IMPACT OF MACROECONOMIC VARIABLES ON PERFORMANCE OF FIRMS QUOTED IN THE ENERGY AND ALLIED SECTOR IN THE NAIROBI SECURITIES EXCHANGE

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Abstract

The purpose of this study was to determine the relationship between macroeconomic variables and financial performance of firms quoted in the energy and allied sector in the Nairobi Securities Exchange. The financial performance measures of companies quoted in the energy and allied sector in the Nairobi Securities Exchange was the energy segment stock index which was regressed against the macroeconomic variables including annual exchange rate (USD/Ksh), GDP growth rate, average annual lending interest rates as computed by CBK and inflation rate measured by annual percentage changes in the consumer price index (CPI).

The study used descriptive correlation research design. The population of this study comprised of all firms quoted in the energy and allied sector in the Nairobi Securities Exchange. The study employed annual secondary data which was obtained from the Central Bank of Kenya, Kenya National Bureau of Statistics and published annual financial statements from the NSE. The period of study was six years from 2009 to 2014. The data was analysed using descriptive analysis, correlation analysis and multiple regression analysis.

The study revealed that indeed macro-economic factors have pronounced influence on the financial performance of firms quoted in the energy and allied sector in the Nairobi Securities Exchange. The study concludes that lagging macroeconomic indicators have a significance influence on among companies listed in Energy and petroleum segment of NSE since 20.44% of firm performance variation can be explained by inflation rate, interest rate, GDP and exchange rate jointly.

1.0 Introduction

Macroeconomic indicators are statistics published regularly by government with the primary purpose of indicating the present economic status. They can be classified as either leading indicators if they can be used to future economic prospects. Leading economic indicators include: manufacturing companies activities, retail sales, inventory levels, building permits, housing markets conditions and levels of new business start-ups. Lagging macroeconomic indicators are used to measure their influence on past performance. They include: inflation rate, exchange rate, gross domestic product, levels of unemployment, consumer price index, home currency strength, balance of trade, interest rate, corporate profits as well as value of commodities in relation to US dollar (Bellalah, Levyne and Masood, 2013).

Ali, Akhtar and Ahmed (2011) investigated the bank specific indicators and macroeconomic indicators of profitability of commercial banks in Pakistan. Results of the study showed a positive significant relationship between gross domestic product fluctuations and bank profitability while there was an inverse significant relationship between consumer price index and profitability. Sing (2014) investigated the relationship between macroeconomic indicators and Indian stock market. Results of the study showed that the index of industrial production, wholesale price index, money supply and crude oil price had positive relationship with stock market performance. The foreign institutional investment had a positive significant relationship with stock market performance. Interest rate, trade deficit, exchange rate and gold price had an inverse relationship with stock market performance. Elly and Oriwo (2012) examined the relationship between macroeconomic indicators and stock market performance. Results of the study showed a positive relationship between 91-day Treasury bill rate and stock market performance and weak inverse relationship with inflation rate.

1.2 Problem Statement

Numerous reviews across the globe denote significant relationships exist between exchange rate, interest rate, inflation rate, GDP fluctuation and the financial performance of a firm. Most of these studies show that the macro-economic elements affecting performance of a firm include goods price, money supply, real activity, exchange rates, interest rates, political risks, oil prices, the trade sector, budget deficits, trade deficits, domestic consumption, unemployment rate, imports and regional stock market indices and real wage (Menike, 2006). The Kenyan economy has been characterized with fluctuations in the macroeconomic environment such as interest rates, inflation rates and the exchange rate (Appendix II). For the last decade, this has been the key attention of professional investors, investment advisers and scholars. While, there are multitudes of studies on the effects of such fluctuation in the performance of firms in other sectors especially the banking industries, there has been scarcity of research on the effects of these factors in the energy and allied industry. The neglect of this sector is particularly astonishing since it is one of the vital sectors identified in the achievement of the Vision 2030 in Kenya.

Olweny and Omondi (2011) sought to find out the influence of macroeconomic factors on the performance of the stock market. The results showed evidence that foreign exchange rate, interest rate and inflation rate have a significant effect on stock return volatility. This research assumes that macro-economic factors would affect all the listed companies in the same way. It should however be noted that, while macroeconomic factors affect all industries, the nature and extent of such effects differs from one industry to another. In their research, Ongore and Kusa (2013) found out bank specific factors affect the performance of commercial banks in Kenya. The effect of exchange rate, interest rate, inflation rate and GDP fluctuation variables was however inconclusive and thus requires further research.

According to the Kenya Economic Survey, the challenges facing the energy and allied sector in Kenya include: high cost of production, oil price fluctuations, and comparatively higher interest rates. The consequences of fluctuation of the macroeconomic factors on the financial performance of this sector are nonetheless not sufficiently documented. This therefore reveals that there occurs an empirical gap on the nature and extent of the impact of the macro economic factors on the financial performance of firms in this sector.

The research therefore sought to find out the effect of such fluxes on the financial performance of the firms operating in the energy and allied segment. Satisfying these empirical gaps was a vital addition to existing empirical evidence on this subject matter. The research was therefore a crucial scholarship effort at contributing to, and supplementing other scholarly exertions in providing an empirical foundation for designing a suitable model that would illustrate the relationship between the macroeconomic environment and the financial performance of firms in the energy and allied sector. Moreover, the study used time series analysis method as contrasted to past studies which used ordinary least squares analysis

1.3 Objectives of the Study

The main objective of the study was to establish the effects of macroeconomic variables on financial performance of firms quoted in energy and allied sectors in the Nairobi Securities Exchange.

Specifically the study sought:

i. To find out the relationship between inflation rate and firm performance among companies listed in energy and petroleum segment of NSE.

ii. To establish the relationship between exchange rate and firm performance among companies listed in energy and petroleum segment of NSE.

iii. To investigate the relationship between GDP fluctuations and firm performance among companies listed in energy and petroleum segment of NSE.

iv. To find out the relationship between interest rate and firm performance among companies listed in energy and petroleum segment of NSE.

2.0 Review of Literature

The current study was guided by three theories which were purchasing power parity theory, liquidity preference theory and arbitrate pricing theorem. This section sought to clarify whether there exists posits that a relationship exists between theoretical framework and firm performance. Theoretical framework will act as the foundation upon which empirical review will be carried out. The main source of literature was past studies in relation to the four objectives of the study.

2.1 Purchasing Power Parity Theory

Purchasing power parity theory (PPP) is a theory of exchange rate determination. It argues that the exchange rate change between two currencies over any period of time is determined by the change in the two countries relative price levels. Since the theory singles out price level changes as the overriding determinant of exchange rate movements, it has also been called inflationary theory of exchange rate. PPP can be categorised into either absolute or relative PPP. According to Coakley *et, al.*, (2005) if home country's currency is converted to foreign currency in absolute term then it will have similar purchasing power. Coakley *et. al,* argued that home currency should always purchase a similar basket of goods in the foreign country. Relative PPP argues that changes in national prices reflect changes in nominal price levels between countries. The theory is appropriate in the current study since companies listed in industrial and allied segment imports some products which will precipitate the use of foreign currency which will have an effect on their performance.

2.2 Conceptual Framework

A conceptual framework is the diagrammatic presentation of variables, showing the relationship between the independent variable and dependent variables. In this study, the independent variables will be; annual inflation rate, dollar exchange rate, GDP fluctuations and interest rate. Firm performance will be measured using return on assets. The hypothesized relationship between the independent variables and dependent variable is presented schematically in the conceptual framework in Figure 2.1.

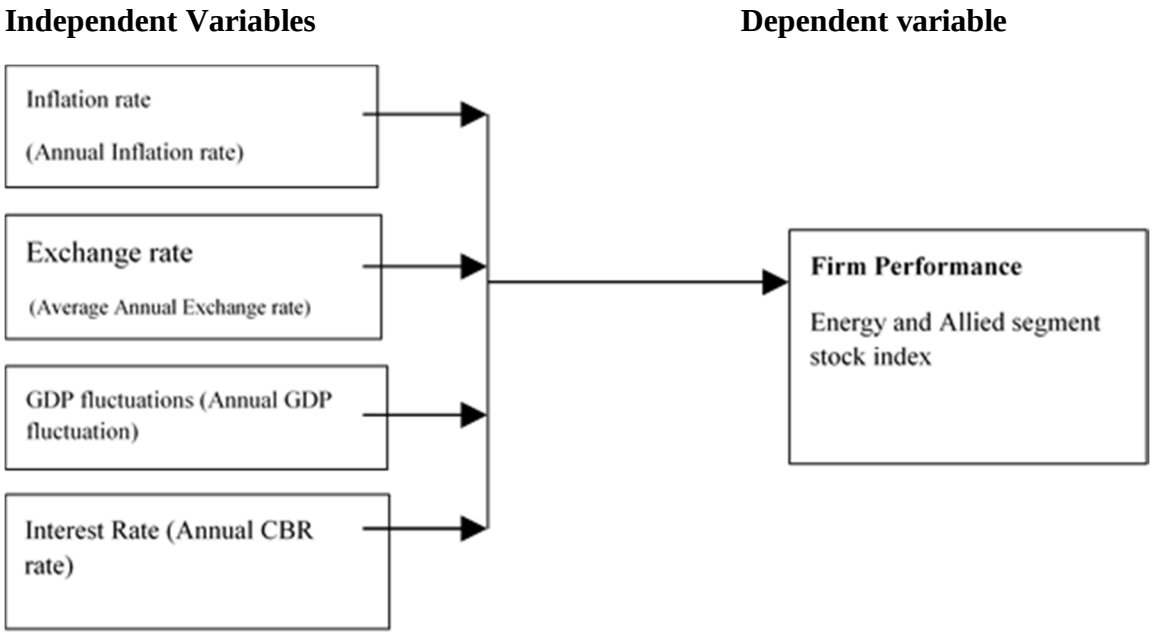

Figure 2.1 Conceptual Framework

2.3 Inflation and Firm Performance

Zulfiqar and Din (2015) examined the relationship between macroeconomic indicators and firm performance among textile industries in Pakistan. They applied panel regression analysis. They found positive insignificant relationship between inflation rate and firm performance. The analysis approach was not appropriate since the data was time series in nature thus the most appropriate analysis would have been VECM to investigate the long term relationship between macroeconomic indicators and firm performance.

Limpanithiwat and Rungsombudpornkul (2010), examined the relationship between inflation rate and stock return among companies listed in Thailand. Time series data was collected in the years in 2000 to 2010. A unit root was used to test for stationarity while vector auto regression was used to test the association between variables. Results of the study showed that there is no significant association between inflation rate and stock returns. The choice of VAR was appropriate since the data was time series in nature thus regression analysis would not have been appropriate to investigate the relationship between variables.

Oleka, Sabina and Ebue (2015) investigated the relationship between inflation and firm performance in Nigeria. Judgmental sampling was used to select 18 commercial banks operating in Nigeria. Secondary data was collected from annual financial statements for years in 2000 to 2014. Ordinary least squares regression analysis was applied analyse the data. Results of the study showed

a positive but not significant relationship between both return on equity and earnings per share which were used as proxy measures of financial performance. The choice of OLS as data analysis technique was not appropriate since the data was time series in nature thus the appropriate analysis ought to have been VAR, VECM as such to show the long run relationship between the study variables.

Kumar (2013) examined the relationship between inflation and stock returns; evidence from BRICS market using panel Cointergration test. Secondary quarterly data was collected in January 2000 to September 2013 was collected from Brazil, India, Russia, China and South Africa. Time series was used to analyse the data, Augmented Dickey Fuller (ADF) test, Phillips-Perrons (PP), Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests were applied to test the stationary of time series data. Pedroni co integration test (Engle- Granger Based) was used to test the long term relationship and Johansen Co integration test was used to test Cointergration relationship between inflation rate and stock return. Johansen Co integration tests the null hypothesis of the trace statistics test hypothesis that there is no co integration. Stationarity tests showed that the data was stationary in among the BRICS members. Moreover, there was a significant long term relationship between returns and inflation rate. Correlation analysis showed that there was a positive significant relationship between return and inflation rate.

Kairuthi (2014) studied the effect of inflation and interest rates on stock market returns of firms listed at the NSE. The study adopted descriptive time series correlation design. Secondary monthly data was collected on stock return, inflation rates, spot exchange rates and month end liquidity. According to the study there is negative inverse relationship between inflation rates and stock returns. In addition, there was a positive significant relationship between interest rate, spot exchanges and stock return. Although, the study meant to use time series analysis, the results shows that ordinary least squares regression analysis was used to show the nature of the relationship. The choice of OLS was not appropriate the study ought to have used Johansen Cointergration test, error correction method and Granger causality test to show the short run and long run relationship between the study variables.

2.4 Exchange Rate and Firm Performance

An empirical study by Eita (2011) among Namibia listed companies was carried to examine the relationship between several macroeconomic variables which has significant influence on stock performance. Specifically, the study sought to investigate the relationship between interest rate, inflation rate, money supply and exchange rates. VECM was used to analyse the data. According to the results of the study there was a positive significant relationship between stock market prices and money supply and economic activity. In addition, there was inverse relationship between stock prices and inflation rates while interest rate showed positive significant relationship with stock performance.

Barasa (2014) examined the economic performance indicators and stock returns among companies listed in NSE. The study adopted exploratory research design. Census sampling technique was used to select all the companies listed in 2008 to 2012. Multiple regression analysis was analysis was used to examine the nature of the relationship while correlation analysis was used to measure the strength of the relationship between stock returns and economic performance indicators. Results of the study found that there is a positive significant relationship between inflation, overall inflation, economic growth, interest lending rate and stock returns. In contrast, there was an inverse relationship between exchange rate and stock returns. The choice of multi linear regression analysis

was not appropriate since the data was time series in nature then the most appropriate method would have been to use Johansen Cointergration test to test the short run relationship and error correction method to test the long run relationship.

2.5 GDP Fluctuations and Firm Performance

Duca (2007) studied the relationship between the stock market and the economy: experience from international financial markets. Granger causality was used to test the relationship between GDP and stock returns. The study found that there was positive significant relationship between stock returns and GDP. Stock and Watson (2001) use a forecasting regression consisting of real GDP against lagged explanatory variables that are theoretically relevant predictors for each of the seven most industrialized economies (Canada, France, Germany, Italy, Japan, the UK and the US) and find results that provide some evidence that stock prices have a small marginal predictive content for output at the two, four and eight quarter horizon. However the ability of stock prices as predictors varies across countries and over decades.

Monthly secondary data was adopted by Lai and Roy (2005) to study the effects of macroeconomic stock news announcements on mean stock returns. Secondary monthly news was collected on eight indicators which were; gross domestic product, real activity, consumption, investment, government purchases, net exports, prices, money supply and forward looking indicators. Results of the study showed that there was a negative significant relationship between GDP news announcement and mean stock returns.

Barnor (2014) studied the effect of macroeconomic indicators on stock returns in Ghana in 2000-2003. Census sampling was used to select all 36 companies listed in Ghana securities exchange. Secondary data on the study variables was obtained from Bank of Ghana bulletins, Ghana statistical service website and GSE websites. Time series analysis was used to analyze the data;

2.6 Interest rate and Firm Performance

Njoroge (2013) investigated the relationship between interest rate and firm performance among listed companies in NSE. Judgmental sampling technique was used to select all companies which were actively trading in 2008 to 2013. Casual research design was applied to investigate the relationship. OLS regression analysis was applied was applied to investigate the nature of the relationship between interest rate and firm performance. Results of the study showed a positive but not significant relationship between interest rate and return on equity. In additional, comparative showed that industry and allied had a negative and significant relationship with firm performance. Both judgmental sampling and causal research design were appropriate but the choice of OLS was not appropriate since the data was time series in nature thus the most appropriate analysis technique would have been Cointergration to show the short term influence between the variables and VECM to show the long term relationship between the study variables.

Census sampling techniques was used by Ochieng and Oriwo (2012) to examine the relationship between macroeconomic variables on NSE all share index. Macroeconomic indicators were operationalized as interest rate, inflation rate and 91 day Treasury bill rate. Multi linear regression analysis was applied and the study found that there is a negative significant relationship between 91 Treasury bill rate and stock return. Moreover, there was an inverse significant relationship between inflation rate and stock returns. The choice of multiple ordinary linear regression analysis was not appropriate since the data was time series in the most appropriate method would have been Johansen Cointergration test to examine the short run relationship, error correction method for long run relationship.

2.7 Summary

In summary, firms should evaluate the effects of macroeconomic variables on stock returns which were used as a proxy for firm performance among companies listed in energy and allied segment. There are several macroeconomic indicators which have been documented to significantly affect stock returns among companies listed in both developed and developing economies though none of the study has factored the industry specific segment. For companies listed in NSE there are grouped into 12 differentiated segment and each of them can be influenced differently by the prevailing market segment.

3.0 Introduction

This chapter discusses the methodology that were employed in the study. The key aspects being discussed in the current chapter were research design, sampling frame and sample size, data collection instruments, data analysis and the operationalization of the study variables.

3.1 Research Design

According to Mugenda and Mugenda (2009) a research design is a step by step guideline which shows how the current study will be undertaken. Descriptive correlation research design was applied. According to Dusan Rijbarova (2005) descriptive correlational study measures two or more variables as they exist naturally and the goal is to establish that a relationship exists between variables. This research design was used to obtain information concerning the current status of the phenomena to describe what exists with respect to variables or conditions in a situation (Mwangi, 2013). It involves range from the survey to the correlation study which investigates the relationship between variables (Key, 1997). In the current study, correlation research design was appropriate since the researcher sought to investigate the relationship between macro-economic indicators and firm performance among industries listed in industrial and allied segment in NSE for the period in 2009 to 2014.

3.2 Data and Data Analysis

The data was modeled in time series. The analysis was conducted through a procedure of various steps. Descriptive analysis, measures of central tendency (mean, minimum, maximum) and measures of dispersion (standard deviation). Trend analysis was presented using graphs. The normality of the data was tested in time series. The Jacque Bera test which combines both the skewness and kurtosis coefficient into a concrete measure of normality was also used. The null hypothesis under Jacque Bera test is that the distribution of the data is not significantly different from that of a normal distribution. Product moment correlation coefficient was used to test multicollinearity between the variables, if two independent variables will have a correlation coefficient greater than 0.8 then multicollinearity. Heteroskedasticity checks for uniformity across the error terms, in this study it will be tested using white tests. Autocorrelation tests whether there is correlation across the error terms, in this study first order autocorrelation will be tested using the LM. Moreover, Durbin Watson will also be used to test for autocorrelation. A multiple regression modelling will be used to investigate the relationship between lagging macroeconomic indicators and firm performance. The hypothesized model will be of the form:

$$y_{i,t}=\alpha+\beta_1 x_{1i,t}+\beta_2 x_{2i,t}+\beta_3 x_{3i,t}+\beta_4 x_{4i,t}+\beta_5 x_{5i,t}+\acute{\varepsilon}_{i,t}$$

y= Firm performance, x_1= Annual inflation rate, x_2= Exchange rate, x_3= GDP fluctuations, x_4= Interest rate, $\acute{\varepsilon}_{i,t}$= error term.

Unit root tests will be conducted on each variable. If variables exhibit a mixture of stationary and non-stationary series, then the first step is to conduct first differences for the non-stationary series until the state of stationary is achieved. Both Philips Perrons and Augmented Dickey-Fuller (ADF) test will be employed in this study to test the time-series properties of the data series. Both Philips Perrons and ADF test the null hypothesis of non-stationarity against the alternative hypothesis of stationary. Co-integration Analysis involves the testing of the existence of cointergrating equations. The long run relationship can be established by conducting co integration tests for the mixture of stationary and non-stationary series. Two methods are available for this. The first method is the two step Engel granger method. Co integration using the two step Engel granger method involves generating residuals from the long run equation of the non-stationary variables. To establish whether variables are co integrated, the stationarity of the residuals is established by applying the ADF and PP tests. If the residuals are stationary at levels, then it can be concluded that there is both a short run and a long run relationship among the variables. The second method is the Johansen co integration test. However, the Johansen co integration has been cited as more robust and more accurate in identifying the presence of co integration. The Johansen test requires that the appropriate lag length to be known. The lag length (p) is determined by the Schwarz criterion to ensure that the residual is white noise. Error Correction Modelling (ECM) will help to establish the short run relationship between the variables. However, the short run relationship is only established a) after converting all non-stationary series into stationary series (either by differencing or by de trending) b) after successfully testing for co integration and after using the residuals from the Cointergration model to generate an error correction term(ect), c) which is inserted into the short run model.

4.0 Results and Findings

4.1 Descriptive Statistics

Descriptive analysis shows that the average return index was 0.190 with a minimum index of 0.67 and a maximum of -0.004. The average return index was normally distributed since the p value for Jarque-Berra test was 0.057. The average inflation rate was 6.62% with a maximum of 14.915%. The Kenyan shilling weakened to a minimum of 93.87 against the US dollar within the period under investigation. On average the exchange rate was 83.995. Within the period under investigation the Kenyan economy experienced an average growth rate of 2.6%. The average interest rate charged on a 91 day treasury bill was 8.4% with the highest interest rate of 9.353%. The widest variation among independent variables was recorded in exchange rate which averaged at 4.95. This can be attributed to anticipated changes in the political landscape when the Kenyan shilling weakened against the US dollar.

Table 4.1 Descriptive Statistics

	Firm Performance	Inflation rate	Exchange rate	GDP	Interest rate
Mean	0.190	6.620	83.995	0.026	8.400
Median	0.171	6.229	84.442	0.026	8.650
Maximum	0.670	14.915	93.870	0.054	9.353
Minimum	-0.004	3.200	75.138	0.005	1.823
Std. Dev.	0.192	2.888	4.985	0.025	3.954
Skewness	1.841	1.115	0.020	0.373	0.777
Kurtosis	2.553	4.047	2.435	4.264	4.396
Jarque-Bera	3.551	6.067	0.321	2.153	4.366
Probability	0.057	0.048	0.852	0.341	0.113
Sum	4.571	158.869	2015.878	1.339	201.590
Sum Sq. Dev.	0.846	191.780	571.644	0.014	359.572

4.2. Correlation Analysis

Results in Table 4.2 show the correlation matrix indicating the strength of the relationship between firm performance and inflation rate, exchange rate, GDP and interest rate. There was a negative and significant relationship between inflation rate and firm performance, rho = -0.117, p value <0.05. This implies that a unit increase in inflation decreased firm performance by 11.7%. There was an inverse and significant relationship between exchange rate and firm performance (rho = -0.083, p value <0.05). This implies that an increase in exchange rate decreased firms performance among those companies listed in energy and allied segment of Nairobi securities exchange. There was a positive and significant relationship between GDP and firm performance (rho = 0.5516, p value <0.05). This implies that an increase in GDP increased firm performance. Finally, there was an inverse significant relationship between interest rate and firm performance (rho = -0.1691, p value <0.05). This implies that an increase in interest rate was associated with a decrease in firm performance.

Table 4.2Correlation Analysis

	Firm performance	Inflation rate	Exchange rate	GDP	Interest rate
Firm performance	1				
Inflation rate	-0.1170	1			
	0.0000				
Exchange rate	-0.0833	0.2080	1		
	0.0000	0.3294			
GDP	0.5516	-0.2961	0.0374	1	
	0.0020	0.1600	0.8621		
Interest rate	-0.1691	0.3034	0.4919	-0.4845	1
	0.0000	0.1496	0.0146	0.0164	

4.3 Stationarity Test

Augmented Dickey Fuller Test (ADF) was used as the test for checking the stationary level of the variables. Results in Table 4.3 shows that none of the variables were non-stationary at levels thus the null hypothesis which stipulated the presence of unit root was accepted. Since firm performance, exchange rate, inflation rate, GDP and interest rate all were not stationary it was paramount to difference in the first order. Results showed that firm performance, exchange rate, inflation rate, GDP and interest rate were stationary after the first difference. Therefore, it can be concluded that firm performance, exchange rate, inflation rate, GDP and interest rate all were integrated of order (1).

Table 4.3 Unit Root Test at Levels

Variable		Test at levels			Test at first difference		
		T statistic	Critical Value at 5%	P value	T statistic	Critical Value at 5%	P value
Firm performance	Constant	-4.69	-3.00	0.00	-4.92	-3.01	0.00
	Constant and Trend	-4.58	-3.62	0.01	-4.75	-3.64	0.01
Inflation rate	Constant	0.73	-3.00	0.99	-1.69	-3.00	0.42
	Constant and Trend	-2.72	-3.62	0.24	-3.08	-3.67	0.14
Exchange rate	Constant	-2.46	-3.00	0.14	-4.85	-3.00	0.00
	Constant and Trend	-3.03	-3.62	0.15	-4.47	-3.67	0.01
GDP	Constant	-3.13	-3.00	0.04	-6.71	-3.00	0.00
	Constant and Trend	-3.07	-3.62	0.14	-6.54	-3.63	0.00
Interest rate	Constant	-3.34	-3.00	0.02	-6.77	-3.00	0.00
	Constant and Trend	-3.71	-3.62	0.04	-4.73	-3.64	0.01

4.4 Co-integration Test

Since all the variables were integrated of order one I (1) it was necessary to carry out test to examine whether the variables were cointergrated. Two time series variables are said to have tendencies of drifting from each other if they are non-stationary and cointergrated though they will always tend to remain proximate to each other. In the current study Johansen Cointergration was used, the choice was guided by the fact that it's a multivariate autoregressive approach and it has chances of dealing with more than cointergrating factors. Moreover, the approach separates long run equilibrium relationships from short term dynamics. In this test the Trace statistics was used to test the significance of estimates of Eigen values.

Results revealed no Cointergration between firm performance, inflation rate, interest rate, GDP and exchange rate. The Trace statistics indicated none cointergrating equation at 5% level of significance. This implied there was no long run relationship between the variables under investigation.

Table 4.4 Johansen Cointergration Test

Trend assumption: No deterministic trend				
Series: RETURN INFLATION_RATE EXCHANGERATE GDP INTERESTRATE				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.745	63.071	60.061	0.027
At most 1	0.575	33.046	40.175	0.216
At most 2	0.341	14.204	24.276	0.520
At most 3	0.204	5.023	12.321	0.564
At most 4	0.000	0.001	4.130	0.981

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

4.5 Error Correction Model

If the variables are cointergrated then there is an error correction model which is meant to show the short run dynamics of study variables towards equilibrium. Error Correction Model (ECM) is composed of single period Cointergration equations and lagged first difference of endogenous variables. In the current study Vector Auto regression (VAR) method was used to estimate the ECM. Results in Table 4.5 revealed that in the short run there was a negative and significant relationship between inflation rate and firm performance, therefore it can be implied that an increase in inflation rate eroded the prospect of positive performance among the listed companies. Secondly, there was an inverse but significant relationship between exchange rate and firm performance this implies that an increase in exchange rate decreased an organization returns. Thirdly, there was an inverse and significant relationship between firm performance and interest. An increase in GDP increased firm performance.

Table 4.5 Error Correction Modelling

Error Correction:	Coefficient	Std. error	T statistics
D(Firm performance (-1))	0.042	0.223	0.19
D(Inflation rate (-1))	-0.057	0.029	-1.97
D(Exchange rate (-1))	-0.013	0.009	-2.47
D(GDP(-1))	0.162	1.691	2.10
D(Interest rate (-1))	-0.001	0.009	-1.99
C	0.025	0.033	0.77
R-squared	0.802	Mean dependent	0.01
Adj. R-squared	0.723	S.D. dependent	0.28
Sum sq. resids	0.334	Determinant resid covariance	0.00
S.E. equation	0.149	Determinant resid covariance	0.00
F-statistic	10.134	Log likelihood	-67.28
Log likelihood	14.848	Akaike information criterion	9.75
Akaike AIC	-0.713	Schwarz criterion	11.74
Schwarz SC	-0.366		

4.6 Relationship between Lagged Macro Economic Indicators and Firm Performance

GARCH model was used to show the relationship between firm performance and exchange rate, inflation rate, GDP and interest rate. The coefficient of determination R squared of 20.4% shows that inflation rate, GDP, exchange rate and interest all jointly explained 20.4% of the variations in firm performance. Further, the F statistics indicated that all jointly had a significant influence. The Durbin Watson statistics indicated that the data had no serial correlation since its coefficient was almost 2. The fitness statistics revealed that the model fitted well.

The first hypothesis of the study stated that there is no significant relationship between firm inflation and firm performance. The findings show that there was a negative and significant relationship between inflation rate and firm performance (β=-0.0098, P value <0.05). This implies that a unit change in inflation decreased firm performance by 0.0098 units.

Secondly the study stated that there was no significant relationship between exchange rate and firm performance. Results revealed that there was an inverse and significant relationship between exchange rate and firm performance (β= -0.0032, p value <0.05), this implies that a unit change in exchange decreases firm performance by 0.0032 units.

Thirdly, the stated hypothesized that there was no significant relationship between GDP and firm performance. The study revealed that there was a positive and significant relationship between GDP and firm performance (β= 0.4110, p value <0.05); this implies that a unit change in GDP increased the firm performance by 0.4110 units.

Finally, the study hypothesized that there was no significant relationship between interest rate and firm performance. Results of the study revealed a negative and significant relationship between firm performance and interest rate (β= -0.0031, p value <0.05).

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The current chapter summarizes the study from which conclusions and recommendations of the results are drawn as well as areas of future research.

5.2 Summary

The risk return trade-off have been of concern among various scholars since investors have to be always assured of their returns since this will increase the level of investors' confidence. Scholars have shown significant relationship between macroeconomic indicators and firm performance among companies listed in securities exchanges though none had been customized for companies quoted in petroleum and energy segment in NSE. The Kenyan government has consistently promoted economic development; through various legislation, expenditure on resources exploration, investment on human resources training.

The first objective of the study sought to examine the relationship between inflation rate and firm performance among companies listed in energy and petroleum segment in NSE. To achieve this, firm performance was regressed against inflation rate. ECM was used to examine both short run and long run adjustment processes. Quarterly time series data of 2009 to 2014 was used. ECM was appropriate since all the variables were non-stationary at levels thus differencing was appropriate to eliminate the chances of spurious regression. Results of the study showed there was an inverse significant relationship between inflation rate and firm performance among those companies listed in energy and petroleum segment of NSE.

The second objective sought to find out the relationship between exchange rate and firm performance among companies listed in energy and petroleum segment in NSE. The study applied both regression modeling estimates and error correction modeling techniques. In both short run and long run the study revealed that there was an inverse and significant relationship between firm performance and exchange rate.

The third objective of the study investigated the relationship between GDP and firm performance through the use of both regression modeling and ECM. In both short run and long run there was a positive and significant relationship between firm performance and GDP.

The fourth objective of the study sought to find out the relationship between interest rate and firm performance among the companies listed in Energy and petroleum segment of NSE. Through the use of both regression and ECM there was an inverse and significant relationship between interest rate and firm performance.

5.3 Conclusion

The study concludes that lagging macroeconomic indicators have a significance influence on among companies listed in Energy and petroleum segment of NSE since 20.44% of firm performance variation can be explained by inflation rate, interest rate, GDP and exchange rate jointly. The government has a pivotal role on these macroeconomic indicators though exchange rate and interest rate ought to be freely determined depending on the forces of demand and supply. The government can strengthen or weaken the currency depending on monetary policies taken especially when the currency weakens. In the period prior to general elections there were downward trend among the

key macroeconomic indicators which calls for necessary measures to be employed to eliminate currency devaluation.

Since an increase in inflation decreased firm performance, both short and long run polices should be employed to hinder any upward trajectory of inflation which in both scenarios will increase investors return and confidence and consequently promote economic development.

Although, there was a negative significant relationship between firm performance and exchange rate. An increase in exchange rate signifies weakening of the Kenyan currency against the US dollar measures should be taken to strengthen the currency and consequently ensure fair exchange rate. Moreover, there is need to investigate the factors the weakening of the Kenyan shilling and corrective actions taken immediately.

Even though financial services attract costs there is need to maintain the inverse relationship between interest rate and firm performance since it implies at lower interest rate firm performance are higher and thus more beneficial to the investors. There is need to ensure that interest rate are maintained at manageable levels.

5.4 Recommendation

The study recommends that in order for energy and allied sector firms to improve, there is need for the government to initiate policies measures that will control the exchange rate in Kenya. Lower exchange rates would be more appropriate for energy companies to perform better since they are negatively correlated with financial performance of these companies.

The study further recommends that there is need for the government to initiate policies that ensure lower inflation or tighten liquidity so as energy firms may offer services to the public hence improved financial performance.

Lower lending rates initiated by the CBK will greatly improve financial performance of firms quoted in the energy sector as it will improve liquidity in the economy therefore more investments and consumption.

5.5 Suggestion for Further Studies

Future research should adopt the use of primary data as such to examine the qualitative influencers of firm performance among companies listed in Energy and petroleum segment in NSE. Moreover, there is need to seek for investors perception on role of lagging macroeconomic indicators on firm performance among all companies listed in NSE.

Secondly the study suggest since they are efforts for economic integration a similar study sought to be carried out among all companies listed in energy and petroleum segment of NSE. This is precipitated by the fact that an integration of the common market may create an avenue for arbitrage profits.

REFERENCES

Adam, A.M. & Tweneboah, G., 2008. *Macroeconomic factors and stock market movement: Evidence from Ghana*. Munich Personal RePEc Archive, No. 14079.

Akers, H (2014). *Key macroeconomic variables.* EHow Contributor

Basher, S.A. & Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal. 17.* 224- 251.

Brauninger, M. & Pannenberg, M. (2002). *Unemployment and productivity growth: an Empirical Analysis with an Argumented Solow Model,* Economic modeling, Vol 19, 105-120.

Claire, S. Wrightsman L.S. & Cook S.W. (1962) *Research Methods in Social Sciences.*

Coakley, J. Flood, R. Fuertes, A and Taylor, M. (2005). Purchasing power parity and the theory of general relativity: the first tests. *Journal of International Money and Finance* 24 (2005) 293–316 Countries. Review of Economics and Statistics, 85, 212-217

Crowley, J. 2007. *Interest Rate (2007). Interest Rate Spreads in English- Speaking Africa*. IMF Working paper. April 2007.

Gikungu, H.M. (2012). *The impact of macroeconomic variables on the performance of the Nairobi securities exchange. Unpublished MBA project*, University of Nairobi, 2011.

Haruna, I. Yazidu U. & Domanban P. B., (2013). *Macroeconomic variables and stock market returns in Ghana*.

Illo, A. D. (2012). The effect of Macroeconomic Factors on Financial Performance of Commercial Banks in Kenya. Unpublished MSC project, University of Nairobi, 2012

Indranarain, R. (2009), Bank Specific, Industry Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation, *International Research Journal of Finance and Economics*, ISSN 14502887 Issue 34 (2009), Euro Journals Publishing, Inc. 2009,

Kumar, A. (2013). Relationship between inflation and stock returns –evidence from BRICS markets using panel Co integration Test. *International Journal of Accounting and Financial Reporting*. Vol, 4, 2.

Limpanithiwat, K. and Rungsombudpornkul, L. (2010). Relationship between inflation and stock prices in Thailand. Accessed on line on http://www.diva-portal.org/smash/get/diva2:326653/FULLTEXT01.pdf on 27/7/2015

Malkiel, Burton G. (2008). "Interest Rates" In David R. Henderson (Ed.). Concise Encyclopedia of Economics (2nd ed.). Indianapolis: Library of Economics and Liberty.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance, 7*(1), 77–91.

Mugenda, O.M & Mugenda. A.G (2009). Research methods. Quantitative and qualitative approaches. Nairobi, Kenya: ACTS Press.

Njoroge, K.A., (2013). The relationship between interest rate and firm performance among companies listed in NSE. MBA Thesis. University of Nairobi, Unpublished.

Oleka, C.D., Sabina, E.A., and Ebue, I. M. (2015). Relationship between Inflation and Firms' Performance- Evidence. *World Applied Sciences Journal.* 33 (5): 814-822,

Yusuf, B., Onafalujo, A., IDOWU, K., & SOYEBO Y. (2014), *Capital structure and profitability of quoted firms: the nigerian perspective* (2000-2011), International Academic Conference, Vienna, ISBN 978-80-87927-02-1, IISES

Zulfiquar, Z., and Din, N. (2015). Inflation, interest rate and firms' performance: the evidence from textile industry of Pakistan. *International Journal of Arts and Commerce.* Vol 4(2).