P-ISSN: 2709-6254	Journal of Development and Social Sciences	Apr-June 2024, Vol. 5, No.2
O-ISSN:2709-6262	https://doi.org/10.47205/jdss.2024(5-II)21	[211-221]

Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Herd Investing in Pakistani Stock Market: Evidence from Pakistan's Stock Market Using Data of More Than Three Decades

[1]Abida Perveen *, [2]Faiq Mahmood and [3]Ahsan Riaz

1. PhD Scholar, Lyallpur Business School, Government College University Faisalabad, Faisalabad, Punjab, Pakistan
2. Assistant Professor, Lyallpur Business School, Government College University Faisalabad, Faisalabad, Punjab, Pakistan
3. Assistant Professor, Lyallpur Business School, Government College University Faisalabad, Faisalabad, Punjab, Pakistan

***Corresponding Author:** abida.saima@gmail.com

ABSTRACT

To contribute to the inconclusive existing literature about presence of herd-investing behavior in Pakistani stock market, this study utilizes non-linear regression approach introduced by Chang et al. (2000) to analyze investors' herding behavior in Pakistani stock investors and whether it varies during extreme market conditions. The study finds a symmetric and significant correlated trading behavior, both during bullish and bearish market conditions, among Pakistani stock investors, though the static herding behavior is absent at the full sample level. In addition, the herding behavior persists not only during the global financial crisis but also during COVID-19 pandemic, albeit more prominently during the former. The analysis of study also reveals a symmetric and significant correlated trading behavior during both lockdown and post-lockdown periods of COVID-19. These findings imply that Pakistani stock investors comprehend herding patterns in crafting efficient and proactive investment strategies to maximize portfolio diversification advantages, particularly during extreme market conditions.

KEYWORDS OVID-19, Global Financial Crisis, Investors' Herding Behavior, Pakistani Stock Market

Introduction

Efficient market hypothesis states that financial markets are efficient, investors are rational, and security prices fully reflect all available information at any time. However, Shiller (2003) documents that in reality investors' decisions are affected by their emotions and individual behaves irrationally. Kahneman and Tversky (1979) argue that human psychology plays a significant role in financial markets' trading and therefore studying human behavior is important to understand the financial markets. One of the much-studied irrational behavior of investors is the herd behavior, which have been documented to affect the stock prices if exists in the investors. Scharfstein and Stein (1990) challenge the efficient market hypothesis and argue that managers often follow the herds for a variety of reasons, which affects their individual decision-making processes. Olsen (1996) argues that stock prices do not reflect their fundamental values in presence of herding behavior. It is therefore important for informed investment decision making to have knowledge of presence or absence of investors' herding in the stock market where investment decision takes place.

Although existing studies have investigated the herding behavior in Pakistani stock market, they do not capture the data for a longer horizon, provide no comparative analysis of GFC and COVID-19, and no evidence about herding asymmetry during post lock-down compared to lock-down periods of COVID-19. We attempt to fill this void in the existing literature on herding in Pakistani stock market by answering the following questions: (1) Does herd behavior exist in Pakistani stock market in the long-run? If yes, does it change during bear and bull market conditions? (2) is herding behavior asymmetric during GFC and COVID-19? (3) do herds disappear in post lock-down compared to lock-down?

Our findings show no evidence of long-run static herding behavior among Pakistani stock investors at the full sample level. However, we find significant correlated trading behavior among investors in the Pakistani stock market during both bullish and bearish market conditions. Remarkably, our results suggest that this correlated trading behavior persists not only during the GFC but also throughout the COVID-19 pandemic, with a more pronounced effect observed during the former. Our analysis demonstrates that investors' herding behavior persists during both lockdown and post-lockdown periods, with no herding asymmetry during lockdowns compared to the post-lockdown phase. These findings indicate that Pakistani stock investors tend to disregard their individual analysis and private information, not only during periods of high market volatility but also during crisis situations, as they emulate their peers in making portfolio selections and investment decisions.

Our study has several contributions to the existing herding literature in Pakistan. First, as per authors knowledge, this is the only study that used more than three decades of data of Pakistani stock market. Second, this study offers comparative analysis of herding in global financial crisis and COVID-19, which is not offered by any other study in the existing literature in Pakistan. Finally, the comparative analysis of herding during lock-downs and post lock-downs is new to the existing literature in Pakistan.

The study carries several implications for investors, portfolio managers, and regulators. Recognizing the existence of herding behavior in stocks may encourage investors and portfolio managers to regard herding as a speculative indicator in their stock assessments, thereby enhancing decision-making. Additionally, herding tendencies during crises may lead to less effective portfolio diversification, as investors may find it challenging to differentiate between negatively and positively correlated stocks during down-market times. Consequently, comprehending herding patterns can aid portfolio managers in crafting efficient and proactive investment strategies to maximize portfolio diversification advantages.

Literature Review

In the mainstream literature Christie et al. (1995) are among the first who investigated herding in the stock market using daily aggregated market data. They conclude an absence of herding in the US stock market by documenting an insignificant non-linear effect of daily portfolio returns on cross-sectional standard deviation (CSSD) of the returns. Many other studies used Christie et al. (1995) methodology to document presence (Ghorbel, Snene, & Frikha, 2023) and absence (Javaira & Hassan, 2015; Tahir et al., 2018; Yousaf, Ali, & Shah, 2018) of herding in various international stock markets. Chang et al. (2000) objected the CSSD measure to capture the herding behavior adequately by arguing that CSSD measure can be affected by outliers in the data. They introduced cross-sectional absolute deviation (CSAD) to control for the bias in estimating herding behavior through the non-linear relationship between cross-sectional dispersion and returns of the daily portfolios.

Some studies have used the measures of Christie et al. (1995) and Chang et al. (2000) to investigate herd investment behavior in Pakistani stock market. For instance, Yousaf et al. (2018) used data over the period from 2004 to 2014 to document absence of herding in the Pakistani stock market. Javaira and Hassan (2015) find no evidence of herding Pakistani stock market over the period from 2002 to 2007 and during liquidity crisis of 2005. Malik and Elahi (2014) uses quantile regression analysis to find the evidence of herding behavior in Pakistani Stock market during normal and both bullish and bearish market conditions. Zafar and Hassan (2016) also document the evidence of correlated trading during bullish and bearish market conditions of Pakistani stock market over their sample period. The study of Shah et al. (2017) investigates herding behavior in Pakistani stock market and find herding evidence in large capitalizations firms during extreme market movements. They particularly document that stock market experiences herd behavior when returns fall by 5%. All of these studies about herding in Pakistani stock market document mixed results

about the presence of herding in Pakistani stock market. In order to provide a recent and long-term evidence on presence or absence of herding in Pakistani stock market and whether it is asymmetric during up and down market conditions, we develop the following hypotheses:

H_1: Herding is present in Pakistani stock market ($\lambda_2 \neq 0$)

H_2: Herding in Pakistani stock market during bull and bear market conditions is asymmetric ($\lambda_{2\text{Bull}} - \lambda_{2\text{Bear}} \neq 0$)

Existence literature on herding behavior discerns two forms of herding, i.e., rational and irrational herding. Rational herd behavior is associated with the situation where investors voluntarily ignore their own analysis and emulate another manager's decision who is more competent in investment analysis and decisions. Most focus of the extant literature have been on rational herding behavior. Irrational herding behavior is associated with collective actions of individuals under uncertain conditions. Some studies investigated investors' herd behavior during crises. For instance, Kremer and Nautz (2013) find that behavior of correlated trading during the financial crisis slows down. Similar findings are also reported by Hwang and Salmon (2004) who document a decreased herd intensity during Asian and Russian crises of 1990s. However, Chiang and Zheng (2010) document an increase in herding intensity during GFC. The mixed evidence on increasing or decreasing intensity of herding during financial crisis allows us to substantiate the evidence by conducting and comparing herding analysis in Pakistani stock market during GFC and crisis stemming from COVID-19 pandemic. In addition, most of these studies are either restricted to short time span (Yousaf et al., 2018; Tahir et al., 2020) limited data (Javaira and Hassan, 2015; Kamran et al., 2020) or are unable to capture both global financial crisis (GFC) and COVID-19 crisis for comparison purposes, which is a void in the existing studies. To investigate herding in Pakistani stock market during both GFC and COVID-19 crisis for comparison purposes, we develop the following hypothesis:

H_3: Herding in Pakistani stock market during GFC and COVID-19 market conditions is asymmetric ($\lambda_{2\text{GFC}} - \lambda_{2\text{COVID}} \neq 0$)

The global lockdowns brought about a near-total cessation of international trade and business activities, consequently impacting stock markets worldwide. Several studies have documented both the beneficial (Anh and Gan, 2020; Alam et al., 2020) and adverse (Eleftheriou and Patsoulis, 2020) effects of lockdowns on stock markets. For example, Ashraf (2020) suggests that government containment measures, health responses, and income support packages could elicit a positive market response by fostering investor confidence and mitigating the economic fallout of COVID-19. Moreover, heightened uncertainty in the pre-lockdown period may lead investors to perceive lockdowns as favorable measure, resulting in an increase in average abnormal returns during lockdowns in India (Alam et al., 2020). Similarly, findings from Anh and Gan (2020) indicate a positive impact of lockdowns on the Vietnamese stock market, attributed to reduced investor anxiety and market uncertainty. Zaremba et al. (2020), in contrast, assert that government-imposed restrictions may prompt a reassessment of investors' portfolio decisions and contribute to market destabilization. These conflicting findings regarding the effects of lockdowns on stock markets underscore the need to investigate whether herd investing behavior in the Pakistani stock market differs during lockdowns and post lock-down, given that such behavior is influenced by stock returns. We develop the following hypothesis to test whether investors' herding behavior is Pakistani stock market differs during lockdown and post-lockdown periods of COVID-19.

H_3: Herding in Pakistani stock market differs during lockdown and post-lockdown periods of COVID-19 ($\lambda_{2\text{LD}} - \lambda_{2\text{PLD}} \neq 0$)

Material and Methods

The daily data for this study spans over January 1991 to April 2022 and covers the data of all the stocks listed on Karachi Stock Exchange over the stated period. The data on the stock prices, volumes and market capitalization of the sampled stocks is retrieved from Datastream database. The choice of time period is driven by the important changes in the Pakistani stock exchange that include – but not limited to – 9/11 war on terror, GFC of 2008, COVID-19 pandemic, marshal laws, and a surge in geopolitical risks which significantly affected the investors in Pakistani stock market. It also allows us to compare our results to the mainstream literature.

The selection of the country, Pakistan, is motivated by the fact that it has provided better returns to investors compared to Chinese and Indian equity markets and has been documented as best performing Asian stock market in Asia as per a basket of 26 peers tracked by Bloomberg (Kim and Mangi 2016). Since after, MSCI Incorporation includes Pakistan in its benchmark emerging-market index. In addition, the volatility of Pakistani stock market is significantly higher compared to other Asian Markets (Hamid et al. 2017). These factors make Pakistani stock market attractive for behavioral studies.

Our survivor bias free dataset consists of all active companies of Pakistan Stock Exchange until April, 2022. Similar to Vidal-Tomas et al. (2019) and Kumar et al. (2021), we constructed equally weighted portfolio returns for measuring the market return. While Pakistan wasn't the focal point of the GFC, it felt both direct and indirect repercussions, primarily stemming from shifts in global economic conditions, trade dynamics, and financial markets. The crisis triggered a worldwide economic deceleration, which reverberated into Pakistan's economy, manifesting in reduced export demand, dwindling remittances, diminished foreign investment, and pressures on the exchange rate as investor confidence faltered and foreign reserves strained. Consequently, Pakistan's stock market, mirroring global trends, underwent substantial downturns during the peak of the crisis, with the Karachi Stock Exchange (now part of the Pakistan Stock Exchange) witnessing significant declines in both stock prices and trading activity. We follow Mobarek et al. (2014) to define GFC, where GFC spans over August 09, 2007 – December 31, 2009.

We consider duration of COVID-19 spanning over February 28, 2020 – April 1, 2022 and define the dates of COVID-19, lockdown and post-lockdown based the announcements of National Command and Operation Centre of Pakistan. The choice of COVID-19 is driven by the fact that it affected stock markets across the globe including Pakistan. Contrary to Rubbaniy et al. (2021), we didn't winsorize our data which resulted in more than 8,154 daily observations that we used in our analysis.

The prevailing literature on herding in financial markets employs two primary methodologies for gauging cross-sectional dispersion in market portfolio returns: Christie and Huang's (1995) cross-sectional standard deviation (CSSD) and Chang, Cheng, and Khorana's (2000) cross-sectional absolute dispersion (CSAD). One notable limitation of Christie and Huang's (1995) CSSD measure is its susceptibility to outliers and the inclusion of a squared term in its formulation, which may introduce bias into estimations.

To address this concern, we adopt the CSAD measure of cross-sectional dispersion, initially introduced by Chang et al. (2000). The fundamental premise underlying Chang et al.'s (2000) model is that during periods of significant fluctuations in asset prices, investors often opt to disregard their individual information and instead conform to prevailing market sentiment. This behavior leads to a clustering of stock returns around the average market return, thereby reducing cross-sectional return dispersion. Following Chang et al. (2000), we utilize their approach to calculate cross-sectional absolute deviation in returns, as represented by the equation below:

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

Where $CSAD_t$ is the portfolio return dispersion measure in time *t*, N is the number of stocks in the portfolio in time *t*, $R_{i,t}$ is the observed return of stock *i* in time *t*, $R_{m,t}$ represents the cross-sectional average return of stocks *m* in the portfolio in time *t*.

After computation of the $CSAD_t$, we use the non-linear framework of Chang et al. (2000) to examine the causal relationship between average market return and cross-sectional absolute deviation which is as follows:

$$CSAD_t = \lambda_0 + \lambda_1 \left|R_{m,t}\right| + \lambda_2 R_{m,t}^2 + \mathrm{u_t} \qquad (2)$$

Where λ_0 is the intercept, $\lambda_1, \lambda_2$are loadings of $\left|R_{m,t}\right|$ and $R_{m,t}^2$ respectively; $\left|R_{m,t}\right|$ ($R_{m,t}^2$) is the absolute (squared) cross-sectional average returns, and $u_{i,t}$ is the error term. Chang et al. (2000) demonstrate that the asset pricing model suggests a positive linear relationship between CSAD and absolute market return. However, in the wake of extreme price movements, herd behavior or the market consensus appears which declines the value of $CSAD_t$ and makes the relationship non-linear. A significantly negative value of λ_2 in Equation 2 owing to market consensus captures the non-linearity in the relationship between $R_{m,t}^2$ and $CSAD_t$ and indicates presence of herding behavior during the episodes of market swings.

A sound theoretical ground of Chang et al. (2000) model allows existing studies (Guney et al., 2017) to investigate the herding in the market using daily time series data.

Following Christie and Huang (1995) and Chang et al. (2000), we use Newey and West (1987) heteroscedasticity and auto correlation consistent estimators to address the autocorrelation issue in regression coefficient estimates.

We also examine the herding behavior in various market conditions for instance bear and bull market conditions. We use Thomas et al. (2010) model to test our hypothesis. This method is considered more robust than the Tan et al. (2008) approach, which splits the sample into two and estimates different models for the subsamples. We use the below-mentioned model to test the asymmetric herding behavior based on market returns.

$$CSAD_t = \lambda_0 + \lambda_1 D_U \left|R_{m,t}\right| + \lambda_2 D_D R_{m,t}^2 + \mathrm{u_t} \qquad (3)$$

$$CSAD_t = \lambda_0 + \lambda_1 D_D \left|R_{m,t}\right| + \lambda_2 D_D R_{m,t}^2 + \mathrm{u_t} \qquad (4)$$

Where D_U (D_D) is the dummy variable that takes value equal to 1 if $R_{m,t} > 0$ ($R_{m,t} < 0$), and 0 otherwise. We estimate Equation 9 for both the fundamental and non-fundamental components of the CSAD to test the underlying mechanism of herding if any. The statistically significant and negative coefficient of λ_2 and imply herding during bear and bull market days, respectively.

Additionally, we also test whether investors herd during the GFC and COVID-19 and follow Thomas et al. (2010) model to test this hypothesis, which is stated as:

$$CSAD_t = \lambda_0 + \lambda_1 D_{crisis} \left|R_{m,t}\right| + \lambda_2 D_{crisis} R_{m,t}^2 + \mathrm{u_t} \qquad (5)$$

Where D_{crisis} is a dummy variable that takes the value of 1 if *t* falls during the period of GFC and 0 otherwise. We estimate Equation (7) separately COVID-19 period as well. The statistically significant and negative coefficient of λ_2 imply herding during the GFC and COVID-19.

Results and Discussions

The summary statistics of our data is presented in Table 1, where Panels A, B and C report the descriptive statistics of our variables of study for full sample and during GFC and COVIF-19 pandemic, respectively.

Panels A, B and C of Table 1 reveal that the average portfolio returns of Pakistani stocks are 0.53% in full sample which increase to 0.68% during GFC and fall to 0.63% during COVID-19 pandemic. These number suggest that Pakistani stock market realized higher log returns during GFC and performs better during crisis times. The table shows that standard deviation of returns has been highest during the GFC and lowest in the full sample. Comparing the three panels, we find that skewness of the returns remains positive and have been highest (lowest) in full sample (GFC). These statistics suggest that during GFC Pakistani stock market earned better portfolio returns, which were less concentrated towards left tail of returns' distribution compared to COVID-19 pandemic and full sample.

Table 1 also reports the descriptive statistics of CSAD (CSSD) measure, which shows that the average value of CSAD is highest (lowest) during GFC (COIVD-19) period indicating that uncertainty is most (least) pronounced during GFC (COVID-19). However, the skewness (kurtosis) of CSAD is lowest during GFC followed by COVID-19 and full sample. These statistics suggest that during GFC Pakistani stock market earned better portfolio returns, which were less concentrated towards the left tail of returns' distribution compared to COVID-19 pandemic and full sample. These statistics suggest that during GFC the skewness of uncertainty of Pakistani stock market was less concentrated towards left compared to COVID-19 pandemic and full sample; however, the peakness of uncertainty is close to the normal distribution. Finally, the results of Augmented Dicky-fuller test reported in the last column of Table 1 indicate that all time-series of our study are stationary.

Table 1
Descriptive Statistics

	Mean	Median	SD	Skew	Kurt	P25	P75	N	ADF
Panel A: Full Sample									
Log Realized Portfolio Return	0.526	0.361	0.602	3.599	37.564	0.122	0.733	8154	-71.76***
Cross-sectional SD(CSSD)	3.820	3.434	2.610	2.795	23.602	2.706	4.576	8154	-55.07***
Cross-sectional AD(CSAD)	1.772	1.760	0.998	1.590	22.247	1.338	2.216	8154	-50.98***
Panel A: Global Financial Crisis									
Log Realized Portfolio Return	0.681	0.426	0.770	1.917	7.221	0.130	0.944	625	-17.91***
Cross-sectional SD(CSSD)	5.385	4.627	3.524	0.779	4.057	3.165	7.537	625	-15.95***
Cross-sectional AD(CSAD)	2.362	2.349	1.399	0.145	3.080	1.612	3.414	625	-12.21***
Panel B: COVID-19 Pandemic									
Log Realized Portfolio Return	0.628	0.448	0.661	2.512	12.321	0.194	0.823	548	-20.41***
Cross-sectional SD(CSSD)	3.123	3.088	1.053	0.613	12.042	2.760	3.443	548	-15.27***
Cross-sectional AD(CSAD)	1.864	1.823	0.651	0.209	7.596	1.611	2.109	548	-15.65***

Notes: Table 1 showcases key statistics concerning Cross-Sectional Absolute Deviation (CSAD), Cross-Sectional Standard Deviation (CSSD) and portfolio returns (Rm) of Pakistani stock market. The dataset spans from January, 1991, to April, 2022. CSAD (CSSD) denotes the daily cross-sectional absolute (standard) deviation, while Rm represents the daily equally weighted returns of the entire energy stock portfolio. Descriptive statistics for these variables are presented in Panel A for full sample, Panel B for global financial crisis and Panel C for COVID-19 Pandemic. Last column of the table shows values of Augmented Dickey Fuller tests for all three-time series. Significance levels are indicated as ***, **, and *, denoting significance at the 1%, 5%, and 10% levels, respectively.

Table 2 presents the correlation matrix of CSAD, CSSD and Rmt in full sample, GFC and during COVID-19 pandemic in Panels A, B and C, respectively. The table reveals that the correlation between Pakistani stock market returns and uncertainty is highest (lowest)

during COVID-19 (full sample) with value 0.49 (0.40). These findings show that COVID-19 pandemic altered the correlation patterns between CSAD and portfolio returns (Rmt). The table also show that the correlations between the two measures of uncertainty are very high, suggesting that any measure can be used to investigate the relationship between uncertainty and portfolio returns. To compare our results with mainstream literature, we choose CSAD measure to investigating the relationship between returns and uncertainty.

Table 2
Pair-Wise Correlation Matrix

	Full sample			Global financial crisis			Covid-19 pandemic		
Variables	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
(1) Log Realized Portfolio Return	1			1			1		
(2) Cross-sectional SD(CSSD)	0.40	1		0.43	1		0.49	1	
(3) Cross-sectional AD(CSAD)	0.71	0.80	1	0.67	0.87	1	0.79	0.86	1

Notes: Table 2 documents the pair-wise correlations between the variables of our study at the level of full sample, and during global financial crisis and Covid-19 pandemic

Herding Behavior in Pakistani Stock Market

After discussing the descriptive statistics of our data, we next report the results of investors' herding in Pakistani stock market in Table 3. The statistics in Table 3 reveals no herding in Pakistani stock market at full sample level presented by insignificant coefficient of $[R_{mt}]^2$; however, the table shows a significant presence of herding in both bull and bear market conditions indicated by significantly negative coefficients of $[R_{mt}]^2$ during up (bull) and down-market (bear) conditions. These results suggest that at overall sample level both negative and positive correlated trading results cancel out the effect of each other; however, in bear and bull market conditions there are clear exhibitions of significant correlated trading in Pakistani stock market, where investors' herding is much stronger during the bear market conditions as clear by value of Chi-square test and higher negative value of herding coefficient of bear market conditions.

Table 3
Herd Investing in Pakistan Stock Market

	(1)	(2)	(3)	(4)
Variables	Intercept	|Rmt|	Rmt^2	Adj.R^2
Overall	1.141***	1.208***	-0.007	0.511
	(39.689)	(20.936)	(-0.321)	
Bull Market	0.393***	2.200***	-0.100***	0.662
	(26.833)	(26.596)	(-2.520)	
Bear Market	0.287***	2.564***	-0.393***	0.673
	(16.368)	(14.183)	(-3.985)	
$\lambda_{2\text{Bull}} - \lambda_{2\text{Bear}}$			+2.985***	
Wald's Chi-Square			(-7.63)	

Notes: This table reports the results of Chang et al. (2000) herding models: $CSAD_t = \lambda_0 + \lambda_1\left|R_{i,t}\right| + \lambda_2 R_{m,t}^2 + u_t$ (full sample); $CSAD_{t,Bull} = \lambda_0 + \lambda_1\left|R_{m,t}\right| + D_U\lambda_2 R_{m,t}^2 + u_t$ (Herding during bull market); $CSAD_{t,Bear} = \lambda_0 + \lambda_1\left|R_{m,t}\right| + D_L\lambda_2 R_{m,t}^2 + u_t$ (Herding during bear market). Where $CSAD_t$ represents the cross-sectional absolute deviation of stock returns relative to the cross-sectional average return $R_{m,t}$. The difference in coefficients between the Bull and Bear market herding models, indicated by $\lambda_{2\text{Bull}} - \lambda_{2\text{Bear}}$ is evaluated for significance using Wald's Chi-Square test. T-statistics are presented within parentheses, and significance levels are denoted by asterisks: ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively. All computations incorporate standard errors according to Newey & West's (1987) method, which corrects for heteroscedasticity and autocorrelation.

Although, our full sample results of absence of herding behavior are consistent with Yousaf et al. (2018), our results about herding during bear and bull market conditions and contradicting to that of Yousaf et al. (2018) but consistent to Malik and Elahi (2014) and Shah et al. (2017). One possible explanation of this contradiction could be that they used the data over 2004-2014, while our study spans over 1991-2022 and covers the periods of very high stock market volatility including COVID-19.

During our period of study Pakistan stock market was affected by two important financial market crises namely GFC and the financial crisis stemming from COVID-19 pandemic. Due to importance of these two events, we analysed the existence of investors' herding behavior during these crises and also tested whether or not this behavior changes across the two events. We report our herding results in Table 4, which reveal that correlated trading behavior not only exits during GFC but also during COVID-19 pandemic. In addition, investors' herding in Pakistani stock market is more pronounced during GFC compared to COVID-19 pandemic indicated by higher negative significant values of coefficients of $[R_{mt}]^2$ using Chi-square test. These results suggest that Pakistani stock investors follow the peers in their investment decisions not only during bear and bull market conditions but also during the crises times.

Table 4
Herding in Pakistani Stock Market during GFC and COVID-19

	(1)	(2)	(3)	(4)
Variables	Intercept	|Rmt|	Rmt^2	Adj.R^2
GFC	1.208***	2.271***	-0.371***	0.512
	(11.288)	(10.954)	(-4.611)	
COVID-19	1.320***	0.942***	-0.057***	0.627
	(24.272)	(10.625)	(-2.513)	
$\lambda_{2\text{GFC}} - \lambda_{2\text{Covid}}$			-0.294***	
Wald's Chi-Square			(16.76)	

Notes: This table reports the results of Chang et al. (2000) herding models: $CSAD_{t,Crisis} = \lambda_0 + \lambda_1|R_{m,t}| + D_{Crisis}\lambda_2 R^2_{m,t} + u_t$. Where $CSAD_t$ represents the cross-sectional absolute deviation of stock returns relative to the cross-sectional average return $R_{m,t}$. The difference in coefficients between the GFC and COVID-19 market herding models, indicated by $\lambda_{2\text{GFC}} - \lambda_{2\text{COVID}}$ is evaluated for significance using Wald's Chi-Square test. T-statistics are presented within parentheses, and significance levels are denoted by asterisks: ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively. All computations incorporate standard errors according to Newey & West's (1987) method, which corrects for heteroscedasticity and autocorrelation.

Table 5
Herd Investing in Pakistan Stock Market during COVID-19

	(1)	(2)	(3)	(4)
Variables	Intercept	|Rmt|	Rmt^2	Adj.R^2
COVID-19	1.320***	0.942***	-0.057***	0.627
	(24.272)	(10.625)	(-2.513)	
Lock-down	1.246***	1.542***	-0.202***	0.753
	(5.889)	(3.792)	(-2.177)	
Post Lock-down	1.290***	1.010***	-0.122***	0.561
	(21.774)	(9.088)	(-3.255)	
$\lambda_{2\text{LD}} - \lambda_{2\text{PLD}}$			-0.080	
Wald's Chi-Square			0.82	

Notes: This table reports the results of Chang et al. (2000) herding models: $CSAD_{t,Crisis} = \lambda_0 + \lambda_1|R_{m,t}| + D_{Crisis}\lambda_2 R^2_{m,t} + u_t$. Where $CSAD_t$ represents the cross-sectional absolute deviation of stock returns relative to the cross-sectional average return $R_{m,t}$. The difference in coefficients between the Lock-down and Lock-down market herding models, indicated by $\lambda_{2\text{LD}} - \lambda_{2\text{PLD}}$ is evaluated for significance using Wald's Chi-Square test. T-statistics are presented within parentheses, and significance levels are denoted by asterisks: ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively. All computations incorporate standard errors according to Newey & West's (1987) method, which corrects for heteroscedasticity and autocorrelation

The COVID-19 pandemic has injected a significant level of uncertainty and instability into the Pakistani stock market, influencing investor conduct, sectoral performance, and market dynamics. This has resulted in heightened volatility, marked by sharp fluctuations in stock prices triggered by evolving economic circumstances, pandemic-related news, and governmental interventions aimed at managing the crisis. Investor confidence has been eroded by the ambiguity surrounding the pandemic's repercussions on the economy, corporate profits, and future prospects, prompting a more cautious approach to investment. In response to lockdowns and social distancing mandates, numerous Pakistani investors have transitioned to utilizing remote trading platforms and online brokerage services to

execute their investment strategies. Considering the alterations in investment behavior brought about by the COVID-19 pandemic, we examine the phenomenon of investor herding in the Pakistani stock market during periods of COVID-19, lockdowns and post-lockdowns, with our findings detailed in Table 5. The results in the table exhibit a significant herding by investors in Pakistani stock market during the period of COVID-19 pandemic, which neither changes during lock-down nor post lock-down time spans. We suspected that the investors' herd behavior could be more pronounced during lock-downs compared to post lock-down period; however, as evidenced by the insignificant Chi-square statistic test, we do not find any trace of herding a symmetry during bear and bull market conditions. These findings suggest that Pakistani stock investors preferred to follow the peers in their investment decisions during COVID-19, lock-down and post lock-down periods and kept the peer trading patterns ahead of their private information and personal analysis. In addition, this behavior remains symmetric during lock-downs and post lock-down periods.

Conclusion

The main objective of this study is to investigate the presence of herding behavior in Pakistani stock market investors and whether it varies during bear market, bull market, global financial crisis and COVID-19 pandemic.

Our results find no evidence of herding behavior in Pakistani stock market at full sample level; however, we find clear exhibitions of significant correlated trading behavior in Pakistani stock market during both bull and bear market conditions. However, the investors' herd behavior is more pronounced during bear market conditions compared to a bull run.

Our findings reveal that correlated trading behavior not only exits during global financial crisis but also during COVID-19 pandemic, where investors' herding behavior in Pakistani stock market is more pronounced during GFC compared to COVID-19 pandemic. In addition, the existence of investors' herding behavior does not change during lock-down and post lock-down time spans, and remains symmetric during lock-downs and post lock-down period. These findings suggest that Pakistani stock investors ignore their personal analysis and private information, and follow their peers in their portfolio choice and investment decisions not only during bear and bull market conditions but also during the crises times.

The findings of our study hold various implications for investors, portfolio managers, and regulators. Awareness of the presence of herding behavior in stocks may prompt investors and portfolio managers to consider herding as a speculative signal in their stock valuations, thereby contribute in more informed decision-making. Moreover, herding tendencies can result in suboptimal portfolio diversification, as investors may struggle to distinguish between negatively and positively correlated stocks. Therefore, understanding herding patterns can assist portfolio managers in devising effective and proactive investment strategies to optimize portfolio diversification benefits.

References

Alam, M. N., Alam, M. S., & Chavali, K. (2020). Stock market response during COVID-19 lockdown period in India: An event study. *The Journal of Asian Finance, Economics and Business, 7*(7), 131-137.

Anh, D. L. T., & Gan, C. (2020). The impact of the COVID-19 lockdown on stock market performance: evidence from Vietnam. *Journal of Economic Studies, 48*(4), 836-851.

Ashraf, B. N. (2020). Economic impact of government interventions during the COVID-19 pandemic: International evidence from financial markets. *Journal of Behavioral and Experimental Finance, 27*, 100371.

Chang, E. C., Cheng, J. W., & Khorana, A. (2000). An examination of herd behavior in equity markets: An international perspective. *Journal of Banking & Finance, 24*(10), 1651-1679.

Chiang, T. C., & Zheng, D. (2010). An empirical analysis of herd behavior in global stock markets. *Journal of Banking & Finance, 34*(8), 1911-1921.

Christie, W. G., & Huang, R. D. (1995). Following the pied piper: Do individual returns herd around the market? *Financial Analysts Journal, 51*(4), 31-37.

Ghorbel, A., Snene, Y., & Frikha, W. (2023). Does herding behavior explain the contagion of the COVID-19 crisis? *Review of Behavioral Finance, 15*(6), 889-915.

Guney, Y., Kallinterakis, V., & Komba, G. (2017). Herding in frontier markets: Evidence from African stock exchanges. *Journal of International Financial Markets, Institutions and Money, 47*, 152-175.

Hamid, K., Suleman, M. T., Ali Shah, S. Z., & Imdad Akash, R. S. (2017). Testing the weak form of efficient market hypothesis: Empirical Evidence from Asia-Pacific markets. *Available at SSRN 2912908*.

Hwang, S., & Salmon, M. (2004). Market stress and herding. *Journal of Empirical Finance, 11*(4), 585–616.

Javaira, Z., & Hassan, A. (2015). An examination of herding behavior in Pakistani stock market. I*nternational Journal of Emerging Markets, 10*(3), 474-490.

Kamran, H. W., Nawaz, M. A., & Ullah, M. R. (2020). Vulnerability of stock returns and the effects of covid-19: An event study from the energy sector of USA. *International Journal of Innovation, Creativity and Change, 13*(6), 1157-1174.

Kim, N., & Mangi, F. (2016). What's next for Asia's best-performing stock market. *Bloomberg Markets*.

Kremer, S., & Nautz, D. (2013). Causes and consequences of short-term institutional herding. *Journal of Banking & Finance, 37*(5), 1676-1686.

Kumar, A., Badhani, K., Bouri, E., & Saeed, T. (2021). Herding behavior in the commodity markets of the Asia-Pacific region. *Finance Research Letters, 41*, 101813.

Mobarek, A., Mollah, S., & Keasey, K. (2014). A cross-country analysis of herd behavior in Europe. *Journal of International Financial Markets, Institutions and Money, 32*(1), 107–127.

Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. *International Economic Review*, *28*(3), 777-787.

Olsen, R. A. (1996). Implications of herding behavior for earnings estimation, risk assessment, and stock returns. *Financial Analysts Journal, 52*(4), 37-41.

Rubbaniy, G., Polyzos, S., Rizvi, S. K. A., & Tessema, A. (2021). COVID-19, Lockdowns and herding towards a cryptocurrency market-specific implied volatility index. *Economics Letters, 207*, 110017.

Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *The American Economic Review*, 465-479.

Tahir, S. H., Sarosh, R., Shoukat, A., Ahmad, G., & Ullah, M. R. (2018). Time varying volatility of stock exchanges: comparative analysis of Pakistan with newly industrialized countries. *Journal of Managerial Sciences, 12*(3), 346-359.

Tahir, S. H., Tahir, F., Syed, N., Ahmad, G., & Ullah, M. R. (2020). Stock market response to terrorist attacks: An event study approach. *The journal of Asian finance, economics and business, 7*(9), 31-37.