







Aggregate Herding Behavior in Asymmetric and During COVID-19 Pandemic: Evidence from ASEAN Capital Market

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Abstract. Aggregate herding behavior can arise in asymmetric scenarios when the market is in different states (up and down markets) and during the COVID-19 pandemic, which may lead to stock market stress. This study aims to look into the existence of aggregate herding behaviour in asymmetric conditions and during the COVID-19 pandemic from four capital markets in ASEAN. This study employs a cross-sectional dispersion approach to capture herding by employing daily closing stock price data from January 2015 to December 2020. The findings revealed that asymmetric herding was only discovered in the Thailand capital market when the market was down, whereas other capital markets had no asymmetric herding behaviour. During the COVID-19 pandemic, herding behavior occurred in the Malaysian, Thailand, and Singapore capital markets but not in the Indonesian capital market. These findings may assist capital market officials in anticipating herding behavior to keep capital markets stable, especially during times of high market volatility in ASEAN capital markets.

Keywords: herding behavior; asymmetric herding; COVID-19 pandemic; ASEAN capital market

1. Introduction

The price of stocks frequently changes over time. The movements of stock prices on the capital market reflect investor behaviour. Regarding the mechanisms underlying investor behavior in the capital market, two opposing and divergent viewpoints have developed, notably the perspective of the view of conventional finance theory concerning rationality & efficient capital markets and behavioural bias. The behavioural bias concept is very different from the efficient capital market hypothesis explanation that the market is not fully efficient, and it states that psychological factors predominate investors in making investment decisions in the capital market [1], [2]. High levels of uncertainty brought about by the financial crises that have repeatedly occurred worldwide have given rise to several market anomalies. Due to behavioural biases' increased dominance, efficient capital is no longer applicable to the state of affairs, making it challenging for investors to profit from diversification and optimal asset allocation [3]. Herding behaviour, observed in numerous marketplaces worldwide, is one type of behavioural bias that has been hotly debated since successive crises hit the globe [4].

Herding behaviour arises as a result of interactions among investors associated with information access, which can result in investors making mistakes in investment decisions [5], regardless of personal information held, and choosing to follow the behaviour of others in the market [6], based on the assumption that other people have better information and understanding of the market, this condition is more pronounced when the market is stressed [7]. Herding behavior in the capital market is a widespread occurrence and is believed to be the primary cause of market instability and volatility [8], [9]. Herding is commonly considered prevalent, even though actual data is limited [10]. Several researchers feel that herding is a widespread phenomenon in many capital markets [8], including in developed and emerging capital markets, during crises and non-crises (normal conditions). However, it is not uniformly distributed throughout all capital markets.

Herding behaviour research in the capital market can be grouped into two categories: first, research by using microdata or ownership data to investigate whether certain types of investors have herding behaviour, and second, research using aggregate prices and market activity data to investigate herding behaviour in the entire market [11]. Aggregate herding behaviour is fascinating to investigate since it focuses on the aggregate behaviour of investors, who prefer to make investment decisions based on market movements. The initial person to investigate herding behavior on the capital market in aggregate was [12], that is, the capital market in the United States, and the results displayed no herding activity. [13] investigated the presence of herding behavior in developed and emerging capital markets, including the United States, Hong Kong, Japan, South Korea, and Taiwan, finding that herding behavior was more

prevalent in emerging than in developed capital markets. Many researchers have discovered that herding behaviour is more prevalent when the market is stressed, as seen by high volatility and uncertainty. However, it is not evenly distributed across all countries [14], [15]. For instance, market volatility was relatively significant during the COVID-19 pandemic, which shook the world at the end of 2019 and culminated in early 2020.

ASEAN, as one of the regions with the majority of its capital markets remaining categorized as emerging capital markets, has captured the interest of a number of researchers interested in detecting the presence of herding behaviour, including asymmetric herding behaviour, and when the market is stressed during the COVID-19 pandemic. Asymmetric herding occurs on days when the market is bullish or bearish. Hence, the market's optimistic and pessimistic perspectives can be distinguished by this disparity [12]. Asymmetric herding can arise from different investor reactions to market fluctuations [16]. [17] studied herding behaviour in Indonesia, Malaysia, the Philippines, and Vietnam. The findings show that Asymmetric herding was present in all markets except the Philippines when the market was up. However, only in Malaysia, when the market was falling, and during the pre-crisis and economic crisis, strong herding behaviour was seen in the Indonesian and Malaysian capital markets.

[18] observed that herding behaviour was especially prominent in the Singapore capital market during the financial crisis and market ups and downs. Thailand's capital market recognized herding activity, whether the market was up or down from 1995 to 2014 [19]. [20] investigated herding behaviour in the Indonesia capital market and found that there was herding behaviour in extreme COVID-19 conditions and that the market was in a downtrend and not an uptrend. Herding behaviour was found in all East Asian and Southeast Asian stock markets (Singapore, Taiwan, Hong Kong, Mainland China, Japan, and South Korea) and escalated during the March 2020 market crash [21].

This study aims to detect aggregate herding behavior in asymmetric and during the COVID-19 pandemic in the ASEAN countries' capital markets (Indonesia, Malaysia, Thailand, and Singapore). Indonesia, Malaysia, and Thailand are ASEAN emerging capital markets that are interesting to study because they have the most investors compared to other countries that have not been studied and are dominated by young investors, particularly Indonesia. Meanwhile, Singapore is worthwhile researching because it is ASEAN's sole developed capital market with a solid trade regulatory framework, a favourable investment climate, and sound economic policies [22]. This does not guarantee that herding behaviour will not be noticed because past research results are still mixed. This study differs from others in that it uses all daily market activity to demonstrate the prevalence of asymmetric aggregate herd behavior in ASEAN capital markets, whether the market is up or down, and herding during the current COVID-19 pandemic, which is still limited research. The findings of this study may contribute to developing the field of behavioural finance literature and also provide information to ASEAN capital market regulators to anticipate herding behavior by enhancing capital market trading rules.

2. Methods

This research is fundamental research employing a quantitative approach to detect aggregate herding behaviour of investors in asymmetric and during the COVID-19 pandemic in ASEAN capital markets (Indonesia, Malaysia, Thailand, and Singapore). The data used in this study is secondary data in the form of historical data on the daily closing prices of all shares listed on the Indonesian, Malaysian, Thailand, and Singapore capital markets from January 2015 to December 2020. To meet the research objectives, the appropriate sample size must be determined because the sample is critical in this study in terms of estimation and interpretation of the data. As a result, in this study, the sample was determined using a purposive sampling approach, with a total sample of 473 firms for the Indonesian capital market, 816 companies for Malaysia, 575 companies for Thailand, and 463 companies for Singapore.

The cross-sectional absolute deviation (CSAD) proposed by [12] and a nonlinear regression model proposed by [13] that captures the relationship between the CSAD and the market return using the entire distribution of market returns are used to detect the presence of aggregate herding behavior in asymmetric, both in up and down market conditions, as well as during the COVID-19 pandemic in the ASEAN capital market.

Model development by [13] will be utilized to detect asymmetric aggregate herding behaviour in different market settings, as employed by [23], [24], [25]. This model employs a dummy variable in standard form, as shown by the equation:

$$CSAD_{jt} = \theta + \alpha_1 D^{up} |R_{m,t}| + \alpha_2 (1 - D^{up}) |R_{m,t}| + \alpha_3 D^{up} R_{m,t}^2 + \alpha_4 (1 - D^{up}) R_{m,t}^2 + e_t \quad (1)$$

Where D^{up} is a dummy variable with a criteria value of 1 for days with positive market returns and 0 for days with negative market returns. α_3 and α_4 are assessed to be negative, indicating asymmetric herding during market ups and downs. The research hypothesis will be approved if the coefficients α_3 and α_4 are negative and significant.

The model [20], a nonlinear model that shows the link between $CSAD_{j,t}$ and market returns using the complete distribution of market returns, will be used to detect herding behaviour during the COVID-19 pandemic. The equation appears as follows:

$$CSAD_{j,t} = \theta + \alpha_1 |R_{m,t}| + \alpha_2 R_{m,t}^2 + e_t \quad (2)$$

[13] explained that under the assumption of capital asset pricing methods, rational asset pricing expects that the dispersion of stock returns maintains an increasing linear relationship with absolute market returns due to the differential sensitivity of individual stocks to market returns. The existence of herding behaviour under extreme market conditions is likely to cause this relationship to decrease non-linearly, and the coefficient α_2 is expected to be negative ($CSAD_{j,t}$ increases at decreasing values). This means that the presence of herding behavior will be detected when the coefficient α_2 is negative and significant so that the research hypothesis can be accepted. The research hypothesis was rejected when the α_2 coefficient was positive, even though it was significant.

3. Empirical Result and Discussion

Descriptive statistics summarize the sample characteristics used in this research to discover aggregate herding behaviour in asymmetric and during the COVID-19 Pandemic. Table 1 displays descriptive statistics for the four ASEAN capital market samples.

Table 1. Descriptive statistics from four ASEAN capital market samples

	Indonesia		Malaysia		Thailand		Singapore	
	CSAD	Rm	CSAD	Rm	CSAD	Rm	CSAD	Rm
Mean	1.858	0.071	2.140	0.201	1.488	0.021	2.134	0.113
Median	1.770	0.072	1.978	0.247	1.366	0.089	2.024	0.090
Maximum	42.014	22.294	8.153	8.514	4.825	6.410	7.247	3.183
Minimum	0.003	-3.733	0.582	-11.482	0.351	-8.410	0.004	-5.967
Std. Dev.	1.172	0.827	0.681	0.936	0.458	0.806	0.659	0.677
Observations	1454		1468		1461		1501	

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

The country with the highest CSAD value and market return is Indonesia. Malaysia has the highest CSAD value and average standard deviation of market return. A high CSAD number indicates that the rate of return on individual equities has deviated sufficiently from the market rate of return. [20] Explained that the rational asset pricing model expects the dispersion of stock returns to maintain an increasing linear relationship with absolute market returns due to the differential sensitivity of individual stocks to market returns under the assumptions of the capital asset pricing model. Herding occurs when the growth in CSAD is less than the increase in market returns. The standard deviation amount implies that market return is frequently positively related to market risk. The Singapore capital market is unique in that, while the market return is lower than in Malaysia, the level of risk, as measured by the standard deviation value, is the lowest. The assumption that the rate of return obtained is positively connected to the risk that must be borne only applies to Malaysia, Indonesia, and Thailand's capital markets, not Singapore's only developed capital market in the ASEAN.

Asymmetric herding happens in various market scenarios, including down-market and up-market periods and with optimistic and pessimistic viewpoints. The results of the asymmetric herding tests at different market conditions, as shown in Table 2 below, show that there is no herding behavior in the Indonesian, Malaysian, and Singapore capital markets, even though the coefficient values of α_3 and α_4 Malaysia and α_4 Singapore are negative but not significant. Asymmetric herding was only observed in the Thailand capital market during a down-market. Meanwhile, during optimistic market conditions were not observed, there was no herding behaviour, although the α_3 coefficient was negative but not significant.

Table 2. Regression estimates of aggregate herding behaviour in asymmetric

	Indonesia	Malaysia	Thailand	Singapore
Konstanta	1.66(87.63)***	1.64(56.20)***	1.18(59.54)***	1.64(58.49)***
$D^{up} R_{j,t} $	0.60(7.34)***	0.91(16.09)***	0.70(10.93)***	1.15(13.61)***
$(1 - D^{up}) R_{j,t} $	0.25(5.55)***	0.67(8.44)***	0.53(11.58)***	0.83(11.88)***
$D^{up}R_{j,t}^2$	0.06(15.39)***	-0.01(-0.87)	-0.03(-1.12)	0.02(0.30)
$(1 - D^{up})R_{j,t}^2$	0.17(6.07)***	-0.01(-0.86)	-0.01(-2.28)**	-0.01(-0.48)
R ² adj. (%)	89.25	65.30	51.46	60.90

Note: *, **, ***Significant at the level 10%, 5%, and 1%
 Sources: Data processed by using equation 2 as follows:

$$CSAD_{jt} = \theta + \alpha_1 D^{up}|R_{m,t}| + \alpha_2 (1 - D^{up})|R_{m,t}| + \alpha_3 D^{up}R_{m,t}^2 + \alpha_4 (1 - D^{up})R_{m,t}^2 + e_t$$

This condition indicates that the volatility of the Indonesian, Malaysian, and Singapore capital markets is neither too high nor too low. That investor sentiment does not encourage herding behaviour when the market rises and falls. The findings of empirical testing on the Thailand capital market are consistent with studies [25], [26] showing asymmetric herding occurs during downturns. When the market is pessimistic, investors prefer to follow market fluctuations [27].

Undetected asymmetric herding in the Indonesian, Malaysian, and Singapore capital markets demonstrates that investors do not overreact to market changes, whether they are optimistic or pessimistic. Individuals making market investments do not follow market movements up or down because they believe that investment risk will increase if many investors have the same thought to buy when market conditions are bullish and sell when market conditions are bearish, resulting in asymmetric herding.

Table 3 shows the prediction results of herding behavior in ASEAN capital markets (Indonesia, Malaysia, Thailand, and Singapore) using equation 2 with the Newey and West consistent estimator.

Table 3. Regression estimates of herding behaviour during the full period and during the COVID-19 Pandemic

Panel A: Full Period (Jan 2015 – Dec 2020)				
	Indonesia	Malaysia	Thailand	Singapore
Konstanta	1.48 (45.15)***	1.64(59.40)***	1.19(60.59)***	1.60 (57.86)***
$ R_{j,t} $	0.80 (9.48)***	0.84(15.21)***	0.61(12.44)***	1.18 (19.59)***
$R_{j,t}^2$	0.05 (12.30)***	-0.02(-2.99)***	-0.02(-3.31)***	-0.06 (-2.46)***
R ² adj. (%)	90.92	63.13	50.24	58.04
Panel B: COVID-19 Pandemic Period (Jan 2020 – Dec 2020)				
	Indonesia	Malaysia	Thailand	Singapore
Konstanta	1.61 (36.98)***	2.24(31.75)***	1.59(36.59)***	1.92 (31.17)***
$ R_{j,t} $	0.72 (9.70)***	0.71(9.14)***	0.59(9.03)***	1.03 (10.43)***
$R_{j,t}^2$	0.05 (15.17)***	-0.01(-1.779)*	-0.02(-3.21)***	-0.05 (-1.73)*
R ² adj. (%)	98.86	71.65	64.69	68.24

Note: *, **, ***Significant at the level 10%, 5%, and 1%
 Sources: Data processed by using equation 3 as follows:

$$CSAD_{jt} = \theta + \alpha_1 |R_{m,t}| + \alpha_2 R_{m,t}^2 + e_t$$

Referring to Table 3 above, panel A summarizes the findings of empirical tests conducted on the capital markets of ASEAN nations (Indonesia, Malaysia, Thailand, and Singapore) from 2 January 2015 to 30 December 2020. The test results demonstrate that the coefficient α_1 is positive and significant at 1% for every ASEAN country studied, illustrating the expected association between CSAD and market returns in each ASEAN nation’s capital market. The α_2 coefficient test results demonstrate that only the capital markets in Malaysia, Thailand, and Singapore have negative and significant values, whereas Indonesia has positive and significant values. The negative and significant α_2 coefficient value implies the presence of herding behavior in the capital markets of Malaysia, Thailand, and Singapore during the study period. However, no herding activity was identified in Indonesia. Empirical test results during the COVID-19 pandemic show that herding behavior is detected in the capital markets of Malaysia, Thailand, and Singapore, which is characterized by a negative coefficient α_2 and significant. In contrast, Indonesia did not detect herding behaviour because the coefficient α_2 is positive and significant.

The presence of herding behavior in the Malaysian capital market due to the COVID-19 pandemic is assumed to be related to the country's capital market, which is the most open compared to other Asian countries [28]. The Malaysian capital market is particularly appealing to overseas investors since it offers the most shares compared to other ASEAN countries. Foreign investors are considered the source of capital market volatility since they tend to remove funds fast from the country where they invest, especially during times of financial crisis. During the Asian crisis, foreign investors exhibited herding behavior in the Malaysian capital market, and they were also quick to respond to economic shocks caused by local investors, resulting in heightened volatility in the Malaysian capital market [29]. Besides, herding behaviour is more likely to occur among Malaysian investors when investors examine market trading volume before making investment decisions to maximize investment returns by neglecting personal information stored [30].

Herding behaviour reported in the Thailand capital market during the COVID-19 outbreak was also caused by foreign investors, which resulted in market instability. A sudden decrease typically follows high market volatility in capital market asset prices, which can cause investor fear. As a result, investors will act to follow market movements, resulting in herding behaviour [31]. Another cause is the long-standing inefficiency in the Thai capital market, which is undoubtedly risky due to less educated and well-informed investors, cultural differences and regulation of economic activity and others. All of these issues are followed by a collective culture that prevents market players from departing from others, resulting in herding behaviour [13]. Herding behavior reported in the Singapore capital market during the COVID-19 outbreak was supposedly attributable to the Confucius principle, which placed the group's interests over the individual, as most ASEAN investors do [22]. Following this approach allows Singapore capital market participants to make investment decisions based on group cooperation, potentially leading to herding behaviour.

4. Conclusion

Empirical test results on asymmetric herding at various market conditions reveal that it is only discovered in the Thailand capital market when the market is down, not up-market. Meanwhile, no asymmetric herding behavior was observed in the capital markets of Indonesia, Malaysia, and Singapore, regardless of whether the market was optimistic or pessimistic. The results on herding behaviour during the COVID-19 pandemic show that the Malaysia, Thailand, and Singapore capital markets detected herding behaviour. In contrast, no herding behaviour was found in the Indonesian capital market.

The findings of this paper are expected to be useful for policymakers in the capital markets of Indonesia, Malaysia, Thailand, and Singapore to maintain capital market stability. Resilience in the face of various crises and economic upheavals that cause market conditions to be stressed due to herding behaviour that tends to encourage high levels of volatility and uncertainty. As a result, the market becomes unstable, investors struggle to benefit from appropriate asset allocation and diversification, and enterprises struggle to get capital market funding. The study contributes to and extends the literature on herding behaviour research in particular and general behavioural finance by providing fresh insights.

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References

1. F. Economou, "Herding in frontier markets: evidence from the Balkan region," *Rev. Behav. Financ.*, vol. 12, no. 2, 2020, doi: 10.1108/RBF-08-2018-0090.
2. R. E. Rahman and Ermawati, "Analisis Herding Behavior di Pasar Saham : Studi Kasus ASEAN-5 + US," *Bank Indones.*, pp. 1–21, 2019.
3. N. Barberis and R. Thaler, "Working Paper Series a Survey of Behavioral Finance," *NBER Work. Pap. Ser.*, pp. 2–67, 2002, [Online]. Available: <http://www.nber.org/papers/w9222>
4. S. N. Bhaduri and S. D. Mahapatra, "Applying an alternative test of herding behavior: A case study of the Indian stock

- market,” *J. Asian Econ.*, vol. 25, pp. 43–52, 2013, doi: 10.1016/j.asieco.2013.02.001.
5. A. Devenow and I. Welch, “Rational herding in financial economics,” *Eur. Econ. Rev.*, vol. 403, no. 3–5, pp. 603–615, 1996.
 6. P. T. Komalasari, M. Asri, B. M. Purwanto, and B. Setiyono, *Herding behaviour in the capital market: What do we know and what is next?*, vol. 72, no. 3. Springer International Publishing, 2022. doi: 10.1007/s11301-021-00212-1.
 7. H. Litimi, A. BenSaïda, and O. Bouraoui, “Herding and excessive risk in the American stock market: A sectoral analysis,” *Res. Int. Bus. Financ.*, vol. 38, pp. 6–21, 2016, doi: 10.1016/j.ribaf.2016.03.008.
 8. X. Deng, S. Hung, and Z. Qiao, “Mutual fund herding and stock price crashes,” *J. Bank. Financ.*, vol. 94, pp. 166–184, 2018, doi: 10.1016/j.jbankfin.2018.07.014.
 9. S. Spyrou, “Herding in financial markets: A review of the literature,” *Rev. Behav. Financ.*, vol. 5, no. 2, pp. 175–194, 2013, doi: 10.1108/RBF-02-2013-0009.
 10. I. Welch, “Herding among Security Analysts,” *J. financ. econ.*, vol. 58, pp. 369–396, 2000, doi: 10.2469/dig.v31.n2.857.
 11. Z. Javaïra; A. Hassan, “An examination of herding behavior in Pakistani stock market,” *Int. J. Emerg. Mark.*, vol. 10, no. 3, pp. 474–490, 2015, [Online]. Available: <https://www.emerald.com/insight/content/doi/10.1108/IJoEM-07-2011-0064>
 12. W. G. Christie and R. D. Huang, “Following the Pied Piper: Do Individual Returns Herd around the Market?,” *Financ. Anal. J.*, vol. 51, no. 4, pp. 31–37, 1995, doi: 10.2469/faj.v51.n4.1918.
 13. E. C. Chang, J. W. Cheng, and A. Khorana, “An examination of herd behavior in equity markets: An international perspective,” *J. Bank. Financ.*, vol. 24, pp. 1651–1679, 2000, [Online]. Available: [https://doi.org/10.1016/S0378-4266\(99\)00096-5](https://doi.org/10.1016/S0378-4266(99)00096-5)

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