ANALYSIS OF AGGREGATE HERDING BEHAVIOR IN THE CAPITAL MARKET: EVIDENCE FROM INDONESIA AND SINGAPORE

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Abstract

The high uncertainty in the capital market due to some crises that hit the world over the last few decades has the potential to cause herding behavior in the aggregate capital market, both in developed and emerging capital markets. The main objective of this study is to detect the existence of herding behavior, including asymmetric herding and global factor drives (oil prices and fed fund rates) on aggregate herding behavior in the Indonesian and Singapore capital markets during the period Jan 2015 to December 2020. This study employs a cross-sectional dispersion approach to achieve study goals. Research findings denote aggregate herding behavior occurs only in the Singapore capital market, while in Indonesia no herding behavior is detected. Asymmetric herding testing for both capital markets revealed no herding tendency in up and down market conditions. This condition implies that low volatility cannot ensure the absence of aggregate herding behavior. Global factors have proven to significantly drive herding behavior in the Singapore capital market, while in Indonesia it is only the oil price. The findings of this study will provide information that policymakers can use to maintain capital market stability in both countries.

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INTRODUCTION

The financial crisis that has hit the world several times has resulted in a high level of uncertainty and caused some market anomalies indicating that the views of traditional financial theory on rationality and efficient capital markets are no longer under existing conditions because beha-

vioral biases are still dominant. As a result, investors in the capital market will find it difficult to benefit from optimal asset allocation and diversification (Economou, 2020). One form of behavioral bias that has been widely discussed in the capital market recently and has become the focus of some researchers in the financial literature is herding behavior (Mobarek, Mollah, & Keasey, 2014; Balcilar, et al., 2014; Youssef, 2022). Research on the herding phenomenon has been around for a long time (Veblen, 1899; Le Bon, 1895; Keynes, 1936). However, the term "herding" has not been utilized. After (Banerjee, 1992; Bikhchandani et al., 1992) examined herd behavior but did not particularly address it in the stock market, the study of herd behavior in the stock exchange began to expand swiftly in the 1990s. Herd behavior comes from interactions among investors over access to information, which can lead to misunder-standings by investors when making investment decisions (Javaira and Hassan, 2015). Investors do not care about their personal information and instead follow the behavior of other people in the market (Youssef, 2022), assuming that other investors have superior information about the market, and this condition tends to occur when the market is stressed (Litimi et al., 2016). This behavior is often labeled as the main driver of instability and volatility in the capital market (Spyrou, 2013; Deng, et al. 2018), and occurs widely in the capital market, although empirical evidence is still limited (Welch, 2000).

Several researchers are eager to demonstrate the presence of herd behavior in different stock markets around the world, including developed, emerging, and frontier capital markets. Study on the presence of herd behavior are groups into two; herding on certain stocks using micro data and herding throughout the market using macro market data (Spyrou, 2013; Javaira & Hassan, 2015). The most intriguing aspect of aggregate herding research is that it observes the actions of investors who tend to make investment decisions according to market movements. Christie and Huang, 1995, were the first to investigate the presence of herd behavior in the aggregate capital market of the United States, employing the cross-sectional standard deviation of returns (CSSD) approach that they devised, and their findings revealed no evidence of herding behavior in the market. Then they updated the CSSD model to become the cross-sectional absolute deviation (CSAD). Chang, Cheng, and Khorana (CCK, 2000) extended this model with a more sensitive technique that reveals the relationship between CSAD and market returns by analyzing the whole distribution of market returns to discover herd behavior in numerous global capital markets. Many studies across the world have employed this CCK technique to detect herd behavior. CCK (2000) investigated the presence of herd behavior in developed and emerging capital markets (the US, South Korea, Hong Kong, Japan, and Taiwan) and found that herd behavior was more prevalent in emerging than developed capital markets due to the availability of information and sophisti-cated analysis tools. Celik (2013) presen-ted different research outcomes, finding that herd behavior was more prevalent in developed than emerging capital markets. A number of experts suggest that herd behavior often occurs at the time when the capital market is in stress condition characterized by high levels of volatility and uncertainty, although it is not proven to occur evenly for all countries studied (Hwang & Salmon, 2004; Henker, et. al., 2006 ; Chiang and Zheng 2010; Economou et al., 2011; Economou et al., 2018). As an example, during the COVID-19 epidemic, which rocked the world at the end of 2019 and peaked in 2020, market volatility was quite high. In the era of the COVID-19 pandemic, research on herding behavior has only been conducted in a few countries, such as research (Fang et al.,

2021) that tested herding behavior on the Eastern European stock market, and the results showed that the COVID-19 crisis increased herding behavior in all capital markets. (Dhall & Singh, 2020) did study on herding behavior on the Indian stock market and discovered that herding behavior was noticed after the commencement of COVID-19. (Espinosa-Méndez & Arias, 2021) did study on herding behavior on the Australian stock market during COVID-19, and the results demonstrate that the COVID-19 pandemic has increased herding behavior.

The phenomenon of herd behavior presence in the ASEAN region is also an attraction for a number of researchers to prove it. Most of the countries in ASEAN are still classified as emerging capital markets, merely Singapore has entered the developed capital market. A number of researchers have proven that herding behavior take place in ASEAN capital markets (Singapore, Indonesia, Malaysia, the Philippines, Thailand, Vietnam), especially when the market is under stress (Liu, 2013; Bui, Nguyen and Nguyen, 2015; Noviliya & Prasetiono, 2017; Kabir and Shakur, 2018; Rahman & Ermawati, 2019; Jirasakuldech & Emekter, 2020; Muharam, et al., 2021). Other research in ASEAN countries found no evidence of herd behavior (Kabir & Shakur, 2018; Ramadhansyah, 2020; Nimanussornkul & Nimanussornkul, 2021; Muharam et al., 2021; Ah Mand et al., 2021). Several researches also discovered herding behavior in the ASEAN capital market during the COVID-19 outbreak, although the number of studies is still limited. Sadewo and Cahyaningdyah (2022) discovered that the covid-19 epidemic in Indonesia encouraged herding behavior. Different results mentioned by Resindra and Lubis (2022) report that herding behavior was not observed in Indonesian, Singaporean, Malaysian, or Philippine capital markets during the COVID-19 pandemic. Vidya et al. (2023) found that herding behavior was more dominant in the Vietnamese and Indonesian capital markets during the COVID-19 pandemic and was not found in the Singapore capital market. The results of previous research on herd behavior in the ASEAN capital market are still varied and inconsistent, so it is still very interesting to study.

Herding behavior can also occur under different market conditions, which is called asymmetric herding. Asymmetric herding can take place in both down and up markets, it is determined by market performance, domestic capital market volatility, and investor sentiment. Unfortunately, research on asymmetric herding is still limited. Mobarek et al. (2014) discovered that herding behavior was obvious when the market was down (bearish) on the Portuguese, Greek, Swedish, and German capital markets, but it is observed notably during periods of low trading activity in Ireland and Norway. Sadewo and Cahyaningdyah (2022) discovered herding behavior in the Indonesian capital market when the market was down (bearish), but not when the market was up (bullish). Vidya et al. (2023) demonstrate that herding behavior exists in the Indonesian and Vietnamese capital markets when the market is up and down, however it is only observed in the South Korean and Singapore capital markets when the market is up (bullish).

Both global and local factors can drive the existence of herding behavior (Balcilar et al., 2014; Rahman & Ermawati, 2019; Youssef, 2022). World oil prices and the US Fed funds rate are two global factors that are frequently examined as causes of herding behavior, but the number of studies is still limited. Oil prices and Fed funds rate are proven to have a relationship with herding behavior, although they are not evenly distributed for all countries or sectors studied (Balcilar, et. al., 2014; Rahman & Ermawati, 2019; Youssef, 2022). According to Balcilar et al. (2014), the oil price and the Fed Fund Rate have been demonstrated to cause herd behavior

in GCC capital markets. Ulussever and Demirer (2017) discovered that oil prices in the GCC region are connected with herding behavior, particularly when oil prices fluctuate drasticall. Herding behavior is more obvious when oil prices fall than when they rise (Benmabrouk and Litimi, 2018). According to Indars et al. (2019), herding behavior is closely tied to oil price volatility. Rahman and Ermawati (2019) discovered that FFR enhances herding behavior in Indonesian, Philippine, Thai, and Singaporean capital markets. Arisanti (2020) found that FFR drive herding behavior in Indonesia, Malaysia, Thailand, Vietnam, and the Philippines capital market.

This study aims to identify the presence of herding behavior in Indonesia and Singapore as an emerging and developed capital market in ASEAN, including asymmetric herding and the drive of global factors (oil prices and fed fund rates) on herd behavior in both countries. Indonesia and Singapore are very interesting to study herding behavior because Indonesia has the most investors when compared to other ASEAN countries' capital markets, with the majority of investors being young people, who we know are braver in making investment decisions without proper education because they are trapped in euphoria, which can encourage herding behavior (Rahmawati, 2021), but the results are still varied. Meanwhile, Singapore is known to have a capital market that is far more advanced than the capital markets of other ASEAN countries, due to a strong framework of trade regulations in the capital market, followed by a good investment climate for investors, and supported by qualified economic policies that make Singapore have an orderly, sophisticated macroeconomics and finance (Arjoon, Bhatnagar, & Ramlakhan, 2020), hence herding behavior should not be observed in that country, however past research results are still mixed.

This study differs from others in that it uses all daily market activity to prove the presence of aggregate herd behavior in the Indonesian and Singapore capital markets while also detecting the appearance of asymmetric herding when the market is up or down (Chiang and Zheng, 2010; Economou et al., 2011; Guney et al., 2017; Economou, 2020) which is currently limited research and the strength of global factors in driving aggregate herding behavior in both countries has not yet become a focus of researchers in ASEAN countries, hence study remains limited. The findings of this study are likely to add to the advancement of behavioral finance literature, particularly herding behavior in ASEAN capital markets. The results of this research will offer policymakers with information they can utilize to ensure capital market stability in this both countries.

LITERATURE REVIEW

Herding Behavior in Capital Market

The phenomena of herd behavior have been researched for a long time, but the term herding has not been used, even though it discusses the behavior of imitating individuals (Le Bon, 1895; Veblen, 1899; Keynes, 1936). Since Banerjee (1992) and Bikhchandani et al. (1992) presented the results of their research that individuals frequently imitate the conduct of others by neglecting their information, the analysis of academic herding behavior in financial markets has begun to grow. These two researchers have helped to the development of herd behavior study in the stock market. Understanding the meaning of herding behavior seems a little difficult because there is no one definition that is mutually agreed upon. A number of researchers seem to translate the meaning of herding behavior according to the form of their research (Komalasari et al., 2021). Herding is an idea that leads to systematically wrong decisions being made by the entire

community (Devenow and Welch, 1996). Chiang & Zheng (2010) explain herd behavior as a tendency in investor behavior in which investors emulate other investors in making investment decisions, which also shows interaction between investors. Herding behavior can also be interpreted as the interest of participants within the market to follow the actions of other people (Mobarek, Mollah, & Keasey, 2014). Litim et al. (2016) interpret herd behavior as a heuristic behavior because, in times of complex and uncertain conditions, investors follow other investors with the assumption that other investors have better stock market information with poorer quality information. This behavior is an important concept in cognitive economics related to financial markets (Parker & Prechter, 2005), which has an impact on the price mechanism and investors' trading decisions (Javaira, and Hassan, 2015).

Herding behavior that occurs in the capital market can be either intentional or spurious herding. Devenow & Welch (1996) explain that investors believe they can get favorable results by purposefully emulating the conduct of others under the premise that other people's information is superior to their own (Economou, 2020). Spurious herding occurs due to similarities between investors (Guney, Kallinterakis, & Komba, 2017), such as in the employment of analytical tools and procedures (Hirshleifer, Subrahmanyam, & Titman, 1994), and the correlation between information availability and interpretation, which can lead to inadvertent investment decisions (The, and De Bondt, 1997). Intentional herding behavior is divided into rational and irrational categories. Rational intentional herding behavior occurs because investors may not have perfect information and knowledge about actual market conditions to make investment decisions, so they trust more information signals in the market and imitate them in making investment decisions (Baddeley et al., 2012). This behavior is generally associated with external factors related to access to information (information cascades) or incentive issues (compensation based on herding), which can have an impact on less optimal investors in making investment decisions (Javaira & Hassan, 2015). Irrational intentional herding behavior, also known as non-informational-based herding, occurs as a result of pressure and psychological shackles such as pressure from social groups or social habits (Spyrou, 2013). This behavior makes the market inefficient, asset prices do not follow their fundamental value, causing errors in determining asset prices (Spyrou, 2013).

In the financial literature, herd behavior in the capital market is grouped into herd behavior towards certain stocks by individual, institutional, and mutual fund investors using microdata, that is, data on certain stocks at the same time regardless of other securities with the same pattern (Merli & Roger, 2013; Spyrou, 2013; Javaira & Hassan, 2015), and herding behavior throughout the market using aggregate market data, which illustrates that investors act according to market trends and movements (CCK, 2000; Spyrou, 2013). Research on aggregate herding behavior is very appealing and has drawn the interest of many scholars all over the world. Christie and Huang (1995) detected the existence of herd behavior in the US capital market for the period 1962–1988 using stock data recorded on the NYSE & AMEX, and found no herding behavior. Furthermore (Gelason et al., 2004; Celik, 2013; Economou, Hassapis, & Philippas, 2018) also observed herd behavior in the United States capital market both during normal and stressful market conditions, and the findings revealed no evidence of herding behavior. Rahman & Ermawati (2019) attempted to identify the presence of herd behavior in the United States, Singapore, Thailand, Malaysia, Philippines, and Indonesia by using the prices of leading stocks and found herding behavior in all countries.

Gunawan et al. (2011) investigated herding behavior in the Indonesian capital market and discovered that it occurred only when market conditions were highly unclear (market stress). Liu (2013) observed herd behavior in the Singapore capital market both throughout the financial crisis and when the market soared and collapsed, and discover the occurrence of herding tendency, especially when the market falls. Bui, Nguyen, and Nguyen (2015) conducted herding behavior research in Indonesia, the Philippines, Malaysia, and Vietnam and discovered very high herding behavior in the Indonesian and Malaysian capital markets during the pre-crisis and economic crises. Noviliya & Prasetiono (2017) checked herd behavior in the Singapore and Indonesia capital markets, study results showed that herd behavior only occurred in the Indonesia capital market. Arjoon et al. (2020) did research on the Singapore capital market and discovered herding at both the market and portfolio level. Other studies have found no evidence of herd behavior in Indonesia, Malaysia, or Singapore (Ramadhansyah et al., 2020; Ah Mand et al., 2021). Pointing to this elucidation, the initial hypothesis construct is:

H1: There is herding behavior in the Indonesian and Singapore aggregate capital markets

Asymmetric Herding

Asymmetric herding may take place in a variety of market conditions, including down-market and up-market periods. According to Christie and Huang (1995), asymmetrical herding happens on days when the market increases or decreases, allowing the market's optimistic and pessimistic viewpoints to be distinguished. Asymmetric herding can arise as a result of differing investor reactions to market movements. For example, some investors believe that buying stocks when the market

is weakening and selling when the market is strengthening is the correct decision (Neal & Wheatley, 1998). According to many sources, investors tend to buy stocks when prices are rising and sell them when prices are falling, and they believe that risk can be decreased by tracking market fluctuations in aggregate (Prechter and Parker, 2007). The potential impact of asymmetric herding is highly dependent on market outcomes, local capital market fluctuation, and investor sentiment. Several studies have attempted to detect asymmetric herding.

Asymmetric herding research is still sparse and available in both developed and emerging financial markets. Mobarek et al. (2014) investigated asymmetric herding in developed capital markets, which is on European liquid constituent indexes, and discovered that herding behavior was evident when the market was down (bearish) on the Portuguese, Greece, Sweden, and German capital markets, whereas in Ireland and Norway it is found especially during periods of low trading volume. Tan et al. (2008) attempted to study asymmetric herding behavior in the Chinese emerging capital market for ordinary investors by differentiating market returns, the volume of trading, and market fluctuations using the CSAD approach. According to their findings, asymmetric herding is only relevant within the up-market era. Economou, Kostakis, and Philippas (2011) investigated asymmetric herding of market returns, the volume of trading, and volatility in the markets in southern European countries (Portuguese, Italian, Spanish, and Greek) as developed capital market using a dummy variable model in a single CSAD approach, and the results revealed that asymmetric herd behavior was found throughout the up-market period. Chen (2013) also proves that asymmetric herding in Romania as emerging capital market tends to occur during up-market days, but other research rejects this and says that asymmetric herding in that country is more common

within down-markets and high-volatility days (Economou, 2020). Other research has found that asymmetric herding is more likely during down-market days (Philippas et al., 2013; Mobarek et al., 2014). Sugiantara (2022) studied asymmetric herding behavior in the Indonesian capital market in 2020 and discovered it when the market was up (bullish) but not when it was down (bearish). Sadewo and Cahyaningdyah (2022) identified herding behavior in the Indonesian capital market when it was falling (bearish), but not when it was rising (bullish). Vidya et al. (2023) show that herding behavior exists in the Indonesian and Vietnamese capital markets during up and down markets, while it is only evident in the South Korean and Singapore capital markets during up markets. In this context, the second hypothesis construct is:

H2: There is asymmetric herding during up and down markets in the Indonesian and Singapore aggregate capital markets

Oil Price and Herding Behavior

Oil prices are global factors, also called "external factors" in some research that are expected to increase capital market herding. There are just a few studies that explore the correlation among herding behavior and oil prices, despite the fact that research is still rare. Because oil plays such a significant role in the economy, oil price fluctuations will have an impact on stock values. As a result, herd behavior in the capital market is extremely possibly to be driven by the global crisis, which is transferred through behavioral contagion among the capital market and the crude oil market (Benmabrouk & Litimi, 2018). According to Balcilar et al. (2017), investors seek speculative indications from the oil market as bullish expectations and strive to earn bigger gains by opposing the multitude in their market. Indārs, Savin, &

Lublóy (2019) argue that herding behavior can occur due to large oil price fluctuations, which are driven by fundamental and non-fundamental information.

Several studies have found a correlation between oil prices and herding behavior, despite the fact that the number of studies is still restricted. Balcilar, Demirer, and Hammoudeh (2014) used weekly data from the oil-rich Gulf Cooperation Council (GCC) countries of Abu Dhabi, Dubai, Kuwait, Qatar, and Saudi Arabia to conduct a study for the period 17 January 1995–6 March 2012 (the sampling period for each country varies). According to the findings of his research, the oil price has been shown to induce herd behavior in the capital markets of GCC countries. Ulussever and Demirer (2017) also conducted a study of the GCC countries' capital markets as (Demirer and Hammoudeh, 2014) by adding Oman and Bahrain countries, utilizing daily data and varying research periods for each country, primarily in January from 2003 to December 2013. According to the findings of their research, oil prices are associated to herding behavior in the GCC region, particularly when oil prices fluctuate dramatically. This circumstance suggests that events in the oil market influence investors' herding behavior in the capital market. Demir & Solakoglu (2016), state that oil prices drive herd behavior in Qatar.

Benmabrouk and Litimi (2018), investigated the US stock market using daily data from January 2000 to December 2017 for 11 sectors, and their findings reveal that herding behavior is more noticeable when oil prices fall than when they rise. It was also discovered that oil market fluctuations reduced herd behavior by sector in the US capital market, indicating a link among the oil markets and herd behavior. Cakan et al. (2018) discovered that speculative action in the global oil market is closely related to herd behavior in Russia and Brazil, which are oil exporting and importing countries,

respectively. Indārs et al. (2019) studied herd behavior in the Russian capital market and discovered that it is closely tied to oil price volatility. Youssef (2022) conducted commodities market research from 2003 to 2017 and discovered that prices of oil mainly supported herd behavior in the energy industry, but not in other sectors. Research on the relationship between oil prices and herding behavior is very limited ini ASEAN capital market. Rahman and Ermawati (2019) reported contradictory research findings, concluding that there is no link between oil prices and herding behavior in the United States, Indonesia, Malaysia, Thailand, Singapore, and the Philippines capital market. Base on this elucidation, the third hypothesis construct is:

H3: Oil price drive herding behavior in the Indonesian and Singapore aggregate capital markets

Fed Fund Rate and Herding Behavior

The capital market and interest rates are said to have an indirect link, however, one of these macroeconomic variables lean to move in the reverse direction of the capital market. The US Federal Reserve Fund Rate, generally known as the Fed Fund Rate (FFR), is a general guideline for practically all investors worldwide and is frequently used as an indicator affecting the dynamics of global financial markets (Rahman & Ermawati, 2019). The Fed Fund Rate is a monetary policy indicator that is the primary focus of stock market investors' attention (Garg, 2008). When the Fed raises interest rates, the capital market tends to fall; conversely, when interest rates are lowered, there is no guarantee of how large or small the stock market's response will be to changes in certain interest rates (Thorbecke, 1997; Bernanke

and Kuttner, 2005; Arisanti, 2020). An increase in the Fed Fund Rate makes investors more sensitive since it is interpreted as unfavorable news that influences investment decisions (Gong & Dai, 2017). Announcements of Fed Fund Rate rises or falls frequently cause herd behavior in the capital market because many stock experts will offer predictions related to rise or fall in stock prices, which will encourage investor reactions in making investment decisions, both rational and irrational investors (Arisanti, 2020).

Balcilar, Demirer, and Homoudeh (2014) investigated the influence of adjustments in the Fed Fund Rate on the capital markets of oil-producing countries, specifically the GCC, and discovered that the Fed Fund Rate significantly encourages herding behavior. Rahman and Ermawati (2019) studied the link among FFR and herding behavior in five ASEAN countries, as mentioned above, and their findings indicate that FFR has an enormous effect on the capital markets of Indonesia, the Philippines, Thailand, and Singapore. Another study of 130 financial sector enterprises in five ASEAN Countries (Indonesia, Malaysia, Thailand, Vietnam, and the Philippines) found that FFR drive herding behavior (Arisanti, 2020). The Fed Fund Rate, according to Silitonga, Sadalia, and Silalahi (2021), considerably supports herd behavior in the Indonesian capital market. Referring to this explication, the fourth hypothesis construct is:

H4: Fed Fund rate drive herding behavior in the Indonesian and Singapore aggregate capital markets

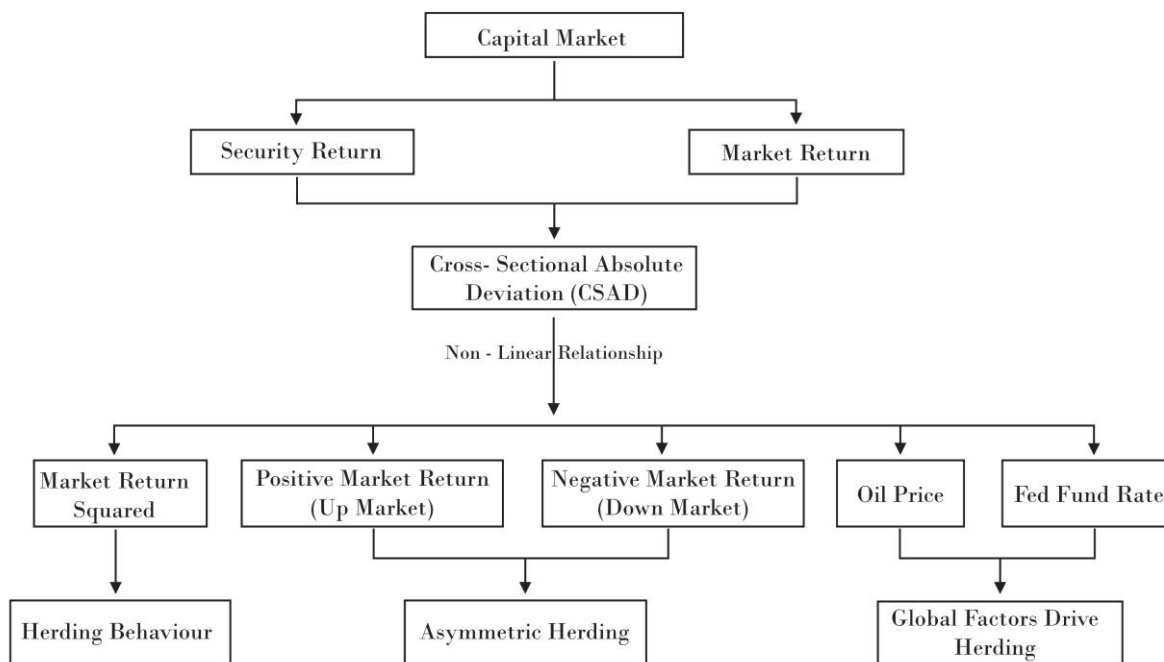Based on the literature review and hypotheses development, the study paradigm is depicted in Figure 1.

Figure 1. Study Paradigm

RESEARCH METHODS

This study is basic research using a quantitative technique to detect aggregate herd behavior in the Indonesian and Singapore capital markets, including asymmetric herding under diverse market conditions and driven by global influences. In practice, this research will employ both descriptive and quantitative approaches. The goal of using descriptive research methodologies is to gather accurate and valuable information about herding behavior. The data used in this study are secondary data in the form of historical data on closing daily prices of all shares listed on the Indonesian and Singapore capital markets from 5 January 2015 to 30 December 2020. The research time period was chosen because of the unstable world economic conditions since the war between Russia and Ukraine, as well as various other world problems, and the occurrence of the economic and financial crisis, which was exacerbated by the COVID-19 pandemic in 2020, making it an interesting study. This research's total sample consists of 473 enterprises listed on the Indonesian capital market and 463 firms listed on the Singapore capital market, chosen using a purposive selection technique with criteria: (1) the company listed its shares on the stock markets of Indonesia, Malaysia, Thailand, and Singapore before 2015; (2) during the research period, the company's shares were traded actively and continuously in each capital market, and they were never suspended or delisted.

In the way to achieve the research objectives, this study will utilize systematic research approach to find aggregate herd behavior, asymmetric herding in different market conditions and global factors (oil prices and fed fund rates) that drive herd behavior in the Indonesian and Singapore capital market. Christie and Huang's (1995) CSAD approach is used, employing the formula:

$$CSAD_{m,t} = \sum_{k=1}^{N} \frac{|R_{i,t} - R_{m,t}|}{N} \quad \dots\dots\dots(1)$$

Where CSADm,t is the cross-sectional absolute deviation market m on day t, $R_{i,t}$

is the return on stock i on day t, $R_{m,t}$ is the stock market return, i.e. the same weighted average return for all individual stocks on day t, and N is the sum of all equity on the stock market on day t. CCK (2000), a non-linear model that will reveal the link among CSAD$_{m,t}$, and market returns utilizing the whole distribution of market returns, will also be applied to find the presence of herd behavior with the following equation (to test H$_1$):

$$CSAD_{mt} = \alpha + \beta_1|R_{mt}| + \beta_2 R_{m,t}^2 + \varepsilon_{m,t} \quad .(2)$$

CCK (2000) emphasized that the existence of herd behavior will be identified when β_2 is negative, which means that CSAD$_{m,t}$ grows as the value decreases.

To find out the effect of asymmetric herding on different market conditions (testing H$_2$) as used by (Mobarek et al., 2014; Economou, 2020), will adopted the approach of CCK (2000) used a dummy variable in the standard model with the equation:

$$CSAD_{mt} = \alpha + \beta_1 D^{up}|R_{mt}| + \beta_2(1 - D^{up})|R_{m,t}| + \beta_3 D^{up} R_{m,t}^2 + \beta_4(1 - D^{up})R_{m,t}^2 + \varepsilon_{m,t} \quad ....(3)$$

where D^{up} stands for dummy variable with a criterion value of 1 for days with positive market returns, and 0 otherwise. β_3 and β_4 are negative to denote asymmetric hearding during up and down markets.

The CSAD Chang et al. (2000) approach, which has been modified as used by (Rahman & Ermawati, 2019; Youssef, 2022), is used to determine whether there is a drive-by global factors, such as oil prices and the Fed Fund rate, on herding behavior in the Indonesia and Singapore capital markets (testing H$_3$ and H$_4$) with the formula:

$$CSAD_{mt} = \alpha_0 + \beta_1|R_{mt}| + \beta_2 R_{m,t}^2 + \beta_3 OP + \beta_4 FFR + \varepsilon_{m,t} \quad ....(4)$$

where OP is oil price and FFR is the fed funds rate. The presence of global factors driving herding behavior will be seen when the coefficients β3 and β4 are negative and significant which illustrates that oil prices and the US Fed Funds rate contribute to the presence of herd behavior in the Indonesia and Singapore aggregate capital markets.

RESULT AND DISCUSSION

Table 1, provides a brief summary of descriptive statistics for CSAD calculated using equation 1 and market return (R$_m$).

Singapore had the highest CSAD average throughout the study period, with a value of 2.1335, while Indonesia had the lowest, with a value of 1.8580. The high average CSAD in Singapore suggests that individual assets vary significantly from market returns on a trading day. Singapore also has the highest average daily market return (0.1134), whereas Indonesia only has 0.07086, however, the risk is smaller than in Indonesia, as evidenced by the standard deviation value. Market return is often positively related to market risk, as seen from the standard deviation value. Indonesia has a higher standard deviation than Singapore, which is 0.8268, indicating that the Indonesian capital market is more appealing to investors and speculators, who can increase market volatility and risk.

Table 2 displays the CSAD correlation and market returns between Indonesian and Singapore capital markets. The Pearson correlation test results demonstrate that the link among the Indonesian and Singapore capital markets is slightly low, as seen by the CSAD correlation of 0.0036

between Indonesia and Singapore, and the market return of 0.0026. This circumstance demonstrates that the Singapore capital market has little influence on the Indonesian capital market, implying that Singapore's market sentiment is slightly low towards the Indonesian capital market.

The findings of predictions on the occurrence of herd behavior in Indonesia and Singapore using the CCK (2000) technique or equation 2, which is evaluated using the Newey and West consistent estimator, are shown in Table 3. Panel A provides the empirical test results for the entire period of research on the Indonesian and Singapore aggregate capital markets. The test results denote that the β_1 coefficient is positive for the two countries studied and is significant, which shows the supposed link between CSAD and market returns. Meanwhile, the test results for the β_2 coefficient were only negative and statistically significant in Singapore, which provided evidence of the existence of herding on the country's capital market, while in Indonesia, the value of the β_2 coefficient was positive and significant, which indicated that herding behavior was not detected. Therefore H1 is proven for only Singapore.

To better understand the presence of herd behavior, especially when the market is under stress as a result of the global economic and financial crisis, which was exacerbated by the COVID-19 pandemic that occurred in early 2020 in both Indonesia and Singapore, it is critical to test the existence of herding behavior both before and during the COVID-19 pandemic. Panel B depicts the test findings for the presence of herding behavior prior to the COVID-19 pandemic, and the results demonstrate no herding behavior in either Indonesia or Singapore, despite Singapore's β_2 coefficient being negative but not significant. Panel C is a test of herding behavior during the COVID-19 pandemic, and the results denote the existence of herding behavior only in

Singapore, while it has yet to be proven in Indonesia. The presence of herding, which is only detected in Singapore's capital market is in line with research (Liu, 2013; Rahman & Ermawati, 2019). The presence of herding behavior in Singapore is inseparable from Singapore's popularity as one of the developed countries in ASEAN whose capital market is developing very rapidly, which certainly attracts foreign investors to invest, even though the number of investors is still greater in Indonesia, but the percentage is higher in Singapore. These conditions can encourage changes in trade dynamics that lead to herding behavior, including when the market is under stress.

Indonesia, as one of the nations involved in the emerging capital market, does not exhibit herd behavior, indicating that Indonesian investors make more rational investment decisions. Investors in the Indonesian capital market are not easily frightened and continue to make investment decisions in order to earn or prevent losses. Because their investment decisions appear to be based on clear analysis and information, they do not engage in stock transactions like herding investors. Empirical findings in Indonesia are consistent with research (Ramadhansyah et al., 2020; Ah Mand et al., 2021).

Asymmetric herding test results in Table 4 reveal that there is no herding tendency in both the Indonesian and Singapore capital markets during up and down markets, even if Singapore's β_4 is negative but not significant, so that H_2 is rejected. This scenario shows that the volatility of the Indonesian and Singapore aggregate capital markets is low, and investor sentiment does not encourage herding behavior during market ups and downs. At a period in which domestic market volatility is low and investor sentiment has little influence on changes in market participant behavior during market ups and downs, there should be no herding behavior in the two countries, but this

condition only applies to the Indonesian capital market, while in the Singapore capital market, herding behavior was detected, as explained above. The empirical findings of this study contradict previous research by (Tan et al., 2008; Economou et al., 2011; Chen, 2013), which discovered that asymmetric herding occurs during an up market, whereas (Economou, 2020; Philippas et al., 2013; Mobarek et al., 2014) discovered asymmetric herding during a down market.

Table 5 shows how global factors drive herding behavior. Only oil prices have the ability to foster herd behavior in the Indonesian capital market since the coefficient of oil price is negative and significant. That's why third hypothesis is proven for Indonesia. Oil plays a significant impact in the Indonesian economy by influencing stock prices, which can lead to herding behavior. Capital market investors will seek for speculative indications from the oil market as good hopes and aim to outperform the crowd in their market (Balcilar, 2017). According to Indārs, Savin, & Lublóy (2019), herding behavior might emerge as a result of huge changes in oil prices caused by fundamental and non-fundamental information. Meanwhile, it has not been demonstrated that the Fed Fund Rate can encourage aggregate herd behavior in the Indonesia capital market, so the fourth hypothesis in this study was rejected. In general, investors in Indonesia are constantly monitoring the evolution of the Fed funds rate announcements, but not to the extent that they make investment decisions that blindly follow other investors without having clear information. The Indonesian capital market does not overreact to interest rate increases, which can trigger herd behavior. This finding contradicts study findings (Rahman & Ermawati, 2019; Arisanti, 2020; Silitonga et al., 2021) that the Fed Funds rate strongly increases herding behavior in Indonesia.

Oil prices and the fed funds rate have been shown to induce herd behavior in the Singapore capital market, as evidenced by the negative and significant coefficients oil price and FFR, that's why H_3 and H_4 is proven. Oil plays a significant role in the Singapore economy and has a strong influence on stock prices. Price changes in the capital market can encourage aggregate herd behavior. Singaporean investors will attempt to profit on oil price swings, and their actions will be followed by many other investors who lack clear information of their own, resulting in herding behavior. This finding contrasts with the results of a previous study (Rahman & Ermawati, 2019), which found no correlation between oil prices and herding behavior in the Singapore capital market. Singapore investors are more sensitive to the Fed fund rate because they regard it as poor information that influences investment decisions. Announcements of an increase or decrease in the fed fund rate cause herd behavior in the Singapore stock market as a whole because many stock analysts will make predictions about rises or falls in stock prices related to FFR movements, which will encourage investor reactions in making investment decisions, both rational and irrational investors (Arisanti, 2020). This result is consistent with previous studies (Rahman & Ermawati, 2019; Arisanti, 2020). The findings of this study can help investors in the Indonesian and Singapore capital markets avoid over-reacting and following market movements when making investment decisions based on fluctuations in oil prices and the Fed Fund Rate, which can cause herding behavior and harm investors. As a result, investors should continue to rely on their analysis and personal knowledge when making investing decisions.

Table 1. Descriptive statistics of CSAD dan R_m

	Indonesia		Singapore	
	CSAD	R_m	CSAD	R_m
Mean	1.858023	0.070860	2.133535	0.113368
Median	1.769865	0.071697	2.023524	0.090350
Maximum	42.01446	22.29394	7.246559	3.183290
Minimum	0.003040	-3.733382	0.004179	-5.966910
Std. Dev.	1.172387	0.826780	0.658623	0.677127
Observations	1454		1501	

Source: Data processed by using equation 1 and average of return (R_m)

Table 2. Cross-Market Correlation

	CSAD $_{Ind}$	CSAD $_{Sing}$	$R_{m\ Ind}$	$R_{m\ Sing}$
CSAD $_{Ind}$	1.000000			
CSAD $_{Sing}$	0.003632	1.000000		
$R_{m\ Ind}$	0.666182	-0.012073	1.000000	
$R_{m\ Sing}$	-0.038510	0.231873	0.002591	1.000000

Source: Data processed by using equation 1 and average of return (R_m)

Table 3. Estimation results of aggregate herding behavior

	Constant	$|R_{mt}|$	$R_{m,t}^2$	R^2 adj. (%)
Panel A: Full Period (5 Jan 2015 – 30 Des 2020)				
Indonesia	1.482 (45.15)***	0.801 (9.48)***	0.046 (12.30)***	90.92
Singapore	1.604 (57.86)***	1.176 (19.59)***	-0.062 (-2.46)***	58.04
Panel B: Before Covid 19 Period (5 Jan 2015 – 28 Feb 2020)				
Indonesia	1.495 (40.22)***	0.670 (4.78)***	0.1423 (1.016)	42.65
Singapore	1.592 (48.20)***	1.072 (8.04)***	-0.013 (-0.132)	49.11
Panel C: Covid 19 Period (23 Jan 2020 – 30 Des 2020)				
Indonesia	1.608 (36.98)***	0.718 (9.70)***	0.049 (15.17)***	98.86
Singapore	1.917 (31.17)***	1.026 (10.43)***	-0.049 (-1.73)*	68.24

Sources: Data processed by using equation 2
Note: *, **, and *** significance at 10%, 5% and 1%

Table 4. Estimation results of asymmetric herding behavior

	Constant	$D^{up}|R_{mt}|$	$(1-D^{up})|R_{m,t}|$	$D^{up}R_{m,t}^2$	$(1-D^{up})R_{m,t}^2$
Indo-nesia	1.655(87.63)***	0.597(7.34)***	0.245(5.55)***	0.055(15.39)***	0.165(6.07)***
Singa-pore	1.642(58.49)***	1.149(13.61)***	0.833(11.88)***	0.017(0.30)	-0.011(-0.48)

Sources: Data processed by using equation 3
Note: *, **, and *** significance at 10%, 5% and 1%

Table 5. Emperical results of aggregate herding behavior with global factors

	Constant	$|R_{mt}|$	$R_{m,t}^2$	OP	FFR
Indo-nesia	10.006(6.51)***	0.796(9.39)***	0.046(12.40)***	-0.637(-5.65)***	0.088(5.12)***
Singa-pore	7.715(6.68)***	1.098(18.88)***	-0.059(-2.50)***	-0.447(-5.13)***	-0.066(-1.98)**

Sources: Data processed by using equation 4
Note: *, **, and *** significance at 10%, 5% and 1%

CONCLUSION AND RECOMMENDATION

Herding behavior has grown in popularity and prominence as a result of a series of global crises, prompting scholars from numerous countries to become interested in studying the phenomena, both in developed and emerging capital markets. The purpose of this study is to detect herding behavior, including asymmetric herding within the up-market and down-market, as well as global factors (oil prices and fed funds rates) that drive herding behavior in Indonesia as emerging capital market, and Singapore as a developed capital market in ASEAN. This study will contribute to the financial literature by detecting the presence of herding behavior and global factors that drive herding behavior in ASEAN's developed and emerging capital markets. To achieve the research goal, daily stock price data for all shares listed on the Indonesian and Singapore capital markets from January 5, 2015, to December 30, 2020, were employed. Herding behavior was only observed in the Singapore capital market within full and during the COVID-19 period, with no herding detected prior to the COVID-19 era. During the study period, including before and during the COVID-19 periods, no herding behavior was observed in the Indonesian capital market.

The findings of empirical testing on asymmetric herding under diverse market conditions reveal that there is no herding behavior in both the Indonesian and Singapore capital markets during up and down markets. The financial markets in Indonesia and Singapore are less volatile, and investor sentiment that happens during up and down markets does not foster herding behavior in either country. Furthermore, testing the global factors that drive herding behavior in the two countries reveals that only oil prices drive aggregate herd behavior in the Indonesia capital market, whereas the fed fund rate does not. Oil prices and fed funds rates play a significant effect in the Singapore capital

market and causing herding behavior throughout the country. The study's findings are very useful for both local and international investors interested in investing in ASEAN capital markets, particularly Indonesia and Singapore, so that they can make the right investment strategies and decisions, especially during times of high uncertainty, which frequently triggers herding behavior. The empirical findings presented can provide information that policymakers can use to maintain capital market stability in Indonesia and Singapore, particularly amid adverse market situations, because herding behavior leads to significant levels of volatility and uncertainty. As a result, the market becomes unstable, making appropriate asset allocation and diversification difficult for investors.

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