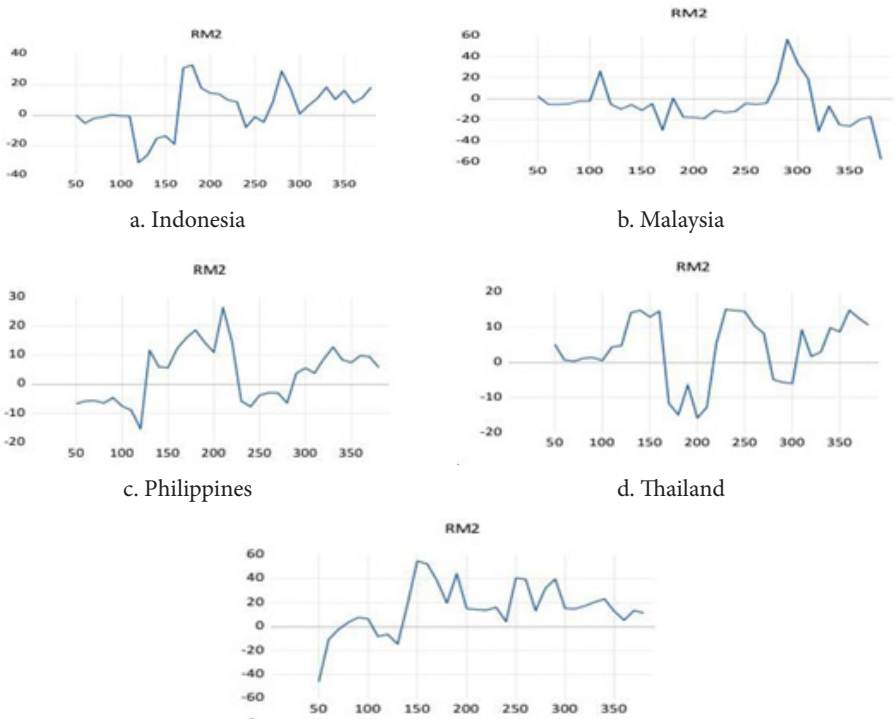
Rolling Window Regression Results for Robustness Check on Herding Behavior Findings in ASEAN Stock Markets

To test the strength of the findings on herding behavior marked by a negative market return coefficient, this study will conduct a Rolling Window regression on equation 3 and will see the movement of the regression coefficient of the squared market return variable from equation 3. There is no provision on how large the window period is used to test the strength of the regression coefficient, but we use the consideration of the width of the observation period and the duration of the reaction, we will take a rolling window period of 50 trading days and repeat every next day. Then the negative market return variable coefficient indicates that herding occurred in that period. The results of the market return variable coefficient for each sampled ASEAN country are presented in Figure 3.

From Figure 3, it can be seen that each ASEAN country shows herding at a certain point in time during the observation period. This is indicated by the presence of a negative RM2 coefficient on the coefficient graph. For Indonesia, for example, the RM2 coefficient is found to be negative at observation points 50 to 60; observation points 110 to 170 and observation points around 250. For Malaysia, we can also see more negative RM2 coefficients at many observation points. If we compare the five countries, the rolling regression coefficient graph for the squared market return variable with the most negative values is Malaysia, followed by Indonesia. From the graphs of the five countries, it can also be seen that herding does occur (although not at all observation times) but is not the same between countries. Both the time and the magnitude of herding are heterogeneous.

When at the end of 2019 the world was shocked by the emergence of the Covid-19 outbreak which started from Wuhan China. The Covid pandemic then spread to almost all countries in the world, including ASEAN countries. The world's health conditions including ASEAN countries worsened, people became stressed and panicked, there were restrictions on mobility and even lockdowns everywhere. The threat of a crisis became real, not only a world health crisis, but also a world economic crisis. When the situation enters a crisis like a pandemic, people will experience stress and depression. The government's policy to increase mobility restrictions in order to contain the spread of the virus actually makes people more anxious, interpreted as a signal that the pandemic is getting worse. During this crisis, the response that usually appears is the instinct to panic and try to survive. One effort to survive is to see what most investors are doing. During the Covid-19 pandemic, most

investors are worried about the uncertainty of the economic future due to the Covid-19 pandemic, and the possible risk of an economic crisis due to the many disrupted economic activities. Concerns have caused many stock exchanges to fall and investors have *panic sold* shares and massive herding behavior has emerged in various markets, including the stock market. The results of this study indicate that herding behavior occurs in the stock markets of several ASEAN countries that were sampled.



a. Indonesia

b. Malaysia

c. Philippines

d. Thailand

e. Singapore

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

The government then implemented many policies to curb the negative impact of this pandemic and reduce investor anxiety and panic and increase market liquidity. The success or failure of the policies taken by the government will be seen from the reduction in investor *herding*. 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 that can trigger market panic. The findings of this study indicate that the policy of restricting and stopping short selling is able to reduce herding (or become anti-herding).

In addition to implementing policies to limit and eliminate short selling, the government is also trying to suppress the spread of the virus. In this study, we took the stringency index (SI) variable to show the strictness of the government's response to the pandemic. The higher the stringency index number, the stricter the country is in making various efforts to suppress the spread of the virus in the country. This study found that the SI coefficient is negative and significant. This means that the policy actually triggers increased public anxiety and stress which ultimately increases herding in the stock market.

CONCLUSION

There are several conclusions that can be drawn from this study.

First, this study successfully detected the presence of herding behavior in the stock exchanges of ASEAN countries during the Covid-19 pandemic. The magnitude and timing of herding behavior varied between each ASEAN stock market. When conditions enter a crisis such as a pandemic, people will experience stress and pressure. During this crisis, the response that usually appears is the instinct to panic and try to survive. One effort to survive is to see what most investors do. During the Covid-19 pandemic, most investors are worried about the uncertainty of the

economic future due to the Covid-19 pandemic, and the possible risk of an economic crisis due to the many disrupted economic activities. Concerns have caused many stock exchanges to fall and investors to panic sell stocks that are getting worse so that the government immediately takes policies to reduce investor anxiety and panic and increase market liquidity. The success or failure of the policies taken by the government will be seen from the reduction in investor herding. Furthermore, the volatility or standard deviation of stock market returns will decrease.

Second, this study found that the policy of prohibiting short-selling transactions that began to be implemented in various stock exchanges by each authority in each country in response to investor anxiety due to the impact of Covid-19, can 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 means that with the prohibition of short-selling, anti-herding occurs on the stock exchange.

Third, this study found that the level of strictness of the government's response to Covid-19 actually increased herding behavior. The stricter the government's response (for example, limiting mobility, lockdown, closing schools and working from home, which is expected to be able to control the spread of Covid-19), it was actually perceived by the public that the pandemic situation was getting worse and that made investors increasingly anxious, thus encouraging herding behavior. Although the initial hope was that if the government's policy response to Covid-19 was stricter, it could reduce and control the rate of Covid, this was interpreted differently by investors. Initially, if Covid-19 could be controlled, it would create a sense of security among the public and the public could return to normal activities. However, 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 increased herding, although initially the expected response with a stricter SI could calm the market and reduce investor herding.

For further research, it is advisable to increase the time span of the research period because the pandemic has not ended yet and government policies are still rolling to help the economy survive the Covid-19 pandemic crisis. It is good for comparison because herding behavior is generally due to market concerns that trigger survival instincts, so it would be better if we not only use Covid-19 crisis samples but also use crisis samples in other forms. The difference in crisis psychology is also interesting to test for further research, the psychology of the Covid pandemic crisis will certainly be different from the psychology of the 2008 or 1998 monetary crisis.

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