INVESTOR SENTIMENTS AND STOCK RETURNS: A QUANTITATIVE STUDY ON CO-INTEGRATION AND LEAD-LAG CAUSAL RELATIONSHIP

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ABSTRACT

This research study explores the investor sentiments on stock returns. The co-integration and lead-lag causal relationship is tested in the study. Quarterly data is collected from 49 firms of KSE-100 from 2012 to 2019, covering 1464 observations of secondary data to be analysed with the unbalanced panel. The FMOLS cointegration analysis is used to investigate the long-term relationship between the investor sentiment and stock returns. In addition, the Granger causality is applied to assess the direction and lead-lag relationships between these variables. The empirical results confirm both hypotheses, pointing to the existence of a stable long-run relationship as well as important causal relationships between investor sentiment and stock returns. This study has some limitations related to data constraints and measurement of variables. This research theoretically supports behavioural finance by reinforcing systematic effect of investor sentiments on stock returns that challenges efficient market hypotheses in emerging markets. Practically, the results imply that investors as well as regulators can use sentiment indicators to control volatility, to control risk management strategies, and to increase market stability.

Keywords: Investor sentiment, stock returns, co-integration relationship, lead-lag relationship

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1. INTRODUCTION

The sentiments of investor has been widely considered as a crucial element in the movements of stocks across the globe (Wang, 2023). International financial markets have experienced rapid changes that cannot be narrated by mere economic fundamentals changes (Qi, 2023). The Covid-19 epidemic, stock market crash and fast technological developments have made the influence of market psychology stronger as fear, optimism and uncertainty are considered to be commonly driving asset prices (Naidoo et al., 2025). These dynamics have brought investor sentiment into the spotlight as an important factor in liquidity, short-run volatility, and trading behaviour and is therefore an important area of research in this era (Iqbal & Gul, 2024; Zhou, 2025).

Simultaneously, the development of online trading communities, social media platforms, and online news platforms has made the transmission of sentiment through economies in a quick manner (Li et al., 2023). Specifically considering retail investors, who can access and react to information immediately which adds to the herding behaviour and sudden market disruptions (Kim et al., 2023). Events such as the rise in trading activity in GameStop in the United Kingdom as well as large market drops due to pandemic-related news being widespread are examples of how sentiment-driven reactions can amplify market movements. These are a good example of how investor sentiment can be the dominant factor in outcomes in the market even without strong signals on the fundamentals (Yuan, 2025). This global backdrop illustrates the reasons of assessing the impact of sentiment in stock returns well-timed and appropriate (Kim-Hahm et al., 2025).

A large amount of empirical evidence from around the world has established that investor sentiments serves as a crucial element in pricing. There have been numerous studies documenting the explanatory and analytical power of sentiment indicators, including measures of consumer confidence, investor optimism, and media-based proxies in explaining short-term returns, as well as predicting market volatility in not only developed but also developing markets (Baker & Wurgler, 2007; Smales, 2017). Major episodes of financial turbulence for instance the economic financial crisis and the Covid-19 pandemic have further confirmed that market downturns and recovery are not only dependent on the macroeconomic fundamentals such as GDP performance but also the change in investor confidence and overall market mood (Yang et al., 2025). Recent theoretical contributions further underscore that internal and external economic factors have a joint effect upon the performance of firms and financial markets in developing economies (Fazil et al., 2025).

In this perspective, examining the state of investor sentiment in emerging economies is even more relevant (Andleeb & Hassan, 2023). While there are generally good regulatory regimes in developed economies and disclosure requirements along with active institutional oversight, there are several developing economies where investor protection and enforcement capacity is weak and where the level of activity in the informal sector is substantial (Prasad et al., 2022). The presence of a large grey market in other economies, such as Pakistan, make it more difficult for the translation of fundamentals into stock prices to occur as financial transactions are not recorded and informal practices to trade make it difficult to trace the pricing action and open scope to financial speculation. These circumstances enhance the role of investor sentiment due to their lesser severity in the link between the formation of price and fundamentals, and susceptibility to the dynamics of behaviour and moods (Rahman et al., 2023). Evidence from the Pakistani context also indicates that information relating to dividend and financial indicators play an influential role in investment decisions and market behaviour (Iqbal et al., 2025).

The PSX has been renowned for the trading activities and market movements frequently subjugated by some big institutional investors, family owned groups, and business conglomerates. These influence price, and regulate market by overcoming the activities of small investors. However, rather than this concentration, the participation of retail investor remains extremely sentiment driven, although lower in value. It raises some important questions in terms of the relative strength of the overall mood of the smaller market player versus institutional dominance in determining stock returns (Thalassinos et al., 2025). In the history of Pakistani stock market, the sharp corrections and speculative bubbles, for instance, the 2005-2006 market boom and market crash, were due to the optimistic and pessimistic behaviour of investors instead

of changes in economic fundamentals (Shaukat, 2026). Furthermore, empirical evidence from developed markets indicates that investor reactions to corporate announcements such as dividends may change as a function of the level of market efficiency and investor expectations (Wahab et al., 2026).

In addition to it, the PSX regulation show difficulties faced by developing markets. The SECP have taken initiatives to reinforce oversight, to increase requirements of disclosure and to increase disclosure. Nevertheless, implementation voids, risks related to market influence and insider trading activities continue to challenge the market (Thalassinos et al., 2025). In contrast, developed economies have a well-established regulatory environment, a strong mechanism for enforcement and a complex investor base, which tends to minimize the role of sentiment and speculative behaviour in long term returns. In developing markets such as Pakistan, the weaker regulatory environment in the country makes the sentiment of investors a more dominant factor in causing short-term fluctuations in prices and market mispricing (Shah et al., 2022). Moreover, technological advances and digital financial advisory platforms are playing an increasingly larger role in investment behavior and financial decision-making processes in contemporary markets (Kumari et al., 2024, 2025).

The motivation of this research derives from the fact that internationally, investor sentiment is becoming more widely accepted as an important factor in understanding short-term market movements, volatility and anomalies in asset returns, according to behavioural finance. Domestically, the structure of markets in Pakistan, which is dominated by a large informal economy together with high levels of market power being concentrated among a small number of influential participants and comparatively low levels of regulatory enforcement, provides an ideal context to investigate the importance of sentimentally-driven effects. Investigating this relationship not only adds to the existing academic dialogue but also helps to produce useful insights for regulators and policymakers in terms of the role of behavioural biases and institutional frameworks in the determination of stock market outcomes. Therefore, the research objective for this study is to examine the effect of investor sentiments on the stock returns in the Pakistani stock market. It also aims to examine the lead-lag and causal relation among investor sentiments and stock returns in the Pakistani stock market.

Research Contribution

This research offers some key contributions to the behavioral finance field. To begin, it builds on the previous research on investor sentiment by analyzing how various investor sentiment proxies relate to the returns of stocks listed on an emerging market like the Pakistan Stock Exchange (PSX), which has not been researched extensively (Aggarwal, 2022; Reis & Pinho, 2021). Second, this study does not use a composite sentiment index as typically done in previous research (Baker & Wurgler, 2006, 2007; Schmeling, 2009), but rather adopts a multidimensional framework which uses traditional as well as novel sentiment measures such as share mispricing, spread in bond yields and gold bullion prices, to provide a more complete picture of investor sentiment. Third, the study is methodologically novel in using firm-level panel data which allows the study to account for both cross-sectional and time series variation of stock returns (Khan & Ahmad, 2018; Khan et al., 2023). Last but not least, the results have implications for investors, asset managers, and policy makers as they help to better understand how markets function when investors are sentimentally driven and how the sentiment can be improved for better investment decisions in emerging financial markets.

2. LITERATURE REVIEW

Investor sentiment research has been born from the very early psychological research, starting with Watson's (1912) pioneering work on human behaviour, which has later influenced the evolution of behavioural finance (Zhou, 2018). Over the years, behavioural finance emerged as the counter to the limitations of traditional rational models of asset pricing, bringing the psychological biases into models of financial decision making. A key component of this area is Prospect Theory (Kahneman & Tversky, 2013), which states that investors are likely to be influenced by cognitive biases, emotions, and loss aversion, resulting in the potential for investors to deviate from rational expectations.

Despite its widespread application, investor sentiment does not have a universally accepted definition. Stein (1996) Stein conceptualised sentiment as a systematic regular deviation from rational expectations about future outcomes. Investor sentiment is driven by an expectations of cash flows and the risks of the investment that is not entirely warranted or justified by the information available (Baker & Wurgler, 2006). In essence, the concept of investor sentiment is a way of indicating investor's subjective expectation and emotional view on future return, which in turn, also influences investor's trading behaviour and the result of the market.

Measuring investor sentiment poses some challenging methodological problems because it involves quantifying psychological states that differ from person to person. Nonetheless, a lot of empirical studies confirm the existence of significant explanatory power of investor sentiment in understanding the behaviour of the stock markets (Baker & Wurgler, 2006; Ding et al., 2019; Zhou, 2018). Sentiment is an indistinct and powerful force in a financial activity with regard to investor's expectations and movement of prices away from fundamental.

Baker and Wurgler (2007) further expound that investor sentiment is general optimism or pessimism toward stocks coupled with a willingness to speculate. They find two main transmission channels for the effect of sentiment on stock prices: (1) limits to arbitrage and (2) valuation uncertainty. First, even in the face of common knowledge that sentiment is misplaced, rational investors are prevented from completely correcting mispricing by arbitrage constraints. Second, sentiment affects the demand for speculative stocks, especially stocks that are hard to value. Assets that are young, small, volatile, non-dividend paying or difficult to arbitrage are particularly at risk of being mispriced by sentiment. As a result of this, periods of high sentiment result in overvaluation of such stocks, and pessimistic periods in undervaluation. Over time, prices move back to equilibrium causing predictable patterns of return.

The theoretical mechanisms have been supported by empirical evidence from a variety of markets around the world. Hu and Wang (2013) demonstrate that noise trading has an effect on both small and large-cap stocks in the Chinese stock market, indicating that investors are speculative. Uygur and Taş (2014) conclude that sentiment has a significant impact on conditional volatility for some sectors on the Istanbul Stock Exchange. Li (2015) reports that sentiment is able to explain substantial amount of the variation in stock prices in China relative to other macroeconomic variables.

Similarly, various research done when financial crises are occurring have shown the predictive power of sentiment. Sun et al. (2016) show investor sentiment forecast returns for the

S&P 500 in turbulent times. Renault (2017) finds stronger long run anomalies after high sentiment periods in the US market. Chen and Haga (2021) document that optimistic pre-crisis in China is followed by higher returns and subsequently followed by corrections, indicating that sentiment-driven overpricing. The analytical power of sentiment proxies in forecasting stock returns is also confirmed by Reis and Pinho (2021).

Lan et al. (2021) prove that investor sentiments are related to abnormal returns surrounding seasoned equity offerings in China under which overvaluation was corrected within a month. Audrino and Tetereva (2019) cross-industry news spillovers driven by sentiment in European and US markets. Collectively, these studies validate the existence of effects on investor-feeling-related pricing dynamics, volatility and predictability of returns in different market structures. From a theoretical perspective, there are behavioural models that argue that excessive optimism or pessimism may result in systematic mispricing (De Long et al., 1990; Kumar et al., 2018; Kumar & Lee, 2006; Lee et al., 1991). When sentiment gives way and economic fundamentals are once again to the fore, prices adjust accordingly. This process of adjustment shows a negative relationship between investor sentiments and future returns, thereby serving sentiment a forecasting variable in the context of asset pricing model.

In addition to it, Baker and Wurgler (2006) find out firm-related factors for instance age, dividend policy, size, growth forecasts, financial distress, and volatility as the factors to determine the fluctuations in stock sentiments. In this context, less age and smaller size are the most vulnerable firm characteristic. Chen et al. (2013) argue that high sentiment periods increase the expected significance of the accounting information. It also impacts on the analysts' behaviour. Jordão et al. (2022) also suggest that the risk exposure of optimistic investors may undermine, and need risk premiums in the high sensitive periods; thereby distorting expected returns.

Not only theoretical, but also empirical evidence reveal that sentiments are significant determining factor in stock returns. Given the structural characteristics of emerging markets like Pakistan, where informational inefficiencies, speculative behaviour and behavioural biases are likely to be more pronounced, the role of investor sentiment in explaining stock returns is likely to be substantial. Based on the above, the following hypothesis is proposed by this study:

H_1: *Investor sentiment has a statistically significant impact on stock returns in the Pakistani stock market.*

The concept of a lead-lag relationship means a dynamic relationship between two variables whereby one variable precedes and perhaps influences changes in another. This framework is often used to investigate the causal linkages or to project future outcomes through movements of relevant variables in the past. In financial markets, such relationships are often analysed in order to determine whether investor sentiment drives stock returns, or vice versa. The bandwagon effect, on the other hand, is a psychological circumstance in which investors come to believe, think or act in a particular manner simply because they see others doing the same. In financial markets, this effect is mirrored in the fact that individuals have a tendency to follow current trends, popular opinions, or market fads, instead of following only the basic information. As more and more people participate in a certain trend, more investors will be willing to join as they expect to profit from the group movement. Investor sentiment, thus, usually coincides with the trending stocks with expectation of a higher return (M. Hu et al., 2019). Investors can go

along with market trends even when there is no sound economic fundamentals supporting this kind of behaviour (Hu et al., 2019).

This herd-like behaviour makes it challenging to establish a meaningful reason of investor sentiment vis-a-vis stock returns. Influential research has suggested that the bandwagon effect can introduce distortion in the return expectation and can potentially reduce future returns once excessive optimism is factored into prices (Brown & Cliff, 2004). While increased investor sentiment might lead to higher stock prices at first, leading to a positive relation between sentiment and returns at the same time, such movements may not be sustainable in the long run. In the perspective of Pakistan, Khan and Ahmad (2018) study the lead and lag and bidirectional relationship between market returns and investor sentiment and show evidence of investor irrationality which sidetracks the markets from economic fundamentals and long-run sustainability. Similarly, Raza et al. (2019) in their study of Pakistan Stock Exchange (PSX) find that noise traders tend to engage in irrational trading by responding to trends and news, rather than fundamental indicators. Such behavioural patterns do affect the asset pricing process. For example, Rashid et al. (2019) suggest that the dynamics of momentum and investor sentiment play a role in the underpricing of stocks in the Pakistan stock market, which results in increased chances of undervaluation.

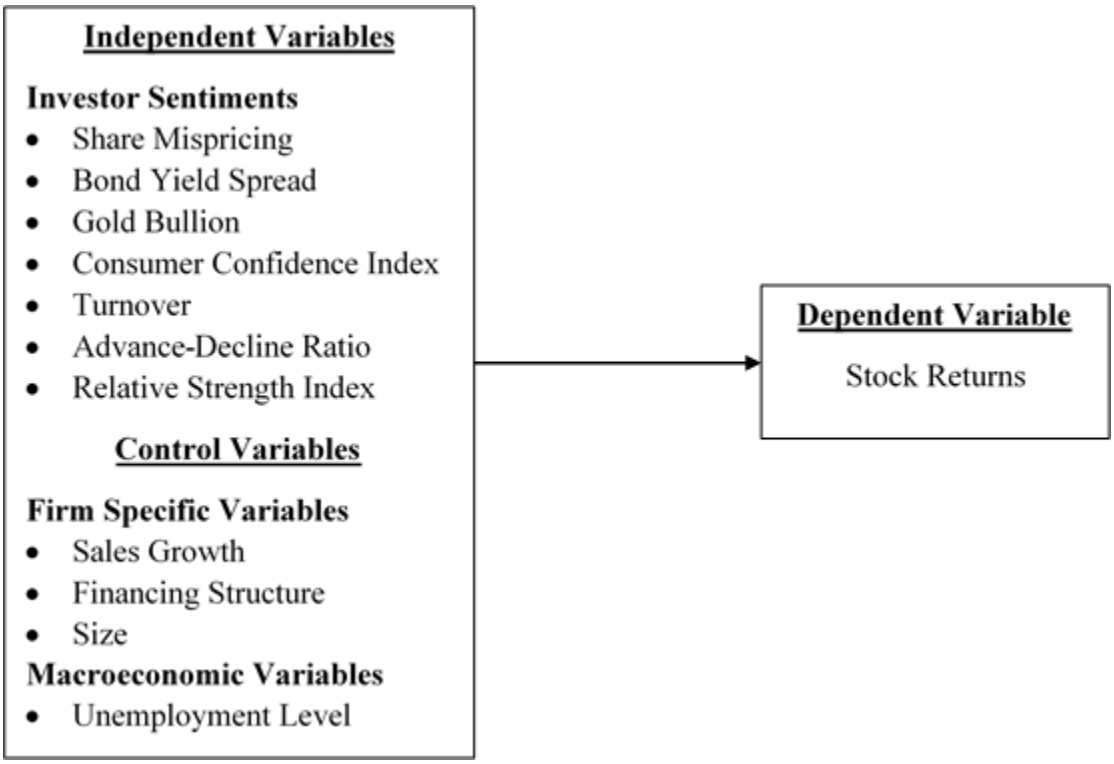
Furthermore, Tauseef (2020) considers the causal relationship between the investor sentiment and the returns of Islamic and conventional stocks in the Pakistani market. The results suggest that the trading based on sentiment affects the prices of stocks for about one month and then the initial gains get corrected within the next two months. This pattern is a short-term overreaction that is justified by the market later on. The study further goes on to report that external events such as terrorist events have a major impact on investor mood and performance of the markets in general. Beyond direct economic losses, these kinds of events create uncertainty and fear that makes investors overreact in the short run before the markets slowly recover (Ali et al., 2020).Overall, these results imply that investor sentiment is a crucial element in influencing economic and financial activity in the Pakistani stock market (Muhammad, 2022), affecting price dynamics beyond the impact of traditional fundamental factors on them. Drawing from the preceding analysis, the study proposes the following hypothesis:

H_2: *Investor sentiment exhibits a statistically significant causal and lead–lag relationship with stock returns in the Pakistani stock market.*

Based on above literature review, figure 1 is framed as the schematic diagram of the study.

Figure 1

Schematic Diagram of Theoretical Framework



3. METHODOLOGY

The research methodology employed in this research is quantitative with a timeframe of eight quarters from 2012-2019 after excluding crisis years to avoid structural distortions. A sample of 49 non-financial companies that are listed in the KSE-100 index are selected to represent different industries and market conditions. Financial and utility companies are excluded to ensure comparability in the sample and robustness of the results. The final dataset contains 1,464 quarterly observations in the form of an unbalanced panel. Secondary data are collected based on the following variables presented in table 1:

Table 1

Operationalisation of Variables

Variable	Type	Meaning	Data Source	Source
Stock Returns (R)	Dependent variable	$R_{i,t} = \ln(\frac{P_t}{P_{t-1}})$ Here, $R_{i,t}$ is the return of security i during period t, ln the natural logarithm, P_t is the stock price at the end of quarter, and P_{t-1} is the stock price at the start of same quarter.	Business Recorder and PSX	Van Horne (2020)
Share	Independent	Share price difference between fair	Quarterly	Reis &

Mispricing (SMP)	variable: sentiment proxy	and market value Where, intrinsic value of share is measured using Graham Formula ($\sqrt{22.5 * EPS * BVPS}$)	financial data was taken from official websites of the companies, Pakistan Stock Exchange (PSX), State Bank of Pakistan (SBP), and DataStream database.	Pinho (2020)
Bond Yield (BON)	Independent variable: sentiment proxy	Bond yield difference 10y and 3m	SBP	Reis & Pinho (2020)
Gold Bullion (GOLD)	Independent variable: sentiment proxy	Percentage change of gold price in PKR	World Gold Council	Reis & Pinho (2020)
Consumer Confidence Index (CCI)	Independent variable: sentiment proxy	Consumer Confidence Index	SBP-reports section	Banchit, Abidin, Lim, & Morni, (2020); Qiu & Welch (2004); Reis & Pinho (2020); Vieira (2011).
Share Turnover (TURN)	Independent variable: sentiment proxy	Quarterly Share volume to quarterly number of shares issued	Business Recorder and PSX	Reis & Pinho (2020); Wu et al.

				(2018);
Advance-Decline Ratio (ADR)	Independent variable: sentiment proxy	Advance-Decline Ratio = Number of Quarterlty Advancing sto / Number of Quarterly Declining stoc	Business Recorder and PSX	Reis & Pinho (2020)
Relative Strength Index (RSI)	Independent variable: sentiment proxy	Relative Strength Index = 100 + $[\frac{100}{1+\frac{Average\ gain}{Average\ loss}}]$ Where, Average Gain = [{(previous average gain)*(n-1)} + current gain]/n Average Loss = [{(previous average loss)*(n-1)} + current loss]/n	Business Recorder and PSX	Chen, Chong, & Duan (2010); Hudson & Green, 2015; Reis & Pinho (2020); Ryu, Kim, & Yang (2017); Seok, Cho, & Ryu, (2019); Yang & Zhou (2015); Yang & Zhou (2016); Zhou & Yang (2020)
Sales growth (SALES)	Firm-specific control variable	Sales Growth is measured as quarterly percentage change in sales	PSX, SBP, and data stream	Baker & Wurgler (2006); Reis & Pinho (2020)
Financing Structure (FIN)	Firm-specific control variable	$FIN_{i,t} = \frac{Net\ Debt_{i,t}}{PPE_{i,t}}$ Net debt = Total liabilities (short term liabilities + long term liabilities) – cash and cash equivalents	Quarterly financial data was taken from official websites of the	Reis & Pinho (2020)

				companies, Pakistan Stock Exchange (PSX), State Bank of Pakistan (SBP), and DataStream database.	
Size (SIZ)	Firm-specific control variable		Log of assets	Quarterly financial data was taken from official websites of the companies, Pakistan Stock Exchange (PSX), State Bank of Pakistan (SBP), and DataStream database.	Seok, Cho, & Ryu, (2019); Reis & Pinho (2020)
Unemployment Level (UNEMP)	Macroeconomic control variable		Percent of total labor force unemployed	World Bank	Rangel (2011)

The Fully Modified Ordinary Least Squares (FMOLS) method is used to analyze the association between investor sentiment and stock returns over long periods to ensure that the residuals are stationary. The estimation is done using E-Views 12 and the specification of the model is given in Equation 1 as follows:

$$R_{i,t} = \beta_0 + \beta_1 SMP_{i,t} + \beta_2 BON_t + \beta_3 GOLD_t + \beta_4 CCI_t + \beta_5 TURN_{i,t} + \beta_6 ADR_{i,t} + \beta_7 RSI_{i,t} + \beta_8 SALES_{i,t} + \beta_9 FIN_{i,t} + \beta_{10} SIZ_{i,t} + \beta_{11} UNEMP_t + \mu_t \quad (1)$$

4. RESULTS

The descriptive statistics of the variables used in the study are shown in Table 2 in the results section, based on 1,464 quarterly observations. The results show that non-financial corporations traded on the stock exchanges in Pakistan produced an average quarterly stock return of 2.8 percent over the sample period. The average magnitude of share mispricing has been found to be 9.7 percent, implying that, on average, market prices tend to be higher than underlying values which implies a general tendency to overvaluation. The average quarter on quarter bond yield spread is recorded at 2.1 percent. A positive yield spread is generally an indication of an upward sloping yield curve in which long rate of return is higher than the short rate of return and this is often a sign of optimism about the future economic conditions. Such expectations may affect the short-run portfolio allocation choices of investors to equities. Along with this, the price of gold bullion shows an average quarterly rise of 1.9 percent, which means that there is a general upward trend in the price of gold during the period covered in the research.

Table 2
Descriptive Statistics

n = 1464	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Sig. of Jarque-Bera
R	0.028	0.019	1.235	-1.980	0.193	-0.251	12.734	0.000
SMP	0.097	-0.013	111.797	-65.703	4.813	9.536	268.528	0.000
BON	0.021	0.022	0.041	-0.025	0.012	-1.766	7.592	0.000
GOLD	0.019	-0.002	0.259	-0.224	0.093	0.239	4.055	0.000
CCI	0.015	0.013	0.249	-0.184	0.083	0.386	3.829	0.000
TURN	0.113	0.041	1.997	0.000	0.194	3.265	16.669	0.000
ADR	1.007	0.960	5.000	0.000	0.383	3.497	30.068	0.000
RSI	50.014	49.348	99.780	1.004	13.731	0.107	3.241	0.042
SALES	0.050	0.025	3.280	-0.646	0.214	9.586	123.501	0.000
FIN	0.725	0.287	90.947	-118.247	8.148	-6.242	132.894	0.000
SIZ	10.256	10.223	13.620	7.468	1.217	0.247	2.750	0.000
UNEMP	0.008	0.009	0.010	0.002	0.002	-0.945	2.676	0.000

Furthermore, table 2 reveals that that average quarterly percentage change in CCI of non-financial firms listed in Pakistan is 1.5%. Although the average CCI level is 48, indicating an overall pessimistic mood, by focusing on percentage changes, it is clear that there is a slow trend of investor confidence rising for consecutive quarters. The average quarterly turnover ratio is 11.3%, which is rather low and indicates that there is not much trading activity, i.e., investors do not buy and sell stocks very often within each quarter. The mean advance-decline ratio is 1.007, which means on average there are about the same amount of advancing stocks and declining

stocks with a slight skew in favor of a bullish sentiment caused by the fact that there are slightly more advancing stocks. The average Relative Strength Index (RSI) of 50.014 indicates the market is generally neutral as securities are neither overbought nor oversold. The data show, further, an average quarterly sales growth rate of 5% for the non-financial firms. In terms of capital structure, the firms keep their debt capital on average backed up by fixed assets to 72.5%. The average firm size is 10.256 with a standard deviation of 1.217 which indicates moderate variation among the sample firms. Lastly, the unemployment rate on average in Pakistan across the whole period between 2012 and 2019 was 0.8% of the total labour force per quarter.

Table 3

Unit Root Test

	At level		At 1st Difference	
	PP - Fisher Chi-square	ADF - Fisher Chi-square	PP - Fisher Chi-square	ADF - Fisher Chi-square
R	806.587	393.777	1835.260	1008.350
(p-value)	0.000	0.000	0.000	0.000
SMP	949.455	516.63	1733.570	1006.210
(p-value)	0.000	0.000	0.000	0.000
BON	146.275	110.877	1069.960	599.221
(p-value)	0.001	0.176	0.000	0.000
GOLD	1127.170	404.332	1837.890	950.306
(p-value)	0.000	0.000	0.000	0.000
CCI	1480.110	486.603	1747.230	1015.800
(p-value)	0.000	0.000	0.000	0.000
TURN	324.735	303.036	1205.870	767.373
(p-value)	0.000	0.000	0.000	0.000
ADR	773.861	410.668	1358.990	1010.970
(p-value)	0.000	0.000	0.000	0.000
RSI	933.920	453.027	1556.580	1026.090
(p-value)	0.000	0.000	0.000	0.000
SALES	214.825	183.721	287.987	193.952
(p-value)	0.000	0.000	0.000	0.000
FIN	131.963	140.603	221.066	156.851
(p-value)	0.013	0.003	0.000	0.000
SIZ	125.856	71.0509	184.788	131.515
(p-value)	0.031	0.982	0.000	0.014
UNEMP	236.047	141.915	349.092	249.551
(p-value)	0.000	0.003	0.000	0.000

Table 3 is the results of unit root tests through PP-Fisher and ADF-Fisher Chi-square method. The results show that all variables (with the exception of two variables) are all

stationary at their level and hence do not need differencing. In contrast, the BON and SIZ variables are only made stationary after first difference, indicating that these variables have difference stationarity.

Table 4

Endogeneity Test

Wald Test	
Variable	Probability
SMP	0.274
BON	0.587
GOLD	0.000
ADR	0.000
CCI	0.063
RSI	0.000
TURN	0.002
FIN	0.873
SALES	0.050
SIZ	0.050
UNEMP	0.000

Table 4 shows that SMP, BON, CCI, and FIN can be assumed to be exogenous as their p-value is higher than 0.05. In contrast, the signs of endogeneity are present for the remaining variables.

Table 5

Cointegration Test

Kao Residual Cointegration Test		
	t-Statistics	Probability
ADF	-20.088	0.000

Cointegration analysis method is a way to ascertain whether two or more non-stationary time series have a stable long-term relationship with each other despite short-term fluctuations (Brooks, 2019). As presented in Table 5 the results confirm a long run association among the model's variables. The Fully Modified Ordinary Least Squares (FMOLS) method is suitable for the case in which the variables are integrated of order one, I(1), and have a cointegrating relationship (Agyemang & Bardai, 2022). To meet these conditions, the data went through rigorous transformations in order to make sure the data were stationary. Variables such as R, SMP, GOLD, CCI, TURN, ADR, RSI, SALES, FIN, and UNEMP were found to be first-difference stationary and hence fulfilling the requirements for application of FMOLS. Two-step procedure of Engle-Granger as explained by Brooks (2019) was then used as follows:

Table 6

Unit Root Test of Error term

Error Correction Term	Statistic	Prob.
ADF - Fisher Chi-square	1020.820	0.000

A unit root test on the error term is performed in Table 6 to test its stationarity to assess whether there is a long-term equilibrium relationship among the variables. In order to model both the short-run adjustments in order to capture the short run and also the speed with which the variables return to their long run equilibrium variables following some shock an error correction model (ECM) is used. The results for the unit root of the ECM are presented in Table 6, and we can see that the results are significant at the 99% confidence level. When all the explanatory variables are integrated of order one, I(1), and the residuals of a model are stationary at level, I(0), it implies cointegration and indicates a stable long-run relationship between the variables (Brooks, 2019). Following this confirmation, the estimation of the short run dynamic regression model is carried out as the next step.

Table 7

Short Run Regression

Dependent Variable: D(R)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECT (-1)	-1.007	0.027	-37.975	0.000

Table 7 indicates that the ECT coefficient (γ) is negative and significant (-1.007), suggesting that the model is converging towards the long run equilibrium position (Brooks, 2019). On the basis of this, the Fully Modified Ordinary Least Squares (FMOLS) method is used to estimate Equation 1.

Table 8

Panel Regression

Variable	β	SE	t-Stats	Sig.
SMP	0.002	0.001	2.277	0.023
BON	-0.789	0.318	-2.479	0.013
GOLD	-0.289	0.046	-6.233	0.000
CCI	-0.100	0.050	-2.019	0.044
TURN	0.085	0.032	2.622	0.009
ADR	0.231	0.012	19.935	0.000
RSI	0.004	0.000	14.366	0.000
SALES	0.045	0.020	2.234	0.026
FIN	0.000	0.001	0.652	0.515
SIZ	-0.052	0.017	-3.106	0.002
UNEMP	-5.504	2.201	-2.501	0.013

R-squared	0.549

Table 8 presents the findings related to the relationship of investor sentiments and stock returns. The analysis shows that SMP, TURN, ADR, RSI, and SALES have a positive and statistically significant impact on the returns of stocks. In contrast, BON, GOLD, CCI, SIZ, and UNEMP have a significant negative effect. The FIN, which was used as a control variable, was found to be statistically insignificant.

For the empirical relationship between the investor sentiment and the stock return, to test the lead lag and the causal links between the two variables, the optimal time lag for the Vector Autoregression (VAR) model was calculated using four standard selection criteria: Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). Among these, AIC and SC are generally considered to be the most reliable for model selection (Brooks, 2019). The results show that there are seven lags which are optimal for all criteria. Therefore, the lead-lag analysis is performed by using a seven-lag VAR specification.

After determining the optimum lag length, the next step is to research the directional and temporal link between investor sentiment and stock return using Granger Causality Test (Brooks, 2019). This analysis is conducted to see the lead-lag dynamics of the investor sentiments and stock returns in line with Hypothesis 2 of the study.

Table 9

Granger Causality Test

Lags: 7			
Null Hypothesis:	Obs	F-Statistic	Prob.
There is no Granger causality from SMP to R	1121	2.36794	0.021
There is no Granger causality from R to SMP		1.85241	0.074
SMP → R			
There is no Granger causality from BON to R	1136	12.2315	0.000
There is no Granger causality from R to BON		7.42045	0.000
BON ↔ R			
There is no Granger causality from GOLD to R	1136	14.8947	0.000
There is no Granger causality from R to GOLD		12.8223	0.000
GOLD ↔ R			
There is no Granger causality from CCI to R	1136	25.9926	0.000
There is no Granger causality from R to CCI		16.0659	0.000
CCI ↔ R			
There is no Granger causality from TURN to R	1136	2.03165	0.048
There is no Granger causality from R to TURN		2.7782	0.007
TURN ↔ R			
There is no Granger causality from ADR to R	1113	1.21745	0.290
There is no Granger causality from R to ADR		0.59974	0.757
Indecisive			

There is no Granger causality from RSI to R	1136	5.33249	0.000
There is no Granger causality from R to RSI		2.00184	0.052
RSI → R			

The results of the Granger Causality Test are presented in Table 9 in which BON, GOLD, CCI, and TURN are found to have a two-way lead-lag relationship with stock returns, meaning that these variables affect stock performance as well as vice versa. In contrast, SMP and RSI shows a unidirectional relationship with stock returns, i.e. causality flows in one direction. The ADR, however, does not show any significant lead-lag relationship or any causal relationship with stock returns in Pakistan between the years 2012-2019. Therefore, the hypothesis is partially substantiated with bidirectional and unidirectional effects depending on the type of sentiment indicator (Brown & Cliff, 2004; Dergiades, 2012; Schmeling, 2009).

5. DISCUSSION

The results indicate that all investor sentiment proxies have significant impact on stock returns, suggesting that investor sentiment plays important role in explaining the dynamics of the Pakistan Stock Exchange. The results are consistent with the core tenets of behavioral finance theory, which propose that investor sentiment can lead to stock price mispricing caused by optimism, pessimism, overreaction and other types of cognitive biases (Baker & Wurgler, 2006, 2007). The importance of sentiment related variables suggests that investments are not made solely on the basis of rational evaluations of the fundamental characteristics of the firms but are also affected by psychological and emotional aspects.

The findings are in line with previous research which has found a strong link between investor sentiment and stock market behaviour in developed and emerging markets (Reis & Pinho, 2021; Seok et al., 2019; Zhou, 2018). The large effect of this share mispricing further reinforces the belief that the sentiment-driven mispricing of shares might have implications for future stock returns, which suggests market inefficiencies and restrictions on arbitrage. Likewise, bond yield spread is important, which implies that investors do take account of future economic conditions when making an investment decision, as also noted by Georgoutsos and Migiakis (2013) and Gómez-Puig et al. (2014). The impact of sentiment measures related to gold is also in line with the literature on the safe haven effect of gold during periods of uncertainty and market confidence, which is particularly dated (Baur & Lucey, 2010; Baur & McDermott, 2010; El Hedi Arouri et al., 2015). Overall, the results support behavioral finance theories and support the case that investor sentiment is an important factor in stock returns. The findings highlight the need for market sentiment indicators to complement conventional financial data when assessing market conditions and making investment decisions, both by individual market participants and by policy makers.

The findings of granger causality test are useful to gain insights on the dynamic relationship between investor sentiment and stock returns in Pakistan Stock Exchange. Bidirectional causal relationships are identified between bond yield spread (BON), gold bullion (GOLD), consumer confidence index (CCI), turnover (TURN), and stock returns, indicating a feedback relationship between investor sentiment and stock market performance and between the performance and the investor's perceptions and expectations. The results are in line with the

behavioral finance literature, which claims that sentiment and stock returns co-evolve over time due to the investor's reaction to market information and their past returns (Brown & Cliff, 2004; Dergiades, 2012; Schmeling, 2009). This cycle of sentiment and returns can be created as investors become more bullish on positive market performance and more bearish on negative returns.

The unidirectional causal relationships found between share mispricing (SMP) and the relative strength index (RSI) suggest that there are predictive elements contained in these indicators. The results confirm the idea that investor behavior and market expectations are reflected in valuation anomalies and/or technical trading signals before they are reflected in stock prices (Baker & Wurgler, 2006, 2007; Schmeling, 2009). The findings are in line with the behavioral finance arguments that investors do not always process information efficiently, and that sentiment-related signals can have a subsequent return impact on the market (Brown & Cliff, 2004; Seok et al., 2019; Reis & Pinho, 2021)

On the other hand, if there is no significant causal relationship between the advance-decline ratio (ADR) and stock returns, then the market breadth will not be a good indicator of market sentiment during the study period in the Pakistani market. This could be due to market-specific factors, less informational efficiency, or greater influence by other sentiment channels on investor decision-making (Dergiades, 2012; Schmeling, 2009; Zhou, 2018). The results confirm the need to take a multi-indicator approach when evaluating the behavior of the stock market and suggest that sentiment and stock return relationships are contingent on the type of sentiment indicator (Baker & Wurgler, 2006, 2007; Brown & Cliff, 2004).

6. CONCLUSION, LIMITATIONS, AND POLICY IMPLICATIONS

Overall, the research underscores investor sentiment's impact on the stock returns of non-financial companies listed on the PSX. Specifically, four sentiment indicators (BON, GOLD, CCI, and TURN) exhibit mutual causality with returns, and 2 indicators (SMP, and RSI) have a unidirectional impact on returns. The advance-decline ratio is still statistically insignificant for some cause and effect relationship or lead-lag effect. These results confirm the existence of causal and lead-lag relationships between measures of investor sentiment and stock market performance.

Despite these insights, the study has a number of limitations. This research is based on quarterly data gathered from 49 non-financial listed firms on the KSE-100 index over the time period of 2012-2019. This time period does not cover recent COVID-19 pandemic, post-pandemic market recovery, regulatory changes and changing behaviour of investors. Future studies should incorporate latest trends to capture changing market conditions. It excludes non-listed firms because of data constraints and only considers non-financial firms because of their homogeneity in terms of operations. The sample is restricted to the KSE-100 index, which may not be representative of all the firms listed in the market and their distinctive nature. The Consumer Confidence Index (CCI) only goes back to 2012, which limits the range of starting dates for the sample and does not include the period of the Pandemic in 2020. Additionally, the advance-decline ratio (ADR) which was solely based on the number of advancing and declining stocks without taking into account the magnitude of their price change. Future research can

address these limitations by using a larger data set, covering a longer period, data on all listed companies, and improving the measure of sentiment at the firm level.

The results give a strong support to behavioural finance in confirming that the behaviour of investors does have a significant influence on their stock returns in Pakistani market. It confirms the behavioural biases in the context of Pakistani emerging economy i.e. herd behaviour, overreaction, and mispricing and also challenges Efficient Market Hypothesis by nullifying the exclusive role of fundamentals in the determination of stock prices. This impact is more pronounced in the emerging markets where noise trading and market inefficiencies are widespread. Furthermore, the gap between short-run volatility and long-run corrections is theoretically persistent and cyclic in the behavioural financial market.

The results also give a strong support for policy-making to government authorities, regulators, and policy-makers. It is important to increase dissemination of information, financial literacy, and transparency to limit speculative bubbles and delayed mispricing as investor sentiments impact on the asset prices and market volatility. The relationship of bond yield spread with stock returns entails a prospective role for signals in macroeconomic policy. In the fiscal and monetary policies, the bond yield spread impacts on the borrowing perspectives and investor psychology.

The results also give a strong support for practical implications by presenting the evidences from various countries (India, China, and South Korea). These economies stabilizes their funds, injects liquidity and regulates derivatives to control sentiment based fluctuations in their economies. These cases show that appropriate regulatory intervention, direct support in the markets and better mechanisms to monitor risks can restore confidence in times of increased uncertainty. For portfolio managers and institutional investors, sentiment indicators can be an important tool in understanding how to better time strategies, how to diversify portfolios, and also how to manage risk, especially if there is economic or political instability.

This study extends to the academic literature by incorporating a range of sentiment proxies, such as SMP, BON, GOLD, CCI, TURN, ADR, and RSI in order to evaluate their predictive power for the stock returns in Pakistan. The documented lead-lag and two-way relationships contribute to the empirical evidence on the behavioural indicators of financial performance in emerging markets. The results confirm the role played by bond market as an advance warning system and also verify that gold serves as safe heaven commodity in the local context. By showing that sentiment effects are stronger in the short-run but have a tendency to correct out, the study refines the understanding of temporal dynamics of behavioural influences, and provides a basis for future studies on market inefficiencies, predictive modelling and cross-market comparison.

REFERENCES

Agyemang, J. K., & Bardai, B. B. (2022). The Mediating Effect of Corporate Governance on the Relationship Between Accounting Information and Stock Market Return of Listed Entities in Ghana. *Journal of Modern Accounting and Auditing*, *18*(2). https://doi.org/10.17265/1548-6583/2022.02.002

Aggarwal, D. (2022). Defining and measuring market sentiments: A review of the literature. *Qualitative Research in Financial Markets*, *14*(2), 270–288. https://doi.org/10.1108/QRFM-03-2018-0033

Andleeb, R., & Hassan, A. (2023). Predictive effect of investor sentiment on current and future returns in emerging equity markets. *PLOS ONE*, *18*(5), e0281523. https://doi.org/10.1371/journal.pone.0281523

Audrino, F., & Tetereva, A. (2019). Sentiment spillover effects for US and European companies. *Journal of Banking & Finance*, *106*, 542–567. https://doi.org/10.1016/j.jbankfin.2019.07.022

Baker, M., & Wurgler, J. (2006). Investor Sentiment and the Cross-Section of Stock Returns. *The Journal of Finance*, *61*(4), 1645–1680. https://doi.org/10.1111/j.1540-6261.2006.00885.x

Baker, M., & Wurgler, J. (2007). Investor Sentiment in the Stock Market. *Journal of Economic Perspectives*, *21*(2), 129–151. https://doi.org/10.1257/jep.21.2.129

Brooks, C. (2019). *Introductory Econometrics for Finance* (4th ed.). Cambridge University Press. https://doi.org/10.1017/9781108524872

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/10.1016/j.jempfin.2002.12.001

Chen, M.-P., Chen, P.-F., & Lee, C.-C. (2013). Asymmetric effects of investor sentiment on industry stock returns: Panel data evidence. *Emerging Markets Review*, *14*, 35–54. https://doi.org/10.1016/j.ememar.2012.11.001

Chen, S. T., & Haga, K. Y. A. (2021). Using E-GARCH to Analyze the Impact of Investor Sentiment on Stock Returns Near Stock Market Crashes. *Frontiers in Psychology*, *12*, 664849. https://doi.org/10.3389/fpsyg.2021.664849

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise Trader Risk in Financial Markets. *Journal of Political Economy*, *98*(4), 703–738. https://doi.org/10.1086/261703

Dergiades, T. (2012). Do investors' sentiment dynamics affect stock returns? Evidence from the US economy. *Economics Letters*, *116*(3), 404–407. https://doi.org/10.1016/j.econlet.2012.04.018

Ding, W., Mazouz, K., & Wang, Q. (2019). Investor sentiment and the cross-section of stock returns: New theory and evidence. *Review of Quantitative Finance and Accounting*, *53*(2), 493–525. https://doi.org/10.1007/s11156-018-0756-z

Fazil, S., Iqbal, N., & Wahab, D. F. U. (2025). Theoretical aspects of internal and external determinants of firm performance: insights from developing economies. *International Journal of Social Sciences Bulletin*, *3*(2), 546–557. https://socialsciencesbulletin.com/index.php/IJSSB/article/view/466

Georgoutsos, D. A., & Migiakis, P. M. (2013). Heterogeneity of the determinants of Euro-area sovereign bond spreads; what does it tell us about financial stability? *Journal of Banking & Finance*, *37*(11), 4650–4664. https://doi.org/10.1016/j.jbankfin.2013.07.025

Gómez-Puig, M., Sosvilla-Rivero, S., & Ramos-Herrera, M. D. C. (2014). An update on EMU sovereign yield spread drivers in times of crisis: A panel data analysis. *The North American Journal of Economics and Finance*, *30*, 133–153. https://doi.org/10.1016/j.najef.2014.09.003

Hu, C., & Wang, Y. (2013). Noise trading and stock returns: Evidence from China. *China Finance Review International*, *3*(3), 301–315. https://doi.org/10.1108/CFRI-02-2012-0017

Hu, M., Tuilautala, M., & Kang, Y. (2019). Bandwagon effect: Special dividend payments. *International Review of Economics & Finance*, *63*, 339–363. https://doi.org/10.1016/j.iref.2019.04.002

Iqbal, N., Fazil, S., & Fakhr Ul Wahab. (2025). Dividends and Investment Decisions: A Case of Pakistan. *UW Journal of Management Sciences*, *9*(2). https://doi.org/10.56220/uwjms.v9i2.277

Iqbal, N., & Gul, F. (2024). Determinants of Stock Returns: The Role of Bond Yield Spread and Gold Bullion as Investor Sentiments. *Journal of Business and Management Research*, *3*(2), 377–403. https://jbmrjournal.com/index.php/Journal/article/view/244

Jordão, R. V. D., Almeida, V. R. D., & Novas, J. (2022). Intellectual capital, sustainable economic and financial performance and value creation in emerging markets: The case of Brazil. *The Bottom Line*, *35*(1), 1–22. https://doi.org/10.1108/BL-11-2021-0103

Kahneman, D., & Tversky, A. (2013). Prospect Theory: An Analysis of Decision Under Risk. In L. C. MacLean & W. T. Ziemba, *World Scientific Handbook in Financial Economics Series* (Vol. 4, pp. 99–127). WORLD SCIENTIFIC. https://doi.org/10.1142/9789814417358_0006

Khan, M., & Ahmad, E. (2018). Measurement of Investor Sentiment and Its Bi-Directional Contemporaneous and Lead–Lag Relationship with Returns: Evidence from Pakistan. *Sustainability*, *11*(1), 94. https://doi.org/10.3390/su11010094

Khan, S., Saleem, F., & Bibi, A. (2023). The impact of investor sentiment on equity returns: Comparison between financial and non-financial sectors of Pakistan Stock Exchange. *UW Journal of Management Sciences*, *7*(2), Article 2. https://www.uwjms.org.pk/index.php/uwjms/article/view/147

Kim, K., Lee, S.-Y. T., & Kauffman, R. J. (2023). Social informedness and investor sentiment in the GameStop short squeeze. *Electronic Markets*, *33*(1), 23. https://doi.org/10.1007/s12525-023-00632-9

Kim-Hahm, H., Abou-Zaid, A. S., & Mohd, A. (2025). News vs. Social Media: Sentiment Impact on Stock Performance of Big Tech Companies. *Journal of Risk and Financial Management*, *18*(12), 660. https://doi.org/10.3390/jrfm18120660

Kumar, A., Babu, D., & Scholar, P. (2018). *EFFECT OF LOSS AVERSION BIAS ON INVESTMENT DECISION: A STUDY*. *5*, 71.

Kumar, A., & Lee, C. M. C. (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

Kumari, A., Fazil, S., & Iqbal, N. (2025). Determinants Shaping Choices for Robo and Human Advisors in German Financial Market: A Theoretical Review. *Journal of Finance and Accounting Research*, 93–115. https://doi.org/10.32350/jfar.72.04

Kumari, A., Iqbal, N., & Fazil, S. (2024). Determinants Shaping Choices for Robo and Human Advisors in The German Financial Market: The Analysis of Retail Consumers.

International Journal of Management Research and Emerging Sciences, *14*(4). https://doi.org/10.56536/ijmres.v14i4.668

Lan, Y., Huang, Y., & Yan, C. (2021). Investor sentiment and stock price: Empirical evidence from Chinese SEOs. *Economic Modelling*, *94*, 703–714. https://doi.org/10.1016/j.econmod.2020.02.012

Lee, C. M. C., Shleifer, A., & Thaler, R. H. (1991). Investor Sentiment and the Closed-End Fund Puzzle. *The Journal of Finance*, *46*(1), 75–109. https://doi.org/10.1111/j.1540-6261.1991.tb03746.x

Li, J. (2015). The asymmetric effects of investor sentiment and monetary policy on stock prices. *Applied Economics*, *47*(24), 2514–2522. https://doi.org/10.1080/00036846.2015.1008770

Li, T., Chen, H., Liu, W., Yu, G., & Yu, Y. (2023). Understanding the role of social media sentiment in identifying irrational herding behavior in the stock market. *International Review of Economics & Finance*, *87*, 163–179. https://doi.org/10.1016/j.iref.2023.04.016

Muhammad, A. U. R. (2022). The impact of investor sentiment on returns, cash flows, discount rates, and performance. *Borsa Istanbul Review*, *22*(2), 352–362. https://doi.org/10.1016/j.bir.2021.06.005

Naidoo, T., Moores-Pitt, P., Muzindutsi, P.-F., & O Isah, K. (2025). Analysing investor sentiment and stock market volatility of the JSE size-based indices: A GARCH-MIDAS approach. *Risk Management*, *27*(3), 14. https://doi.org/10.1057/s41283-025-00165-9

Prasad, S., Mohapatra, S., Rahman, M. R., & Puniyani, A. (2022). Investor Sentiment Index: A Systematic Review. *International Journal of Financial Studies*, *11*(1), 6. https://doi.org/10.3390/ijfs11010006

Qi, L. (2023). After COVID-19 Epidemic Restriction: Investor Sentiment and Stock Market Response. *Highlights in Business, Economics and Management*, *21*, 578–585. https://doi.org/10.54097/hbem.v21i.14693

Rahman, S. U., Faisal, F., Ali, A., Sulimany, H. G. H., & Bazhair, A. H. (2023). Investigating the financial market development and shadow economy nexus in the presence of country risk in an emerging economy. *Heliyon*, *9*(7), e17791. https://doi.org/10.1016/j.heliyon.2023.e17791

Rashid, A., Fayyaz, M., & Karim, M. (2019). Investor sentiment, momentum, and stock returns: An examination for direct and indirect effects. *Economic Research-Ekonomska Istraživanja*, *32*(1), 2638–2656. https://doi.org/10.1080/1331677X.2019.1650652

Raza, S. A., Mansoor, M., & Iraqi, K. M. (2019). Influence of Investor Sentiments on Stock Market Capitalization of Different Economic Sectors in a Developing Economy: Evidence from Pakistan. *Journal of Finance and Economics Research*, *4*(1), 31–43. https://ideas.repec.org//a/gei/jnlfer/v4y2019i1p31-43.html

Reis, P. M. N., & Pinho, C. (2021). A Reappraisal of the Causal Relationship between Sentiment Proxies and Stock Returns. *Journal of Behavioral Finance*, *22*(4), 420–442. https://doi.org/10.1080/15427560.2020.1792910

Renault, T. (2017). Intraday online investor sentiment and return patterns in the U.S. stock market. *Journal of Banking & Finance*, *84*, 25–40. https://doi.org/10.1016/j.jbankfin.2017.07.002

Schmeling, M. (2009). Investor sentiment and stock returns: Some international evidence. *Journal of Empirical Finance*, *16*(3), 394–408. https://doi.org/10.1016/j.jempfin.2009.01.002

Shah, S. A., Hashmi, A. M., & Raza, H. (2022). Investor sentiments and stock returns in emerging market: Evidence from pakistan stock exchange (psx). *Pakistan Journal of Social Research*, *4*(04), Article 04. https://doi.org/10.52567/pjsr.v4i04.816

Shaukat, S. (2026). Investigating Investor Herding in the Pakistan Stock Market (PSX): A Sectoral Analysis. *Journal of Finance and Accounting Research*, *8*(1), 24–46. https://doi.org/10.32350/jfar.81.02

Smales, L. A. (2017). The importance of fear: Investor sentiment and stock market returns. *Applied Economics*, *49*(34), 3395–3421. https://doi.org/10.1080/00036846.2016.1259754

Stein, J. C. (1996). *Rational Capital Budgeting in an Irrational World* (Working Paper No. 5496). National Bureau of Economic Research. https://doi.org/10.3386/w5496

Sun, L., Najand, M., & Shen, J. (2016). Stock return predictability and investor sentiment: A high-frequency perspective. *Journal of Banking & Finance*, *73*, 147–164. https://doi.org/10.1016/j.jbankfin.2016.09.010

Tauseef, S. (2020). Sentiment and Stock Returns: A Case for Conventional and Islamic equities in Pakistan. *Business & Economic Review*, *12*(3), Article 3. https://www.bereview.pk/index.php/BER/article/view/350

Thalassinos, E., Andleeb, R., Ahmed, S., & Aksar, M. (2025). *Response of Emerging Equity Markets to Swings in Investor Sentiments*. Business, Economics and Management. https://doi.org/10.20944/preprints202504.0533.v1

Uygur, U., & Taş, O. (2014). The impacts of investor sentiment on different economic sectors: Evidence from Istanbul Stock Exchange. *Borsa Istanbul Review*, *14*(4), 236–241. https://doi.org/10.1016/j.bir.2014.08.001

Wahab, F. U., Iqbal, N., & Fazil, S. (2026). Semi-Strong Market Efficiency and Post-COVID Investor Reactions to Dividend Announcements: Evidence from Developed Markets. *Advance Journal of Econometrics and Finance*, *4*(1), 555–574. https://doi.org/10.63075/ws00zy48

Wang, Z. (2023). Investor Sentiment and The Stock Market. *Highlights in Business, Economics and Management*, *21*, 346–351. https://doi.org/10.54097/hbem.v21i.14424

Wu, Y., Liu, T., Han, L., & Yin, L. (2018). Optimistic bias of analysts' earnings forecasts: Does investor sentiment matter in China? *Pacific-Basin Finance Journal*, *49*, 147–163. https://doi.org/10.1016/j.pacfin.2018.04.010

Yang, Y., Lin, Y.-W., & Cheng, L.-C. (2025). Impact of real-time public sentiment on herding behavior in Taiwan's stock market: Insights across investor types and industries. *International Review of Economics & Finance*, *102*, 104397. https://doi.org/10.1016/j.iref.2025.104397

Yuan, Y. (2025). The Influence of Social Media Sentiment on Investor Behavior: A Case Study of the GameStop Short Squeeze and Behavioral Economic Insights. *Advances in Economics, Management and Political Sciences*, *149*(1), 110–115. https://doi.org/10.54254/2754-1169/2024.19239

Zhou, G. (2018). Measuring Investor Sentiment. *Annual Review of Financial Economics*, *10*(1), 239–259. https://doi.org/10.1146/annurev-financial-110217-022725

Zhou, Z. (2025). The impact of investor sentiment fluctuations on stock market liquidity and volatility: Implications for market returns. *Finance Research Letters*, *86*, 108771. https://doi.org/10.1016/j.frl.2025.108771