



Are market performance and volatility determining the evolution of herd mentality of investors in a frontier stock market? Evidence from the Colombo Stock Exchange of Sri Lanka

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Abstract

This paper investigates whether market performance and volatility are determinants of herd behavior of equity investors of the Colombo Stock Exchange, covering the period from April, 2000 to September, 2016. Both conditional and unconditional tests consistently find herding during the first half of the sample period only. These test results show herd behavior in up and down market days, however, reveal no asymmetric behavior between these market days, indicating investors' tendency to herd irrespective of the market performance. Further, the evidence strongly suggests the propensity to herd in periods of high volatility market days. Accordingly, the market volatility appears as a determinant of herd evolution during the period 2000-2008. The absence of evidence on herd behavior in the second half of the sample period may be due to the fact that investors may have gradually learnt their irrational behaviors and adapted to a rational behavior in stock trading, or the weaknesses of the ordinary least square approach may cause biases in detecting the herding, which are required to be further investigated in the future research.

Keywords: *Asymmetric behavior, equity investors, frontier market, market-wide herding.*

1. Introduction

The herding in a stock market is an investor's tendency to follow the trading patterns of peer investors while discarding his/her own information and beliefs. As previous studies reveal, this behavioral pattern could arise intentionally due to factors such as market uncertainty, asymmetric flow of information, panic and fear of investors, and reputation

concerns of investment professionals; or unintentionally (spurious herding) mainly among investment professionals and institutional investors as a result of correlation of their trading activities from similar indicators considered in their analyses and trading¹. Further, this behavioral tendency would be a double-edged sword, in the sense that it could be considered as rational or irrational. It may be rational to a certain extent for those investors involved in monitoring the trading patterns of other investors for learning to adapt dynamic market conditions. However, most studies claim herding as an irrational behavior leading to dreadful effects to a stock market such as formation of market bubbles and subsequent crashes, increased market volatility, and information cascades² which decrease its efficiency hindering its development.

This study focuses on investigating the herd behavior in a frontier stock market, the Colombo Stock Exchange (CSE) of Sri Lanka³ due to the following reasons. First, unlike the developed and emerging stock exchanges, the herd behavior would be expected to be relatively stronger in frontier stock markets since they are highly concentrated, illiquid and having vague informational environment due to lower transparency. Thus, the awareness on the nature of such behavior in the frontier market setting is vital in formulating appropriate policies and procedures to mitigate its desperate effects. Second, a limited volume of empirical studies are currently available producing inconclusive evidence on the existence of such behavior on the CSE⁴. Accordingly, we examine the herd behavior among market participants on the CSE, contributing to the existing literature by providing further evidence on the existence of such behavior and its asymmetric properties with respect to the direction of market movement (also called “market performance”) and the market volatility.

The rest of the paper is organized as follows. Section two provides a review of literature on herd behavior, focusing mainly on the frontier stock exchanges. Section three describes data and methodology used to detect herding behavior. In section four, we report evidence on herd behavior, both unconditional and conditional on market performance and volatility. Section five concludes the paper.

2. Review of literature

Behavioral finance researches have revealed plenty of evidence on the existence of herd behavior across both developed and emerging equity markets⁵ in terms of different types (herding by institutional investors, herding on analyst recommendations and market-wide

¹ For details on intentional and unintentional herding, see Dang and Lin (2016); Galariotis, Rong, and Spyrou (2015); Gavrilidis, Kallinterakis, and Ferreira (2013); Guney, Kallinterakis, and Komba (2017); Holmes, Kallinterakis, and Ferreira (2013); Tan, Chiang, Mason, and Nelling (2008).

² Since herding causes investors to suppress their own beliefs and information, market prices are shaped by limited information (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992).

³ The CSE is recognized as a frontier market in the Morgan Stanley Capital International (MSCI) frontier market index.

⁴ Of the two studies on the CSE, Sewwandi (2016) does not find herding behavior while Xiaofang and Shantha (2017) reveal some herding patterns in both up and down market days.

⁵ See the literature reviews by Bikhchandani and Sharma (2000); Kumar and Goyal (2015); Spyrou (2013).

herding), different nature (intentional herding and spurious herding), and its determinants⁶. The previous studies have also recognized asymmetries of herding with respect to these determinants. In addition, the results reveal herd behavior as time-varying phenomenon⁷, and its occurrence in different episodes of a stock market such as bubbles and crashes, and during specific economic events such as financial crises.

Despite the fact that herding is expected to be stronger in frontier stock markets, compared developed and emerging equity markets, the evidence supporting this prediction is currently limited. To this respect, Balcilar, Demirer, and Hammoudeh (2013) find herding in stock markets of Middle East countries, namely Saudi Arabia, Dubai and Qatar, but not for Kuwait and Abu Dhabi. Similarly, the study conducted by Guney et al. (2017) reveal herd trading patterns in frontier markets of Botswana, Ghana, Kenya, Namibia, Nigeria, Tanzania and Zambia. In addition, Vo and Phan (2016) show herding patterns in Vietnam stock market. However, studies of Ahsan and Sarkar (2013) on Bangladesh stock market, and Sewwandi (2016) and Xiaofang and Shantha (2017) on Sri Lankan stock market, applying a methodology similar to those of other studies⁸, find no evidence of herding in the respective markets. When the determinants of herding in frontier markets are concerned, Vo and Phan (2016) find significant differences of herd behavior in relation to up-market days vs. down-market days, and pre-crisis vs. post-crisis periods. However, Guney et al. (2017) do not find strong evidence on the asymmetric herding between up and down market movements. The studies conducted by Ahsan and Sarkar (2013) and Sewwandi (2016) also reveal no evidence of herding in both of these market movements. Further, Balcilar et al. (2013) and Guney et al. (2017) find asymmetries with respect to high and low volatility days, suggesting the market volatility as a determinant of herd evolution in frontier markets. Taken together, due to the limitations in the current literature, in terms of its volume and consistency of results, it is inconclusive as to whether the inherent limitations in frontier markets induce the herd behavior, and market performance and volatility are determinants of such behavior.

3. Data and methodology

The sample period covers from 1st April, 2000 to 30th Sep 2016, a total of 3955 daily observations. All the common stocks listed on the CSE during the sample period are considered, extracting the required stock prices from the Data Library (CD ROM) published by the CSE. This study employs the cross-sectional absolute deviation (CSAD) model of Chang et al. (2000), which is, among other, the most widely applied empirical specification for detecting market-wide herding⁹. The model, as given in equation (1), is

⁶ For example, size (small stock vs. large stocks), industry, market performance (up-market days vs. down-market days), volatility, market sentiments, and trading volume.

⁷ See, for example, Bekiros, Jlassi, Lucey, Naoui, and Uddin (2017); Clements, Hurn, and Shi (2017); Klein (2013); Zhou and Anderson (2013).

⁸ All the studies discussed here have examined herding using the cross-sectional absolute deviation (CSAD) model of Chang, Cheng, and Khorana (2000) applying ordinary least square regression (OLS) procedure. The study of Xiaofang and Shantha (2017) does not find the herd behavior using the OLS procedure while revealing some herding patterns with the quantile regression procedure.

⁹ Christie and Huang (1995) was first to test market-wide herding, calculating cross-sectional standard deviation (CSSD) of security returns, and examining the latter in the extreme low and

based on the CAPM, assuming stock returns are linear and increasing function of portfolio of market returns. This assumption implies a significant positive relationship between *CSAD* of returns and absolute market return (a significant positive value for γ_1 and insignificant γ_2). However, in the presence of herding, the stock returns cluster around the market average, decreasing the *CSAD* of returns. In this case, the relationship between *CSAD* of returns and market return is expected to be negative and non-linear, which is captured through the coefficient of R_{mt}^2 term in equation (1). Accordingly, R_{mt}^2 would be significantly negative in the presence of market-wide herding behavior.

$$CSAD_t = \alpha + \gamma_1 |R_{mt}| + \gamma_2 R_{mt}^2 + \varepsilon_t \dots \dots \dots (1)$$

where, $CSAD_t$ is cross-sectional absolute deviation of stock return at day t , which is calculated as given in equation (2), R_{mt} is the equally-weighted average return of all stocks on day t , and $|R_{mt}|$ is the absolute value of R_{mt} . The stock returns (R_{it}) are calculated as first logarithmic difference of daily closing prices.

$$CSAD_t = (1/N) \sum_{i=1}^N |R_{it} - R_{mt}| \quad (2)$$

In addition to the test of herding for the aggregate market (also called “unconditional herding behavior”) as in equation (1), the empirical tests are carried out to detect herding asymmetries conditional on two market variables, namely market performance and market volatility. For examining the herd behavior conditional on market performance, the sample is separated into up and down market movements based on the direction of market return. The asymmetric herding with respect to market performance appears when herd behavior during up-market days (that is, days with $R_{mt} > 0$) is significantly different from that in down-market days (that is, days with $R_{mt} < 0$), which is examined using equation (3).

$$CSAD_t = \alpha + \gamma_1 D_t^{up} |R_{mt}| + \gamma_2 D_t^{up} R_{mt}^2 + \gamma_3 (1 - D_t^{up}) |R_{mt}| + \gamma_4 (1 - D_t^{up}) R_{mt}^2 + \varepsilon_t \quad (3)$$

In equation (3), D_t^{up} is the dummy variable representing the value of unity for up-market days and zero for down-market days. The wald test is employed to examine whether γ_2 is significantly different from γ_4 .

The equation (4) is used to test herding asymmetry conditional on market volatility, separating the sample into high-volatility days and low-volatility days. The volatility is measured using the squared value of R_{mt} , and categorized as high (low) when the volatility at a particular day is higher (lower) than its previous 30-day moving average¹⁰.

$$CSAD_t = \alpha + \gamma_1 D_t^{HIGH} |R_{mt}| + \gamma_2 D_t^{HIGH} R_{mt}^2 + \gamma_3 (1 - D_t^{HIGH}) |R_{mt}| + \gamma_4 (1 - D_t^{HIGH}) R_{mt}^2 + \varepsilon_t \quad (4)$$

In equation (4), D_t^{HIGH} is the dummy variable representing the value of unity for high-volatility days and zero for low-volatility days. The wald test is used to examine whether

upper tails of the return distribution. This method suffers drawbacks such as biased CSSD in the presence of outliers (Economou, Kostakis, & Philippas, 2011), and ignoring the possibility of non-linear return dynamics associated with herding (Focardi, Cincotti, & Marchesi, 2002; Lux, 1995). Since *CSAD* model overcomes these drawbacks, it has been widely used in herding studies.

¹⁰ This procedure is consistent with the studies of Economou et al. (2011); Guney et al. (2017); Tan et al. (2008).

herd behavior during high volatility days (that is, significantly negative γ_2) is significantly different from that in low volatility days (that is, significantly negative γ_4).

As a robustness check, the total sample period is split into two eight-year sub-periods, four four-year sub-periods, and pre-war and post-war periods¹¹. All the tests, as performed using equations (1), (3) and (4) above, are repeated for those sub-sample periods to test the robustness of our results.

4. Results and discussion

Table 1 shows some descriptive statistics on $CSAD_t$ and R_{mt} for the total sample period and sub-periods considered for examining herd behavior. Overall, all mean values of R_{mt} are positive, indicating positive market performance during the sample period from 2000-2016. The magnitude of the volatility of the market, as reflected by the standard deviation of R_{mt} is considerably lower during the second half of the sample period than that of the first half. Similarly, the volatility of $CSAD_t$ is lower in the second half of the sample period than that of the first half.

Table 1
Descriptive statistics

	$CSAD_t$		R_{mt}	
	Mean	Standard deviation	Mean	Standard deviation
Total Sample	1.068	0.405	0.059	0.740
8-year sub-periods;				
2000-2008	1.176	0.487	0.078	0.872
2008-2016	0.968	0.272	0.041	0.590
4-year sub-periods;				
2000-2004	1.128	0.449	0.082	0.920
2004-2008	1.223	0.517	0.074	0.821
2008-2012	1.024	0.288	0.063	0.724
2012-2016	0.918	0.248	0.022	0.439
Pre and post-civil war periods;				
Pre-war period	1.158	0.473	0.069	0.871
Post-war period	0.959	0.261	0.048	0.539

All sub-periods in panel B and C start from 1st April and end 31st March of the given year, except the last sub-period which ends 30th September 2016. The cut-off date for dividing the sample into pre and post war sub-period is 19th May, 2009.

The empirical results relating to unconditional herding behavior (estimating equation 1), herding behavior conditional on market performance (estimating equation 3) and market volatility (estimating equation 4) are presented in Table 2, 3 and 4 respectively. The results for the total sample period are presented in Panel A of these tables. As a robustness

¹¹ For dividing the sample into pre and post war periods, 19th May 2009, the date on which the end of the civil war was officially declared in parliament, is used as the cut-off point.

check, panel B and C of the tables exhibit the results for the two eight-year sub-periods and four four-year sub-periods respectively. Panel D represents estimates of unconditional and conditional herd behavior for pre and post war periods to further check the robustness of the results. The coefficients of the absolute market return, γ_1 in equation (1) and γ_1 and γ_3 in equation (3) and (4), are significantly positive in the total sample period and sub-sample periods, supporting the hypothesis on the positive relationship between CSAD of returns and absolute market returns.

Table 2
Unconditional herding estimations

	α	γ_1	γ_2	Adjusted R^2
Panel A: Total Sample	0.800 (64.470)***	0.599 (16.881)***	-0.038 (-4.157)***	0.454
Panel B: 8-year sub-periods;				
2000 – 2008	0.825 (43.558)***	0.681 (13.731)***	-0.049 (-3.986)***	0.484
2008 – 2016	0.806 (66.304)***	0.421 (13.431)***	-0.018 (-1.232)	0.370
Panel C: 4-year sub-periods;				
2000 – 2004	0.795 (36.453)***	0.623 (15.103)***	-0.035 (-5.266)***	0.587
2004 – 2008	0.819 (32.315)***	0.856 (10.891)***	-0.108 (-7.067)***	0.437
2008 – 2012	0.869 (48.036)***	0.304 (7.985)***	0.010 (0.652)	0.369
2012 – 2016	0.753 (50.798)***	0.544 (10.172)***	-0.043 (-1.243)	0.356
Panel D: Pre and post-war periods;				
Pre-war period	0.825 (47.187)***	0.645 (14.078)***	-0.045 (-3.838)***	0.477
Post-war period	0.808 (60.418)***	0.411 (10.679)***	-0.014 (-0.582)	0.322

*This table presents estimates from equation (1). All sub-periods in panel B and C start from 1st April and end 31st March of the given year, except the last sub-period which ends 30th September 2016. The cut-off date for dividing the sample into pre and post war sub-period is 19th May, 2009. The numbers in parentheses are t-statistics based on the Newey and West (1987) test for heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.*

4.1. Unconditional herding estimations

The coefficient γ_2 of equation 1 (hereafter called as “herding coefficient”) estimates unconditional herding behavior. As shown in Table 2, the herding coefficient is significantly negative for the total sample period, indicating presence of herding behavior at the aggregate market level. This supports the prediction that inherent limitations in

frontier markets such as low transparency of informational environment, low number of stocks actively traded and illiquidity motivate investors to herd disregarding their own beliefs and information when trading financial assets. However, this result is not consistent with that of Sewwandi (2016), which reveals no evidence of herding in the CSE¹². When the results of the sub-period analysis given in panel B and C of Table 2 is considered, the herding coefficients are significantly negative only in the first half of the sample period. Panel D also shows a significantly negative herding coefficient in the pre-war period whereas an insignificant one in the post-war period. The insignificant herding coefficients in the second half of the sample period are consistent with the findings of Xiaofang and Shantha (2017), which reveal investors' lesser tendency to herd and rely more on fundamentals in stock trading.

4.2. Herding estimations conditional on market performance

Table 3 presents the empirical results of herding conditional on market performance. The herding coefficients, γ_2 and γ_4 indicate herd behavior for up-market days and down-market days respectively. Panel A shows significantly negative herding coefficients during both up and down market days for the total sample period. These evidence reflect, contrary to Sewwandi (2016), the presence of herd behavior in those market states. Though the absolute value of the herding coefficient of down-market days is greater than that of up-market days, the difference is not statistically significant (as reflected by an insignificant F statistic). Thus, the results relating to total sample do not support the asymmetry of herding conditional on market performance.

The findings seem to be mixed when the sub-period analyses given in panel B, C and D are taken into consideration. They show herd behavior in both up and down market days during the first half of the sample period only. However, the asymmetries of herding between up and down market days (as reflected by a significant F statistics) reveal only for the first eight-year sub-period (2000-2008 in panel B) and the first four-year sub-period (2000-2004 in panel C). In these two sub-periods, the herd behavior appears to be stronger in down-market days, compared to up-market days. With respect to the 2004-2008 sub-period, though the absolute value of the herding coefficient of up-market days is greater than that of the down-market days, the difference is not statistically significant. The same is further evident from the results relating to the pre-war period in which herding is presence in both up and down market days without a significant difference of herding between these market states. Accordingly, when first half of the sample period (2000-2008) is concerned, there is no concrete evidence to support asymmetric herding pattern conditional on the market performance. Therefore, it is evident that investors tend to herd irrespective of the direction of market movement during 2000-2008 and market performance does not appear as a determinant of herding on the CSE. As Guney et al. (2017) suggests, due to low number of stocks actively traded in frontier markets and

¹² The two previous studies on the CSE, Sewwandi (2016) and Xiaofang and Shantha (2017) cover the sample periods 2001-2015 and 2007-2016 respectively. Considering these different sample periods in these previous studies, the former is comparable with the results of the total sample period, while the latter is comparable with results relating to the 2008-2016 sub period in panel B, 2008-2012 and 2012-2016 sub periods in panel C, and post-war period given in panel D.

associated lower transparency in informational environment, investors may decide to herd based on the trading pattern of individual stocks rather than the market performance as a whole.

Table 3
Herding estimations conditional on market performance

	α	Up-market days		Down-market days		Adjusted R^2	F statistic
		γ_1	γ_2	γ_3	γ_4		c
Panel A: Total Sample							
	0.799	0.642	-0.037	0.554	-0.041	0.462	0.220
	(66.993)***	(20.819)***	(-5.527)***	(13.494)***	(-4.934)***		
Panel B: 8-year sub-periods;							
2000-2008	0.817	0.720	-0.045	0.676	-0.066	0.494	3.630*
	(46.420)***	(17.761)***	(-6.289)***	(11.971)***	(-5.839)***		
2008-2016	0.809	0.492	-0.037	0.313	0.011	0.386	5.685**
	(65.935)***	(16.155)***	(-3.050)***	(7.241)***	(0.450)		
Panel C: 4-year sub-periods;							
2000-2004	0.790	0.658	-0.034	0.614	-0.048	0.594	3.101*
	(35.796)***	(16.093)***	(-8.045)***	(11.643)***	(-5.399)***		
2004-2008	0.818	0.896	-0.110	0.791	-0.097	0.440	0.610
	(33.004)***	(12.818)***	(-7.117)***	(8.307)***	(-5.114)***		
2008-2012	0.873	0.391	-0.015	0.162	0.054	0.395	12.957
	(48.564)***	(10.356)***	(-1.205)	(3.279)***	(2.507)**		
2012-2016	0.753	0.595	-0.054	0.502	-0.054	0.361	0.000
	(51.249)***	(10.785)***	(-1.540)	(7.778)***	(-1.028)		
Panel D: Pre and post-war periods;							
Pre-war period	0.819	0.686	-0.042	0.630	-0.059	0.486	2.336
	(50.398)***	(18.041)***	(-5.528)***	(12.356)***	(-5.596)***		
Post-war period	0.811	0.495	-0.042	0.283	0.028	0.341	12.650***
	(60.804)***	(12.397)***	(-1.762)*	(6.534)***	(1.056)		

*This table presents estimates from equation (3). All sub-periods in panel B and C start from 1st April and end 31st March of the given year, except the last sub-period which ends 30th September 2016. The cut-off date for dividing the sample into pre and post war sub-period is 19th May, 2009. The numbers in parentheses are t -statistics based on the Newey and West (1987) test for heteroskedasticity and autocorrelation consistent standard errors. The F statistic tests the null hypothesis that $\gamma_2 = \gamma_4$. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.*

Further, consistent with Xiaofang and Shantha (2017), the herding appears to be mostly absence during the second half of the sample period. Though the herding coefficients are significantly negative in up-market days of 2008-2016 sub-period in panel B and post-war period in panel D, the same do not hold true for the 2008-2012 and 2012-2016 sub-periods given in panel C. Moreover, there is no evidence of herding in down-market days throughout all sub-periods relating to the second half of the sample period.

4.3. Herding estimations conditional on market volatility

Table 4 provides the results on the herd behavior conditional on market volatility, estimating equation 4 in which the herding coefficients, γ_2 and γ_4 denote it for high volatility days and low volatility days respectively.

Table 4
Herding estimations conditional on market volatility

	α	High volatility days		Low volatility days		Adjusted R^2	F statistic
		γ_1	γ_2	γ_3	γ_4		
Panel A: Total Sample							
	0.785 (57.831)***	0.589 (15.393)***	-0.036 (-3.896)***	0.703 (12.051)***	-0.087 (-1.963)**	0.450	1.620
Panel B: 8-year sub-periods;							
2000-2008	0.842 (39.313)***	0.676 (12.166)***	-0.049 (-3.654)***	0.607 (7.625)***	-0.039 (-0.714)	0.477	0.044
2008-2016	0.777 (54.906)***	0.408 (13.135)***	-0.010 (-0.731)	0.627 (7.855)***	-0.077 (-0.868)	0.385	0.591
Panel C: 4-year sub-periods;							
2000-2004	0.806 (31.044)***	0.593 (14.265)***	-0.032 (-4.713)***	0.580 (6.815)***	-0.013 (-0.226)	0.579	0.130
2004-2008	0.841 (32.122)***	0.887 (10.350)***	-0.117 (-6.705)***	0.769 (6.553)***	-0.158 (-1.773)*	0.443	0.217
2008-2012	0.845 (41.100)***	0.282 (7.428)***	0.019 (1.370)	0.423 (4.064)***	0.040 (0.391)	0.383	0.043
2012-2016	0.736 (40.377)***	0.489 (8.727)***	0.004 (0.098)	0.654 (4.592)***	0.115 (0.428)	0.370	0.186
Panel D: Pre and post-war periods;							
Pre-war period	0.829 (42.392)***	0.640 (12.581)***	-0.045 (-3.541)***	0.641 (8.706)***	-0.063 (-1.226)	0.470	0.157
Post-war period	0.784 (48.005)***	0.401 (10.394)***	-0.006 (-0.267)	0.560 (5.416)***	-0.002 (-0.013)	0.332	0.001

*This table presents estimates from equation (4). All sub-periods in panel B and C start from 1st April and end 31st March of the given year, except the last sub-period which ends 30th September 2016. The cut-off date for dividing the sample into pre and post war sub-period is 19th May, 2009. The numbers in parentheses are t-statistics based on the Newey and West (1987) test for heteroskedasticity and autocorrelation consistent standard errors. The F statistic tests the null hypothesis that $\gamma_2 = \gamma_4$. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.*

Panel A exhibits significantly negative herding coefficients during both high and low volatility market days, indicating the existence of herding during both of these market states for the total sample period. Despite higher herding coefficient, in absolute terms, in low volatility days, compared to that relating to high volatility days, a stronger herding is

not evident for the former since F statistic specifies an insignificant difference between these two coefficients. However, sub-period analyses reveal consistently investors' tendency to herd during high volatility days of the first half of the sample period only. It seems to be absence with respect to low volatility day for all sub-periods given in panel B, C and D with the exception of 2004-2008 sub-period in panel C, of which herding coefficient is significantly negative at 10% level. These results are not consistent with similar previous studies conducted by Balcilar et al. (2013) and Guney et al. (2017) in the context of frontier markets, which find herding in both high and low volatility days, and asymmetry between them. Similar to the results discussed in section 4.1. and 4.2., the evidence does not suggest presence of herd behavior in the second half of the sample period.

5. Conclusion

Although herd behavior is expected to be more pronounced in frontier stock markets, compared to developed and emerging markets, the current empirical evidence relating to the nature of such behavior in frontier markets is relatively limited. Thus, as evident mainly in emerging stock markets, this study examines whether market performance and volatility determine investors' tendency to herd in the frontier stock market of Sri Lanka, the CSE. According to the findings of the study, the herding appears in up and down markets days as well as in high volatility days relating to the first half of the sample period (2000-2008) only. Since the results do not provide strong evidence on significant difference of the behavior between up and down market days, we do not suggest market performance as a determinant of herd evolution. Thus, investors tend to herd irrespective of the direction of market movement during the first half of the sample period, supporting the prediction that inherent limitations in frontier stock markets encourage investors to herd based on the trading pattern of individual stocks rather than the market performance. With respect to the market volatility, herd behavior is evident during high volatility days only, which confirms the fact that market uncertainties induce investors to herd disregarding their private information and beliefs.

Interestingly, the herding does not manifest consistently over the second half of the sample period. This may result from the mistake-learning process of market participants, as predicted by the adaptive market hypothesis. It predicts that trading experiences prompt investors to gradually learn their irrational trading behaviors so that their behavioral beliefs, attitudes, and assumptions are expected to shift to adapt more rational behavior in stock trading decisions. The disappeared herding may also be due to the weaknesses of the ordinary least squares approach¹³, which may cause biases in the estimations of herd behavior. Accordingly, the future research should be focused on studying what drives for the absence of herding on the CSE during the period 2008-2016.

¹³ See Wilcox (2010) for details about weaknesses in ordinary least squares regression and approaches minimizing such weaknesses.

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