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HERDING BEHAVIOUR IN EMERGING MARKET: EVIDENCE FROM PAKISTAN STOCK EXCHANGE

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ABSTRACT

To measure the extent of fundamental and non-fundamental herding behaviour in Pakistan stock exchange for the period 2012-2017, this study takes into account the relationship between stock returns, crude oil prices and multifactor assets pricing models such as size (SMB), value (HML) and momentum (MOM) using cross-sectional absolute dispersion (CSAD) of return for 67 non-financial firms. The study finds that there is evidence of non-fundamental herding and herding during political turbulence, but investors do not herd during a downward moment of oil prices.

Disciplinary: Management Sciences (Financial Management).

1. INTRODUCTION

In financial markets, herding behaviour is explained as peer influence on people to adopt certain actions. These actions are theirs believes, how they perceive forecast and principles on which they base their actions. When a group of people mimics each other, they form a group that leads towards a correlation in the pricing of the asset. Herding prevails when many investors have different information and make certain decisions based on that information. Furthermore, the literature supports the notion that herding is more pronounced during the days when major news is released, which is macroeconomic or political. People tend to copy other investors who are well informed or known for their good reputation in the market, in the hope of gaining more benefit from the arising situation (Galariotis et al., 2015; 2016).

Unintentional herding is common among professional traders who have the same educational and work experience, tools, techniques and indicators used for their analysis, characteristic in their trading and same political and regulatory framework (Guney et al., 2017). In a study by Guney et al. (2017) researched sample made from US mutual funds, he explained herding behaviour can help managers achieve good repute by keeping good relative performance.

This study highlights the presence of both, fundamental and non-fundamental herding

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behaviour during the period of a falling market, unforeseen emergency and moment of oil prices in the international markets. This study suggests that investors herd differently under different market conditions that include oil price fluctuation, trends in the market, uncertainty, and crisis.

The study also documents the effects of oil price fluctuations especially slump of 2014 to 2016 on the stock market. This is the most prolonged slump in the history of the oil world lasting for almost two years when oil prices started dropping on June 23, 2014 from a high of $23/barrel to $24/barrel on Jan. 18, 2016. Previously recorded slumps were in 1986 and 2008 but they were very short-lived, and prices recovered within six months. It is considered that there is a negative association between oil prices and stock market prices in the oil trading nations (Siddiqui et al., 2019).

2. LITERATURE REVIEW

Most recent studies claim that the attitude of the speculator is not to look at the maximum returns and risk intensities as explained and assumed by the portfolio theory. Speculators are generally eyeing for a potential bullish trend with downside security. They look for consistency in return, so choose to make decisions that maintain future financial flexibility. Market investors often rely on their other investors to make investment decisions, which may explain the misrepresentations in the market.

The Behavioural Finance theory emerged with the assumption of the effective business hypothesis of financial market members through governance-based study and decision-making practices. Bondt & Thaler (1995) and Zhang & Zheng (2015) studied the theory of behavioural finance and termed it as "simple, broad-minded funding". They did not agree with the idea of market efficiency and beyond. Kahneman (1979) inspects the postulate of ordinary utility, which additionally helps in avoiding risks, and cannot be predicted by simply giving examples that the assumption is true and accurate. There is a need for a model that, through analysing the definition in the responsible market and the deficit foresees a greater benefit decision that needs an ideal model to represent the conclusion made under state of vulnerability, social and market transparency.

Also, the financial world is very complex where defining herding is not an easy task as individuals try to distinguish herding from normal behaviour in the market. Herding can be of different sorts, such as intentional and unintentional herding (Devenow & Welch, 1996). They identified various forms of concentration when analysing the effects of various research studies on herding behaviour in financial literature. They acknowledged different kinds of motivations like payoff externalities, bank runs, liquidity in market and evidence about acquirement.

Keeping in view the discussion of herding, Kremer & Nautz (2013) recognized three types of herding; the unintentional, intentional and spurious herding. According to them, the first is fundamental herding driven because nearly all institutions receive the same private information and therefore examine the same factors that lead them to a similar conclusion for each stock. Intentional herding has been described as being more sediment-driven as other market participants are being actively copied by traders, resulting in trading the same stocks regardless of any data revealing about them or previous information. That is why asset prices do not represent reliable and fundamental data, leading to extreme exacerbation of market volatility and destabilization.

Furthermore, an examination question is whether sure worldwide intermediaries of market strain can clarify the development of herd and anti-herd behaviour in the market. Balcilar et al.

(2014); Balcilar & Demirer (2015; Philippas et al. (2013; Wang et al. (2013; Yao et al. (2013) contributed towards the understanding of herding behaviour of the investors during oil prices fluctuations. If one can recognize such worldwide intermediaries of market stress that fundamentally impact financial specialists' conduct, especially in developing markets, at that point controllers in those nations can concentrate on those stress intermediaries to create wellbeing nets and turn off switches. This can assist in anticipation of destabilization impacts of speculator herding as herd conduct assumes a job in influencing market unpredictability and price disorganization.

Wang et al. (2013) claim that 20-30% fluctuation in the stock returns is the result of oil price jolts. Their study further explained that oil price shocks contribute as much as oil importance in the economy of the country. Depending on the country trade of oil, high volatility of oil prices, depending on its direction, improves or damages the equity price (Indārs et al., 2019).

Besides, studies reveal that during the period of stressful market conditions, highly volatile market, news release or fluctuation, herding behaviour in the investors is quite prominent. When the market is under stress there prevails aggregated irrationality. This exponentially increases instability in the market and the whole system becomes vulnerable and fragile (Bikhchandani & Sharma, 2001). Portfolio management also gets hurt because of this unusual behaviour in the market. All these actions trigger a chain reaction that elevates inefficiency, instability and fragility generating a financial crisis during market turbulence (Cakan et al., 2019). Hwang & Salmon (2004) claimed that herding takes place before and during the crisis, there is a flight of fundamentals in terms of volatility of returns and the level of average return.

3. HYPOTHESES DEVELOPMENT

The literature backs the notion that herding in the wealth maximization sense can be rational when other participants in the market are thought to be more informed and accurate in their decisions. Although there is very little certainty that some investors might have full access to complete and accurate information. However, people mimic their investment decisions because they believe that they are more informed (Chiang & Zheng, 2010). Unintentional herding is common among professional traders who have the same educational and work experience, tools, techniques and indicators they use for their analysis, characteristic in their trading, and same political and regulatory framework (Guney et al., 2017). In emerging markets (like Pakistan), non-fundamental factors drive herding among investors because there is less informational transparency which pulls their trust from public information leading to herding. We develop the hypothesis based on the discussion:

H1: Investors exhibit herd behaviour at Pakistan stock exchange driven by fundamental or non-fundamental factors.

Herding is induced by the common believes of the investors looking into fundamental information that is macroeconomic factors or news release (Institute, 2000). In 2018 Balaji et al. (2018) analysed the effect of general elections on both NSE and BSE returns in pre and post-elections period compared to volatilities of the periods using data from the Indian stock market for daily closing prices of NIFTY & SENSEX index from 1998-2014. They comprehended an increase in volatility and uncertainty during the election period. Elections have a strong effect on the stock market in the short term period. Chaudhry et al. (2018) examined the effects of terrorism on the

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stock markets of numerous South Asian Association of Regional Cooperation (SAARC) Countries. The data included stock indices of SAARC countries, data of terrorist attacks, and earthquake data from 2000 to 2014. Terrorism produces adverse effects on the stock markets of the SAARC. They concluded that terrorism is followed by adverse effects on the stock markets of the SAARC countries and severely hurts investors and regulatory authorities. Especially in Pakistan and India it causes uncertainty on a much larger scale. Political turbulence is usually escorted by increased uncertainty and high uncertainty is followed by herding. Herding determinants, which are widely tested. Non-fundamental information is expected to back herd behaviour during political turbulence and security concern periods. Based on the discussion, we propose

H2: Investors exhibit herding behaviour due to fundamental or non-fundamental factors during periods of political turbulence or terrorist attack.

Shaeri & Katircioğlu (2018) examined the relationship between crude oil prices and stock prices of oil, transport, and tech-related companies of USA listed companies to conclude crude oil fluctuations are more reflected in oil companies' stock prices as compared to the transport and tech companies' stocks. Chong et al. (2017) explained that herding was caused due to risk and short-term investor horizon. They studied herding in the Chinese stock market using a nonlinear model which was based on cross-sectional absolute dispersion of return (CSAD). They found a significant herding effect during the bearish market in the service industry and bullish market in the manufacturing industry (Camara, 2017). Balcılar et al. (2017) studied herding on oil speculation in major oil-exporting countries. Their findings suggested that herding existed in the crisis period or volatility is high in the market. They found that extreme oil price moment results in herding which can be fundamental or non-fundamental. Thus, the hypothesis of this study is:

H3: On days of large oil price fluctuations, investors exhibit fundamental or non-fundamental herding.

4. METHODOLOGY

4.1 TEST FOR FUNDAMENTAL/NON-FUNDAMENTAL HERDING

The cross-sectional standard deviation of return (CSSD) model proposed by Christie and Huang in 1995 to examine the herding effect in the stock market will be used in the study. The main concept of this model was to calculate the dispersion of return in investment (Christie & Huang, 2006). This method tends to compare an individual stock return and overall market return but the inefficiency of the CSSD model led Chang et al. (2000) to develop cross-sectional absolute dispersion of return (CSAD) model that is based on CSSD model and CAPM. The model scrutinizes the association of market rate of return and deviation of return. CSAD is a more effective model to determine herding behaviour in the market. In its regression model, instead of using a dummy variable as in CSSD, it uses market returns and deviations. Thus, providing solid data support for pragmatic analysis of herding effect. The deviation of the return rate of stocks decreases as the market yield increases indicate that there exists certain herding. Because this model is based on rational CAPM, when the factual results lack the rational explanation of the hypothesis, it leads to the indication of some irrational factors present in the market such as herding. Cross-sectional absolute dispersion measures dispersion of return expressed as a nonlinear regression model was developed to cover the market consensus during extreme fluctuation in prices

$$CSAD = \beta_1 + \beta_2|R_{m,t}| + \beta_3|R_{m,t}|^2 + \varepsilon_t \quad (1),$$

where constant is denoted by β_1, β_2 and β_3 are coefficients and error term is denoted by ε_t at time t. $|R_{m,t}|^2$ is the square of market return that captures the linearity of the relationship. If β_2 and β_3 are equal to zero, then there is no herding. Herding exist if β_3 is negative and statistically significant.

The method proposed by Chang could indicate herding but could not distinguish whether it is fundamental or non-fundamental. For this purpose, we have a decomposed version by (Dang & Lin, 2016; Galariotis et al., 2015) to determine fundamental and non-fundamental variables.

$$CSAD_t = \beta_1 + \beta_2|R_{m,t} - R_{f,t}| + \beta_3|HML_t| + \beta_4|SMB_t| + \beta_5|MOM_t| + \varepsilon_t \quad (2),$$

where, $R_{m,t}$ represents the market return on day t. $R_{f,t}$ represents a risk-free rate. HML represents a high minus low factor. SMB represents a small minus big factor. MOM represents momentum factor and ε_t represents error term at time t. Considering the unavailability of data on the fundamental factors for Pakistan, (Fama & French, 1993; 1995) is used to calculate HML and SMB factors while MOM is constructed in line with Carhart (1997). The risk premium, HML, SMB and MOM factors are fundamental factors while the error term is a non-fundamental factor. For measuring overall fundamental and non-fundamental, herding regression equations are

$$CSAD_{t,F} = \beta_1 + \beta_2|R_{m,t}| + \beta_3 R_{m,t}^2 + \varepsilon_t \quad (3),$$

$$CSAD_{t,NF} = \beta_1 + \beta_2|R_{m,t}| + \beta_3 R_{m,t}^2 + \varepsilon_t \quad (4),$$

If non-fundamental factors drive herding behaviour, in Equation (3) β_3 must be negative and statistically significant, while β_3 in Equation 8 should be insignificant. H1 will be accepted if β_3 for Equation (8) is statistically significant and negative and β_3 in Equation 3 is insignificant.

Asymmetric herding using dummy variable will be tested using

$$CSAD = \beta_1 + \beta_2 D_u|R_{m,t}| + \beta_3 D_u R_{m,t}^2 + \beta_4 D_d|R_{m,t}| + \beta_5 D_d R_{m,t}^2 + \varepsilon_t \quad (5).$$

Equation (5), $D_u = 1$ when $R_{m,t}$ is greater than 0, while $D_d = 1$ when $R_{m,t}$ is less than 0. To uncover the basic mechanism of herding, if there exists any herding, we test Equation (5) for both factors i.e. fundamental and non-fundamental. If coefficients of β_4 and β_5 are negative and statistically significant indicates herding during the up or down market. If the model calculated for non-fundamental herding, negative and statistically significant β_5 depicts herding is due to non-fundamental factor. While insignificant β_5 for fundamental factors model. Herding will be considered more pronounced during falling market if β_3 is insignificant for the model calculated for non-fundamental factors.

4.2 TEST FOR TERRORISM AND POLITICAL TURBULENCE PERIOD

Data is divided into three parts. The first is political regime change from 13-24 May 2013. General elections took place in Pakistan, Pakistan Peoples Party (PPP) government completed its five years, and PMLN's Nawaz Sharif became a new prime minister. Presidential and General elections have a great impact on the stock market returns. There is uncertainty, which leads to a stressful market condition (Khan, 2015). Fluctuations in stock markets are based on news, good or bad. Elections can be good or bad news for investors because they are unsure as to what is going to happen when the next ruling party comes (Balaji et al., 2018). We will test herding for the short

period before and after the election. Then we will test herding for the period when Nawaz Sharif was disqualified and had to step down from the seat of prime minister. The window was created from 28 July to 10 August 2017.

Another window is a 10-day window after the Peshawar massacre in 2014. Terrorist attacks negatively affect the stock market. These attacks can lead to uncertainty and chaos in the market (Ahmed, 2018; Chaudhry et al., 2018). Literature gives enough evidence that uncertainty causes herding. For that, we will check herding in the period 16-30 December 2014.

For measuring the herding effect in the crisis period, the regression model is

$$CSAD_{t,C} = \beta_1 + \beta_2 |R_{m,t}| + \beta_3 R_{m,t}^2 + \beta_4 D_c R_m + \varepsilon_t \quad (6),$$

where $CSAD_{t,C}$ is the cross-sectional absolute deviation of crisis period returns. $R_{m,t}$ In this equation are the returns during the period of turbulence. $D_c = 1$ for the day when turbulence occurs and 0 otherwise. Statistically significant and negative β_4 implies herd effect in the crisis period. H2 will be accepted when β_4 is negative and statistically significant for non-fundamental components and insignificant for fundamental components.

4.3 TEST FOR OIL PRICE FLUCTUATION

Lastly, we will test the effect of oil fluctuation specifically reflecting the effect of the oil slump of 2014-2016. Previously herding is tested in a highly volatile market when oil prices are rising. This will be a new addition to the literature as herd behaviour is tested when the oil prices are decreasing. Oil price fluctuations affect transport, oil and technology sectors (Shaeri & Katircioğlu, 2018), which are included in our data. Following specifications will be the test of the herd effect

$$CSAD_t = \beta_1 + \beta_2 |R_{m,t}| + \beta_3 R_{m,t}^2 + \beta_4 D_{u,2.1\%} R_{m,t}^2 + \beta_4 D_{l,2.1\%} R_{m,t}^2 + \varepsilon_t \quad (7).$$

Equation (7), days when changes in oil prices falling in the upper 2.1th percentile bracket is represented by $D_{u,2.1\%} = 1$ which is otherwise 0; a day with changes in the oil prices falling in the lower 2.1th percentile bracket is represented by $D_{l,2.1\%} = 1$ which is otherwise 0. The threshold is set at the first percentile to determine the strength of the equation. During the days of extreme fluctuations in oil prices, herding in Pakistan Exchange is reflected by negative and statistically significant β_4 coefficient when oil prices are going upward and β_5 coefficient represents when oil prices are going downward. The negative and statistically significant value of β_4 or β_5 represents fundamental or non-fundamental herding. Because oil price change occurs only once a month so there are a smaller number of days for a change. So, our threshold is reduced to 2.1% to capture the market-wise effect of an oil price change and its fluctuation.

This study scope is to measure herding behaviour, which can lead a group of people taking making the same decision which if under normal circumstances would not be so. This activity contributes to the mispricing of assets, which causes a rise in the bubble. This change in the market is temporary but when the bubble pops the whole market crashes. This research target tests the presence of herding in Pakistan stock exchange so that ways to eliminate herding can be devised in the future.

5. RESULTS AND DISCUSSION

5.1 HERDING TOWARDS MARKET

Table 1 shows the empirical result of herding towards the market from the equal-weighted estimation of Equations (3), (4), and (5). Newey-West heteroscedasticity and autocorrelation consistent standard errors are used to estimate p-values. The significance level is set to 5%. The result shows that there is overall herding in the market. When we decompose it into fundamental and non-fundamental components, we see that the herding is due to non-fundamental components. Thus, H1 is accepted.

Table 1: Fundamental/non-fundamental Herding

	Full Sample				Up Market			Down Market		
	Intercept	$\lvert R_{m,t}\rvert$	$R^2_{m,t}$	R^2	Intercept	$D_u\lvert R_{m,t}\rvert$	$D_u R^2_{m,t}$	$D_d\lvert R_{m,t}\rvert$	$D_d R^2_{m,t}$	R^2
Total Herding	0.013	0.433	-8.658	0.194	.0127	0.471	-8.330	0.313	-6.009	0.209
P-Value	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	
Fundamental Herding	0.015	0.003	-0.200	0.230	-0.002	0.460	-8.552	0.321	-6.112	0.212
P-Value	<0.001	0.475	0.111		<0.001	<0.001	<0.001	<0.001	<0.001	
Non-Fundamental Herding	-0.002	0.423	-8.461	0.187	0.015	0.011	-0.377	-0.011	0.166	0.024
P-Value	<0.001	<0.001	<0.001		<0.001	0.032	0.060	0.021	0.261	

5.2 TEST FOR CRISIS AND POLITICAL TURBULENCE PERIOD

Table 2 represents the results of Equation (6). Test show no overall herding during 2013 elections but when the decomposed results of fundamental and non-fundamental equations are analysed, fundamental herding is detected while no non-fundamental herding was detected. Similarly during terrorist activity in 2014 no overall and fundamental herding was reported, but there was non-fundamental herding. Newey-West heteroscedasticity and autocorrelation consistent standard errors are used to estimate p-values. The significance level is set to 5%. When we analysed results for disqualification of Nawaz Shareef (2017), there were no signs of overall herding but when we decomposed equation and detected non-fundamental herding. Therefore, we accept hypothesis 2.

Table 2: Herding Under Crisis.

	Intercept	$\lvert R_{m,t}\rvert$	$R^2_{m,t}$	$D_e R^2_{m,t}$	R^2
Total Herding					
Election 2013	0.015	1.195	-66.342	0.001	0.207
P-Value	<0.001	0.075	0.152	-0.023	
Terrorist Attack	0.017	-1.002	98.277	-53.980	0.442
P-Value	<0.001	0.080	0.049	0.051	
Disqualification	0.017	-0.946	69.313	226.21	0.697
P-Value	<0.001	0.070	0.070	<0.001	
Non-Fundamental					
Election 2013	-0.001	-0.284	30.176	0.00	0.285
P-Value	-0.50	-0.65	1.08	-	
Terrorist Attack	0.001	-0.941	99.859	-61.035	0.378
P-Value	0.548	0.083	0.036	0.025	
Disqualification	-0.002	0.315	-12.931	63.831	0.249
P-Value	-2.05	1.33	-0.94	3.72	
Fundamental					
Election 2013	0.015	1.479	-96.519	0.00	0.310
P-Value	<0.001	0.016	0.025	-	
Terrorist Attack	0.016	-0.061	-1.590	7.055	0.432
P-Value	<0.001	0.772	0.919	0.375	
Disqualification	0.0183	-1.261	82.244	162.38	0.650
P-Value	<0.001	0.016	0.014	<0.001	

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5.3 TEST FOR OIL PRICE FLUCTUATION

Table 3 shows the results of estimating Equation (7). There is the only downward movement of oil during the said period there is no evidence of herding in regards to the downward movement of oil prices. Neither on the bases of fundamental nor non-fundamental factors. Thus, H3 is not accepted, as the result does not signify any herding during days with the downward movement of oil. Newey-West heteroscedasticity and autocorrelation consistent standard errors are used to estimate p-values. The significance level is set to 5%.

Table 3: Oil Price Herding

	Intercept	$\lvert R_{m,t} \rvert$	$R^2_{m,t}$	$DuR^2_{m,t}$	$DlR^2_{m,t}$	R^2
Total Herding At 2.1 Percentile	0.013	0.436	-8.884	3.388	-0.731	0.184
P-Value	<0.001	<0.001	<0.001	0.507	0.520	
Fundamental At 2.1 Percentile	0.015	0.003	-0.197	0.069	-0.080	0.024
P-Value	<0.001	0.496	0.190	0.798	0.712	
Non-Fundamental At 2.1 Percentile	-0.002	0.421	-8.312	-0.854	-0.683	0.186
P-Value	<0.001	<0.001	<0.001	0.169	0.537	

Table 4: Summary of Empirical Results

Events	Total herding	Fundamental	Non-fundamental
Overall	Yes	No	Yes
Elections 2013	No	Yes	No
Terrorist attack 2014	No	No	Yes
Disqualification 2017	No	No	Yes
Oil prices	No	No	No

6. CONCLUSION

Overall Pakistan stock exchange manifests herding. We also found empirical evidence of herding during political turbulence and period of terrorism. Therefore, hypothesis 1 and 2 are accepted. Table 4 illustrates a summary of the results. The non-fundamental factors drive herding in the market. This study determines herding during the up and down market though it was not a part of our study; it gives a clear picture and understanding of herding. Therefore, herding during down markets is more visible and it is merely due to non-fundamental factors. Investors do not exhibit herding during the down market, as it does not trigger any stress in the market. Fundamental herding was during the general election period of 2013 observed while no overall herding and non-fundamental herding was determined. However, when the news of disqualification and termination uproar in the microenvironment, non-fundamental herding was observed. However, we did not observe herding behaviour during a downward moment of oil prices.

In addition, the 2013 election period was a regime switch from Asif Ali Zardari of Pakistan People's Party (PPP) to Nawaz Shareef of Pakistan Muslim League-N (PMLN). People were quite aware of the whole situation and PPP had served its 5 years so there was no such political stress environment. However, the new government has new sets of policies and new ways of governing. That is in favor of few and opposed by others. So people herd on fundamental factors.

Our data period is the era of oil price slump and we have observed the absence of herding behaviour. Because oil prices are significantly decreasing. Pakistan is an importer of oil and Pakistan's government policies are to regulate oil prices. However, this oil slump was so significant that oil prices in Pakistan dropped significantly. Therefore, we see non-herding during this period and hypothesis 3 is rejected.

In contrast, we see non-fundamental herding while Nawaz Shareef termination. Investors got a hint of uncertainty. In this situation investors herd without referring to fundamentals.

Similarly, when the massacre of APS School occurred in 2014, there was again a stress full condition in the market and participants of the market blindly followed each other due to panic. Therefore, we see non-fundamental herding at large but lack of fundamental and overall herding.

7. DATA AND MATERIAL AVAILABILITY

This study data can be provided upon contacting the corresponding author.

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