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The effect of Exchange Rate on Stock Market Capitalisation in the Zambian Capital Market

Obed Shiyunga
Student Researcher (PhD)
Graduate School of Business
University of Zambia
Lusaka, Zambia
oshiyunga@gmail.com

Abstract

In recent years the performance of most african capital markets has shown a downward trend, Zambia included. The Lusaka Stock Exchange stock price index performed the worst, dropping 26.83% in local currency by the end of 2016. This study sought to find out the effect of exchange rate on stock market capitalisation.

The time sample that was used in this study was a yearly time series that span from 1994 to 2017, thus representing 23 observations from each ZMW/USD exchange rate and market capitalisation. Multiple regression analysis was performed using the Johansen Cointegration test and the Vector Error Correction model (VECM), where market capitalisation was used as the dependent variable while Exchange rate, Inflation rate and GDP were used as the independent variables. All the findings were conducted to test whether F-test statistic hold at 5% level of significance and these were done using E-views, statistical software package.

The probability rejection rule of p value < 0.05 indicating relationship between variables, the research results with a probability of 0.0416 and 0.0440 shows that there is a long run relationship between valuables. While the study also found a negative relationship between exchange rate and stock market capitalisation, that the coefficient of -0.109843 indicates that the stock value decreases by 10.98 percent for any one percent depreciation of the Kwacha against the dollar. Hence, this suggests that the depreciation of the exchange rate negatively affects the performance of the Lusaka Stock market capitalisation. GDP also showed a negative effect of exchange rate on GDP implying that for any one percent depreciation of the currency, GDP decreases by -54.15879. The results for inflation rate also showed a negative relationship between exchange rate and inflation. Inflation rate of -20.7728 showed a negative effect. If the currency depreciates by any one percent change, inflation changes by - 20.7728.. Therefore, this study recommends that the bank of Zambia, ministry of finance and mines to adopt policies that can lead to boosting the economy via an increase in productivity so as to ensure an increase in foreign exchange earnings in the country. These policies may include a predictable and non-discriminatory regulatory environment and an absence of undue administrative impediments to business more generally. Hence, ensuring that there is public sector transparency, which may include an impartial system of courts and law enforcement penned at redressing the tax system that could constitute eliminating barriers to attracting more firms to participate in the capital market. Generally, development in financial inclusion in the financial system will encourage both foreign and domestic capital flows. Therefore, the more foreign currency inflows in the country the better will be the performance of the stock market which will ultimately result in an increase of values all shares on the stock market.

Keywords
Exchange Rate, Market Capitalisation, Johansen Cointegration and Vector Error Correction Model (VECM).

1. Introduction
The development of capital market and its link to economic performance is of great importance to all countries across the globe. The performance of capital market is known to be an important economic driver and this largely attributed to the role of mobilising savings and investments. Since privatisation of the Zambian economy in the 1990's, capital markets has played a critical role in the provision of funds to investors. Today, the performance of Zambian capital markets has a broader perspective, partly due to the influence of ideas among policy makers. The consensus holds that Zambia needs a stable and efficient financial policy to achieve macroeconomic objective of economic growth shaped by the evolution of the capital market. To achieve this, the government is rigorously applying orthodox performance strategies with an emphasis on implementing strict financial policies. These

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performance strategies are based on the view that the improvement in the performance of the Zambian economy prior to liberalization was directly attributed to capital market developments.

Globally, capital market development is identified as a market, contributing to social, economic growth among industrialised countries. This is made possible because of some of its tasks, such as linking deficit with surplus sectors of the economy, promoting economic reforms to modernize the financial sector, and channelling resources.

Ekundayo, I.K (2002). argues that a nation needs a lot of investment, both domestically and abroad, to achieve economic sustainability. Hence, the development of capital markets offers that path. Therefore, the lack of long-term capital in most African countries, including Zambia, is the biggest problem for economic development. In emerging financial markets and industrialized countries, the capital market is seen as a major contributor in promoting economic growth and development. The state of the financial sector is recognised as the major obstacle to economic growth in Zambia. According to Kabala, E., Mapoma, R., Nalutongwe, C., Muyani, D. and Lungu, J., (2021) the financial sector in Zambia has little access to financial services for economically excluded people (in rural areas) and middle-income people. Economically underserved people face two obstacles; one related to income and the other attitudes towards monetary affairs among financial institutions. For many years, Zambian has been subject to a number of social, political and economic measures. With the introduction of the Lusaka Stock Exchange (LuSE) in 1994, the need to encourage capital investment was recognized for quite some time. After the liberalisation of the economy in Zambia, the financial market has been structured among specialised institutions. These consist of the central bank (BoZ), which is responsible over regulating banks and non-bank financial institutions. Other institutions include the Exchange Commission (SEC), which is responsible for regulating the stock market, and the Stock Exchange (LuSE), which provides a market for buying and selling securities. The other institution is the Pensions Insurance (PIA), who oversees the general insurance and schemes.

Developing stock market has been the focus of most African countries. In Africa, for instance, as of 1989 the new stock markets have emerged from as low as 8 to 19 in 2006. Further statistics indicate that most African stock market capitalisation have doubled their market capitalisation between the year 1992 and 2002. Additionally, within the same period, most stock market capitalisation for African countries have increased from US$113,423 million to US$244,672 million (Yartey and Adjasi, 2007).

Exchange rate fluctuations affect the stock prices of not only domestic firms but also multinational firms. With most multinational companies, any variation in the exchange results in an immediate change in the exchange rate positively by increasing income and stock prices, this has a significant bearing on investor confidence and perception of stocks. Hence, understanding the link between exchange rate and stock market capitalisation will help both domestic and foreign investors in hedging and diversifying their portfolios.

In Zambia, the study conducted by sichoongwe (2016) established a negative effect of exchange rate *volatility* on the stock market using the GARCH model. This researcher used the GARCH model because of the volatility of the exchange rate and did not test if the variables have a short run and long run relationship. The use of volatility in a research for a country like Zambia is inconclusive because the volatility of exchange rate is high in developing countries, hence the need to include more variables in the model i.e. interest rates, money supply, bonds, treasury bills etc. Therefore, this study will employ a time series analysis using the Johansen Cointegration and the Vector error correction model. Hence, the following questions will be addressed;

What is the effect of exchange rate on stock market capitalisation in Zambia?
How does the Gross domestic Product (GDP) affect the stock market capitalisation in Zambia?
What is the relationship between inflation rate and exchange rate in Zambia?

1.1 Objectives of the Study

This research study aims to identify the relationship between the exchange rate and the stock market capitalisation in Zambia, if it exists. Lack of empirical studies regarding capital markets in Zambia could be one of the factors influencing policymakers in determining sustainable economic policies. The main aim of this study is therefore to help fill the gap that exists in Zambia. The following objectives are to be discussed;
To determine the effect of inflation on stock market capitalisation?
To analyse the relationship between stock market capitalisation and exchange rate?
To establish the effect of the gross domestic product on market capitalisation?
To draw conclusions from the analysis and make the necessary recommendations?

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2. Literature Review

This section of the report provides a critical review of empirical literature about the relationship between market capitalisation and exchange rate. Many researchers not only studied the two-way relationship between stock market capitalisation and exchange rate but also between stock market capitalisation, exchange and other macroeconomic variables such as interest rate, inflation, money supply and consumer price index.

2.1 Empirical Literature

Notwithstanding these old-style hypotheses, researchers like Cornell (1983) and Wolff (1988) posits a verifiable relationship between securities exchange return and exchange rate movement. Sichoongwe (2016) explored the impacts of exchange rate volatility on the return of stocks in Zambia. The examination utilized time series information from 2000 to 2015, utilizing the GARCH model. The exploration showed that there is a negative connection between stock returns and exchange rate movement.

Solnik (1987) states a negative relationship between domestic returns of stock and exchange rate. Utilizing relapse examination, information was gathered from eight modern nations from 1973–1983. The outcomes further showed a frail yet a sure relationship between two factors exists.

Grange R, Huang B and Yang, C (2000) conducted research on analysing the causality between stock prices and exchange rates. The result shows stock prices lead to negative correlation against exchange rate. This research used the Granger causality test and Cointegration test. Another study by Haji, (2014) analysed the relationship between stock prices on exchange and market capitalisation in Dare Salaam using regression and correlation model. The results indicated that a strong positive linear relationship exists between market capitalisation and the exchange rate of all share indexes. In India Gulati, D. and Kakhani, M. (2012) using a multivariate model analysed the relationship between the stock market and foreign exchange in India. The research shows no relationship between exchange rate and stock market.

Abdalla, I.S. and Murinde, V., (1997) investigated the interaction between the real effective exchange rates of South Korea, India, Pakistan, and the Philippines and the stock price. They found that all countries in the sample, except the Philippines, have a causal relationship one-way from exchange rates to stock prices. Furthermore, Granger et al. (2000) studied the causal relationship between the exchange rate and the price of shares. Their research report indicated that South Korea data is consistent with the traditional method of exchange rates leading stock prices. In contrast, data for the Philippines is consistent with the portfolio approach: equity prices lead the exchange rate with a negative correlation.

Utilizing a broad investigation of six nations, Ma and Kao (1990) discovered domestic currency to adversely influence financial exchange returns for a fair domestic country. Smith (1992) relapsed the relationship between US and German stock profits from US-dollar exchange rate. The outcomes showed a critical impact on US, Germany stock price on the US dollar exchange rate. Bello, Z., (2013) investigated the association between exchange rate and stock market returns using the ANOVA. The findings showed the Chinese yuan was the least volatile of the four currencies and the euro was the most volatile. In Turkey, Kırankabeş, M.C. and Başarır, Ç. (2012) using causality and Cointegration analysed the impact of exchange rates on the stock market. The findings of the research showed a no long run relationship between exchange rate and stock prices.

Adamola A Olugbenga (2012) using the quarterly data since 1985:1 to 2009:4, analysed the effect of exchange rate on stock market behaviour in Nigeria. The research showed a strong bidirectional relationship between exchange rate and stock prices. The researcher used the granger Causality test and the Engle 2 step granger model. Rahman, M.L. and Uddin, J., (2009). investigated the relationship between the exchange rate and stock prices in Bangladesh, India, Pakistan and Sri Lanka. The research showed no long run relationship exists in four countries and unidirectional causality between India and Sri Lanka.

2.2 Theoretical and Conceptual Framework

The theoretical and conceptual framework clarifies the path of the research and grounds it solidly in hypothetical development. The general point of the two frameworks is to make research discoveries more significant, satisfactory to the hypothetical builds in the exploration field and guarantees generalizability. They aid invigorating examination while guaranteeing the augmentation of information by providing both direction and force to the enquiry of the research. They additionally improve the experimentation and meticulousness of the research. Accordingly, it is an embellishment to say that both the theoretical and conceptual frameworks give life to the research.

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2.2.1 Theoretical Framework

Several theories on exchange rate suggest a strong effect of exchange rate on stock market capitalisation. These theories are of great significance to this study in that they serve as an essential nuclear to this research study. We present these theories to facilitate a comprehensive understanding of the study. But first, we introduce factors that determine exchange rates then we look at the background of foreign exchange system, that is, the foreign exchange risk and exposure and finally the flow-oriented model.

Currency exchange rates are subject to significant fluctuations such that managers of Multinationals are always worried. In fact, not only multinational corporations but also domestic companies involved in international activities. The appreciation of the local currency can adversely affect a company's competitive position. To understand a company's forex risk, there are two basic things to consider asking 'why exchange rates fluctuate rather than stay static and what factors to evaluate when considering exchange rate fluctuations. Canales, K and Habermeier (2004, p. 1-13.) examined four macroeconomic controls variables of their study (customer price inflation, GDP growth, monetary deficit (in percentage of GDP), outside trade (in percentage of GDP)). Here, two important variables are worth mentioning; inflation rate differentials and GDP.

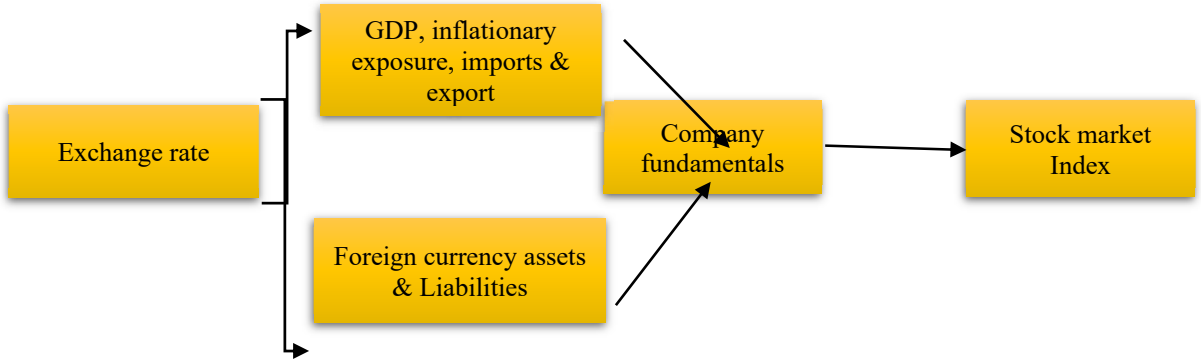

Figure 1. Flow Oriented Model

The above model (fig 1) depicts that there is a relationship from the exchange rate to the stock price. In other words, exchange rate movements affect stock prices. Changes in exchange rates affect a company's competitiveness through its impact on input and output prices. Exporters are adversely affected when exchange rates rise. Soaring currencies will make their goods and services more expensive in the international market. This will reduce exports as buyers in the international market consider it expensive. As a result, they lose their international competitiveness. As a result, profits decline, and when profits decline, companies lose their competitiveness in the domestic stock market. The attractiveness in the domestic stock market will decrease, and the stock price will fall. As a result, you can see the negative relationship between your home currency and stock prices.

To test the theoretical dilemma between exchange rate movements and stock returns, Chen, N.F., Roll, R. and Ross, S.A.,(1986) generated different regression models from both the CAPM and APT theory using the empirical approved theories. The two models tested whether or not exchange rate had any explanatory effect on stock return. However statistical complications were put forward when interpreting the results of these tests. Consequently two new models were derived, Jorion, P., (1991). Using Arbitrage Pricing model: Two-Factor, the two-factor model were derived from the popular CAPM theory. One of the major strengths of the theory is the testability of the model suggested (Chen et al, 1986).
The general consensus of acknowledgment makes this a good model to use when examining whether or not currency fluctuations and exchange rate movements should have effect on stock return or not, defined as part of the systematic or unsystematic risk explained under the CAPM theory. The equation below gives a clear picture of why the researcher believes the CAPM is effective in analysing the effect of exchange rate on stock market returns.

$$\mathcal{R}it = \alpha + \beta i \quad ^{m}\ \delta it \quad ^{m} + \ Bi \quad ^{s}\ Rst + \ £$$

Where;

$\mathcal{R}it$ is the return of stock i in excess of the risk free rate, in time t, dependent variable.
δit ^{m} is the market return of company i in time t in excess of the risk free rate

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δit^{m} is the change in exchange rate for company i´s home currency in time t.
βiM and βi is the loading of the independent variables to the stock return

Therefore, finding a significant exchange rate means that currency fluctuations can be priced on stock returns and are therefore part of the systematic risk that investors should be rewarded with. Investors who have not found an empirical reason for pricing exchange rates should not be rewarded as this is part of the market or unsystematic risk.

2.2.2 Conceptual Framework

According to Camp (2001) a conceptual Framework is a structure that the researcher believes can explain the natural progression of the phenomenon to be studied. The framework is linked to the concepts, empirical research and important theories for promoting the knowledge that the researcher espoused . It is the explanation of how the researcher's problem will be explored. From a statistical point of view, the framework describes the relationship between the main concepts of a study.

The researcher helps, for example, to identify and establish his world view of the phenomenon to be investigated. Renukappa, S, Akintoye, A, Egbu, C. and Suresh, S., 2015 (2015) suggests that researchers often use the conceptual framework when existing theories are inapplicable or sufficient to provide a solid structure for research. The research uses an adaptive approach connecting the exchange rate and stock market returns as purported by the APT and CAPM theory model where variables are to be used as dependent and independent. This approach is essential in generating the hypothesis, the relationship between variables. In this research, the dependent variable is the Stock market capitalisation (SMC) whilst the exchange rate EXR (ZMW/USD$), inflation (IR) and Gross domestic Product (GDP) are independent variables. The figure below (fig 2) illustrates the conceptual framework developed in order to answer the research question.

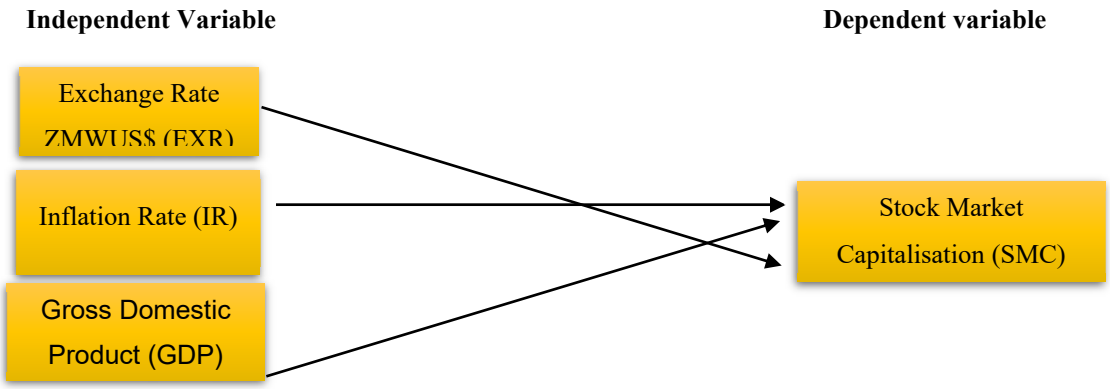

Figure 2. Conceptual Model

2.3 Research Hypothesis

The following research hypothesis were developed from the conceptual framework.

i. Exchange Rate (EXR)

Null hypothesis (Ho)*:* The Exchange rate has no negative influence on stock market capitalisation.

Alternative hypothesis (H1): The Exchange rate has a negative influence on stock market capitalisation.

ii. Inflation rate (IR)

Null hypothesis (Ho)*:* The inflation rate has no negative influence on stock market capitalisation

Alternative hypothesis (H1): The Inflation rate has a negative influence on stock market capitalisation

iii. Gross domestic Product (GDP)

Null hypothesis (H1): The GDP has no negative influence on stock market capitalisation

Alternative hypothesis (Ho)*:* The GDP has a negative influence on stock market capitalisation

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3. Methodology

The selection of model specification in this research refers to the theory and results of empirical research which have been mentioned in the introduction and literature review subsections**.** To test the relationship between stock market capitalisation and exchange rate, the Johansen cointegration and the Vector error correction method were employed, and the regression equation was formulated as follows;

$$\gamma = \beta o + \beta 1x1 + \beta 2x2 + \beta 3x3 \ldots\ldots + \varepsilon$$

Where

βo = y intercept of the regression equation

$\beta 1, \beta 2, \beta 3 =$ Represents all slopes of the equation.

$$SMCt = \beta o + \beta 1IFt + \beta 2GDPt + \beta 3ERt + \varepsilon$$

γ = Stock Market capitalisation (SMC)

$x1 =$ Inflation rate (IR)

$x2 =$ Gross domestic product (GDP)

$x3 =$ Exchange rate ZMWUS$ (EXR).

Johansen cointegration equation

The Johansen's cointegration methodology takes its starting point in the vector autoregression (VAR) of order p given by

$$\gamma t = u + A1Yt - 1 + \ldots ApYt - p + \varepsilon$$

Where γt is an nx1 vector of variables that are integrated of order one commonly denoted I (1) – and εt in an nx1 vector of innovations. This VAR can be rewritten as

$$\Delta\, yt = \mu + \Pi yt - 1 + \sum_{i=1}^{p-1} \Gamma i\, \Delta yt - 1 + \; e \quad t$$

Where

$$\Pi = \sum_{i=1}^{p} At - I \; and \; \Gamma i = \sum_{j=i+1}^{p} Aj$$

If the coefficient matrix Π has reduced rank $r < n$, then there is an existence of nxr matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta\gamma t'$ is stationary, r is the number of contegrating relationships, the elements of α are known as the adjustment parameters in the vector error correction model and each column of β is a contegrating vector. It can be shown that for a given r, the maximum likelihood estimator of β defines the combination of $\gamma t - 1$ that yields the r largest canonical correlations of $\Delta\gamma t$ with $\gamma t - 1$ after correcting for lagged differences and deterministic variables when present. 3 Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the Π matrix. The trace test and maximum eigenvalue test, shown in the two equations below.

$$Jtrace = -T \sum_{i=r+1}^{n} In(1 - \lambda i)$$

$$Jmax = -T\, In(1 - \lambda r + 1)$$

From the equation, T represents the sample size and λi ˆ is the ith largest canonical correlation. Here the trace statistic tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of r +1 contegrating vectors.

4. Data Collection

There were four types of data series used in the research study which are market capitalization, exchange rate (represented by ZMW/USD exchange rate), inflation and GDP. The time sample that was used in this study was a yearly time series that span from 1994 to 2017, thus representing 23 observations from each ZMW/USD

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exchange rate and market capitalisation. The time series period chosen is as a result of data limitation. The data was obtained using unobtrusive data collection method, and this is important as it helped in tackling known biases such as experimenter's bias. All data was collected from Lusaka Stock Exchange (LuSE) and bank of Zambia and full consent was given in using the material only for research purposes.

4.1 Data Analysis

In order to statistically test the significance of the research the t test was used at 95% confidence level. The t-statistical test was done so as to establish the significance of the coefficients and all analysis were done using E-views statistical software package.

5. Results and Discussion

Several statistical preliminaries were conducted before the regression analysis was employed, these included the test for Normality, this was necessary to ensure that the data is normally distributed in a times series analysis, the other test is the test for Stationarity, this was done in order to establish that the there is a constant variance over time so that no periodic fluctuations (seasonality) exist. Autocorrelation test was conducted to measure the relationship of the observation between the different points in a time and the heteroskedasticity tests whether the variance of the errors from a regression is dependent on the values of the independent variables. The other most important tests conducted was the test for Multicollinearity to ensure that two or more explanatory variables in the regression are highly correlated. Finally, the test for Cointegration to test whether there is a long run and the short run relationship between variables.

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The test for Stationarity was done using the *Augmented Dickey-Fuller model* equation for the autogressive process. In other words, the ADF is used to test the null hypothesis that a unit root is present in an autoregressive model of a given time series, and that the process is thus not stationary. The equation below is used to test for Stationarity;

$$\gamma t = C + \beta t + \alpha \gamma t - 1 + \Phi \Delta \gamma t - 1 + \varepsilon t$$

Where;

$\gamma t - 1$= lag 1 of time series

Delta $\gamma(t-1)$= first difference of the series at time $t-1$

If the coefficients $\gamma(t-1)$ is 1, this is implying the presence of a unit root. The null hypothesis for both tests is that the data are non-stationary. We want to reject the null hypothesis for this test, so we want a p-value of less that 0.05 (or smaller).

Tables 1, 2, 3 and 4 will show the Stationarity tests conducted for market capitalisation, exchange rate, inflation rate and gross domestic product (GDP), this will be essential so as to ensure that the data is Stationary and that there is a constant variance over time in a time series analysis. In table 5, the test for Cointegration will be done to establish if there is a relationship among variables. Finally, in table 6 the test for vector error correction will be done to analyse cointegrating relationships. Hence, this will provide a mechanism to understand the long run behavior of the variables in the system.

5.1 Statistical Hypothesis

Null Hypothesis Ho: p-value > 0.05: Fail to reject the null hypothesis (H0), the data have a unit root and is non-stationary.

Alternative Hypothesis Ha: p-value <= 0.05: Reject the null hypothesis (H0), the data does not have a unit root and is stationary.

Table 1. Stationarity – Market Capitalisation

Null Hypothesis: D(MARKET_CAPILISATION_US$M) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.033380	0.0056

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Test critical values:	1% level	-3.769597
	5% level	-3.004861
	10% level	-2.642242

*MacKinnon (1996) one-sided p-values.

Table 2. Stationarity – Exchange Rate

Null Hypothesis: D(EXCHANGE_RATE_ZMW_PER_US) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.355983	0.0003
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Table 3. Stationarity – Inflation Rate

Null Hypothesis: D(INFLATION_RATE__IR_) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.722451	0.0000
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Table 4. Stationarity - Gross Domestic Product (GDP)

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.624393	0.0001
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

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*MacKinnon (1996) one-sided p-values.

From table 1, the P-value for market capitalisation is 0.0056 < 0.05: Reject the null hypothesis (H0), the data does not have a unit root and is stationary at 1st difference.
From table 2, the P-value for exchange rate is 0.0003 < 0.05: Reject the null hypothesis (H0), the data does not have a unit root and is stationary at 1st difference
From table 3, the P-value for inflation rate is 0.0000 < 0.05: Reject the null hypothesis (H0), the data does not have a unit root and is stationary at 1st difference
From table 4, the P-value for GDP rate is 0.0001 < 0.05: Reject the null hypothesis (H0), the data does not have a unit root and is stationary at level.

The next step is to test for cointegration to test whether there is a long run relationship between variables.

This test was conducted using the Johansen Cointegration test and the error correction model (VECM). This has

the hypothesis as follows;

Hypothesis
Null Hypothesis Ho: there is no Cointegration (no long run relationship between variables) p – value < 0.05, reject Ho.
Alternative Hypothesis Ha: p > 0.05, fail to reject the Null Hypothesis, data is cointegrated.

Table 5. Cointegration test

Sample (adjusted): 1996 2017
Included observations: 22 after adjustments
Trend assumption: Linear deterministic trend
Series: STOCK_MARKET_CAPITALIZAT INFLATION_RATE__IR_ GDP EXCHANGE_ZMW_PER_US$
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.868131	75.05766	47.85613	0.0000
At most 1 *	0.566379	30.48690	29.79707	0.0416
At most 2	0.306400	12.10402	15.49471	0.1520
At most 3 *	0.168333	4.055103	3.841466	0.0440

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

From table 5. The probability shows 0.0416 and 0.0440 < 0.05, reject Ho, 2 contegrating equation while 0.1520 > p value 0.05, fail to reject Ho, conclude that the variable is not cointegrated (no long run relationship exists between variables) and trace elements of 75.05766 > critical value of 47.85613 also shows the existence of Cointegration. Hence the results of the regression will be not be spurious.

Table 6 Vector Error Correction Equation

Sample (adjusted): 1996 2017

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Included observations: 22 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
STOCK_MARKET_CAPITALIZAT(SMC)(-1)	1.000000
EXCHANGE_ZMW_PER_(EXR)US$(-1)	1.974570 (0.41359) [4.77424]
INFLATION_RATE__IR_(-1)	1341.632 (108.514) [12.3637]
GDP(-1)	2214.453 (298.741) [7.41261]
C	-49124.20

Error Correction:	D(STOCK_MARKET_CAPITALIZAT)	D(EXCHANGE_ZMW_PER_US$)	D(INFLATION_RATE__IR_)	D(GDP)
CointEq1	0.051025 (0.06208) [0.82186]	-0.066658 (0.04875) [-1.36728]	-0.000680 (8.9E-05) [-7.65525]	-0.000126 (0.00010) [-1.22839]
D(STOCK_MARKET_CAPITALIZAT(-1)) (SMC)	0.052412 (0.42703) [0.12273]	-0.024010 (0.33533) [-0.07160]	0.000281 (0.00061) [0.46002]	0.000213 (0.00071) [0.30060]
D(EXCHANGE_ZMW_PER_US$(-1))(EXR)	-0.109843 (0.51916) [-0.21158]	-0.223554 (0.40767) [-0.54837]	0.002763 (0.00074) [3.71755]	0.000536 (0.00086) [0.62318]
D(INFLATION_RATE__IR_(-1))	-20.77281 (61.6836) [-0.33676]	37.25363 (48.4373) [0.76911]	-0.120304 (0.08830) [-1.36251]	0.086797 (0.10221) [0.84922]
D(GDP(-1))	-54.15879 (144.308) [-0.37530]	102.0316 (113.319) [0.90039]	0.987856 (0.20657) [4.78224]	0.214931 (0.23911) [0.89886]
C	291.5558 (454.288) [0.64179]	518.3003 (356.731) [1.45291]	-3.290800 (0.65028) [-5.06057]	-0.232213 (0.75274) [-0.30849]

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R-squared	0.064652	0.135045	0.901421	0.126498
Adj. R-squared	-0.227644	-0.135254	0.870615	-0.146472
Sum sq. resids	35303545	21768982	72.33678	96.92749
S.E. equation	1485.420	1166.431	2.126276	2.461294
F-statistic	0.221188	0.499614	29.26119	0.463414
Log likelihood	-188.3896	-183.0711	-44.30984	-47.52878
Akaike AIC	17.67178	17.18829	4.573622	4.866252
Schwarz SC	17.96934	17.48584	4.871179	5.163809
Mean dependent	263.0455	412.4091	-1.288636	0.027273
S.D. dependent	1340.642	1094.744	5.911220	2.298698

Determinant resid covariance (dof adj.)	1.36E+13
Determinant resid covariance	3.81E+12
Log likelihood	-443.5236
Akaike information criterion	42.86578
Schwarz criterion	44.25438

Vector error correction equation

$$\Delta Yt = \sigma + \sum_{t=1}^{k-1} \quad Yt-1 + \sum_{j=1}^{k=1} \quad n\Delta t-j + \sum_{m=1}^{k-1} \quad \xi m\Delta i-m + \lambda ECTt-1 + \mu t$$

Derived from the equation;

Vector correction Equation (VECM)

$$SMCt = 0.051025ECTt + 0.052412SMCt - 0.109843EXRt - 20.7728IRt - 54.15879GDPt + 291.558$$

From table 6 and the VECM equation established, the positive constant shows that the stock market capitalisation increases by approximately 291.558 percent due to the influence of other factors not captured in the model. In the long run, the study found negative relationship between exchange rate and stock market capitalisation, that the coefficient of 0.109843 indicates that the stock value decreases by 10.98 percent for any one percent depreciation of the Kwacha against the dollar.

5.2 Proposed Improvements

This research does not exhaust all the independent variables that affect the performance of the stock market capitalisation. This research suggests that further studies should encompass other variables, such as foreign direct investment, Consumer Price Index (CPI), bonds, interest rates, and other macroeconomic variables. The research also suggests that causality relationships can also be employed by other researchers.

6. Conclusion

From the research conducted, the findings conclude that a negative and significant relationship between exchange rate and stock market capitalisation both in the long run exists. The coefficient of -0.109843 indicates that the stock value decreases by 10.98 percent for any one percent depreciation of the Kwacha against the dollar. The gross domestic product and inflation also shows a similar trend, GDP and Inflation decreases by -54.15879 and-20.7728 respectively showing a negative but significant relationship. Therefore, the study contributes to relevant existing theory and practice by advancing a proactive possible solution to the effect of exchange rate on stock market capitalisation. Hence, according to the results, there is need for a careful review of the tax system and policy administration in Zambia that could constitute eliminating barriers to attracting more firms to participate in the capital market. Generally, development in financial inclusion in the financial system will encourage both foreign and domestic capital flows. Therefore, the more foreign currency inflows in the country the better will be the performance of the stock market which will ultimately result in an increase of values all shares on the stock market.

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Biography

Obed Shiyunga is a Trade Finance Specialist and Lecturer in the School of Business at Information and Communications University. He is a student researcher pursuing a Doctor of Philosophy (PhD) degree in Business and Management at the University of Zambia. Obed has over 7 years' experience in the banking sector, specialised in retail credit and trade finance. He has worked with Standard Chartered bank, Ab bank and Euro Exim bank. Obed has a Bachelor of Business Administration and a Master of Business of business administration – finance from the Copperbelt University. He has so much passion for business, hence he has taught a vast number of students in courses such as international finance and strategy. His research interests are in finance, specifically development of capital markets.

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