



Herding Behaviors in ASEAN Stock Markets

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ABSTRACT

This paper aims to use comprehensive evidence to test the herding behaviors existing in 6 ASEAN stock markets, including Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. The paper used a survivor-bias-free dataset of daily stock returns during the period January 1, 2009 to June 30, 2016 to measure the results. The empirical results from the 6 ASEAN stock markets showed that herding behavior has existed only in Vietnam, and Vietnam own significant herding behavior during different asymmetric market conditions. We also found evidence to show the significant role of U.S. return dispersions in the ASEAN stock market; however, the U.S. stock market cannot affect the herding formation of each ASEAN stock market.

Keywords: Herding Behavior, Cross-sectional Absolute Deviation, ASEAN Stock Markets

Introduction

After global economic crisis, many researchers found stock market price may deviate from fundamental value on some periods. And they also found herding behavior is one of the way which can cause the stock price deviated from its fundamental value. VinhVo and AnhPhan (2016) indicated that the rampant of herding phenomenon in global stock markets increase the fluctuation in securities' price. Stock may not be appropriately priced resulting in an increase in the inefficiency of stock market. Long time herding behavior will cause great instability and inefficiency of stock market, even the failure of financial system.

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Herding behavior belongs a part of behavioral finance, and many researchers found psychology factors of investors as significant variables that affect investment behavior. Herding behavior is widely researched, but there is no consistent model and results to show whether herding behavior exists. What's more, most researchers mainly focus on large and mature markets such as China, U.S., Japan and Europe, while very minimal studies have examined small or less mature markets. Compared with other large and mature stock markets, ASEAN countries' stock markets are different in terms of size and maturity. Just as Hee Ng (2002) and Click & Plummer (2005) indicated the increasing relationship between all ASEAN stock markets, and those ASEAN stock markets are most significantly affected by U.S. stock market. It would be interesting to measure in which ASEAN country can herding behavior be found, and how ASEAN stock market interacting with U.S. stock market.

This paper aims to test whether herding behaviors exist in six ASEAN stock markets (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam) in different periods and situation. To determine the herding behaviors, this study employs a cross-sectional standard deviation of return, or CSAD (Chang, Cheng, & Khorana, 2000). The rational asset pricing models predict that the equity return dispersions are a linear and increasing function of the market return. If herding behavior existing in stock market, the market participants tend to follow aggregate market behavior and ignore their own priors during periods of large average price movements, then the linear and increasing relation between dispersion and market return will no longer hold. Therefore, the non-linear relationship between the equity return dispersions and the return on aggregate market portfolio implies that the herding behaviors have existed in that stock market. In the end, this paper also tested the interactive relationship between 6 ASEAN stock markets and US stock market.

This paper has much contribution to the society. First of all, this paper combined three areas' studies, they are behavioral finance, behavioral economic and psychology. Secondly, this research updated the data of six ASEAN countries stock markets with different periods and different situations. Thirdly, this paper also proved the interactive relationship between six ASEAN stock markets and American stock market. The last but not the least, this research is practical, the implications of this paper can be used by government, institutional investors and listed companies, they can use the results to analyze how avoid the negative effect of herding behavior in stock markets.

Literature Review

There is no definite description to explain herding behaviors in the global stock markets. According to Lakonishok, Shleifer and Vishny (1992), they pointed out that herding behavior means investors buying or selling same stocks as what other investors buy or sell, and those investors may have ignored their own private information and blindly followed what others are doing.

Banerjee (1992) described herding behavior as the behavior of an individual who just blindly follows what other people do even if a different decision is recommended to them. When herding behavior exists, different investors own different private information, but they still trade on the same side in the market and hold the same securities at the same period, and most of them may follow what other people do and ignore their own private information. What's more, Sciubba (2000) also described herding behavior as the behavior of correlated pattern behavior of different individuals.

However, Hirshleifer, Subrahmanyam, and Titman (2006) provided different opinions in that herding behavior only happens when different investors own the same information source, and they use similar ways to explain and interpret those information, leading to the same decision. If people own different information or use different ways to interpret the same information, the correlated pattern behavior will not occur.

And many researchers paid a lot of attentions on the research of rational herding behavior phenomenon. There are two distinct explanations regarding the rationality of the herding behavior phenomenon. Chang, Cheng and Khorana (2000) pointed out that herding behavior can be the results of either rational or irrational behavior of investors. For irrational behavior, the explanation is similar with other researchers, in that irrational herding behavior focuses on the psychological aspect of making, where investors only blindly follow other investors' decision and ignore personal belief (Devenow & Welch, 1996). Rational herding behavior, which is also called informational cascade, is linked with the principal-agent problem, whereby a manager or an investor ignore their private information and follow reputational capital in the market, just copy others' action, in order to get profit (Welch, 1992).

What's more, many researchers found that not only individual investors may blindly follow other investors, but also institutional investors. Lakonishok, Shleifer, and Vishny (1992) used the institutional investors as the example to measure herding behavior in the stock market, and they evaluated the percentage of changing of buyer and seller of securities based on observation, and they found there is no solid evidence to support the finding of herding

behavior based on the example of 769 tax-exempt U.S. pension funds analyzed for 1985–1989. Then Grinblatt, Titman, and Wermers (1995) used 155 U.S. mutual funds to check whether the herding behavior existed in US market between 1974 and 1984. The results indicated that there was a weak evidence to support the herding behavior in US market, but around 70% investors follow winner to buy and not follow loser to sell their stock, that means herding behavior may act different in different situations.

Patterson and Sharma (2010) used a sample of 8000 stock-days' trade data from the New York Stock Exchange to examine whether the herding behavior existed in the US stock market from 1998 to 2001. They found there was no evidence to find the herding in the market. They concluded that high volatility will hide the herding behavior in the stock market. Economou, Kostakis and Philippas (2011) investigated four south European stock markets, and they found evidence of herding in some European countries. And they also tried to test whether return's dispersion is different in different market condition. In the end, they found some evidence to support their hypothesis that market return's dispersions are presence different in different market conditions with different market trading volume, volatility and up or down market states.

There are limited academic papers examine the presence of herding from ASEAN stock markets' perspectives. And many of them examined the herding phenomenon from international perspectives or in a multimarket setting (except ASEAN area). Chiang and Zheng (2010) used comprehensive evidence from 18 countries to prove that all of those countries (except the US) stock markets own herding behaviors during the period 1988-2009. They only tested four ASEAN stock markets, they are Indonesia, Malaysia, Singapore and Thailand. They found the evidence of herding in those four ASEAN stock market, and they are affected by US stock market because they found US stock market cross-sectional return dispersion was playing a significant role to explain herding behavior in all 17 non-US markets.

Chang and Lin (2015) used 50 stock markets to check whether herding behavior existing in those markets with the data from January 6, 1965 to May 31, 2009. They found half of those markets include US market, own herding behavior. They also investigated 4 ASEAN countries as their sample, those countries are Indonesia, Malaysia, Singapore and Thailand. Based on their research, in those four ASEAN countries, they found significant evidence of herding in Malaysia and Thailand markets, but did not found the presence of herding in Indonesia and Singapore stock markets.

VinhVo and AnhPhan (2016) used Vietnam stock market daily data from January 2005 to April 2015 to examine the herding behavior of Vietnam stock market based on different research methodologies. They found that Vietnam stock market existing significant herding behavior during different asymmetric market conditions.

Methodology

This study gathers data using daily stock returns from 6 ASEAN starting from January 1, 2009 to June 30, 2016 to measure six ASEAN stock markets herding behavior in different periods and situations, and their interactive relationship with US stock market. Researchers follow the way of Chang, Cheng, and Khorana (2000) to measure those countries herding behavior. Based on the rational asset pricing models, it can predict that the equity return dispersions are a linear and increasing function of the market return. So, researcher prefer to described that herding behavior of stock market happen when the market participants tend to blindly follow aggregate market behavior and ignore their own priors during periods of large average price movements even they own different information, then in the stock market, the linear and increasing relation between market dispersion and market return will no longer hold. Instead, the relation can become non-linear.

Chang, Cheng, and Khorana (2000) developed the methodology of Christie and Huang (1995) and showed the method of cross-sectional absolute deviation of returns or CSAD is the best measurement way to test herding behavior in different stock markets with more sensitivity and to hold in times of large average price movement. And this point was acknowledged by many researchers, such as Economou, Kostakis and Philippas (2011) and Mobarek, Mollah and Keasey (2014). So, researcher is going to follow their way to measure herding behavior in six ASEAN stock markets. The cross-sectional absolute deviation of returns or CSAD can be showed as follows.

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

where $R_{(i,t)}$ means the stock return of asset i at time t and $R_{(m,t)}$ means the cross-sectional average of the N returns in the aggregate market portfolio at time t .

In order to determine whether the herding behaviors existed in those ASEAN stock markets, the non-linear relationship between the equity return dispersions and the return on aggregate market portfolio is examined as follows.

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

where $R_{(m,t)}$ is the cross-sectional average of the N returns in the aggregate market portfolio at time t , the squared market return $R_{(m,t)}^2$ is used to capture the non-linearity in the relationship, α is the constant, γ_1 and γ_2 are coefficients, and ε_t is the error term. Moreover, in order to check the data and methodology properties, present researcher used the Newey and West (1987) estimator to check and detect heteroskedastic and autocorrelation consistent (HAC) co-variance for all the ordinary least square (OLS) regressions.

In order to determine the herding behavior, the coefficient γ_2 is determined. If the coefficient γ_2 is not statistically significant, the linear relationship between the equity return dispersions and the return on aggregate market portfolio holds which is consistent with the rational asset pricing models. However, if the coefficient γ_2 is significantly negative, it implies that the herding behavior has presented in that stock market.

We further examine whether the return's dispersion behave differently in different market conditions. We follow the ways of Chiang and Zheng (2010) and Economou, Kostakis and Philippas (2011) to utilize a dummy variable to approach in different market condition, and those condition is market in up or down market, in different period of trading volume (high or low) and trading volatility (high or low). This is also a way to measure the asymmetric effect of ASEAN market return sign as follow:

$$CSAD_t = \alpha + \gamma_1 D^{UP} |R_{m,t}| + \gamma_2 (1 - D^{UP}) |R_{m,t}| + \gamma_3 D^{UP} R_{m,t}^2 + \gamma_4 (1 - D^{UP}) R_{m,t}^2 + \varepsilon_t \quad (3)$$

Where D^{UP} is dummy variable with a value of 1 for those days with positive market returns and 0 for those days with other conditions. where $R_{(m,t)}$ is the cross-sectional average of the N returns in the aggregate market portfolio at time t , the squared market return $R_{(m,t)}^2$ is used to capture the non-linearity in the relationship, α is the constant, γ_1 , γ_2 , γ_3 and γ_4 are coefficients, and ε_t is the error term. If equation (3) assume that $\gamma_1 > 0$ and $\gamma_2 > 0$, we can conclude that herding effects absence in this stock market, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with positive market returns.

The following equation showed the asymmetric behavior of return dispersion with respect to market trading volume.

$$\begin{aligned} \text{CSAD}_t = & \alpha + \gamma_1 D^{\text{HVolume}} |R_{m,t}| + \gamma_2 (1 - D^{\text{HVolume}}) |R_{m,t}| + \gamma_3 D^{\text{HVolume}} R_{m,t}^2 \\ & + \gamma_4 (1 - D^{\text{HVolume}}) R_{m,t}^2 + \varepsilon_t \end{aligned} \quad (4)$$

Where D^{HVolume} is dummy variable with a value of 1 for those days with high trading volume (higher than previous 30 days trading volume moving average) and 0 for those days with other conditions. where $R_{(m,t)}$ is the cross-sectional average of the N returns in the aggregate market portfolio at time t, the squared market return $R_{(m,t)}^2$ is used to capture the non-linearity in the relationship, α is the constant, γ_1 , γ_2 , γ_3 and γ_4 are coefficients, and ε_t is the error term. If equation (3) assume that $\gamma_1 > 0$ and $\gamma_2 > 0$, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with high trading volume.

The following equation showed the asymmetric behavior of return dispersion with respect to market volatility.

$$\begin{aligned} \text{CSAD}_t = & \alpha + \gamma_1 D^{\text{HVolatility}} |R_{m,t}| + \gamma_2 (1 - D^{\text{HVolatility}}) |R_{m,t}| + \gamma_3 D^{\text{HVolatility}} R_{m,t}^2 \\ & + \gamma_4 (1 - D^{\text{HVolatility}}) R_{m,t}^2 + \varepsilon_t \end{aligned} \quad (5)$$

Where $D^{\text{HVolatility}}$ is dummy variable with a value of 1 for those days with high trading volatility (higher than previous 30 days market volatility moving average) and 0 for those days with other conditions. Where $R_{(m,t)}$ is the cross-sectional average of the N returns in the aggregate market portfolio at time t, the squared market return $R_{(m,t)}^2$ is used to capture the non-linearity in the relationship, α is the constant, γ_1 , γ_2 , γ_3 and γ_4 are coefficients, and ε_t is the error term. If equation (3) assume that $\gamma_1 > 0$ and $\gamma_2 > 0$, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with high trading volatility.

Just as Chiang and Zheng (2010) and many previous literacies informed the significant role of US stock market, and that motivated us to follow their ways and test how it affects ASEAN stock markets. And, we write equation as following:

$$\text{CSAD}_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \gamma_3 \text{CSAD}_{US,t} + \gamma_4 R_{US,t}^2 + \varepsilon_t \quad (6)$$

Where $\text{CSAD}_{(US,t)}$ is the cross-sectional absolute deviation of returns of the US stock market at time t, and $R_{(US,t)}$ is the market return if US stock market at time t. And all other variables are defined same as before.

Results

This study uses daily stock returns from 6 ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam) during January 1, 2009 to June 30, 2016. The descriptive statistics of daily stock returns is reported in table 1.

Table 1 reports the descriptive statistics of daily stock returns of 6 ASEAN countries used in this study. During the period of study, the mean aggregate market return is highest at 0.0327% in Philippines and lowest at 0.0096% in Vietnam. However, the standard deviation of market return is highest in Vietnam at 0.5474% and lowest in Malaysia at 0.2717%. The median stock returns of each country are lower than the mean stock returns which implies that the stock returns in each country are characterized by negative skewness. Only in Malaysia and Singapore, the median stock returns and mean stock returns are closed to each other implying that the stock returns in these two countries are closer to normal distribution.

Table 1 Descriptive Statistics of Daily Stock Returns

Country	Mean (%)	Standard Deviation (%)	Median (%)
Indonesia	0.0296	0.5229	0.0534
Malaysia	0.0145	0.2717	0.0194
Philippines	0.0327	0.4875	0.0482
Singapore	0.0102	0.4249	0.0130
Thailand	0.0263	0.4983	0.0409
Vietnam	0.0096	0.5474	0.0281

The return dispersions are measured by the cross-sectional absolute deviation of returns or CSAD developed by Chang, Cheng, and Khorana (2000) which are calculated as in the equation 2. The description of CSAD is reported in table 2.

Table 2 Description of Cross-Sectional Absolute Deviation or CSAD

Country	Mean (%)	Standard Deviation (%)	Median (%)
Indonesia	0.5665	0.4666	0.4322
Malaysia	0.2049	0.0967	0.1861
Philippines	0.1242	0.1009	0.0999
Singapore	0.2339	0.1468	0.2025
Thailand	0.2629	0.1253	0.2347
Vietnam	0.3020	0.1524	0.2743

Table 2 reports the description of cross-sectional absolute deviation or CSAD of 6 ASEAN countries used in this study. During the period of study, the mean of CSAD is highest at 0.5665% in Indonesia and lowest at 0.1242% in Philippines. Compared the mean and median, the median of CSAD in each country is slightly lower than the mean of CSAD implying that the distribution of CSAD is positively skewed.

In order to determine whether the herding behaviors have existed, the test equation as in the equation 2 is examined and reported in following table 3.

TABLE 3 Regression results for the samples using CSAD measure

Country	Constant	γ_1	γ_2	R-squared	Adjusted R-squared	F-statistics	Pro.
Thailand	0.2131*** (41.99)	0.1407*** (7.13)	-0.0056 (-0.43)	0.1312	0.1303	137.6927	0.0000
Indonesia	0.3856*** (18.28)	0.3430*** (5.22)	0.2307*** (6.18)	0.3413	0.3406	501.7294	0.0000
Malaysia	0.1690*** (40.33)	0.1429*** (4.64)	0.1056** (2.40)	0.1896	0.1888	215.8926	0.0000
Philippines	0.0945*** (22.20)	0.0894*** (5.27)	-0.0097 (-0.83)	0.0616	0.0606	59.8288	0.0000
Singapore	1.1418*** (25.53)	0.6425*** (3.14)	0.3756** (2.34)	0.1569	0.1560	174.7080	0.0000
Vietnam	0.2452*** (28.49)	0.2228*** (6.74)	-0.1130*** (-4.75)	0.0495	0.0484	45.3429	0.0000
USA	0.1652*** (36.16)	0.0997*** (3.94)	0.0702*** (3.74)	0.3079	0.3072	418.8961	0.0000

Note: The number in parenthesis is t-Statistics.

***, ** and * indicate that the coefficient γ_2 is negatively significant at 1%, 5% and 10% level.

Table 3 reports the result of regression analysis used to test whether the herding behavior existed in each stock market. If the herding behavior has existed, the coefficient γ_2 should be negative and significant implying the non-linear relationship between the equity return dispersions and the return on aggregate market portfolio.

For Indonesia, the coefficient γ_2 is 0.2307 which is not negative like what expected to see for the herding behavior. The coefficients γ_2 for Malaysia and Singapore are 0.1056 and 0.3756 which are also not negative. There are only 3 countries that the coefficients γ_2 are

negative which are Thailand, Philippines, and Vietnam. The coefficient γ_2 for Thailand is -0.005568 which is slightly different from zero and it is not statistically significant. The coefficient γ_2 for Philippines is -0.0097 which is also insignificant.

The coefficient γ_2 for Vietnam is -0.1130 which is the most negative among 6 countries used in this study. This coefficient is also statistically significant at convention level. Therefore, this means that the herding behavior does really exist in Vietnam.

The data of USA is also used to test the herding behavior of USA for follow step to test herding behavior incorporating the US factor of those six ASEAN countries. And we found that the coefficient γ_2 is 0.0702 for USA, and it is significant. That means the herding behavior is not existing in USA stock market during that periods. And it is also interesting to know whether the CSAD of USA stock market will affect ASEAN countries stock markets for next step.

Table 4 Estimate of herding behavior in rising and declining markets

Country	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Thailand	0.2129*** (41.98)	0.1569*** (6.76)	0.1229*** (5.36)	-0.0146 (-0.92)	0.0040 (0.2315)	0.1307
Indonesia	0.3196*** (24.98)	0.4991*** (7.95)	0.5404*** (11.03)	0.1350*** (3.25)	0.1757*** (6.7147)	0.4273
Malaysia	0.1695*** (38.93)	0.1581*** (5.41)	0.1142** (2.47)	0.0807** (2.12)	0.1499* (1.87)	0.1887
Philippines	0.0948*** (21.81)	0.0868*** (3.91)	0.0890*** (4.41)	-0.0064 (-0.32)	-0.0102 (-0.82)	0.0596
Singapore	1.1332*** (25.14)	0.7502*** (3.22)	0.6560** (2.92)	0.3697** (2.11)	0.2649 (1.32)	0.1574
Vietnam	0.2444*** (29.00)	0.2545*** (7.61)	0.1983*** (5.46)	-0.1361*** (-5.19)	-0.0977*** (-3.79)	0.0494

Note: The number in parenthesis is t-Statistics.

***, ** and * indicate that the coefficient γ_2 is negatively significant at 1%, 5% and 10% level.

Table 4 reports the result of regression analysis used to test whether the herding behavior existed in each rising and declining market. We can check whether $\gamma_1 > 0$ and $\gamma_2 > 0$, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with positive market returns. Based on above table 4, we can see that only Vietnam

satisfy this condition, that means the herding effect are more significant during the period with positive market returns in Vietnam stock market. And for other stock markets, the herding effect absence in both rising and down declining markets.

Table 5 Estimate of herding behavior on days of high or low trading volume

Country	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Thailand	0.2129*** (41.86)	0.1757*** (6.94)	0.1196*** (4.96)	-0.0204 (-1.39)	-0.0053 (-0.26)	0.1359
Indonesia	0.3215*** (25.87)	0.4656*** (9.81)	0.5281*** (7.79)	0.1814*** (7.30)	0.1755*** (2.99)	0.4254
Malaysia	0.1754*** (40.90)	0.2018*** (6.01)	-0.0319 (-0.78)	0.0252 (0.57)	0.3826*** (5.01)	0.2073
Philippines	0.0901*** (23.82)	0.0757*** (4.02)	0.0185 (0.99)	-0.0143 (-1.64)	0.0276* (1.95)	0.0477
Singapore	1.1483*** (25.67)	0.7826*** (3.67)	0.4724** (1.96)	0.3099* (1.93)	0.4215* (1.67)	0.1577
Vietnam	0.2465*** (29.10)	0.2421*** (6.42)	0.1975*** (6.09)	-0.1147*** (-4.02)	-0.1107*** (-5.12)	0.0526

Note: The number in parenthesis is t-Statistics.

***, ** and * indicate that the coefficient γ_2 is negatively significant at 1%, 5% and 10% level.

Table 5 reports the result of regression analysis used to test whether the herding behavior existed in each high and low trading volume market. We can check whether $\gamma_1 > 0$ and $\gamma_2 > 0$, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with positive market returns. Based on above table 5, we can see that only Vietnam satisfy this condition, that means the herding effect are more significant during the period with high trading volume in Vietnam stock market. And for other stock markets, the herding effect absence in both rising and down declining markets.

Table 6 Estimate of herding behavior in high and low volatility

Country	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Thailand	0.2142*** (39.48)	0.1429*** (6.52)	0.1273*** (4.07)	-0.0080*** (-0.60)	0.0082*** (0.27)	0.1296
Indonesia	0.3396*** (20.75)	0.4678*** (9.77)	0.2822* (1.94)	0.1793*** (7.27)	0.5134* (1.95)	0.4260
Malaysia	0.1735*** (38.36)	0.1518*** (4.83)	0.0454 (0.95)	0.0857* (1.96)	0.2848*** (2.73)	0.1910
Philippines	0.0973*** (20.33)	0.0911*** (5.15)	0.0594** (1.98)	-0.0115 (-0.97)	0.0130 (0.38)	0.0606
Singapore	1.1618*** (25.03)	0.5361*** (2.72)	0.4086 (1.63)	0.3887** (2.55)	0.8238*** (3.15)	0.1589
Vietnam	0.2477*** (28.88)	0.2341*** (6.55)	0.1957*** (5.47)	-0.1193*** (-4.39)	-0.1039*** (-4.22)	0.0489

Note: The number in parenthesis is t-Statistics.

***, ** and * indicate that the coefficient γ_2 is negatively significant at 1%, 5% and 10% level.

Table 6 reports the result of regression analysis used to test whether the herding behavior existed in each high or low volatility market. We can check whether $\gamma_1 > 0$ and $\gamma_2 > 0$, and then we can continue check, if $\gamma_3 < 0$ and $\gamma_4 < 0$, we can conclude that herding effects are present. If $\gamma_3 < \gamma_4$, we can conclude that herding effect are more significant during the period with positive market returns. Based on above table 6, we can see that only Vietnam satisfy this condition, that means the herding effect are more significant during the period with high volatility in Vietnam stock market. And for other stock markets, the herding effect absence in both rising and down declining markets.

Table 7 Estimate of herding behavior incorporating the US factor

Country	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Thailand	0.1988*** (23.04)	0.1374*** (7.02)	-0.0040 (-0.31)	0.0862** (2.28)	-0.0120 (-1.55)	0.1328
Indonesia	0.2667*** (12.95)	0.4093*** (7.54)	0.2021*** (6.91)	0.4265*** (3.99)	0.0266 (0.96)	0.3737
Malaysia	0.1568*** (27.44)	0.1397*** (4.54)	0.1031** (2.32)	0.0670*** (2.98)	-0.0038 (-0.67)	0.1920
Philippines	0.0813*** (9.93)	0.0871*** (5.17)	-0.0087 (-0.74)	0.0709* (1.96)	-0.0023 (-0.34)	0.0637
Singapore	0.8573*** (9.61)	0.5512*** (3.03)	0.2976* (1.91)	1.5699*** (3.96)	-0.0138 (-0.17)	0.1907
Vietnam	0.2190*** (15.28)	0.2220*** (6.78)	-0.1137*** (-4.82)	0.1205** (2.09)	0.0224 (1.58)	0.0579

Note: The number in parenthesis is t-Statistics.

***, ** and * indicate that the coefficient γ_2 is negatively significant at 1%, 5% and 10% level.

Table 7 reports the result of regression analysis used to test herding behavior incorporating the US factor, the results is consistent with previous finding to show only Vietnam existing herding behavior with γ_2 is less than 0 and is statistical significance. In addition, the coefficient of CSAD of US stock market γ_3 are positive and significant across all 6 ASEAN stock markets, that indicated that US return dispersions still play a significant role in ASEAN stock markets. This results are consistent with previous literacies review. But we find the γ_4 is not significant any more compare with previous paper results. The US market condition has much less or no influence on herding formation of ASEAN stock markets.

Conclusion and Discussion

This paper aims to test whether the herding behaviors existing in six ASEAN stock markets. To determine the herding behaviors, this study employs cross-sectional standard deviation of return or CSAD (Change, Cheng, and Khorana, 2000). Using daily stock returns from six ASEAN countries stock market during January 1, 2009 to June 30, 2016, the empirical results reveal that there is no evidence of herding behaviors in most ASEAN countries including Indonesia, Malaysia, Philippines, Singapore, Vietnam and Thailand. The negative coefficients as predicted by the herding behaviors are for Thailand, Philippines, Vietnam. However, the coefficients in Thailand and Philippines are not statistically significant at any convention level. Only in Vietnam, the coefficient is negative and statistically significant.

The empirical results of testing herding behaviors of six ASEAN stock markets showed that the herding behavior has existed only in Vietnam. This result is different compare with previous literacy which measured herding behavior in international perspective and indicated that herding behavior widely exist in global stock markets and also in ASEAN countries. But our research confirmed some recent paper which indicated that herding behavior exist in Vietnam stock market. Vietnam own significant herding behavior during all different asymmetric market conditions. However, Vietnam stock market's herding behavior is stronger during the periods with positive market returns, high trading volume and high volatility of stock markets.

One possible explanation of the absence of herding behavior in other five ASEAN stock markets (except Vietnam) is well trained investors after crisis. Because many of those previous academic paper used the data during crisis or before crisis, and they proved the unstable of stock markets on that period. After economic crisis, those investors in those markets are well educated and trained which have enough ability to invest and may not blindly follow other

investors. Secondly, compared to other stock markets in ASEAN used in this study, the Vietnam stock market own smallest percentage institutional investors. One possible explanation of the existing of herding behavior in Vietnam is the role of institutional investors in stock market. Li (2017) found that the relationship between institutional investors' shareholding ratio and stock price synchronicity. That the more institutional investors in the stock market, the less likely that the herding behavior will occur. Institutional investors are less sensitive to information than individual investors. Institutional investors are well educated, possess more information regarding global perspectives, and possess ability to diversify and analyze their own private information. The third possible explanation of herding exist in Vietnam stock market is market size. Just as Sajter and Ćorić (2009) informed that, the small size is easily affected by herding behavior of investors. Compared to other stock markets in ASEAN used in this study, the market size of Vietnam stock market is smallest. The larger the stock market the less herding behavior existing, because the large size stock market is more stable than small size stock market, and if some investors want to affect large size stock market, they need to invest more money and attention than small size stock market, and it is not easy to affect large size stock markets compare with small size stock markets. Finally, the last reason can follow the explanation of Patterson and Sharma (2010) who indicated high volatility will hide the herding behavior in the stock market. Based on table 1, we can notice that the standard deviation of each stock return is around 0.5, the highly fluctuation of stock market may hide the herding behavior of each stock market.

We also find evidence to show the significant role of US return dispersions in ASEAN stock market. But US stock market cannot affect the herding formation of each ASEAN stock markets. Compare with previous literacy, the influence of US stock market still existing but not strong anymore. The possible explanation is that other countries' investors still have habit to notice the US stock market return even there is no relationship between the returns of US stock market and ASEAN stock markets. Just as Sajter and Ćorić (2009) informed that this is psychological effects of investors.

The Implications and recommendations

This paper has much contributions toward current society and literature. First of all, we provided evidence to answer whether herding behavior existing in those six ASEAN stock markets using sufficient updated daily data. Secondly, we associated six ASEAN stock markets herding behavior with different market conditions when the market is in up or down market, in

periods of high or low trading volume as well as high or low trading volatility states. Thirdly, this paper can be applied to the areas of financial stability in the ASEAN stock market and international portfolio diversification, is to test whether the cross-sectional dispersion of returns in ASEAN stock markets is affected by the cross-sectional dispersion of returns of US stock market which is playing a significant role in non-US markets. The last but not the least, this paper tried to provide some possible reasons to help people to know why herding behavior existing and what is the possible reasons behind herding behavior.

For further investigation, researchers can increase the data base of ASEAN stock markets, try to find other four ASEAN stock markets data and increase the periods and frequency of data base. What's more, researchers also can found a better method to measure herding behavior during high fluctuation period of stock market. Then, further author(s) many examine the Herding Behaviors for the stock of each sector in Thailand as the stock price adjustments of each sector are different from one another. The last but not the least, researchers also can find a good way to measure the possible reasons behind the herding of different countries.

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