Journal of Economic Sciences
Volume 4, Issue 1
https://www.jesciences.com

Investigating Investor Herding in the Pakistan Stock Market: A Sectoral Analysis

Shandana Shaukat [1*]

Affiliations
1. Institute of Management Studies, University of Peshawar, Pakistan

*Corresponding Author Email:
shandanashaukat@gmail.com

Timeline
Received: Mar 24, 2025
Revised: Jun 20, 2025
Accepted: Jun 22, 2025
Published: Jun 30, 2025

DOI
https://doi.org/10.55603/jes.v4i1.a10

Abstract
The current study delves into the phenomenon of investors' herding within the Pakistan Stock Exchange (PSX) and its various sectors. The study operates under the assumption that herd behavior among investors is primarily driven by fundamental information, resulting in price adjustments that align with newly available data and contribute to market efficiency. Conversely, there is a counterargument positing that fundamental information does not instigate herd behavior, consequently leading to price. The study has evaluated the herding behavior demonstrated by all firms listed on the Pakistan Stock Exchange (PSX), especially during times of crisis. A market-wide herding measure known as Cross-Sectional Standard Deviation (CSSD) Cross sectional absolute deviation (CSAD) models introduced by Christie & Huang (1995) and Chang et al. (2000) is applied to assess the presence of herding behavior: To conduct this analysis, the study utilizes intraday, daily, and weekly stock returns from a sample of 620 companies listed on the Pakistan stock exchange. The findings suggest that the variability of equity returns often rises during times of significant price volatility instead of falling, indicating a lack of herding behavior. The results indicate that neither the PSX nor its individual sectors exhibit any significant herding tendencies. The results highlight the need for policymakers and market participants to develop sector-specific strategies that leverage this independence, challenging traditional assumptions of uniform investor behavior and promoting more informed market practices.

Keywords: *Herding Behavior, Cross sectional standard deviation, Cross sectional absolute deviation, Pakistan stock market*

JEL Classification: *G11, G12, G14*

1. Introduction

Behavioral finance is mainly concerned with the study of rationality of investors, and the cognitive processes used by investors in their financial decision making, particularly, investment decisions of capital markets (Fromlet, 2001). Investor behavior can lead to such price changes that are caused by collective phenomena and not due to arrival of the new information. This kind of behavior has made researchers to look for empirical evidence and the theoretical explanations regarding behavior finance phenomena i.e., Herding behavior.

Herding means a group of investors who imitate the decisions of other investors and ignore their own information and beliefs. The pioneers of study on Herding behavior are Banerjee and Welch (1992). These authors found that when large number of investors select a certain type of behaviour, other investors follow the same behavior while ignoring their own information which results in similar decisions. Empirical studies on herding gives contradictory results. One of the factors responsible for these mixed results might be the quarterly time horizon chosen for institutional investors.

Previous studies on institutions indicates that institutional investors are more likely to participate in spurious herding, whereas individual investors are more prone to exhibit intentional herding behavior than institutions. Herding behavior varies among different exchanges and countries and is not consistent across the board (Griffin et al., 2003). Specifically, investors in developing nations might display herding behavior that contrasts with what

is seen in emerging markets. The intentional herding is observed among both domestic individuals and foreign institutional investors in China, in spite of the differences in access to information and expertise between these two (Tan et al., 2008). According to Bikhchandani and Sharma (2000) herding behavior among investors can be categorized into rational and irrational actions. Rational behavior happens when an investor takes into account the actions of others.

The theory of rational herding behavior posits that various elements contribute to herding tendencies, including information cascades (Banerjee 1992; Bikhchandani et al. 1992), compensation frameworks (Scharfstein and Stein 1990; Roll 1992; Admati and Pfleiderer 1997), and the desire to uphold one's reputation (Trueman 1994; Prendergast and Stole 1996). In contrast, the concept of irrational herding behavior suggests that the investment decisions of certain irrational market participants may result in herding behaviors.

It is proposed that investors sometimes make their investment decisions based on current market trends instead of assessing the true value of financial assets (De Long et al., 1990; Froot et al., 1992). Some theoretical examinations of irrational herding behavior indicate that this behavior is a deliberate action influenced by investor sentiment. This suggests that investors recall from past experiences that increasing prices tend to keep rising, and this recollection leads them to purchase stocks as prices go up, which in turn propels stock prices higher. Such herding behavior is influenced by psychological elements, including investors' belief in the potential rise of stock prices, optimistic thinking, consideration of others' opinions, and the pressure to conform (Bikhchandani and Sharma, 2000).

Earlier studies examined the herding behavior of investors during the crisis period and in extreme market movements. Mostly these studies concentrated on Asian countries and developed countries. Herding behavior have not got much attention in the Pakistani stock markets. Javed et al. (2013) conducted pioneering work on herding behavior in Pakistan they studied herding in companies which were listed in KSE-100 Index. Another work was carried out by Malik and Elahi (2014) who investigated the herding behavior of 261 firms daily share prices during the bearish, bullish and normal market trend for the period 2001-2003.

Noise is theoretically associated with irrational behavior, as irrational traders interpret noise as valuable information. Notably, advocates of the efficient market hypothesis argue that rational arbitrageurs take advantage of noise traders, steering prices toward their fundamental equilibrium values. Consequently, the presence of noise reflects the responses of noise traders to the actions of rational arbitrageurs, which can lead to the overvaluation or undervaluation of stocks during times of heightened or diminished market sentiment (Baker and Wurgler, 2003; Lemmon and Portniaguina, 2006).

Researchers have struggled to provide a comprehensive explanation of the dynamics between rational and irrational investors. The ongoing discourse surrounding this topic enriches the academic literature, yet it primarily focuses on the influence of noise traders on expected asset returns and the volatility of those returns. The market's response to noise, which arises from numerous minor events, remains poorly understood. This phenomenon is particularly observed in investors in the developed world, who perceive systematic risk and return anomalies to be a product of irrational investment sentiments (Brown and Cliff 2004; Lemmon and Portniaguina ,2006; Qiu and Welch ,2006).

The Pakistan Stock Exchange (PSX) is characterized by a high percentage of retail investors, who capture the majority of trading volumes and are responsible for the activities in the market (Saeed & Iqbal, 2020). It is necessary to know how these investors behave since their decision-making may be significantly different from those of institutional investors, who tend to use more sophisticated strategies and have superior resources available at hand (Khan et al., 2021). Retail investors, being guided by emotions and sentiment, will have diverse behavior compared to institutional investors, who are likely to base their decisions on fundamental analysis and long-term strategies (Ali & Ahmed, 2019). Therefore, it is important to understand the dominance of retail investors in the PSX along with the influence of their behavior in order to have a complete understanding of market dynamics. Unlike prior research that typically focuses on selected sectors or short time horizons, this study analyzes a comprehensive dataset spanning from 2011 to 2021, encompassing both daily and intraday data across all listed firms. This broad scope enables a detailed market-wide and sectoral assessment of herding patterns, providing

fresh insights into the unique dynamics of an emerging market. By integrating various robust statistical approaches with an extensive dataset, the paper contributes to a deeper understanding of investor behavior and market efficiency in Pakistan's financial markets.

Economic performance in a country is significantly influenced by the stock market's performance and serves as a vital component of that nation's economy. Analyzing behavioral factors, particularly herding behavior, is crucial for understanding and explaining investor decisions and their effects on stock market performance.

Significant price and return fluctuations have been experienced by companies listed on the Pakistan Stock Exchange. The daily ups and downs of stock prices observed at the Pakistan stock exchange are the primary reason for the issues contributing to market instability. A market characterized by volatility can deter investors from committing their funds to the stock market and may erode their trust. This can result in a sluggish improvement in the stock market's performance or even lead to its collapse, negatively affecting the overall economy. Lao and Singh (2011) provided evidence indicating that herd behavior patterns are associated with asymmetric influences. The objectives of the study are to investigate herding behavior of investors in Pakistan stock market and to examine the impact of herd behavior on Stock market performance.

Herding behavior is an important concept to understand in the analysis of the world stock market and particularly for the Pakistan stock market as it offers important information on investors actions and in particular during adverse stock market conditions. This behavior is characterized in the literature as the inclination to adhere to the majority's behavior or opinion based on emotional needs rather than logic and rationality. Within the Pakistan stock market, this behavior is crucial in understanding how market inefficiencies are formed, and the conditions that will lead to the emergence of bubbles or subsequent market crashes. Furthermore, it assists policymakers, regulators, and investors in identifying aspects that cause market imbalances, in the end facilitating the creation of more sound financial markets.

2. Literature Review

One of the most researched aspects of behavioral finance has been the herding behavior of investors in general and how social dynamics and psychological biases play a crucial role in market performance. This is a literature review of some very recent studies on herding behavior that focuses on its prevalence and consequences of this phenomenon in the context of the Pakistan Stock Market. It is hypothesized that because noise cannot exploit the discrepancy, it causes inefficiency in the market. Empirical studies from more developed economies indicate that emotional factors are important for consideration within asset pricing models. Indeed, theories in behavioral finance explain how irrational investor opinions influence the market dynamics. This further affects asset pricing and expected returns. This was further explained by the theoretical model of De Long et al. (1990), according to which some investors, labeled noise traders, based their decisions on sentiment-views regarding future cash flows and securities risks, which do not correspond to the true economic fundamentals of the assets concerned. Other agents behave as rational arbitrageurs and are not affected by this sentiment. Irrational traders misunderstand noise, and hence they come up with some false perceptions.

2.1 Conceptual Framework and Theoretical Underpinnings

Behavioural finance downplays the tenets of classical finance on rationality and offers a foundation upon which the herding behavior of investors' concept is based. Behavioural theories argue that investors do not rely much on their private information or analysis but rather generally tend to follow other people's actions. This phenomenon, known as herd behavior, operates through cognitive biases, such as information cascades (Bikhchandani et al. ,1992). Asset mispricing, increased volatility, and market inefficiencies are possibly some of the results of this type of behavior.

2.2 Empirical Evidence from Global Markets

International marketplaces' research has generated extensive empirical data on herding behavior across various asset classes and market conditions. Chang et al. (2000) identified considerable evidence of herding behavior by institutional investors in the Taiwanese stock market during periods of market turbulence. Similarly, Demirer and Kutan's (2005) study evidenced that investors in emerging markets exhibit herd behavior and their importance and influence regarding the stability of that very market. The empirical studies conducted on herding

behavior divide the investors into two groups: individual investors and institutional investors, the latter group being wider. The data is not quite explicit on which group practices herding behavior more often. The reason for this obscurity is that herding is a multifaceted phenomenon it could be either irrational or rational. According to Griffin et al. (2003) there are several determining variables as to whether herding behavior is rational or spurious. These include incentives for similar stock choices, the same old response to similar news occurrence, and actions of fund managers that produce desirable market results. Irrational or intentional herding can be defined as the act of trading practices which mimic others' choices without analysis of previous experience.

2.3 Herding Behavior in Emerging Markets

Newly emerging economies have specific characteristics in the reaction of investors that need further explanation. Ahsan and Sarkar (2013) conducted study of herding effect by using both Christie and Huang (1995) models and Chang et al. (2000) in Dhaka Stock Exchange (DSE). Here, the authors used monthly Data for all equities listed on the DSE for the period 2005-2011. Also, market stress of 2010 was taken into consideration. No evidences were found in the results of herding at the DSE. These results of Ahsan and Sarkar, (2013) are also contradictory to the previous studies. Javaira and Hassan (2015) examined the tendency of investors in Pakistan's Stock Exchange to collaborate, while also identifying distinct group behaviors among individual investors, especially when market signals appear to be changing or during speculative activities. Their study was on the role of some influences and social ties that stimulate investment in livestock farming in the Pakistani market, and they were able to show the implications of such influences. Kiran and Khan (2016) found mixed results for herding phenomenon by employing methodologies of Christie and Huang (1995) and Chang et.al (2000).

2.4 Influence of ECG Initiatives and Corporate Governance on Herding Behavior in Stock markets

Moussa, Alkaraan & Elmarzouky (2024) examine the relationship between ESG initiatives and financial performance in UK firms. Their findings indicate that companies with strong ESG practices tend to experience enhanced financial performance. This relationship is crucial for understanding herding behavior, as investors may flock to firms perceived as socially responsible, leading to collective buying or selling based on ESG ratings rather than fundamental values Alkaraan et al. (2023) focus on the influence of governance mechanisms on sustainable strategic investment decision-making in UK companies. They highlight that effective governance can create synergies between Industry 4.0 technologies and circular economy practices. This alignment can enhance investor confidence, leading to herding behavior as investors are drawn to firms that demonstrate a commitment to innovation and sustainability. The study suggests that strong governance can mitigate risks associated with herding by fostering a more stable investment environment. The studies collectively suggest that the growing emphasis on ESG factors is reshaping investment behavior in both developed and emerging markets. As investors increasingly prioritize sustainability, herding behavior may become more pronounced, with market participants gravitating towards firms that align with their values, potentially leading to volatility in stock prices based on collective sentiment rather than fundamental analysis.

2.5 Factors Influencing Herding Behavior in Pakistan

Several issues specific only to the environmental context of Pakistan have an important role in the emergence of herding behavior among investors.In contrast, regulatory uncertainty and information inconsistency have been found to complicate herd behavior within the emerging markets (Kumar and Lee, 2006). Latif and Shah (2014) conducted a study examining the herding behavior exhibited by investors in mutual funds within the Pakistan stock market.They used pooled variance technique Measured herding and descriptive statistics for data analysis, the regression model was returns taken through equity were considered to be the dependent variables, while herding of funds was adopted as Independent variable over a five-year monthly sample, ranging from 2006-2010.Khan (2013) identified herding for daily data from 18 distinct KSE sectors using the cross sectional dispersion of returns technique.

According to Chang et al. (2000) and Christie and Huang (1995), the authors were unable to determine herding for maximal quantity of sectors. The research conducted by Jabeen and Rizavi (2019) revealed that herding behavior was not present in the Pakistan Stock Exchange (PSX); however, certain sectors exhibited this tendency. Afzal, Rasheed, and Khalid (2024) applied CSSD/CSAD models across bull/bear markets, Ramadan, and crises—including COVID-19 and the 2007–08 financial crisis—and found that herding tends to emerge during the 2007–

08 crisis and pandemic but not under regular market conditions. Bilal et al. (2021) further confirm this pattern using state-space methodologies, demonstrating that herding in the PSX is more episodic—particularly evident during crises—and less persistent during normal periods. Shah, Imran, and Khan (2024) use CSAD-GARCH panel models to link herding with increased volatility under uncertainty, recommending future research to incorporate institutional investor behavior and macroeconomic variables to fully capture the dynamics.

2.6 Implications for Market Efficiency and Stability

The impact of herding practices on market efficacy and stability is substantial. Research shows that the sector can lead to weak prices, which can ultimately lead to a market crash (Chiang and Zheng, 2010). The research conducted by Hassan and Jamil (2021) demonstrates that there is a lack of market-wide herding behavior in response to both positive and negative market returns, particularly during periods of high volatility in the stock market.

The most significant aspect of investigation in behavioral finance is investor herding behavior in the Pakistan Stock Market. So far, the literature has identified its presence, drivers, and implications as far as herding behavior among investors is concerned. Much consideration has been directed towards how it contributes to market dynamics and efficiency as a whole. The future studies should investigate how strategies that mitigate negative herding promote better decision-making among investors in emergent markets like Pakistan.

3. Methodology

3.1 Research Design

This research encompasses data from 620 companies that are registered on the Pakistan Stock Exchange, covering the period from 2011 till 2021.Business studies and surveys of investors helped develop direct measures. Economic surveys and the official website of the Pakistan Stock Exchange were used to obtain the data. The dependent variable in the study is provided by quarterly bulletins. The independent variables include investor herding behavior. Historical data was obtained from websites including www.psx.com.pk and www.brecorder.com.

3.2 Models used in Study

This study examines the occurrence of herding behavior within the Pakistani stock exchange. The methodologies employed for data analysis include those developed by Christie and Huang (1995), Chang et al. (2000), and Gleason et al. (2004). OLS regression estimation technique is used for data analysis. The model developed by Christie and Huang (1995), known as CSSD, is employed to assess the average closeness in order to detect herding behavior. The proximity is determined by assessing the actual market returns in relation to the returns of each individual asset.

Cross-Sectional Standard Deviation (CSSD)

Christie and Huang (1995) are widely recognized for pioneering research on market-wide herding. Their model centers on examining how closely the returns of individual stocks align with overall market returns. The model operates on the following principles:

$$\text{CSSDt} = \frac{\sqrt{\sum N(Rit - Rm,t)2}}{N-1}$$

In the model, N is the total number of stocks in the portfolio, Ri,t is the return of stock I at time t, and Rmt is the cross-sectional average return of the N stocks in the market portfolio at time t.

The study uses an approach with dummy variables to identify herd behavior. First, it distinguishes the degree of dispersion at times when the return distributions of the market are at their furthest tails. It then looks at whether this dispersion, with the outermost market returns excluded, deviates noticeably from the average dispersion levels. The following regression model is utilized for conducting these tests:

$$\text{CSSD}_t = \alpha + \beta_1^U D_t^U + \beta_2^L D_t^L + \varepsilon_t$$

Where α represents the coefficient indicating the average. Where α represents the coefficient indicating the sample average dispersion, excluding the segments covered by the two dummy variables; D_t^L / D_t^U equals 1 if on day t, Rm is either 0 or in the extreme lower/upper tail of the return distribution.

In the absence of herd behavior, there is an increase in dispersion in relation to market, resulting in coefficients that are positive. Conversely, negative coefficients suggest that herd behavior is present within the market. Furthermore, the equation delineates significant market fluctuations based on two criteria: the upper one percent (or five percent) and the lower one percent (or five percent) thresholds.

Cross-Sectional Absolute Deviation (CSAD)

The CSAD model shares similarities with the CSSD model, there are notable distinctions between them. The CSAD model is more sophisticated in its ability to detect herd behavior during periods of extreme market returns. It employs an absolute deviation approach to measure the dispersion of individual stock returns in relation to the weighted average market returns.

The CSAD model integrates elements of the Capital asst pricing model to illustrate the phenomenon of herd behavior in the collective returns of individual securities, particularly during periods of significant market volatility. This phenomenon indicates that investors tend to disregard their own information and instead follow the prevailing market sentiment.

The model is outlined as follows:

$$CSADt=1N\ \Sigma|R_{i,t}-R_{m,t}|$$

In this context, Ri,t indicates the return of firm i at time t, while Rm,t refers to the average return across N stocks within the portfolio at that same time. Here, N represents the total number of stocks included in the portfolio.The metric emphasizes two dimensions of market returns and suggests a nonlinear relationship between the returns of individual stocks and overall market returns. This methodology effectively underscores the presence of herd behavior. In a market devoid of herding, the returns of the market and those of individual securities generally exhibit opposing movements, leading to a stronger linear correlation. In contrast, during instances of herding, the relationship between the returns of individual securities and their variability tends to diminish, or at the very least, increases at a rate that is less than proportional to the market return.

$$\text{CSADt} = \alpha+\gamma1|Rm.t| + \gamma2R^2\text{m,t} +\varepsilon t$$

Where Rm,t denotes the market return and Y2 indicates herd behavior if it is significant and negative.The relationship between CSAD and Rm may demonstrate asymmetrical characteristics, with herd behavior evident in both upward and downward market trends. This analysis encompasses the entire market, yet it is segmented into two sections according to the direction of the corresponding market return.

$$\text{CSAD}_t^{UP} = \alpha + \gamma_1^{UP}\left|R_{m,t}^{UP}\right| + \gamma_2^{UP}\left(R_{m,t}^{UP}\right)^2 + \varepsilon_t \ \text{ if } R_{m,t}^{UP} > 0$$

Chiang and Zheng (2010) Model

This equation differs from the one used in the CSAD model by incorporating an additional variable, Rmt. This inclusion allows for a comprehensive observation of variations in investor behavior across different market conditions. The term γ2 + γ1 focuses on the relationship between return dispersion and market return when Rm,t > 0, while γ2 − γ1 describes the same relationship when Rm,t < 0.

$$\text{CSAD}_t = \gamma_0 + \gamma_1 R_{m,t} + \gamma_2\left|\text{R}_{\text{m,t}}\right| + \gamma_3 R_{m,t}^2 + \varepsilon_t$$

CSADt reflects the degree of variability in returns, while Rmt represents the value of the equally weighted realized return for all industry indexes on day t. The notation |Rmt| represents the absolute value. According to the CSAD model, the Capital Asset Pricing Model (CAPM) is founded on the idea that there is a linear relationship between the market portfolio's returns and the variability of the returns of individual securities. This theory indicates that the variability in returns of individual assets is expected to rise in accordance with |Rm,t|. Investors

demonstrate herd behavior by uniformly reacting to large market price movements or changes. Therefore, the addition of R2 and a significant negative coefficient, γ3, aligns with the presence of herd behavior.

3. Results and Discussion

The data was analyzed on the basis of descriptive statistics and regression analysis of CSSD and CSAD Models.

Table 1: Daily Descriptive Statistics

		CSADt				Rm,t			
S #	Sector	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
	All Sectors (PSX)	3.387	2.623	.0273	56.347	.024	.869	-15.991	21.0848
1	Auto Assembler	2.933	3.009	.009	64.278	6.847	.005	233.987	0.001
2	Automobile Parts & Accessories	3.422	4.883	0	123.553	.054	4.082	-122.604	87.916
3	Cable& Electric Goods	3.503	5.662	0	134.316	.031	4.425	-94.922	111.549
4	Cement	3.117	2.392	.0002	26.721	.034	2.637	-16.432	15.482
5	Chemicals	3.008	2.578	.032	37.913	.056	2.378	-22.148	19.946
6	Close EndMutual Funds	4.342	5.939	.017	105.172	4.342	5.939	.019	105.173
7	Commercial Banks	2.513	2.018	.105	33.704	.028	2.535	-11.093	18.218
8	Engineering	3.255	4.989	0	135.938	.041	3.641	-92.387	75.498
9	Fertilizers	2.274	2.918	.011	74.241	.014	3.002	-55.149	55.593
10	Food & Personal Care Products	3.146	6.644	.017	168.332	.063	3.885	-152.416	203.596
11	Glass &Ceramics	3.498	4.559	.013	96.791	.031	3.562	-73.884	64.323
12	Insurance	2.888	2.796	.009	45.661	.008	2.257	-25.624	22.228
13	Investment Banks/Investment Co/Security Cos	3.684	3.252	.024	54.041	-.005	3.171	-28.905	44.643
14	Jute	5.579	8.852	.015	148.662	.028	9.135	-86.738	86.738
15	Leasing Companies	3.948	4.194	.004	34.601	-.009	3.416	-18.531	18.487
16	Leather& Tanneries	3.291	5.457	.0004	135.029	.038	4.584	-124.498	101.076
17	Miscellaneous	3.329	4.051	.009	72.809	.027	3.058	-46.062	51.267

18	Modarabas	4.243	3.765	.009	58.841	.021	3.016	-17.351	36.651
19	Oil&Gas Exploration Companies	2.185	2.291	.0007	35.969	.062	2.847	-35.462	19.146
20	Oil &Gas Distribution Companies	2.458	3.638	.003	98.298	.028	4.199	-63.591	64.952
21	Paper & Board	3.128	4.882	.003	76.885	.023	3.492	-49.784	49.766
22	Pharmaceuticals	2.691	4.658	.015	113.345	.057	4.029	-113.345	89.776
23	Power Generation &Gas Distribution	3.396	3.119	.037	67.076	.006	2.964	-41.418	38.444
24	Synthetic &Rayon	3.117	4.024	.041	77.178	.013	3.255	-61.148	65.413
25	Refinery	2.555	3.138	.002	69.249	.033	3.539	-49.621	92.591
26	Sugar&Allied Industries	3.638	3.731	.007	58.155	.035	2.838	-21.623	37.263
27	Technology& Communication	2.919	2.509	.019	52.188	.003	3.121	-28.185	17.514
28	Textile Composite	6.482	5.558	.003	98.293	.013	4.369	-31.377	21.733
29	Textile Spinning	4.206	4.073	.106	63.192	.025	2.964	-27.751	59.322
30	Textile Weaving	3.861	6.238	.008	154.435	.006	4.837	-116.804	118.999
31	Tobacco	3.063	8.088	.0004	163.597	.117	5.728	-122.948	118.977
32	Transport	2.939	3.756	.004	108.408	.031	3.592	-67.035	88.722
33	Vanaspati & Allied Industries	2.996	4.176	.0186	67.657	.047	3.272	-43.216	34.247
34	Wool	2.764	3.728	.0009	57.571	-026	5.831	-138.687	138.757

Source: *Author's estimation*

Table 1 presents the daily descriptive statistics for CSADt and Rm,t, along with the sectoral distribution of the Pakistan Stock Exchange. The dispersion of stock returns is computed as C= $\sum_{i=1}^{n}\left|P_{t-1}-P_{t-i-1}\right|$. The daily descriptive statistics for all sectors of the Pakistan Stock Exchange (PSX), along with the Rm,t and CSADt metrics, are presented. This analysis utilizes daily and intraday data spanning from 2011 to 2021. Observations indicate a gradual increase in both the daily and monthly mean and standard deviation of the CSADt. Notably, the jute sector exhibits the highest mean values for Rm,t (5.8) and CSADt (4.5) on a daily basis. Such elevated average values imply that market fluctuations among sectoral returns are significantly pronounced. Furthermore, a high standard deviation indicates that unforeseen events or shocks contribute to the notable cross-sectional disparities observed within the stock markets and their respective sectors. In contrast, the Cement sector demonstrates significant nonlinear effects, as reflected in a high $\gamma 3$ value and R^2, suggesting sensitivity to macroeconomic factors like

construction demand and policy shifts. These differences highlight the role of sector-specific fundamentals and investor composition in influencing market behavior.

Table 2: Regression estimates

S#	Sector	γ0	γ1	γ2	γ3	R2	Durbin Watson
	All Sectors (PSX)	1.45 *** (37.51)	.075*** (5.65)	.542*** (14.95)	.088*** (4.56)	0.634	2.547
1	Auto Assembler	1.389*** (52.08)	. 037*** (2.59)	.278*** (6.37)	.102*** (8.88)	0.559	2.048
2	Automobile Parts Accessories	&.588*** (13.23)	.008 (0.28)	.758*** (16.48)	.0118** (2.49)	0.834	2.207
3	Cable &Electric Goods	1.501*** (44.41)	.027** (2.03)	.328*** (10.11)	.0368*** (8.17)	0.901	2.385
4	Cement	1.476*** (43.38)	.019** (1.98)	.461*** (11.08)	.599*** (8.98)	0.995	2.068
5	Chemicals	1.101*** (57.14)	.036* (1.82)	.774*** (24.31)	.0716*** (20.95)	0.837	2.125
6	Close End Mutual Funds	.932*** (27.04)	.001 (0.27)	1.082*** (48.12)	.011*** (8.48)	0.839	2.093
7	Commercial Banks	1.115*** (38.35)	.053*** (3.67)	.244*** (4.51)	.054*** (3.88)	0.551	2.074
8	Engineering	.755*** (26.17)	.022 (1.27)	1.145*** (21.64)	.0408*** (3.91)	0.794	2.025
9	Fertilizers	.786*** (27.38)	.017 (1.48)	.229*** (4.4)	.062*** (4.52)	0.502	2.048
10	Food& Personal Care Products	.737*** (25.54)	.022 (1.29)	1.249*** (42.07)	.014*** (10.04)	0.965	2.036
11	Glass & Ceramics	.849*** (46.14)	.007 (0.38)	1.155*** (41.15)	.011*** (11.61)	0.817	2.183
12	Insurance	1.467*** (41.65)	.037*** (2.83)	.812*** (36.11)	.025*** (8.61)	0.859	2.293
13	InvestmentBanks/Insurance Cos/Security Co	1.276*** (48.54)	.027 (1.58)	1.001*** (41.44)	.016*** (4.98)	0.657	1.928

14	Jute	.617***	-.012	1.628***	-.021***	0.942 2.044
		(18.43)	(-0.86)	(54.16)	(-6.44)	
15	Leasing Companies	.498***	-.0147	1.728***	-.026***	0.795 2.044
		(17.65)	(-0.99)	(59.32)	(-7.96)	
16	Leather&Tanneries	.386*** (13.25)	-.029 (-1.68)	1.332*** (33.48)	-.002 (-0.66)	2.013 0.808
17	Miscellaneous	.957***	-.025*	1.148***	.019***	0.771 2.211
		(43.03)	(-1.89)	(51.39)	(10.85)	
18	Modarabas	1.539***	-.013	1.132***	.026**	0.668 2.327
		(35.69)	(-0.83)	(24.56)	(2.34)	
19	Oil &Gas Exploration Companies	.705***	.016	.329*** (12.98)	.021***	0.511 2.061
		(29.15)	(1.02)		(16.96)	

Source: *Author's estimation*

Table 2 presents the regression estimates for the equation CSADt = $\gamma 0_3$ + γ1Rm,t + γ2|Rm,t| + γ3Rm,t^2 + εt. Within this framework, CSADt refers to the measure of return dispersion, Rm,t represents the equally weighted realized return of all industry indexes on day t, |Rm,t| denotes the absolute value, and Rm,t^2 indicates the squared term ***,**,* denote statistical significance at the .01 level, .05 level, and .1 level, respectively.

Positive coefficients (γ1, γ2, γ3) suggest that increases in market returns and their absolute values are associated with higher return dispersion in the respective sectors. R-squared values provide insights into how much of the variability in return dispersion can be explained by the regression model.Differences across sectors (e.g., higher R2 for sectors like Cement indicating better fit) highlight sector-specific sensitivities to market conditions. The tendency for herding behavior to vary across sectors can be attributed to differences in market structure, investor composition, and sensitivity to external factors. For example, sectors such as Jute, Leasing Companies, and Textile Composite exhibit high mean CSADt values and significant nonlinear return-dispersion coefficients (γ2), suggesting stronger herding tendencies.

These sectors are often characterized by lower liquidity, limited analyst coverage, and a high proportion of retail investors, making them more susceptible to collective behavioral biases and speculative trading. In contrast, sectors like Commercial Banks and Fertilizers show lower dispersion and weaker nonlinear effects, indicating relatively stable investor behavior, likely due to institutional investor dominance and stronger fundamentals. Moreover, cyclical and sentiment-driven industries—such as Cement and Technology—tend to respond more sharply to macroeconomic or policy signals, amplifying the risk of short-term herding during uncertainty.These patterns emphasize the importance of sector-specific factors in identifying the degree and nature of herding behavior in financial markets.

The table shows a comparison study of the response of various sectors of the PSX to the changes in market returns. Following these studies, investors and analysts may wish to be informed about specific risks by sector, this tends to be useful while making portfolio allocation decisions and managing its risks. Regression estimates in the table embark on full details regarding how much the market returns and return dispersions of different industries of the PSX are, which turn out to be meaningful to different market participants as well as researchers doing business in that region.

These results are aligned with current literature which stipulates that herding behavior in the Pakistan Stock Exchange (PSX) is more pronounced during periods of market stress. For instance, Shah, Imran, and Khan (2024) reported higher herding during periods of high volatility and uncertainty and elucidated those investors tend to follow the crowd when there is turbulence in the market. Similarly, Perveen, Mahmood, and Riaz (2024) found

herding behavior during both the global financial crisis and the COVID-19 pandemic, citing the role of external shocks on investor behavior. In contrast, studies by Kashif et al. (2021) and Javaira and Hassan (2015) found no herding behavior in normal market conditions, emphasizing the significance of market context in shaping investor behavior. These findings point to the complexity of herding behavior and suggest that while it can lead to market efficiency in times of crisis, it can also lead to mispricing and excess volatility. Therefore, an understanding of the conditions under which herding occurs is important for investors and policymakers wishing to evade its potential adverse effects.

5. Conclusion and Policy Implications

The study investigated the presence of herd behavior in Pakistan stock market. The analysis found that the stock returns in equities increased during these price changes as well proposed that it was unproven theory that during high volatility,individual investment would yield poorer returns because this belief that people are irrational and thus reduce their investment during periods of high uncertainty.The results presented in this study are in line with those by Christie and Hunag (1995) which also validate the assumption made by the rational asset pricing model that the market is generally efficient throughout period of excessive movements.

The findings of Chang et al. (2000) model provide more evidence that herding tendency does not exist when there is significant market volatility. This finding is consistent with the method proposed by Gleason et al. (2004), which emphasizes the important role of the spread measure used, as market returns exhibit similar trends across different agents Christie and Huang (1995) provide documentation of this and they strengthen the basis for meaning-making. Asset pricing models that show market efficiency in critical market conditions confirm this efficiency.Notably, excessive market dynamics can manifest during such periods, and the findings support the conclusions of Gleason et al. (2004) respectively.

The use of a spread measure is argued to be appropriate, since market returns exhibit the same structure.The different agents exhibit specific behaviors depending on the particular agent in question. Chang et al. (2000) examined the possibility that this relationship was not indirect.

Chang et al. (2000) confirmed that the presence of a remarkably negative nonlinear coefficient is associated with another significant negative nonlinear coefficient. Statistically significant results indicate the absence of herding behavior. In summary, the investigation of investor behavior variables in Pakistani stock market reveals the dynamics of collective actions of investors. Through comprehensive data analysis and application of statistical techniques , this study enhances the understanding of network economics and its impact on market activity. Understanding the causes and consequences of livestock practices is essential for market stability and sustainable development in Pakistani financial markets.

Herding phenomenon in Pakistan stock market provides valuable insights into complex investor decisions, overall market efficiency Many studies and empirical data show that herding tends to increase market volatility and can create asset mispricing and the tendency to they will conform to the majority.

This study finds no significant evidence of herding behavior at the aggregate level in the Pakistan Stock Market, despite theoretical expectations of investor mimicry. However, sector-specific herding—particularly in energy and consumer goods—emerges during periods of heightened volatility. These results highlight the importance of targeted policy interventions. Enhancing investor education, improving transparency, encouraging greater institutional participation, and deploying sector-specific surveillance can collectively reduce irrational trading behavior, stabilize market fluctuations, and enhance market efficiency. The findings suggest that regulators should focus on sectors prone to herding by enhancing transparency and investor education to reduce irrational trading. Implementing measures like volatility controls during market stress can help stabilize these sectors. Clear communication of policy changes is also crucial, especially for sensitive sectors, to prevent herding-driven market swings and improve overall market efficiency.

Pakistan's stock market has the potential to generate short-term momentum and affect the overall stability of the economy. This situation highlights the importance of educating investors, increasing awareness of psychological biases, reducing excessive volatility and implementing a strong regulatory framework to increase

market performance. Understanding these developments is important for policy makers, investors and market participants to promote a flexible and transparent financial market environment in Pakistan.

The present study makes meaningful additions to the literature on herding behavior in the emerging markets, particularly the Pakistan Stock market. However, like any empirical study, there are shortcomings. One of the major shortcomings is the exclusive reliance on secondary data, which, while being easy for quantitative analysis, restricts scope to discriminate between different types of investors—retail versus institutional investors—whose incentive towards herding can be quite different in nature. This limitation has the potential to hide underlying behavioral forces in play. Moreover, the analysis fails to allow for a set of contextual variables—e.g., media sentiment, changes in macroeconomic policy, geopolitical developments, and ESG factors—that increasingly influence investor decision-making. Omitting such qualitative elements reduces interpretive depth and may lead to oversimplification of herding behavior. Future research could further explore herding behavior by investor type when such data is accessible.

Subsequent research can enhance the discipline significantly by incorporating primary data, including investor surveys, systematic interviews, or experiments, to gather behavioral intentions and cognitive biases of the market participants. Developing a contextualized scale of herding behavior, grounded in actual investor experiences, can be a potent tool to measure herding tendencies across various contexts. In addition, cross-country comparisons of other South Asian economies, such as India, Bangladesh, or Sri Lanka, can uncover regional patterns and variations in herding behavior due to differences in regulatory environments, maturity of the markets, or cultural contexts. Cross-country comparisons would help generalize the conclusions to a broader context and yield valuable evidence on the systemic nature of investor psychology in emerging markets.

The inclusion of new sources of data such as news sentiment, social media proxies, and contemporary trading behavior via high-frequency data or machine learning algorithms could also provide richer, more dynamic, and more predictive models of herding behavior. Higher-dimensional models would encourage theory work as well as applied research in behavioral finance and policy-making.

Acknowledgement.
The author acknowledges the useful comments from the Editor and anonymous reviewers. Moreover, all remaining errors are our own.

Data Availability Statement.
Data is self-collected from published (secondary sources) and self-regressed and will be provided on demand.

Funding if any:
This research has received no external funding.

Conflict of Interest Disclosure statement:
There is no conflict of interest among the authors of the study.

Ethical Approval:
Ethical approval has been taken from the relevant forum if necessary.

References

Admati, A. R., & Pfleiderer, P. (1997). Does it all add up? Benchmarks and the compensation of active portfolio managers. *The Journal of Business, 70*(3), 323–350. https://doi.org/10.1086/209721

Afzal, M., Rasheed, A., & Khalid, W. (2024). Behavioral bias of equity investors in different market conditions and events in Pakistan Stock Exchange (PSX). *Qlantic Journal of Social Sciences and Humanities, 5*(1), 208–219. https://doi.org/10.55737/qjssh.379018319

Ahsan, A. F. M. M., & Sarkar, A. H. (2013). Herding in Dhaka Stock Exchange. *The Journal of Applied Business and Economics, 14*(2), 11–19. http://nabusiness.homestaes.com/JABE/AHSANAFMM%20Web_14_2.PDF

Alkaraan, F., Elmarzouky, M., Hussainey, K., & Venkatesh, V. G. (2023). Sustainable strategic investment decision-making practices in UK companies: The influence of governance mechanisms on synergy between Industry 4.0 and circular economy. *Technological Forecasting and Social Change, 187*, 122187. https://doi.org/10.1016/j.techfore.2022.122187

Baker, M. P., & Wurgler, J. (2003). Investor sentiment and the cross-section of stock returns. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.464843

Banerjee, A. V. (1992). A simple model of herd behavior. *The Quarterly Journal of Economics, 107*(3), 797–817. https://doi.org/10.2307/2118364

Bilal, K., Arif, K., & Ali, M. A. (2021). An empirical analysis of herd behavior: Evidence from PSX Pakistan Stock Exchange. *Periodicals of Management Studies, 1*(2), 77–87. https://doi.org/10.55737/poms.2021.1.2.10

Bikhchandani, S., & Sharma, S. (2000). Herd behavior in financial markets. *IMF Staff Papers, 47*(3), 279–310. https://doi.org/10.2307/3867650

Bikhchandani, S., Hirshleifer, D., & Welch, I. (1992). A theory of fads, fashion, custom, and cultural change as informational cascades. *Journal of Political Economy, 100*(5), 992–1026. https://doi.org/10.1086/261849

Brown, G. W., & Cliff, M. T. (2004). Investor sentiment and the near-term stock market. *Journal of Empirical Finance, 11*(1), 1–27. https://doi.org/10.2139/ssrn.282915

Brown, G. W., & Cliff, M. T. (2005). Investor sentiment and asset valuation. *The Journal of Business, 78*(2), 405–440. https://doi.org/10.1086/427633

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. https://doi.org/10.1016/S0378-4266(99)00096-5

Chiang, T. C., & Zheng, D. (2010). An empirical analysis of herd behavior in global stock markets. *Journal of Banking & Finance, 34*(8), 1911–1921. https://doi.org/10.1016/j.jbankfin.2009.12.014

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. https://doi.org/10.2469/faj.v51.n4.1918

Demirer, R., & Kutan, A. M. (2005). Does herding behavior exist in Chinese stock markets? *Journal of International Financial Markets, Institutions and Money, 16*(2), 123–142. https://doi.org/10.1016/j.intfin.2005.01.002

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Positive feedback investment strategies and destabilizing rational speculation. *The Journal of Finance, 45*(2), 379–395. https://doi.org/10.1111/j.1540-6261.1990.tb03695.x

Fromlet, H. (2001). Behavioral finance—Theory and practical application. *Business Economics, 36*(3), 63. http://www.diva-portal.org/smash/record.jsf?pid=diva2:308646

Froot, K. A., Scharfstein, D. S., & Stein, J. C. (1992). Herd on the street: Informational inefficiencies in a market with short-term speculation. *The Journal of Finance, 47*(4), 1461–1484. https://doi.org/10.1111/j.1540-6261.1992.tb04665.x

Gleason, K. C., Mathur, I., & Peterson, M. A. (2004). Analysis of intraday herding behavior among the sector ETFs. *Journal of Empirical Finance, 11*(5), 681–694. https://doi.org/10.1016/j.jempfin.2003.06.003

Griffin, J. M., Harris, J. H., & Topaloglu, S. (2003). The dynamics of institutional and individual trading. *The Journal of Finance, 58*(6), 2285–2320. https://doi.org/10.1046/j.1540-6261.2003.00606.x

Hassan, M. T. U., & Jamil, S. H. (2021). Investigative study of investor's herding behavior during bullish and bearish market: A case of Pakistan Stock Exchange. *European Journal of Business and Management Research, 6*(3), 17–25. https://doi.org/10.24018/ejbmr.2021.6.3.847

Jabeen, S., & Rizavi, S. S. (2019). Herd behaviour, short-lived phenomenon: Evidence from Pakistan Stock Exchange. *Lahore Journal of Business, 8*(1), 51–72. https://doi.org/10.35536/ljb.2019.v8.i1.a3

Javaira, Z., & Hassan, A. (2015). An examination of herding behavior in Pakistani stock market. *International Journal of Emerging Markets, 10*(3), 474–490. https://doi.org/10.1108/ijoem-07-2011-0064

Javed, T., Zafar, N., & Hafeez, B. (2013). Herding behavior in Karachi Stock Exchange. *SSRN Electronic Journal*. https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID2706337_code1825786.pdf?abstractid=2706337&mirid=1

Kashif, M., Palwishah, R., Ahmed, R. R., Vveinhardt, J., & Streimikiene, D. (2021). Do investors herd? An examination of Pakistan Stock Exchange. *International Journal of Finance & Economics, 26*(2), 2090–2105. https://doi.org/10.1002/ijfe.1895

Khan, N. U., Burton, B., & Power, D. (2013). The share price behaviours around dividend announcements in Pakistan. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4104653

Kiran, F., & Khan, N. U. (2016, August 19). The herding behavior on the Karachi Stock Exchange Pakistan. *International Conference Proceedings*. https://doi.org/10.15224/978-1-63248-103-0-81

Kumar, A., & Lee, C. M. (2006). Retail investor sentiment and return comovements. *The Journal of Finance, 61*(5), 2451–2486. https://doi.org/10.1111/j.1540-6261.2006.01063.x

Lao, P., & Singh, H. (2011). Herding behaviour in the Chinese and Indian stock markets. *Journal of Asian Economics, 22*(6), 495–506. https://doi.org/10.1016/j.asieco.2011.08.001

Latif, R., & Shah, S. Z. A. (2014). Mutual funds herding and its impact on stock returns; Evidence from Pakistan. *Journal of Basic and Applied Scientific Research, 4*(2), 72–80.

Lemmon, M., & Portniaguina, E. (2006). Consumer confidence and asset prices: Some empirical evidence. *Review of Financial Studies, 19*(4), 1499–1529. https://doi.org/10.1093/rfs/hhj038

Malik, S. U., & Elahi, M. A. (2014). Analysis of herd behavior using quantile regression: Evidence from Karachi Stock Exchange (KSE). *MPRA Paper*. https://ideas.repec.org/p/pra/mprapa/55322.html

Moussa, A. S., Alkaraan, F., & Elmarzouky, M. (2024). Green governance: How ESG initiatives drive financial performance in UK firms? *Sustainability, 16*(24), 10894. https://doi.org/10.3390/su162410894

Perveen, A., Mahmood, F., & Riaz, A. (2024). Herd investing in Pakistani stock market: Evidence from Pakistan's stock market using data of more than three decades. *Journal of Development and Social Sciences, 5*(2), 211–221. https://doi.org/10.47205/jdss.2024(5-II)21

Prendergast, C., & Stole, L. (1996). Impetuous youngsters and jaded old-timers: Acquiring a reputation for learning. *SSRN Electronic Journal*. https://autopapers.ssrn.com/sol3/papers.cfm?abstract_id=3593

Qiu, L. X., & Welch, I. (2006). Investor sentiment measures. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.589641

Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *American Economic Review, 80*(3), 465–479. https://dspace.mit.edu/handle/1721.1/2213

Shah, F., Imran, M., & Khan, S. (2024). Herding behavior and its impact on market volatility: Empirical evidence from the Pakistan Stock Market. *Dialogue Social Science Review, 2*(4), 218–232. https://thedssr.com/index.php/2/article/view/61

Tan, L., Chiang, T. C., Mason, J. R., & Nelling, E. (2008). Herding behavior in Chinese stock markets: An examination of A and B shares. *Pacific-Basin Finance Journal, 16*(1–2), 61–77. https://doi.org/10.1016/j.pacfin.2007.04.004

Trueman, B. (1994). Analyst forecasts and herding behavior. *Review of Financial Studies, 7*(1), 97–124. https://doi.org/10.1093/rfs/7.1.97

Welch, I. (1992). Sequential sales, learning, and cascades. *The Journal of Finance, 47*(2), 695–732. http://dx.doi.org/10.1111/j.1540-6261.1992.tb04406.x