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Macroeconomic Determinants of Stock Market Returns in Pakistan: Evidence from ARCH, GARCH, and TGARCH Models

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Abstract

This study examines the relationship between macroeconomic fundamentals and stock market returns in Pakistan from 1999–2023, with a particular focus on volatility dynamics and asymmetric market behavior. Using ARCH, GARCH, and TGARCH models, the study analyzes the impact of GDP growth, inflation, broad money supply, and Exchange Rate (ER) fluctuations on stock market performance and volatility. The empirical results from the GARCH model reveal that broad money supply, GDP growth, inflation, and ER movements significantly influence stock market returns, with strong evidence of persistence in return dynamics. The variance equation confirms pronounced volatility persistence, indicating that market fluctuations are largely driven by past volatility rather than short-term shocks. The TGARCH results further show that macroeconomic variables remain significant determinants of stock returns; however, volatility dynamics exhibit limited evidence of asymmetry and leverage effects. Overall, the findings suggest that Pakistan's stock market is primarily influenced by macroeconomic stability and monetary conditions, while volatility is characterized more by persistence than structural shocks. The study highlights the importance of macroeconomic management in enhancing financial stability, reducing uncertainty, and strengthening investor confidence in emerging financial markets like Pakistan.

Keywords: Stock market returns, Macroeconomic factors, GDP growth; Inflation, Exchange rate, GARCH models, Pakistan.

1 | Introduction

Macroeconomic stability and financial market development are fundamental drivers of sustainable economic growth, particularly in emerging economies where capital markets play an increasingly important role in resource allocation and investment decisions [1]. Over the past three decades, Pakistan has experienced

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persistent economic and political challenges, including terrorism, political instability, Exchange Rate (ER) volatility, natural disasters, external financial crises, and the COVID-19 pandemic [2]. These shocks have generated substantial economic uncertainty, influencing investor sentiment and the overall performance of financial markets. To capture these dynamics, recent studies have developed economic uncertainty indices based on news-based measures, highlighting the significant influence of policy uncertainty on equity markets and broader macroeconomic fundamentals in Pakistan [3], [4]. As a relatively small open economy, Pakistan remains particularly vulnerable to both domestic and external shocks. The interaction between macroeconomic instability and financial market performance has therefore become an increasingly important area of empirical investigation. In this context, stock market volatility provides a useful indicator of the economy's response to internal and external disturbances and offers valuable insights into broader macroeconomic conditions and financial resilience.

Stock markets perform functions that extend well beyond facilitating the trading of securities. They mobilize savings, allocate capital efficiently, distribute risk, and connect investors with productive investment opportunities, thereby supporting long-term economic development. Efficient capital markets also improve information transmission and provide forward-looking signals regarding future economic conditions, making them an essential component of modern financial systems [5]. Similarly, stock exchanges facilitate wealth creation and investment by enhancing liquidity and directing financial resources toward productive sectors, ultimately contributing to economic growth and financial stability [6]. Pakistan's long-term economic prospects depend not only on political and macroeconomic stability but also on the continued development and modernization of its financial sector. Experiences across emerging Asian economies demonstrate that structural transformation of equity markets can significantly strengthen economic performance, improve investment efficiency, and enhance international competitiveness. Consequently, sustained financial sector development remains a critical prerequisite for Pakistan's long-term economic transformation.

The relationship between macroeconomic variables and stock market performance has attracted considerable attention in both theoretical and empirical finance literature [7], [8]. Macroeconomic indicators not only influence stock prices but also provide important signals regarding economic conditions, enabling policymakers and investors to make informed decisions. Global financial crises have further demonstrated that stock market volatility has far-reaching implications for economic stability, corporate investment, portfolio management, and financial policymaking. Consequently, identifying the macroeconomic determinants of stock market volatility remains a critical research priority for both academics and policymakers. An efficient stock market promotes capital formation by channeling savings into productive investments while simultaneously providing investors with opportunities for portfolio diversification and risk management [9]. However, stock returns remain highly sensitive to changes in macroeconomic fundamentals, including economic growth, inflation, monetary conditions, and ER movements. Sudden fluctuations in these variables create uncertainty regarding future returns, directly influencing investor behavior and market volatility [10].

The present study investigates the impact of key macroeconomic factors on stock market returns and volatility in Pakistan over the period 1999-2023. Using ARCH, GARCH, and TGARCH modeling frameworks, the study examines the dynamic effects of GDP growth, inflation, money supply, and ER movements on stock market performance. By providing robust empirical evidence from an emerging economy characterized by recurrent economic and political shocks, this research contributes to a deeper understanding of volatility dynamics and offers policy-relevant insights for strengthening financial market resilience and macroeconomic stability. The study has the following research questions:

- I. To what extent do macroeconomic factors influence stock market returns and volatility in Pakistan?
- II. How do monetary policy variables, particularly money supply and inflation, affect stock market performance and financial market stability?
- III. What is the role of macroeconomic uncertainty and ER movements in shaping stock market volatility in Pakistan?

This study contributes to the existing literature by providing a comprehensive assessment of the dynamic relationship between macroeconomic fundamentals and stock market volatility in Pakistan using advanced volatility modeling techniques. By integrating ARCH, GARCH, and TGARCH specifications over an extended sample period (1999-2023), the research captures both symmetric and asymmetric volatility dynamics and offers evidence that can inform monetary policy formulation, financial market regulation, and investment decision-making in emerging economies.

2 | Literature Review

The relationship between macroeconomic fundamentals and stock market performance has been a central theme in financial economics, particularly in emerging markets where economic and political uncertainties substantially influence investor behavior. Existing literature suggests that stock market returns are closely linked to macroeconomic indicators such as economic growth, inflation, money supply, interest rates, and ER movements [11], [12]. Accordingly, this review is organized into three interrelated themes: 1) the relationship between stock market returns and macroeconomic variables, 2) the interaction between economic growth, inflation, and stock market performance, and 3) the role of monetary variables and ER dynamics in shaping stock market returns.

Empirical evidence consistently supports the existence of a long-run relationship between macroeconomic variables and stock market performance in Pakistan. Alam and Rashid [13] reported a significant cointegrating relationship between stock prices and major macroeconomic indicators, demonstrating that the Consumer Price Index (CPI), money supply, ERs, and interest rates exert negative effects on stock returns, whereas the industrial production index positively influences market performance. The study further highlights the usefulness of GARCH models in explaining stock return dynamics and emphasizes that market behavior is strongly influenced by historical volatility patterns. Similarly, Naseem et al. [14] investigated the relationship between the KSE-100 Index and key macroeconomic variables, including money supply, inflation, interest rates, and ERs, using monthly data from 2009 to 2018. Applying Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), Johansen cointegration, and Vector Error Correction Model (VECM) techniques, the authors found strong evidence of both long-run equilibrium and short-run adjustment mechanisms between stock prices and macroeconomic fundamentals. Their findings confirm that macroeconomic conditions play a decisive role in determining stock market performance in Pakistan.

The relationship between inflation and stock market performance has also attracted considerable scholarly attention. Khan [15] argued that inflation creates uncertainty regarding future returns, increases market frictions, and may distort financial sector development through inflationary financing mechanisms. Their findings underscore the importance of maintaining price stability to enhance market efficiency and improve resource allocation, suggesting that effective inflation management is fundamental to sustainable financial and economic development. Extending this perspective, Dilawer et al. [16] examined the long-run relationship between Pakistan's stock market returns and macroeconomic indicators over the period 1960-2020. Their results indicate that ERs, interest rates, and unemployment negatively affect stock market returns, while GDP exhibits a significant positive relationship. Inflation and gross national expenditure display statistically insignificant negative effects. The study concludes that macroeconomic stability remains essential for improving market efficiency and promoting long-term economic growth.

The interaction between monetary policy variables and stock market performance has also been widely documented in the literature. Zafar et al. [17] demonstrated that investment returns are significantly influenced by monetary and macroeconomic variables, including interest rates, ERs, inflation, cash reserve requirements, and money supply. Using secondary data from the State Bank of Pakistan, Pakistan Stock Exchange, Business Recorder, and Trading Economics, the study highlights the importance of monetary policy transmission mechanisms in shaping stock market efficiency and investor behavior. Likewise, Bashir and Ali [18] explored the effects of ERs and interest rates on stock returns using weekly KSE-100 data and econometric techniques including Ordinary Least Squares (OLS) and GARCH (1,1) models. The findings reveal that interest rates exert a positive effect on stock returns, whereas ER depreciation negatively affects market performance. The

study emphasizes that understanding the interaction between financial markets and macroeconomic variables is essential for evidence-based policymaking and effective investment decision-making.

Overall, the existing literature demonstrates that macroeconomic fundamentals exert substantial influence on stock market dynamics in Pakistan. However, empirical findings remain mixed regarding the magnitude and direction of these effects across different time periods and estimation techniques. Moreover, evidence using advanced volatility models to simultaneously capture the dynamic effects of GDP growth, inflation, money supply, and ER movements over an extended period remains limited. By employing ARCH, GARCH, and TGARCH frameworks for the period 1999-2023, the present study seeks to address this gap and provide more robust evidence on the macroeconomic determinants of stock market returns and volatility in Pakistan.

3| Data and Methodology

3.1| Data and Variable Description

This study examines the impact of key macroeconomic factors on stock market returns in Pakistan over 1999-2023 (see *Table 1*). Annual data are obtained from the World Development Indicators [19]. Stock market returns are modeled as the dependent variable. At the same time, GDP growth, inflation, broad money supply, and the official ER are incorporated as explanatory variables based on theoretical and empirical evidence from the financial economics literature.

Table 1. List of variables [19].

Variables	Symbol	Unit	Expected Relationship
Stock Market Returns	SMR	% of GDP	Dependent variable
GDP Growth	GDPG	Annual%	Positive
Inflation	INF	Annual %	Negative
Broad Money Supply	BMS	% of GDP	Positive
Exchange Rate	ER	LCU per US\$, period average	Negative

Stock market returns are measured as a percentage of GDP. GDP growth is expected to have a positive effect on stock market performance due to its role in strengthening economic activity and investor confidence. Inflation is expected to negatively affect stock returns by increasing uncertainty and reducing real returns. Broad money supply is anticipated to positively affect stock returns by enhancing liquidity and investment capacity in the economy. The ER is expected to negatively affect stock market performance due to external vulnerability and ER risk exposure.

3.2| ARCH Model

To capture time-varying volatility in stock market returns, the study employs the Autoregressive Conditional Heteroskedasticity (ARCH) framework introduced by Engle et al. [20]. This model is widely used in financial econometrics to account for volatility clustering, a phenomenon where periods of high market volatility tend to be followed by similar periods, and the same pattern holds for low volatility phases. The ARCH approach allows the conditional variance of stock returns to depend on past error terms, making it suitable for analyzing financial time series characterized by instability and changing variance over time. This framework is particularly useful for capturing short-term volatility dynamics and provides a foundation for more advanced models used in this study.

3.3| GARCH Model

Building on the ARCH framework, the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model developed by Bollerslev [21] captures volatility persistence in financial markets. Unlike ARCH, the GARCH model incorporates both past shocks and past volatility, allowing for a more comprehensive representation of market behavior. This model is particularly appropriate for stock market data, as financial markets typically exhibit long memory in volatility, where shocks to the market tend to

persist over time. The GARCH framework is widely applied in volatility forecasting, risk assessment, and financial decision-making due to its robustness in modeling dynamic market conditions.

3.4|TGARCH Model

To further examine potential asymmetries in volatility behavior, the study applies the Threshold GARCH (TGARCH) model. This model extends the standard GARCH framework by allowing positive and negative shocks to affect volatility differently. It is particularly useful for capturing the leverage effect, where negative shocks tend to increase volatility more than positive shocks of the same magnitude. The TGARCH model is appropriate for financial markets like Pakistan, where investor sentiment and external shocks often generate asymmetric responses in stock prices. By incorporating this feature, the model provides a more realistic representation of market dynamics and improves the understanding of risk transmission mechanisms.

4| Results and Discussion

Table 2 presents the descriptive statistics of the key variables used in the study, providing an overview of their distribution, central tendency, and variability over the sample period. Stock Market Returns (SMR) exhibit a relatively high mean value of 20.72, but the median is considerably lower at 6.20, indicating the presence of extreme positive observations that pull the average upward. This argument is further supported by a high standard deviation (31.14), reflecting substantial volatility in stock market performance. The distribution is strongly positively skewed (1.74) and exhibits excess kurtosis (4.75), suggesting a non-normal and leptokurtic distribution characterized by extreme market fluctuations.

Table 2. Descriptive statistics.

Methods	SMR	BMS	INF	GDPG	ER
Mean	20.71641	44.61801	8.266200	4.180782	93.98259
Median	6.203668	46.50235	7.645420	4.239015	85.76860
Maximum	106.1087	54.52639	20.28612	7.831256	204.8672
Minimum	0.198865	28.68950	2.529328	-1.274087	49.50069
Std. Dev.	31.14195	7.161324	4.891679	2.028485	41.00334
Skewness	1.738162	-0.949051	1.024516	-0.444933	1.129487
Kurtosis	4.747140	2.809698	3.574016	3.585491	3.564294

Source: Author's estimation.

Broad Money Supply (BMS) shows a mean value of 44.62 with a median of 46.50, indicating a relatively stable central tendency with limited deviation between average and midpoint values. The standard deviation is relatively low (7.16), suggesting moderate stability in monetary expansion over time. The distribution is slightly negatively skewed (-0.95), implying a tendency toward higher frequency of values above the mean, while kurtosis (2.81) remains close to the normal benchmark, indicating near-normal distribution characteristics. Inflation (INF) records a mean value of 8.27 and a median of 7.65, indicating a moderately stable inflation environment with some upward deviations during certain periods. The standard deviation of 4.89 reflects moderate variability in price levels across time. The positive skewness (1.02) suggests occasional spikes in inflation, while kurtosis (3.57) indicates a distribution that is moderately peaked and close to normal, with occasional extreme inflationary episodes. GDP growth (GDPG) shows a mean of 4.18 and a median of 4.24, indicating a relatively stable growth pattern over the study period. However, the presence of a negative minimum value (-1.27) reflects periods of economic contraction. The standard deviation (2.03) suggests moderate fluctuations in economic performance. Slight negative skewness (-0.44) indicates a tendency toward lower-than-average growth in some years, while kurtosis (3.59) suggests mild leptokurtic behavior with occasional deviations from normal growth trends.

The ER exhibits the highest level of dispersion among macroeconomic variables, with a mean of 93.98 and a standard deviation of 41.00, indicating substantial volatility in currency valuation over time. The wide range between the minimum (49.50) and maximum (204.87) further confirms significant ER fluctuations. The distribution is positively skewed (1.13), suggesting frequent depreciation episodes, while kurtosis (3.56)

indicates moderate leptokurtic behavior with occasional extreme ER movements. Overall, the descriptive results highlight that while macroeconomic fundamentals exhibit moderate stability, the stock market remains highly volatile and sensitive to economic fluctuations in Pakistan.

Table 3 presents the results of the unit root tests for all variables under both level and first-difference specifications. The findings indicate a mixed order of integration across the variables, which have important implications for model selection and econometric estimation.

Table 3. ADF unit root test estimates.

Variables	Level	First Difference		
	Intercepts	Trend/Intercept	Intercepts	Trend/Intercept
SMR	1.055 (0.710)	-3.749 (0.043)	-7.495 (0.000)	-2.903 (0.182)
BMS	-1.555 (0.4891)	-2.491 (0.329)	-6.369 (0.000)	-3.183 (0.118)
INF	-0.154 (0.9320)	-0.627 (0.967)	-3.899 (0.0072)	-4.100 (0.019)
GDPG	-3.381 (0.0221)	-3.498 (0.062)	-5.352 (0.0003)	-5.195 (0.002)
ER	1.624 (0.999)	1.173 (0.999)	1.915 (0.999)	0.528 (0.998)

Source: Author's estimation.

Stock market returns and GDP growth are stationary at level under the intercept specification, indicating that both variables do not contain a unit root and exhibit stable long-run statistical properties. It suggests that stock market performance and economic growth in Pakistan adjust relatively quickly to shocks without requiring differencing to achieve stationarity. In contrast, broad money supply and inflation are non-stationary at level but become stationary after first differencing, confirming that both variables follow an integrated process and stabilize only after transformation into growth or change form. This behavior reflects the inherent persistence in monetary expansion and price level dynamics over time. The ER, however, remains non-stationary even after first differencing under all specifications, indicating strong persistence and high inertia in currency movements. It suggests that ER dynamics are driven by deep structural factors and exhibit long-memory characteristics that are not easily removed through simple differencing. Overall, the results confirm that the dataset contains a combination of stationary and non-stationary variables. This mixed integration structure supports the use of advanced volatility modeling techniques such as ARCH, GARCH, and TGARCH, which are capable of handling complex time-varying behaviors in macroeconomic and financial series.

The Heteroskedasticity Test results in Table 4 reveal significant variance instability in the residuals of the regression model. Specifically, SMR, BMS, INF, and ER exhibit heteroskedasticity, indicating changing residual variance across different levels of these variables. In contrast, GDPG shows no significant heteroskedasticity (p-value: 0.206). These findings suggest volatility clustering and non-constant variance, violating regression assumptions and potentially leading to inaccurate predictions. Remedial measures, such as variable transformation or robust standard errors, are necessary. Awan et al. [22] investigate stock price volatility using ARDL and ARCH models. Findings show ERs, money supply, and interest rates positively impact long-run volatility, while industrial production has a positive short-run effect. Policymakers should focus on ER and monetary stability to reduce volatility and ensure effective monetary and fiscal policies.

Table 4. ARCH estimates.

Heteroskedasticity Test: ARCH	
Variables	ARCH Values
SMR	2.562 (0.0181)
BMS	3.943 (0.0007)
INF	5.409 (0.000)
GDPG	1.302 (0.206)
ER	7.748 (0.000)

Source: Author's estimation.

The GARCH results presented in Table 5 highlight the relationship between macroeconomic variables and stock market returns, along with the volatility dynamics captured through the variance equation. In the mean

equation, the constant term is positive and statistically significant, indicating a stable baseline level of stock market returns in Pakistan over the study period. Among the explanatory variables, broad money supply exerts a strong and highly significant positive effect on stock market returns, suggesting that liquidity expansion in the economy plays a crucial role in supporting market performance. Inflation also shows a positive but weakly significant impact, indicating that price level changes exert some influence on returns but with limited statistical strength. GDP growth is positively associated with stock market returns and is marginally significant, implying that improvements in economic activity contribute to better market performance, although the effect is relatively modest. The ER also shows a significant positive relationship, indicating that currency movements are closely linked with stock market behavior, possibly through trade and external sector channels. The lagged dependent variable is highly significant, confirming strong persistence in stock market returns and indicating that past market performance plays an important role in explaining current returns.

Table 5. GARCH estimates.

Variables	Coefficient	Std. Error	z-Statistic	Prob.
C	50.38444	5.226313	9.640533	0.0000
BMS	1.071002	0.148190	7.227230	0.0000
INF	1.608388	0.861764	1.866390	0.0620
GDPG	1.585639	0.809518	1.958743	0.0501
ER	1.655747	0.651700	2.540658	0.0111
AR(1)	0.802117	0.115149	6.965908	0.0000
Variance Equation				
C	1.225639	0.615308	1.991912	0.0464
RESID(-1) ²	-0.089766	0.091228	-0.983976	0.3251
GARCH(-1)	0.693949	0.145472	4.770333	0.0000

Source: Author's estimation

In the variance equation, the constant term is statistically significant, confirming the presence of baseline volatility in the market. The ARCH term, which captures short-run shock effects, is statistically insignificant, suggesting that immediate past shocks do not strongly influence current volatility. In contrast, the GARCH term is highly significant and positive, indicating strong volatility persistence in the Pakistani stock market. It implies that volatility is primarily driven by past conditional variance rather than short-term shocks, confirming the presence of long memory in market fluctuations [23]. Overall, the results demonstrate that macroeconomic fundamentals significantly influence stock market returns. At the same time, volatility dynamics are dominated by persistent structural effects rather than short-run disturbances, justifying the use of a GARCH framework for modeling financial market behavior in Pakistan. Alam et al. [24] investigate the relationship between the Karachi Stock Exchange's KSE-100 index and macroeconomic variables. The study employs advanced econometric techniques, including cointegration tests and GARCH modeling, to analyze the long-term dynamics. The results reveal a significant cointegrating relationship between stock prices and macroeconomic variables, with industrial production exhibiting a positive association and consumer price index, money supply, ERs, and interest rates showing negative relationships. These findings provide valuable insights for investors and policymakers, highlighting the importance of macroeconomic factors in shaping Pakistani stock market returns.

Table 6 presents the results of the TGARCH model, which captures both the impact of macroeconomic variables on stock market returns and the asymmetric volatility dynamics in the Pakistani stock market. In the mean equation, the results show that all key macroeconomic variables significantly influence stock market returns. Broad money supply has a strong positive and statistically significant effect, indicating that liquidity expansion plays an important role in enhancing stock market performance [25]. Inflation also shows a significant positive relationship with stock returns, suggesting that moderate inflationary conditions may be associated with higher nominal market returns in the Pakistani context. GDP shows a highly significant, strong positive impact, confirming that economic growth is a major driver of stock market performance. The ER also exhibits a highly significant effect, highlighting the sensitivity of stock returns to currency movements

and external sector dynamics. The lagged dependent variable is statistically significant, indicating persistence in stock market behavior and confirming that past returns strongly influence current performance.

Table 6. TGARCH estimates.

Variables	Coefficient	Std. Error	z-Statistic	Prob.
C	44.24355	23.95875	1.846655	0.0648
BMS	0.922723	0.296654	3.110431	0.0019
INF	0.807827	0.247809	3.259874	0.0011
GDPG	7.191057	1.777060	4.046604	0.0001
ER	0.959914	0.000319	3004.848	0.0000
AR(1)	0.675247	0.327810	2.059874	0.0394
Variance Equation				
C	228.7507	469.9932	0.486711	0.6265
RESID(-1)^2	-0.065455	0.303588	-0.215604	0.8293
RESID(-1)^2*(RESID(-1)<0)	-0.398236	0.783932	-0.507997	0.6115
GARCH(-1)	0.631896	0.968639	0.652355	0.5142
R-squared	0.570127	Adjusted R-squared		0.44369

Source: Author's estimation

In the variance equation, the constant term is statistically insignificant, suggesting no fixed baseline volatility component in the model. The ARCH term is also insignificant, indicating that short-term shocks do not strongly affect current volatility. Similarly, the asymmetric term capturing the impact of negative shocks is statistically insignificant, implying that the Pakistani stock market does not exhibit a strong leverage effect, where negative shocks generate disproportionately higher volatility than positive shocks. The GARCH term is also insignificant, suggesting weak volatility persistence once this specification controls for macroeconomic variables and asymmetry effects. Overall, the results indicate that while macroeconomic fundamentals play a strong role in explaining stock market returns, volatility in the TGARCH framework appears less structurally driven and does not strongly exhibit asymmetric or persistent dynamics in this model specification. Ahmed [26] examines the volatility of the Pakistani Rupee (PKR) against major currencies (USD, EUR, GBP, and JPY) from 1995 to 2016 using ARCH and GARCH models. The findings reveal significant volatility in PKR ERs, with lagged variance and residual coefficients being highly significant. Heteroskedasticity effects were detected in the yen's ER. Improved models (GARCH, EGARCH, TGARCH, and PGARCH) confirmed significant coefficients and the absence of ARCH effects. Asymmetric models showed leverage effects, indicating negative shocks have varying impacts on future volatility, particularly for EUR and GBP. Volatility clustering suggests high volatility periods persist, emphasizing the importance of understanding these dynamics for economic stability.

5 | Conclusions

This study investigated the impact of macroeconomic variables on stock market returns and volatility in Pakistan over the period 1999-2023 using advanced econometric techniques, including GARCH and TGARCH models. The findings confirm that macroeconomic fundamentals play a significant role in shaping stock market performance. Broad money supply and GDP growth emerge as key positive drivers of stock returns, indicating that liquidity expansion and economic growth enhance market performance. Inflation and ER movements also significantly influence returns, reflecting the sensitivity of the Pakistani stock market to price instability and external sector fluctuations. The volatility analysis reveals strong persistence in stock market fluctuations, suggesting that past volatility plays a dominant role in explaining current market uncertainty. However, short-term shocks do not exert a significant independent effect on volatility once persistence is accounted for. The TGARCH results further indicate that although macroeconomic variables significantly affect returns, the market does not exhibit strong asymmetric volatility behavior, implying limited leverage effects from negative shocks. Overall, the study concludes that the Pakistani stock market is primarily driven by macroeconomic conditions and monetary dynamics, while volatility is characterized more by

persistence than structural instability. These findings highlight the importance of macroeconomic stability in ensuring sustainable financial market development.

6 | Policy Recommendations

The findings of this study carry important implications for policymakers, regulators, and financial authorities in Pakistan. First, macroeconomic stability should be prioritized as a core policy objective, as variables such as GDP growth, inflation, ER, and money supply significantly influence stock market performance. Maintaining stable inflation and predictable monetary conditions can enhance investor confidence and improve capital market efficiency. Second, monetary authorities should manage liquidity expansion carefully, as broad money supply has a strong positive impact on stock market returns. However, authorities should avoid excessive liquidity growth to prevent inflationary pressures and financial imbalances. Third, ER stability is crucial for sustaining stock market performance. Given the market's sensitivity to currency fluctuations, coordinated monetary and ER policies are necessary to reduce uncertainty and attract both domestic and foreign investors. Fourth, the presence of strong volatility persistence suggests that financial regulators should focus on strengthening risk management frameworks in capital markets. Improved market surveillance, better disclosure mechanisms, and enhanced investor protection can help reduce the impact of prolonged volatility. Finally, because volatility does not exhibit strong asymmetry, policy responses should focus more on structural macroeconomic stabilization than on short-term shock management. Strengthening economic fundamentals will be more effective than reactive interventions in ensuring long-term stock market stability and financial development in Pakistan.

Authors' Contributions

M. B.: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Supervision, Writing-original draft, Visualization, and Validation. The author has read and agreed to the published version of the manuscript.

Data Availability

The data are freely available in the World Development Indicators published by the World Bank (WDI, 2025) at <https://databank.worldbank.org/source/world-development-indicators>

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Conflict of Interest

There are no competing interests to declare.

Consent for Publication

The author has given consent for the publication of this manuscript.

Ethics Approval and Consent to Participate

The authors confirm that this research did not involve human participants or animal subjects.

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