“Mind over market: Impact of investor sentiment on the Indian stock market”

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MIND OVER MARKET: IMPACT OF INVESTOR SENTIMENT ON THE INDIAN STOCK MARKET

Abstract

Investor sentiment influences financial markets beyond fundamental factors. Understanding the extent of this influence on market returns is crucial for stakeholders to make informed decisions. The study analyzed the impact of investor sentiment on the National Stock Exchange (NSE). The investor sentiment index, constructed by extracting sentiments from Times of India business news articles, is used to create the first index, the Financial Index (FinDex), using FinBERT (Financial Bidirectional Encoder Representations from Transformers). The Composite Investor Sentiment Index (CISI), which consists of FinDex and selected sentiment proxy variables, is finally constructed using Principal Component Analysis. This study has analyzed the impact of CISI on selected market indices. Results indicated that stock market returns significantly influence investor sentiment. The broad market index explains 39.12% of the variations in CISI. In the sectoral indices, the percentage of variations explained by the sectoral market index is more than 40% for auto, realty, and pharma. Investor sentiment also influences stock market returns, but comparatively, the influence is minimal. Thus, sentiment lags behind stock returns rather than driving them. Bidirectional causal relation exists in the case of the auto, public sector bank, and realty sectors (p-value < 0.10). CISI can be used by investors to refine their asset allocation strategies, ensuring better market timing and reducing exposure to irrational market swings. It can also be used as an early warning system for systematic risk in financial markets.

Keywords sentiment, Times of India, FinBERT, composite index, Psychological Line Index, Relative Strength Index, VAR, Granger causality

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INTRODUCTION

Investor sentiment has long been recognized as a key driving force behind market oscillations. Investor sentiment is a measure of the stock market attitude at a given time. It can be either bullish or bearish, or something in between (S. H. Kim & D. Kim, 2014). Stock Market prediction has always fascinated researchers. Researchers have made many attempts, but the dynamic market complexities make predicting it difficult. Financial market theories suggest that stock markets follow a random walk, and it is foolish to think you can predict them (Fama, 1970). On the other hand, behavioral finance theories consider emotions, biases, and psychological influences (Kahneman & Tversky, 1979; Wong, 2020). Although behavioral finance has helped to reduce this gap, the majority of the studies that link investor sentiments and stock market movement concentrate on US or European stock markets, and in the case of Asia, largely on China.

With the advancement of social networks, the interaction between investors in the stock market has increased (Guo et al., 2017). Sentiments that impact investment decisions can rapidly disseminate, which may influence the stock market and intensify across networks. India is a growing economy, so it becomes essential to investigate how media-

based sentiment indicators impact stock market movements. Several global studies have examined the effect of sentiment on stock market behavior (Bao & Suzuki, 2020; Ni et al., 2015). However, limited research has been conducted that focuses explicitly on India, using sentiments derived from newspapers to construct a sentiment index.

1. LITERATURE REVIEW

Investor sentiment has evolved as a pivotal construct in understanding stock market behavior. Consequently, creating trustworthy proxies to gauge investor sentiments has become a crucial area of study in finance. The investor sentiment decision-making process is explained by Chang et al. (2016). According to the decision-making process, the first and most crucial step is to choose a sentiment index with a high degree of predictability so that it can be used to forecast future market movements and eventually assist in making wise financial decisions. A strong sentiment index aids in interpreting market dynamics and also enhances the ability to forecast future trends. Thus, developing a robust sentiment index is vital. The present literature review explores three popular methods used for gauging investor sentiments: survey-based indices, market-based indices, and text-based sentiments extracted from social platforms and media. Additionally, it highlights the studies that integrate these methods.

The relationship between investor sentiment and market performance can be analyzed using the following approaches. The first approach was based on survey-based indices. The commonly used surveys include the Association of Individual Investors (AAII) sentiment, the Consumer Confidence Index (CCI) by Economic Co-operation & Development, and the Michigan consumer sentiment survey. Using information from the Michigan consumer sentiment survey, Otoo (2005) suggests that market movements influence consumer sentiments. Lee et al. (2002) investigated the influence of Investor Intellect sentiment on volatility, concluding that market volatility is inversely correlated with sentiment. A positive relation is detected between individual investor sentiment and market variables using the Association of Individual Investors (AAII) sentiment index (Kresta et al., 2024). University of Michigan's consumer sentiment was used as a proxy for investor sentiment, which confirmed a positive association between sentiment and returns (Michael Lemmon, 2006). CCI was used as a proxy variable by Banchit et al. (2020), who conducted a correlation analysis to analyze the association between sentiment and macroeconomic variables. The authors confirm the presence of a weak correlation between sentiment and most of the macroeconomic variables. The impact of sentiments on market movements across countries using CCI as a sentiment proxy and found sentiment to be a significant predictor (Schmeling, 2009).

The second approach was using market variables. The proxy sentiment is a market-based measure such as trading volume, closed-end fund discounts, and initial public offering first-day returns, among others. The most influential measure is the investor sentiment index (Baker & Wurgler, 2006a), constructed using principal component analysis. The investor sentiment index consists of six market-based proxies, which include the number of initial public offerings (IPOs), the average first-day returns of IPOs, the dividend premium, the closed-end fund discount, the turnover, and the equity share in new issues. A negative relation was observed between investor sentiment and future stock returns. Most studies have used several macroeconomic factors as proxies for investor sentiment (Oprea & Brad, 2014; Anusakumar et al., 2017, Smales, 2017; Limongi Concetto & Ravazzolo, 2019; Chen et al., 2020; P H & Rishad, 2020; Su et al., 2020; Hu et al., 2021) and adopted the framework developed by Baker and Wurgler (2006) to construct the investors' sentiment index. Studies have incorporated additional variables into the existing Baker and Wurgler's (2006b) framework to enhance the predictability of the sentiment index. Money Flow Index, Relative Strength Index (RSI), Interbank offer rate, and change in local market index variables were used to construct a sentiment index to investigate the influence of developed countries' stock exchanges on developing countries' stock exchanges (Zia Ur Rehman et al., 2017).

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The third approach uses sentiments extracted from news and social media. Investor sentiment is central to investors' decision-making but is hard to measure. The indicators of investor sentiment can be classified as subjective and objective. Subjective indicators can be identified via questionnaires, but this method has reliability problems. It is also cumbersome and takes a long time. On the other hand, objective indicators are based on stock exchange data. With the development and ease of accessibility of the internet, a large amount of big data related to investors is generated and is available every minute, a click away (Cen et al., 2019). This gives birth to a third source of measuring investor sentiment, i.e., text mining, big-data analysis, social media, and search engine data (Banholzer et al., 2019). People worldwide use social networking sites, like Facebook, Twitter, etc., to express their opinions and views. Sentiment analysis can categorize users' thoughts and comments as positive, negative, and neutral sentiments (Chuang et al., 2010). Tetlock (2007) considered daily articles to measure the interactions between the media and the stock market. Fisher et al. (2015) and Fisher and Statman (2000) confirm an insignificant relation between sentiment measures and future returns. However, Tetlock et al. (2008) and Chuang et al. (2010) report that opinions shared in news and social media have the potential to predict companies' earnings and stock performance. A dataset of thirty-two million posts on ninety-one companies posted on Yahoo Finance was analyzed to examine the relationship between stock returns and investor sentiment (S.-H. Kim & D. Kim, 2014). The study concludes that investor sentiment does not forecast market returns. However, prior market price positively influences sentiment.

Some studies have integrated the above-mentioned three methods (Adjei & Adjei, 2017; Chen et al., 2014; Choi & Yoon, 2020; Chong et al., 2017; He et al., 2017; Huang & Song, 2021; P H & Rishad, 2020). Using ten newspapers, Yao and Li (2020) have constructed an economic policy uncertainty index for Hong Kong. The final sentiment index is constructed using Principal Component Analysis (PCA), integrating the economic policy uncertainty index with RSI, Psychological Line Index (PSY), trading volume, and turnover.

The extant literature underscores the multi-layered nature of investor sentiments and their influence on financial markets. While early approaches predominantly relied on survey-based data and market indicators, recent advancements in computational techniques have enabled hybrid models that incorporate textual analysis. It highlights the importance of context-specific sentiment indices for emerging markets like India. The present study thus builds upon by integrating textual sentiment analysis with market-based factors, and has adopted a mixed-method approach to develop a Composite investor sentiment index. Business news articles from the Times of India are scraped to construct FinDex (Financial Index). Using PCA, the FinDex is combined with selected market factors to construct CISI.

The purpose of the study is to determine if the constructed index can forecast market movements and explore the mutual influence between investor sentiment and market returns. The study aims to address the following research questions: (1) Does investor sentiment influence market movements? (2) What is the association between sentiment and market returns? Thus, the following hypotheses are formulated:

H_{01}: *Investor sentiment and stock returns do not influence each other.*

H_{1a}: *There exists no causal relationship between CISI and the stock market returns.*

2. METHOD

The Composite Investor Sentiment Index (CISI) is constructed using the following variables: Psychological Line Index, Relative Strength Index, Turnover, Net FII Flows, Index of Industrial Production, and Exchange Rate. The data for the variables were collected for the period from January 1, 2017 to February 29, 2024. Based on the availability of the data, the sectoral indices were selected for the study. The datasets are uploaded to Zenodo, Alarnkar, 2025, TOI FinBERT Scores for news articles. [Data set]. Zenodo. https://doi.org/10.5281/zenodo.15462126.

Table 1. List of variables

Sr. No	Variables	Source
1	Psychological line index (PSY),	Calculated
2	Relative strength index (RSI),	Calculated
3	Turnover	NSE
4	Net Foreign Institutional Investor (FII) flows	Bloomberg
5	Index of Industrial Production (IIP).	Bloomberg
7	Exchange rate	Bloomberg
8	Business News Articles	Times of India
9	Stock Market Indices	National Stock Exchange

Broad Index: Nifty 50
Sectoral Indices: Auto, Bank, Financial Services, Fast-moving consumer goods (FMCG), Information Technology, Media, Metal, Pharma, Private Bank, Public Bank, Realty, and Energy.

Appendix A explains the methodology adopted for the construction of the Composite Investor Sentiment Index (CISI). Table A1 lists the final variables selected for constructing the CISI, and Table A2 specifies the equation of CISI for the respective stock market indices. Descriptive statistics and Augmented Dickey-Fuller Unit Root tests were performed on all variables. The VAR model analyzed the interdependencies between security market returns and sentiment. Appropriate lags for examining the relation are selected using Akaike Information Criteria (AIC). The VAR model examines the correlations between the factors and is employed to understand the association between the factors. The Granger Causality test investigates the short-term association between the factors and examines the causal relationship between the variables if one variable leads to another. Equations for analysing returns and CISI:

$$CISI = \alpha_1 + \sum_{i=1}^{\rho} \beta_{1i} CISI_{t-1} + \sum_{i=1}^{\rho} \gamma_{1i} Z_{t-1} + \varepsilon_{1t}. \quad (1)$$

$$Z_t = \alpha_2 + \sum_{i=1}^{\rho} \beta_{2i} CISI_{t-1} + \sum_{i=1}^{\rho} \gamma_{2i} Z_{t-1} + \varepsilon_{2t}. \quad (2)$$

Here, *CISI* is a constructed sentiment index. Z_t is the calculated daily returns of selected market indices. α_1 and α_2 are constant. β_1 and β_2 are coefficients capturing the association of past sentiment with current sentiment and returns. γ_1 and γ_2 are coefficients capturing the association of past returns on current sentiment and returns.

3. RESULT

The unit root test is used to determine whether the data are stationary. The most popular and widely accepted test is the Augmented Dickey-Fuller Test (ADF). Returns were calculated for daily closing prices of selected indices. The investor sentiment variables include FinDex scores and CISI. The returns of the selected indices and the sentiment scores are stationary at level, i.e., I (0). The p-value is less than 0.05 for the intercept and trend. The null hypothesis is rejected, *H0*: A unit root exists in the series. Johansen Cointegration Test requires the data to be non-stationary at level. Since the above condition is not met, it is evident that a long-run relation between selected investor sentiment variables and stock market returns does not exist. Thus, the short-run relationship is analyzed using the Vector Auto Regression (VAR) test.

The appropriate lag is selected, as shown in Table B1 (Appendix B), using the Akaike Information Criterion. Tables B2, B3, and B4 depict the Vector Auto Regression (VAR) output of CISI and thirteen selected stock market indices. The first lag of stock returns depicts a weak influence, inferring that past returns do not strongly affect current returns. The past returns do not impact current returns, as the t-statistic is below two, signifying weak predictive power, except for Nifty Auto, Nifty Realty, and Nifty FMCG. However, the stock returns of all selected indices significantly influence the CISI variable (t-stat > 2), signifying a positive association where previous returns strongly influence the sentiment index. Like the first lag, the second lag of stock market returns significantly impacts sentiment (t-stat > 2), implying continued investor focus on past returns in the case of Nifty Auto, Energy, FS, FMCG, Metal, Private Bank, and Nifty 50.

In the case of the first lag of CISI, it is evident that the past sentiment is a good predictor of current sen-

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Table 2. ADF test results of the stock market returns of indices

Variable	Intercept		Intercept and Trend		No intercept and Trend	
	t-stat	Prob	t-stat	Prob	t-stat	Prob
Index Returns						
ReturnsAuto	–41.536	0.0000	–41.586	0.0000	–41.4879	0.0000
ReturnsBank	–40.66	0.0000	–40.651	0.0000	–40.596	0.0000
ReturnsEnergy	–41.89	0.0000	–41.89	0.0000	–41.7384	0.0000
ReturnsFS	–17.862	0.0000	–17.873	0.0000	–15.2767	0.0000
Returns FMCG	–43.908	0.0001	–43.896	0.0000	–43.7699	0.0001
Returns IT	–43.343	0.0001	–43.331	0.0000	–43.1919	0.0001
Returns Media	–42.009	0.0000	–42.001	0.0000	–42.0204	0.0000
Returns Metal	–43.188	0.0000	–43.19	0.0000	–43.1201	0.0001
Returns Pharma	–40.943	0.0000	–40.982	0.0000	–40.9093	0.0000
Returns Private Bank	–40.257	0.0000	–40.251	0.0000	–40.2085	0.0000
Returns PSU Bank	–41.388	0.0000	–41.442	0.0000	–41.3552	0.0000
Returns Realty	–38.948	0.0000	–38.95	0.0000	–38.8276	0.0000
ReturnsNifty50	–14.923	0.0000	–14.919	0.0000	–14.7453	0.0000

Table 3. ADF test results of proxy investor sentiment variables

Variable	Intercept		Intercept and Trend		No intercept and Trend	
	t-stat	Prob	t-stat	Prob	t-stat	Prob
Investor sentiments						
FinDex	–10.56	0	–10.765	0	–9.935	0
CISI						
ReturnsAuto	–6.128	0	–6.1327	0	–6.130	0
ReturnsBank	–6.303	0	–6.343	0	–6.304	0
ReturnsEnergy	–6.852	0	–2.5067	0	–2.506	0.0118
ReturnsFS	–6.688	0	–6.7513	0	–6.690	0
Returns FMCG	–7.087	0	–7.0842	0	–7.088	0
Returns IT	–7.680	0	–7.7277	0	–7.682	0
Returns Media	–2.559	0.1019	–5.949	0	–2.561	0.0101
Returns Metal	–1.42	0.5739	–5.091	0.0001	–2.506	0
Returns Pharma	–6.01	0	–6.598	0	–6.014	0
Returns Private Bank	–6.44	0	–6.490	0	–6.450	0
Returns PSU Bank	–2.40	0.1411	–6.029	0	–2.405	0.0157
Returns Realty	–6.26	0	–6.259	0	–6.266	0
ReturnsNifty50	–6.03	0	–6.056	0	–6.035	0

timent trends (t-stat > 2). Sentiment has a positive and significant impact on stock returns in the case of Nifty Auto, Energy, FS, and Realty. Regarding the second lag of CISI, Past sentiment is a good predictor of current sentiment trends. The second lag of sentiment has a small but significant adverse effect on returns, suggesting a potential mean-reversion effect. Aligns with behavioral theories of investor overreaction, where extreme sentiment levels may lead to corrections. Past sentiment exhibits a reversal effect, indicating that sentiment trends may not persist indefinitely and revert over time.

Tables B5 to B11 of Appendix B show the variance decomposition output of CISI and returns of selected indices. In period 1, 100% of the variance in stock market returns is explained by itself, meaning no impact from CISI initially. The CISI experiences a gradual yet minimal influence and starts contributing slightly over time. By period 10, it achieves the highest contribution among all indices, reaching 46% for Realty. Investor sentiment (CISI) appears to be influenced significantly by stock market returns over time, implying that fluctuations in market returns play a key role in shaping overall sentiment.

Table B12 shows the output of Granger Causality. Unidirectional causality exists between returns and CISI as the p-value is less than 0.10. The results indicate that market returns contain information that can predict the Composite Investor

Sentiment Index. However, in the case of Auto, PSU Bank, and Realty, bidirectional causality is evident as the p-value of both null hypothesis index returns does not have a causal relation with CISI, and vice versa is less than 0.10. Thus, CISI also contains information that can predict stock market returns.

Thus, we reject the null hypothesis $H_{01:}$ There exists no relationship between investor sentiment and the Indian stock market returns, and H_{0a}: There exists no causal relationship between investor sentiment and the Indian stock market returns. This confirms the presence of a relation between sentiments and market returns.

4. DISCUSSION

The study builds upon the foundations of Behavioral Finance (BF) theory. Traditional finance theories assume that stakeholders are rational, and the market is efficient, whereas behavioral finance theory considers the influence of sentiments. Based on the theories, the hypotheses were formulated, and all the hypotheses are accepted. This validates the interdependence between CISI and market returns.

In most indices, past returns do not significantly influence current returns, suggesting weak predictability except in the case of Nifty Auto, FMCG, and Realty, where current returns strongly influence past returns. Therefore, certain indices display diverse patterns in returns that allow for short-term prediction.

It is evident from the results that past stock returns influence CISI. However, this is not true for Nifty Energy and Metal. However, investors continue to be influenced by returns from two periods ago, especially for Nifty Auto, Energy, FS, FMCG, Metal, Private Bank, and Nifty 50. Hence, it is evident that investor memory influences the development of expectations. The study's findings coincide with Huang et al. (2015) and Yao and Li (2020).

CISI affects market returns in Nifty Auto, Energy, FS, and Realty. Baker and Wurgler (2006) provide compelling evidence supporting the impact of sentiment on returns, which aligns with the findings of Dash and Maitra (2018), Ryu et al. (2016), Shi et al. (2020), and Verma and Verma (2008). According to Dash and Maitra (2018), investor sentiment has a stronger impact on small-cap and mid-cap indices. Thus, observations made by Dash and Maitra support the study's findings, which indicate that stock market returns influence investor sentiment to a large extent. Investor sentiment also influences stock market returns, but comparatively, the influence is minimal as the current study mainly focuses on large-cap indices. Nevertheless, the CISI developed in the present study detected a sentiment-return relationship in the case of Nifty Auto, Energy, FS, and Realty, highlighting the superiority of the index.

The mean reversion effect of past sentiments indicates that when sentiment is bullish for an extended period, returns may eventually decline (Schmeling, 2009). It is also detected that a correction follows the overreaction (Ni et al., 2015).

The findings of the study are in line with Wang (2024), who indicated that the sentiment-return relation is negative when sentiment is measured using a trade-based composite proxy. Since India is an emerging market, an immediate sentiment-return reaction is observed. Schmeling (2009) postulates that the impact of sentiment on returns is more substantial for countries where market integrity is frailer.

Results show that sentiment lags behind stock returns rather than driving them. Past studies (Baker et al., 2012; Baker & Wurgler, 2006) have shown that investor sentiment is influenced by past stock market performance, with a typical lag of a few days, weeks, or even months, depending on the sentiment measure used. There is an asymmetry in sentiment's influence; that is, investors react more strongly to losses than gains, which aligns with Prospect theory (Olsen, 2010).

In the case of the Composite Investor Sentiment Index, it is evident that bidirectional causality exists between returns and investor sentiment in the Auto, Energy, Financial Services, and Realty sectors, which is in line with the findings of Yadav et al. (2022). According to the weak form of the Efficient Market Hypothesis theory, stock prices already incorporate all past publicly available

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information, including sentiment-driven movements. Since markets process available information efficiently, sentiment alone does not systematically predict future returns. Other necessary factors, such as the market status, company financial statement, and risk-free rate, should be considered for effective stock return prediction (Shi et al., 2020). Fundamentals, news, and macroeconomic variables influence stock returns. Sentiment, however, develops gradually as investors process past returns. This explains why sentiment lags behind stock returns rather than leading them. The study emphasizes the dynamic nature of market effects and the critical role of incorporating several market factors and sentiment proxies. Future researchers can build a more exhaustive and refined framework for analyzing this relationship by integrating a broad range of sentiment indicators.

CONCLUSION

The purpose of the present study was to examine various methods for gauging investor sentiment, as well as the effects of these sentiments on the stock market, to analyze whether sentiments may be used to predict stock market performance or vice versa, and to investigate the role of the CISI constructed using business news from the Times of India, Psychological Line Index, Relative Strength Index, Turnover, Net FII Flows, Index of Industrial Production, and Exchange Rate in influencing the stock market in emerging countries such as India.

The results suggest that sentiment is largely influenced by stock market returns. However, in certain indices, Nifty Auto, Energy, FS, and Realty, sentiment influences market returns. Furthermore, unidirectional causality is observed between returns and sentiments, and bidirectional causality is witnessed in the Nifty Auto, Energy, Financial Services, and Realty indices.

The conclusions drawn from the study will help to understand the stocks' responses to investor sentiments in the context of an emerging country, India. Sentiment-based trading strategies can be developed. Short-term trading strategies can be adopted to exploit sentiment trends, especially in the Auto, Energy, Financial Services, and Realty sectors. Contrarian traders can profit from market overreactions if sentiment exhibits a mean-reversion effect. Thus, the CISI can be used by investors to refine their asset allocation strategies, ensuring better market timing and reducing exposure to irrational market swings. It could also be used as an early warning system for systematic risk in financial markets. Managers should consider sentiment exposure when constructing sectoral portfolios and use sentiment measures to hedge against excessive optimism/pessimism in specific industries. The study's findings will help policymakers, traders, and institutional investors understand the market dynamics, investment risks, and their effect on financial stability.

AUTHORS CONTRIBUTIONS

Conceptualization: Aakruthi Amrut Alarnkar, K. G. Sankaranarayanan.
Data curation: Aakruthi Amrut Alarnkar.
Formal analysis: Aakruthi Amrut Alarnkar.
Investigation: Aakruthi Amrut Alarnkar.
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Writing – original draft: Aakruthi Amrut Alarnkar.
Writing – review & editing: Aakruthi Amrut Alarnkar, K. G. Sankaranarayanan.

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APPENDIX A

Appendix A explains the methodology adopted for the construction of the Composite Investor Sentiment Index (CISI) is explained below:

The FinBERT model is used to process the news articles. Araci (2019) introduced FinBERT as a financial sentiment analysis model based on pre-trained language models. FinBERT is a domain-specific adaptation of the Bidirectional Encoder Representations from Transformers (BERT) model, fine-tuned specifically for financial sentiment analysis.

The first step is loading the Model. Here, FinBERT and its tokeniser are loaded to process financial text. The second step is Data Preparation, where the financial text is read from an Excel file and converted into a string format. The third step is tokenization, where the text is split into tokens (words or subwords). The fourth step is padding & truncation. This ensures all sequences are of the same length (up to 512 tokens). Tokens are passed to FinBERT, which assigns sentiment scores and a softmax function, converting model logits into probabilities for positive, negative, and neutral sentiment.

FinBERT Composite score (FinDex) = (Ppositive–Pnegative). Where (Ppositive) and (Pnegative) are the probabilities of the text being classified as positive and negative, respectively. This score can range from –1 to 1, where positive values indicate an overall positive sentiment; negative values indicate an overall negative sentiment, and values around 0 indicate a neutral sentiment.

The Relative Strength Index (RSI) is the average gain and loss calculated for fourteen days. The relative strength (RS) ratio is computed by dividing average gains by average losses (Bahng, 2003; Ley & Varian, 1994; Lobão & Pereira, 2017; Mangee, 2017; Woodhouse et al., 2016). The formulae used to compute RSI are:

$$RSI = 100 - \frac{100}{1 + RS}, \tag{A1}$$

Where Relative strength

$$\left(RS\right) = \frac{Average\,Gain}{Average\,Loss}. \tag{A2}$$

Psychological Line Index (PSY) is computed by counting the number of positive observations in a 14-day time period. For calculating PSY, the formula is:

$$PSY = \frac{Number\,of\ \ positive\,observations}{Time\ period} \cdot 100. \tag{A3}$$

Both RSI and PSY are used to identify bearish and bullish trends. If the RSI or PSY value is above 50, it indicates a bullish trend; if it is less than 50, it indicates a bearish trend (Khairudin et al., 2022; Lim, 2024; Phuong, 2021).

The turnover of selected indices is computed as follows:

$$Turnover = \frac{Vale\,of\ shares\,traded}{Market\,Capitalization}.$$

Here, market capitalization is the number of shares multiplied by the total shares held by shareholders. Several studies have explored the influence sentiments have on trading volume or turnover, linking sentiment-driven trading volume to market trends (Irum Saba et al., 2019; Lei et al., 2012; So & Lei, 2011).

Principal Component Analysis (PCA) is used to construct the index (Baker & Wurgler, 2006). KMO measure of sampling adequacy and Bartlett's test of sphericity are checked to determine the adequa-

cy of the sample. The proxies and their first lags are subjected to Principal Component Analysis, and Principal Component One is selected to create the raw sentiment index. To develop the final sentiment index, whichever of the proxies' lead or lag values has a greater correlation with the raw sentiment index is used. The CISI is constructed using seven variables: Psychological line index (PSY), Relative Strength Index (RSI), Turnover, Foreign Institutional Investors, Exchange Rate, Index of Industrial Production (IIP), and FinDex scores of Times of India business news articles.

Table A1. Final variables selected for constructing the CISI

Index	PSY	RSI	Turnover	FII	ER	FinDex	IIP
CISI Auto	t	T	t–1	T	t	t–1	
CISI Bank	t–1	T		T	t	t–1	t–1
CISI Energy	t–1	t–1	t–1	T	t	t–1	
CISIFS	t–1	T		t–1	t	t–1	t–1
CISI FMCG	t	t–1	t–1	T		t–1	
CISI IT	t	t–1	t	T	t–1	T	
CISI Media	t	t–1	t	T	t	t–1	
CISI Metal	t–1		t	T	t	t–1	
CISI Pharma	T	T	t–1	T		T	
CISI Private Bank	T	T		t–1	t	t–1	t–1
CISI PSU Bank	t–1	t–1	t	T	t–1	t–1	
CISI Realty	t–1	T	t–1	T	t	T	
CISI Nifty50	t–1	t–1		T	t	t–1	

Note: t is the current value and t–1 is the day lagged value. CISI: Composite Investor Sentiment Index, PSY: Psychological Line Index, RSI: Relative Strength Index, Turnover of respective stock indices, FII: Foreign Institutional Investors, ER: Exchange Rate, IIP: Index of Industrial Production, FinBERT: Financial Bidirectional Encoder Representations from Transformers, FinDex: FinBERT Composite Score.

Table A2. Final composite investor sentiment index

Index	Equation
CISI Auto	0.9393PSY +0.9311RSI+0.203Turnovert-1+0.126FII-0.0161ER+0.0877FinDext-1
CISI Bank	0.9337PSYt-1 +0.9343RSI+0.0611FII-0.0914ER+0.1601FinDext-1 -0.1592IIPt-1
CISI Energy	0.1215PSYt-1+0.0999RSIt-1+0.776Turnovert+0.8048FII+0.8769ER+0.1764FinDext-1
CISI FS	0.9294PSYt-1 +0.9349RSI+0.0614FIIt-1-0.1137ER+0.1175FinDext-1 -0.1239IIPt-1
CISI FMCG	0.9189PSY +0.9225RSIt-1-0.0147Turnovert-1+0.0285FII+ 0.0769FinDext-1
CISI IT	0.9264PSY +0.9215RSIt-1+ 0.1697Turnover+ 0.0162FII-0.0821ERt-1-0.0201FinDext-1
CISI Media	-0.141PSY +0.0386RSIt-1+ 0.6374Turnover+ 0.8633FII+0.8355ER+0.1241FinBERTt-1
CISI Metal	0.0553PSYt-1 + 0.7486Turnover+ 0.8221FII+0.8718ER+0.0548FinDext-1
CISI Pharma	0.886PSY +0.904RSI+ 0.502Turnovert-1+ 0.378FII+0.8355ER-0.131FinDex
CISI Private Bank	0.9442PSY +0.9434RSI+ 0.0552FIIt-1-0.0916ER-0.1618IIPt-1+0.1739FinDext-1
CISI PSU Bank	0.1774PSYt-1 +0.1359RSIt-1+0.6901Turnover+ 0.8335FII+0.861ERt-1+0.054FinDext-1
CISI Realty	0.9362PSYt-1 +0.9255RSI+0.3003Turnovert-1+ 0.2641FII-0.0749ER-0.051FinDex
CISI Nifty50	0.9459PSYt-1 +0.9545RSIt-1+ 0.0998FII-0.0964ER+0.149FinDext-1

Note: CISI: Composite Investor Sentiment Index, PSY: Psychological Line Index, RSI: Relative Strength Index, Turnover, FII: Foreign Institutional Investors, ER: Exchange Rate, and FinDex: FinBERT Composite Score, FinBERT: Financial Bidirectional Encoder Representations from Transformers.

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APPENDIX B

Appendix B shows the tables referring to the findings under the subsection Results.

Table B1. Lag selection

Variable	lag	LogL	LR	FPE	AIC	SC	HQ
Index Returns							
ReturnsAuto	2	4737.8	12.72950*	1.66e–05*	–5.333135*	–5.3	–5.32
ReturnsBank	2	4943.1	127.5626*	1.31e–05*	–5.564673*	–5.533762*	–5.553254*
ReturnsEnergy	2	4979.4	289.2799*	1.26e–05*	–5.605688*	–5.574778*	–5.594270*
ReturnsFS	2	5008.8	186.4890*	1.22e–05*	–5.638855*	–5.607945*	–5.627436*
Returns FMCG	2	5676.3	49.04578*	5.78e–06*	–6.385415*	–6.27	–6.341873*
Returns IT	2	5088.3	76.86267*	1.11e–05*	–5.728521*	–5.697610*	–5.717102*
Returns Media	2	4504.9	94.64342*	2.15e–05*	–5.070343*	–5.039433*	–5.058924*
Returns Metal	2	4605.4	126.9233*	1.92e–05*	–5.183776*	–5.152866*	–5.172357*
Returns Pharma	2	4575.4	73.69783*	1.99e–05*	–5.149917*	–5.119007*	–5.138498*
Returns Private Bank	2	4430.9	12.14235*	2.34e–05*	–4.986966*	–4.96	–4.98
Returns PSU Bank	1	4551	5519.679*	2.04e–05*	–5.124039*	–5.105501*	–5.117191*
Returns Realty	1	4302.6	4405.5	2.69E–05	–4.85	–4.828158*	–4.84
ReturnsNifty50	2	5251.8	42.26345*	9.27e–06*	–5.912965*	–5.882054*	–5.901546*

Note: LogL: Log-Likelihood, LR: Likelihood Ratio, FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Criterion, HQ: Hannan-Quinn Criterion. *

Table B2. VAR output of CISI and Nifty Auto, Nifty Bank, Nifty Energy, and Nifty FS

		Nifty Auto		NiftyBank		Nifty Energy		Nifty FS	
		RETURNSNifty Auto	CISI	RETURNSNifty Bank	CISI	RETURNSNifty Energy	CISI	RETURNSNifty FS	CISI
RETURNS(–1)	Coefficient	–0.02472	1.69E+00	0.019431	4.85E+00	0.006615	–3.19E–01	0.003845	5.14E+00
	Standard error	–0.02901	–7.15E–01	–0.02593	–4.82E–01	–0.02374	–4.76E–01	–0.02605	–5.13E–01
	t-statistics	[–0.85207]*	[2.35721]*	[0.74928]	[10.0526]*	[0.27870]	[–0.67062]	[0.14760]	[10.0238]*
RETURNS(–2)	Coefficient	0.026721	1.36E+00	–0.03799	–1.68E–01	0.052656	–9.73E–02	–0.05785	–1.03E+00
	Standard error	–0.02464	–6.08E–01	–0.02556	–4.75E–01	–0.02373	–4.76E–01	–0.0258	–5.08E–01
	t-statistics	[1.08462]	[2.24665]*	[–1.48625]	[–0.35246]	[2.21911]*	[–0.20433]	[–2.24213]*	[–2.02330]*
CISI(–1)	Coefficient	2.69E–03	0.99346	2.11E–03	1.19E+00	2.58E–03	0.59004	2.20E–03	1.239953
	Standard error	–1.17E–03	–0.02896	–1.35E–03	–2.52E–02	–1.10E–03	–0.02198	–1.27E–03	–0.02494
	t-statistics	[2.28633]*	[34.3091]*	[1.56332]	[47.2224]*	[2.35449]*	[26.8499]*	[1.73229]*	[49.7274]*
CISI(–2)	Coefficient	–2.27E–03	–0.07262	–1.71E–03	–0.25351	–2.23E–03	0.384655	–1.85E–03	–0.309583
	Standard error	–1.13E–03	–0.02796	–1.32E–03	–0.02448	–1.10E–03	–0.022	–1.23E–03	–0.02423
	t-statistics	[–2.00089]*	[–2.59766]*	[–1.29947]	[–10.3568]*	[–2.03699]*	[17.4864]*	[–1.50160]	[–12.7787]*
C	Coefficient	5.41E–04	–0.0014	6.52E–04	–0.0026	7.81E–04	0.002886	7.17E–04	–0.002491
	Standard error	–3.40E–04	–0.00831	–3.50E–04	–0.00646	–3.20E–04	–0.00636	–3.30E–04	–0.00655
	t-statistics	[1.60380]	[–0.16882]	[1.87854]	[–0.40230]	[2.46526]	[0.45399]	[2.15391]	[–0.38027]

Note: CISI: Composite Investor Sentiment Index, Returns Nifty Auto, Returns Nifty Bank, Returns Nifty Energy and Returns Nifty FS are the daily returns of indices. CISI (–1) and CISI (–2) are lagged values of CISI, and RETURNS (–1) and RETURNS (–2) are lagged values of the returns of selected stock market indices mentioned above. * Means statistically significant t-statistics.

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Table B3. VAR output of CISI and Nifty Private Bank, Nifty PSU Bank, Nifty Realty, and Nifty 50

		Nifty Private Bank		Nifty PSU Bank		Nifty Realty		Nifty50	
		RETURNSNifty Private Bank	CISI	RETURNSNifty PSU Bank	CISI	RETURNSNifty Realty	CISI	RETURNSNifty 50	CISI
RETURNS(–1)	Coefficient	0.03319	1.85E+00	0.014009	–1.95E+00	0.072073	6.10E+00	–0.0332	1.80E+01
	Standard error	–0.02773	–7.02E–01	–0.02382	–2.37E–01	–0.02405	–4.09E–01	–0.0238	–6.25E–01
	t-statistics	[1.19675]	[2.637]*	[0.58821]	[–8.20049]*	[2.99649]*	[14.9286]*	[–1.39466]	[28.8245]*
RETURNS(–2)	Coefficient	–0.03316	1.23E+00					0.020566	3.01E+00
	Standard error	–0.02441	–6.18E–01					–0.02872	–7.54E–01
	t-statistics	[–1.35851]	[1.9881]*					[0.71603]	[3.99679]*
CISI(–1)	Coefficient	9.99E–04	0.927405	9.35E–04	0.984102	7.48E–04	0.92533	–6.24E–05	0.975127
	Standard error	–1.09E–03	–0.02771	–5.10E–04	–0.00512	–4.40E–04	–0.00746	–9.00E–04	–0.02352
	t-statistics	[0.91326]	[33.46]*	[1.81935]*	[192.245]*	[1.70413]*	[124.016]*	[–0.06969]	[41.4613]*
CISI(–2)	Coefficient	–6.65E–04	–0.01379					2.66E–04	–0.05165
	Standard error	–1.07E–03	–0.02698					–8.70E–04	–0.02295
	t-statistics	[–0.62429]	[–0.5111]					[0.30433]	[–2.25061]*
C	Coefficient	5.90E–04	–0.00102	7.03E–04	0.004145	1.02E–03	–0.00629	6.23E–04	–0.01263
	Standard error	–3.50E–04	–0.00899	–5.10E–04	–0.00508	–4.30E–04	–0.00735	–2.60E–04	–0.00674
	t-statistics	[1.66154]	[–0.1137]	[1.37851]	[0.81601]	[2.36582]	[–0.85572]	[2.42789]	[–1.87542]

Note: CISI: Composite Investor Sentiment Index, Returns Nifty Private Bank, Returns Nifty PSU Bank, Returns Nifty Realty, and Returns Nifty 50 are the daily returns of indices. CISI (–1) and CISI (–2) are lagged values of CISI, and RETURNS (–1) and RETURNS (–2) are lagged values of the returns of selected stock market indices mentioned above. * Means statistically significant t-statistics.

Table B4. VAR output of CISI and Nifty Media, Nifty Metal, Nifty Pharma, Nifty FMCG, and Nifty IT

		Nifty Media		Nifty Metal		Nifty Pharma		Nifty FMCG		Nifty IT	
		RETURNSNifty Media	CISI	RETURNSNifty Metal	CISI	RETURNSNifty Pharma	CISI	RETURNSNifty FMCG	CISI	RETURNSNifty IT	CISI
RETURNS(–1)	Coefficient	–0.0021	–1.54E+00	–0.02829	–2.40E–01	0.024059	8.22E+00	–0.05176	1.04E+01	–0.02441	7.77E+00
	Standard error	–0.02399	–3.40E–01	–0.024	–3.23E–01	–0.02694	–8.50E–01	–0.02584	–6.55E–01	–0.02648	–5.39E–01
	t-statistics	[–0.08735]	[–4.546]*	[–1.17838]	[–0.7418]	[0.89321]	[9.672]*	[–2.0032]*	[15.95]*	[–0.92197]	[14.43]*
RETURNS(–2)	Coefficient	0.018542	–4.98E–01	0.036603	–1.04E+00	0.029665	8.80E–01	0.005122	–1.32E+00	0.000787	–8.28E–01
	Standard error	–0.02404	–3.40E–01	–0.02382	–3.21E–01	–0.0248	–7.82E–01	–0.02738	–6.94E–01	–0.02699	–5.49E–01
	t-statistics	[0.77126]	[–1.4633]	[1.53659]	[–3.240]*	[1.19616]	[1.124]	[0.18704]	[–1.902]*	[0.02917]	[–1.508]
CISI(–1)	Coefficient	1.97E–03	0.751392	1.96E–03	0.73051	1.18E–04	0.705132	1.02E–03	1.220358	–5.11E–04	1.120345
	Standard error	–1.65E–03	–0.0234	–1.74E–03	–0.02348	–8.40E–04	–0.0265	–9.80E–04	–0.02475	–1.28E–03	–0.02606
	t-statistics	[1.19344]	[32.10]*	[1.12463]	[31.11]*	[0.13986]	[26.60]*	[1.04210]	[49.31]*	[–0.39872]	[42.99]*
CISI(–2)	Coefficient	–1.60E–03	0.223826	–1.72E–03	0.250375	2.91E–04	0.196768	–1.11E–03	–0.289025	6.51E–04	–0.187928
	Standard error	–1.65E–03	–0.02343	–1.75E–03	–0.0235	–8.10E–04	–0.02549	–9.50E–04	–0.02408	–1.24E–03	–0.02523
	t-statistics	[–0.96862]	[9.554]*	[–0.98366]	[10.65]*	[0.35978]	[7.719]*	[–1.17094]	[–12.00]*	[0.52434]	[–7.447]*
C	Coefficient	1.32E–05	0.002532	7.60E–04	0.00433	4.03E–04	–0.00202	6.16E–04	–0.005762	8.33E–04	–0.006053
	Standard error	–4.30E–04	–0.00611	–4.30E–04	–0.00581	–3.00E–04	–0.0095	–2.50E–04	–0.00625	–3.20E–04	–0.00658
	t-statistics	[0.03056]	[0.4144]	[1.76244]	[0.745]	[1.33863]	[–0.212]	[2.49795]	[–0.921]	[2.57443]	[–0.920]

Note: CISI: Composite Investor Sentiment Index, Returns Nifty Media, Returns Nifty Metal, Returns Nifty Pharma, Returns Nifty FMCG, and Returns Nifty IT are the daily returns of indices. CISI (–1) and CISI (–2) are lagged values of CISI, and RETURNS (–1) and RETURNS (–2) are lagged values of the returns of selected stock market indices mentioned above. * Means statistically significant t-statistics.

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Table B5. Variance decomposition (VD) of Nifty Auto and Bank

VD of RETURNSAUTO				VD of RETURNSNIFTYBANK			
Period	**S.E.**	**RETURNSAUTO**	**CISI**	**Period**	**S.E.**	**RETURNSNIFTYBANK**	**CISI**
1	0.014165	100	0	1	0.014589	100	0
2	0.014187	99.70626	0.293736	2	0.014607	99.87151	0.128491
3	0.014197	99.70217	0.297828	3	0.014612	99.85125	0.148747
4	0.014198	99.69908	0.300924	4	0.014612	99.84728	0.152717
5	0.014198	99.69768	0.302323	5	0.014613	99.84503	0.154974
6	0.014198	99.6966	0.303398	6	0.014613	99.84337	0.156633
7	0.014198	99.69573	0.304267	7	0.014613	99.84207	0.157928
8	0.014198	99.69501	0.304989	8	0.014613	99.84102	0.158978
9	0.014198	99.69441	0.305592	9	0.014613	99.84016	0.159844
10	0.014198	99.6939	0.306096	10	0.014613	99.83944	0.160559
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSAUTO**	**CISI**	**Period**	**S.E.**	**RETURNSNIFTYBANK**	**CISI**
1	0.349325	32.77152	67.22848	1	0.271344	16.6631	83.3369
2	0.502519	35.4499	64.5501	2	0.448424	26.44949	73.55051
3	0.610711	37.72368	62.27632	3	0.574195	29.79067	70.20933
4	0.689575	38.83705	61.16295	4	0.664906	31.18965	68.81035
5	0.749515	39.48899	60.51101	5	0.732704	31.9338	68.0662
6	0.796266	39.90247	60.09753	6	0.784751	32.38675	67.61325
7	0.833386	40.18332	59.81668	7	0.825471	32.68479	67.31521
8	0.863226	40.38347	59.61653	8	0.857768	32.89199	67.10801
9	0.887426	40.53121	59.46879	9	0.88364	33.04195	66.95805
10	0.907182	40.64317	59.35683	10	0.904518	33.15372	66.84628

Note: CISI: Composite Investor Sentiment Index

Table B6. Variance decomposition (VD) of Nifty Energy and Financial Services

VD of RETURNSNIFTYENERGY				VD of RETURNSFS			
Period	**S.E.**	**RETURNSNIFTYENERGY**	**CISI**	**Period**	**S.E.**	**RETURNSFS**	**CISI**
1	0.013284	100	0	1	0.013976	100	0
2	0.013302	99.73313	0.266874	2	0.01399	99.84714	0.152864
3	0.013321	99.71459	0.285407	3	0.014003	99.8228	0.177203
4	0.013322	99.69498	0.305015	4	0.014003	99.81988	0.180125
5	0.013322	99.69495	0.305055	5	0.014003	99.81868	0.181316
6	0.013323	99.6915	0.308501	6	0.014003	99.81797	0.182034
7	0.013323	99.69021	0.309794	7	0.014003	99.8175	0.182504
8	0.013323	99.68829	0.311714	8	0.014003	99.81715	0.182847
9	0.013323	99.68672	0.313285	9	0.014003	99.81689	0.183113
10	0.013323	99.6851	0.314903	10	0.014003	99.81668	0.183324
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSNIFTYENERGY**	**CISI**	**Period**	**S.E.**	**RETURNSFS**	**CISI**
1	0.266574	0.044216	99.95578	1	0.274975	17.90364	82.09636
2	0.309593	0.092267	99.90773	2	0.466622	27.65946	72.34054
3	0.366017	0.112922	99.88708	3	0.600895	29.97845	70.02155
4	0.40603	0.128766	99.87123	4	0.696098	30.73432	69.26568
5	0.443642	0.138191	99.86181	5	0.765771	31.11483	68.88517
6	0.476205	0.145241	99.85476	6	0.817873	31.34297	68.65703
7	0.505927	0.150327	99.84967	7	0.857459	31.48952	68.51048
8	0.53289	0.154295	99.8457	8	0.887908	31.58906	68.41094
9	0.557687	0.157424	99.84258	9	0.911547	31.65957	68.34043
10	0.580568	0.159971	99.84003	10	0.930027	31.71099	68.28901

Note: CISI: Composite Investor Sentiment Index.

Table B7. Variance Decomposition (VD) results of Nifty FMCG and Nifty IT

VD of RETURNSFMCG				VD of RETURNSNIFTYIT			
Period	**S.E.**	**RETURNSFMCG**	**CISI**	**Period**	**S.E.**	**RETURNSNIFTYIT**	**CISI**
1	0.010331	100	0	1	0.013539	100	0
2	0.010342	99.94425	0.055754	2	0.013545	99.9914	0.0086
3	0.010344	99.94395	0.056048	3	0.013545	99.99113	0.008872
4	0.010344	99.94312	0.05688	4	0.013545	99.99002	0.009976
5	0.010344	99.94105	0.058951	5	0.013545	99.98889	0.011113
6	0.010345	99.93884	0.061162	6	0.013545	99.98789	0.012109
7	0.010345	99.93687	0.063129	7	0.013546	99.98705	0.012953
8	0.010345	99.93523	0.064768	8	0.013546	99.98634	0.013664
9	0.010345	99.9339	0.066101	9	0.013546	99.98574	0.014261
10	0.010345	99.93282	0.067176	10	0.013546	99.98524	0.014763
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSFMCG**	**CISI**	**Period**	**S.E.**	**RETURNSNIFTYIT**	**CISI**
1	0.261836	15.98508	84.01492	1	0.275373	20.24725	79.75275
2	0.458126	31.6846	68.3154	2	0.459687	35.45799	64.54201
3	0.592927	35.19415	64.80585	3	0.579078	38.93877	61.06123
4	0.689693	36.79322	63.20678	4	0.664376	40.40383	59.59617
5	0.760528	37.64103	62.35897	5	0.728618	41.19162	58.80838
6	0.813506	38.14909	61.85091	6	0.778565	41.67526	58.32474
7	0.853797	38.47738	61.52262	7	0.8182	41.99786	58.00214
8	0.884833	38.70133	61.29867	8	0.850088	42.22536	57.77464
9	0.908971	38.86017	61.13983	9	0.875995	42.39218	57.60782
10	0.927876	38.97611	61.02389	10	0.897192	42.51808	57.48192

Note: CISI: Composite Investor Sentiment Index.

Table B8. Variance decomposition (VD) results of Nifty Media and Nifty Metal

VD of RETURNSNIFTYMEDIA				VD of RETURNSMETAL			
Period	**S.E.**	**RETURNSNIFTYMEDIA**	**CISI**	**Period**	**S.E.**	**RETURNSMETAL**	**CISI**
1	0.018166	100	0	1	0.018128	100	0
2	0.018173	99.9236	7.64E–02	2	0.01814	99.93205	6.80E–02
3	0.018175	99.92331	0.076687	3	0.018152	99.9301	0.069899
4	0.018175	99.92045	0.079547	4	0.018152	99.92777	0.072233
5	0.018176	99.91939	0.080607	5	0.018152	99.92756	0.072444
6	0.018176	99.91806	0.081944	6	0.018152	99.92698	0.073025
7	0.018176	99.91685	0.083145	7	0.018152	99.92655	0.073452
8	0.018176	99.91568	0.084315	8	0.018152	99.9261	0.073904
9	0.018176	99.91457	0.085433	9	0.018152	99.92567	0.074331
10	0.018176	99.91349	0.086506	10	0.018153	99.92525	0.074749
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSNIFTYMEDIA**	**CISI**	**Period**	**S.E.**	**RETURNSMETAL**	**CISI**
1	0.257277	1.992644	98.00736	1	0.24409	2.388864	97.61114
2	0.320653	1.283381	98.71662	2	0.301917	2.152531	97.84747
3	0.377934	0.925519	99.07448	3	0.356256	1.592274	98.40773
4	0.424338	0.735932	99.26407	4	0.400075	1.348256	98.65174
5	0.464778	0.614976	99.38502	5	0.438849	1.170464	98.82954
6	0.500438	0.531712	99.46829	6	0.473287	1.052303	98.9477
7	0.532407	0.470844	99.52916	7	0.504462	0.964252	99.03575
8	0.561353	0.424461	99.57554	8	0.532933	0.897289	99.10271
9	0.587773	0.387967	99.61203	9	0.559151	0.844364	99.15564
10	0.612037	0.358528	99.64147	10	0.58344	0.801586	99.19841

Note: CISI: Composite Investor Sentiment Index.

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Table B9. Variance Decomposition (VD) results of Nifty Pharma and Nifty Private Bank

VD of RETURNSPHARMA				VD of RETURNSPRIVATE_BANK			
Period	**S.E.**	**RETURNSPHARMA**	**CISI**	**Period**	**S.E.**	**RETURNSPRIVATE_BANK**	**CISI**
1	0.012662	100	0	1	0.01492	100	0
2	0.012666	99.99894	0.001061	2	0.01494	99.95324	0.046765
3	0.012675	99.98806	0.011936	3	0.014945	99.9492	0.050796
4	0.012676	99.9812	0.018805	4	0.014945	99.94719	0.052806
5	0.012677	99.97453	0.025465	5	0.014946	99.94517	0.054828
6	0.012678	99.96901	0.030993	6	0.014946	99.94345	0.056551
7	0.012678	99.96426	0.035737	7	0.014946	99.94202	0.057978
8	0.012679	99.96023	0.03977	8	0.014946	99.94083	0.059167
9	0.012679	99.95679	0.043207	9	0.014946	99.93984	0.060159
10	0.01268	99.95387	0.046134	10	0.014946	99.93901	0.060986
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSPHARMA**	**CISI**	**Period**	**S.E.**	**RETURNSPRIVATE_BANK**	**CISI**
1	0.399384	22.68584	77.31416	1	0.377849	26.78345	73.21655
2	0.526838	33.47748	66.52252	2	0.525693	29.64218	70.35782
3	0.62062	36.60021	63.39979	3	0.629252	31.90463	68.09537
4	0.69042	38.43872	61.56128	4	0.704242	32.95744	67.04256
5	0.744846	39.49553	60.50447	5	0.761021	33.53329	66.46671
6	0.788247	40.19466	59.80534	6	0.805316	33.90052	66.09948
7	0.823414	40.68083	59.31917	7	0.840479	34.15216	65.84784
8	0.852225	41.03536	58.96464	8	0.868718	34.33252	65.66748
9	0.876019	41.30212	58.69788	9	0.891586	34.46618	65.53382
10	0.895787	41.50779	58.49221	10	0.910219	34.56773	65.43227

Note: CISI: Composite Investor Sentiment Index

Table B10. Variance decomposition (VD) results of Nifty PSU Bank and Nifty Realty

VD of RETURNSPSU				VD of RETURNSREALTY			
Period	**S.E.**	**RETURNSPSU**	**CISI**	**Period**	**S.E.**	**RETURNSREALTY**	**CISI**
1	0.021459	100	0	1	0.018191	100	0
2	0.021463	99.99163	0.008374	2	0.018246	99.98813	0.011869
3	0.021464	99.98329	0.016715	3	0.01825	99.97657	0.023431
4	0.021465	99.97524	0.024764	4	0.018252	99.96648	0.033522
5	0.021466	99.96747	0.032529	5	0.018254	99.95781	0.042187
6	0.021466	99.95998	0.04002	6	0.018255	99.95039	0.049614
7	0.021467	99.95276	0.047245	7	0.018256	99.94402	0.055979
8	0.021468	99.94579	0.054214	8	0.018258	99.93857	0.061434
9	0.021469	99.93906	0.060938	9	0.018258	99.93389	0.06611
10	0.021469	99.93258	0.067423	10	0.018259	99.92988	0.070118
VD of CISI				**VD of CISI**			
Period	**S.E.**	**RETURNSPSU**	**CISI**	**Period**	**S.E.**	**RETURNSREALTY**	**CISI**
1	0.21383	3.424754	96.57525	1	0.307831	15.1903	84.8097
2	0.297483	1.778468	98.22153	2	0.455419	30.27621	69.72379
3	0.360233	1.221919	98.77808	3	0.566114	37.73521	62.26479
4	0.411808	0.941767	99.05823	4	0.646822	41.05062	58.94938
5	0.456071	0.773144	99.22686	5	0.708824	42.87938	57.12062
6	0.495037	0.660567	99.33943	6	0.757956	44.02224	55.97776
7	0.529922	0.580119	99.41988	7	0.797671	44.79599	55.20401
8	0.561527	0.519799	99.4802	8	0.830207	45.34888	54.65112
9	0.590417	0.472918	99.52708	9	0.857116	45.75939	54.24061
10	0.617008	0.435457	99.56454	10	0.879529	46.07294	53.92706

Note: CISI: Composite Investor Sentiment Index

Table B11. Variance decomposition results of Nifty 50

VD of NIFTY50RETURNS			
Period	**S.E.**	**NIFTY50RETURNS**	**CISI**
1	0.01076	100	0
2	0.010766	99.99973	0.000268
3	0.010768	99.99678	0.003217
4	0.010769	99.99417	0.005834
5	0.010769	99.99182	0.008183
6	0.010769	99.98982	0.010181
7	0.010769	99.98811	0.011889
8	0.010769	99.98665	0.013348
9	0.01077	99.98541	0.014595
10	0.01077	99.98434	0.01566
VD of CISI			
Period	**S.E.**	**NIFTY50RETURNS**	**CISI**
1	0.282448	0.199429	99.80057
2	0.444928	21.53775	78.46225
3	0.559812	29.94585	70.05415
4	0.643005	33.66866	66.33134
5	0.706427	35.68142	64.31858
6	0.756415	36.9241	63.0759
7	0.796646	37.75894	62.24106
8	0.829478	38.35212	61.64788
9	0.856535	38.79058	61.20942
10	0.878995	39.12421	60.87579

Note: CISI: Composite Investor Sentiment Index.

Table B12. Granger causality output of CISI and returns of sectoral indices

Null Hypotheses	Obs	F-stat	Prob	Remark
AUTOCISI does not have a causal relation with RETURNSAUTO	1773	2.99531	0.0837	↔
RETURNSAUTO does not have a causal relation with AUTOCISI		242.778	2.00E–51	
BANKCISI does not have a causal relation with RETURNSNIFTYBANK	1773	1.03503	0.3554	↔
RETURNSNIFTYBANK does not have a causal relation with BANKCISI		8.43428	2.00E–04	
ENERGYCISI does not have a causal relation with RETURNSNIFTYENERGY	1773	2.08831	0.1242	↔
RETURNSNIFTYENERGY does not have a causal relation with ENERGYCISI		3.86441	0.0212	
FSCISI does not have a causal relation with RETURNSFS	1773	1.35692	0.2577	↔
RETURNSFS does not have a causal relation with FSCISI		59.6827	8.00E–26	
FMCGCISI does not have a causal relation with RETURNSFMCG	1773	1.04664	0.3513	↔
RETURNSFMCG does not have a causal relation with FMCGCISI		138.076	2.00E–56	
ITCISI does not have a causal relation with RETURNSNIFTYIT	1773	0.19406	0.8236	↔
RETURNSNIFTYIT does not have a causal relation with ITCISI		128.806	6.00E–53	
MEDIACISI does not have a causal relation with RETURNSNIFTYMEDIA	1773	0.22493	0.7986	↔
RETURNSNIFTYMEDIA does not have a causal relation with MEDIACISI		13.6072	1.00E–06	
METALCISI does not have a causal relation with RETURNSMETAL	1773	0.53097	0.5881	↔
RETURNSMETAL does not have a causal relation with METALCISI		7.35834	0.0007	
PHARMACISI does not have a causal relation with RETURNSPHARMA	1773	0.21335	0.8079	↔
RETURNSPHARMA does not have a causal relation with PHARMACISI		72.2812	7.00E–31	
PRIVATE_BANKCISI does not have a causal relation with RETURNSPRIVATE_BANK	1773	0.55598	0.5736	↔
RETURNSPRIVATE_BANK does not have a causal relation with PRIVATE_BANKCISI		8.80717	2.00E–04	
PSUCISI does not have a causal relation with RETURNSPSU	1773	3.3362	0.0679	↔
RETURNSPSU does not have a causal relation with PSUCISI		35.1702	4.00E–09	
REALTYCISI does not have a causal relation with RETURNSREALTY	1773	3.28621	0.07	↔
RETURNSREALTY does not have a causal relation with REALTYCISI		456.216	3.00E–90	
NIFTY50CISI does not have a causal relation with NIFTY50RETURNS	1773	0.46954	0.6254	↔
NIFTY50RETURNS does not have a causal relation with NIFTY50CISI		161.147	5.00E–65	

Note: CISI: Composite Investor Sentiment Index, AutoCISI, BankCISI, EnergyCISI, FSCISI, FMCGCISI, ITCISI, MediaCISI, MetalCISI, PharmaCISI, Private BankCISI, PSUCISI, RealtyCISI, Nifty50CISI are Composite Investor Sentiment Indices of sectoral indices. Whereas, ReturnsAuto, ReturnsBank, ReturnsEnergy, ReturnsFS, ReturnsFMCG, ReturnsIT, ReturnsMedia, ReturnsMetal, ReturnsPharma, ReturnsPrivate Bank, ReturnsPSU, ReturnsRealty, Nifty50Returns are returns of the sectoral stock market indices.

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