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Macroeconomic Determinants of Stock Market Returns: Evidence from Nifty 50

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Abstract

This research project aims to investigate the effectiveness of macroeconomic factors on the returns of the Nifty50 index, a benchmark index representing the performance of the top 50 companies listed on the National Stock Exchange of India. The study explores the relationship between key macroeconomic variables and Nifty50 returns to assess the impact of economic indicators on stock market performance. To achieve this objective, the research employs quantitative methods and statistical analysis. The study utilizes historical data on Nifty50 returns and various macroeconomic factors such as inflation rates, interest rates, CPI rates, gold and silver rates, exchange rates, oil prices, industrial production index change, Money supply and trade balance. These factors are commonly regarded as influential indicators in determining the overall health and performance of an economy. The research project seeks to identify the significant macroeconomic variables that exhibit a strong correlation with Nifty50 returns. Additionally, it aims to examine the nature of the relationship between these variables and stock market performance, whether it is positive or negative. By understanding these dynamics, investors, policymakers, and market participants can gain valuable insights into the drivers of stock market returns and make informed decisions. The findings of this study have the potential to contribute to the existing body of knowledge on the relationship between macroeconomic factors and stock market returns. The results may have implications for portfolio management, risk assessment, and investment strategies in the Indian stock market. Furthermore, policymakers can utilize the

insights to develop effective economic policies and regulations to promote market stability and growth. Overall, this research project endeavours to shed light on the effectiveness of macroeconomic factors as predictors of Nifty50 returns, providing valuable insights for market participants and stakeholders

I.INTRODUCTION

Section 1.0 is an overview about the subtopics that be included in chapter introduction for the research topics. Where by Section1.1 is a background summary about the research topic of Determination of stock market returns. Section 1.2 is about problem statement such as why capital structure important. Section 1.3 is about research question based on the independent variables and dependent variables. Furthermore, section 1.4 is about research objective that been stated in research question. Section 1.5 basically significance of research is about brief explanation of who are benefit from this research. Section 1.6 is all about organization of thesis. Last but not least section1.7-chapter is summary.

The performance of the top 50 corporations listed on India's National Stock Exchange (NSE) is represented in the Nifty50 index, an important benchmark for the Indian stock market. Investors, policymakers, and market players must all understand the factors that influence Nifty50 performance. Macroeconomic considerations have a significant impact on the performance of the Nifty50 and other stock markets. This study summary aims to offer light on how macroeconomic variables impact the performance of the Nifty50.

Problem Statement

The growth of any specific economic sector or of the economy as a whole is heavily influenced by stock markets. The values of stocks have been trending upward throughout the years, and these prices are primarily influenced by three elements: business-related factors, industry-related factors, and economic considerations. Oil prices, gold prices, and many other macroeconomic factors can influence an investor's decision to invest in shares and can change the flow of money from equities to any other investment. Thus, the movement of the stock market as a whole is determined by these factors. Since many of the companies listed on the stock exchange have global operations, the Indian capital market is susceptible to changes in the macroeconomic climate worldwide.

The performance of India's capital market is significantly impacted by macroeconomic conditions, both favourably and adversely. The Indian Stock Exchange serves as a barometer for the overall health of the Indian economy. It is critical to investigate these characteristics in order to determine the trend of the Indian Stock Exchange. Inflation, the exchange rate, GDP, and industrial

production can all have an influence on the capital markets, either positively or negatively.

The influence of macroeconomic factors on Nifty50 returns is a topic of significant interest and importance for investors, decision-makers, and market players. However, the following issue statement must be addressed.

Research Objective

1. To figure out the association between returns on stock markets and Inflation rate exists in India.
2. To figure out the association between returns on stock markets and consumer price index of India.
3. To figure out the association between returns on stock markets and gold price and silver price change in India.

Literature Review

The NIFTY 50 is a standard indicator in the Indian stock request that reflects a weighted normal of top 50 Indian company listed on the NSE (National Stock Exchange). The Nifty 50 index is possessed and maintained by NSE (National Stock Exchange) indicators, which completely possessed attachment of Strategic Investment wing of NSE (National Stock Exchange). Prior to 2013, On June 26, 2009, the calculation was revised to use a free- pier fashion. The NIFTY 50 indicator's base period begins on November 3, 1995, when the NSE's equities request sector has been functional for a whole timetable time. The indicator's base value is set at 1,000, while its base capital is set at2.06 trillion rupees.

Nifty 50 list of stocks:

Table 1

List of stocks in Nifty 50 Source: NSE Major single day falls in Nifty 50:

		Nifty 50 list of stocks as of April 2023	
S.no	**Symbol**	**Sector**	**Company Name**
1	ADANIENT	Diversified	Adani Enterprises
2	ADANIPORTS	Infrastructure	Adani Ports & SEZ
3	APOLLOHOSP	Healthcare	Apollo Hospitals
4	ASIANPAINT	Consumer Durables	Asian Paints
5	AXISBANK	Banking	Axis Bank
6	BAJAJ-AUTO	Automobile	Bajaj Auto
7	BAJFINANCE	Financial Services	Bajaj Finance
8	BAJAJFINSV	Financial Services	Bajaj Finserv
9	BPCL	Energy - Oil & Gas	Bharat Petroleum

10	BHARTIARTL	Telecommunication	Bharti Airtel
11	BRITANNIA	Consumer Goods	Britannia Industries
12	CIPLA	Pharmaceuticals	Cipla
13	COALINDIA	Energy - Coal	Coal India
14	DIVISLAB	Pharmaceuticals	Divi's Laboratories
15	DRREDDY	Pharmaceuticals	Dr. Reddy's Laboratories
16	EICHERMOT	Automobile	Eicher Motors
17	GRASIM	Materials	Grasim Industries
18	HCLTECH	Information Technology	HCLTech
19	HDFC	Financial Services	HDFC
20	HDFCBANK	Banking	HDFC Bank
21	HDFCLIFE	Financial Services	HDFC Life
22	HEROMOTOCO	Automobile	Hero MotoCorp
23	HINDALCO	Metals	Hindalco Industries
24	HINDUNILVR	Consumer Goods	Hindustan Unilever
25	ICICIBANK	Banking	ICICI Bank
26	INDUSINDBK	Banking	IndusInd Bank
27	INFY	Information Technology	Infosys
28	ITC	Consumer Goods	ITC
29	JSWSTEEL	Metals	JSW Steel
30	KOTAKBANK	Banking	Kotak Mahindra Bank
31	LT	Construction	Larsen & Toubro
32	M&M	Automobile	Mahindra & Mahindra
33	MARUTI	Automobile	Maruti Suzuki
34	NESTLEIND	Consumer Goods	Nestlé India
35	NTPC	Energy - Power	NTPC
36	ONGC	Energy - Oil & Gas	Oil and Natural Gas Corporation
37	POWERGRID	Energy - Power	Power Grid
38	RELIANCE	Diversified	Reliance Industries
39	SBILIFE	Financial Services	SBI Life Insurance Company
40	SBIN	Banking	State Bank of India
41	SUNPHARMA	Pharmaceuticals	Sun Pharma
42	TATAMOTORS	Automobile	Tata Motors
43	TATASTEEL	Metals	Tata Steel

44	TCS	Information Technology	Tata Consultancy Services
45	TATACONSUM	Consumer Goods	Tata Consumer Products
46	TECHM	Information Technology	Tech Mahindra
47	TITAN	Consumer Durables	Titan Company
48	ULTRACEMCO	Materials	UltraTech Cement
49	UPL	Chemicals	UPL
50	WIPRO	Information Technology	Wipro

Table 2
Major single day falls in Nifty 50

Sl. No.	Date	Fall in points	Fall by percentage	Probable Reason
1	28-Oct-97	88.2	-7.87%	During the Asian Financial Crisis, investors fled developing Asian stocks. Crash reports also came in from Thailand, Indonesia, South Korea, and the Philippines.
2	14-May-04	135.1	-7.87%	Election of the UPA.
3	17-May-04	193.5	-12.24%	Election of the UPA.
4	21-Jan-08	496.5	-8.70%	Because of the subprime mortgage crisis in the United States.
5	22-Jan-08	309.5	-5.94%	Because of the subprime mortgage crisis in the United States.
6	16-Aug-13	234.45	-4.08%	Because of the devaluation of the Indian rupee.
7	24-Aug-15	490.95	-5.92%	Because of the Chinese stock market's collapse.
8	24-Jun-16	181.85	-2.20%	As a result of the Brexit referendum.
9	11-Nov-16	229.45	-2.69%	Driven by the Indian government's Demonetization policy and the 2016 US election results.
10	02-Feb-18	256.3	-2.33%	Driven by India's 2018 Union Budget and a global collapse.
11	04-Oct-18	303.2	-2.39%	Panic falls as oil prices rise and the rupee falls against the US dollar.
12	05-Oct-18	282.8	-2.67%	Panic falls as oil prices rise and the rupee falls against the US dollar.

13	08-Jul-19	252.55	-2.14%	Because of the Union Budget for Fiscal Year 2019.
15	03-Sep-19	225.35	-2.04%	As a result of many PSU bank merger announcements.
16	01-Feb-20	373.95	-3.11%	Driven by the Union Budget FY 2020 and a coronavirusepidemic that broke out globally a day before the budget.
17	09-Mar-20	538	-4.90%	Caused by the COVID-19 pandemic.
18	12-Mar-20	868.25	-8.30%	Driven by the COVID-19 pandemic, which was declared a pandemic by the World Health Organisation.
19	16-Mar-20	757.8	-7.61%	Caused by the COVID-19 pandemic.
20	23-Mar-20	1135.2	-12.98%	Caused by the COVID-19 pandemic.
21	11-Jun-20	214.15	-2.12%	The United States Federal Reserve has forecast a dismal economic outlook.
22	26-Feb-21	568.2	-3.76%	Global dissection.
23	12-Apr-21	524.05	-3.53%	The increase in daily COVID instances has fueled rumours about a state-wide shutdown in Maharashtra.
24	26-Nov-21	509.8	-2.91%	South Africa has discovered a new coronavirus strain.
25	20-Dec-21	371	-2.18%	Investor sentiment suffered as a result of economic worries in the United States and an increase of Covid-19 cases in China.
26	24-Jan-22	468.05	-2.66%	Increasing geopolitical tensions and increasing inflation.
27	14-Feb-22	531.95	-3.06%	Tensions between Russia and Ukraine, aggressive Fed pronouncements on rate hikes, and the ABG shipyard fraud case.

Table 3
Major single day gain in Nifty 50

Sl. No.	Date	Raise by points	Raise by percentage	Probable reason
1	18-May-09	651.5	17.74%	The overwhelming positive outcomes of the 2009 Indian general election resulted in several trade restrictions.

2	20-May-19	421.1	3.69%	Exit Polls for the 2019 General Election.
3	23-May-19	300.9	2.49%	The results of the 2019 General Elections show that the NDA coalition has won.
4	08-Aug-19	176.95	1.63%	FPI surcharge reduction.
5	26-Aug-19	234.45	2.16%	Relief measures are expected to be implemented, and USChina trade discussions will commence.
6	20-Sep-19	655.45	6.12%	Indian FM announced a reduction in corporate tax rates for domestic firms and new domestic manufacturing firms.
7	23-Sep-19	420.65	3.73%	Following a reduction in corporation taxes in India.
8	07-Apr-20	708.4	8.76%	Positive news that infection rates were peaking in some of the world's worst-affected locations.
9	01-Feb-21	646.6	4.74%	Nirmala Sitharaman's Union Budget Day.
10	02-Feb-21	366.65	2.57%	Reaction to the Union's budget.
11	15-Feb-22	509.65	3.03%	Russia pulls its troops back from Ukraine's border.

Methodology

Data Analytics

The science underpinning the process of analysing raw data in order to draw judgments about it. It aids in the optimization of the firm in order to maximise profit and make more strategically informed decisions. Techniques and methods for data analytics have been turned into mechanical processes and algorithms that operate on raw data for human consumption.

Data Analytics Methods

Data judges use a number of logical methodologies and ways to assay data and excerpt information. Some of the most current ways are as follows.

Regression analysis is the act of examining the connection between dependent variables to understand how a change in one may prompt a change in another.

Data Analysis

Table 4

ADF test with constant results for stationarity analysis

Test with constant	1st-order autocorrelation coeff. for e	estimated value of (a - 1)	test statistic: tau_c(1)	asymptotic p-value
Nifty 50	-0.002	-0.917319	-4.3441	0.0003671
Inflation	0	-1.03236	-4.32941	0.0003898
CPI_Inflation	-0.008	-1.07211	-4.80783	4.97E-05
silver	-0.018	-1.13333	-4.5308	0.0001
Gold	0	-0.893192	-4.20989	0.0006298
Crude_oil	-0.009	-1.04019	-5.08606	1.36E-05
Industry_produc	-0.019	-0.650392	-3.67119	0.004562
FX_rates	0.007	-1.25836	-4.77234	5.83E-05
Money_supply	0.003	-1.36617	-5.22068	7.06E-06
Trade_balance	-0.051	-0.844968	-3.94362	0.001744

Table 5

ADF test with constant and trend results for stationarity analysis

test with constant and trend	1st-order autocorrelation coeff. for e	estimated value of (a - 1)	test statistic: tau_c(1)	asymptotic pvalue
Nifty 50	-0.002	-0.917271	-4.29369	0.003156
Inflation	0	-1.03186	-4.27627	0.003361
CPI_Inflation	-0.014	-1.12181	-4.89542	0.0001
silver	-0.019	-1.1337	-4.47756	0.001589
Gold	0.001	-0.91513	-4.18688	0.004615
Crude_oil	-0.012	-1.05084	-5.06102	0.0001373
Industry_produc	-0.019	-0.649545	-3.62799	0.02746
FX_rates	0.007	-1.25859	-4.72604	0.0005897
Money_supply	0.004	-1.3781	-5.15787	8.79E-05
Trade_balance	-0.03	-0.986557	-4.22628	0.004019

Table 6
ADF test with constant and quadratic trends results for stationarity analysis
Interpreting the p-values you provided for each variable

test with constant and quadratic trend	1st-order autocorrelation coeff. for e	estimated value of (a - 1)	test statistic: tau_c(1)	asymptotic pvalue
Nifty 50	-0.002	-0.918632	-4.26007	0.01435
Inflation	-0.004	-1.06197	-4.35541	0.01055
CPI_Inflation	-0.015	-1.14109	-4.90819	0.001426
silver	-0.026	-1.19043	-4.45051	0.007675
Gold	-0.001	-0.955523	-4.17159	0.0189
Crude_oil	-0.016	-1.05508	-5.04791	0.0008113
Industry_produc	-0.025	-0.707293	-3.6311	0.08315
FX_rates	0.031	-1.54821	-5.46408	0.0001309
Money_supply	-0.011	-1.41649	-5.26157	0.0003278
Trade_balance	-0.031	-1.08794	-4.51972	0.00605

1. Nifty 50: The ADF test suggests that the Nifty 50 data is stationary as the p-value (0.0003671) is below the significance level.
2. Inflation: The ADF test indicates that the Inflation data is stationary, given the low p-value (0.0003898).
3. CPI Inflation: The ADF test suggests that the CPI Inflation data is stationary due to the extremely low p-value (4.97E-05).
4. Silver: The ADF test results in a low p-value (0.0001), indicating that the Silver data is stationary.
5. Gold: The ADF test suggests that the Gold data is stationary because the p-value is below the significance level (1.36E-05).
6. Crude Oil: The ADF test results in a p-value of 0.004562, indicating that the Crude Oil data is stationary.
7. Industry Production: The ADF test suggests that the Industry Production data is stationary due to the low p-value (5.83E-05).
8. FX Rates: The ADF test indicates that the FX Rates data is stationary as the p-value (7.06E06) is below the significance level.
9. Money Supply: The ADF test suggests that the Money Supply data is stationary because the p-value is extremely low (0.001744).
10. Trade Balance: The ADF test results in a p-value of 0.001744, indicating that the Trade Balance data is stationary.
11. In summary, based on the provided p-values, all variables (Nifty 50, Inflation, CPI Inflation, Silver, Gold, Crude Oil, Industry Production, FX

Rates, Money Supply, and Trade Balance) appear to be stationary, as the p-values are below the significance level.

Descriptive Analysis

Table 7

Descriptive Statistic for Nifty 50 returns and Macroeconomic variables

Summary Statistics, using the observations 2018:01 - 2022:12				
Variable	**Mean**	**Median**	**Minimum**	**Maximum**
Nifty50_returns	1.52927	0.07755	0.0026	23.25
Inflation	0.0523	0.054	0.02	0.078
CPI_Inflation	-0.0031898	0.00506699	-0.126791	0.0184941
silver	0.0121017	0.00175	-0.1042	0.3172
Gold	0.010545	0.00735	-0.0494	0.098
Crude_oil	0.01609	0.0309	-0.3722	0.4339
Industry_production index	0.00584167	0.0096	-0.1274	0.1047
FX_rates	0.00446333	0.0045	-0.0583	0.0386
Money_supply	-0.0081067	-0.0064945	-0.03182	0.0083575
Trade_balance	0.0156363	0.0111939	-5.11392	2.21642

Table 8

Descriptive Statistic for Nifty 50 returns and Macroeconomic variables

Variable	**Std. Dev.**	**C.V.**	**Skewness**	**Ex. kurtosis**
Nifty50_returns	3.40872	2.22898	4.57014	25.6851
Inflation	0.0159324	0.304634	-0.254127	-0.995974
CPI_Inflation	0.0305469	9.57648	-3.33317	9.77363
silver	0.0749624	6.19439	1.49329	3.5554
Gold	0.0318489	3.02029	0.428173	-0.0922479
Crude_oil	0.124196	7.71884	-0.111668	2.92753
Industry_production index	0.0483499	8.27674	-0.449156	0.0746943
FX_rates	0.0165468	3.70726	-0.678347	2.20128
Money_supply	0.00736292	0.908251	-0.664305	1.07095
Trade_balance	0.930988	59.5402	-2.3906	15.0479

Based on the table data, here are some inferences that can be made:

1. Nifty50_returns: The mean and median returns for the Nifty50 index are both rather high, coming in at 1.52927 and 0.07755, respectively. The returns appear to have a high amount of volatility, as indicated by the standard deviation

(3.40872). The right-skewed distribution shown by the positive skewness (4.57014) suggests that there are more instances of positive returns. The distribution might contain outliers or have long tails, according to the distribution's excess kurtosis (25.6851).

2. Inflation: The observed period saw a mild amount of inflation, as indicated by the mean inflation rate of 0.0523. The standard deviation's (0.0159324) low level indicates that inflation rates were largely steady. The distribution is slightly left-skewed as implied by the negative skewness (-0.254127), which suggests that lower inflation rates are more likely to occur. The distribution has a distribution with lighter tails than a normal distribution, according to the negative excess kurtosis (-0.995974).
3. CPI Inflation: The modest negative (-0.0031898) average CPI inflation rate suggests that consumer prices may have fallen throughout the observed period. The higher positive median (0.00506699) indicates a more evenly distributed population. The positive excess kurtosis (9.77363) and relatively high standard deviation (0.0305469) indicate a larger range of data dispersion and the existence of outliers or extreme values in the distribution.
4. Silver, Gold, and Crude Oil: Silver, gold, and crude oil returns are represented by these variables. The average returns for the commodities silver (0.0121017), gold (0.010545), and crude oil (0.01609) are all positive. The relatively large standard deviations for silver (0.0749624) and crude oil (0.124196) indicate strong volatility. Asymmetry in their return distributions is indicated by the positive skewness for silver (1.49329) and the negative skewness for crude oil (-0.111668). Silver (3.5554) and crude oil (2.92753) have excess kurtosis levels, which may point to outliers or extreme values.
5. Industry Production Index: The industrial production index's low mean (0.00584167) and median (0.0096) returns, which indicate relatively subpar performance, are displayed. Moderate volatility is indicated by the standard deviation (0.0483499). The left-skewed distribution shown by the negative skewness (-0.449156) suggests a marginally increased frequency of lower returns. A distribution with significantly heavier tails is suggested by the excess kurtosis (0.0746943).
6. FX rates: The low median (0.0045) and mean (0.00446333) of the foreign currency rates point to relatively minimal variations. Moderate volatility is indicated by the standard deviation (0.0165468). The left-skewed distribution shown by the negative skewness (-0.678347) points to a slightly higher frequency of smaller exchange rate movements. Positive excess kurtosis (2.20128) indicates the distribution may contain outliers or extreme values.
7. Money Supply: Money supply values for the mean (-0.0081067) and median (-0.0064945) suggest a possible decline over the observed period. According to

the standard deviation (0.00736292), there is not much volatility. The left-skewed distribution shown by the negative skewness (-0.664305) suggests that lower money supply fluctuations are more likely to occur. The presence of outliers or extreme values is suggested by the positive excess kurtosis (1.07095).

8. Trade Balance: The median (0.0111939) and mean (0.0156363) readings for the trade balance point to an averagely positive trade balance. The standard deviation (0.930988) indicates that the trade balance is subject to rather considerable variability. The left-skewed distribution is indicated by the negative skewness (-2.3906), which points to a greater prevalence of smaller positive trade balances or bigger negative trade balances. The presence of extreme or outlier values is suggested by the high excess kurtosis (15.0479).

Finding and Conclusion

Finding

Objective 1: To figure out the association between returns on stock markets and Inflation rate.

Findings: Inflation is defined as the entire rise in the prices of goods and services over time. Although inflation is an important economic indicator, it may have minimal direct impact on the Nifty50 index's performance. The Nifty50 is made up of a variety of industries, and the impact of inflation on each industry might differ. Inflation's effect on the aggregate Nifty50 returns so could not be statistically significant.

Objective 2: To figure out the association between returns on stock markets and consumer price index.

Findings: Consumer discretionary and basic materials are two industries that may be more sensitive to inflation than others. consumer price inflation's effect on the aggregate Nifty50 returns so could not be statistically significant.

Objective 3: To figure out the association between returns on stock markets and gold price and silver price change.

Findings: Silver and gold are regarded as precious metals and are frequently linked to investments that provide a safe haven and act as a hedge against inflation or other economic risks. They might not have much of an immediate influence on the Nifty50 index, though. Precious metals mining and jewellery are two industries that are primarily impacted by the performance of silver and gold prices, yet they may not have a large presence on the Nifty50 index. As a result, changes in the price of silver and gold might not have a statistically significant effect on the returns of the entire index.

Limitation of Research

The selection of 2018 to 2022 as the time frame may not fully account for all possible variances and connections between macroeconomic factors and Nifty50 results. Longer time periods or alternative time windows could provide various outcomes.

Macroeconomic factors and Nifty50 performance might have a complicated and endogenous relationship. It can be difficult to determine a clear causal relationship because of variables like reverse causality or omitted variable bias that could have an impact on the outcomes.

A variety of national and international events can have an impact on the stock market and economic conditions throughout time. It's possible that other time periods with differing market dynamics won't be amenable to applying or generalising the results from the chosen time period.

The stock market and other financial markets can be impacted by a variety of short- and long-term factors that operate on distinct time frames. Researchers can observe and record more market cycles, economic developments, and shifts in investor mood by extending the time span of the analysis, which may have an impact on the association between macroeconomic factors and Nifty50 returns.

Longer time periods can be used to better understand the effects of macroeconomic factors on Nifty50 returns by identifying trends, patterns, and the persistence of linkages. Additionally, it can lessen the potential impact of transient or short-lived effects.

II.CONCLUSION

Market sentiment and stock market returns are separate but closely connected ideas. Stock market returns are the monetary gains or losses that stock investors experience as a result of their stock investments. A stock's or an index's value changing by a certain percentage over a given time period is how it is commonly expressed as a measure of the profitability of stock investments. On the other hand, market sentiment describes the general attitude or mood of investors and traders towards the stock market. It depicts the general opinion and mood of market players regarding the course that stock prices will take in the future. Economic indicators, geopolitical developments, corporate earnings reports, investor expectations, and news emotion are just a few of the variables that can affect market sentiment.

When compared to market sentiment, which is more subjective and is influenced by investors' perceptions, emotions, and behavioural biases, stock market returns are based on objective financial data. Due to its influence on investors' purchasing and selling actions, market sentiment can have a major impact on stock

market results. Increased buying activity brought on by a bullish market sentiment can raise stock prices and produce profitable investments. On the other hand, poor market mood might cause selling pressure, which will result in falling stock prices and poor returns. It's crucial to remember that a variety of variables other than market mood affect stock market returns, such as company fundamentals, prevailing economic conditions, interest rates, market trends, and forces on the international stage. While short-term changes and market volatility can be impacted by market emotion, long-term stock market returns are largely determined by larger economic and business fundamentals. Several measures, including investor sentiment surveys, sentiment indexes, options market data, and sentiment analysis of news and social media, can be used to gauge market sentiment. These indicators of market mood assist investors and analysts assess expectations for the market and sentiment-driven market dynamics.

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