Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.16, No.8, 2025

Nairobi Securities Market Performance and Economic Growth Nexus in Kenya: A Predictive Analysis

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Abstract
This study investigates the dynamic relationship between Nairobi Securities Exchange (NSE) performance and Kenya's economic growth from 2010 to 2024. Key stock market indicators—including Nairobi All Share Index (NASI), Nairobi Securities Exchange 20 Share Index (NSE 20 Index), and trading volumes—were examined for their predictive influence on the growth of Gross Domestic Product (GDP) in Kenya, while accounting for inflation as a moderating factor. Using time-series econometric techniques, notably a Vector Error Correction Model (VECM), the study findings reveal four long-run equilibrium relationships among GDP growth, stock indices, and trading activity, confirming that capital market performance and economic growth are mutually reinforcing. While inflation is largely exogenous in the long run, it significantly moderates short-term market interactions, reflecting the context-dependent nature of market efficiency. This is consistent with the Adaptive Market Hypothesis (AMH) developed by Andrew Wen-Chuan Lo (2004) is viewed as a new version of the efficient market hypothesis, derived from evolutionary principles. Findings support Endogenous Growth Theory by highlighting feedback loops between financial markets and economic expansion. The study underscores the importance of policy, liquidity management, and institutional reforms in enhancing the NSE's role as both a barometer and driver of Kenya's economic resilience.
Keywords: Nairobi Securities Exchange, Economic Growth, Stock Market Performance, Vector Error Correction Model (VECM), Adaptive Market Hypothesis, Endogenous Growth Theory.
DOI: 10.7176/JESD/16-8-03
Publication date: November 30th 2025

Introduction

The performance of the Nairobi Securities Exchange (NSE) has long been viewed as a key barometer of Kenya's economic performance. As the principal stock exchange in Kenya, the NSE reflects investor sentiment and economic outlook, and plays a critical role in capital formation—an essential component of economic development (Ngugi, 2003). Historically, fluctuations in NSE performance have had varying implications on macroeconomic stability, investment activity, and financial market development.

As a developing economy in Sub-Saharan Africa, Kenya has undergone significant structural and financial reforms over the past two decades. One of the most transformative reforms was the implementation of devolution in 2013, which introduced fiscal decentralization and altered the management of public finances, infrastructure development, and resource allocation (World Bank, 2016). These changes influenced investment flows, government spending, and public sector project implementation, creating new dynamics in Kenya's macroeconomic environment. The NSE has concurrently grown as an important vehicle for capital mobilization and a mirror of economic performance.

Kenya has experienced robust economic growth over the past decade, with average annual GDP growth rates ranging between 5% and 7% (World Bank, 2022). The financial sector—particularly the NSE—has contributed to this growth by providing platforms for resource mobilization and efficient capital allocation to both public and private enterprises (Were et al., 2013). As a diversified economy comprising agriculture, services, and manufacturing, Kenya's development trajectory has been closely tied to the robustness of its financial markets.

However, the COVID-19 pandemic disrupted this trajectory. Kenya's economy contracted in 2020, following reduced activity in key sectors such as agriculture, tourism, trade, and transportation (Kenya National Bureau of Statistics (KNBS), 2021). Nonetheless, signs of recovery were evident by 2021 and 2022, with a rebound in GDP growth and revitalized investor confidence (KNBS, 2022). This recovery phase is vital in understanding the evolving link between stock market dynamics and broader economic performance in a post-pandemic context.

In response to global and domestic shocks, Kenya has also witnessed shifts in monetary policy. For example, in April 2025, the Central Bank of Kenya (CBK) lowered its benchmark lending rate to 10% from 11.25% set in December 2024 and 12.5% in December 2023 to stimulate borrowing and investment and enhance liquidity (CBK, 2025). Such policy decisions directly affect investor behavior, stock market liquidity, and overall financial market performance, making it imperative to study their implications on economic growth.

The NSE, as Kenya's primary capital market, functions not only as a facilitator of investment but also as a reflection of the nation's economic growth. Understanding the relationship between the NSE and Kenya's economic growth is therefore essential for policymakers, investors, and researchers interested in leveraging capital markets for economic growth.

Theoretical underpinnings have long sought to establish the nature of the relationship between stock market performance and economic growth. According to Endogenous Growth Theory, stock markets enhance growth by improving capital allocation efficiency and fostering innovation through access to external finance (Barro, 1991). The Efficient Market Hypothesis (EMH), as advanced by Fama (1970), posits that stock prices incorporate all available information, making the stock market a forward-looking indicator of economic performance. If markets are efficient, NSE movements should mirror Kenya's GDP dynamics. However, developing markets like Kenya are often characterized by low liquidity, high transaction costs, and limited investor participation-factors that may weaken this relationship (Yartey & Adjasi, 2007).

Despite the theoretical appeal, empirical findings remain inconclusive, particularly in emerging markets. Studies in advanced economies such as the U.S. and the U.K. have found a strong positive correlation between stock market performance and economic growth (Levine & Zervos, 1996). In contrast, evidence from African countries, including Kenya, is mixed. Mlambo and Biekpe (2017) observed that illiquid and underdeveloped capital markets in Africa limit the extent to which stock markets can stimulate economic growth.

Research specific to Kenya is limited in both scope and currency. Earlier studies such as Musyoka W. M., & Mogeni E. G., & Murunga D. M., & Mutunga P. M, (2018) and Kirui, Wawire, and Onono (2014) focused on short-term relationships and used data up to 2012, omitting critical events such as devolution and the economic shocks of the COVID-19 pandemic. Additionally, the NSE 20 Share Index has experienced significant volatility—rising to a high of 5,195 in 2015 before plummeting to 1,676.10 by 2023—highlighting the complex nature of market performance (NSE, 2023).

This study, therefore, seeks to address existing gaps by extending the analysis period to cover 2010–2024. It offers a comprehensive assessment of the predictive relationship between NSE performance and Kenya's economic growth, with particular attention to the effects of post-COVID recovery and recent shifts in monetary policy. The findings aim to inform evidence-based policymaking and promote efficient capital market development as a catalyst of economic resilience.

Research Problem

The Nairobi Securities Exchange (NSE) is considered a key pillar of Kenya's financial system, presumed to aid capital formation and stimulate economic development (Ngugi, 2003; Waweru et al., 2012). However, the direction and strength of its relationship with economic growth remain ambiguous. Empirical studies specific to Kenya are limited and often inconclusive, lacking robust time-series analyses to link NSE performance indicators with macroeconomic outcomes (Mlambo & Biekpe, 2017).

While research from developed markets confirms a bidirectional relationship between stock market development and economic growth (Levine & Zervos, 1998; Bekaert et al., 2005), findings from emerging economies like Kenya are inconsistent, likely due to low market liquidity, volatility, and regulatory constraints (Yartey & Adjasi, 2007).

This study addresses the gap by examining the long-run and short-run dynamics between NSE performance and Kenya's economic growth between 2010 and 2024. It explores whether NSE indicators Granger-cause GDP growth, how inflation, interest rates, and policy mediate this relationship, and the role of market depth in economic expansion. The goal is to clarify whether the NSE acts as a growth stimulant, mirror, or by-product, offering insights for policymakers and investors.

Objectives

1. To examine the trends in key NSE performance indicators—specifically the NSE 20 Share Index, NSE All Share Index, and trading activity—and their alignment with Kenya's GDP growth over the study period.
2. To establish the direction and nature of causality between NSE performance and Kenya's economic growth using appropriate econometric techniques.

3. To evaluate the moderating role of inflation in the relationship between security market performance and Kenya's economic growth.

Significance of the study

This study holds considerable relevance for policymakers, investors, and scholars engaged in Kenya's financial and economic development.

For policymakers, the study offers empirical insights into the linkage between stock market performance and economic growth, providing a data-driven basis for policy direction. The findings can support reforms aimed at strengthening capital market infrastructure, fostering investor confidence, and promoting inclusive, market-led economic growth.

For investors, both domestic and international, the study enhances understanding of the informational efficiency of the Nairobi Securities Exchange (NSE) and its capacity to serve as a predictor of trends of economic growth. Such insights can improve investment strategies, risk assessment, and long-term capital allocation decisions.

For the academic community, this study contributes to the limited body of literature on the finance-growth nexus within African emerging markets. By focusing on Kenya and employing rigorous econometric methods—such as Vector Autoregression (VAR) and Granger causality testing—it provides a methodological framework that can inform comparative studies and stimulate further research in financial economics.

Overall, the study aims to enrich academic discourse, inform sound economic performance policy, and guide strategic investment in Kenya's evolving financial landscape.

Theoretical Framework

Theoretical perspectives such as the Efficient Market Hypothesis (EMH) and Endogenous Growth Theory (EGT) emphasize the critical role of stock markets in driving economic growth. These frameworks posit that when stock markets operate efficiently, they enhance capital allocation, enable effective risk diversification, and improve investment efficiency. Through these mechanisms, well-functioning capital markets are expected to support sustained economic growth

Endogenous Growth Theory

Endogenous Growth Theory (EGT), advanced by Paul Michael Romer (1986) and Robert Lucas (1988), emphasizes internal drivers of economic growth—such as human capital, innovation, and knowledge spillovers—over external technological progress. Within this framework, the Nairobi Securities Exchange (NSE) is positioned as a catalyst for Kenya's economic growth by fostering capital accumulation, innovation, and efficient resource allocation. The NSE mobilizes domestic savings, reduces transaction costs, and channels funds into productive investments, particularly supporting corporate innovation and entrepreneurial activity (Levine & Zervos, 1998; Aghion & Howitt, 1992).

Listed firms often benefit from better access to finance, allowing investments in workforce training and advanced technologies, thus enhancing productivity and economic efficiency (Barro, 1991). Moreover, a reinforcing feedback loop is created: economic growth drives financial market development, which in turn stimulates further growth (Greenwood & Jovanovic, 1990).

However, applying EGT to Kenya's context reveals significant limitations. The theory assumes strong institutional frameworks—efficient governance, secure property rights, and sound regulation—which are often lacking in Kenya (Yartey & Adjasi, 2007). Additionally, EGT underestimates the role of external shocks, such as global commodity price volatility and foreign investor behavior, which heavily influence the NSE (Mlambo & Biekpe, 2017). The NSE also remains relatively shallow, with few listings and limited retail participation, reducing its developmental impact (Ngugi, 2003).

Finally, while EGT has empirical support in developed economies, its effectiveness in emerging markets like Kenya is less conclusive due to data limitations and structural inefficiencies (Bekaert et al., 2005). In sum, EGT provides a useful lens for examining Kenya's financial sector, but its assumptions and expectations must be adapted to the country's institutional and economic realities.

Adaptive Market Hypothesis

The Adaptive Market Hypothesis (AMH), proposed by Andrew W. Lo (2004, 2005), integrates Efficient Market Hypothesis and Behavioral Finance by arguing that market efficiency is context-dependent and time-varying. Efficiency evolves with investor learning, competition, regulation, technology, and shifting risk preferences, making risk–return trade-offs and predictability episodic rather than constant (Andrew W. Lo, 2017). This is

particularly relevant to Kenya, where structural reforms, technological innovations, and regulatory changes continually reshape financial markets (Omondi & Muturi, 2022).

Through the adaptive efficiency channel, efficiency shifts with macro or policy changes; in efficient phases, prices rapidly reflect economic news, while in less efficient periods, predictability increases via anomalies such as momentum (Chirchir, 2021). The risk-appetite and credit channel shows that rising risk tolerance boosts valuations, issuance, and growth during expansions, but shocks like COVID-19 heighten aversion and dampen growth (Were & Wambua, 2021). The liquidity–investment channel highlights how deeper NSE liquidity lowers financing costs, spurring investment and employment (Nyangweso, 2023).

AMH also stresses information diffusion and policy learning, as investors and regulators adapt, improving price discovery and capital allocation. Regulatory reforms and innovations such as Real Estate Investment Trusts (REITs) reshape predictability and broaden market–growth linkages (Mugo & Wekesa, 2022). Policy implications stress regime-aware monitoring, liquidity-deepening reforms, and dynamic investor strategies. Ultimately, under AMH, the securities market–growth nexus in Kenya is dynamic, state-dependent, and adaptive.

Empirical Evidence

A growing body of evidence supports the view that stock market performance is positively correlated with economic growth, particularly in developed economies. According to Investopedia (2015), rising stock prices are typically accompanied by favorable financial conditions and higher consumer confidence. This optimism stimulates consumer spending and business investment, contributing to increased GDP. Conversely, falling stock markets often dampen sentiment and reduce investment activity, slowing economic expansion.

Recent developments in global markets further illustrate this connection. Despite slow economic growth in parts of Europe and Japan, stock indices such as the Nikkei 225 and the Stoxx 600 have reached record highs (Reuters, 2024). In the U.S., Wall Street has maintained strong performance, driven largely by leading technology companies. However, this growth has sparked concerns over its sustainability, given the disconnect between high market valuations and underlying economic fundamentals.

Structural reforms have also played a key role in strengthening stock markets and fostering economic recovery in various nations. Financial Times (2024) highlights cases such as Spain, Greece, and South Africa, where fiscal discipline, subsidy reductions, and infrastructure investments have boosted investor confidence and market performance. These examples show how periods of crisis can trigger reforms that reinvigorate financial markets and stimulate growth.

In emerging markets, the trend is also visible. Investopedia (2013) discusses the emergence of Africa's "Lion Economies," where political stability and economic reforms have spurred investor confidence and fueled stock market expansion. This has contributed to broader economic growth across key sectors, reinforcing the stock market's role as a facilitator of economic development.

In the African context, however, empirical evidence reveals a more complex picture. In South Africa, Ngcobo et al. (2025) used a finance-augmented Solow Growth Model to examine the impact of financial market capitalization on growth and unemployment. Their results showed a positive effect of market capitalization on economic growth and a negative effect of unemployment, suggesting that while capital markets can support economic expansion, labor market health remains crucial.

In contrast, findings from Nigeria present more nuanced results. Fapetu et al. (2022) found a significant long-run relationship between capital market performance and macroeconomic variables such as inflation and exchange rates, indicating the market's sensitivity to economic conditions. However, Osamwonyi and Osaseri (2019) found no causal link between stock market development and economic growth in Nigeria, casting doubt on the market's effectiveness as a driver of long-term development in that context. Additionally, John et al. (2020) examined the role of interest rates in Nigeria, South Africa, and Ghana, discovering that while interest rates had a negative (though insignificant) impact in Nigeria, they had mixed effects in South Africa—negative in the short term but positive in the long run. These findings underscore the need to consider contextual factors such as policy frameworks, market structures, and institutional quality when assessing the role of stock markets in African economies.

In Kenya, studies consistently indicate a strong positive relationship between stock market development and economic growth. Ikikii and Nzomoi (2013) found that market capitalization and trade volume explained 91% of the variation in Kenya's GDP, demonstrating the significant role of the capital market in economic performance. Kirui et al. (2014) further showed that macroeconomic variables—including GDP, interest rates, exchange rates, and inflation—substantially affect stock market volatility, highlighting the market's responsiveness to economic

shifts. Supporting this view, Kanyatta and Kagiri (2015) reported that key stock market indicators such as capitalization, liquidity, and the NSE index are positively linked to economic growth.

Musyoka W. M, et al., (2018) similarly found that market activity, including total shares traded and equity turnover, positively impacts economic expansion.

While findings from across Africa are mixed, the overall evidence suggests that well-developed and properly regulated stock markets can contribute meaningfully to national economic growth especially when complemented by sound macroeconomic policies and institutional reforms.

Research Methodology

This chapter outlines the methodology employed to examine the relationship between the performance of the Nairobi Securities Exchange (NSE) and Kenya's economic growth from 2010 to 2024. It discusses the research design, data sources, variable operationalization, analytical methods, and diagnostic tests for validity and reliability.

Research Design

The study adopted a **quantitative, explanatory research design** using **time-series econometric analysis.** This design is suitable for assessing causal and long-term relationships between NSE performance indicators and macroeconomic variables over time.

Study Period and Justification

The study focused on the period from 2010 to 2024. This timeframe is chosen to capture a series of significant structural, economic, and financial developments in Kenya that are likely to influence the relationship between stock market performance and economic growth. Key among these is the implementation of the post-devolution fiscal regime following the promulgation of the 2010 Constitution, which significantly reshaped public finance and governance structures. The period also included the economic disruption caused by the COVID-19 pandemic between 2020 and 2022, as well as the subsequent recovery phase from 2022 to 2024 (CBK). Most recently, the timeframe covers notable monetary policy shifts by the Central Bank of Kenya. Overall, the 2010–2024 window provides a rich and diverse context for examining how financial market indicators interact with broader macroeconomic conditions.

Data Sources

This study relied on secondary data obtained from reputable and authoritative sources to ensure authenticity, reliability and accuracy. Key financial market indicators, including the NSE 20 Share Index, and share turnover, was sourced from the Nairobi Securities Exchange (NSE). Macroeconomic data such as quarterly GDP at constant prices was collected from the Kenya National Bureau of Statistics (KNBS). The Central Bank of Kenya (CBK) provided data on inflation rates over the study period. Additionally, economic growth indicators for Kenya will be cross-checked with data from Bretton Woods institutions such as the World Bank and the International Monetary Fund (IMF) to enhance data validity and provide a global comparative perspective.

Variable Definition and Measurement

Variable Type	Indicator	Measurement	Source
Independent	NSE 20 Share Index	Quarterly average index points	NSE
	NASI	Quarterly average index points	
	Share Turnover	Volume and value of shares traded	
Dependent	GDP Growth Rate	% change in GDP (quarterly seasoned Rate)	KNBS, World Bank
Control	Inflation Rate	% quarterly inflation rate	CBK

Econometric Model Specification

The econometric analysis adopted a systematic approach to ensure accuracy and reliability. Stationarity of all time-series variables was first tested using the Augmented Dickey-Fuller (ADF) to prevent spurious regression. The optimal lag length was then determined using the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC).

To evaluate long-run relationships between stock market indicators and real GDP, the Johansen co-integration test was applied. The co-integration was confirmed, a Vector Error Correction Model (VECM) was used to estimate both short- and long-run dynamics, including the adjustment process back to equilibrium.

Granger causality tests assessed the direction of causality between stock market performance and economic growth. Finally, variance decomposition and impulse response functions (IRFs) was analyzed to show the magnitude and duration of GDP responses to shocks in stock market variables, offering a dynamic view of their interrelationship.

Ethical Considerations

This study upholds strict ethical standards by utilizing only publicly available, secondary data, thereby eliminating any risks associated with the use of personal or confidential information. All data sources were properly cited and referenced to maintain academic integrity and ensure transparency. Since the research does not involve human subjects or sensitive data, no ethical clearance for human participation was necessary.

Limitations of the Methodology

The methodology adopted in this study was subject to certain limitations. First, the semi-efficient nature of the Nairobi Securities Exchange (NSE) may influence the strength and reliability of causal relationships identified, as prices may not fully reflect all available information. Second, the analysis may be affected by external shocks such as political events, global financial crises, or regional volatility, which could introduce confounding effects and obscure the true relationship between stock market performance and economic growth.

Findings and Discussions

The objective of this chapter is to analyze and interpret the data collected in line with the study's research objectives and hypotheses. The discussion integrates both descriptive and inferential results to provide a comprehensive understanding of the relationship between securities market performance—measured through key indicators such as the NSE 20 Share Index, NASI, and trading activity —and Kenya's economic growth.

The findings are structured to highlight trends in securities market performance, establish the strength and direction of the nexus with economic growth, and examine the predictive power of securities market indicators in explaining macroeconomic outcomes. The discussion draws comparisons with prior empirical studies, situates the results within the theoretical framework adopted, and offers insights into the implications for policy, practice, and further research.

Descriptive Statistics

Table 4.1: Summary of Variables

Variable	Obs	Mean	Std.Dev.	Min	Max
NASI	60	130.3548	31.40233	59.9925	184.5333
NSE20-Index	60	3207.947	1198.185	1501.16	5349.667
Trad-Volumes	60	1422.265	424.582	634.17	2412.44
Trad-Values	60	34.48642	13.08571	11.8	65.21
Inflation-Rate	60	6.818778	3.164151	2.82	19.18667
GDP-Rate	60	4.214778	2.677243	-4.04	10.48

Descriptive Statistics were computed for all study variables Table 4.1. The Nairobi All Share Index (NASI) had an average value of 130.35 points (SD = 31.40), with a minimum of 59.99 and maximum of 184.53, indicating moderate variability. The NSE 20 Index was more volatile, averaging 3,207.95 points (SD = 1,198.19), ranging from 1,501.16 to 5,349.67. Trading activity was also substantial, with average volumes of 1,422.27 million shares (SD = 424.58) and average trading values of KSh 34.49 billion (SD = 13.09).

On the macroeconomic side, the inflation rate averaged 6.82% (SD = 3.16), ranging between 2.82% and 19.19%, while the GDP growth rate averaged 4.21% (SD = 2.68) with a minimum of -4.04% and maximum of 10.48%. These statistics suggest that both the capital market and macroeconomic variables exhibited substantial variability during the study period, supporting the suitability of time-series analysis.

Figure 4.1: Time series plot Graph

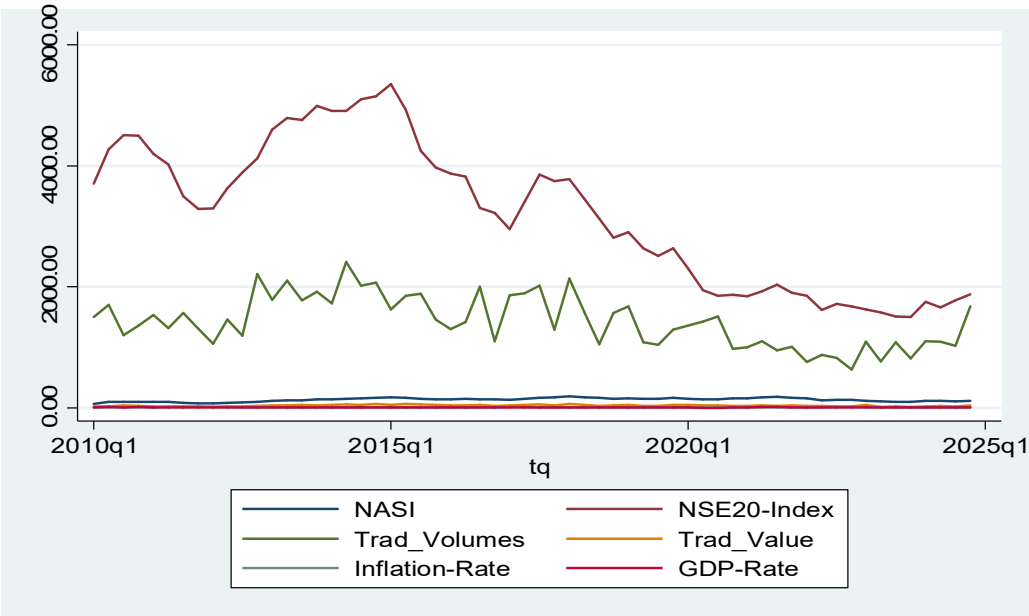

Figure 4.1 illustrates quarterly trends in key NSE indices, trading activity, and macroeconomic indicators from 2010 Q1 to 2024 Q4. The NSE20-Index peaked in 2014–2015 before declining, whereas NASI remained relatively stable, suggesting that large-cap stocks are more susceptible to market volatility than the broader market. Trading volumes exhibit a similar peak during 2014–2015, indicating heightened market activity, while trading values remain relatively subdued. The GDP growth rate shows minor fluctuations with a downward trend post-2015, and inflation remains stable. These patterns provide context for understanding the interplay between market performance and macroeconomic stability.

CORRELATION ANALYSIS

Table 4.2: Pairwise Correlation

Variable	d_NASI	d_NSE20-Index	d_Trad-Volumes	d_Trad-Values	d_Inflation-Rate	d_GDP-Rate
d_NASI	1.0000					
d_NSE20-Index	0.8141	1.0000				
	0.0000					
d_Trad-Volumes	0.0621	0.0205	1.0000			
	0.6404	0.8775				
d_Trad-Values	0.2609	0.2155	0.7202	1.0000		
	0.0460	0.1011	0.0000			
d_Inflation-Rate	-0.2683	-0.3985	-0.0744	-0.0800	1.0000	
	0.0400	0.0018	0.5754	0.5470		
d_GDP-Rate	0.3075	0.2040	0.0905	0.1777	-0.0648	1.0000
	0.0178	0.1212	0.4956	0.1782	0.6257	

A pairwise correlation analysis was conducted to assess the relationships between stock market indicators, macroeconomic variables, and GDP growth. Results (see Table 4.2) show that the NASI and NSE 20 Index are strongly and positively correlated ($r = 0.814$, $p < 0.01$), indicating that both indices move closely together. Similarly, trading value and trading volume exhibit a strong positive correlation ($r = 0.720$, $p < 0.01$), suggesting consistency between market activity and market capitalization.

Inflation is negatively associated with market performance: it correlates significantly with the NSE 20 Index ($r = -0.399$, $p < 0.01$) and NASI ($r = -0.268$, $p < 0.05$). This implies that rising inflation exerts downward pressure on stock returns. Conversely, GDP growth demonstrates a positive and significant correlation with NASI ($r = 0.308$, $p < 0.05$), highlighting that economic growth tends to support stock market performance.

Other correlations (e.g., between trading activity and GDP growth) were weak and statistically insignificant ($p > 0.05$), suggesting limited direct influence. Overall, the results provide preliminary evidence of strong interrelationships between stock indices and significant linkages with macroeconomic conditions, notably inflation and GDP growth.

DIAGNOSTIC TEST

Normality Test

Table 4.3: Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
resid	55	0.96548	1.751	1.201	0.11492

The null hypothesis (H_0) assumes that the residuals are normally distributed, while the alternative hypothesis (H_1) states that the residuals are not normally distributed. The decision rule is to reject the null hypothesis if the p-value is less than the chosen significance level, typically set at 0.05.

Shapiro–Wilk test: $W = 0.965$, $p = 0.115 > 0.05 \rightarrow$ residuals normally distributed.

The Shapiro–Wilk test was applied to assess the normality of the model residuals. The results ($W = 0.965$, $p = 0.115$) indicate that the null hypothesis of normality cannot be rejected at the 5% significance level. Therefore, the residuals are approximately normally distributed, satisfying the assumption of normality required for valid inference in the model.

Unit Root Tests

Table 4.4: Results of Augmented Dickey-Fuller test for unit root

Variable	Test Statistic	1% CV	5% CV	10% CV	p-value	Stationarity
d_NASI	–3.590	–3.574	–2.927	–2.598	0.0059	Yes (1%)
d_NSE20-Index	–3.392	–3.574	–2.927	–2.598	0.0112	Yes (5%)
d_Trad-Volumes	–3.589	–3.574	–2.927	–2.598	0.0060	Yes (1%)
d_Trad-Values	–2.942	–3.574	–2.927	–2.598	0.0407	Yes (5%)
d_Inflation-Rate	–4.802	–3.574	–2.927	–2.598	0.0001	Yes (1%)
d_GDP-Rate	–6.032	–3.574	–2.927	–2.598	0.0000	Yes (1%)

To test for stationarity, the Augmented Dickey–Fuller (ADF) test was conducted on all series. The null hypothesis of the ADF test is the presence of a unit root (non-stationarity). The results (Table 4.4) show that all variables are stationary after first differencing.

For example, the ADF statistic for differenced NASI was –3.590 ($p = 0.0059$), which is significant at the 1% level, rejecting the null hypothesis of a unit root. Similarly, NSE 20 Index (ADF = –3.392, $p = 0.0112$), Trade Volumes (ADF = –3.589, $p = 0.0060$), and Trade Value (ADF = –2.942, $p = 0.041$) all reject the null at the 5% level. Inflation Rate (ADF = –4.802, $p = 0.0001$) and GDP Growth Rate (ADF = –6.032, $p < 0.001$) are strongly stationary at the 1% level.

Therefore, all variables are integrated of order one, (1), and are appropriate for use in cointegration and causality analysis within the VAR/VECM framework.

Autocorrelation (Serial Correlation)

Table 4.5: Portmanteau test for white noise

Portmanteau test for white noise		
Portmanteau (Q) statistic	=	40.5326
Prob > chi2(27)	=	0.0456

The null hypothesis (H_0) assumes that the residuals are white noise, meaning they exhibit no autocorrelation. In contrast, the alternative hypothesis (H_1) states that the residuals are not white noise and instead display serial correlation.

The Portmanteau (Q) test for the GDP growth rate model indicated a test statistic of 40.53 (df = 27, p = 0.046). At the 5% significance level, this provides marginal evidence of autocorrelation in the residuals, suggesting the model may not fully capture GDP growth dynamics and results should be interpreted with caution.

Heteroskedasticity

Table 4.6: ARCH family regression

Sample: 2010q2 - 2024q4				Number of obs	=	59
Distribution: Gaussian				Wald chi2(.)	=	.
Log likelihood = -112.8671				Prob > chi2	=	.
resid	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
resid						
_cons	-0.354978	0.17877	-1.99	0.047	-0.70536	-0.00459
ARCH						
arch						
L1.	0.1601001	0.244433	0.65	0.512	-0.31898	0.639179
L2.	0.0166712	0.173761	0.1	0.924	-0.32389	0.357236
L3.	-0.0253253	0.125959	-0.2	0.841	-0.2722	0.22155
L4.	1.1326440	0.477013	2.37	0.018	0.197715	2.067573
_cons	0.6993272	0.458807	1.52	0.127	-0.19992	1.598572

To test for heteroskedasticity in the residuals, an ARCH LM test was conducted. The results (Table 4.6) indicate that while the first three ARCH terms were insignificant (p > 0.05), the ARCH(4) term was statistically significant (coefficient = 1.133, p = 0.018). This finding suggests the presence of ARCH effects, implying that the error variance is conditionally heteroskedastic and dependent on past shocks. Consequently, the residuals exhibit volatility clustering, a common feature in macroeconomic and financial time series. Given this result, the study adopted VECH -type models to correct for heteroskedasticity and obtain efficient parameter estimates.

Multicollinearity (for VAR/Multiple Regressors)

Table 4.7: VIF Results

Variable	**VIF**	**1/VIF**
d_NASI	3.07	0.32551
d_NSE20-Index	3.35	0.298474
d_Trad-Volumes	2.19	0.455714
d_Trad-Values	2.32	0.430275
d_Inflation-Rate	1.22	0.821927
Mean VIF	2.43	

Source: *Author's computation using Stata 18*

To assess multicollinearity among the independent variables, Variance Inflation Factors (VIFs) were computed. The results (Table 4.7) show that all VIF values are below the threshold of 5, with the highest being 3.35 (d_NSE20Index). The mean VIF is 2.43, suggesting that multicollinearity is not a serious concern in the estimated model. Therefore, all variables were retained for further analysis. The VIF diagnostics indicate that multicollinearity is within acceptable levels, confirming that the explanatory variables in the VAR model are not excessively correlated.

Multivariate Statistical Analysis

Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC) are widely used metrics for model selection, balancing goodness of fit with model complexity. AIC emphasizes predictive accuracy by penalizing additional parameters moderately, while BIC imposes a stronger penalty, particularly for large sample sizes, favoring simpler models. Lower values of AIC or BIC indicate better-fitting models. In this study, these criteria were applied to compare competing models of GDP growth, ensuring that the selected model achieves an optimal balance between fit and parsimony.

Table 4.8: Models estatistics information criteria output

Model	Obs	Log-likelihood	df	AIC	BIC
Model 1	59	-117.243	9	252.4852	271.183
Model 2	59	-122.715	9	263.4302	282.128
Model 3	42	-92.1168	2	188.2336	191.7089

Several ARIMA specifications were estimated and compared using Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC). Lower AIC and BIC values indicate better model fit and parsimony. Among the three models compared, Model 3, the ARIMA(1,1,1) model with selected exogenous regressors (NASI, NSE20, Trade Volumes, Trade Value, Inflation) achieved the lowest AIC (188.23) and BIC (191.71), substantially outperforming alternative models (AIC > 250; BIC > 271). This indicates that GDP growth dynamics are primarily driven by autoregressive and moving average components, capturing both persistence (AR effect) and short-lived shocks (MA effect), while the included financial and macroeconomic indicators contribute little explanatory power in the short run. The superior performance of this parsimonious model suggests that simpler ARIMA structures are more effective than overfitted models with numerous exogenous regressors, consistent with the weak-form efficiency of the market and the dominance of cyclical GDP patterns.

NSE performance indicators and Economic Growth Nexus in Kenya

This section examines the performance indicators of the Nairobi Securities Exchange (NSE) and their alignment with the broader economic growth nexus in Kenya, highlighting the interconnectedness between capital market dynamics and macroeconomic performance.

Table 4.9: Vector error-correction model

Sample: 2010q2 - 2024q4		Number of obs =	55
		AIC =	50.09829
Log likelihood = -1231.703		HQIC =	52.15889
Det(Sigma_ml) = 1.14e+12		SBIC =	55.42685

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_d_GDPRated	23	1.7606	0.8018	125.3936	0.0000
D_d_NASId	23	8.71304	0.7491	92.55349	0.0000
D_d_NSE20Indexd	23	192.432	0.7076	75.0351	0.0000
D_d_Trad_Volume	23	351.646	0.8512	177.3313	0.0000
D_d_Trad_Valued	23	9.64439	0.8532	180.2134	0.0000
D_d_InflationRate	23	1.37343	0.6633	61.08108	0.0000

Table 4.10: VECM – Long-Run Cointegration (Error-Correction Terms)

Dependent Variable	ECT Significant?	Speed of Adjustment (sign)	Interpretation
GDP Growth	Yes (*ce1, ce3*)	Negative, significant	GDP adjusts strongly to disequilibrium
NASI	Yes (*ce3, ce4*)	Negative, significant	Stock prices respond to long-run shocks
NSE20	Yes (*ce3, ce4*)	Negative, significant	NSE20 reverts to long-run path
Trading Volumes	Yes (*ce3*)	Negative, significant	Trading activity mean-reverts
Trading Values	Yes (*ce2, ce3*)	Negative, significant	Trading value adjusts to equilibrium
Inflation	Weak	Mostly insignificant	Inflation more exogenous

Table 4.11: VECM – Short-Run Dynamics (selected significant coefficients)

Equation (Dependent)	Key Short-run Drivers	Significance
GDP Growth	GDP lags, Inflation (L3 +)	$p < 0.05$
NASI	GDP (L2–L3), NSE20 (L1–L2), Trading Volumes (L1–L3, –)	$p < 0.01$
NSE20	Trading Volumes (L1–L3, –)	$p < 0.01$
Trading Volumes	Cointegration terms	$p < 0.01$
Trading Values	Cointegration terms	$p < 0.01$
Inflation	Own lags (L1–L3)	$p < 0.05$

The Vector Error Correction Model (VECM) output summarized in Table 4.9 to 4.11, based on 55 quarterly observations from the second quarter of 2011 to the fourth quarter of 2024, demonstrates a strong fit and provides significant insights into the relationships between key macroeconomic and market variables. The model's validity is supported by low values for the Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC), which endorse the chosen lag structure and cointegration rank. All six equations within the model (for GDP growth, the Nairobi Securities Exchange All Share Index (NASI), the NSE 20 Share Index (NSE20), trading volumes, trading value, and inflation) are highly significant overall, with p-values less than 0.01. The equations also exhibit strong explanatory power, as indicated by R^2 values ranging from 0.66 for the inflation equation to 0.85 for the trading value and volume equations.

The model identifies four significant cointegrating equations, which confirms the existence of long-run equilibrium relationships between GDP growth, the stock indices, trading activity, and inflation. The error

correction terms are particularly telling. For GDP growth, two of the terms are significant, indicating that GDP growth strongly adjusts to correct any long-term disequilibrium. Similarly, the NASI and NSE20 indices, as well as trading volumes and values, show significant error correction terms, suggesting they are also driven by these long-run equilibria. In contrast, the cointegration terms for inflation are mostly insignificant, which implies that inflation behaves more exogenously and has a weaker long-run adjustment to the other variables in the system.

In the short term, the dynamics reveal intricate interactions. The GDP growth equation is highly autoregressive, with its own past values (lags 1–3) being significant predictors of current growth. Interestingly, a three-quarter lag of inflation positively affects GDP growth. The NASI equation is influenced by two- to three-quarter lags of GDP growth, and its strong link to the NSE20 is evidenced by significant lags of the latter. Higher trading volumes over the previous three quarters have a negative short-run effect on the NASI. For the NSE20 equation, both trading volumes and the cointegration terms are highly significant, pointing to strong negative short-run effects from trading volume and a robust adjustment to long-run equilibrium. The equations for trading volumes and values are primarily driven by strong cointegration effects, with only weak autoregressive terms. Finally, the inflation equation shows significant own-lags, indicating a high degree of persistence. However, most other variables have an insignificant short-run impact on inflation, reinforcing the long-run finding that inflation is relatively independent within this system.

Overall, the VECM results provide evidence of multiple long-run equilibrium relationships between GDP growth, stock indices, and trading activity, with inflation playing a more exogenous role. In the short run, stock market indicators are significantly influenced by past GDP growth and trading activity, while inflation exhibits persistence.

Granger Causality Directions

To further explore the dynamic interactions among economic growth, securities market indicators, and inflation, Granger causality tests were conducted. These tests examine the direction of short-run predictive linkages, indicating whether past values of one variable contain useful information in forecasting changes in another. The results provide insights into the causal flow of influence within the system and help clarify the temporal sequencing of relationships.

Table 4.12: VAR Granger Causality / Wald Test Results

Dependent Variable	Explanatory Variable	χ^2 Statistic	p-value	Decision (5% level)
ΔGDP Growth	ΔNASI	2.14	0.143	Fail to Reject H_0
	ΔNSE20 Index	0.87	0.351	Fail to Reject H_0
	ΔTrading Volumes	2.91	0.088	Marginal
	ΔTrading Values	4.65	0.031	Reject H_0
	ΔInflation	0.22	0.637	Fail to Reject H_0
	All variables (joint)	14.49	0.013	Reject H_0
ΔNASI	ΔGDP Growth	5.61	0.018	Reject H_0
	ΔTrading Volumes	4.23	0.04	Reject H_0
	ΔTrading Values	1.28	0.259	Fail to Reject H_0
	ΔInflation	0.67	0.414	Fail to Reject H_0
	All variables (joint)	19.83	0.001	Reject H_0
ΔNSE20 Index	ΔGDP Growth	0.94	0.331	Fail to Reject H_0
	ΔTrading Volumes	3.35	0.067	Marginal
	ΔTrading Values	0.78	0.378	Fail to Reject H_0
	ΔInflation	0.55	0.459	Fail to Reject H_0
	All variables (joint)	7.42	0.116	Fail to Reject H_0
ΔTrading Values	ΔTrading Volumes	4.43	0.035	Reject H_0
	Others	–	–	Not significant
ΔInflation	All Variables	–	>0.10	Fail to Reject H_0

(Null hypothesis: variable i does not Granger-cause dependent variable)

Table 4.13: Summary of Granger Causality Directions

From \ To	Δ GDP Growth	Δ NASI	Δ NSE20	Δ Trading Volumes	Δ Trading Values	Δ Inflation
ΔGDP Growth	–	→	–	–	–	–
ΔNASI	→	–	–	→	–	–
ΔNSE20	–	–	–	(M)	–	–
ΔVolumes	(M)	→	(M)	–	→	–
ΔValues	→	–	–	–	–	–
ΔInflation	–	–	–	–	–	–

(→ indicates Granger causality at 5% level, ↔ indicates bidirectional, (M) indicates marginal at 10% level)

The Granger causality tests summarized in Table 4.12 and 4.13 reveal important directional linkages among GDP growth, securities market indicators, trading activity, and inflation. For the GDP equation, trading values exert a significant causal effect ($\chi^2 = 4.65$, $p = 0.031$), while the joint test of all predictors is also significant ($\chi^2 = 14.49$, $p = 0.013$), suggesting that securities market variables collectively help explain GDP growth dynamics. Conversely, GDP growth significantly causes NASI ($\chi^2 = 5.61$, $p = 0.018$), alongside trading volumes ($\chi^2 = 4.23$, $p = 0.040$), with the joint test strongly significant ($\chi^2 = 19.83$, $p = 0.001$), indicating bi-directional causality between the real economy and stock market activity. For the NSE20 Index, none of the individual variables are statistically significant at the 5% level, though trading volumes are marginal ($\chi^2 = 3.35$, $p = 0.067$), and the joint test is insignificant, suggesting weaker causal linkages. Trading volumes and trading values exhibit limited causality, except for a significant effect of trading volumes on trading values ($\chi^2 = 4.43$, $p = 0.035$). Inflation, on the other hand, appears largely exogenous, with no significant causal links to or from the other variables. Overall, the results indicate strong two-way causality between GDP growth and NASI, as well as significant interactions between GDP growth and trading values, while other relationships remain weak or absent.

Moderating role of inflation on the relationship between securities market performance and economic growth.

This section explores the moderating role of inflation on the relationship between securities market performance and the economic growth nexus, assessing how price level dynamics influence the strength and direction of market–growth linkages.

Table 4.14: Vector error-correction model (with NASI_Infl as Moderator)

Sample: 2010q2 - 2024q4			Number of obs =		55
			AIC =		58.26717
Log likelihood =-1408.347			HQIC =		61.00522
Det(Sigma_ml) = 4.11e+13			SBIC =		65.34758
Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_d_GDPRated	26	1.80998	0.8101	119.483	0.0000
D_d_NASId	26	8.64311	0.7763	97.14185	0.0000
D_d_NSE20Indexd	26	202.361	0.707	67.56451	0.0000
D_d_Trad_Volume	26	359.765	0.8588	170.3698	0.0000
D_d_Trad_Valued	26	9.77309	0.8634	177.0006	0.0000
D_d_InflationRate	26	1.3385	0.7102	68.62574	0.0000
D_NASI_Infl	26	15.3049	0.8025	113.7794	0.0000

Table 4.15: Long-run Equilibrium (Error-Correction Terms)

Dependent	Significant ECTs	Speed of Adjustment	Interpretation
GDP Growth	ce1, ce3, ce4	Negative, strong	GDP corrects disequilibrium with markets
NASI	ce3	Negative	Stock prices revert to equilibrium
NSE20	ce3	Negative	Index adjusts quickly
Trading Volumes	ce3	Negative	Mean-reverts to equilibrium
Trading Values	ce2, ce3	Negative	Adjusts to long-run path
NASI_Infl	ce2, ce3 (weak)	Weak adjustment	Moderating role
Inflation	None	Weak	More exogenous

Table 4.16: Short-run Dynamics (Selected Effects)

Dependent	Key Drivers	Effect
GDP	Own lags (positive), Inflation L3 (+)	Persistence, delayed inflation
NASI	GDP lags (+), NSE20 lags (+), Trading Volumes (–), NASI_Infl (–)	GDP & NSE20 boost, liquidity dampens
NSE20	Trading Volumes (–)	Liquidity reduces index
NASI_Infl	Own lags (–), NASI L3 (+), Inflation L1 (+)	Moderating role confirmed
Trading Volumes	Cointegration, weak NASI effect	Adjusts to equilibrium
Trading Values	Cointegration, NASI L1 (–)	Corrects, linked to NASI

Table 4.14 to 4.16 presents VECM analysis of 55 quarterly observations from 2011 Q2 to 2024 Q4, the model provides a strong fit for the data. The low values for the Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC) indicate that the model is appropriately parsimonious. The high R^2 values for each equation, ranging from 0.71 for inflation to 0.86 for trading value and volume, confirm that the model explains a substantial amount of the variation in the variables. Furthermore, all equations are jointly significant with a p-value less than 0.001, which validates the model's suitability for capturing both short-term and long-term dynamics among the variables.

In long-run dynamics, the analysis reveals that several variables are tightly linked in the long run through significant error correction terms, indicating a stable, long-run equilibrium. GDP growth shows a strong adjustment to disequilibrium, with its error correction term being highly significant. This suggests that GDP growth is closely tied to financial market variables over the long term. Similarly, both the Nairobi Securities Exchange All Share Index (NASI) and the NSE 20 Index adjust significantly to long-run imbalances, indicating that stock prices react to disequilibrium with GDP and trading activity. Trading volumes and values also show significant adjustments to these long-run equilibria, confirming that trading activity is an integral part of this long-term relationship. While the inflation moderation term (NASI_Infl) shows weak evidence of adjustment, and inflation itself has weak cointegration loadings, this suggests that inflation acts more as a moderating force rather than a primary driver of the long-term equilibrium. Overall, the key takeaway is that GDP, stock indices, and trading activity are fundamentally linked in the long run.

In short-run dynamics, the short-run dynamics of the model show more intricate relationships. The GDP growth equation is highly autoregressive, with its own past values (lags 1–3) significantly influencing current growth, suggesting a strong momentum effect. A three-quarter lag of inflation also has a marginally positive effect on GDP. For the NASI equation, GDP growth from two to three quarters prior has a significant positive impact. The negative effect of trading volumes on NASI (lags 1–3) is a notable finding, suggesting that higher short-term trading activity might reduce index returns, possibly due to an "overtrading effect." The NASI_Infl moderation term also confirms its role, as its first lag has a significant negative effect on NASI, showing that inflation dampens stock market movements. This moderation effect is further supported by the NASI_Infl equation itself, which is both strongly autoregressive and positively influenced by inflation's first lag. The NSE20 equation is also significantly and negatively affected by trading volumes, echoing the "overtrading" effect seen in the NASI. Finally, the trading volumes and values equations primarily adjust to long-run cointegration relationships, with some weak short-run influences from other variables like the NASI.

Overall, The VECM provides evidence of multiple long-run equilibria between GDP growth, stock indices, and trading activity, with inflation behaving as an exogenous factor but significantly moderating short-run relationships.

Discussion of Findings

The study demonstrates strong interconnections between Nairobi Securities Exchange (NSE) performance and Kenya's macroeconomic growth over 2010–2024. The VECM results reveal four long-run equilibrium relationships among GDP growth, stock indices (NASI, NSE 20), and trading activity, confirming that capital market performance and economic growth are mutually reinforcing. This aligns with **Endogenous Growth Theory (EGT),** which posits that well-functioning financial markets enhance capital accumulation, innovation, and productivity, thereby sustaining growth (Romer, 1986; Lucas, 1988; Levine & Zervos, 1998). The significant adjustment of GDP growth, NASI, NSE 20, and trading activity to disequilibrium highlights the feedback loop predicted by EGT, where economic expansion and market development strengthen one another (Greenwood & Jovanovic, 1990).

Inflation, however, shows weak long-run adjustment but exerts a significant short-run moderating effect on stock–growth relationships. This observation supports the **Adaptive Market Hypothesis (AMH),** which emphasizes context- and time-dependent market efficiency shaped by policy changes, macro shocks, and liquidity dynamics (Lo, 2004, 2005; Omondi & Muturi, 2022). Specifically, the negative short-run impact of trading volumes on stock indices reflects liquidity shocks, while the NASI–inflation interaction underscores inflation's role in moderating short-term market responses.

Comparisons with prior literature indicate consistency with Kenyan studies reporting strong positive links between market capitalization, liquidity, and GDP growth (Ikikii & Nzomoi, 2013; Kanyatta & Kagiri, 2015; Musyoka W. M., et al., 2018). The results also mirror global evidence that robust capital markets foster economic activity, although mixed findings from other African economies, such as Nigeria, emphasize the importance of institutional quality and macroeconomic stability (Fapetu et al., 2022; Osamwonyi & Osaseri, 2019).

Contextual factors—such as the 2013 devolution, post-COVID recovery, and monetary policy adjustments (CBK, 2025)—played a pivotal role in shaping these dynamics. Structural reforms, technological adoption in trading, and enhanced market depth likely improved the NSE's responsiveness to macroeconomic conditions, explaining the observed short- and long-run linkages.

Practical Implications

Based on the analysis, there are several key practical implications. From a policy perspective, it's crucial to take measures that will deepen market liquidity and strengthen institutional frameworks. By maintaining macroeconomic stability, authorities can reinforce the Nairobi Securities Exchange's (NSE) role as a key catalyst of economic growth. Furthermore, given its significant impact on short-term market behavior, inflation needs to be carefully monitored and managed. For investors, a clear understanding of the dynamic relationship between GDP growth, trading activity, and stock indices is essential. This knowledge can serve as a valuable guide for making informed decisions on portfolio allocation and risk management, particularly during periods of market volatility. Overall, the findings confirm that the NSE serves both as a barometer and driver of Kenya's economic resilience, highlighting the importance of integrated financial and economic policies.

Conclusion

The study confirms a strong long- and short-run relationship between Nairobi Securities Exchange (NSE) performance and Kenya's macroeconomic growth over 2010–2024. Stock indices (NASI, NSE 20) and trading activity exhibit significant adjustment toward long-run equilibrium with GDP growth, highlighting the NSE's dual role as a driver and barometer of economic performance. Inflation, while largely exogenous in the long run, moderates short-term market responses, reflecting the dynamic and context-dependent nature of market efficiency as proposed by the Adaptive Market Hypothesis. Overall, these findings underscore that well-developed, liquid, and regulated capital markets, complemented by sound macroeconomic policies and institutional reforms, can meaningfully support sustainable economic growth in Kenya.

Limitations

The study has some limitations, primarily related to data, scope, and methodology. Firstly, it relies exclusively on publicly available data from the Nairobi Securities Exchange (NSE) and official macroeconomic sources. This approach may not fully represent the market, as it overlooks informal trading activities and the performance of unlisted companies. Secondly, the analysis is limited to aggregate indices and macroeconomic variables, which means it doesn't account for the unique performance of individual firms or specific industry sectors. Consequently, the findings might not capture the heterogeneity and sector-specific dynamics that exist within the market. Methodologically, the use of Vector Error Correction Model (VECM) analysis assumes a linear relationship between variables. This assumption might not accurately reflect the complex and often nonlinear interactions that are characteristic of financial markets.

Areas for Further Study

Based on the aforesaid limitations, several promising avenues for future research emerge. A more granular sectoral analysis could investigate the stock-growth nexus across specific industries or even individual firms to better capture the heterogeneity in capital allocation efficiency. To address methodological constraints, future studies could apply nonlinear or high-frequency econometric models, which would provide a more nuanced understanding of short-term dynamics and market anomalies. Finally, given the increasing interconnectedness of financial systems, it is crucial to assess how foreign investment flows and global shocks affect the NSE's performance and its subsequent role in driving economic growth.

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