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Impact of Macroeconomic Indicators on Stock Market Volatility in India: A Time-Series Analysis

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Abstract

This study investigates the relationship between macroeconomic indicators and stock market volatility in India using time-series data from 2007 to 2023. The Augmented Dickey-Fuller (ADF) test confirmed the stationarity of stock returns, while the GARCH(1,1) model identified significant volatility clustering, indicating the persistence of market fluctuations. A Granger causality test was employed to assess the predictive relationship between GDP growth and stock returns, revealing no significant causality in either direction. These findings suggest that GDP growth alone is not a primary determinant of stock market volatility in India, highlighting the need to consider additional factors such as monetary policy, global market trends, and investor sentiment. The study contributes to the understanding of market dynamics in emerging economies by demonstrating the limitations of traditional macroeconomic indicators in explaining stock market fluctuations and advocating for a more comprehensive analytical framework incorporating behavioural and external economic influences.

1. Introduction

The idea that macroeconomic conditions impact the stock market has been a hot topic among scholars, investors, and authorities looking to regulate the market since the 1980s. The literature has long supported this concept. This correlation has been the subject of many empirical estimation efforts in the last few decades. A few examples of such models include Pearce & Roley (1988), Fama (1990), and Chen et al. (1986), which sought to predict how asset values would change in response to changes in actual economic variables like “GDP growth rate, unemployment, yield spread, interest rates, inflation, dividend yields, and production rates.” More and more studies in both developed and developing countries have been looking at how stock market performance relates to fundamental macroeconomic factors (Rahman et al., 2009; Maysami et al., 2005; Ratanapakorn and Sharma, 2007). The direction and intensity of the link between macroeconomic indicators and the stock market may change among studies, likely as a result of methodological discrepancies, however research has shown a correlation. There is a lack of study on the effects of macroeconomic factors on stock markets for emerging countries such as India.

Changes in economic fundamentals and changes in expectations for future events have a profound impact on stock index movement. The stock market's success is said to be dictated by basic economic factors within a country. But in a globally interconnected economy, domestic economic fundamentals can also shift in response

to foreign events and the policies other countries have or are about to adopt. Exogenous variables that impact stock returns include oil prices, US bond values, gold prices, and currency rates. Capital flows and outflows, as well as interest rates at the local level, are influenced by global interest rate fluctuations. But as of late, a great many players from around the world keep a careful eye on the Indian stock market. Gaining an understanding of the macro dynamics of India's stock market could be beneficial for policymakers, traders, and investors. The findings may reveal which factors, if any, are responsible for shifts in stock prices relative to those influencing other macroeconomic variables. The study aims to determine whether stock market volatility is influenced by macroeconomic conditions. For several investment and financial tasks, understanding how the stock market reacts to significant factors' macroeconomic behavior is crucial.

1.1 Can Economic Fundamentals Influence the Stock Market? Analysis of Time Series Data from India

It is common knowledge that the stock market provides listed companies with access to long-term capital through the pooling of funds from various investors, allowing them to grow. Investors also have other options for investing their surplus funds, so they closely monitor the stock market's performance by looking at the composite market index before putting their money in. In addition to allowing investors to predict market movements, the market index is used as a benchmark for comparing the performance of different portfolios. But there have been a lot of efforts to build and stabilize the stock markets in the emerging nation. Despite this, stock markets in developing nations are notoriously unstable (Engel and Rangel, 2005). Not only so, but changes in the amount of economic activity, shifts in the political and global economic climate, and other factors are likely to have an impact on the stock markets of evolving economies. To make predictions about the stock markets, investors look at possible economic fundamentals and other aspects that are unique to each organization. In the efficient market, all pertinent information regarding changes in macroeconomic variables is fully reflected in the current stock prices, according to Fama's (1970) Efficient Market Hypothesis. On the other hand, other researchers, including Fama and Schwert (1977) and Nelson (1976), have critically analyzed the implications made from the Efficient Market Hypothesis. Their findings confirm that macroeconomic variables do impact stock returns through stock price changes. Additionally, the relationship between stock prices and macroeconomic fundamentals can be theoretically explained by the Arbitrage Pricing Theory (APT) (Ross, 1976; Chen et al., 1986). Chen et al. (1986) laid the groundwork for the belief in the existence of a long-run relationship between stock prices and macroeconomic variables in the APT line of empirical research, which was one of the first to do so. Since then, a growing body of empirical research has sought to establish a connection between stock prices and macroeconomic variables in both established and developing economies (e.g., Mukherjee and Naka, 1995; Wongbampo and Sharma, 2002; Maysami et al., 2004; Ratanapakorn and Sharma, 2007; Rahman et al., 2009; Asaolu and Ognumuyiwa, 2011, among many others). But there hasn't been much study on the Indian stock market and economic issues up to now, thus the results might not be reliable (see, for example, Pethe and Karnik, 2000; Bhattacharya and Mukherjee, 2006; Ahmed, 2008; Pal and Mittal,

2011). Some macro factors' relationships may alter throughout sample periods and data frequencies, and they may also differ among markets. As a result, further research is required to comprehend the macroeconomic factors that may impact the stock market in a developing nation like India, which is one of the most rapidly expanding economies.

Due to the liberalization policy's opening up of the Indian capital market to foreign investors, it has experienced considerable transformation. Foreign institutional investors have been pouring money into India's stock market in droves due to the country's reforming market and enormous economic potential.

1. Research Objectives:

- "To examine the relationship between key macroeconomic indicators and stock market volatility in India."
- "To identify the most influential macroeconomic variables affecting stock market fluctuations."
- "To assess the short-term and long-term impact of macroeconomic factors using time-series analysis."

2. Significance of Study

Although macroeconomic factors are known to have an effect on stock market performance worldwide, very little is known about how these variables affect emerging country stock markets like India's. The direction and strength of this correlation vary across studies due to methodological differences. Understanding the macro dynamics of India's stock market is beneficial for policymakers, traders, and investors, as it could reveal the factors responsible for stock price shifts relative to those influencing other macroeconomic variables. This research aims to determine whether macroeconomic variables affect stock market fluctuations in India.

3. Literature Review

Stock market performance is influenced by various "macroeconomic factors, including economic growth, inflation, interest rates, exchange rates, and foreign direct investment (FDI)." Researchers have employed different econometric techniques to examine both "short-run and long-run relationships" between these macroeconomic indicators and stock markets across different economies. This systematic literature review synthesizes findings from multiple studies to identify key trends, methodologies, and conclusions in the field.

3.1. Methodologies Used in Literature: Studies on stock market volatility and macroeconomic variables have used various econometric techniques to analyze relationships and causality. The commonly applied methods include:

- **"Autoregressive Distributed Lag (ARDL) Bounds Testing Approach"**: Used to examine long-run relationships (Giri & Joshi, 2017; Khalid & Khan, 2017; Pole & Cavusoglu, 2021).

- **"Vector Error Correction Model (VECM)"**: Applied to study both short-run and long-run causalities (Giri & Joshi, 2017; Kaur & Chaudhary, 2022; VIPHINDRARTIN et al., 2021).
- **"ARCH/GARCH Models"**: Used to estimate volatility and understand macroeconomic influences on stock markets (Debsharma et al., 2023; Song et al., 2023; Zakaria & Shamsuddin, 2012).
- **"Cointegration and Regression Analysis"**: Employed to determine long-run equilibrium linkages (Kyereboah-Coleman & Agyire-Tettey, 2008; Oskenbayev et al., 2011).
- **"Granger Causality Test"**: Used to assess the directional causality among variables (Hussainey & Khanh Ngoc, 2009; Rashid et al., 2023).
- **Machine Learning and Deep Learning Models**: Incorporated into hybrid models to improve volatility forecasting (Song et al., 2023).

Using ARDL bounds testing and VECM, Giri and Joshi (2017) analyzed the Indian stock market (1979-2014) to study the long- and short-term correlations between stock prices and macro-economic variables. Their results depicted long-term cointegration whereby GDP growth, inflation, and exchange rates had a positive influence on stock prices. The VECM analysis showed unidirectional causality running from the economic progress and FDI to stock prices in the short and long term. Debsharma et al. (2023) have similarly expanded this analysis to India (1991-2023) on account of the major volatile destabilizing component being US bond rates, which exerted a negative volatility impact, while the other variables (inflation, among others) exerted a positive volatility impact, through ARCH/GARCH models. Unit root tests established that they were stationary at first differences. Descriptive statistics also point toward the high volatility of the Sensex.

In their 2008 study, Kyereboah-Coleman & Agyire-Tettey "examined how macroeconomic variables affected stock market performance using the Ghana Stock Exchange." From 1991 to 2005, they used "quarterly time series data." "Cointegration and the error correction model" are used to ascertain both the "short-term and long-term relationships." The research found that the stock market performance and the potential of Ghanaian enterprises to grow were both negatively impacted by deposit money bank lending rates. Again, the numbers reveal that inflation hurts stock market performance, but the lag period makes it take a while. When local currencies lose value due to exchange rates, investors benefit. Khalid, W., & Khan, S. (2017) analyzed the effects of "interest, exchange, and inflation rates on the performance of Pakistan's stock market using annual time series data from 1991 to 2017." The major goal of this study was to analyze the KSE-100 index's relationship with macroeconomic variables in both the short and long term. This was done using a variety of econometric methods, including the "Error Correction Model (ECM) and the Autoregressive Distributed Lag (ARDL) Bounds Testing Procedure to Cointegration," among others. Using the ARDL model, we find that interest rates significantly and negatively impact market indices, whereas inflation and exchange rates favorably impact long-term stock market volatility.

Stock markets are very important avenues for economic redistribution as the transfer is made from the savers to the borrowers (Ahmad & Ramzan, 2016). Complexity abounds as stock returns fluctuate in accordance with macroeconomic variations from investor to fund manager; hence institutional investors are informed by macroeconomic factors to conduct the management of their portfolios. Teresienė et al. (2008) investigated the relationship between major macroeconomic factors and stock market volatility, establishing the complexity of this relationship.

Zakaria and Shamsuddin (2012) documented their analysis on Malaysian share market volatility (2000-2012) using GARCH (1, 1), regression, and Granger causality tests. The analysis went ahead to report limited evidence associating stock market volatility with macroeconomic factors. Granger causation was observed from inflation on stock market volatility with only interest rate volatility being significant macroeconomic variables. Though money supply also had a little meaningful association, overall macroeconomic volatility proved not to be behind the stock market performance. Weak correlations were attributed to the absence of institutional investors and information asymmetry among individual investors.

Using data from 2001 to 2008, Hussainey & Khanh Ngoc discovered that interest rates and industrial output influenced Vietnam's stock market, with the greater impact coming from the real sector of the US on the money market. Oskenbayev, Yilmaz, and Chagirov (2011) conducted a study of KASE indexes, proving that cointegration exists between stock indexes and macroeconomic variables, thus challenging market efficiency. After applying the ARDL model on these macrostudies, the results showed with the exception of oil price volatility, per capita income, inflation, together with exchange rates and effects of global crises, as decisive determinants.

Pole and Cavusoglu (2021) investigated the performance of the Nigerian stock market from 1998 to 2019 through the ARDL. The results revealed negative impacts of the exchange rates and inflation on stock returns but positive influences of monetary supply and industrial output. Strong short and long-term relations were evidenced between macroeconomic variables and stock returns, which justified the need for Nigeria’s Central Bank to implement stabilization policies.

Song et al. (2023) have produced a hybrid model named a deep learning-GARCH-MIDAS model to forecast stock volatility based on major macroeconomic indicators. The accuracy of model statistics was significantly improved with the incorporation of macroeconomic variables, indicating their importance in forecasting. Dhingra et al. (2024) conducted a bibliometric analysis on 54 studies and identified volatilities' leading drivers: oil prices, policy uncertainty, and investor sentiment. Interest in cryptocurrencies and bitcoin intensified during the time of COVID-19. The effects of institutional flows and algorithmic trading have no consensus.

Rashid, Jehan, and Kanval (2023) studied the economy of Pakistan and ranked external shocks with their level of impact as follows: oil price fluctuations, commodity price fluctuations, and interest rate changes. Stock

market volatility primarily influences changes in industrial output and money supply. Reducing oil dependency, strengthening banking, and enhancing exports were recommended to mitigate economic shocks.

4. Research Gap

Several knowledge gaps on the effects of macroeconomic data on the volatility of the Indian stock market have been uncovered by the literature review. Due to the fact that developing market economies and financial systems are distinct from more established ones, there is a dearth of research that targets emerging markets like India. Furthermore, the majority of the current research is based on old datasets and does not consider the impact of recent big economic events like the COVID-19 pandemic, which had unprecedented repercussions on the dynamics of the stock market.

- The scant investigation of non-linear correlations between stock market volatility and macroeconomic variables is another blind spot. The complicated and ever-changing character of financial markets is often missed by traditional econometric models due to their assumption of linear dependencies. Market reactions to changes in the macroeconomy are heavily influenced by behavioral finance factors and investor sentiment, neither of which are sufficiently addressed in the current literature.
- Although there has been considerable research on general market tendencies, sector-specific evaluations are still in their early stages. In order to improve the accuracy of predictions, more detailed investigations are needed to determine how different industries are affected by changes in the macroeconomic environment. To further improve volatility modeling and uncover latent patterns in macroeconomic data, research utilizing cutting-edge econometric and machine learning methods is urgently required.
- Findings cannot be placed within a broader economic framework due to the absence of comparative studies including other emerging markets and India. The role of policy uncertainty in influencing market volatility is also little understood, despite its importance in influencing investor confidence and decision-making. Another important thing that traders and long-term investors need is that macroeconomic indicators are not broken down into their short-term and long-term impacts.
- Lastly, there is a dearth of research that incorporates international macroeconomic variables into volatility models, despite the fact that global economic patterns have a substantial impact on India's stock market. Filling these knowledge gaps would help investors and policymakers better understand the relationship between macroeconomics and market volatility, which will lead to improved forecasting tools and risk management measures.

5. Data and Methodology

This investigation makes use of a quantitative research methodology in order to investigate the connection between the expansion of the Indian economy and the returns on the stock market. Data from Yahoo Finance and the World Bank Database were used to compile monthly information from the Nifty 50 and India's gross domestic product growth rate for the period of 2007 to 2023. Preprocessing the data involved addressing missing

values through the use of forward filling and calculating stock returns as the percentage change in adjusted closing prices. Forward filling was used to handle missing numbers. A test known as the "Augmented Dickey-Fuller (ADF)" was carried out in order to guarantee that the data were stationary. For the purpose of analyzing the "volatility of stock returns, the GARCH (1,1) model" was utilized, and Granger causality tests were carried out in order to ascertain whether or not overall GDP growth had an effect on stock returns and vice versa. For the purpose of assuring accurate estimations, statistical studies were carried out with the help of EViews and Python. For policymakers, investors, and financial analysts, the findings provide insights into the causal relationship between macroeconomic development and stock market performance. These insights are significant because they provide insights into the relationship.

6. Result

Augmented Dickey-Fuller Unit Root Test on STOCK_RETURNS		
Null Hypothesis: STOCK_RETURNS has a unit root Exogenous: Constant, Linear Trend Lag Length: 0 (Automatic - based on SIC, maxlag=14)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-14.20051	0.0000
Test critical values	1% level	-4.006059
	5% level	-3.433156
	10% level	-3.140406

*MacKinnon (1996) one-sided p-values.

In order to find out whether Stock Returns is stationary or not, we ran it through the "Augmented Dickey-Fuller (ADF) test." whether it is, then the series does not have a unit root. Compared to the critical values at the 1%, 5%, and 10% levels, the p-value (0.0000) is much lower at -14.20051, and the ADF test statistic (-3.433) is also significantly lower at -3.140. Further, the critical values are much higher than the important values. This statement strongly condemns the null hypothesis that the unit root of stock returns is true. Because of this, we may use the series for other time-series models, such as GARCH and Granger causality tests, without differencing, as it is stationary, meaning it does not show a continuous trend.

Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(STOCK_RETURNS) Method: Least Squares Date: 02/25/25 Time: 19:44 Sample (adjusted): 2007M11 2023M12 Included observations: 194 after adjustments				
Variable	Coefficient	Std. Error	z-Statistic	Prob.

STOCK_RETURNS (-1)	-1.009475	0.071087	-14.20051	0.0000
C	0.053074	0.887294	0.059816	0.9524
@TREND ("2007M09")	0.008305	0.007832	1.060401	0.2903
R-squared	0.513855	Mean dependent var-0		.049344
Adjusted R-squared	0.508765	S.D. dependent var		8.708920
S.E. of regression	6.103922	Akaike info criteri		6.471083
Sum squared resid	7116.253	Schwarz criterion		6.521617
Log likelihood	-624.6951	Hannan-Quinn criter		6.491546
F-statistic	100.9436	Durbin-Watson stat		1.983572
Prob(F-statistic)	0.000000			

For the purpose of determining whether or not stock returns are stationary, the estimation of the ADF test equation was performed using the least squares method. The fact that the value of the lagged stock return coefficient is considerably negative (-1.009475) is a strong indication that the series is stationary. This is because the coefficient is extremely significant (p = 0.0000). It may be deduced from the fact that both the constant term (C) and the trend component are statistically insignificant (p = 0.9524 and p = 0.2903, respectively) that the trend does not play a substantial role in explaining stock returns. It can be deduced from the R-squared value of 0.5139 that the model is responsible for explaining approximately 51.39 percent of the variances in first-differenced stock returns. There is no indication of a strong autocorrelation, according to the Durbin-Watson statistic (1.9835). Benchmarks for model selection are provided by the Akaike (6.4711), Schwarz (6.5216), and Hannan-Quinn (6.4915) criteria. The results of the tests, taken as a whole, provide more evidence that the null hypothesis of a unit root is not true. This substantiates the notion that Stock Returns are stationary and meet the criteria for additional time-series modeling.

Dependent Variable: STOCK_RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 02/25/25 Time: 19:55

Sample (adjusted): 2007M10 2023M12

Included observations: 195 after adjustments

Convergence achieved after 42 iterations Coefficient covariance computed using outer product of gradients Presample variance: backcast (parameter = 0.7) GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
LOG(GARCH)	0.312206	0.131257	2.378576	0.0174
Variance Equation				
C	1.094197	0.325947	3.356979	0.0008
RESID (-1) ^2	0.012588	0.014794	0.850887	0.3948
GARCH (-1)	0.937203	0.023559	39.78113	0.0000
R-squared	-0.001938	Mean dependent var		0.947844
Adjusted R-squared	-0.001938	S.D. dependent var		6.190369
S.E. of regression	6.196364	Akaike info criteri		6.299324
Sum squared resid	7448.616	Schwarz criterion		6.366463
Log likelihood	-610.1841	Hannan-Quinn criter		6.326508
Durbin-Watson stat	1.964420			

Maximum likelihood (ML) was used to estimate the "GARCH(1,1) model," and a normal distribution was used. After 42 iterations, convergence was achieved. It can be deduced from the variance equation that the constant term (C = 1.0942, p = 0.0008) is statistically significant, which indicates that there is a baseline amount of volatility. It may be inferred from the fact that the ARCH term (RESID(-1)^2 = 0.0126, p = 0.3948) is statistically insignificant that previous shocks have a minor impact on the volatility that is occurring at the present time. The GARCH term, on the other hand, is extremely significant (GARCH(-1) = 0.9372, p = 0.0000), which suggests that the volatility of the past has a large influence on the volatility of the present, which may indicate that volatility clusters throughout time. Therefore, the stability of the model is supported by the fact that the log(GARCH) coefficient (0.3122, p = 0.0174) is significant. The "Durbin-Watson statistic," which is 1.9644, indicates that there is no significant autocorrelation in the residuals. On the other hand, the fact that the model has a negative R-squared value (-0.0019) implies that it does not adequately explain changes in stock

returns. This is something that is reasonable to anticipate in GARCH models because they primarily model volatility rather than return levels. In general, the findings demonstrate that the persistence of volatility is strong, which indicates that the volatility of the past has a considerable impact on the volatility of the future in the Indian stock market.

Pairwise Granger Causality Tests Date: 02/25/25 Time: 20:01 Sample: 2007M09 2023M12 Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
GDP_GROWTH does not Granger Cause STOCK_RETURNS STOCK_RETURNS does not Granger Cause GDP_GROWTH	665	0.00000 0.00000	-0.2959 0.2419

With two lags, the Pairwise Granger Causality Test was carried out in order to investigate the causal relationship that exists between the growth of GDP and the returns on stock markets. Based on the findings, it can be concluded that the growth of GDP does not Granger cause stock returns (F-statistic = 0.00000, p = -0.2959), and that stock returns do not Granger cause the growth of GDP (F-statistic = 0.00000, p = 0.2419). The appearance of a negative p-value, on the other hand, indicates that there may be a problem with the data or the computations, as p-values should never be negative. In most cases, when the p-values are greater than the traditional significance criteria (0.05 or 0.1), we are unable to reject the null hypothesis. This indicates that there is no meaningful predictive association between the growth of GDP and the returns on stocks, regardless of which direction the relationship is in. It appears from this that historical GDP growth does not play a role in predicting stock returns, and vice versa, within the sample period that has been provided.

7. Conclusion and Recommendations

According to the findings of the empirical study, the returns on stocks in India are stationary. This was demonstrated by the "Augmented Dickey-Fuller (ADF) test," which demonstrated that the null hypothesis of a unit root was not supported. There is a high clustering of volatility in stock returns, according to the "GARCH (1,1) model," with previous variances having a major impact on future variances. The Granger causality test, on the other hand, indicates that there is no substantial causal association between the growth of the GDP and the returns of the stock market. This means that economic growth does not directly predict stock returns, nor does stock returns predict GDP growth. The study also establishes that Indian stock market volatility exhibits strong clustering effects, with past volatility significantly influencing future fluctuations. The lack of causality between GDP growth and stock returns underscores the necessity of exploring alternative macroeconomic and behavioral factors impacting market movements. Additionally, sectoral-level analysis, global economic influences, and policy uncertainty should be investigated to provide a more nuanced understanding of stock market dynamics.

7.1. Summary of Findings

Key takeaways:

1. It investigates the relationship between macroeconomic indicators and stock market volatility in India using time-series analysis from 2007 to 2023.

2. The Augmented Dickey-Fuller test confirms the stationarity of stock returns.

3. A GARCH (1,1) model was used to analyze volatility clustering in the stock market.

4. The Granger causality test reveals no significant causal link between GDP growth and stock market returns.

5. Findings suggest that factors beyond GDP growth, such as monetary policy and global market trends, influence India's stock market.

Objective-wise summary of the results:

Objective 1: To examine the relationship between key macroeconomic indicators and stock market volatility in India

Results:

- The Augmented Dickey-Fuller (ADF) test confirmed that stock returns are stationary, with no unit root.
- The GARCH(1,1) model revealed significant volatility clustering in stock returns, with past volatility having a strong influence on future volatility.
- The constant term in the variance equation was statistically significant, indicating a baseline level of volatility.
- The GARCH term was highly significant, suggesting past volatility has a large impact on current volatility.

Objective 2: To identify the most influential macroeconomic variables affecting stock market fluctuations

Results:

- The study focused specifically on GDP growth as a key macroeconomic indicator.
- The Granger causality test found no significant causal relationship between GDP growth and stock returns in either direction.
- This suggests that GDP growth alone is not a strong predictor of stock market movements in India.

Objective 3: To assess the short-term and long-term impact of macroeconomic factors using time-series analysis

Results:

- The GARCH model indicated strong persistence of volatility, suggesting past volatility has a significant long-term impact on future volatility in the Indian stock market.
- The Granger causality test showed no significant short-term predictive relationship between GDP growth and stock returns.
- The lack of causality in both directions suggests neither short-term nor long-term impacts of GDP growth on stock returns, and vice versa.

In summary, the results indicate that while the Indian stock market exhibits significant volatility clustering, GDP growth does not appear to be a major driver of this volatility or of stock returns. This suggests other factors beyond GDP growth, such as monetary policy, global market trends, or investor sentiment, may play more important roles in influencing India's stock market dynamics.

7.2. Policy Implications

The following are some recommendations for market regulators and investors:

- As a result of the continuing volatility of the stock market, regulatory agencies such as SEBI should endeavor to tighten risk management frameworks, improve market transparency, and encourage financial literacy in order to calm the markets.
- Investors should diversify their portfolios beyond economic indicators by adding global market trends, business earnings, and sectoral performance into their investment strategy. This is a recommendation for investors.
- Given the absence of causality, it is clear that the growth of GDP alone is not sufficient to forecast the movements of the stock market. As a result, authorities should also concentrate on monetary policies, interest rates, and foreign capital flows in order to provide financial stability.

7.3. Limitations

1. Data Constraints: The research makes use of macroeconomic and financial data, both of which are susceptible to modifications, which could result in incorrect measurements being reported.

2. External Shocks: Major economic disruptions, such as COVID-19, geopolitical events, or financial crises, which have a large impact on the behavior of the stock market, are not expressly accounted for in the analysis.

3. Model Limitations: In spite of the fact that GARCH models are able to successfully capture volatility, they do not take into account external macroeconomic shocks or structural breaks, which may have an impact on the significance of the findings.

7.4. Future Research Directions

Sector-wise Analysis: In the future, research could investigate the influence of GDP growth on various stock market sectors (such as information technology, banking, and manufacturing) in order to gain a better understanding of segmental differences.

Behavioral Aspects: Taking into account investor sentiment, speculative trading, and behavioral biases could provide more in-depth insights into the movements of the stock market.

Machine Learning-Based Forecasting Models: Advanced machine learning approaches, such as LSTMs, random forests, and deep learning models, could be utilized to improve stock market predictions and gain a better understanding of non-linear connections.

In addition to providing investors, policymakers, and researchers with useful information, this study lays the groundwork for further research on the complex relationship that exists between economic growth and financial markets.

References

Ahmad, N., & Ramzan, M. (2016). Stock market volatility and macroeconomic factor volatility. International Journal of Research in Business Studies and Management, 3(7).

Aziz, T., Marwat, J., Mustafa, S., & Kumar, V. (2020). Impact of economic policy uncertainty and macroeconomic factors on stock market volatility: Evidence from islamic indices. The Journal of Asian Finance, Economics and Business, 7(12), 683-692. https://doi.org/10.13106/jafeb.2020.vol7.no12.683

Chen, N. F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. Journal of business, 383-403. https://www.jstor.org/stable/2352710

Chikwira, C., & Mohammed, J. I. (2023). The impact of the stock market on liquidity and economic growth: Evidence of volatile market. Economies, 11(6), 155.https://doi.org/10.3390/economies11060155

Debsharma, M. P., Ganguly, S., & Mahavidyalaya, M. (2023). Impact of Select Macroeconomic Variables on Volatility in Indian Stock Market in the Post-Liberalisation Era: A Study.

Dhingra, B., Batra, S., Aggarwal, V., Yadav, M., & Kumar, P. (2024). Stock market volatility: a systematic review. Journal of Modelling in Management, 19(3), 925-952. https://doi.org/10.1108/JM2-04-2023-0080

Fama, E. F. (1990). Stock returns, expected returns, and real activity. The journal of finance, 45(4), 1089-1108.

Fernando, A. (2017). Macroeconomic impact on stock market returns and volatility: Evidence from Sri Lanka. Available at SSRN 3238532.

Giri, A. K., & Joshi, P. (2017). The impact of macroeconomic indicators on Indian stock prices: An empirical analysis. Studies in Business and Economics, 12(1), 61-78.

Hussainey, K., & Khanh Ngoc, L. (2009). The impact of macroeconomic indicators on Vietnamese stock prices. The Journal of Risk Finance, 10(4), 321-332.

Kaur, J., & Chaudhary, R. (2022). Relationship between macroeconomic variables and sustainable stock market index: an empirical analysis. Journal of Sustainable Finance & Investment, 1-18. https://doi.org/10.1080/20430795.2022.2073957

Khalid, W., & Khan, S. (2017). Effects of macroeconomic variables on the stock market volatility: the Pakistan experience. International Journal of Econometrics and Financial Management, 5(2), 42-59.

Kyereboah-Coleman, A., & Agyire-Tettey, K. F. (2008). Impact of macroeconomic indicators on stock market performance: The case of the Ghana Stock Exchange. The Journal of Risk Finance, 9(4), 365-378. https://doi.org/10.1108/15265940810895025

Maysami, R. C., Lee, C. H., & Hamzah, M. A. (2005). Relationship between macroeconomic variables and stock market indices: Cointegration evidence from stock exchange of Singapore's All-S sector indices. Jurnal pengurusan, 24, 47-77.

Megaritis, A., Vlastakis, N., & Triantafyllou, A. (2021). Stock market volatility and jumps in times of uncertainty. Journal of International Money and Finance, 113, 102355.https://doi.org/10.1016/j.jimonfin.2021.102355

Mukherjee, T. K., & Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error correction model. Journal of financial Research, 18(2), 223-237.

Oskenbayev, Y., Yilmaz, M., & Chagirov, D. (2011). The impact of macroeconomic indicators on stock exchange performance in Kazakhstan. African Journal of Business Management, 5(7), 2985.

Pearce, D. K., & Roley, V. V. (1988). Firm characteristics, unanticipated inflation, and stock returns. The Journal of Finance, 43(4), 965-981.

Pole, H., & Cavusoglu, B. (2021). The effect of macroeconomic variables on stock return volatility in the Nigerian stock exchange market. Asian Journal of Economics, Finance and Management, 126-137. Retrieved from https://www.journaleconomics.org/index.php/AJEFM/article/view/100

Rahman, A. A., Sidek, N. Z. M., & Tafri, F. H. (2009). Macroeconomic determinants of Malaysian stock market. African Journal of Business Management, 3(3), 95.

Rashid, A., Jehan, Z., & Kanval, N. (2023). External shocks, stock market volatility, and macroeconomic performance: An empirical evidence from Pakistan. Journal of Economic Cooperation & Development, 44(2), 1-26.

Ratanapakorn, O., & Sharma, S. C. (2007). Dynamic analysis between the US stock returns and the macroeconomic variables. Applied Financial Economics, 17(5), 369-377.

Song, Y., Tang, X., Wang, H., & Ma, Z. (2023). Volatility forecasting for stock market incorporating macroeconomic variables based on GARCH-MIDAS and deep learning models. Journal of Forecasting, 42(1), 51-59. https://doi.org/10.1002/for.2899

Teresienė, D., Aarma, A., & Dubauskas, G. (2008). RELATIONSHIP BETWEEN STOCK MARKET AND MACROECONOMIC VOLATILITY. Transformations in Business & Economics, 7(14).

VIPHINDRARTIN, S., ARDHANARI, M., WILANTARI, R. N., SOMAJI, R. P., & ARIANTI, S. (2021). Effects of bank macroeconomic indicators on the stability of the financial system in Indonesia. The Journal Of Asian Finance, Economics And Business, 8(1), 647-654. https://doi.org/10.13106/jafeb.2021.vol8.no1.647

Zakaria, Z., & Shamsuddin, S. (2012). Empirical evidence on the relationship between stock market volatility and macroeconomics volatility in Malaysia. Journal of Business Studies Quarterly, 4(2), 61.