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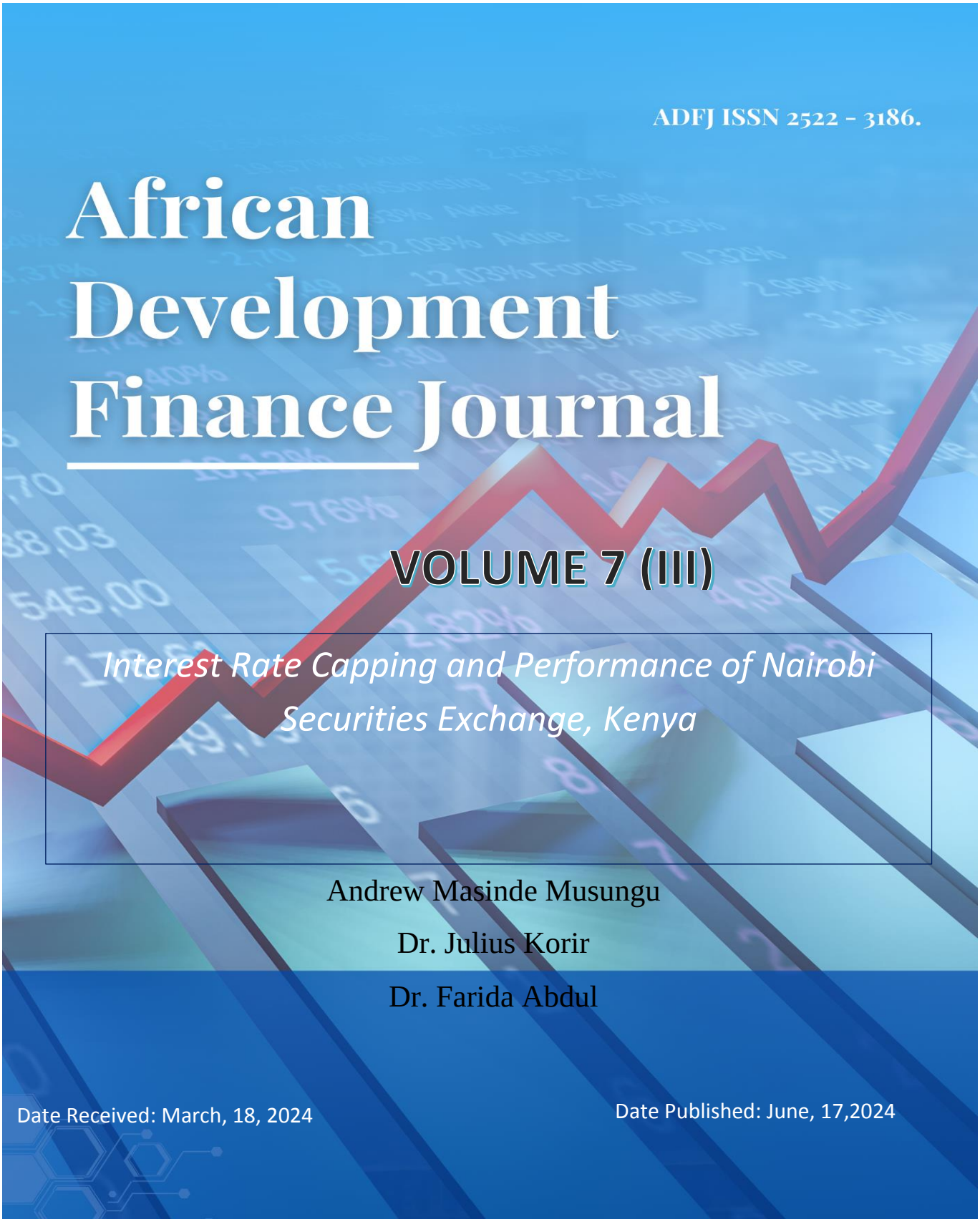

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Interest Rate Capping and Performance of Nairobi Securities Exchange, Kenya

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Abstract

This studied the effect of interest rate capping on the performance of Nairobi Securities Exchange in Kenya after the adoption of the Banking Amendment Act (2016) following the Banking Amendment Act (2016). The new law imposed regulations lending rates on interest rates charged by commercial banks and interest rates applied on savings rate applicable on customer savings in commercial banks. The effect of lending rates, Treasury bills rates and savings rate on performance of Nairobi Securities Exchange in Kenya were the specific objectives of the study. The moderating effect of the volume of credit on the relationship between interest rate capping and the performance of Nairobi Securities Exchange in Kenya was also considered. Classical Theory of Interest Rates, Fisher's Theory, the Arbitrage Pricing Theory and the Efficient Market Hypothesis were used in the study. Positivism philosophical views and explanatory design were employed. All the 20 firms which yield the Nairobi Securities Exchange (NSE) 20 Share Index constituted the target population. The census sample design approach was used to collect the secondary data. The study performed diagnostic tests, including the test for autocorrelation, homoscedasticity, multicollinearity, normality, model specification and model stability. Tests for time series properties, stationarity and cointegration were conducted. Furthermore, model specification and model stability checks were also performed, after which data was analyzed by use of Autoregressive Distributed Lag Model to find out the long run relationship and Autoregressive Distributed Lag Error Correction Model to establish the short term relationship. From the results, it was evident that interest rate capping affects performance of Nairobi Securities Exchange in several ways. It was generally concluded that interest rate capping affects performance of Nairobi Securities Exchange in Kenya. It was concluded that interest rate capping has an effect on the performance of Nairobi Securities Exchange in the long run. Lending rates had no effect on the performance of Nairobi Securities Exchange in the long run. Conversely, lending rate had a negative impact on the performance of Nairobi Exchange in the short run. It was, however, observed that Treasury bill rates did not affect the performance of Nairobi Securities Exchange in the long run. However, there existed a negative relationship between Treasury bill rates and the performance of Nairobi Securities Exchange in the short run. Availed by banks be an inverse moderator of the relationship in the long run. However, volume of credit creates a positive moderating relationship between interest rate capping and the performance of Nairobi Securities Exchange. In conclusion, it's recommended that Central Bank of Kenya should refrain from reducing lending rates since it results into a decrease in prices of stocks, thus locking away prospective investors and curtailing economic growth.

Keywords: *Credit Access, Interest rate Capping, Securities Market*

Introduction

The Kenyan National Assembly passed the Banking Amendment Act in 2016 to control bank lending and saving rates, aiming to reduce the wide interest rate spread in the banking sector. Previously, banks charged

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high interest rates on loans while offering minimal returns on savings, resulting in a significant interest spread that affected company net income and the performance of securities at the Nairobi Securities Exchange (NSE). This regulation aimed to balance the lending rates and savings interest to stabilize the financial market and improve investor confidence (Obura & Anyango, 2016; Mogire, 2016).

Following the implementation of interest rate capping, the NSE experienced significant fluctuations. Between January 2016 and January 2017, the NSE Share Index dropped by nearly 31%, and market capitalization decreased by 13.8%, despite stable equity trading volumes. The yield on the 5-year Eurobond also decreased during this period (Obura & Anyango, 2016). Historical efforts to control credit spread, such as the Central Bank of Kenya (Amendment) Act of 2001 and the Public Finance Bill of 2012, were largely unsuccessful, highlighting the complexities and challenges in regulating interest rates and their impact on financial markets (Mogire, 2016).

Other countries have also experimented with interest rate capping, with mixed results. El Salvador and the Kyrgyz Republic saw reductions in lending rates and positive stock market performance following the introduction of interest rate controls. Conversely, South Africa experienced limited loan accessibility and uneven growth of small and medium enterprises due to interest rate capping. These global examples illustrate the diverse impacts of interest rate regulations on credit access, market performance, and economic development, reflecting the intricate relationship between monetary policy and financial markets (Chirambo, 2017; Odalo, 2016; Lidiema, 2017).

Research Problem

The objective of interest rate capping was to control interest rate spread, make credit cheaper, accessible and improve the performance of Nairobi Securities Exchange. Foreseeably investors would be capable of accumulate capital, invest in securities and make the securities market more vibrant. These notwithstanding, evidence shows that interest rate capping affects market returns positively or negatively (Rono, 2016).

Studies by Thorbecke (1997) and Smal and de Jager (2001) in US, confirm that a decrease in lending rates contributes to higher access to credit, which as a result, in the long run prompts a provision of liquidity into the economy and the securities market. Muthama (2015) examined how controls of interest rates impacts financial markets and observed bank interest rate movements are useful in forecasting securities returns.

Širucek (2013) sought to find out the relationship between regulation of interest rate and securities prices at S&P500 between 2009 and 2012. An existence of a positive relationship between stock returns and interest rate capping was established.

Nonetheless, other researchers established that interest rate changes may not be sufficient to cause security market indices misalignments. Schmeling and Schrimpf (2008) examined how control of lending rates affects credit access, savings and the performance of securities market in Germany. The study confirmed that a mere lending rates control does not essentially lead to a wider access to credit and improved performance of securities market since banks may view the controlled rates as being insufficient to reward for the credit risk. Correspondingly, they concluded that higher returns on savings result in to marginal savings since savings is principally a function of disposable income. Ko & Morita (2012) examined the connection between securities market performance and interest rate controls in Japan. Study results indicate that market share index is inversely related with interest rates controls.

Studies from a number of exchange markets show that interest rate capping results into access to credit, more savings, ultimately building a capital pool for businesses, and consequently, impacting securities markets directly (Muthama, 2015; Smal&Jager, 2009; Thorbecke, 1997; Širucek, 2013). On the other hand, other studies show that interest rate regulation causes unavailability of credit to borrowers, thus, denying investors capital, subsequently, affecting stock returns negatively (Ko and Morita 2012; Samuel & Abdul, 2017; Schmeling and Schrimpf, 2008). This study is therefore seeking to examine how interest rate capping in Kenya affects performance of Nairobi Securities Exchange. The study will be examining movements in market indices over a period of 52 months by use of monthly data.

Research Objectives

The main objective of the study was to investigate the effect of interest rate capping on the performance of Nairobi Securities Exchange, Kenya. Specifically, the study seeks to:

i. Determine the effect of lending rates on performance of Nairobi Securities Exchange, Kenya.
ii. Establish the effect of Treasury bills rates on performance of Nairobi Securities Exchange, Kenya.
iii. Determine the effect of savings rate on performance of Nairobi Securities Exchange, Kenya.
iv. Establish the moderating effect of volume of credit on the relationship between interest rate capping and performance of Nairobi Securities Exchange, Kenya.

Literature Review

This section reviews the theories and models relevant to the study, discussing empirical research on the impact of interest rate capping on securities exchange markets worldwide. It concludes with a conceptual framework illustrating the relationships between the independent variables and the performance of the Nairobi Securities Exchange (NSE).

Theoretical Framework

The study considers several theories to understand the impact of interest rate capping on the performance of the Nairobi Securities Exchange (NSE). The Classical Theory of Interest Rates, proposed by Marshall and Fisher in 1930, posits that interest rates are determined by the supply and demand for savings, which are used for business investments. The equilibrium is reached when savings supply matches borrowing demand. Changes in interest rates affect bank savings and investments, subsequently influencing the prices and demand for securities. However, this theory has been challenged by economists who argue that other factors like wealth levels and macroeconomic variables also influence savings.

The Fisher Effect Theory, popularized by Fisher in 1930, asserts that nominal interest rates include all necessary information about future inflation, comprising the real return rate and expected inflation rate. This theory suggests that nominal returns on investments move with expected inflation, but inflation does not impact real returns. The Fisher Effect implies a negative relationship between securities market performance and unexpected interest rate changes. Therefore, a decrease in interest rates leads to higher business profitability, real returns on securities, and improved market performance. This theory is relevant to the study as it links real returns from securities to real interest rates while acknowledging the influence of inflation.

The Efficient Market Hypothesis (EMH), introduced by Fama in 1970, argues that stock prices reflect all available information, making it difficult for investors to achieve excess returns. EMH categorizes market efficiency into weak, semi-strong, and strong forms, each relying on different levels of information availability. Stock prices react to changes in macroeconomic factors such as interest rates, inflation, and exchange rates. The theory suggests that market prices adjust quickly to new information, impacting securities market indices. The Arbitrage Pricing Theory (APT), advanced by Steve Ross in 1976, further supports this by modeling expected returns based on macroeconomic variables. This theory helps investors

understand how changes in lending rates, savings rates, Treasury bill rates, and credit access influence securities prices and market indices, emphasizing the responsiveness of these factors to changes in central bank rates.

Empirical Review

Lending Rate and Securities Market Performance

Campbell (1987) Analyzed excess securities returns in the USA from 1979-1983 using VAR models. Found that securities market indices negatively respond to lending rates, while bond yields respond with a lag. Higher lending rates decrease market efficiency and capitalization. Kunt (1996) examined the impact of lending rates and GDP growth rates on stock markets in Zimbabwe, Thailand, and the UK over ten years. Concluded that lower lending rates correlate with higher stock exchange indices and market performance, particularly in advanced countries.

Omotor (2011) Studied stock markets in Nigeria and South Africa from 2004-2010. Found lending rates had an insignificant effect on market performance, with political and economic turbulence causing stock index declines. Maimbo (2015) Investigated the impact of various economic factors on Zambia's stock market from 2013-2015 using a structural VAR model. Found anticipated inflation rates significantly impact stock prices and real interest rates. Olweny and Omondi (2011) Analyzed the effect of macroeconomic variables on stock returns and bond yields at the NSE from 2001-2010 using EGARCH. Concluded that long-term interest rates significantly affect stock market indices.

Treasury Bills Rate and Securities Market Performance

Kyereboah-Coleman and Biekpe (2006) Explored how the cost of funds influences investment decisions at the NSE from 1999-2003. Concluded that company size affects investment choices between Treasury bills and stocks, with Treasury bill rates having a weak effect on securities returns but a strong impact on bank lending rates. Kuwornu and Owusu-Nantwi (2011) investigated the link between stock market returns and macroeconomic variables in Thailand over eight years using OLS. Found a strong link between securities returns and the consumer price index, with weak impacts from Treasury bill rates, exchange rates, and crude oil prices.

Momani and Alsharari (2012) Examined the effect of Treasury bill rates on stock indices at the Amman Stock Exchange from 1992-2010 using the Variance Components Model. Found a significant inverse effect on banking stock indices, but a weak link with insurance stock indices. Kralik (2012) Analysed the Bucharest Stock Exchange from 2002-2011 using VAR. Concluded that Treasury bill rates do not affect stock market indices.

Savings Rate and Securities Market Performance

Nsofor Sabina Ebele (2016) examined the impact of savings on Nigeria's stock market from 2008-2013 using OLS. Found that savings positively affect stock exchange development, enabling efficient allocation of funds for investments. Saksouk and Pires (2007) studied the link between income, savings, and investments in Ghana and Nigeria from 1990-2006 using autoregressive models. Found a weak link between changes in disposable income and savings, and no significant relationship between savings and stock investments.

Masila and Onsongo (2012) Analyzed factors affecting the securities market in Kenya from 2002-2012 using regression analysis. Found a weak link between stock market development and per capita income, stock volumes, and domestic savings. Adjasi and Biekpe (2005) Contradicted Masila and Onsongo by finding a significant positive impact of savings rates on stock market indices in the UK and US from 1995-2005 using a structural VAR model. Concluded that savings influence stock market development.

Volume of Credit and Securities Market Performance

Chen and Wu (2014) studied the impact of interest rates and credit access on stock prices in Asia from 2008-2009 using the Granger causality test. Found that stock prices are affected by interest rates, moderated by credit access. Ari and Franken (2010) Analyzed the response of banks to interest rate changes in Latin America from 1999-2007 using VECM. Found that government and local banks are more responsive to changes in Treasury bills and lending rates, but credit growth does not moderate the effect on stock indices.

Valentina and Shin (2013) Studied the relationship between credit growth and stock exchange performance in China from 1992-2010. Found that credit availability and economic growth positively impact stock prices**.** Soentjens (2012) Examined the relationship between savings, credit growth, and stock prices in

France from 2004-2012. Found a bidirectional relationship between savings, credit growth, and stock indices, but credit growth does not moderate the effect of savings on stock prices.

Conceptual Framework

The following conceptual framework was adopted in order to investigate the research questions; the dependent variable is stock market return, which is measured by the Nairobi All Share Index. The independent variables are lending rate, Treasury Bills rate, bank savings rates and volume of credit.

Independent variables

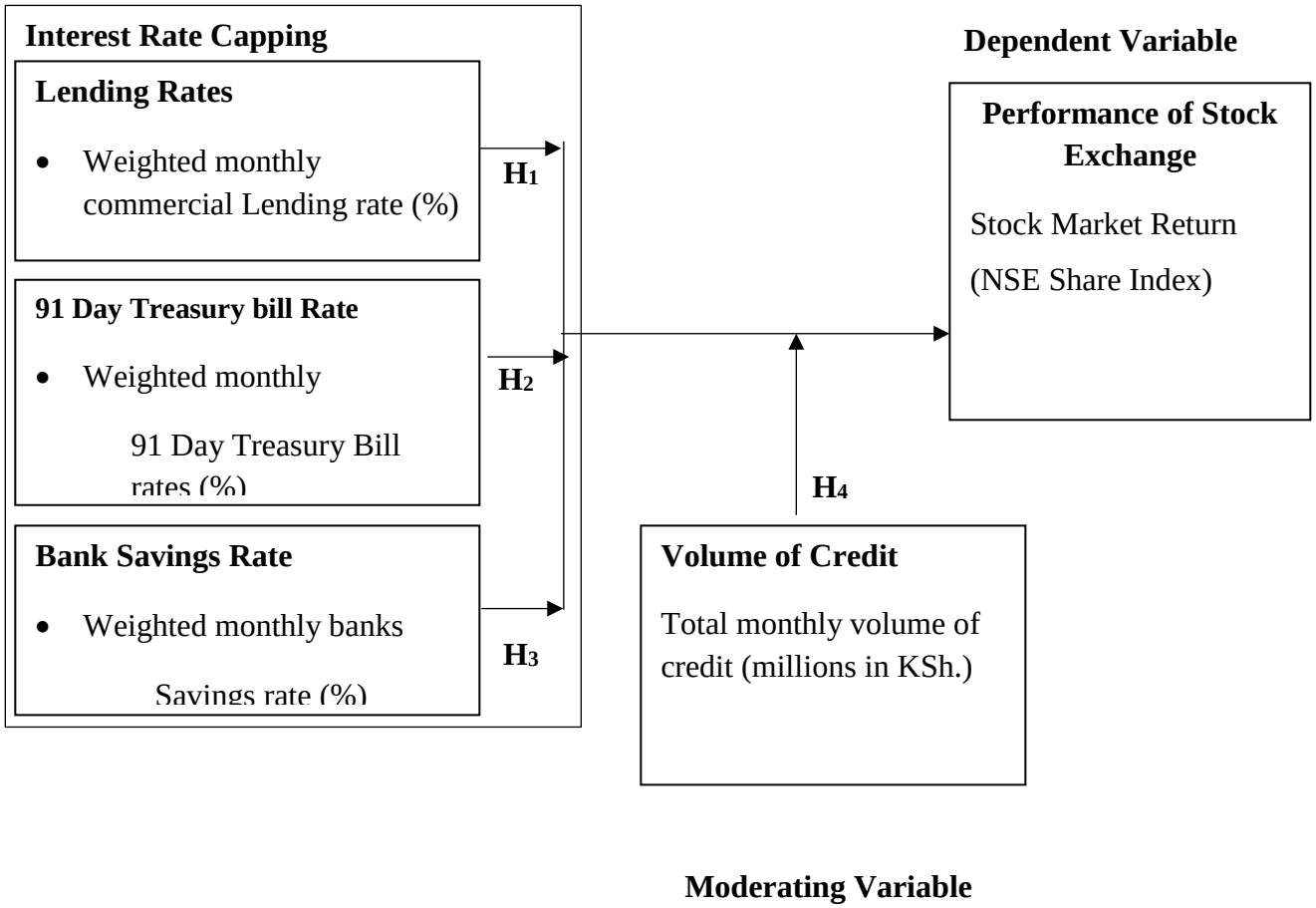

Figure 2.1: Conceptual Framework

1.4 Research Hypotheses

The study sought to test the following null hypothesis

H_{01}: Lending rates do not have a significant effect on the performance of Nairobi Securities Exchange, Kenya.

H_{02}: Treasury bills rates do not have a significant effect on the performance of Nairobi Securities Exchange, Kenya.

H_{03}: Savings rates do not have a significant effect on the performance of Nairobi Securities Exchange, Kenya.

H_{04}: Volume of credit does not have a significant moderating effect on the relationship between interest rate capping and performance of Nairobi Securities Exchange, Kenya.

Methodology

This section explores the research philosophy, design, model specification, operationalization and measurement of study variables, target population, sampling technique, data collection method and procedures, data analysis and presentation, and ethical considerations. The study adopts a positivist philosophy, relying on facts and scientific evidence, such as statistical data, to identify the reasons behind social phenomena. Positivism enables independent examination of data, testing hypotheses, and making generalized conclusions using statistical methods. This approach was chosen for its focus on factual observations and quantifiable results.

The research design used is explanatory, also known as causal, to determine the nature and degree of cause-and-effect relationships. This design is suitable for studies focusing on specific variables or changes and their impact on other variables, particularly in decision-making scenarios with high uncertainty. The explanatory design was applied to analyze how interest rate capping affects the performance of the Nairobi Securities Exchange (NSE), allowing for statistical analysis of market performance changes due to variations in lending rates, Treasury bill rates, savings rates, or credit access. An empirical model was utilized to systematically analyze the cause-and-effect relationships between various economic elements. Time series data, which often exhibit non-stationary behavior, were analyzed using co-integration methods to preserve long-term information. The study employed Vector Autoregressive (VAR) models, accounting for linear relationships between variables and their previous lags.

The study collected secondary data from the Central Bank of Kenya and Kenya National Bureau of Statistics, covering the period from July 2015 to December 2018. Data collection procedures involved gathering and evaluating information systematically to address research questions and test hypotheses. The target population comprised all 20 firms that contributed to the NSE 20 Share Index between 2015 and

2018. The study conducted a census, including all 20 firms, to ensure comprehensive data collection. Descriptive and inferential statistics were obtained, and relationships were analyzed using Autoregressive Distributed Lag (ARDL) models. Various diagnostic tests were conducted to ensure the model's validity and reliability, including tests for stationarity, autocorrelation, homoscedasticity, multicollinearity, normality, model specification, and model stability. The analysis was performed step-by-step using Stata software, ensuring thorough and accurate results.

Findings and Discussions

This section presented key findings of the study both descriptive and inferential findings. Trend analysis was also presented. In this study discussion of key findings in relation to theory and other studies was also presented.

Descriptive Statistics

Descriptive statistics are used to present the fundamental characteristics of the data, providing a summary of the sample and key measures. This study calculated the mean, standard deviation, maximum, and minimum values of the variables. The mean represents the central value of the variables, while the standard deviation shows the data's spread from this central value. Maximum and minimum values indicate the highest and lowest data points. The summary of these descriptive statistics for the performance of the Nairobi Securities Exchange (NSE), as measured by the NSE 20 share index, lending rate, treasury bill rate, savings rate, and volume of credit over 52 months from September 2014 to December 2018, is presented in Table 1. Table 1 presents the results of the descriptive statistics.

Table 41: Summary of Descriptive Statistics

VARIABLES	Mean	Maximum	Minimum	Std. Dev.
NSE INDEX 20 (value)	3,851.82	5,491.00	2,794.00	753.76
LENDING RATE (%)	14.95	18.30	12.51	1.86
TREASURY BILL RATE (%)	8.87	21.65	6.16	2.27
SAVINGS RATE (%)	4.08	7.01	1.32	2.40
VOLUME OF CREDIT (KES Million)	3,046,387.04	3,594,635.28	2,364,672.36	350,137.97

The descriptive statistics for the key variables were analyzed over a 52-month period from September 2014 to December 2018. For the lending rate, the weighted monthly commercial banks' lending rates averaged 14.95% with a standard deviation of 1.86%, ranging from 12.51% to 18.30%. High lending rates typically make loans more expensive, reducing credit availability and slowing economic activity. The treasury bill rate had a mean of 8.87% and a standard deviation of 2.27%, indicating a contractionary monetary policy. The savings rate averaged 4.08% with a standard deviation of 2.40%, suggesting a profitable spread for banks between the cost of funds and the interest rates charged. The volume of credit showed a mean of KES 3,046,387 million and a standard deviation of KES 350,138 million. Lastly, the performance of the Nairobi Securities Exchange, measured by the NSE 20 Share Index, had a mean of 3851.82 with a standard deviation of 753.76, with values ranging from 2794.00 to 5491.00.

Time Series Properties

The study considered time series properties, which included tests for stationarity, and cointegration.

Stationarity Test

The test for stationarity was performed because the study used time series data. The use of non-stationary variables may give spurious results since estimates obtained from such data may possess non-constant mean and variance. Augmented Dickey-Fuller (ADF) tested for the existence of stationarity among the variables, and the results are shown in Table 2.

Table 2: ADF test results at level

		t-statistic	Critical value	Conclusion
NSE 20 Index	Constant	-1.340307	-2.919952	The variable was non-stationary
	Constant, Linear Trend	-1.580026	-3.500495	
	None	-2.090584	-1.947381	
Lending Rates	Constant	-0.799846	-2.935001	The variable was non-stationary
	Constant, Linear Trend	-1.83555	-3.500495	
	None	-0.906554	-1.947381	
Treasury bill Rates	Constant	-3.088207	-2.919952	The variable was non-stationary
	Constant, Linear Trend	-3.434592	3.500495	
	None	-0.782596	-1.947381	

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Savings Rate	Constant	-1.586456	-2.936942	The variable was non-stationary
	Constant, Linear Trend	-1.333496	-3.526609	
	None	-0.12335	-1.949319	
Interaction Between Lending Rates and Volume of Credit	Constant	-1.914458	-2.919952	The variable was non-stationary
	Constant, Linear Trend	-1.716775	-3.500495	
	None	0.302793	-1.947381	

In the study, the null hypothesis was that the series has a unit root or non-stationary. Results obtained indicate that variables had test statistics which were lower than critical values in absolute terms, therefore, the null hypothesis was not rejected. This implies that all variables were non-stationary at level. The test of stationarity at first difference was then done, whereby results were presented in Table 3.

Table 3: ADF test results at first difference

		t-statistic	Critical value	Conclusion
NSE 20 Index	Constant	-6.354472	-2.921175	The variable was stationary
	Constant, Linear Trend	-6.313878	-3.502373	
	None	-6.06095	-1.94752	
Lending Rates	Constant	-6.34181	-2.921175	The variable was stationary
	Constant, Linear Trend	-6.310111	-3.502373	
	None	-6.332768	-1.94752	
Treasury bill Rates	Constant	-6.920241	-2.922449	The variable was stationary
	Constant, Linear Trend	-6.863899	-3.50433	
	None	6.992321	-1.947665	
Savings Rate	Constant	-4.262893	-2.936942	The variable was stationary
	Constant, Linear Trend	-4.381333	-3.526609	
	None	-4.25168	-1.949319	
Volume of Credit	Constant	-5.921891	-2.921175	The variable was stationary
	Constant, Linear Trend	-5.971356	-3.502373	
	None	-5.962272	-1.94752	

It was concluded that all variables were stationary at first difference.

Test for Cointegration

There was need to perform cointegration checks because all the variables were non-stationary at level but stationary at first difference. In order to test for cointegration, an augmented autoregressive distributed lag (ARDL) bounds test for cointegration was used. The ARDL bounds testing method is a cointegration method advanced by Pesaran et al. (2001) to check for existence of a long-run relationship between variables. There are three merits associated with this technique as compared with other cointegration methods. The first reason is that, using ARDL doesn't require all variables to be integrated of the same order and it can also be used when the variables are integrated of order one, order zero or fractionally integrated. The second reason is, ARDL technique is comparatively more efficient when using small and finite sample data sizes. Lastly, by use of ARDL technique, unbiased estimates of the long-run model are obtained (Harris and Sollis, 2003).

While, primarily the method was basically popular in the circumstances where some variables are stationary at level and others are stationary at first difference, the approach has been extended for use in cases where all the variables are stationary at first difference.

The asymptotic spreading of values under the null hypothesis is that the long-run relationship, irrespective of whether the independent variable is at level I(0) or at first difference I(1) does not exist. Two sets of values are given: one when all independent values are purely I(1) and the other if all regressors are purely I(0). If the F-statistic is greater than the upper critical value, then the null hypothesis of no long-run relationship is rejected despite the fact that the orders of integration for the variables could be different. If the test statistic is lower than the lower critical value, however, then the null hypothesis is not rejected. However, if the F-statistic is between the lower and upper critical values, it means that the results are indeterminate. Table 4 and Table 5 show the ARDL cointegration test results for the model without moderating variable and the one with moderating variable, respectively.

Table 4: F-bounds test without moderation

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	1.704614	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Table 4 shows that before moderation, there was no cointegration since the critical value of 1.7046 was less than the lower value of F-statistic. In such a case, a short-run ARDL would be estimated. Cointegration test was also carries out on the model with a moderating variable.

Table 5: F-bounds test with moderation

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.517607	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Table 5 shows that with moderation, there was cointegration since the critical value of 4.517607 was more than the upper value of the F-statistic. In this case, it was necessary to estimate ARDL error correction model.

Short-run ARDL Model without Moderation

The study empirically examined short-run relationship among the variables using the autoregressive distributed lag (ARDL) model given that there was no co-integration among the variables in the model without moderation. The diagnostics of this model were carried out and the results are presented below.

Diagnostics of the Short-Run Model without Moderation

Multicollinearity Test

This study examined the presence of multicollinearity by examining tolerance and the Variance Inflation Factor (VIF). The Variance Inflation Factor (VIF) was used to measure the impact of collinearity among the variables in a regression model. VIF values obtained were more than 10, which is an indication that there is definite multicollinearity issues (Cooper and Schindler, 2010). The study results are shown in Table 6 and 7.

Table 6: Collinearity Statistics

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	6847498	3373.166	NA
Lending_Rate	3467.391	378.9135	6.794952
Savings_Rate	4225.587	56.27313	10.90396
Treasury bill rate	297.314	124.463	3.665934
Volume_of_Credit	0.833185	2148.31	2.244732

Table 7: Correlations coefficients

Variable	Lending Rate	TB	SR	VC	NSE20
Lending_Rate(LR)	1	0.351	-.877**	-.655**	.464**
Treasury Bill Rates(TB)	.351*	1	-.371**	-.332*	0.145
Savings Rates(SR)	-.877**	-.371**	1	.819**	-.648**
Volume of Credit(VC)	-.655**	-.332*	.819**	1	-.847**
NSE20	.464**	0.145	-.648**	-.847**	1

Results in Table 6 and Table 7 show that saving rate was the variable that would cause multicollineariry. It had VIF of 10.90396 which was than the rule of thumb of less than 10.Therefore, the study dropped savings rates in the analysis. Thus, only lending rate and treasury bills rate were the independent variables, while the volume of credit was used as the moderating variable.

Test for Autocorrelation

It is common for time series data to experience the problem of autocorrelation. Breusch Godfrey Langrange-multiplier test was used to find out if the model had serial correlation (Gujarati, 2004. Table 8 presents the diagnostic results.

Table 8: Breusch-Godfrey serial correlation results

Model without moderation	F-statistic	0.240695	Prob. F(2,44)	0.7871
	Obs*R-squared	0.541113	Prob. Chi-Square(2)	0.763
Model with moderation	F-statistic	0.504896	Prob. F(2,40)	0.6074
	Obs*R-squared	1.255782	Prob. Chi-Square(2)	0.5337

F-statistic	0.240695	Prob. F(2,44)	0.7871
Obs*R-squared	0.541113	Prob. Chi-Square(2)	0.7630

The results show the non-rejection of null hypothesis of residuals having no serial correlation.

Heteroscedasticity Test

Homoscedasticity test was based on Breusch-Pagan-Godfrey. The null hypothesis being a constant variance among the error terms. The results of the test are presented by Table 9

Table 9: Heteroscedasticity test results

F-statistic	0.339417	Prob. F(3,46)	0.7969
Obs*R-squared	1.082826	Prob. Chi-Square(3)	0.7812
Scaled explained SS	0.748820	Prob. Chi-Square(3)	0.8617

Table 7 showed that the error term was homoscedastic since the p-value of 0.8617 > 0.05, hence there was no problem of heteroscedasticity since the null hypothesis of constant variance of the error term was not rejected.

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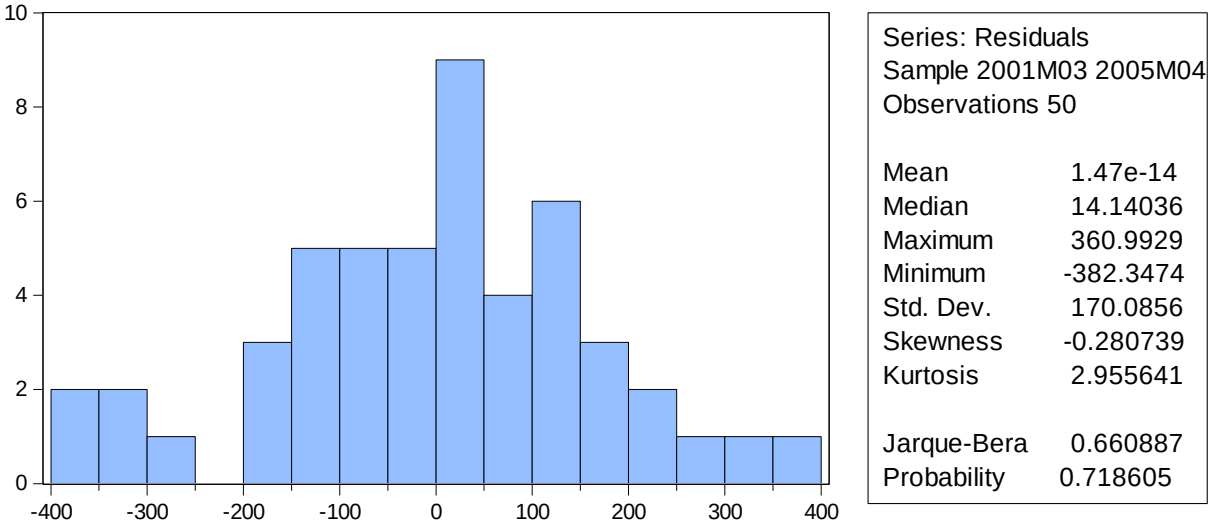
Normality Test

In this study, Jarque-Bera tests to show whether or not the residuals are normally distributed. The test provides an examination to ascertain the level of normality in the residuals. The value gives an indication of normality; as the value tends to move further away from zero, it becomes more indicative that residuals do not take a normal distribution. Residuals are normally distributed if the null hypothesis is not rejected at 5 per cent level (Table 8).



Jarque-Bera test indicated that residuals were normally distributed because the test statistic value of 0.66 had a p-value 0.72, which was more than 0.05 s level of significance.

Test for Model Specification

A specification error occurs when explanatory variables and their functional form erroneously represent the actual relationship existing in the data set. This problem can cause bias, which can overstate, understate, or completely conceal the underlying relationships rendering results untrusted. Ramsey RESET Test was performed to test for model specification, where the null hypothesis was that the model was correctly specified and the model did not omit variables.

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Table 10: Ramsey RESET test

	Value	df	Probability
t-statistic	0.278570	44	0.7819
F-statistic	0.077601	(1, 44)	0.7819

Results presented in Table 10 show that the hypothesis that the model was well-specified was not rejected.

Cussum Test for Model Stability

Cussum tests were carried out to test for stability of the coefficients of predictor variables.

In Cussum Test for stability, interpretation was based on a series of sums, or sums of squares, of recursive residuals as derived from selected subsamples of the data. In the study, the null hypothesis was that the the parameters coefficients are constant; this meant that the values of the series beyond the expected range would indicate a structural change in the model in the long run.

Figure 2: Cussum Test by use of cumulative recursive residuals

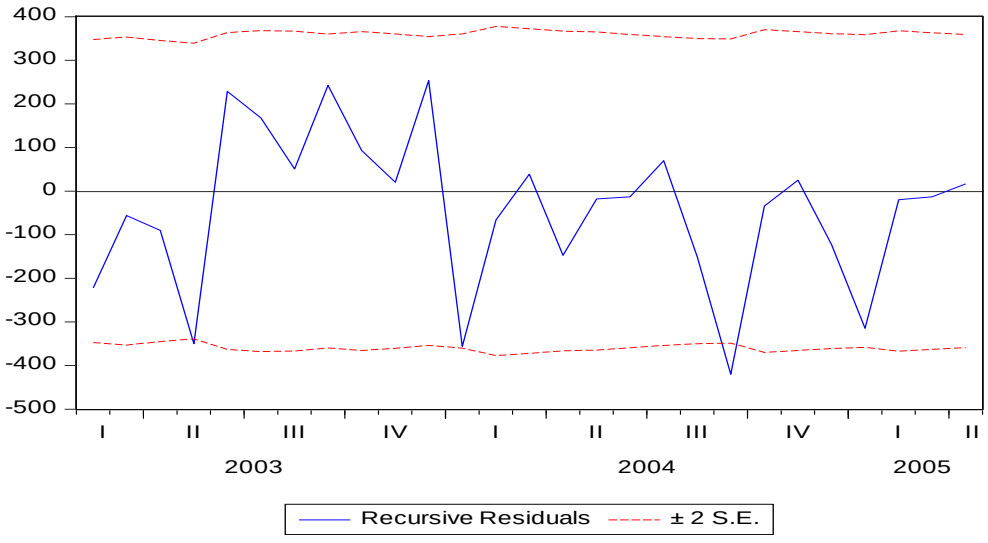

Figure 2 shows a random walk on the independent variables of the data used in the study. The cumulative sums were within the expected confidence range. This indicated that the model was stable and well-specified.

Short Run Model with Moderation

For the purposes of empirically examining the short-run relationship among the variables when the moderating variable was introduced, ARDL Error Correction Regression (ECM) technique was used. The diagnostics for this model were carried out and the results are presented below.

Diagnostics for ARDL Error Correction Regression (ECM) with Moderation

Test for Autocorrelation

Breusch Godfrey Langrange-multiplier test was used to check whether the residual values experienced autocorrelation (Gujarati, 2004). The ability to integrate lag orders made Breusch Godfrey Langrange-multiplier test appropriate to reveal residual autocorrelation. The findings are shown in table 10.

Langrange-Multiplier Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.504896	Prob. F(2,40)	0.6074
Obs*R-squared	1.255782	Prob. Chi-Square(2)	0.5337

The results in Table 10 shows that probability of Chi-Square was 0.5337>0.05. This results made the null hypothesis not to be rejected that the residuals have no serial correlation. Therefore, there is no problem of serial correlation.

Heteroscedasticity Test

Homoscedasticity test was based on Breusch-Pagan-Godfrey. This test was carried out to find out if there was no significant difference from inequality of variance across the various conditions of the variables. The null hypothesis being a constant variance among the error terms. Table 11 presents the findings.

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Table 11: Heteroscedasticity Test Results

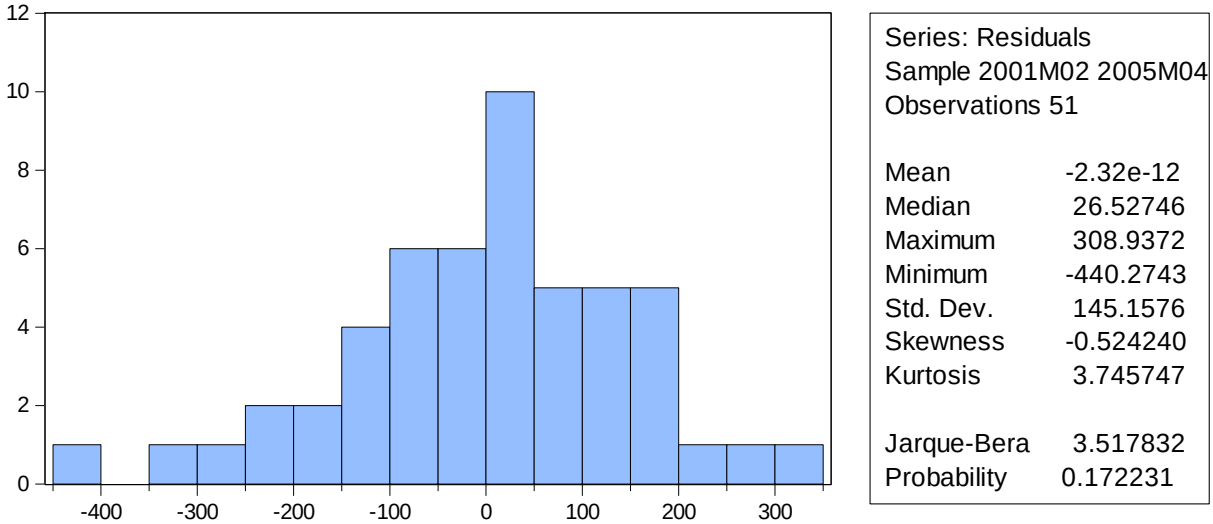
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.395068	Prob. F(8,42)	0.9170
Obs*R-squared	3.569215	Prob. Chi-Square(8)	0.8938
Scaled explained SS	3.323238	Prob. Chi-Square(8)	0.9125

The results for Table 11 showed that the residual values were homoscedastic since the p-value of 0.8938>0.05 at 5 percent significance level. This implied that, there was no problem of heteroscedasticity across the various conditions of the experiment, so the homoscedasticity condition was satisfied meaning the observations had constant variance.

Normality test

Normality test was carried out by the study to ascertain if residuals are normally distributed. In this study, normality diagnostics was assessed using the Jarque-Bera tests to show that the residuals are normally distributed. This test enabled the researcher to have a quick assessment and ascertain the degree of normality in the residuals. The value that was obtained gives an indication of normality; as the value tends away from zero, it gets definate that the residuals do not resemble a normal distribution. Residual values are normally distributed if the significance value is > 0.05 as shown.



Jarque-Bera Test Results showed that the residuals were normally distributed since Jarque-Bera value was 3.5178 with p-value 17.22 percent which is more than 0.05 significance level. The study, therefore, failed to reject the null hypothesis that residuals are normally distributed at 5 percent significance level and concluded that the residuals behaved normally.

Test for Model Specification

Ramsey RESET Test for model specification was undertaken, where the null hypothesis was that the model is correctly specified and the model did not omit variables. The null hypothesis was to be rejected with a 5 percent level of significance, meaning that the model has omitted variables.

Table 13: Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Specification: NSE_20 NSE_20(-1) LR LR(-1) TB TB(-1) LRVC LRVC(-1) DMY C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.782690	41	0.4383
F-statistic	0.612603	(1, 41)	0.4383

The p-value for F-statistic is 0.6126, thence at 5 percent significance level, the Ramsey RESET test null hypothesis of correct specification was not rejected. Therefore, this shows that the functional form is correct and the model does not suffer from omitted variables.

Cussum Test for Model Stability

In Cussum Test for stability, interpretation is based on a series of sums, or sums of squares, of recursive residuals calculated from selected subsamples of the data. The null hypothesis was that the coefficients of the parameters are constant, which means that the values of the series below or above the expected range show a structural change in the model in the long run.

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Figure 3: Cussum Test by use of cumulative recursive residuals

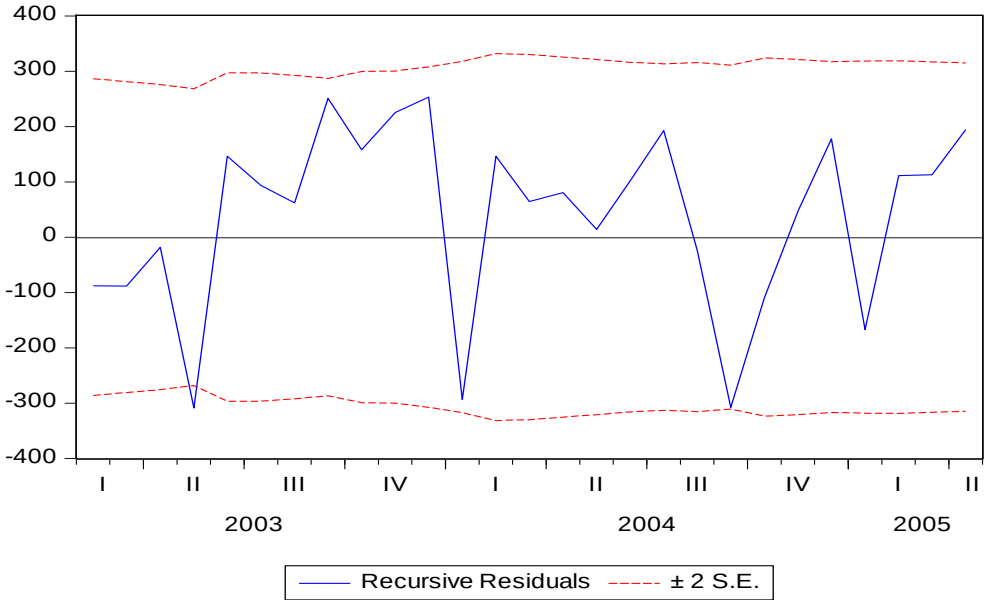

Figure 3: Cussum Test by use of cumulative recursive residuals

Figure 3 shows a random walk on the exogenous data variables. The cumulative sums are within the expected confidence range. The findings show that the model is stable and well specified.

Estimation of Results

Short-run ARDL Model without Moderation

The short-run was estimated to determine the relationship since variables were not cointegrated. Table 14 shows estimation results.

Table 14: Short-Run ARDL Model without Moderation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NSE_20(-1))	0.085042	0.13951	0.60958	0.5452
D(TB)	-34.8828	13.6656	-2.552599	0.0142
D(LR)	9.907298	42.68999	0.232075	0.8175

DUMMY	74.85671	52.61798	1.422645	0.1617
C	-85.85473	39.73119	-2.16089	0.0361

The R-square was 17.32 indicating that, under interest rates capping, and before introducing volume of credit as a moderating variable, treasury bill rates and lending rates account for about 17.32 percent of the changes in NSE 20 Share index**.**

The NSE 20 share index had a lag of positive coefficient that was statistically insignificant at 5 percent since its t- statistic is less than 1.96 and the p-value is more that 5 percent. The implication of this is that there is no lag effect of NSE 20 share index on itself. These results are in full agreement with Buccheri et al.(2019), who investigated the effect of lagged stock prices on its successive prices at NASI and established the existence of a weak liner relationship between current stock prices and past stock prices which could not be used by investors in predicting future stock market trends.

It is shown that the treasury bill rate had a negative coefficient which was statistically significant at 5 per cent level This coefficient can be interpreted to mean that 1 per cent increase in the treasury bill rate would cause 34.88 decrease in the NSE 20 share index in the short run. The study findings agreed with Mutoko (2006) who studied the relationship between stock returns at NSE and the Treasury bills rates by use of GARCH Analysis. It was concluded that treasury bill rates impacts stock returns negatively as indicated by the NSE - 20 Share Price Index and All Share Index.

However, the findings are at variance with Momani and Alsharari (2012), after they undertook an investigation into the impact of changes in the twelve-monthly interest rates on long-term bank deposits and securities prices for the Amman Stock Exchange from 1992-2010. The researchers used three exogenous variables; the general stock index, the stock indices for the industry of banking, stock indices for the industry of insurance, while the Treasury bill rates, were the dependent variable. The study employed the Variance Components Model, where all the indices are considered as random variables. Four models were established where it was found out that there is an inverse relationship between banking stock index and Treasury bill rates. Nonetheless, an existance of a weak negative relationship between stock indices of the insurance industry and treasury bills was established.

The lending rate had a positive coefficient which was statistically insignificant. The findings that lending rates are positively related to the performance of the Nairobi Securities Exchange were in agreement with Omotor (2011) and Olweny and Omondi (2011) that lending rates influence the performance of stock exchange market. However, Maimbo (2015) observed that lending rates might have no effect on stock performance in Zambia because there are several uncontrolled institutions that lend to businesses and ensure that there is enough liquidity.

Table 14 also shows that interest rate capping had a positive and statistically insignificant effect on NSE 20 share index. The study results resonate with Maimbo (2015), who investigated how interest rate capping affects economic parameters and established that interest rate capping has a direct relationship with lending rates but unidirectional relationship with stock exchange returns. These results also agree with Omotor (2011) who examined how GDP growth rate, foreign direct investments and commercial lending rates influence stock market performance. Omotor (2011) confirmed the existence of a minimal effect of treasury bill rates on stock market performance.

Long Run ARDL Model with Moderation

ARDL Bounds tests for cointegration

In order to empirically examine the long-run relationship among the variables, the autoregressive distributed lag (ARDL) technique was used.

Table 15: ARDL Long Run Model with Moderation

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LR	1159.658	865.8501	1.339329	0.1877
TB	-85.40613	114.0072	-0.749129	0.458

LRVC	-0.000295	0.000158	-1.86275	0.0695
C	-2042.68	8496.177	-0.240423	0.8112

Lending rate had a positive coefficient which is statistically insignificant. The results were in agreement with the findings of Omotor (2011) who investigated the effect of foreign direct investments, GDP growth rate and commercial lending rates on stock market performance. Omotor (2011) observed that lending rate has no influence or has only minimal influence on stock market performance.

The treasury bill rate had a negative coefficient, that was statistically insignificant at 5 percent since the t-statistic was less than 1.96 and its p-value was more than 5 percent The findings that the coefficient of treasury bills was statistically insignificant is in agreement with Kyereboah-Coleman and Biekpe (2006) who investigated how investors rely on the information about the cost of funds when making investment comparative analyzing between treasury bills and stocks at the NSE. Stock returns, as measured by stock indices was the dependent variable, while bank lending rates and 91-Day Treasury bill rates were used as independent variables. It was found out that, large firms have no particular preference when making a comparison between Treasury bills and stock market as options of financial investments. It was similarly established that Treasury bill rate had a weak impact on stock returns, but had a positive significant effect on the banks' lending rates.

The interaction between lending rates and volume of credit had a negative coefficient which is statistically significant at 10 percent. This can be interpreted to mean that the performance of NSE is affected by lending rates, but the relationship is moderated by the volume of credit availed by commercial banks. This is in agreement with Chen and Wu (2014) who undertook to examine credit growth in emerging economies between 2008 and 2009. The research undertook an examination on how changes in interest rate and credit access affects stock prices in Asia. They used Granger causality test which established that stock prices respond to variations in interest rates, however, the response is moderated by the credit access rate both in the long run and short run.

Short Run ECM Model with Moderation

ARDL Error Correction Regression (ECM) technique was used to examine the short-run relationship among the variables. ECM is applicable where variables have a long-run common stochastic movement. Every so often, there occurs a long-run equilibrium relationship between two economic or financial variables, Engle and Granger (1987). However, there could exist disequilibrium in the short run. Therefore, a period of disequilibrium error in a prior period is corrected by ECM in the subsequent period. ECM comprises a factor for the deviation from the long-run model which forecasts the degree and magnitude of disequilibrium that dissipates in the subsequent estimating period. Therefore, ECMs forecasts the acceleration at which an explained variable adjusts to the point of equilibrium following changes in other economic variables.

Table 4.15 ARDL Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LR)	-323.1843	145.1026	-2.227281	0.0313
D(TB)	-36.95853	11.58543	-3.190087	0.0027
D(LRVC)	0.000133	4.94E-05	2.687505	0.0103
DMY	355.1535	80.61204	4.405712	0.0001
CointEq(-1)*	-0.109296	0.021974	-4.973859	0

The R-square was 38.56 percent. This indicates that under interest rates capping, Treasury bill rates, lending rates, and the interaction between lending rates and volume of credit account for about 38.56 percent of the movements in NSE 20 Share index.

The lending rates had a negative coefficient which was statistically significant at 5 per cent because its t-statistic was less than -1.96 and its p value was less than 5 percent . This could mean that 1 percent increase in lending rates may cause NSE20 Share index to decrease by 323.18. This results agree with Campbell (1987) study on factors contributing to excess stock returns in USA. Campbell (1987) found out that stock indices are affected negatively by variations in interest rates. The research also ascertained that higher

interest rates lower the efficiency of stock markets, which in turn, has a negative effect on stock market indices and market capitalization.

Treasury bill rates had a negative coefficient which is statistically significant at 5 percent since the t-statistic is less than -1.96 and its p value was less than 5 percent. This can be interpreted to mean that 1 percent positive change in the treasury bill rate may cause 36.96 decrease in the NSE 20 share index in the short run. The study findings are nearly similar to Momani and Alsharari (2012) who examined how changes in twelve-monthly interest rates impacts the long-term bank deposits and prices of stocks at Amman Stock Exchange over a period of 18 years from 1992-2010. The independent variables were general stock index, the stock indices for industry of banking, stock indices for the industry of insurance while Treasury bill rates was the the dependent variable. The researchers applied the Variance Components Model, whereby, all the indices are treated as stochastic variables. The study established four models and observed a significant inverse effect of Treasury bill rates on the banking stock index. On the contrary, the research established the existence of a weak inverse relationship between stock indices of insurance industry and treasury bills.

The interaction between lending rates and volume of credit had a positive coefficient which was statistically significant at 5 percent since its t-statistic was more than 1.96.This could mean that an increase in lending rates and volume of credit causes an increase in NSE20 share index. This can be interpreted to mean that the performance of NSE is affected by lending rates, but the relationship is moderated by the volume of credit availed by commercial banks. This is in agreement with Chen and Wu (2014) who undertook to examine credit growth in emerging economies between 2008 and 2009. The objective of the research undertaken was to examine how stock prices respond to changes in credit access and interest rates in Asia. They used Granger causality test which established that stock prices respond to interest rates movements, however, the response is moderated by the credit access rate both in the long run and short run.

Table 15 too indicates that interest rate capping impacted NSE20 share index positively. These findings are comparable with the results of Mokeira (2019) who investigated the effects of interest rate capping on the performance of SMEs listed at the NSE. Using regression analysis, it was observed that interest rate capping showed a positive and statistically significant link with amount of loans taken at by SME's listed at NSE, which in turn improved firms' profitability and stock returns. However, this study's findings are at variance

with Maimbo (2015) who investigated how interest rate capping impacts other economic parameters and concluded that interest rate capping impacts the performance of stocks of banks listed at NSE negatively.

Summary, Conclusions and Recommendations

The study investigated the impact of interest rate capping on the performance of the Nairobi Securities Exchange (NSE) in Kenya, following the Banking Amendment Act (2016) which regulated lending rates and savings rates. The volatility of NSE indices post-implementation inspired this study, as it led to shareholder losses. The objectives were to examine the effects of lending rates, treasury bill rates, and the volume of credit on NSE performance. The study utilized secondary data from KNBS and CBK, applying theories such as the Classical Theory of Interest Rates and the Efficient Market Hypothesis, and employing Eviews software for data analysis over 52 months. Diagnostic tests and hypothesis testing were conducted at a 95% confidence interval.

The study found that lending rates had no significant effect on NSE performance, aligning with findings from Zambia. Treasury bill rates were inversely related to NSE performance, consistent with studies from the Amman Stock Exchange. The volume of credit moderated the relationship between interest rates and NSE performance negatively, indicating that more credit availability negatively impacts NSE performance, similar to findings in emerging Asian economies.

The conclusions revealed mixed effects of interest rate capping on NSE performance. Lending rates negatively affected NSE in the short run but had no long-term relationship. Treasury bill rates had a short-term negative impact but no long-term effect. Volume of credit had an inverse moderating effect in the long run and a direct effect in the short run, suggesting that lower lending rates could stimulate more business loans, improving company performance at NSE.

Recommendations included that the Central Bank of Kenya should avoid reducing lending rates to prevent stock price decreases and economic slowdowns. Financial analysts and policymakers could use these findings to inform investment decisions and economic policies. The study also suggested further research in different contexts, possibly focusing on specific stock sectors or using savings rates instead of lending rates.

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