The Influence of Foreign Exchange Volatility, Interest Rates on the Stock Performance of Uganda Securities Exchange

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Abstract

This study examines the influence of foreign exchange rate volatility and interest rate, on the stock performance of the firms listed on the Uganda Securities Exchange (USE). Using the Arbitrage Pricing Model on 16 firms for a ten (10) year period. The findings of this study suggest that increase in foreign exchange rate, and interest rate reduces the performance of the stocks of the listed firms in USE. This implies that when the Uganda shilling depreciates against the US dollar or when interest rates increase, the performance of stocks on the USE will shrink and vice versa. The major contribution, is the localization of research findings on how movements in macroeconomic factors affect performance of stocks.

1 Introduction

The purpose of this study is to examine how foreign exchange volatility and interests rates impacts on the performance of the Uganda Securities Exchange. Macroeconomic stability is the cornerstone of private sector development and economic growth. Evidence is provided on the impact of the macroeconomic environment on the stock markets. Most of the evidence provided is in highly developed stock markets, shows that macroeconomic environment is the most

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important determinants of stock market behavior (Martinez-Moya, 2013; Agalega and Antwi, 2013). As financial markets become liberalized, their relationship with stock market performance became more evident (Kirui, et al, 2014).

Stock Markets play a crucial role of channeling of resources from surplus units to the deficit units of an economy (Dudley and Hubbard, 2004). This intermediation role benefits investors to find suitable investment opportunities for their surplus funds as well as listed firms and Government units with financial needs and by so doing stock markets foster the development of an economy. Dudley and Hubbard, (2004) further argue that stock markets can provide a barometer of a country's fiscal health and provide a mechanism for supervision and regulation of businesses listed on the markets. They also play a role in redistributing of wealth by providing a chance to smaller investors to earn dividends and capital gains from otherwise unaffordable investments.

The nexus between macroeconomic fundamentals and stock market performance is an on-going interest of investor, academics and policy makers. The changes in factors constituting the macroeconomic environment have a diverse effect across the economic spectrum (Ouma and Muiru, 2014). Osamwonyi and Eybario (2012) argue that economic theory and empirical studies consider stock prices as one of the best indicators of economic activity. And indeed there has been growing intellectual curiosity during the last two or three decades regarding what influences the changes in prices of stocks. Barnor (2014) argues that the effect of macroeconomic fundamentals on stock market returns is without dispute although there is little evidence of this effect in case of emerging markets.

An examination of the Uganda Securities Exchange All Share Index (USE ALSI) indicates that stock performance experienced a negative trend between 2010 and 2012 and more recently in the second half of 2015. A credit crunch which led to an economic downturn in major world economies was explained by analysts as one of the major contributors to the modest performance between 2010 and 2012. This implied that economic conditions affect stock performance in Uganda. However, Evidence provided by Maswere and Kaberuka, (2013) indicate a positive relationship between USE stock prices and foreign exchange rate both in the long term and short term; and a negative relationship between USE stock prices and interest rate in the long term and an insignificant relationship in the short term. In contrast Kitati, Evusa and Maithya, (2015) find a negative relationship between stock prices and, interest rate and foreign exchange rate. The contradiction of foreign exchange findings of Maswere and Kaberuka, (2013) with the findings of Kitati et al, (2014) motivates for further study.

On the other hand, although findings of interest rate for the two studies above on the USE seem to be consistent (at least in the long term), they are not consistent with known economic logic. Consumer theory dictates that when a

price of product X which is a substitute for product Y increases, the demand for product Y will increase forcing its price to rise as well, (Allan et al., 2004). To an investor, equity shares and Debt instruments are considered substitutes and alternative investment products and therefore from the economic point of view, the rise in stock prices would lead to a similar rise in interest yield and vice versa. The inconsistence of these findings with economic logic motivates further study into the area.

Finally, since opening of trading in 1998, the USE has grown in terms of number of Companies listed on the exchange, volume of trade, and turnover. Although the USE turnover and volume of trade were modest with turnover falling from Ushs.42.0 billion to Ushs.26.4 billion between 2010 and 2012 due to the global economic downturn, the number of Companies listed on the exchange rose from four in 2001 to sixteen in 2015; with the volume of trade rising from 123,231,889 to 2,116,902,689 shares from 2009 to 2014 while turnover rose from Ushs.19.7 billion to 466.4 billion over the same period of time. Despite the progress shown by the above indicators, the USE can be considered to be in its infancy and its volume of trade is way below that of the more established African stock exchanges such as the Johannesburg Stock Exchange and Nairobi Stock Exchange (Maswere and Kaberuka, 2013). And indeed although the above indicators are considered important for measuring performance, investors are particularly concerned about share prices. Share prices provide significant, leading information on investment and, given this apparent empirical link between share prices and investment, it reasonable to suppose that inefficient pricing in equity markets could influence investment, (Warren T, 1993). This study therefore uses the share price as a measure of stock performance.

In Uganda, stock performance as measured by the USE ALSI has experienced considerable fluctuations over the last 4 years with aggregate prices falling from Ushs.1,192.57 at the beginning of March 2011 to 896.27 at the beginning of March 2012, rising sharply to 1,394.70, Ushs.1,482.71 and Ushs.2,032.78 at the beginning of March 2013, 2014 and 2015 respectively. The second half of 2015 however depicted a worrying trend with average prices falling to Ushs.1, 822.20 in October and Ushs.1, 763.75 at the end of December 2015.

A point worth to note is that the Uganda Shilling: United States Dollar (UShs.:USD) exchange rate and other major currencies experienced considerable highs towards the end of same period (2014 through 2015) with the shilling depreciating by up to 40% in September 2015 and the average mid-rate price reaching Ushs. 3,668 per US dollar in September 2015 according to BoU, State of the Economy Report, (2015) probably suggesting a correlation between stock price movements and foreign exchange rates. Similarly, although interest rates on loans have increased steadily over the last decade with only a 6.82 per cent overall rise between January 2005 and December 2014, remarkable highs were noticed

between November 2011 and September 2012 with the maximum Weighted Average Commercial Bank Lending Rate recorded at 27.77 percent in December 2012 according to Bank of Uganda data, probably suggesting that interest rates lead stock price movements. Although the fall in the USE ALSI in 2015 is believed by financial analysts to have resulted from the performance of cross listed counters on the NSE, there is still a gap as to actual root causes of fluctuations in the index over the years and such a general movement in prices is likely to be caused by macroeconomic rather than microeconomic influences.

Negative changes in share prices have a great potential to cause a loss of investor confidence in the securities market. Moreover stock prices are considered to be one of the best indicators of economic activity, (Osamwonyi and Eybario, 2012). A point worth attracting concern to academicians and policy makers in the developing world is that much of the research conducted in this area has centered on highly developed stock markets, (Martinez-Moya, et al., 2013). Moreover, the economic environment in these countries and the under developed economies like Uganda is very different and findings obtained in these economies may not apply to the under developed world. This calls for a study to aid the understanding of the macroeconomic influences on stock returns in underdeveloped economies.

Individuals and firms invest in stocks to earn returns in form of dividends or capital gains resulting from market price increases of their stocks. Unlike investments in Government securities stocks are highly risky investments. Part of the risk of investment in stocks, the unsystematic risk can be reduced through diversification and the other part borne of macroeconomic factors, the systematic risk, cannot be diversified away. Laichena & Obwogi (2015) aver that the economic growth of countries in both the developed and developing markets is dependent on the stability of the stock market. Yet the African equity market has been of little concern to many researchers Mensah M., et al. (2012) and Anisan and Olufisayo,(2009).

Thus, investors need to understand how the systematic risk can be reduced or increased by studying the factors that cause them. If investors are not aware of the effect of these factors on their investment, their investment decisions will be uninformed and visionless. The result is to make unexplainable negative returns which would discourage investment. Economic theory indicates that economic variables could cause such fluctuations but this needs to be further proven in Uganda.

2   Literature Review

2.1 Exchange Rates and Stock Performance

Taylor (1995) explains that in an efficient foreign exchange market, foreign exchange rates should fully reflect information available to market participants. Taylor's assertion seems to borrow leaf from the EMH developed by Fama (1965, 1970). The relationship between exchange rates and stock prices can be explained by the Purchasing Power Parity (PPP) theory (Cassel, 1918). According PPP, changes in exchange rate are equal to changes in relative national prices. If this theory holds, then there should be a strong relationship between inflation and exchange rates of major hard currencies holding that the prices in the countries for the hard currencies are kept relatively stable.

Two models explain the relationship between exchange rates and stock performance. The first – the traditional approach concludes that exchange rates should lead stock prices (Tabak, 2006). The model is based on the premise that an increase in exchange rate (devaluation of home currency) leads to stocks appearing cheaper to foreign investors since they can get more local currency units from a unit of foreign currency. The apparent reduction in market price of the stocks will therefore attract more foreign investors creating a higher demand for stocks on the local bourse and vice versa. The second model is the portfolio adjustment approach which concludes that changes in stock prices may influence movements in exchange rates via portfolio adjustments (inflows/outflows of foreign capital). If stock prices increase, they will attract more foreign capital, leading to a higher demand for money and an increase in interest rates. However, if stock prices drop, a fall in investor wealth will result leading to a fall in demand for money and monetary authorities may reduce the interest rates to avert the situation (Tabak, 2006; Kitati, et al., 2015).

There have been considerable research on the effect of changes in exchange rate on the stock performance in many parts of the world with substantially conflicting results. Maswere and Kaberuka, (2013) used the Johansen-Juselius co-integration procedure to determine whether a co-integrating relationship existed between selected macroeconomic variables and the USE stock prices. Their findings indicated that exchange rate fluctuations had a positive bearing on the performance of the USE stocks. These findings were replicated by Barnor, (2014) who tested the effect of macroeconomic variables on stock prices on Ghana Stock Exchange (GSE) using multiple regression; (Mun, 2008) who tested the effect of exchange rate fluctuations on equity markets obtaining evidence from the Asian Financial Crisis; and (Odoyo, et al., 2014).

However, using simple and multi-variate regression, Kitati et al, (2015), established a negative relationship between stock performance and Kshs/Euro and Kshs/USD exchange rates. Hsing, (2011) applied the GARCH model to determine the foreign exchange effect on Czech stock market index and also established a negative relationship. These findings were consistent with evidence by Alam and

Kashif, (2014) on Istanbul Stock Exchange; Kuwornu and Owusu-Nantwi, (2011) on the GSE; Menike, (2006) on Sri Lankan Stock Market; and Zohaib, et al. (2012) on the KSE-100 index, although studies by Naik and Padhi, (2012) on the National Stock Exchange of India, Kutty, (2010), and Mlambo et al., (2013), on the JSE, found the relationship to be insignificant.

Interestingly, evidence by Bello, (2013) on the effect of foreign exchange rates on stock markets of four of the trading partners of the US is not consistent across the four partners. The study evidence indicated that there was a significant negative association between the Japanese Yen and the US stock market; a significant positive bearing between the Euro and Pound Sterling; and the US stock market but the relationship was insignificant between Yuan and the US stock market.

In this study an examination of the impact of foreign exchange rates on the performance of stocks listed on the USE was explored using the following hypothesis.

> Null hypothesis (H_o): There is no association between stock market performance and foreign exchange rate.
> $H_{1:}$There is an association between stock market performance and foreign exchange rate.

Interest Rates and Stock Performance
The Efficient Market Hypothesis can used to illustrate the relationship between interest rates and stock performance. According to Fama (1965, 1970) in an efficient market, stock prices fully reflect all available information and therefore in such a market stocks will always trade at fair prices. Considering that investors have the option to invest in stocks (to earn capital gains or dividends), or debt (to earn interest), then a change in interest rates should be reflected in the prices of stocks.

A number of studies to examine the relationship between interest rates and stock performance have been conducted in different parts of the world consistently indicating a negative relationship. For example, Martinez-Moya et al., (2013)'s study on the impact on interest rate fluctuations on the Spanish stock prices indicate a remarkably negative degree of interest rate exposure with sizeable differences across industries. The study used a Haar á trous wavelet econometric procedure. Their conclusions, however, are based on a sample of selected firms across industries. Alam and Uddin, (2009), investigated the relationship between interest rate and stock prices in a number of developing and developed countries and also found the association negative and significant. Laichena and Obwogi, (2015) carried out similar research but based on East African Community

countries virtually similar results.   Other studies such as Amarasinghe, (2015) on the Colombo Stock Exchange also found that stock prices react negatively to increases in interest rate. Similar evidence is given by; (Hsing, 2011; Hsing, 2013; Humpe and MacMillan, 2007; Barnor, 2014; Quadir, 2012; Kitati, et al., 2015; and Maswere and Kaberuka , 2013). Despite consistency of results, studies such as Ouma and Muiru, (2014) using the OLS regression found the relationship between interest rates and the performance of the stocks listed on the NSE to be insignificant.

There are however, studies that indicate conflicting results. For example, Jawaid and Uihaq, (2012) concluded that the Pakistani stock market react positively to fluctuations in interest rate. Gregoriou, et al., (2009) conducted a study on the banking sector in UK and found the stock returns-interest rate-change relationship had changed to positive during the credit crunch.

In examining the relationship between interest rates and performance of stocks listed on the USE, the following hypotheses were tested:

Null hypothesis *(H$_o$):* There is no association between stock market performance and interest rate.

H$_1$:   There is an association between stock market performance and interest rate.

3 Methodology

We use times series monthly data for the sample period of 10 years (January 2005 to December 2014). This period was considered long enough to form a representative sample considering that the USE has only been in existence since 2003. The data set was transformed using logarithms so that the data could appear to more closely meet the assumptions of statistical inferences and improve the interpretability and appearance of graphs obtained using the data set. Since the purpose of this study was to establish whether foreign exchange rates and interest rates had an influence on the performance of listed stocks on the USE, we controlled for economic growth (GDP), Inflation rate, and Money Supply. This consistent with previous similar studies on the same market such as Maswere and Kaberuka, (2013).

The performance of stocks in Uganda Securities Exchange is the All Share Index (ALSI). The USE ALSI is used to make a general prediction about the performance of stocks in Uganda. This is consistent with the study of Maswere and Kaberuka, (2013) who investigated the determinants of stock market price on the USE over a rather a short window. In this this study we cover a long window of 10 years of 120 months observations. We argue that macroeconomic environment is not static but dynamic over time. Although this study's choice for

independent variables is largely consistent with (Maswere and Kaberuka, 2013), the choice of proxies for the variables differs. For example, this study employed the monthly weighted average commercial bank lending rate for interest rate while (Maswere and Kaberuka, 2013) employed the 3-months Treasury Bills.

The study considered a sample period running from January 2005 to December 2014 for selected macroeconomic variables and stock market prices. This translates to 120 monthly observations. In selecting a large sample, the intention of the study was to increase the power of the test and hence reduce the possibility of a statistical type II error, thereby eliminating the chances of accepting a wrong null hypothesis. There are five local, eight cross-listed, and three international Companies listed on the USE (*See Table 1 below*). All cross-listed companies originate from Kenya which contributes 50% of the total listing on the bourse with the percentage listing higher than the local listing at 31.3%. However. One can argue that all international companies listed on the exchange operate in Uganda which explains why their International Securities Identification Numbers (ISINs) are local.

Data on the study and exogenous variables was collected from the databases of different Uganda Government bodies and the World Bank.

Table 1: Description of Data

Name of Variables	Symbol Used	Proxy Used
Exchange Rate	*ExR*	Monthly Average Inter-Bank Foreign Exchange Rate: Uganda shillings per US Dollar
Interest Rate	*IntR*	Weighted Average Commercial Bank Lending Rate
Gross Domestic Product	*GDP*	Annual GDP in Uganda shillings at market prices taken and monthly average
Inflation Rate	*InfR*	Consumer Price Index, CPI: Base: 2005/2006 =100
Money Supply	*Ms*	M2 measured in Local Currency Unit, the Uganda shilling

The study employed theoretical modeling to investigate the effect of the selected macroeconomic factors on performance of shares listed on the USE.

Equation (3.1) below represents the model used to test the effect of changes foreign exchange rate on stock performance.

$$SP = \alpha + \beta_1 FxR + \beta_2 GDP + \beta_3 MS + \beta_4 InfR + \in \qquad (3.1)$$

Equation (3.2) below represents the model used to test the effect of changes in interest rate on stock performance.

$$SP = \alpha + \beta_1 IntR + \beta_2 GDP + \beta_3 Ms + \beta_4 InfR + \in \qquad (3.2)$$

Equation (3.3) below represents the model used to test the combined effect of changes in foreign exchange rate and changes in interest rate on stock performance.

$$SP = \alpha + \beta_1 FxR + \beta_2 IntR + \beta_3 GDP + \beta_4 MS + \beta_5 InfR + \in \qquad (3.3)$$

Where:
SP measures the variability of stock price index indicating performance of stocks; the data set will consist of monthly observations of the average stock price index for the USE ALSI.
FxR is foreign exchange rate Ushs/USD
IntR is Weighted Average Commercial Bank Lending Rate as a proxy for interest rate
GDP is the Gross Domestic Product
Ms is M2 measurement of money supply
InfR is CPI as a proxy for headline inflation.

4 Results

Descriptive Statistics
Table 2 shows the descriptive statistics namely the mean, median, standard deviation, skewness, kurtosis and the minimum and maximum statistics for the variables.

Table 2: Descriptive Statistics of the variables

	N	Mean	Median	Std. Deviation	Skewness	Kurtosis	Min.	Max.
SP	120	1,031.98	959.93	340.73	.78	-.05	386.51	1,864.35
FxR	120	2,147.80	2,098.57	371.67	.15	-1.53	1,600.74	2,814.02
IntR	120	21.21	20.61	2.43	1.10	.49	17.89	27.77
GDP	120	3,286.00	3,143.76	1,561.70	.25	-1.44	1,337.55	5,710.24
InfR	120	151.13	144.21	42.50	.28	-1.43	93.57	218.49
Ms	120	5,807.54	5,313.93	2,749.01	.18	-1.36	2,054.44	11,081.07

a.   Dependent Variable: Log10(SP)
SP = Stock Performance; Uganda Security Exchange All Share Index
GDP = Gross Domestic Product at current prices expressed in billions of Uganda shillings
InfR = Consumer Price Index; Base: 2005/2006 = 100
FxR = Foreign Exchange Rate; Uganda Shillings per US dollar
IntR = Interest Rate; Weighted Average Commercial Bank Lending Rate
Ms = Money Supply; M2 measured in Uganda shillings

The descriptive statistics shown in Table 3 indicate that the mean statistics of variables (*SP, FxR, IntR, GDP, InfR, and Ms)* were 1,031.977, 2,147.796, 21.213, 3,285.997, 151.132, and 5,807.537 for USE ALSI, foreign exchange rate, interest rate, GDP, inflation rate, and money supply respectively for the 120 observations considered in this study. A comparison of the means with the medians of the respective variables (959.93, 2,098.57, 20.61, 3,143.76, 144.21 and 5,313.93 for *SP*, *FxR, IntR, GDP, InfR,* and *Ms* respectively*)* indicates that the mean lies relatively close to median. This implies that the distributions are not clustered round one end of the data set indicating the data sets are fairly normally distributed.

The standard deviations of variables were 340.73, 371.67, 2.43, 1,561.70, 42.50, and 2,749.01 for *SP, FxR, IntR, GDP, InfR, and Ms* respectively. it is clear that the standard deviations of foreign exchange rates, interest rates and inflation rates are relatively low indicating that the data does not spread over a wide range of values, and therefore does not vary greatly from the arithmetic means while the standard deviations of the other variables (*SP, GDP*, and *Ms*) are high indicating that the datasets spread over a wide range of values, and therefore vary greatly from the arithmetic means.

Data Trends
The patterns of the study data is provided to enable the reader observe the general picture in the movement of variables for the period under study.

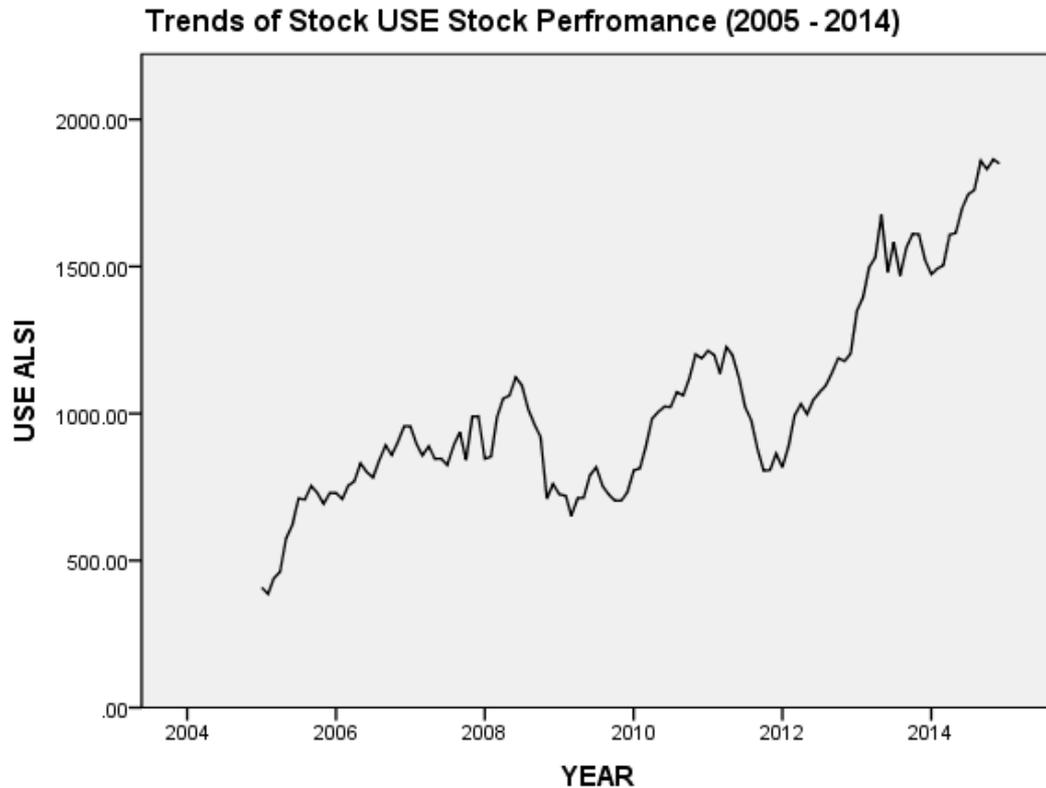**Trends of Stock USE Stock Perfromance (2005 - 2014)**

Figure 1: Trends of USE Stock Performance

The performance of stocks on the USE has generally been upward sloping with slumps in performances noticeable between 2009 and 2010 and the last half on 2011 spreading through the first half of 2012 as shown above. The index has generally been a star performer compared to other African exchanges; for example in 2010 the USE was ranked the best performing exchange in Sub-Saharan Africa and in 2014 the USE ALSI registered a gain of 27.63% a performance that exceeded that most of African's big players such as the JSE, the GSE and the MADEX. The USE's star performance has been linked to a host of incentives including investment capital allowances, and an export promotion incentive including a 10 year income tax break according to *The Mail and Guardian Africa.*

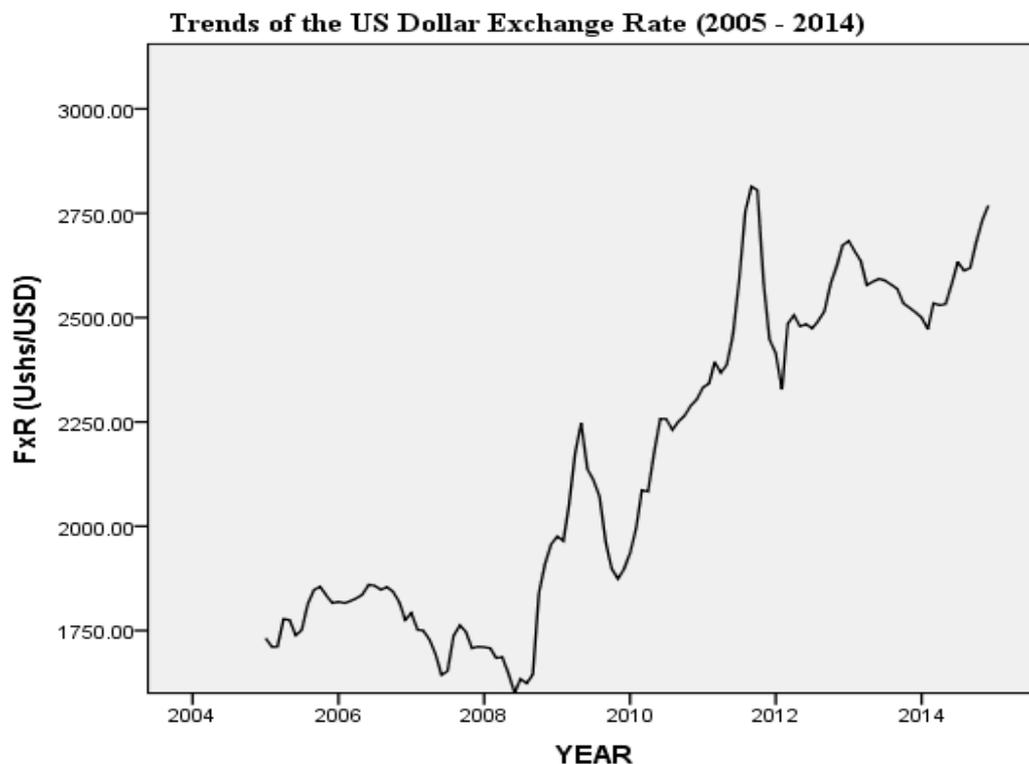**Trends of the US Dollar Exchange Rate (2005 - 2014)**

Figure 2: Trends in Foreign Exchange rate movements

The Line graph above shows trends in foreign exchange movements Ushs./USD over the study period. It can be observed that there was a sharp upward movement in foreign exchange rate over the period of study with only noticeable falls in the last half of 2007 through the first half of 2008, towards the end of 2009 and beginning of 2010 and at the end of 2011. This indicates a sharp loss of value of the Uganda shilling against the United States Dollar over the period of study. The depreciation of the shilling against major foreign currencies has consistently been explained by analysts and BoU as resulting from unfavorable balance of payment. For example, the rapid depreciation of the Uganda shilling against the US. Dollar was explained by BoU to have affected many emerging economies and frontier market due a fall in prices of export commodity prices *(*Ggobi, The Sunrise, July 10, 2015*)*.

The depreciation of the Uganda shilling may have two opposing implications; (1) to foreign investors, the stocks listed in Uganda shillings may look cheaper and therefore fetch higher returns (*ceteris paribus*), and hence attract more foreign buyers and; (2) it may signal a volatile economy with a propensity to discourage investment on the Ugandan bourse.
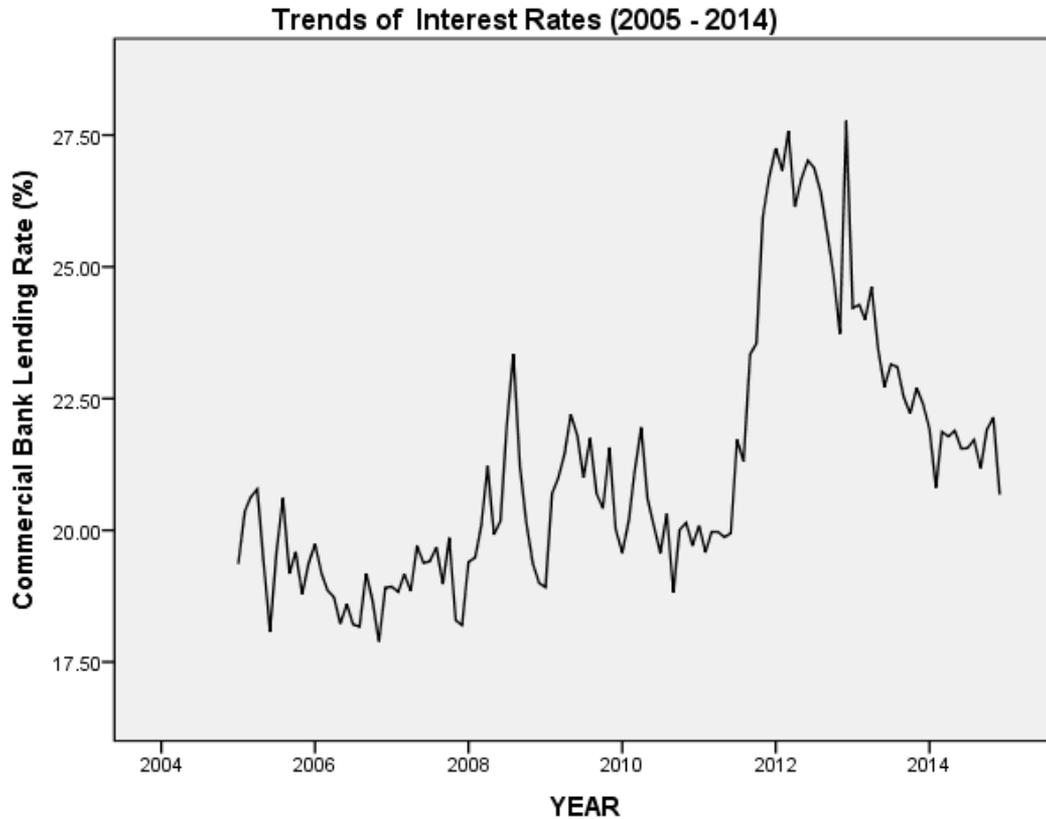
Figure 3: Trends of Commercial Bank Lending Rates

Figure above shows the trends in the Weighted Average Commercial Bank Lending Rate as a proxy for interest rate. The trend shows high volatility of the interest rates for all months under study although due to a sharp rise towards the end of 2011 and a sharp decline between December 2012 and January 2013, the variation is more noticeable during the year 2012. Uganda's Commercial Bank Lending rates are the highest in the East African region averaging 23% by September 2013 (*The New Vision, Friday 6th September, 2013*) compared to Kenya-17%, Rwanda and Burundi-20%, and Tanzania-21%. In addition, the interest rates have been highly volatile with the minimum rate during the period under study being 17.89% and the highest being 27.77% a range of almost 10%. The high volatility of the interest rates implies high risk of investment in Uganda and according to the CAPM; Sharpe, (1964) investors will require a risk premium for taking on extra risk implying that the price of investment assets will be negatively affected.
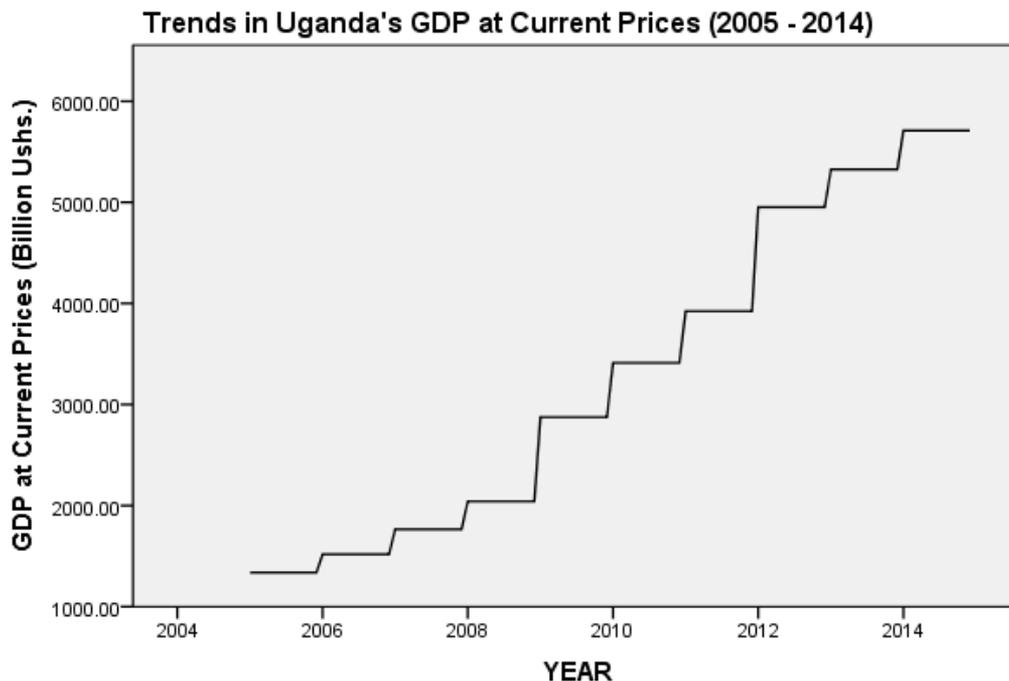
Trends in Uganda's GDP at Current Prices (2005 - 2014)

Figure 4: Trends of GDP at Current Prices

        The trend of the annual GDP as shown in the figure above has been
generally upward sloping moving from Ugshs.1, 337.55 billion in 2004 to Ushs.5,
710.24 billion in 2014 with annual figures moving in one direction. This indicates
continuous economic growth during the period under study. Uganda's GDP
growth rate is the 46th best in the world basing on 2013 estimates according to the
CIA World Fact Book. Given stability of the general price levels, a growth in
GDP indicates economic growth. Continuous economic growth instils confidence
in investors to continue investing in the securities with the likely implication of
growing returns of the securities listed on the bourse. Despite the growth,
however, Uganda's GDP still ranks 104th of the world economies – lower than
Tanzania (91st) and Kenya (72nd) although its ranking is higher than that of
Democratic Republic of Congo (114th), Rwanda (144th) and Burundi (173rd).

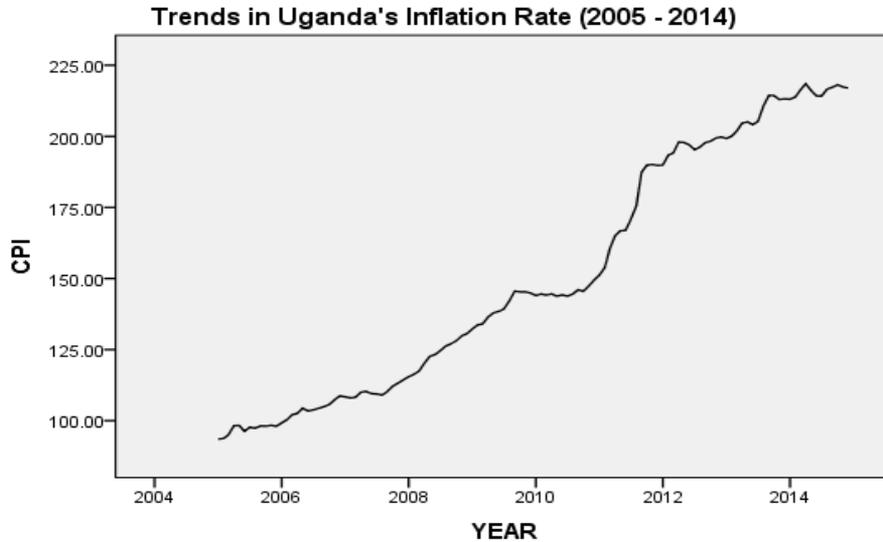**Trends in Uganda's Inflation Rate (2005 - 2014)**

Figure 5: CPI Trends 2005 -2014

The figure above indicates that the inflation rate as measured by headline CPI has been on the rise during the period under study with no major reductions during the period. The rise in inflation impacts the market sentiments. Interest rates rise and hence borrowing becomes costly both from the market and financial institutions. Therefore, the valuations of capital-intensive companies and sectors come under pressure as their margins decrease due to the higher interest burden.

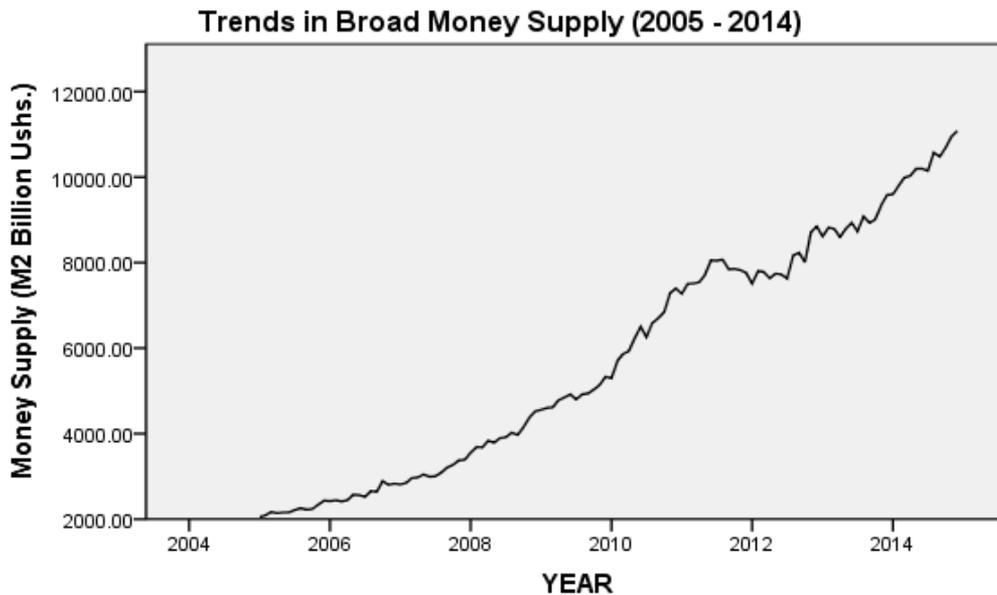**Trends in Broad Money Supply (2005 - 2014)**

Figure 6: Trends in money supply (M2)

The figure above indicates that the money supply measured using M2 has been on the rise during the period under study with no major drops during the period. According to Schwartz (2012), in a buoyant economy, increasing money supply will cause stock market prices to rise and firms will issue equity and debt. If the money supply continues to expand, prices begin to rise, especially if output growth reaches capacity limits. As the public begins to expect inflation, lenders insist on higher interest rates to offset an expected decline in purchasing power over the life of their loans. In short, increasing money supply is expected to increase both interest rates and prices of securities.

Regression Test Results

Table 3: OLS Regression Results

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
3.1	(Constant)	2.134	.596		3.582	.001
	Log10(GDP)	-.556	.273	-.878	-2.034	.044
	Log10(InfR)	.919	.387	.800	2.378	.019
	Log10(Ms)	.704	.212	1.138	3.316	.001
	Log10(FxR)	-.546	.267	-.291	-2.044	.043
3.2	(Constant)	1.980	.226		8.758	.000
	Log10(GDP)	-.344	.247	-.543	-1.391	.167
	Log10(InfR)	1.694	.373	1.474	4.542	.000
	Log10(Ms)	.125	.212	.202	.589	.557
	Log10(IntR)	-1.453	.247	-.487	-5.876	.000
3.3	(Constant)	3.146	.549		5.733	.000
	Log10(GDP)	-.299	.243	-.472	-1.228	.222
	Log10(InfR)	1.884	.375	1.639	5.023	.000
	Log10(Ms)	.144	.208	.233	.694	.489
	Log10(FxR)	-.543	.234	-.290	-2.323	.022
	Log10(IntR)	-1.452	.243	-.487	-5.984	.000

b.   Dependent Variable: Log10(SP)

SP = Stock Performance; Uganda Security Exchange All Share Index

GDP = Gross Domestic Product at current prices expressed in billions of Uganda shillings

InfR = Consumer Price Index; Base: 2005/2006 = 100

FxR = Foreign Exchange Rate; Uganda Shillings per US dollar

IntR = Interest Rate; Weighted Average Commercial Bank Lending Rate

Ms = Money Supply; M2 measured in Uganda shillings

H_0: At least 1 of the predictor variables does not have predictive capability of stock performance in the presence of other predictor variables.
H_1: All predictor variables have predictive capability of stock performance in the presence other predictor variables.

In model 3.1, the p-values for the coefficients of Log10 (*FxR*) are less than 0.05 significant. The unstandardized and standardized β-coefficients lead to the regression equations (4.1) and (4.2) respectively for predicting stock performance:

$Log10\ (SP) = 2.134 – 0.556\ Log10\ (GDP) + 0.919\ Log10\ (InfR) + 0.704\ Log10\ (Ms) – 0.546\ Log10\ (FxR) + \in$ (4.1)

$Log10\ (SP) = 0.800\ Log10\ (InfR) + 1.138\ Log10\ (Ms) – 0.878\ Log10\ (GDP) – 0.291\ Log10\ (FxR) + \in$ (4.2)

Similarly, in model 3.2, Log10 (*IntR*)) are both <0.05 and are therefore significant.The unstandardized and the standardized coefficients lead to the regression equations (4.3) and (4.4) respectively for predicting stock performance:

$Log10\ (SP) = 1.980 + 1.694\ Log10\ (InfR) – 1.453\ Log10\ (IntR) + \in$ (4.3)
$Log10\ (SP) = 1.474\ Log10\ (InfR)\ – 0.487\ Log10\ (IntR) + \in$ (4.4)

The findings in model 3.3 confirm the findings in model 3.1 and model 3.2. This implies that the predictor variables that are of value in the fitted model of explaining the variability in stock performance are (*Log10 (FxR)*), and (*Log10 (IntR)*).

Foreign exchange rate and stock performance
The findings of this study on the relationship between foreign exchange rate and stock performance are consistent with Maswere and Kaberuka, (2013); Alam and Kashif, (2014); Kitati et al, (2015); and Kuwornu and Owusu-Nantwi, (2011) who find a negative relationship between foreign exchange rate and stock prices on the Istanbul Stock Exchange and, Ghana Stock Exchange respectively. However, the findings are not consistent with the findings of Barnor, (2014); and Kuwornu and Owusu-Nantwi, (2011) on the Ghana Stock Exchange; who find the relationship to be positive; and the findings of Naik and Padhi, (2012); and Mlambo, Maredza, and Sibanda, (2013), on the National Stock Exchange of India and Johannesburg Stock Exchange respectively, who find the relationship to be insignificant. These findings are also consistent with known facts about the USE. According to *(The Daily Monitor, Monday July 6 2015)*, the USE is dominated by foreign investors with about 71 percent of the dividends declared by Companies listed on the exchange by October, 2014 being due to foreign investors. Given this datum,

foreign exchange fluctuations would be expected to impact highly of the performance of the bourse. Again applying the price theory, when the Uganda shilling depreciates against major hard currencies, foreign investors will be attracted to invest on the USE (*ceteris paribus*). The influx of foreign investment will cause a rise in the prices of the stocks in short-run but in the longer-run the price will decline due to diminishing returns on investment. On another note, the shrinkage in prices of the stocks on the USE may be related to the risk averse nature of investors as suggested by (Markowitz, 1952). A rise in foreign exchange rate may send a signal of economic unrest in the country scaring off investors and thereby forcing the prices of stocks to move downwards.

Interest rate and stock performance
This study used the Commercial Bank Lending Rate as a proxy for interest rate. This is because it is one of the major sources of business finance in Uganda, (Kasekende and Opondo, 2003). As posited by Martinez-Moya et al., (2013) interest rate changes are broadly recognized as a major source of uncertainty. Being a source of uncertainty therefore makes interest rate fluctuations a good candidate for impactors on stock performance. The findings of this study show a significant relationship between interest rate and stock performance. The relationship between interest rate and stock performance we find to be negative implying that the two variables move in the opposite directions.

These results are consistent with the Efficiency Market Hypothesis which indicates that movements in stock prices should reflect all available information assuming investors are rational and markets are efficient. The findings of this study are consistent with Maswere and Kaberuka, (2013) and similar studies elsewhere in Africa (*e.g.* Barnor, 2014;. Quadir, 2012; and Ouma et al, et al, 2015) and the rest of the world (*e.g.* Hsing, 2011; Hsing, 2013; Humpe and MacMillan, 2007; Amarasinghe, 2015; Perera, 2016). However, Jawaid and Uihaq, (2012) found that the Pakistani stock market react positively to fluctuations in interest rate.

The study results are also consistent with known economic logic of price theory and Markowitz, (1952). When the price of a commodity rises suppliers will be (*ceteris paribus*) willing to supply more of that commodity and less of the substitute commodity. Consequently, when interest rate rises, suppliers of investment finance would channel their investment to loan investment and fewer would investment in equity forcing the prices of stocks to fall. According to MPT, the price of a risky asset will adjust so that the ratios in the tangency portfolio are the same as the ratios in which the risky assets are supplied to the market (i.e. relative supplies will equal relative demands).

5 Conclusion and Implications of the Study

The stock exchange operates in the macroeconomic environment and as concluded in this study, its performance is influenced by macroeconomic factors. Prior studies have used different macroeconomic variables and employed different methodological approaches in order to ascertain the relationship between macroeconomic variables and the performance of stock markets. For example, (Maswere and Kaberuka, 2013) employed the Johansen-Juselius cointegration procedure to determine the long-run relationship between the prices of stocks listed of the USE and macroeconomic variables namely; inflation, interest rate, money supply, and real effective exchange rate while (Kitati et al, 2015) employed correlation and regression analyses to determine relationship (whether positive or negative) and extent of influence of the predictor variable on prices of stocks listed on the Nairobi Stock Exchange and studied macroeconomic variables namely; inflation rate, foreign exchange rate and interest rate.

The findings of this study have some important policy implications. First, both interest rate and foreign exchange movements contain some significant information to forecast stock market performance. Second, regulatory bodies such as Bank of Uganda and Capital Markets Authority government can make important contributions towards the development of the Uganda Securities Exchange (USE). Finally, investors can predict the performance of their investment on the USE by observing the patterns of movements of macroeconomic variables.

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