

Herding to Market Consensus: An Empirical Investigation of its Presence in Nepal Stock Exchange

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Abstract

The study examines herd formation in Nepalese equity market. The study uses linear regression models including quadratic variant to model the relationship between return dispersion of individual scrips and aggregate market return for finding the herding behavior. The study does not find presence of herding. On the contrary, when presence of herding is tested for bearish and bullish trend, herd formation is detected in bullish trend. The study supports the notion that Nepalese equity market is prone to behavioral biases leading to pricing inefficiencies. The findings of the study can be helpful to make policies to protect retail investors from downside risk arising from these behavioral biases.

Keywords: NEPSE, Herding, Multiple Regression, CSAD, CSSD

1. Introduction

It is found that irrationalities in the behavior of investors create booms and bust in the market. Herding is one of the anomalies that discards market efficiency as it drives prices well above or below the fair value (Bikachandani & Sharma, 2001). Moreover, in a financial market, investors are not always sure of their private information and believe that whole market (crowd) cannot be wrong about the direction of market (Avery & Zemsky, 1998). So, investors herd with their individual stocks to mimic other investors (crowd) leading to faulty pricing of securities. Similarly, investors herd stocks with extreme market movements, meaning large movement in market inclines investors with individual stocks to herd towards market's extreme movement (Christie & Huang, 1995). Thus, from previous studies it is intuited that herding behavior could lead to inefficiency in pricing of securities which is not supported by fundamentals.

Some behaviors like: mimicking other investors (buying what others are buying and selling what others are selling) and need to confirm with others to buy/sell scrips are present in Nepalese equity market (Adhikari, 2010). Furthermore, deficit of awareness among investors, lack of information due to infrastructural issues, unethical trading practices, absence of corporate governance in listed firms and laggard behavior among the retail investors are prominently found in Nepalese equity market. These behaviors can provide possibility of herding anomaly to take place.

A recent event can be an example of how herding and other behavioral biases are affecting Nepalese equity market. NEPSE Index reached the level of 3198 on 19th July, 2021 from 1189 level within a span of a year without any apparent fundamental reason. Additionally, this bullish trend was suspicious as the economy at that time was just starting to recover from remnant effect of COVID-19's first wave. Prime reasons for the upsurge were credit disbursement by financial institutions as loan for stock trading at

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exorbitant levels and overexcited retail investors buying overpriced stocks leading to further increase in prices. Moreover, retail investors also enticed other inexperienced investors to invest money. These inexperienced investors mainly focused on imitating experienced investors creating a conducive environment for herding. This erratic buying spree can be attributed to other heuristics and frame driven biases as well.

On previous instances, there have been studies on examining herding behavior in Nepalese market. Previous studies have found existence of herding among sampled investors (Adhikari, 2010), and also a study have found determinants of herding among investors (Risal & khatiwada, 2019). This present study tends to look for more about herding in Nepalese equity market. The study aims at finding the existence of herding and the form of its existence (presence under market circumstances like: bull/bearish phases and /or extreme market movements). So, as herding could drive the prices without any fundamental reason and Nepalese equity market is considered risky and subjected to manipulation, it is important to investigate the form of herding and implications would be useful for policymakers, practitioners and other retail investors.

2. Literature Review

Early studies on herding have found investors flocking to buy or sell the stocks by imitating other investors. While working out their investment decisions, they particularly give less weightage to their private information or own analysis (Kallinterakis & Ferreira, 2007; Bikhchandani et al., 1992). Similarly, some studies have given the reasons for herding. Liu (2013) found investors herding to stay fit in the crowd and not to be an outsider. Earlier, Pucket and Yan (2007) found herding when there is excessive volatility.

Past literature have used different methodologies while investigating presence of herding. Analyzing herding in extreme price movement was carried out through CH Model (Christie & Huang, 1995). The study used market observables to find herding. Using daily and monthly data, the study found no herding at time of price stress (extreme price movements). As the CH model studied herding while experiencing extreme market movement, CCK Model by Chang et al. (2000) studied herding in any day (irrespective of extreme or normal price movements). They studied herding in securities markets of different economies including developed, frontier and emerging markets. The model was successful in finding significant herding in emerging markets like South Korea, Taiwan and to some extent in Japan. Also, the study did not find herding in USA and Hong Kong. In 2004, new herding measure came into consideration named as HS model developed by Hwang and Salmon (2004). The measure found significant herding activity in both developed and emerging market like in India, USA and South Korea (Mandal, 2011; Poshakwale & Mandal, 2014; Hwang & Salmon, 2004). Similarly, Patterson and Sharma (2006) developed a model identifying herding behavior. Moreover, use of quantile regression for investigating herding is also prominent. Jhandir and Elahi (2015) and Shrotriya and Kalra (2021) used quantile regression to find the presence of herding.

Likewise, presence of herding under different circumstances were studied in detail. Presence of herding during events like bullish/bearish returns, high/low volume, high/low volatility; herding in growth / value stocks ; intensity of herding before and after crisis; herding around festivities etc. were prominently studied in past literature. Studies of Prosad et al. (2012), Lao and Singh (2011) found asymmetric

relationship between herding measure and direction of market return. Both the studies found emerging markets (China and India) to have greater herding bias when there is bullish (positive) return. Yao et al. (2014) found high intensity of herding among growth stocks compared to value stocks. Wermers (2002) found strong herding in smaller stocks. Gavriilidis et al. (2016) indicates in most of the market studied, strong herding was found during Ramadan festival. Chaouachi (2021) found moderate level of herding during days of high trading volume. BenSaïda (2017) used modified CSAD model to find investors herding around market in US. Moreover, the same study found herding impeding the conditional volatility and no significant relationship between Volume and Herding measure. BenSaïda et al. (2015) using VAR and Granger Causality found significant relationship between herding and volume indicating bi-directional causality among them. Likewise, Kabir (2018) found significant influence of global financial crisis on herding. Satish and Padamsree (2018) divided the whole sample into 3 parts namely *before 2008 crisis*, *during 2008 crisis* and *after 2008 crisis*. Using CSAD Methodology in Indian stock market from 2003 to 2017, the study found no significant herding in any of the three cases. Along with financial crisis, during COVID-19 pandemic, Rubesam and Raimundo (2021) found anti herd behavior in the beginning of COVID-19 pandemic (first half of 2020) and pro herding behavior after government intervention in economic support and higher vaccination rates in global markets.

It is important to see herding in equity markets of different economies. Christie and Huang (1995) found herding in emerging markets but not in developed market like U.S. Chang et al. (2000) also did not find herding in developed countries. As an exception, Hwang and Salmon (2004) found herding in developed market like of U.S. Similarly, Chen (2013) found herding to be most prominent in developed market like US. Yao et al. (2006) found herding in Chinese market especially in B Class of shares. In contrast, Demirer and Kutan (2006) found no evidence of herding in Chinese market. Caporale et al. (2008) found much robust presence of herding in daily intervals of Greek stock market as compared to other intervals. It is vivid that there are mixed results concerned with presence of herding in the same market.

Similarly, herding was also found in different types of investment instruments and avenues. The studies have also been done on institutional investors like fund managers and mutual funds. Mohammed et al., (2011) used LSV Method (Lakonishok et al., 1992) and FHW Method (Frey et al., 2014) to find herding among French mutual funds. Similarly, Bhattacharya and Sonaer (2018) and Latief and Shah (2014) found relationship between herding and returns earned in mutual fund. Also, in China, Caglayan et al. (2021) found mutual fund herding to have stronger effect on return co-movement. Drakos and Ballis (2020) found herding in cryptocurrency markets. Phillippas et al. (2013) used CSAD Model to find significant herding in Real Estate Investment Trust (REIT). Likewise, Demirer et al. (2014) found herding behavior in American Depository Receipt (ADR).

In the context of Nepal, few yet important research have been carried out. Adhikari (2010) found around 77% of investors bought stocks on some other's advice and only 33% chose their own investments. This means a considerable portion of investors are in need of conformity based on others' investment decision. So, Nepalese investors may have tendency to buy/sell stocks based on others' trading behavior implying presence of herding. Risal and Khatiwada (2019) found hasty decision to have significant relationship with herd behavior among Nepalese investors.

Very few studies have been carried out on herding in the context of Nepalese equity market. Especially, using empirical methodology to investigate the presence of herding during the occurrence of extreme price movements and negative/positive price fluctuation is of particular importance. The study aims to answer how herding is present in Nepalese equity market. So, our objective is to fill in the gap of these un-explored aspects of herding in Nepalese securities market

3. Methodology

The primary objective of the study is to detect market wide herding in Nepalese equity market. The study uses CH Model (Christie & Huang, 1995) and CCK Model (Chang et al., 2000) to detect herding by modelling market observables like return and standard deviation. Data in the study are collected from NEPSE’s official website. The study comprised of 87 scrips. The scrips are sampled out on the basis of popularity, frequency of trades, and volume of trades. The time period for the study is from 1st January, 2015 to 31st May, 2022. This makes total observation of 1450 days.

3.1 Model

In CH Model, presence of herding in market during extreme market movements is measured by Cross Sectional Standard Deviation (CSSD). The concept of CSSD Model is based on the notion that all individual stock returns verge on to average cross sectional market return implying minimum deviation while herding. CSSD can be measured as:

$$CSSD = [1/(N - 1) * \sum_i^N (R_{it} - R_{mt})^2]^{(1/2)} \dots\dots\dots(1)$$

Where, N is the sample of stocks, R_{it} is return of the scrip i at certain time t and R_{mt} is the cross sectional average of the sampled stocks that are in consideration. In the time of extreme returns, people disregard their own beliefs and move on to market consensus. It means each individual investor will move with the crowd converging the each individual security’s return with market average return. This leads to minimum dispersion between individual security’s return and average market return. Thus, in case of serious herding in market extremes, herding measure, CSSD, will decrease.

The next step is to find the dummy variables for extreme movements. The model needs to separate extreme movement with the soothing movement (normal period). D_t^L is given value as “1”, when R_{mt} is within or equal to the lower tail threshold of its distribution or as “0” otherwise. Similarly, D_t^U is valued as “1” when R_{mt} is above upper tail threshold of its distribution or as “0” otherwise. The upper and lower threshold tails are determined at 95% ($\pm 2 \sigma$). Thus, the variables are arranged in a regression equation. The regression function is as follows:

$$CSSD_t = \alpha + \gamma^L D_t^L + \gamma^U D_t^U + \epsilon_t \dots\dots\dots (2)$$

Herding is concluded to be present if either of coefficients γ^L or γ^U (or both) are negative and significant.

In the CCK Model, Chang et al. (2000) propose that if there is herding which is opposed to rational pricing model, then dispersion will be negatively related to market return and also the relationship is nonlinear. Thus, the dispersion model is known as Cross Sectional Absolute Deviation (CSAD) calculated as:

$$CSAD_t = [1/N * (\sum_{i=1}^N |R_{it} - R_{mt}|)]^{(1/2)} \dots\dots\dots(3)$$

Likewise, the quadratic regression function is defined as:

$$CSAD_t = \alpha + \gamma_1 R_{mt} + \gamma_2 R_{mt}^2 + \epsilon_t \dots\dots\dots(4)$$

The regression function would indicate herding if coefficient γ_2 is negative and significant.

Herding in Bull and Bearish Phase of Market

The herding behavior can be lopsided in nature. Herding can be present when market is either bullish or bearish. The same intensity of herding cannot be always found in both phases of market. So, CCK model also defines two model to find asymmetric pattern of herding concerned with return.

$$CSAD_t^{UP} = \alpha + \gamma_1^{UP} |R_{mt}^{UP}| + \gamma_2^{UP} (R_{mt}^{UP})^2 + \epsilon_t \dots\dots\dots(5)$$

$$CSAD_t^{DOWN} = \alpha + \gamma_1^{DOWN} |R_{mt}^{DOWN}| + \gamma_2^{DOWN} (R_{mt}^{DOWN})^2 + \epsilon_t \dots\dots\dots(6)$$

R_{mt}^{DOWN} and R_{mt}^{UP} are average market return of the sampled scrips when market is decreasing (down) and increasing (up) respectively. Similarly, to the previous case of CCK Model, presence of herding can be proved when either of the coefficient, γ_2^{DOWN} or γ_2^{UP} (or both) are negative and significant.

4. Results

Augmented Dickey Fuller Test and Phillips Perron Test are carried out as diagnostic test. The result of ADF and PP test are depicted as follows:

Table 1: ADF Test of CSSD, CSAD, D^L , D^U , R_{mt} , R_{mt}^2

ADF t statistics					
CSSD	CSAD	D^L	D^U	R_{mt}	R_{mt}^2
-4.370**	-5.2323**	-16.4446**	-11.6047**	-30.6451**	-4.4122**

** : 1% level of significance

Source: Author’s own calculation through Eviews11

Table 2: Phillips Perron Test of CSSD, CSAD, D^L , D^U , R_{mt} , R_{mt}^2

Philips Perron t Statistics					
CSSD	CSAD	D^L	D^U	R_{mt}	R_{mt}^2
-42.5503**	-41.3671**	-35.0807**	-35.2489**	-30.8721**	-34.9186**

** : 1% level of significance

Source: Author’s own calculation through Eviews11

Unit root test is carried out on CSAD, CSSD, squared return, absolute return, D_t^L , D_t^U . All the series are found to be stationary at level with P- value being less than 1%. It conveys the time series don’t have unit root and can be modelled through regression.

4.1 Presence of Herding in Extreme and Overall Phases

Table 3: Results of Regression of Daily CSSD with Dummy variables for DtL and DtU

Dependent Variable : CSSD				
Independent Variable: D_t^L, D_t^U				
Particulars	Coefficients	t-statistics	P-Value	Adjusted R squared
Constant	0.0251	39.8635	0.0000	0.059
D_t^L	0.0249	3.4224	0.0000	
D_t^U	0.0094	3.4224	0.0000	

Source: Author's own calculation through Eviews11

Table 4: Results of Regression of Daily CSAD with R_{mt} and R_{mt}^2

Dependent Variable : CSAD				
Independent Variable: R_{mt}, R_{mt}^2				
Particulars	Coefficients	t-statistics	P-Value	Adjusted Rsquared
Constant	0.0147	80.7153	0.0000	0.4300
R_{mt}	0.0551	5.1037	0.0000	
R_{mt}^2	5.7418	32.0206	0.0000	
Particulars	Coefficients	t-statistics	P-Value	

Source: Author's own calculation through Eviews11

The coefficients of D_t^L and D_t^U are positive and significant at 1% level of significance. It means dispersion (among each scrip's returns) increases when extreme market returns are generated. This positive relationship refutes the presence of herding.

Similarly, the coefficient of R_{mt}^2 is positive and significant at 1% level of significance. It means dispersion (among each scrip's returns) and market return have positive relationship. This positive relationship refutes the presence of herding in overall phase of returns (without any discrimination between extreme and soothing phases of returns).

4.2 Presence of Asymmetric Herding in Bearish and Bullish Phases

Table 5: Result of Regression of Daily CSAD^{Down} with $|R_{mt}|^{DOWN}$ and $(R_{mt}^{DOWN})^2$

Dependent Variable : CSAD ^{Down}				
Independent Variable: $ R_{mt} ^{DOWN}$ and $(R_{mt}^{DOWN})^2$				
Particulars	Coefficients	t-statistics	P-Value	Adjusted Rsquared
Constant	0.0127	32.4810	0.0000	0.5264
$ R_{mt} ^{DOWN}$	0.1290	3.8282	0.0001	
$(R_{mt}^{DOWN})^2$	4.5615	14.0141	0.0000	

Source: Author's own calculation through Eviews11

Table 6: Result of Regression of Daily CSAD^{UP} with $|R_{mt}|^{UP}$ and $(R_{mt}^{UP})^2$

Dependent Variable : CSAD ^{UP}				
Independent Variable: $ R_{mt} ^{UP}$ and $(R_{mt}^{UP})^2$				
Particulars	Coefficients	t-statistics	P-Value	Adjusted Rsquared
Constant	0.0115	29.3327	0.0000	0.4048
$ R_{mt} ^{UP}$	0.6454	13.8113	0.0000	
$(R_{mt}^{UP})^2$	-6.2372	-6.6973	0.0000	

Source: Author's own calculation through Eviews11

The coefficients of $|R_{mt}|^{DOWN}$ and $(R_{mt}^{DOWN})^2$ are positive and significant at 1% level of significance. It means dispersion (among each scrip's bearish returns) increases with bearish market return. This positive relationship refutes the presence of herding.

$(R_{mt}^{UP})^2$ is negative and significant at 1% level of significance. It means dispersion (among each scrip's bullish returns) and bullish market return have inverse relationship. This negative relationship detects presence of herding.

The study do not find presence of herding in cases of extreme and overall set of returns. But, the study detects the presence of herding when stock prices provide bullish return. Chen (2013) found frontier markets like Sri Lanka, Pakistan, and Bangladesh do not experience herd formation when market moves to extreme sides. But herding exist when these market provides both positive and negative returns. This is partially consistent with present findings that herd formation in Nepalese equity market is found only when market is providing positive return. Likewise, the findings of the present study is fully consistent with Prosad et al. (2012) as the present study finds herding behavior only in the bullish trend of market.

Thus, the present study finds herding behavior when there is positive news or bullish sentiment in the market. So, during bullish trend, investors may herd aggressively (sell what others are selling and buy what others are buying) and further increase the prices eventually leading to pricing distortions.

5. Conclusion

The study finds investors preferably herd or follow crowd while market is providing bullish returns. It implies that investors become risk takers during bullish times but risk averse during bearish times. Especially, *crowding - in* behavior of retail investors during the climax of a bullish phase can trap retail investors into large losses.

Thus, in conclusion, investors of Nepalese equity market are prone to various behavioral biases including herding that can lead to mispricing of securities. Furthermore, on account of laggard behavior of retail investors, these mispricing can lead to further booms or busts. It is recommended that policy makers and regulators create investor centric policies to strengthen the investment awareness of retail investors

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