Moderating Role of Savings on The Relationship Between Interest Rates and the Stock Market Performance. A Case of Nairobi Securities Exchange

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Abstract

Nairobi Securities exchange (NSE) is playing a vital role in the growth of Kenya's economy by encouraging savings and investment, as well as helping local and international companies' access cost-effective capital. NSE operates under the jurisdiction of the Capital Markets Authority of Kenya. This study sought to examine the Moderating role of Savings on the Relationship between Interest rates and the Stock market Performance a case of Nairobi securities exchange. Data was analyzed using Descriptive statistics; Mean median standard deviation, skewness and kurtosis while inferential statistics used were multiple regression analysis and Pearson correlation. The study was informed by Capital Asset Pricing Model. The philosophical foundation underpinning the study was positivism and an explanatory research design. In addition, panel regression analysis was engaged to establish the nature as well as significance of the association between Interest rates and Stock market performance. The outcome displayed that Interest rates had a negative influence on Stock market performance. The study findings are in contrast with the assertion that high savings increase value with interest rates (β= -.203, ρ<.05) to Stock Market Performance. Later the process was repeated with the moderating variable results showing that savings has a negative and significant moderating influence on the association between Interest rates and Stock Market Performance ($R2\Delta$=0.05 β= -0.08; ρ<0.05). The study found that the Savings had a buffering moderation influence on Interest rates and Stock Market Performance. Finally, the researcher recommends a further study focusing on firms listed in NSE to ascertain whether the study results hold.

Keywords: Interest Rates, Savings and Stock Market Performance

INTRODUCTION

Stock market is a financial market where publicly traded companies' stocks are bought and sold. It is a place where investors can buy and sell securities, such as stocks, bonds, and other securities (Alshubiri, 2021). The stock market plays a crucial role in the economy, as it allows companies to raise capital by selling shares of stock to investors, and it allows investors to buy and sell those shares (Heijdra et al., 2019). It is often seen as a barometer of a country's economic health, as the performance of the stock market can be influenced by a variety of factors, including the overall health of the economy, the performance of individual companies, and market sentiment (Bustos & Pomares-Quimbaya, 2020). Stock Market Performance is the indicator of the stock market as a whole or of a specific stock. It gives signal to the investors about their future moves (Cappa et al., 2022). The movement in the price of a stock and the indexes gives the idea of the near future trend of the stock, sector or the economy as a whole. As financial domain is the most important one of an economy, so the stock market performance works as an indicator of the overall health of the economy (Takyi & Bentum-Ennin, 2021). Stock markets in the United States begun in Philadelphia in

1790 when the Buttonwood Agreement was signed under a buttonwood tree, which marked the beginning of New York's Wall Street in 1792 (Xu et al., 2019). The agreement was signed by 24 traders and was the first American organization of its kind to trade in securities. The traders renamed their venture the New York Stock and Exchange Board in 1817 (Heckman, 2017).

In London, the Stock Exchange market begun in a coffeehouse, where traders met to exchange shares, in 1773(Apergis & Voliotis, 2015). The United Kingdom is home to some of the oldest and most developed financial markets in the world, with London generally being considered one of the three 'command centers' of the global economy (along with New York City and Tokyo) (Lee & Lee, 2023). While the UK is the sixth largest economy in the world in terms of nominal GDP, it is ranked third in terms of the share of global equity markets by country (behind the U.S. and Japan) (Procasky & Yin, 2023). The country also houses the world's largest foreign exchange (forex) market, and is the biggest derivatives market for off-exchange derivatives (Apergis & Voliotis, 2015).

The Nairobi Securities Exchange (NSE) limited was constituted in 1954 as a voluntary association of stockbrokers registered under the Societies Act (Ngugi and Njiru, 2005), although it was initiated much earlier, in the 1920sSince then, NSE has seen tremendous development in structure, depth, breadth and regulation to be the third biggest exchange in Africa by 2014 in terms of volume, behind Johannesburg and Nigerian stock exchanges. Despite its recent growth, the NSE is still considered as of the emerging markets of the world, characterized by low trading volume, few listed companies, low turnover ratios, and inefficient information delivery (Kimani et al., 2021). The performance of the NSE largely reflects the economic, policy, institutional and political environment at the time (Isaac, 2022). The Nairobi Securities Exchange or NSE houses both local and international investors looking to gain exposure to Kenya and Africa's economic growth. The NSE demutualized and self-listed in 2014 which meant that shares of the NSE can be tradable on the stock exchange itself. This made it possible to separate ownership from management of the NSE while keeping along with the global trends (Mukumbi et al., 2020). The NSE currently has four indices used to measure the performance of stocks. One of the indices is known as the NSE All Share Index or NASI which is a weighted index of all the listed companies on the exchange (Kimani et al., 2021).

The falling turnover on the NSE and the drop by the NSE-20 Share index to a low of 1,681.8 last week is largely a result of massive sell-off by foreign investors who are fleeing frontier and emerging markets in search of safer havens following a rise in interest rate in the US and news that Sri Lanka has defaulted on its debt obligations for the first time in its history-East African(Onsongo et al., 2020).The Nairobi Securities Exchange (NSE) has shed about Sh10 billion in the first week of trading in 2023, continuing the woes of massive net selling by foreign investors that gripped the bourse for months in the previous year. Presently, NSE's market capitalization closed at Sh1.976 trillion compared to the Sh1.986 trillion value it had in the last week of December 2022, representing a 0.49 per cent depreciation (Isaac, 2022).

The problem of stock market performance falling day by day at the NSE will make the achievement of Kenya's Vision 2030 Impossible (Erondu et al., 2021). Despite the fact the country has laid down macroeconomic frameworks that aim at regulating the monetary policies in order to create an enabling environment to achieving the country's Vision, Inflation climbed to 6.1% in 2021 from 5.3% in 2020, reflecting increased input costs. It is evident that the preferred rates of Inflation at 5% or below and GDP

growth rate Accelerating at 10% annually are yet to be attained that will subsequently contribute to positive stock market performance in Kenya thus achieving the country's set vision 2030 (Mustafa et al., 2018).

THEORETICAL REVIEW

The study was grounded by the Capital Asset Pricing Model. The CAPM theory provides insights into the relationship between risk and expected returns, suggesting that investors require higher returns for assuming higher levels of risk. The CAPM is a widely used model in finance that calculates the expected return of an asset by considering its risk and the expected return of the overall market. It posits that investors demand higher returns for riskier assets and lower returns for less risky assets. While the CAPM is useful for assessing the expected return of an asset and comparing it to other investments, it has limitations such as assuming rational investors with the same level of risk aversion (Choudhary et al., 2022). Studies have examined the impact of inflation and interest rates on stock returns using the CAPM, finding positive associations between inflation and stock returns and negative associations between interest rates and stock returns, particularly for firms with higher betas (Belyaeva., et al, 2018; Hans, 2018; Cepel et al., 2019; Belas et al., 2020).

Conceptual Framework

This is a device that organizes empirical observations in a meaningful Structure (Gupta., et al, 2011). Childs (2010) argued a conceptual framework to be a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation. It's the researcher's explanation of how the research problem would be explored. The framework defines the connection between the main concepts of a study.

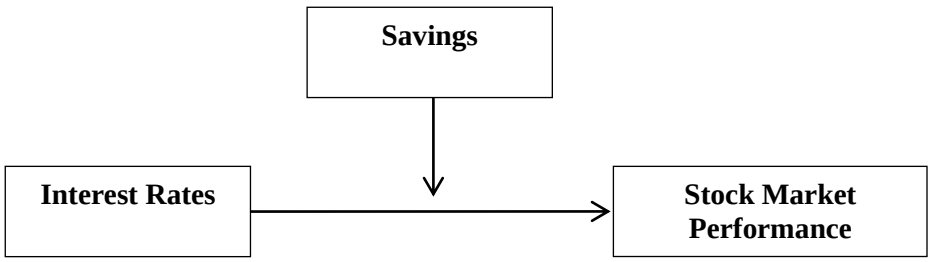

Figure 1: Conceptual framework

Hypotheses

The study hypothesized that:

Ho_1 There is no significant association between Interest Rates and the Stock Market performance of Nairobi securities exchange.

Ho_2 Savings does not moderate the association between Interest rates and Stock Market performance of Nairobi Securities Exchange.

METHODOLOGY

The philosophical foundation underpinning the study was positivism and explanatory research design. In this study, the target population was the Nairobi Securities Exchange (NSE). The data for stock market performance was collected from NSE website and published reports. Information on the Interest rates and savings was

sourced from the Kenya National Bureau of Statistics and the Central Bank of Kenya who provide authoritative data on economic indicators, making them appropriate sources for the study. This study used a positivism research philosophy. Positivists argue that there exist cause-effect association in nature between phenomena, which are predictable with certainty (Paredes., et al, 2022).

Regression models

For direct effect variables

$$SMP = \beta_0 + \beta_1 INT + \varepsilon \quad \ldots 1$$

Moderation model for the indirect effect

$$SMP = \beta_0 + C + \beta_1 INT + \beta_2 SAV + \varepsilon \quad \ldots 2$$

Where;

β_o is the Constant; *SMP* is Stock Market Performance (DV); *INT* is Interest Rates(IV); *SAV* is the Savings (moderator variable) and ε is the error term.

RESULTS

In order to ascertain the nature of the data used in the study, descriptive statistics were determined. The mean in this study was used to describe the typical or average value of a data-set, the Skewness was used to understand the shape of a data-set, while the standard deviation was used to understand the variability of a dataset (Mishra et al., 2019; Witte 2017). The results of the descriptive statistics are presented in table below.

Table 1: Descriptive Statistics Results

Variables	Observation	Mean	Maximum	Minimum	Skewness	Standard Deviation
Savings	22	8.700	26.240	1.960	1.966	5.024
Interest Rates	22	7.500	17.810	-10.096	-0.840	7.098
Stock Market performance	22	26.623	44.100	8.054	-0.198	9.341

Source: Research Data 2023

The mean Savings rate was 8.7%, with a minimum of 1.96% and a maximum of 26.24%. The skewness value of 1.97 indicates that the distribution is highly positively skewed, suggesting that there may be some extreme values in the data. The standard deviation of 5.02 indicates that there was some variability in the inflation rate data. Consequently, the mean interest rate was 7.50%, with a minimum of -10.10% and a maximum of 17.81%. The skewness value of -0.84 indicates that the distribution is slightly negatively skewed. The standard deviation of 7.10 indicates that there is a wide range of interest rates in the sample. Finally, on Market capitalization, the mean market capitalization was 26.59 billion Kes, with a minimum of 8.05 billion Kes and a maximum of 44.06 billion Kes. The skewness value of -0.20 indicates that the distribution is slightly negatively skewed. The standard deviation of 9.34 billion Kes indicates that there was some variability in the market capitalization data. The descriptive statistics provide a snapshot of the key characteristics of the data in the sample, allowing for comparisons and identification of patterns and trends. The results suggest that the data for some variables may be skewed, and there is variability in the data for all variables.

Correlation Analysis

The findings in the Table below showed that Interest Rates had a positive and significantly association with Stock Market performance (r=0.691, p<0.05) and Savings was positive and significantly correlated with Stock market performance (r=0.052, p<0.05). This indicates presence of linearity in the data which give a foundation for regression model.

Table 2: Correlation Results

	SMP	INT	SAV
SMP	1		
INT	0.691**	1	
SAV	0.052**	0.061**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Where

SMP = Stock Market Performance (DV);
INT = Interest Rates (IV);
SAV = the Savings (moderator variable)

Hypothesis Testing

The regression tested both the dependent and the independent variables (direct effect) were done. The hypotheses tested the effect of interest rates on stock market performance of Nairobi securities exchange. This was in line with the specific objectives of the study. The findings regarding this were presented in Table below.

Table 3: Coefficients of Estimate

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	0.618	0.131		4.718	0.000		
Predictors							
INT	0.109	0.035	0.121	3.170	0.002	0.443	2.259
Summary statistics							
R	0.847a						
R Square	0.718						
Adjusted R Square	0.714						
Std. Error of the Estimate	0.30753						
Durbin-Watson	1.95						
ANOVA (F stat)	157.898						
ANOVA (F prob)	0.000						

a Dependent Variable: Stock Market Performance

The coefficient of determination explains the extent of the variation change of predictor variable (Independent variable) against the dependent variable Stock Market Performance). The results in the table above showed that all the predictors explain 71.8% of the variation on Stock Market Performance, where (R-squared = 0.718,

Adjusted R-squared = 0.714). The findings also indicated that the coefficient of determination was significant as shown by F = 157.898 ($p < 0.05$).

Ho₁ *There is no significant association between Interest Rates and the Stock Market performance of Nairobi securities exchange.*

From the findings in Table above, the null hypothesis is rejected. The findings reveal that Interest Rates has a positive and significant effect on stock market performance, β=0.121, $p = 0.02$, where (p-value = 0.000 which is less than α = 0.05), indicating that each unit increase in Interest rates, Stock Market Performance increases by 0.121 units. The results are in line with Carlson et al, (2010) who posited that Interest Rates increases the overall ability of the value chain to respond to threats and contingencies thereby saving on costs and contributing to superior firm performance.

Ho₂ *Savings does not moderate the association between Interest rates and Stock Market performance of Nairobi Securities Exchange.*

The outcomes indicated beta values for Interest Rates against stock market performance (β = -0.1652, ρ<0.00) when moderated with savings. This implies that stock market performance was significantly associated with Interest rates, and this relationship was enhanced by the savings

Table 4: Moderating effect of Savings on Interest Rates and Stock Market Performance

Predictors	Model 1 (INT) a1		Model 2 (SMP) b1C'		Model 3 (SAV)a1		Model 4 (SMP)b1C'	
	β	PV	β	PV	β	PV	β	PV
INT	.1854	(.000)	.1226	(.000)	-	-	-	-
SAV	.2447	(.000)	.1663	(.000)	.2218	.000	.1699	(.000)
INT×SAV	-.2483	(.000)	-.1652	(.000)	-	-	-	-
R2	.6919		.6910		.7289		.7099	
F	195.8588	(.000)	162.1032	(.000)	234.4525	.000	177.4194	.000

Level of confidence intervals in output: 95.0000
Number of bootstrap samples for percentile bootstrap confidence intervals:5000

CONCLUSION AND RECOMMENDATION

Overall, this study contributes to the understanding of the relationship between interest rates and stock market performance at the NSE in Kenya. The findings align with previous research conducted in similar contexts and emphasize the significance of macroeconomic factors in shaping stock market performance. It is important to note that these results are specific to the Nairobi Securities Exchange and may not be directly applicable to other stock markets. Changes in interest rates can have a substantial impact on stock market performance. Lower interest rates tend to stimulate stock market activities and encourage investment, while higher interest rates may dampen investor enthusiasm. Recommendation is for the Central Bank of Kenya and the Capital Market Authority to Develop appropriate monetary policies to ensure a balanced interest rate environment that supports investment and economic growth. Maintaining interest rate stability is crucial for sustaining investor confidence and promoting stock market performance.

Consequently, further research can be done on nonlinear relationships, examining potential nonlinear relationships between macroeconomic variables and stock market performance could enhance our understanding of their impact. Nonlinear econometric techniques, such as threshold regression models or quartile regression, could be used to

investigate if the effects of macroeconomic variables on stock market performance. Overall, the study suggests that policymakers should pay attention to the interplay between macroeconomic variables and stock market performance. By implementing appropriate policies and measures to manage exchange rates, inflation rates, economic growth, and interest rates, policymakers can create a stable and conducive environment for the Nairobi Securities Exchange and foster sustained stock market growth.

REFERENCES

Alshubiri, F. N. (2021). Analysis of financial sustainability indicators of higher education institutions on foreign direct investment: Empirical evidence in OECD countries. *International Journal of Sustainability in Higher Education*, *22*(1), 77-99.

Apergis, N., & Voliotis, D. (2015). Spillover effects between lit and dark stock markets: Evidence from a panel of London Stock Exchange transactions. *International Review of Financial Analysis*, *41*, 101-106.

Belás, J., Belás, Ľ., Čepel, M., & Rozsa, Z. (2019). The impact of the public sector on the quality of the business environment in the SME segment. *Administratie si Management Public*.

Belyaeva, L. A., van Deursen, P. M., Barbetsea, K. I., & Schneider, G. F. (2018). Hydrophilicity of graphene in water through transparency to polar and dispersive interactions. *Advanced materials*, *30*(6), 1703274.

Bustos, O., & Pomares-Quimbaya, A. (2020). Stock market movement forecast: A systematic review. *Expert Systems with Applications*, *156*, 113464.

Cappa, F., Franco, S., & Rosso, F. (2022). Citizens and cities: Leveraging citizen science and big data for sustainable urban development. *Business Strategy and the Environment*, *31*(2), 648-667.

Carlson, A., Kim-Lee, H. J., Wu, J., Elvikis, P., Cheng, H., Kovalsky, A., ... & Rogers, J. A. (2011). Shear-enhanced adhesiveless transfer printing for use in deterministic materials assembly. *Applied Physics Letters*, *98*(26), 264104.

Cepel, M. (2019). Social and cultural factors and their impact on the quality of business environment in the SME segment.

Chaudhary, V., Kaushik, A., Furukawa, H., & Khosla, A. (2022). Towards 5th generation ai and iot driven sustainable intelligent sensors based on 2d mxenes and borophene. *ECS Sensors Plus*, *1*(1), 013601.

Childs, D. Z., Metcalf, C. J. E., & Rees, M. (2010). Evolutionary bet-hedging in the real world: empirical evidence and challenges revealed by plants. *Proceedings of the Royal Society B: Biological Sciences*, *277*(1697), 3055-3064.

Erondu, N. A., Aniebo, I., Kyobutungi, C., Midega, J., Okiro, E., & Okumu, F. (2021). Open letter to international funders of science and development in Africa. *Nature Medicine*, *27*(5), 742-744.

García, J. L., Heckman, J. J., Leaf, D. E., & Prados, M. J. (2017). *The life-cycle benefits of an influential early childhood program* (No. w22993). National Bureau of Economic Research.

Gupta, P. B., Fillmore, C. M., Jiang, G., Shapira, S. D., Tao, K., Kuperwasser, C., & Lander, E. S. (2011). Stochastic state transitions give rise to phenotypic equilibrium in populations of cancer cells. *Cell*, *146*(4), 633-644.

Heijdra, B. J., Jiang, Y., & Mierau, J. O. (2019). The macroeconomic effects of longevity risk under private and public insurance and asymmetric information. *De Economist*, *167*, 177-213.

Kimani, M. M., Lanzarotta, A., & Batson, J. S. (2021). Trace level detection of select opioids (fentanyl, hydrocodone, oxycodone, and tramadol) in suspect pharmaceutical tablets using surface-enhanced Raman scattering (SERS) with handheld devices. *Journal of Forensic Sciences*, *66*(2), 491-504.

Lee, S., Lee, J., Zhai, H., Tong, Y., Dalzell, A. M., Kumar, A., ... & Chan, G. K. L. (2023). Evaluating the evidence for exponential quantum advantage in ground-state quantum chemistry. *Nature Communications*, *14*(1), 1952.

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, *22*(1), 67.

Mukumbi, M. C., Eugine, K. W., & Jinghong, S. (2020). Effect of capital structure on the financial performance of non-financial firms quoted at the Nairobi Securities Exchange. *International Journal of Science and Business*, *4*(4), 165-179.

Mustafa, H. K., & Yaakub, S. (2018). Innovation and technology adoption challenges: impact on SMEs' company performance. *International Journal of Accounting*, *3*(15), 57-65.

Newton, I. (2022). *Sir Isaac Newton's mathematical principles of natural philosophy and his system of the world*. Univ of California Press.

Ngugi, R., & Njiru, R. (2005). *Growth of the Nairobi stock exchange primary market* (No. 47). Private Sector Development Division, Kenya Institute for Public Policy Research and Analysis.

Onsongo, S. K., Muathe, S. M., & Mwangi, L. W. (2020). Financial risk and financial performance: evidence and insights from commercial and services listed companies in Nairobi securities exchange, Kenya. *International Journal of Financial Studies*, *8*(3), 51.

Paredes, M. I., Lunn, S. M., Famulare, M., Frisbie, L. A., Painter, I., Burstein, R., ... & Oltean, H. N. (2022). Associations between SARS-CoV-2 variants and risk of COVID-19 hospitalization among confirmed cases in Washington State: a retrospective cohort study. *Medrxiv*.

Procasky, W. J., & Yin, A. (2023). Identifying the true nature of price discovery and cross-market informational flow in the investment grade CDS and equity markets. *The North American Journal of Economics and Finance*, *64*, 101877.

Shang, J., Liu, L., Ren, X., Gu, X., Ren, T., & Han, J. (2018). Learning named entity tagger using domain-specific dictionary. *arXiv preprint arXiv:1809.03599*.

Takyi, P. O., & Bentum-Ennin, I. (2021). The impact of COVID-19 on stock market performance in Africa: A Bayesian structural time series approach. *Journal of Economics and Business*, *115*, 105968.

Witte, R. S., & Witte, J. S. (2017). *Statistics*. John Wiley & Sons.

Xu, C., Anusuyadevi, P. R., Aymonier, C., Luque, R., & Marre, S. (2019). Nanostructured materials for photocatalysis. *Chemical Society Reviews*, *48*(14), 3868-3902.