Herding in Dhaka Stock Exchange

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This paper examines herding in Dhaka Stock Exchange (DSE) in Bangladesh. Daily and monthly returns for all the stocks listed on DSE for the period of January, 2005 to December, 2011, including the market crash in December, 2010, have been used in this study. Using Cross-Sectional Standard Deviation (CSSD) and Cross-Sectional Absolute Deviation (CSAD) technique, this study did not detect existence of herding in Dhaka Stock Exchange for the above mentioned time period. Absence of herding in Bangladesh depicts that investors in DSE are rational and make investment decisions based on information available in the marketplace rather than following the market consensus.

INTRODUCTION

Everyday tons of information gets dumped in the stock market. However, which information investors should use when they make an investment decisions? A common approach is to study what other investors do, and follow the herd. "Herding" takes place when investors imitate the market consensus rather than using their own judgments. Nofsinger and Sias (1999) suggests that herding can be observed when "a group of investors trading in the same direction over a period of time." Banerjee (1992) believes herding exists when "everyone doing what everyone else is doing, even when their information suggests doing something different."

Herding is more likely to form under conditions of market stress. Christie and Huang (1995) believes that in normal conditions, investors act as explained by modern finance theories, i.e., they are rational and make decisions based on available information. However, extreme conditions tend to generate extreme emotions, and investors seem to find reassurance in following the masses. Herding or "following the trend" has frequently been observed in the housing market, in the stock market crash of 1987 (Shiller, 1990) and also in the foreign exchange market (Frankel & Froot, 1986).

Kumar and Prasad (2002) argue that persistent herding in the stock markets may produce excessive inflows or outflows of capital without any accurate estimation of the reliability of coming information. Such behavior is completely contagion. Herding can also lead to mispricing of stocks since decision making is disturbed through the exercise of biased analysis of expected return and systematic risk (Hwang & Salmon, 2004). Furthermore, presence of herding makes diversification difficult for investors. According to Chang, Cheng and Khorana (2000), when investing in a financial market where herding is present, a larger number of securities are needed to achieve the same level of diversification than in an otherwise normal market.

Section 2 of this study lists previous studies related to herding, section 3 describes data collection, section 4 defines models employed in this study, section 5 discusses results of the research and lastly, section 6 provides concluding remark on the study.

LITERATURE REVIEW

Banerjee (1992) develops an analytical model to conclude that costly acquisition and asymmetry of information motivates investors to neglect the fundamental value of the asset and follow the market consensus which in turn leads to market inefficiency.

Christie and Huang (1995) used their own method, Cross-Sectional Standard Deviation (CSSD), and daily returns for stocks listed on the NYSE and Amex during July 1962 to December 1988. Their results show that "herding" takes place under conditions of market stress, when individual investors are likely to suppress their own beliefs and follow the market consensus.

Chang, Cheng and Khorana (2000) also used their own technique, Cross-Sectional Absolute Deviation (CSAD) and studied markets in the U.S., Hong Kong, South Korea, Taiwan and Japan. They found no evidence of herding in the U.S. and Hong Kong, limited evidence of herding in Japan and significant evidence of herding in South Korea and Taiwan.

Hwang and Salmon (2001) found evidence of herding in the U.S., UK, and South Korean stock markets. Contrary to a common belief, they detected herding during normal market conditions rather than market stress.

Kim and Wei (2002) analyzed herding among domestic and foreign investors in the Korea Stock Exchange. The results suggest that foreign investors tend to exhibit herding more comparing to domestic investors. Chen, Rui and Xu (2003) studied A-share and B-share markets to identify whether there is a difference in behavior of foreign and domestic investors. The results also confirm that foreign investors are more likely engaged in herding. These results point to the fact that lack of available reliable information and vague investment environment creates encouragement for investors to be engaged in herding in emerging markets.

Caparrelli, D'Arcangelis and Cassuto (2004) did not found evidence of herding in the Italian stock market for the period September 1988, to January 2001. Gleason, Mathur and Peterson (2004) applied Christie and Huang (1995), Chang et al. (2000) methodology and used intraday data of SPDR and nine sector ETFs traded on the AMEX from April 1, 1999 to September 30, 2002, to study whether traders herd during periods of extreme market movements. Their results illustrate that investors do not herd during periods of extreme market movements.

Demirer and Kutan (2006) used daily firm-level returns as well as sector returns from 1999 to 2002, and found no indication of herding in Chinese stock market. Their findings show that the Asian crisis era did not have significant effect on Cross Sectional Standard Deviations (CCSD). With the Christie and Huang (1995) and the Chang et al. (2000) models on a sample of 160 most actively traded stocks on the Australian Stock Exchange for the period 2001 – 2002, Henker, Henker and Mitsios (2006) found no evidence of herding in Australian Market. Farber, Nam and Hoang (2006) used the Christie and Huang (1995) methodology and confirmed herding in extreme market conditions in Ho Chi Minh City Securities Trading Center (HSTC), Vietnam as expressed by Christie and Huang (1995).

Using dual-listed Chinese A-share and B-share firms from 1996 to 2003, Tan, Chiang, Mason and Nelling (2008) analyzed herding in China. Their findings show existence of herding in both categories of shares (i.e., A & B) in the Shanghai and Shenzhen stock exchange. Their results also shows that evidence of herding over weekly and monthly time intervals is much weaker, revealing the short-term character of the phenomenon. According to their results, herding in A-share in Shanghai market is more intense during periods of rising stock markets, high trading volume, and high volatility. However, no asymmetry in the B-share firms has been observed.

Caporale, Economou and Philippas (2008) examined herding in extreme market conditions using data from the Athens Stock Exchange, and found significant herding behavior for the period 1998-2007.

Kallinterakis and Lodetti (2009) detected no herding in the New Securities Stock Exchange of Montenegro.

Chiang and Zheng (2010) used daily data from May 25, 1988, through April 24, 2009, for industrial stock returns, and studied herding activity for 18 countries: the United States, Australia, France, Germany, Hong Kong, Japan, the United Kingdom, Argentina, Brazil, Chile, Mexico, China, South Korea, Taiwan, Indonesia, Malaysia, Singapore, and Thailand. They found significant indication supporting existence of herding all national markets except the US and Latin America which stands in contrast to the earlier literature that herding in advanced markets (Chang et al. 2000) and in Chinese markets (Demirer & Kutan, 2006) do not exist.

Lao and Singh (2011) using the CSAD approach proposed by Tan et al. (2008) and daily data of top 300 stocks from the Shanghai A-Share index, and 300 stocks from the Bombay Stock Exchange index from 1999 to 2009, detected herding behavior in both the Chinese and Indian stock markets. Similar to Christie and Huang (1995), they found that herding is greater during extreme market conditions in both markets but the pattern is different. In the Chinese market, herding is greater when market is falling, i.e., bear period, and the trading volume is high; on the other hand, in India, herding occurs during upswings in market trends, i.e. bull stage.

Lakshman, Basu, Vaidyanathan, (2011) witnessed that the presence of herding in Indian stock markets is not very severe which depicts that Indian investors are better informed and behave rationally. Contrary to Christie and Huang (1995), they suggested that periods of market crisis can lead markets to equilibrium, and that herding can be more apparent before market stress, rather than during it. Gabsia (2011) found evidence of significant herding behavior in Tunis Stock Exchange, Tunisia, only during downward market cycle.

Prosad, Kapoor and Sengupta (2012) used daily data of Nifty 50 starting from April, 2006 to March, 2011, and also failed to detect herding in the Indian stock market which is in contrast to the findings of Chang et al. (2000) where herding was present in emerging economies like South Korea and Taiwan. However, individual tests for bull and bear phases of markets show that herding is observed in greater magnitude in bull period. These results are in alignment with findings of Lao and Singh (2011).

DATA AND METHODOLOGY

In order to examine herding in Dhaka Stock Exchange in Bangladesh, daily and monthly stock returns for all firms listed on the DSE for 7 years (January 1, 2005 – December 31, 2011) have been used which also includes data of stock market crash in December 2010. After a long bullish trend, on December 6, 2010, DSE started to decline and thus is taken as the beginning of market crash. DSE All Share Price Index (DSI) return has been used as the proxy for the market. DSI Index includes all stocks listed on DSE. All the data have been collected from the Dhaka Stock Exchange library.

HERDING MEASUREMENT

When herding exists, the returns of individual stocks converge towards the market return. In this paper, two measures of dispersion, Cross-Sectional Standard Deviation (CSSD) and Cross-Sectional Absolute Deviation (CSAD), have been used to identify herding behavior in Dhaka Stock Exchange (DSE). The Cross-Sectional Standard Deviation (CSSD) method, recommended by Christie and Huang (1995), is given below:

$$CSSD_t = \sqrt{\frac{\sum_{i=1}^{N}(R_{i,t}-R_{m,t})^2}{N-1}} \quad (1)$$

In equation (1), $R_{i,t}$ is the observed stock return of firm i at time t; $R_{m,t}$ is the return of market index during the same time period t; and N is the number of firms listed in the Dhaka Stock Exchange (DSE)

during time period t. The observed CSSD of returns were then regressed against a constant and two dummies in order to identify the extreme market conditions. Details of regression equation are as follows:

$$CSSD_t = \alpha + \beta^U D_t^U + \beta^L D_t^L + \varepsilon_t \quad (2)$$

Where,

D_t^L=1, if the market return on day t lies in the extreme lower tail of the distribution or equal to zero otherwise; and

D_t^U=1, if the market return on day t lies in the extreme upper tail of the distribution or equal to zero otherwise.

This study adopts 5% to define extreme market upward and downward. The α co-efficient denotes the average dispersion of the sample excluding the regions corresponding to the two dummy variables. If herd exists, $CSSD_t$ will be smaller during periods of market stress. Statistically significant negative values for β_1 and β_2 would indicate the presence of herding.

However, the Cross-Sectional Standard Deviation of returns can be noticeably influenced by the presence of outliers. That is why Chang, Cheng and Khorana (2000) suggested using Cross-Sectional Absolute Deviation (CSAD) as a better measure of dispersion:

$$CSAD_t = \frac{1}{N_t}\sum_{i=1}^{N_t}\left|R_{i,t} - R_{m,t}\right| \quad (3)$$

Here, $R_{i,t}$ is the observed stock return of firm i at time t; $R_{m,t}$ is the return of market index during the same time period t; and N is the number of firms listed on the Exchange during time period t. The equation for the CSAD analogous to Equation (2) is the following:

$$CSAD_t = \alpha + \beta^U D_t^U + \beta^L D_t^L + \varepsilon_t \quad (4)$$

However, under CAPM assumptions, rational asset pricing models predict that the stock return dispersions are not only an increasing function of the market return but also that the relation is linear. In the presence of herding, the relation can become nonlinearly increasing or even decreasing. Thus, alternative to Christie and Huang (1995) method, using the entire distribution of market returns, Chang, et al. (2000) suggested the following first nonlinear model for testing herding:

$$CSAD_t = \alpha + \gamma_1\left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \varepsilon_t \quad (5)$$

Even though this nonlinear technique is similar in spirit with Christie and Huang's (1995), they may provide contradictory results with regard to the existence of herding. That is because the Christie and Huang (1995) model is a more stringent test, which requires "a far greater magnitude of nonlinearity" in order to get confirmation of herding (Tan et al., 2008).

A statistically significant negative coefficient γ_2 implies the existence of herding. Presence of herding is expected to raise the correlation among individual asset returns, and the dispersion among asset returns will either increase at a decreasing rate or diminish in the case of serious herding. If investors herd during periods of large price movements, then there should be a less than proportional increase (or decrease) in the CSAD measure. In absence of herding, the relationship is linear and increasing, that is, the dispersion increases proportionately with the increasing returns of the market.

Also, the link between CSAD and market returns may be asymmetric in bull and bear market phases. The generalized relationship mentioned above can be separated into following two equations. A positive or zero market return is labeled as bull phase and, on contrary, a negative market return is marked as bear phase.

$$CSAD_t^{UP} = \propto + \gamma_1^{UP} \left| R_{m,t}^{UP} \right| + \gamma_2^{UP} (R_{m,t}^{UP})^2 + \varepsilon_t \quad \text{if } R_{m,t} \geq 0 \tag{6}$$

$$CSAD_t^{DOWN} = \propto + \gamma_1^{Down} \left| R_{m,t}^{Down} \right| + \gamma_2^{Down} (R_{m,t}^{Down})^2 + \varepsilon_t \quad \text{if } R_{m,t} < 0 \tag{7}$$

Here, $\left| R_{m,t}^{UP} \right|$ and $\left| R_{m,t}^{Down} \right|$ are the absolute values of the average overall sample return when market is up (or down). Like earlier case, here also negative and significant γ_2^{UP} and γ_2^{Down} captures herding in DSE.

However, measures proposed by Christie & Huang (1995) and Chang, Cheng, & Khorana (2000) have some major shortcomings. First, Hwang (2000) documents that there is a positive relationship between cross-sectional volatility of market return and time series volatility. So, reduction in cross-sectional standard deviation of returns does not necessarily imply existence of herding but it may be explained by decrease in uncertainty of market return. Second, these approaches do not account for the effect of changes in fundamental variables, so do not distinguish spurious herding from intentional one (Bikchandani & Sharma, 2001). In addition, there is no hard and fast rules in which values of the market return must be considered as extreme. Also, herding is not necessary observable only in periods of market stress; it might be also recognizable in sufficiently calm periods when herding drives reallocation of funds in the market toward particular industry, which does not reflect in significant change in market index. So, detecting herding only in periods of extreme market movement leads us to ignore some important points about herding behavior.

RESULTS

Empirical results reveal that herding was not present in Dhaka Stock Exchange (DSE) during January, 2005 - December, 2011. Table 1 represents descriptive statistics of DSE All Share Price Index Return, CSSD, and CSAD, both on a daily and monthly basis. Table 2 presents regression results using Christie and Huang (1995) and Chang et al. (2000) method described in equation (2) and equation (4) respectively. Even though, on a daily basis, all the coefficients are negative, they are not statistically significant which is interpreted as absence of herding in DSE during 2005-2011. Even monthly data reveals that herding did not exist in DSE during the described period.

Table 3(A) reports the regression results using the Chang et al. (2000) measure described in equation (5) for DSE. For daily data, the coefficient γ_1 and γ_2 is positive and is not statistically significant. However, for monthly data, the coefficient γ_1 is negative and γ_2 is positive and is not statistically significant. Table 3(B) also states regression results using Chang et al. (2000) technique explained in equation (5), but only for the period of market crash in 2010. Even though coefficient for γ_2 is negative, it is not significant which again points to the fact that herding wasn't present in DSE even during market crash of 2010 which contrasts Christie and Huang's (1995) idea that herding takes place during extreme market movements.

Using Chang et al. (2000) measure described in equation (6) and (7), herding was also tested for bullish and bearish market trend in DSE for the period 2005-2011. In table 4(A) and 4(B), regression results for up market and down market, correspondingly, are provided. For both daily and monthly data, herding was not detected for neither bullish nor the bearish period. Nonexistence of herding in the DSE in the bull and bear phase is in disagreement with Lao and Singh (2011).

Findings from this study are in contradiction with Chang et al. (2000) observation that herding is present in emerging economies like South Korea and Taiwan. Absence of herding in DSE depicts that investors in Bangladesh are rational and make decisions based on information available in the marketplace. The results of the study are in alignment with the findings of Lakshman, Basu & Vaidyanathan (2011).

CONCLUSIONS

Lack of available accurate information and opaque investment environment creates incentive for investors to be engaged in herding behavior in emerging markets (Chen, Rui, & Xu (2003)). Better and clearer information would probably increase the chance of investors disregarding the herd (Andersson, 2009).

Herding was not present in Dhaka Stock Exchange (DSE), Bangladesh, during January, 2005 - December, 2011. The result is opposite of what we hear in popular media in Bangladesh. From the findings it can be inferred that, in the past following market consensus might not have led to encouraging results for the investors. This could have reinforced their belief that following the crowd is a wrong idea due to which they discontinued to herd.

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TABLE 1
DESCRIPTIVE STATISTICS

	Particulars	**Mean**	**Standard Deviation**	**Maximum**	**Minimum**
Daily	DSE All Share Price Index Return	0.000733	0.016928	0.226079	-0.08908
	CSSD	0.054509	0.195214	6.500421	0.012494
	CSAD	0.028911	0.111269	4.519642	0.00741
Monthly	DSE All Share Price Index Return	0.014483	0.094927	0.289796	-0.30343
	CSSD	0.619174	0.982069	8.320518	0.078452
	CSAD	0.17768	0.124749	0.981285	0.054347

TABLE 2
RESULTS OF REGRESSION OF DAILY & MONTHLY CSSD AND CSAD USING DUMMY VARIABLES

	$CSSD_t = \alpha + \beta^U D_t^U + \beta^L D_t^L + \varepsilon_t$			$CSAD_t = \alpha + \beta^U D_t^U + \beta^L D_t^L + \varepsilon_t$		
	Coefficients		***p*-value**	**Coefficients**		***p*-value**
Daily	Constant	0.054668	(<0.00001) ***	Constant	0.02881	(<0.00001) ***
	D_t^U	-0.000909	(0.97366)	D_t^U	0.004944	(0.75276)
	D_t^L	-0.003579	.888838	D_t^L	-0.001438	(0.92116)
Monthly	Constant	0.610305	(<0.00001) ***	Constant	0.167824	(<0.00001) ***
	D_t^U	-0.0193253	(0.96360)	D_t^U	0.074498	(0.16013)
	D_t^L	0.170412	(0.71161)	D_t^L	0.074224	(0.19807)

TABLE 3 (A)
TOTAL MARKET REGRESSION RESULTS USING CHANG, CHENG & KHORANA (2000) TECHNIQUE

Model: $CSAD_t = \alpha + \gamma_1 \lvert R_{m,t} \rvert + \gamma_2 R_{m,t}^2 + \varepsilon_t$			
	Coefficients		***p*-value**
Daily	Constant	0.0267451	(<0.00001) ***
	$\lvert R_{m,t} \rvert$	0.156847	0.63559
	$R_{m,t}^2$	1.58703	0.57328
Monthly	Constant	0.176195	(<0.00001) ***
	$\lvert R_{m,t} \rvert$	-0.257554	0.67210
	$R_{m,t}^2$	2.07597	0.38689

TABLE 3 (B)
TOTAL MARKET REGRESSION RESULTS DURING THE MARKET CRASH IN 2010

Model: $CSAD_t = \alpha + \gamma_1 \lvert R_{m,t} \rvert + \gamma_2 R_{m,t}^2 + \varepsilon_t$			
	Coefficients		***p*-value**
Daily	Constant	0.020738	(<0.00001) ***
	$\lvert R_{m,t} \rvert$	0.233429	0.20146
	$R_{m,t}^2$	-2.67698	0.53523
Monthly	Constant	0.125302	(<0.00001) ***
	$\lvert R_{m,t} \rvert$	0.27529	0.26428
	$R_{m,t}^2$	0.92016	(0.00116) ***

TABLE 4 (A)
UP MARKET REGRESSION RESULTS

Model: $CSAD_t^{UP} = \alpha + \gamma_1^{UP}\left\|R_{m,t}^{UP}\right\| + \gamma_2^{UP}(R_{m,t}^{UP})^2 + \varepsilon_t D_t^L + \varepsilon_t$			
	Coefficients		***p*-value**
Daily	Constant	0.025642	(<0.00001) ***
	γ_1^{UP}	0.029786	0.62242
	γ_2^{UP}	2.63762	(<0.00001) ***
Monthly	Constant	0.153769	(<0.00001) ***
	γ_1^{UP}	-0.054515	0.90185
	γ_2^{UP}	2.08037	0.25078

TABLE 4 (B)
DOWN MARKET REGRESSION RESULTS

Model: $CSAD_t^{DOWN} = \alpha + \gamma_1^{Down}\left\|R_{m,t}^{Down}\right\| + \gamma_2^{Down}(R_{m,t}^{Down})^2 + \varepsilon_t$			
	Coefficients		***p*-value**
Daily	Constant	0.0262446	(0.02547) **
	γ_1^{Down}	1.00149	0.43367
	γ_2^{Down}	-14.0628	0.50306
Monthly	Constant	0.213916	(0.00136) ***
	γ_1^{Down}	-0.669244	0.63185
	γ_2^{Down}	2.56447	0.62644

*** indicates significant at 1 percent level ** indicates significant at 5 percent level
* indicates significant at 10 percent level