Macroeconomic Factors and Stock Return of Firms Listed at the Securities Exchanges in East Africa

Francis Kimani Ngure[1], Peter Wangombe Kariuki[2], Kirema Nkanata Mburugu[3]

[1]PH.D Student, University of Embu, Kenya.

[2]Lecturer, Department of Business Studies, University of Embu, Kenya.

[3]Lecturer, Department of Agricultural Economics and Extension, University of Embu, Kenya

Abstract

This study examined the relationship between macro-economic factors and stock returns of 96 firms listed in East African Stock Exchanges over the period 2016 - 2020. The macro-economic variables were foreign exchange rate, gross domestic product, interest rate and inflation rate. Regression analysis was used to examine the relationship between the variables. The results showed that foreign exchange rate negatively and significantly affects stock returns. The findings suggest that when the foreign exchange rate of a country increases, it negatively affects stock performance and thus the returns of stocks decrease. Policies should thus be put in place to ensure foreign exchange rate is kept constant or lower in order to attract investors and enhance stock returns. The results also showed that gross domestic product positively and significantly affects stock returns. The findings imply that when gross domestic product of a country increases, stock returns increase. Policies should be put in place that ensures growth in gross domestic product in order to enhance stock returns. The results also show that inflation rate negatively and significantly affects stock returns. The findings suggest that when inflation increases in a country it results in decrease in stock returns. Policies should thus be established to curb inflation and enhance stock returns. The results also show that interest rate negatively and significantly affects stock returns. The results imply that when the rate of interest increases in a country, stock returns decrease. Policies that ensure low interest rates should be put in place in order to boost stock returns. This study demonstrates that macroeconomic variables significantly affect stock returns. Therefore, we recommend that governments and other stakeholders should put in place proper macro prudential policies in order to encourage investments and boost stock returns. We also recommend that regulators and policymakers should come up with policies and regulations that will stabilize inflation, reduce or stabilize interest rates, stabilize or reduce exchange rates and also ensure growth in GDP. We suggest that future research may focus on data from developed and developing countries to compare and contrast the effect of macro prudential policies adopted in the various countries and its effects on stock returns.

1. Introduction

Security market is a crucial institution in an economy as it greatly determines and indicates the performance of an economy. The market plays a key role in the mobilization of capital in a country, leading to the growth of industry and commerce (Ho,2019). The securities market thus acts as a link between borrowers and savers by mobilizing savings from a pool of small investors and channel the funds into rewarding investments (Buyuksalvarcu and Hassan, 2010). A well-functioning stock market enables a country to achieve sustainable growth and development by enabling accumulation of savings, attracting local and foreign investment portfolios and channel resources into optimal investments (Olokoyo et al, 2020). Despite the vital role played by the securities market in economic development, uncertainty in stock return has been a major concern in the financial sector globally. In the United States (US), the New York Stock Exchange (NYSE) composite index indicates that the stock returns have been fluctuating. In the year 2015, the returns were -6.4%, 9% in the year 2016, 14.5% in the year 2017 and 11.2% in the year 2018 (NYSE, 2019). In the United Kingdom (UK), the Financial Times Stock Exchange (FTSE) report indicates that the stock returns for all listed companies were 1% in the year 2015, 16.8% in the year 2016, 13.1% in the year 2017 and -9.5% in the year 2018 (FTSE, 2019).

In Africa, a report by Nigeria Securities Exchange indicates that the stock return in Nigeria recorded mixed results. During the year 2015 the return was -17.42% which improved slightly to -6.17% in the year 2016. In the year 2017 the return improved significantly to 41% before declining to -17% in the year 2018 (NSE, 2019). Similarly, a report by Capital Market Authority (CMA) indicates that in Kenya, the NSE all share index registered positive and negative growth. During the year 2015 the NSE index was -10.40% which improved slightly to -8.48% in the year 2016. In the year 2017 the index registered a positive performance of 28.00% but declined to -17.97 in the year 2018 (CMA, 2019). This indicates that the stock performance is highly volatile and thus this may affect deter investors from investing in various stock due to the uncertainty of returns.

Theories have been advanced by various scholars explaining the possible cause of volatility in stock market performance. The Arbitrage Pricing Theory advanced by Ross (1976) asserted that the returns of an asset or stock can be predicted by the linear relationship between the stock's expected return and a number of macroeconomic variables that account for systematic risk.

The Arbitrage Pricing theory implies that the stock performance can be influenced by macroeconomic factors and any change of the macroeconomic factors could result to the volatility of stock returns. Many countries thus established macro prudential policies aimed at mitigating volatility of macroeconomic factors and ensure stability. In the USA, the federal reserve established policies that include monetary policies to ensure stable prices, maximum economic growth and moderate long term interest rates (Federal Reserve, 2021). In the UK, the monetary policy was established to stabilize inflation, interest rates and support other economic aims for growth (BOE, 2021). Countries in Africa have also established the monetary policies aimed at stabilizing inflation, interest rates and facilitating economic growth which are implemented by the Central Banks of the respective countries (CBK, 2021; BOU, 2021; BNR, 2021 & BOT, 2021)

Despite the implementation of the macro prudential policies by the various countries, stock market volatility still persists. This has motivated studies to determine the effectiveness of the macro prudential guidelines adopted by the various countries. The results of the studies are however inconclusive and give mixed results. Some of the studies indicate that the macroeconomic factors negatively and significantly affect stock performance (Asprem, 1989; Mukherjee, 1995; Kandir, 2008; Humpe & Macmilllan, 2009; Tripathy, 2011, Ajaz et al., 2017, Chang and Rajput, 2018; Pilinkus & Boguslauskas, 2009; Subburayan & Srinivasan, 2014; Ibrahim & Musah, 2014).

Some studies also indicate that macroeconomic factors do not affect stock market performance (Joseph &Vezos, 2006; lee & Brahmasrene, 2018; Anwer et al., 2019) while other studies indicate that macroeconomic factors positively and significantly affect stock performance (Kandir 2008; Barakat et al., 2015; Chang and Rajput, 2018; Yartey, 2010; Makan et al., 2012; Mutuku & Ng'eny, 2014, Al-shami and Ibrahim,2013; Tiryaki et al., 2019). Most of these studies also focused on developed countries. This study thus attempts to address these gaps by investigating the effect of macroeconomic factors on stock performance in East Africa Securities Exchanges which is from a developing countries perspective. Specifically, the study examined the effect of interest rate, inflation rate, gross domestic product, and foreign exchange rate on stock performance in East Africa Securities Exchange.

The study contributes to macroeconomics literature in various ways. First, the study provides empirical evidence on the effect of macro-economic factors (interest rate, inflation rate, gross domestic product, and foreign exchange rate) on stock performance in East Africa Securities Exchanges. The findings thus provide insight on the effect of the various macro-economic factors on stock performance from developing Countries perspective contrary to other studies which focused on developed countries. Second, this study examines empirically the effect of macro prudential guidelines adopted by Countries in East Africa on stock performance of firms listed in East Africa Securities Exchanges. To the best of our knowledge, no study has been done to determine the effect of the macro prudential guidelines on stock performance of the firms listed in East Africa Securities Exchanges. This study thus provides an empirical examination of the effect of the various macro prudential guidelines and gives recommendations that can be utilized by policymakers in assessing and reviewing the policies. Thirdly, the study gives recommendations to policy makers of various countries reserve or central banks regarding macro prudential policies that can be adopted to stabilize the economy, boost investments and enhance economic growth.

The rest of this paper is structured as follows: background of the study is presented in section 2, theoretical review in section 3, empirical review, and hypotheses development in section 4. Research design is presented in section 5, empirical results and discussion is presented in section 6, summary and conclusion are presented in section 7.

2. Background

East Africa has four operational stock exchanges; the Nairobi Securities Exchange (NSE) in Kenya, Rwanda Securities Exchange (RSE) in Rwanda, Dare salaam Securities Exchange (DSE) in Tanzania and Uganda Securities Exchange (USE) in Uganda. A total of 116 companies are listed on the four exchanges; 64 on the NSE, 7 on the RSE, 28 on the DSE and 17 on the USE. The East African Securities Exchanges Association (EASEA) came into being in 2004, following the signing of a Memorandum of Understanding between the DSE, the USE and the NSE (African Securities Exchanges Association (ASEA), 2009). The key objective of EASEA is to oversee the creation of single or integrated and efficient market infrastructure, from the current disenfranchised markets, compatible with other markets globally.

Securities exchange play a vital role in the growth of an economy by encouraging savings and investment, as well as helping local and international investor's access cost-effective capital. Despite the benefits of the sector, investors are faced with high volatility of stock return which poses greater risk to their investments. During the year between 2014 to the year 2018 the NSE all share index registered positive and negative growth. In the year 2014 the index increased by 24.51% but declined by 10.40% in the year 2015. The index further declined by 8.48% in the year 2016 and increased by 28.00% in the year 2017 before declining by 17.97% in the year 2018 (NSE, 2019).

In Uganda, the USE all share index also registered positive and negative performance. In the Year 2014 the USE index increased by 9% and also increased by 22% in the year 2015. However, the index declined by 2% in the year 2016 and further declined by 24% in the year 2017. In the year 2018, the index registered positive growth and increased by 55% (USE, 2019). In Tanzania, the DSE all share index recorded positive and negative performance between the year 2014 to 2018. In the Year 2014, the DSE all share index increased by 39% before declining by 14% in the year 2015. The index declined further by 7% in the year 2016 before increasing by 10% in the year 2017 and declining by 9% in the year 2018 (DSE, 2019). Due to this volatility, investors are likely to avoid the market due to unpredictable nature of the expected returns. This may negatively impact the performance of the market and may adversely affect the economy in general. Trading volumes will also be affected drastically if investors avoid securities deemed to be highly volatile. In view of this volatility, the governments in East Africa introduced macro prudential measures to ensure sustained macroeconomic stability which in turn stabilize the securities market and attract investors.

In Kenya for instance, a law capping interest rates was enacted in the year 2016 to check on high cost of credit and interest rate fluctuation. All the countries in East Africa have also put in place monetary policies to ensure stability of prices, foreign exchange, interest rates and foster economic growth (CBK, 2021; BOU, 2021; BNR, 2021 & BOT, 2021). Despite the introduction of the measures, the volatility of the securities market still persists. This then raises the question of whether macroeconomic factors contribute to the volatility of the stock market. This study thus attempts to determine the effect of macroeconomic factors on stock performance in East Africa Security Exchanges.

3. Theoretical Literature Review

This study adopted arbitrage pricing theory which was advance by Ross (1976). The theory is a multi-factor asset pricing model based on the idea that an asset's returns can be predicted using the linear relationship between the asset's expected return and a number of macroeconomic variables that capture systematic risk. The theory asserts that the expected return of a financial asset can be modelled as a linear relationship of various macroeconomic factors. The model derived will then be used to obtain the price or value of the security correctly. The security value should equal the expected end of period value discounted at the rate implied by the model. If the security value changes, arbitrage should bring it back to the line. Huberman and Wang (2005) formalized Ross' (1976) heuristic argument by defining arbitrage as the existence of zero-cost portfolios. Based on this, APT can be proven to hold in the limit for well-diversified portfolios. The theory in general, demonstrates how securities are priced given the associated risks. Extant literature indicates that several studies have adopted this theory to determine the effect of Macro-economic factors on stock performance (Pilinkus & Boguslauskas, 2009; Subburayan & Srinivasan, 2014; Ibrahim & Musah, 2014). The theory is useful in the study since it explains the relationship between macro-economic factors and stock return in line with the following APT formula developed by Ross (1976).

$$E(ri) = rf + \beta i1 * RP1 + \beta i2 * RP2 + \ldots + \beta kn * RPn \qquad (1)$$

Where

E(ri) is expected return

rf is the risk-free rate of return,

β is the sensitivity of the portfolio to the specific factor (Inflation, GDP, Interest rate & foreign exchange rate)

RP is the risk premium of the specified factor

4. Literature Review and Hypotheses Development

4.1 Foreign Exchange Rate

Foreign exchange rate is the price of one countries currency in relation to another (Vogler et al, 2019). Investment in stock markets have become global thus enabling investors invest across different nationalities (Cornelius, 2011). The exchange rate movement is thus critical because when a currency depreciates fast, a country may not be attractive to foreign investors who play a major role in the stock market.

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Capital flight to other attractive markets may also be experienced thus negatively affecting performance of the stock market and result in reduction of wealth in a nation (Kyereboah-Coleman & Agyire-Tettey, 2008; Vejzagic & Zarafat, 2013). Adverse changes in exchange rates negatively impacts firm competitiveness leading in changes in firms' equity and profits, which in turn result to price adjustment in the stock market (Vejzagic & Zarafat, 2013). This view is supported by Arbitrage theory which asserts that the expected return of a financial asset can be modelled as a linear relationship of various macroeconomic factors (Ross (1976).

Extant literature affirm that foreign exchange rate negatively affects stock performance (Pilinkus & Boguslauskas, 2009; Subburayan & Srinivasan, 2014; Ibrahim & Musah, 2014). We therefore hypothesize that;

$H_{01:}$ There is a negative relationship between foreign exchange rate and the stock performance of firms listed in East Africa Security Exchanges.

4.2 Gross Domestic Product

Gross domestic product is the aggregate market value of goods and services produced during a particular period by a Country (Verma & Bansal, 2021). During periods of high economic growth, there is confidence within the economy and this would stimulate demand for products and services. Accordingly, growth in GDP is expected to have a positive influence on the excess returns for stocks. On the contrary, in periods of economic downturn accompanied by high economic volatilities, investors' confidence on the prospect of the economy may be dampened and as a consequence, associated with a lower expected excess returns on investments (Liow et al., 2006). Studies affirm that gross domestic product positively affect stock performance (Yartey, 2010; Makan et al., 2012; Mutuku & Ng'eny, 2014, Al-shami and Ibrahim,2013; Tiryaki et al., 2019). We thus hypothesize that:

$H_{02:}$ There is a positive relationship between Gross domestic product and the stock performance of firms listed in East Africa Security Exchanges.

4.3 Inflation Rate

Inflation rate is the rate at which inflation increases and it is measured by consumer price index. Inflation occurs when there is consistent rise in prices of goods and services over a period of time. Extant literature on the relationship between inflation rate and stock performance give mixed results. Some studies have found positive relationship between inflation and stock returns (Kandir 2008; Barakat et al., 2015; Chang and Rajput, 2018).

Some studies also did not find any relationship between inflation and stock performance (Subburayan & Srinivisan, 2014, Gurloveleen & Bhatia, 2015; Megaravalli and Sampagnaro, 2018). Other studies also found that there is a negative relationship between inflation and stock performance (Humpe & Macmilllan, 2009; Tripathy, 2011; Issakhu et al., 2013, Ho, 2017; lee & Brahmasrene, 2018).

High rates of inflation rises the cost of living thus shift funds from stock market instruments to consumables. The demand for market instruments will thus reduce and in turn lower trading volumes and prices (Kyereboah-Coleman & Agyire-Tettey, 2008). We thus hypothesis that:

H_{03}: There is a negative relationship between inflation rate and the stock performance of firms listed in East Africa Security Exchanges.

4.4 Interest Rate

Interest rate is the rate charged by the Central or Reserve banks of a given country for provision of loans to a commercial bank. This rate is crucial as it influences the rate of interest that commercial banks will charge borrowers and also the rate at which commercial banks will offer in order to accept deposits from investors. Increase in interest rate may attract savings while decrease in the rate of interest will discourage investors who in turn seek for better investment opportunities elsewhere (Murungi, 2014). Some studies have found positive relationship between interest rate and stock performance of some countries (Nasseh & Strauss, 2000; Wongbangpo & Sharma, 2002). Some studies also did not find any relationship between interest rate and stock performance (Joseph & Vezos, 2006; lee & Brahmasrene, 2018; Anwer et al., 2019). However, other studies have found that interest rate negatively affect stock performance (Asprem, 1989; Mukherjee & Naka, 1995; Kandir, 2008; Humpe & Macmilllan, 2009; Tripathy, 2011, Ajaz et al., 2017, Chang and Rajput, 2018). Interest rates control flow of money and investments in an economy. High interest rates may slow down an economy while low interest rates may stimulate an economy (Egbunike & Okerekeoti, 2018). We thus hypothesize that:

H_{04}: There is a negative relationship between interest rate and Stock performance of firms listed in East Africa Security Exchanges.

5. Research Design

5.1 Sample selection and data sources

The target population comprised of all the ninety-six (96) listed companies in the NSE, RSE, DSE and USE which have traded for five consecutive years as at 31st December 2020.

A census of all the companies which have traded in the East Africa Security Exchange in the year 2016 to 2020 was carried out. The data was obtained from the audited financial reports of the firms listed in the respective East African Stock Exchanges, reports published by the Central Banks and Capital Market Authorities and security exchanges of the respective countries under the study (Kenya, Rwanda, Tanzania, and Uganda).

5.2 Research Model and Measurement of Variables

The study adopted regression analysis to determine the relationship between the variables. The dependent variable was stock return (SR) while the independent variables were four macroeconomic variables, namely: foreign exchange rate (FER), Gross domestic product (GDP), Inflation Rate (INR) and interest rate (IR). Firm characteristics which were the leverage (LEV) and size of the firm (SIZE) was used as the control variable. The summary of how the variables were operationalized is presented in table 1.

Table 1: Operationalization of the Variables

Variable	Indicator (s)	Operationalization
Dependent	Stock Return	$\dfrac{Dividend+(P_1-P_0)}{P_0}$
Independent	Foreign Exchange Rate	X to US dollar rate
Independent	Gross Domestic Product	$\dfrac{GDP_1-GDP_0}{GDP_0}$
Independent	Inflation Rate	$\dfrac{CPI_1-CPI_0}{CPI_0} *100$
Independent	Interest Rate	Annual average of 91 day Treasury bill rate
Control	Leverage	$\dfrac{Long\ term\ debt\ *100}{Equity}$
Control	Size of a firm	Log of total assets.

Where

P_1 – is the price of share at the end of the year, P_0 – is the price of share at the beginning of the year

X – Is the currency of the respective Country, CPI_1 – is consumer price index at the end of the year

CPI_1 – is consumer price index at the beginning of the year, GDP_1 – Is the gross domestic product at the end of the year, GDP_0 – Is the gross domestic product at the beginning of the year.

The following model was used to determine the relationship between the variables:

Model:

$$SR_{it} = \beta_0 + \beta_1 FER_{ct} + \beta_2 GDP_{ct} + \beta_3 INR_{ct} + \beta_4 IR_{ct} + \beta_5 LEV_{it} + \beta_6 SIZE_{it} + \varepsilon \tag{1}$$

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Where:

SR is Stock Return, t = 1,….,5 years, c = 1, ……...,4 countries, i = 1, ……...,96 firms, β_0 is regression constant, β_1 …. β_4 are the coefficients for the various independent variables, β_5 …. β_6 are the coefficients for the control variables, FER is Foreign Exchange rate, GDP is Gross Domestic Product, INR is Inflation Rate, IR is Interest Rate, LEV is leverage and SIZE is the Size of company while ε is the Error term

6. Empirical Results and Discussion

6.1 Descriptive Statistics

The descriptive results of macro-economic factors and stock performance are presented in Table 2. The results indicate that the stock return was between -8.28 and 7.37 with a mean of 3.06. The results suggest that majority of the firms listed in the East Africa Security Exchanges registered positive returns whereas some registered negative returns during the period under study. Foreign exchange rate was between 101 and 3713 with a mean of 1185. This implied that there have been different exchange rates and thus foreign exchange rate volatility is experienced in East Africa. The results also indicate that gross domestic product was between 0.10 and 8.70 with an average of 5.21. The results also confirm the GDP has been fluctuating. The Inflation rate was between 0.01 and 1.28 with an average of 0.26. This implied that the countries experience cases of inflation and the rate also fluctuates. The results also indicate that interest rate was between 4 and 20 with a mean of 9.30. This suggested that the countries experience changes in rate of interest from as low as 4 to as high as 20.

Table 2: Descriptive Statistics

Variable	Indicator	Mean	Maximum	Minimum	Std. Dev.	Observations
Dependent	Stock Return	3.06	7.37	-8.28	1.90	480
Independent	Foreign Exchange Rate	1185	3713	101	1363	480
Independent	Gross Domestic Product	5.21	8.70	0.10	0.016	480
Independent	Inflation Rate	0.26	1.28	0.01	0.29	480
Independent	Interest Rate	9.32	20	4.0	2.80	480
Control	Leverage	1.8	12.2	0.01	1.66	480
Control	Size	5.83	8.99	2.71	2.31	480

6.2 Correlation and Diagnostic Test Results

The correlation results in Table 3 shows that the correlation between stock returns and foreign exchange rate is negative and significant (r = -0.1141, p-value < 0.01).

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The results imply that when the foreign exchange rate increases, the stock returns decreases. The findings also show that the correlation between stock returns and gross domestic product is positive and significant (r = 0.1579, p-value < 0.01). The findings suggest that an increase in gross domestic product leads to an increase in stock returns. The correlation between stock return and inflation rate is negative but not significant (r = -0.0709, p-value > 0.01). The finding implies that an increase in inflation rate results to a decrease in stock returns. The findings also show that the correlation between interest rate and stock return is negative and significant (r = -2788, p-value < 0.01). The results imply that an increase in interest rate results to decrease in stock returns.

The correlation between stock return and size of the firm is positive and significant (r = 0.325, p-value < 0.01). The findings suggest that when the size of a firm increases the stock returns increase. The correlation between stock returns and leverage was negative and significant (r = -0.082, p-value < 0.01). The findings imply that increasing leverage of firm results to decrease in stock returns. The results of the correlation matrix also indicate that the correlation between the variables is below 0.80. The results suggest that there was no multi-collinearity problem. When the correlation between variables exceeds 0.80, then there may be a problem of multi-collinearity (Gujarati,1995). The results presented in Table 4 further shows that the VIF values were below 10, implying that there was no multi-collinearity problem.

Table 3. Pearson Correlation Matrix

VARIABLE	INDICATOR	SR	FER	GDP	INR	IR	SIZE	LEV
Dependent	Stock Return (SR)	1.0000						
Independent	Foreign Exchange Rate (FER)	-0.1141** 0.000	1.0000 -----					
Independent	Gross Domestic Product (GDP)	0.1579** 0.000	-0.039 0.383	1.0000 -----				
Independent	Inflation Rate (INR)	-0.0709 0.1205	0.285** 0.000	-0.133** 0.003	1.0000 -----			
Independent	Interest Rate (IR)	-0.2788** 0.000	0.086 0.057	0.307** 0.000	0.014 0.759	1.0000 -----		
Control	Firm Size (SIZE)	0.325** 0.000	0.088** 0.000	-0.339** 0.000	0.354** 0.000	-0.182** 0.000	1.0000 -----	
Control	Leverage (LEV)	-0.082** 0.000	0.109* 0.016	0.121** 0.007	0.058 0.199	0.125** 0.005	-0.041 0.364	1.0000 -----

**. Correlation is significant at the 0.01 level (2-tailed).
 *. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Variance Inflation Factors

VARIABLE	INDICATOR	VIF	1/VIF
Independent	Foreign Exchange Rate	1.8489	0.54086
Independent	Gross Domestic Product	1.7428	0.57376
Independent	Inflation Rate	1.1877	0.84192
Independent	Interest Rate	1.4890	0.67157
Control	Firm Size	1.1565	0.86464
Control	Leverage	1.1348	0.88118
	Mean VIF	**1.4266**	

Breusch and Pagan Lagrangian multiplier test was carried out to establish whether pooled OLS, random-effects, or fixed-effects model was appropriate. The findings showed that the P value was 0.000 which was less than 0.05 implying that pooled OLS was not appropriate. Hausman test was further carried out to determine whether the random or fixed-effects model was appropriate. The results in table 5 show that the p-value was 0.000 which was less than 0.05 suggesting that the fixed effects model was appropriate. The results in table 6 also show that there is a difference between the values of fixed effect and random effect models. The fixed-effect model was thus used in estimating the effect of risks management on performance. A histogram normality test was also carried out to determine normality. The histogram was bell-shaped and the p-value for Jarque-Bera statistic was 0.379 with a probability of 0.827 which was insignificant at a 5% level of significance, suggesting that the residuals were normally distributed. Scatter plots of the residuals were also generated which confirmed that there was no linearity problem.

Table 5. Hausman test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	47.855895	6	0.0000

Table 6. Cross-section random effects test comparisons

Variable	Indicator	Fixed	Random	Var. (Diff.)	Prob.
Independent	Foreign Exchange Rate	-0.003169	-0.000643	0.000000	0.0001
Independent	Gross Domestic Product	0.275052	0.328935	0.001495	0.1634
Independent	Inflation Rate	-1.084391	-1.019509	0.004893	0.3536
Independent	Interest Rate	-0.135678	-0.036377	0.000468	0.0000
Control	Leverage	0.505178	0.664729	0.047797	0.4655
Control	Firm Size	-0.818056	-0.857902	0.000623	0.1105

6.3 Regression Results and Discussion

The regression results in Table 7 indicate that foreign exchange rate negatively and significantly affects stock returns (β = -0.003201, $p < 0.5$). The findings imply that when the foreign exchange rate of a country increases, it negatively affects stock performance and thus the returns of stocks decrease. The results were in agreement with the findings by (Pilinkus & Boguslauskas, 2009; Subburayan & Srinivasan, 2014; Ibrahim & Musah, 2014). The hypothesis that there is a negative relationship between foreign exchange rate and stock returns in East Africa Securities Exchanges is thus accepted.

The results also showed that gross domestic product positively and significantly affects stock returns (β = 0.27, $p < 0.5$). The findings imply that when gross domestic product increases, stock returns increase. The results were consistent with the recommendation of other studies (Humpe & Macmilllan, 2009; Tripathy, 2011; Issakhu et al., 2013, Ho, 2017; lee & Brahmasrene, 2018). Therefore, the hypothesis that there is a positive relationship between gross domestic product and stock returns in East Africa Securities Exchanges is thus accepted.

The results also show that inflation rate negatively and significantly affects stock returns (β = -1.09, $p < 0.5$). The findings suggest that when inflation increases in a country it results in decrease in stock returns. The findings support the findings of other studies (Humpe & Macmilllan, 2009; Tripathy, 2011; Issakhu et al., 2013, Ho, 2017; lee & Brahmasrene, 2018). Therefore, the hypothesis that there is a negative relationship between inflation rate and stock returns in East Africa Securities Exchanges is thus accepted.

The results also show that interest rate negatively and significantly affects stock performance (β = -0.13, p < 0.5). The results imply that when the rate of interest increases in a country, stock returns decrease. The findings were consistent with the results by (Asprem, 1989; Mukherjee, 1995; Kandir, 2008; Humpe & Macmilllan, 2009; Tripathy, 2011, Ajaz et al., 2017, Chang and Rajput, 2018). High interest rates may slow down an economy while on the other hand low interest rates may stimulate an economy (Egbune & Okerekeoti, 2018).   Therefore, the hypothesis that there is a negative relationship between interest rate and stock returns in East Africa Securities Exchanges is thus accepted.

Table 7: Fixed Effect Model Regression Results

Variable	Indicator	Coefficient	Std. Error	t-Statistic	Prob.
Constant	C	5.542677	1.725016	3.213117	0.0014
Independent	Foreign Exchange Rate	-0.003201	0.000652	-4.907699	0.0000
Independent	Gross Domestic Product	0.276239	0.058381	4.731633	0.0000
Independent	Inflation Rate	-1.092566	0.147547	-7.404871	0.0000
Independent	Interest Rate	-0.136044	0.026558	-5.122599	0.0000
Control	Firm Size	0.501426	0.225339	2.225208	0.0267
Control	Leverage	-0.822270	0.033680	-2.441383	0.0000
	R^2	0.874			
	Adjusted R^2	0.840			
	F statistic	0.000			

 Dependent variable is Stock Returns.

We also conducted further analysis using different models to check the robustness of our findings. The results presented in Table 8 shows that the results obtained from the different models are similar to the results of the fixed effects model adopted. The results from all the models indicate that the relationship between foreign exchange rate, inflation rate, interest rate, Leverage and stock returns was negative. The results of all the models also indicate that the relationship between gross domestic product, firm size and stock returns was positive.

Table 8: Robustness or Additional Regression Analysis Results

Variables	Pooled OLS Model	Generalized Linear Model (GLM)	Random effect Model	Fixed Effect Model	Robust Least Squares Model
C	0.376072	0.376072	0.398686	5.542677	-0.187141
(t-statistic) (Z-statistic)	(0.785801)	(0.785801)	(0.858722)	(3.213117)	(-.377248)
Foreign Exchange Rate	-0.000644*	-0.000644*	-0.000643*	-0.003201*	-0.000710*
(t-statistic) (Z-statistic)	(-7.625747)	(-7.625747)	(-7.805837)	(-4.907699)	(-8.112175)
Gross Domestic Product	0.332039*	0.332039*	0.329094*	0.276239*	0.379886*
(t-statistic) (Z-statistic)	(7.324153)	(7.324153)	(7.54279)	(4.731633)	(8.084234)
Inflation Rate	-1.021242*	-1.021242*	-1.019654*	-1.092566*	-0.979309*
(t-statistic) (Z-statistic)	(-7.523654)	(-7.523654)	(-7.851160)	(-7.404871)	(-6.960439)
Interest Rate	-0.035550*	-0.035550*	-0.036328*	-0.136044*	-0.030338
(t-statistic) (Z-statistic)	(-2.238052)	(-2.238052)	(-2.372177)	(-5.122599)	(-1.842613)
Firm Size	0.665785*	0.665785*	0.664672*	0.501426*	0.713591*
(t-statistic)	((1.24354)		(1.27322)	(2.225208)	
(Z-statistic)		(1.24354)			(1.28585)
Leverage	-0.860946*	-0.860946	-0.858202*	-0.822270*	-0.835490
(t-statistic)	(-3.68178)		(3.79134)	(-2.44138)	
(Z-statistic)		(-3.68178)			(-3.44699)
F.Stat.	62.92589	-	36.628	25.99637	-
Prob(F-Stat)	0.000	-	0.0000	0.00000	-
Prob(LR-Stat)	-	0.00000	-	-	-
Prob (Rn-squared. Stat)	-	-	-	-	0.000000
R-Squared	0.827098	-	0.822893	0.874152	0.639449
Adjusted R-Squared	0.824909	-	0.820646	0.840526	0.864217
Durbin-Watson Statistic	2.344761	-	2.338816	2.385999	-

* = Significant at the 0.05 level.

Dependent variable is Stock Returns.

Independent variables: Foreign exchange rate, Gross domestic product, interest rate and Inflation rate

Control Variables: Leverage and Firm Size

7. Summary and Conclusion

This study investigated the relationship between macro-economic variables and stock returns of 96 Firms listed in East Africa Securities Exchanges. The macro-economic variables were foreign exchange rate, gross domestic product, interest rate and inflation rate. Regression analysis was used to examine the relationship between the variables. The results showed that foreign exchange rate negatively and significantly affects stock returns. The findings suggest that when the foreign exchange rate of a country increases, it negatively affects stock performance and thus the returns of stocks decrease. Policies should thus be put in place to ensure foreign exchange rate is kept constant or lower in order to attract investors and enhance stock returns.

The results also showed that gross domestic product positively and significantly affects stock returns. The findings imply that when gross domestic product of a country increases, stock returns increase. Policies should be put in place that ensures growth in gross domestic product in order to enhance stock returns. The results also show that inflation rate negatively and significantly affects stock returns. The findings suggest that when inflation increases in a country it results in decrease in stock returns. Policies should thus be established to curb inflation and enhance stock returns. The results also show that interest rate negatively and significantly affects stock returns. The results imply that when the rate of interest increases in a country, stock returns decrease. Policies that ensure low interest rates should be put in place in order to boost stock returns.

This study demonstrates that macroeconomic variables significantly affect stock returns. Therefore, we recommend that governments and other stakeholders should put in place proper macro prudential policies in order to encourage investments and boost stock returns. We also recommend that regulators and policymakers should come up with policies and regulations that will stabilize inflation, reduce or stabilize interest rates, stabilize or reduce exchange rates and also ensure growth in GDP. This study contributes to macroeconomics literature by providing an empirical examination of the effect of the various macroeconomic variables and gives recommendations that can be utilized by policymakers in assessing and reviewing macro prudential policies. The study also gives recommendations to regulators and other stakeholders regarding macro prudential strategies that can be adopted to boost the stock returns. We suggest that future research may focus on data from developed and developing countries to compare and contrast the effect of macro prudential policies adopted in the various countries and its effects on stock returns.

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