

Macro-Economic Factors Affecting Stock Market Performance in Zambia: A Case of the Lusaka Securities Exchange

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Abstract

Capital markets across the globe channel funds from savers to firms, enabling them to finance various projects. Efficient capital markets facilitate capital raising by determining the prices at which security holders are willing to exchange claims on a firm's future cash flows. Numerous studies have examined whether macro-economic factors influence stock market performance in both developed and developing markets. This study aimed to determine the influence of macro-economic factors on stock market performance in Zambia, specifically focusing on the Lusaka Stock Exchange. The independent variables included annual interest rates, exchange rates, money supply, GDP growth rate and the Index of Industrial Production, measured by the Central Statistical Office and the Bank of Zambia. The dependent variable was the all Lusaka Stock Exchange Annual Share Index. Secondary data was collected over a 20-year period from 1998 to 2017. The study employed a descriptive research design and used a multiple linear regression model for data analysis, conducted using SPSS version 23. The results produced an R-square value of 0.819, indicating that 81.9% of the variations in stock market indices are explained by the selected macro-economic factors, while 18.1% are due to other variables not included in the model. ANOVA results showed a significant F-statistic of 12.632 at the 5% level, confirming the model's fitness. Individually, interest rates had a strong negative and statistically significant association with stock market performance. Conversely, money supply, exchange rates, and the Index of Industrial Production showed positive and statistically significant associations. GDP growth rates exhibited a positive but statistically insignificant association with stock market performance.

Keywords: Stock Market, All LuSE Share Index, Performance, Macro-Economic Factors, Interest Rates, Exchange Rates, Money Supply, GDP Growth Rates, Index of Industrial Production, Regression, Correlation, SPSS

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1. Introduction

Capital markets globally facilitate the transfer of funds from surplus units to deficit units, enabling the financing of projects; efficient markets help firms raise capital by accurately pricing securities based on expected future cash flows (Ali, 2014). Informational efficiency ensures that capital is allocated to the most valuable projects, making it a crucial condition for effective market functioning (Ali, 2014). Market efficiency refers to the extent to which asset prices reflect all available and relevant information, a concept central to financial performance and analysis (Otieno et al., 2017).

The idea of informational efficiency dates back to Bachelier (1900), who noted that market prices reflect past, present, and even discounted future events insights that prefigured later financial models, though his work was only widely recognized after being circulated by Samuelson in the 1950s and translated by Cootner (Bernstein, 1992). According to Fackson (2010), Zambia was considered one of the wealthiest nations in Sub-Sahara Africa at independence in 1964, after having inherited very generous foreign reserves from the British Colonial government. The socialist policies adopted and a state controlled, after political independence by the Zambian government were characterized by nationalization of industries and the country witnessed the mushrooming of state-controlled enterprises under Zambia industrial and Mining corporation (ZIMCO), the Industrial Development Corporation (INDECO), the Mining Development Corporation (MINDECO) and Financial Development Corporation (FINDECO).

Moreover, the second republic through the government led by the Chiluba regime privatized most of the state enterprises in 1992 as part of economic reforms under structural adjustment programme. This meant that these state-controlled enterprises were no longer funded by the state. As such, this move forced these enterprises to find other alternative sources of funding. Hence, the government with the support of collaborating partners, found it necessary to form a capital market as an intermediation organization through which eligible companies would raise capital funds for investment in order to restore economic stability and growth in Zambia.

The stock market brings together various economic agents in its core function of moving resources from surplus units of the economy to deficit units. Economic agents raise long-term funds for financing new projects, expanding and modernizing industrial or commercial concerns by raising equity capital through issuing shares; and raising debt capital by issuing bonds, Opong et al. (2008). The stock market gives investors the dual advantage of easy liquidity and better information gathering. This makes it easier for financial resources to be mobilized because the investors are willing to commit to long-term projects under these conditions.

2. Review of Literature

Theoretical framework

Quite simply, a theoretical framework is the ‘blueprint’ or guide for a research Asika, (2008). It is a framework based on an existing theory in a field of inquiry that is related and/or reflects the hypothesis of a study. In this study, the Efficient Markets Hypothesis (EMH) was used suggests that at any given time, stock prices of an efficient market reflect all the available information (Fama, 1965). The implication of this hypothesis is that no investors can out-perform the market and gain abnormal profits given that stocks are traded at their intrinsic value. As such, investors and market participants wanting higher returns can only do so by making riskier investment decisions as opposed to market timing and stock selection. However, the EMH has a fair share of critics despite it being the backbone of many studies on financial markets. The main idea is that the EMH assumes that investors are rational in their dealings, and that they have access to all available information and their market expectations are homogeneous and yet these assumptions beat the idea of trading after all given that trade signals existence of heterogeneous expectations. Many behavioural economists do not agree with the notion of rational investors as it purports irrational exuberance (1997).

Arbitrage Pricing Theory (APT) The theory presumes that stock market returns are influenced by some macroeconomic variables through their effect on the discount rates and future dividends (Shresha & Subedi, 2015). Further, APT correlates with market portfolio concept, according to arbitrage theory, individuals have different portfolio of investments with their specific systematic risk. Most scholars have argued that the APT proposes better results compared to CAPM because it used multiple factors for explaining shared systematic risk (Sheefeni, 2015). As such, based on this linear correlation between stock market returns and macroeconomic variables, it can be deduced that interest rates as a macroeconomic variable have an influence on the value of stock market securities and assets. As a result, the value of a security or asset can be described as the total of the expected return and any unexpected returns on the asset (Cuthbertson, 2004).

data was exclusively collected from secondary sources and annually data for twenty years (1998 to 2017 on the following Objectives;

- i. To establish the effects of money supply on stock market performance in Zambia.
- ii. To determine the nature of the relationship between exchange rates and stock prices in Zambia.
- iii. To determine the influence of interest rates on stock market performance in Zambia.
- iv. To describe the relationship between GDP growth rate and stock market performance in Zambia.
- v. To explain the influence of Index of Industrial Production on stock performance in Zambia.

According to Asika (2008), research methodology is the particular method or means by which a particular research work is carried out. It comprises of the procedures and activities involved in drawing logical conclusions on the research study.

3. Research Methodology

3.1 Research Design

A research design is a blue print of those procedures which are utilised by a researcher to test the correlation between independent and dependent variable (Akintoye, 2015). This research adopted a descriptive study so as to describe all

elements of the population and also allows estimates of a part of a population that has these attributes.

3.2 Data Collection

In this study, all data was exclusively collected from secondary sources and annually data for twenty years (1998 to 2017) was collected and analysed. The study focused on the Lusaka Stock Exchange Share index for the dependent variable. Data for the independent variables was obtained from Bank of Zambia (interest rate, money supply and exchange rate) and (GDP growth rate and Index of Industrial Production from the Central Statistical Office).

3.3 Data Analysis

Data was sorted, classified, corded and then tabulated for easy analysis. Collected secondary data was analysed using both descriptive and inferential statistics. The SPSS Version 23 Computer software was used to analyse because it is more user friendly than other econometric packages such as E-views. The data was entered in the SPSS and examined using correlation and regression analysis, and also descriptive analysis. In descriptive statistics, the study used the mean and standard deviation. In the inferential statistics, the study used multivariate regression analysis to determine the relationship between the dependent and independent variables.

3.4 Model Specification

Using the collected data, the researcher conducted a regression analysis so as to establish the extent of the relationship between interest rates and stock market returns. The study applied the following regression model;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where:

β_0 = y intercept of the regression equation

$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 = are the slopes of the equation

Y = All Lusaka Stock Exchange Stock Market Indices as measured by the Lusaka Stock Exchange.

X_1 = Average interest rates as measure by the Bank of Zambia lending rate.

X_2 = Money supply as measured by BOZ

X_3 = Average exchange rates measured against the U.S dollar as measured by BOZ

X_4 = GDP growth rate as measured by Central Statistical Office.

X_5 = Index of Industrial Production as measured by Central Statistical Office

ε = error term.

3.5 Tests of Significance

In order to test the statistical significance, the F-test were used at 95% confidence level. The F statistic was utilised to establish a statistical significance of regression equation while the t statistic was used to test the statistical significance of study coefficients.

4 Data Analysis and Interpretation

4.1 Diagnostics Tests

The study looked for the data that would suit and meet the objective of the study. Secondary annual data was collected from the Lusaka Stock Exchange (for the All LuSE Share Index), Bank of Zambia (for the annual interest rates, exchange rates and money supply) and Central Statistical Office (for GDP growth rates and Index of Industrial Production), respectively. Then it was cross checked for errors to test the validity of the data sources. The researcher assumed a 95% confidence interval or 5% percent significant levels. These values helped to verify the truth or falsity of the data. This was close to 100% confidence interval (and thus, the closer to 0 percent the significance level), the higher the accuracy of data used and analysed is assumed to be.

The null hypothesis for the test was that secondary data was not normal. If the p-value recorded was more than 0.05, the researcher would reject it. The result of test is as shown in Table 1 below.

Table 1: Descriptive Normality Test

Stock market Returns	Kolmogorov-Smirnov Statistics			Shapiro-Wilk Statistics		
	Statistics	Df	Sig.	Df	Sig.	
Interest rates (%)	.173	20	.795	.981	20	.176
Exchange rates	.176	20	.795	.881	20	.015
GDP Growth Rate	.178	20	.795	.893	20	.795
Index of Industrial Production	.181	20	.795	.886	20	.691
Money supply	.172	20	.795	.862	20	.009
a.Lilliefors Significance Correction						

Both Kolmogorov-Smirnova and Shapiro-Wilk test record o-value greater than 0.05 which implies that the research data was normally distributed and therefore the null hypothesis was rejected. The data was appropriate for the use of conducting parametric tests such as Pearson’s correlation, regression analysis of variance as shown in Table 1: descriptive normality test.

4.2 Descriptive Statistics

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Stock market indices	20	158.85	4710.24	1909.5550	1368.36340
Exchange Rates against US dollar	20	2.26	10.84	5.3140	2.32094
Interest Rates (%)	20	15.8	48.7	28.330	9.0418
GDP Growth Rates (%)	20	2.6	10.3	5.490	2.3797
Index of Industrial Production	20	66.5	223.9	157.195	52.7165
Money Supply (K’ Million)	20	197.0	7315.0	2574.050	2381.0166
Valid N (listwise)	20				

Stock market indices had a mean of 1,909.56 (SD = 1,368.36), while the other variables recorded the following means and standard deviations respectively: exchange rate (mean = 5.31, SD = 2.32), interest rates (mean = 28.33, SD = 9.04), GDP growth rate (mean = 5.49, SD = 2.38), index of industrial production (mean = 157.20, SD = 52.72), and money supply (mean = 2,574.05, SD = 2,381.02).

Standard deviation was used to measure volatility, with money supply showing the highest variability, suggesting it has the strongest influence on stock market performance. This was followed by the index of industrial production, interest rates, GDP growth rate, and exchange rates, in that order of impact as shown in table 2 above.

4.3 Correlation Analysis

Table 3: Correlation Analysis Correlations

		Stock market indices	Exchange Rates against US dollar	Interest Rates (%)	GDP Growth Rates (%)	Index of Industrial Production	Money Supply (K’Million)
Stock market indices	Pearson Correlation	1	.549*	-.569**	.404	.876**	.767**
	Sig. (2-tailed)		.012	.009	.077	.000	.000
	N	20	20	20	20	20	20
Exchange Rates against US dollar	Pearson Correlation	.549*	1	-.309	-.193	.746**	.896**
	Sig. (2-tailed)	.012		.184	.414	.000	.000
	N	20	20	20	20	20	20
Interest Rates (%)	Pearson Correlation	-.569**	-.309	1	-.402	-.621**	-.449*
	Sig. (2-tailed)	.009	.184		.079	.003	.047
	N	20	20	20	20	20	20
GDP Growth Rates (%)	Pearson Correlation	.404	-.193	-.402	1	.307	-.047
	Sig. (2-tailed)	.077	.414	.079		.188	.843
	N	20	20	20	20	20	20
Index of Industrial Production	Pearson Correlation	.876**	.746**	-.621**	.307	1	.910**
	Sig. (2-tailed)	.000	.000	.003	.188		.000
	N	20	20	20	20	20	20
Money Supply (K’Million)	Pearson Correlation	.767**	.896**	-.449*	-.047	.910**	1
	Sig. (2-tailed)	.000	.000	.047	.843	.000	
	N	20	20	20	20	20	20

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

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

The analysis revealed a strong positive and significant correlation between exchange rates and stock market indices ($r = 0.549$, $p = 0.012$), while interest rates showed a strong negative and significant correlation with stock market performance ($r = -0.569$, $p = 0.009$). GDP growth rate had a weak positive but insignificant correlation ($r = 0.404$, $p = 0.077$). A very strong and highly significant positive correlation was found between the index of industrial production and the stock market ($r = 0.876$, $p < 0.001$). Money supply also showed a strong positive and significant correlation with stock market indices ($r = 0.767$, $p < 0.001$), indicating that both variables have a considerable influence on stock market performance as shown in table 3 above.

4.4 Regression Analysis

Table 4: Regression Analysis for Interest Rates

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569 ^a	.324	.287	1155.77508
a. Predictors: (Constant), Interest Rates (%)				

Stock market indices were regressed against interest rates at 5% significance levels or 95% confidence levels. The results revealed an R Square of 0.324, which quite simply shows that, interest rates individually influence stock market performance or variation at the Lusaka Stock Exchange in Zambia by up to 32.40% as show in table 4 above.

Table 5: Model Summary for Exchange Rates

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.549 ^a	.301	.263	1175.10300
a. Predictors: (Constant), Exchange Rates against US dollar				

Stock market indices were regressed against exchange rates at 5% significance levels or 95% confidence levels. The results revealed an R Square of 0.301, which quite simply shows that, exchange rates individually influence stock market performance or variation at the Lusaka Stock Exchange in Zambia by up to 30.10% as shown in the table above.

Table 7: Model Summary for GDP Growth Rates

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.404 ^a	.163	.117	1286.03365
a. Predictors: (Constant), GDP Growth Rates (%)				

Stock market indices were regressed against GDP Growth rates at 5% significance levels or 95% confidence levels. The results revealed an R Square of 0.163, which quite simply shows that, GDP Growth rates individually influence stock market performance or variation at the Lusaka Stock Exchange in Zambia by up to 16.30 as shown in the table above.

Table 6: Model Summary for Index of Industrial Production

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876 ^a	.768	.755	677.37541
a. Predictors: (Constant), Index of Industrial Production				

Stock market indices were regressed against Index of Industrial Production at 5% significance levels or 95% confidence levels. The results revealed an R Square of 0.768, which quite simply shows that, Index of Industrial Production individually influences stock market performance or variation at the Lusaka Stock Exchange in Zambia by up to 76.80% as shown in the above table.

Table 8: Model Summary for Money Supply

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.767 ^a	.589	.566	901.75387
a. Predictors: (Constant), Money Supply (K'Million)				

Stock market indices were regressed against money supply at 5% significance levels or 95% confidence levels. The results revealed an R Square of 0.589, which quite simply shows that, money supply influences stock market performance or variation at the Lusaka Stock Exchange in Zambia by up to 58.90% as shown in the table above.

Table 9: Joint Model Summary for All the five (5) Selected Independent Variables

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.905 ^a	.819	.754	679.02390	1.616

- a. Predictors: (Constant), Money Supply (K'Million), GDP Growth Rates (%), Interest Rates (%), Exchange Rates against US dollar, Index of Industrial Production
- b. Dependent Variable: Stock market indices

Table 10: Analysis of Variance

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29120921.114	5	5824184.223	12.632	.000 ^b
	Residual	6455028.314	14	461073.451		
	Total	35575949.428	19			

- a. Dependent Variable: Stock market indices
- b. Predictors: (Constant), Money Supply (K'Million), GDP Growth Rates (%), Interest Rates (%), Exchange Rates against US dollar, Index of Industrial Production

The significant value is 0.000 which is less than P=0.01. This implies that the model was statistically significant in predicting how interest rate, GDP growth rate, Exchange rates, money supply and index of industrial production affect stock market indices at Lusaka Stock Exchange. Given 0.00% level of significant, critical value from the table is 2.91, table 10 above shows computed F-value as 12.632. This confirms that overall multiple regression models is statistically significant, it is suitable prediction model for explaining how the selected independent variables influence stock market performance at Lusaka Stock Exchange.

Table 11: Model Coefficients

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-279.832	1775.568		-.158	.877
	Exchange Rates against US dollar	-.224.004	163.594	-.380	-1.369	.192
	Interest Rates (%)	-.1.202	23.550	-.008	-.051	.960
	GDP Growth Rates (%)	149.085	123.133	.259	1.211	.246
	Index of Industrial Production	8.963	14.588	.345	.614	.549
	Money Supply (K'Million)	.461	.347	.802	1.328	.205

- a. Dependent Variable: Stock market indices

The estimated regression model above shows that the constant=-279.832 this show that if the selected dependent variable (Interest rate, exchange rate, GDP Growth rate, money supply and index of industrial production) were related to zero, stock market would be -279.832. A unit decrease in interest rate would lead to a decrease in stock market by -1.202 while a unit increase in exchange rate, GDP Growth rate, index of industrial production and money supply would lead to an increase in stock market by 149.085, 8.963 and 0.461 respectively as shown in table 11.

5 Conclusion, Discussion and Recommendations

First objective: to establish the effects of money supply on stock market performance in Zambia, the researcher performed correlation analysis in SPSS which produced a Pearson correlation of 0.767. Further to this, the researcher regressed stock market indices against money supply. This produced an R square of 0.589 which represents that money supply, individually, influences stock market performance in Zambia by 58.90%. This goes to show that money supply is significantly positively correlated to stock market performance and a unit increase in money supply will cause an increase in stock market performance by 0.461.

Second Objective: to determine the nature of the relationship between exchange rates and stock market performance in Zambia, the researcher performed correlation analysis in SPSS which produced a pearson correlation of 0.549. Further to this, the researcher regressed stock market indices against money supply. This produced an R square of 0.301 which represents that exchange rates, individually, influence stock market performance in Zambia by 30.10%. This goes to show that exchange rates are significantly positively correlated to stock market performance. However, a unit decrease in exchange rates will cause a decrease in stock market performance by -224.004 as shown by the model coefficients.

Third objective: determine the influence of interest rates on stock market performance in Zambia, the researcher performed correlation analysis in SPSS which produced a pearson correlation of -0569. Further to this, the researcher regressed stock market indices against money supply. This produced an R square of 0.324 which represents that interest rates, individually, influences stock market performance in Zambia by 32.40%. This goes to show that interest rates are significantly negatively correlated with stock market performance and a unit decrease in interest rates will cause a decrease in stock market performance by -1.202.

Fourth objective: determine the influence of the Index of Industrial Production on stock market performance in Zambia, the researcher performed correlation analysis in SPSS which produced a pearson correlation of 0.876. Further to this, the researcher regressed stock market indices against the Index of Industrial Production. This produced an R square of 0.768 which represents that index of Industrial production, individually, influence stock market performance in Zambia by 76.80%. This goes to show that exchange rates are significantly positively correlated to stock market performance. A unit increase in Index of Industrial Production will cause an increase in stock market performance by 8.963 as shown by the model coefficients.

Lastly, in order to determine the impact of GDP growth rates and stock market performance in Zambia, the researcher performed correlation analysis in SPSS which produced a pearson correlation of 0.404. Further to this, the researcher regressed stock market indices against money supply. This produced an R square of 0.163 which represents that GDP growth rates, individually, influence stock market performance in Zambia by 16.30%. This goes to show that exchange rates are positively correlated to stock market performance although the correlation is not statistically significant. Accordingly, a unit increase in GDP growth rates will cause an increase in stock market performance by 149.09 as shown by the model coefficients.

Recommendations

- i. The Central Bank of Zambia should carefully regulate prevailing interest rates, as the study found they have a significant negative effect on stock market performance. Lower and stable interest rates could enhance investor confidence and market activity.
- ii. The Bank of Zambia should introduce deliberate and favorable monetary policies aimed at encouraging both local and foreign investment in the Zambian stock market. These policies should reduce barriers to entry and promote participation by individuals and institutions.
- iii. Strengthening the capital market will contribute to overall economic development. This can be achieved through better financial reporting standards, improved corporate governance, reduced transaction costs, enhanced market liquidity and minimizing political interference.
- iv. To realize sustainable financial growth, stronger collaboration between government and the private sector is essential. Joint initiatives can drive the development of both capital and commodity markets in Zambia.

Declaration of Competing Interests

The authors declare that they are not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

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Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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