

Effect of Macroeconomic Variables on the Stock Market Returns of the Energy and Petroleum Sector Firms Listed at the Nairobi Securities Exchange, Kenya

Joyce Jerotich Murey¹ and Tobias Olweny(PhD)²

*Correspondent Author, Postgraduate Studies, Department of Commerce and Economics Studies,
School of Business, Jomo Kenyatta University of Agriculture and Technology, Kenya¹*

*Lecturer, School of Business, School of Business, Jomo Kenyatta University of Agriculture and
Technology, Kenya²*

ABSTRACT

The research study sought to determine the effect of selected macroeconomic variables on stock market returns of firms in the energy and petroleum sector listed in the Nairobi Securities Exchange, Kenya. Specifically, the effect of each selected macroeconomic variable on the stock market returns was studied. The selected macroeconomic variables are exchange rate, interest rate and inflation rate. Findings of similar studies, but in other sectors of the economy, have shown that the nature and extent of the effect of these selected macroeconomic variables on the stock market returns vary from one sector to another. However, not much research is found to have been done in the Energy and Petroleum sector in Kenya, and this informed the reason for this study. The study was guided by three theories namely the Keynesian theory, capital asset pricing model and arbitrage pricing theory. The research used causal research design. The target population was all companies in the energy and petroleum sector listed in the NSE, Kenya. Secondary data used was obtained from NSE for the period January 2010 to June 2017. Multiple regression analysis using E-views was applied. The study found out that all the independent variables namely Inflation, Interest Rate and exchange rate have a negative impact on the share prices. The study also found out that time has a minimal but significant moderating effect on how the macroeconomic variables influence the share prices of the oil and energy firms. A significant positive relationship was obtained on the combined effect of the independent variables on the dependent variable. The study thus concludes that share prices, hence stock returns are determined by some fundamental macro-economic variables such as interest rates, inflation and exchange rate. The study further concludes that the energy sector firms are expected to be highly affected by macroeconomic variables considering that energy sector firms require a lot of working capital and deals with imported products. The study therefore recommends that the government and the corporate world policy makers to come up with macroeconomic policies that will enhance economic growth and stability in the country. The study also recommends that in order for energy and allied sector firms to improve, there is need for the managements in these firms to come up with ways of curbing the volatility of these variables.

Key Words: *Macroeconomic Variables, Stock Market Returns, Energy and Petroleum Sector Firms, Nairobi Securities*

1. INTRODUCTION

Stock market is an important institution in a country's economy and is of great concern to the investors, stakeholders and the government. Mobilization of resources in the economy has been a puzzle to investors, stakeholders, analysts and regulators to solve. Osinubi (2010) studying effective and efficient resource mobilization in an economy foster sustainable growth and development, therefore funds must be effectively mobilized and allocated to enhance economic growth. The stock market in an economy promotes efficiency in capital formation and allocation. 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 for 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 and value of commodities in relation to US dollar (Mugambi & Okech, 2016).

The issue of causality between macroeconomic variables and share Performance over the years has stem up controversies among researchers based on varying findings. Theoretically, macroeconomic variables are expected to affect performance on equities. But over the years the observed pattern of the influence of macroeconomic variables (in signs and magnitude) on share Performance varies from one study to another in different capital markets. Changes in stock prices are linked with macroeconomic behavior in advanced countries (Muradoglu *et al.*, 2000). Ross (1976) employed statistical tools like in the Arbitrage Pricing Theory (APT) and initiated the use of variables without the need of pre specification of variables in determination of stock returns. Since economic forces like interest rates, influence expected dividends and the discount rate, stock prices will be expected to be affected by economic variables (Elly & Oriwo, 2013). Findings of similar studies, but in other sectors of the economy, have shown that the nature and extent of the effect of these selected macroeconomic variables on the stock market returns vary from one sector to another and has been viewed as the most important determinants of stock market behavior as they are used to describe the state of economy that an investor must monitor and forecast in order to make informed choices regarding their investments (Junkin, 2012). An increase or decrease in interest rates may affect the investment decisions of an investor if considered as the cost of capital, For example, when there is a rise in interest rate and the opportunity cost goes up, individual investors would prefer to invest in non-fixed income securities such as bonds (Adam & Tweneboah, 2008). Ajayi et al, (1998) observed that when the stock prices decrease, it is expected that the wealth of the domestic investors also goes down. Moreover, it may also lead to a lower demand for money hence interest rates decreases.

High interest rates are likely to curb business investments and innovation. Rising interest rates could also increase loan defaults in the banking system and bank vulnerability, drive the cost push inflation due to medium term increase in prices associated with higher costs of business financing. When banks make borrowing more expensive, companies might not borrow as much and will pay a higher rate of interest on their loans. Less business spending can slow down the growth of a company and therefore company share price (Kisaka, 2009). The lower interest rates give companies an opportunity to borrow money at lower rates, which allows them to expand

their operations and also their cash flows. When interest rates are declining, the economy is expanding in the long run, so the risk associated with investing in a long-term corporate bond is also generally lower (Saunders and Cornett, 2008). In a low interest rate regime, companies are able to increase profitability by reducing their interest expenses. However, in a rising interest rate regime, since interest expenses rise, profitability is lowered. Thygerson, (2015) found that calculating the inherent value of a company by the cash flow discounting model yields a two-fold impact. There is a reduction in the cash flows due to lower profitability, and a higher discounting rate due to higher interest rate regime. This leads to a relatively lower intrinsic value of the company.

Evidence from the financial theory suggest that as the global financial markets become more liberalized, there has been a close relationship between stock returns and the macroeconomic variables including interest rates, exchange rate, Gross Domestic Product(GDP), inflation, money supply, etc. These variables have been viewed as the most important determinants of stock market behavior as they are used to describe the state of macro economy that an investor must monitor and forecast in order to make choices regarding their investment decisions (Junkin, 2012). Most of the African economies are fragile and resilient to both internal and external shocks hence macroeconomic factors are more likely to influence African investments returns. The relationship between macroeconomic variables and stock returns has emerged due to the fact that the Capital asset Pricing Model (CAPM) assumes that the uncertainty about future prices of securities is the only risk that the investors are concerned with. However, investors are also concerned about other risks that affect their investment opportunities and investment returns. For example, the uncertainty about macroeconomic variables such as Gross Domestic Product, inflation, exchange rates, money supply, and interest rates, are other risks other than the market risks.

Most studies show that inflation has a significant impact on stock return. Whether that impact is positive or negative, however, is a matter of much debate. Chen *et al* (2005) concluded that inflation had not been able to predict stock returns. According to Tripathi and Kumar (2014), the relationship between inflation and stock returns in the BRICS conflicted, with Russia showing a significant negative relationship, while India and China exhibited a significant positive relationship. Kenya is one of the emerging economies in Africa, its stock market performance is highly dependent on the nature of the macroeconomic variables. These variables are considered to be causes of stock return volatility existing in NSE and may lead to stock market crisis (Odhiambo, 2012). The capital market is expected to play a key role towards making Kenya a developed country by 2030. Part of this growth will be spurred by the listing of private and government owned firms in NSE giving the general populace a chance to own equity in such firms and participate in their management and profitability. This underscores the need for investors to understand the worth of investing in both the short and long term as well as the investment climate. Capital Markets Authority (CMA), which regulates and supervises NSE, through its investor education campaign has succeeded in increasing the level of participation in the capital markets by proactively engaging in outreach programmes.

Mugambi and Okech (2016) studied the influence of macroeconomic variables on stock returns of listed commercial bank in Kenya and the results showed that foreign exchange rate, interest rate and rate of inflation have varying effects on the stock returns of commercial banks. Interest rates have a negative influence on stock returns while the inflation rate have a positive influence

and the exchange rate have a negative influence while Gatuhi, Gekara and Muturi (2015) studied the effects of macroeconomic variables on the firms in the Agricultural sector in Kenya and they concluded that the foreign exchange rate, interest rate and rate of inflation have varying effects on the stock market returns of firms in the Agricultural sector in Kenya. Kirui, Wawire and Onono (2014) evaluated the relationship between Gross Domestic Product, Treasury bill rate, exchange rate, inflation and stock market return in Nairobi Securities Exchange Limited by analyzing data from 2000 to 2012. Their results revealed that exchange rate showed a significant and negative relationship with stock returns.

Prevailing interest rates affects the financial performance of firms as have been observed in various researches and since interest rates is a major factor considered in many financial planning decisions, the objective of the study is to assess the nature of the relationship between interest rates and financial performance of the firms listed at the Nairobi Securities Exchange. The results will be useful to the government in setting interest rates; the management of a firm will be able to make informed decision on borrowing and lending; and investors can use the results obtained from the research to make decisions on which sectors of the economy to invest in at different levels of interest rates (Njoroge, 2013). Many governments use the interest rate as a monetary policy tool to control other macroeconomic variables like investment, inflation and unemployment. Alam and Uddin (2009) found that the interest rate has a significant negative relationship with share price for 15 developed and developing countries using data from 1988 to March 2003. Stock prices, hence stock returns are generally believed to be determined by some fundamental macro economic variables such as interest rates, inflation, exchange rate, and Gross domestic Product (Kirui, Wawire and Onono, 2014).

Higher stock prices may inturn lead to asurge in capital outflows thus leading to depreciation of domestic currency. The currency volatility has effects on the stock returns where, when currency appreciates, in a situation where the country is export oriented, it is expected that there will be a reduction in the competitiveness of its exports and would therefore have a negative impact on the domestic stock market. This is because the export-oriented companies quoted on the stock exchange market would be less profitable and this may inturn become less attractive to investors (Muthike & Sakwa, 2012). The opposite happens in a scenario where the currency depreciates as exports become competitive. The witnessed fluctuations in Kenyan shilling will have an effect on the stock prices depending on whether it appreciates or depreciates. This is a clear indication that there exist interrelationship among stock returns and the exchange rate.

In Kenya, dealing in shares and stocks started in the year 1920's. In 1951 a professional stock broking firm was established and in 1954 the Nairobi Stock Exchange was registered under the Societies Act. In February 18, 1994, NSE was rated by the International Finance Corporation (IFC) as the best performing market. A computerized delivery and settlement system was set up in 1994 and the number of stockbrokers was increased. The East African Securities Exchanges Association came into being in 2004 and trading hours increased from two to three hours. In September 2006 live trading on the automated trading systems of the Nairobi Stock Exchange was implemented. The industry of energy and petroleum companies in Kenya is mainly regulated by Energy Regulatory Commission (ERC); this industry of energy and petroleum companies represents the firms that are involved in marketing and distribution of petroleum products in Kenya. They include of both the local and the multinational companies. The energy and

petroleum industry in Kenya is governed by the Kenyan law which covers processes from crude importation, refining and retailing.

The energy industry has few listed firms at the Nairobi Securities Exchange with a positive level of significant control on the market share which is dominated by about 5 major players which include Total, Kenolkobil, Kengen, Kenya power and Lighting Company and Umeme Ltd (NSE, 2017). The Kenyan Energy and Petroleum industry is given much interest due to the fact that it is one of the key segment player of the economy. Petroleum and fuel provides the main source of commercial energy in Kenya. Kenya is an importer of petroleum products currently but with the discovery of some crude oil in it, it is foreseen that in the near future Kenya will be a primary producer of crude oil. Growth and efficiency in performance of the firms in the energy sector will be pegged on various macroeconomic factors which can impact on the growth of the organisation. Main hindrances experienced in the energy and petroleum industry are outlined as relatively huge cost of operation which is always escalating high due to volatility in exchange rates, inflation, Gross domestic product fluctuation and volatility of interest rate.

The study of the energy sector was justified due to the high volatility of the energy sector returns. In 2016, Kenya power share lost value by 40%, Umeme ltd lost 8% while Kengen shares lost by 3%. While some firms shares were losing, others were gaining. Kenolkobil gained value by 41% while Total Kenya gained by 7%. The same was the trend in study period where some stocks lost almost 50% of share value (NSE, 2017). Notably energy sector firms are expected to be highly affected by macroeconomic variables considering that energy sector firms require a lot of working capital and deal with imported products. Hence, exchange rate, interest rates and the rate of inflation will be expected to affect their performance hence performance of stocks. Macroeconomic variables have been volatile over the five years study period. In 2012, inflation was at 14% which reduced to 6% in 2016, Kenya shilling rate against the USD moved from an average of 84 in 2012 to 101 in 2016, a 20% depreciation in Kenya shilling. Average annual interest rates reduced from 19% in 2012 to 17% in 2016, a 10% change (CBK, 2017). This raises questions on whether the performance in share prices of energy sector firms could be as a result of volatility in the macroeconomic variables.

2. STATEMENT OF THE PROBLEM

Stock market returns is an indicator of how well the stock market is operating. Stock market returns indicates the performance of an economy and enhances the efficiency of capital formation and allocation (Osinubi, 2010). Stock market returns for energy sector firms has not been impressive with the returns depicting high volatility. In 2016, Kenya power share lost value by 40%, Umeme ltd lost 8% while Kengen shares lost by 3%. While some firms shares were losing, others were gaining. Kenolkobil gained value by 41% while Total Kenya gained by 7%. The same was the trend in the period under study, where some stocks lost almost 50% of share value (NSE, 2017). Notably energy sector firms are expected to be highly affected by macroeconomic variables considering that energy sector firms require a lot of working capital and deals with imported products. Further, macroeconomic variables have been volatile over the seven years study period. In 2012, inflation was at 14% which reduced to 6% in 2016, Kenya shilling rate against the USD moved from an average of 84 in 2012 to 101 in 2016, a 20% depreciation in Kenya shilling. Average annual interest rates reduced from 19% in 2012 to 17%

in 2016, a 10% change (CBK, 2017). This raises questions on whether the performance in share prices of energy sector firms could be as a result of volatility in the macroeconomic variables.

The relationship between these macroeconomic variables and stock market return have been the subject of research by many researchers whereby the findings vary from one sector to another. Some of the recent studies on this area include; Mugambi and Okech (2016) who studied the influence of macroeconomic variables on stock returns of listed commercial banks in Kenya and found that foreign exchange rate, interest rate and rate of inflation have varying effects on the stock returns of commercial banks in Kenya. Gatuhi, Gekara and Muturi (2015) studied the effects of macroeconomic variables on the firms in the Agricultural sector in Kenya. Njoroge (2013) investigated the relationship between interest rate and firm performance among listed companies in NSE in Kenya and found a positive relationship. Eita (2011) examined the relationship between several macroeconomic variables which had significant influence on stock Performance among Namibia listed companies and found an inverse relationship between stock prices and inflation rates while interest rate showed positive significant relationship with stock performance. From the previous studies it is clear that the macroeconomic variables affect all industries in the economy, but the nature and extent of such effects varies from one industry to another. However not much has been done on the effect of these macroeconomic variables on the stock returns of firms in the Energy and Petroleum sector in Kenya. Therefore, this research considered the petroleum and energy sector and study the effect of the same macroeconomic variables on stock market returns of firms listed in the Nairobi Securities Exchange.

3. OBJECTIVES OF THE STUDY

The general objective was to determine the effect of macroeconomic variables on the stock market returns of the energy and petroleum sector firms listed in the Nairobi Securities Exchange, Kenya.

Specifically, the study sought to:

- i. To determine the effect of exchange rate on the stock market returns of the energy and petroleum sector firms listed in the Nairobi Securities Exchange, Kenya.
- ii. To determine the effect of interest rate on the stock market returns of the energy and petroleum sector firms listed in the Nairobi Securities Exchange, Kenya.
- iii. To determine the effect of inflation on the stock market returns of the energy and petroleum sector firms listed in the Nairobi Securities Exchange, Kenya.
- iv. To evaluate the effect of time on the relationship between macroeconomic variables and stock market returns of the energy and petroleum sector firms listed in the Nairobi Securities Exchange, Kenya.

4. THEORETICAL LITERATURE

This section is to review the theory that is relevant and applicable to the study. This forms the theoretical basis of the study.

4.1 Keynesian Theory

The Keynesian Theory was initially introduced by Keynes(1939). Keynes did not embrace negative interest as such, but the underlying idea of interest as a monetary phenomenon. This

was later developed by Pigou (1946) who saw the implication and agreed that the rate of interest is a purely monetary phenomenon. In this theory interest rate is defined as the reward for parting with liquidity for a specified period of time. Demand for money refers to the desire of the public to hold the cash.

The theory gives three motives for holding cash namely; Transaction motive which is the demand for money for the purposes of current transaction, precautionary motive which is the desire to hold cash to cater for the unseen contingencies and the speculative motive which is the desire to hold ones resource in liquid form to take advantage of the future changes in interest rate and bond. The supply of money refers to the total quantity of money in the country. The theory argues that the higher the interest rate the lower the speculative demand for money (Romana College, 2014). Further the theory argues that low interest rate increases investments income and eventually savings. Patinkin's (1976) further advanced the Keynes through introducing the multiplier effect. Following an initial increase in autonomous investment, the rise in income due to the multiplier process may be reinforced by an increase in new investment, via the accelerator mechanism, which will in turn have a further multiplier effect on income and so on. By combining multiplier and the accelerator model with an analysis of Keynesian model, allows the approach to business cycles to account for both upper and lower turning points in the cycle.

During the 1980s there was a growth of interest in the early Keynes Theory. In order to better understanding on its impact in the economy, Fitzgibbons (1988) and O'Donnell (1989) endeavoured to bridge this gap by provide a serious extended analysis of the connection between Keynes's philosophy and his economics. This enables the theory to have practical applications in various market scenarios. The theory however has limitations in that it is inconclusive as the liquidity preference will shift up or down with changes in the income level. In addition, Further it is argued that interest rate is not purely a monetary phenomenon and other forces like productivity of capital and savings by people also play an important role in the determination of interest (Govt.T Romana College, 2014). Despite this, the theory has been adopted by numerous studies in explaining how interest rate affects the investment income and savings and how this is likely to affect the stock market. The theory is relevant to the study in that it makes implications on the importance of macroeconomic variables in an economy. According to the theory therefore, the economic performance will be attained based on the net income available. Improved performance of the economy will inturn improve stock market performance. The theory therefore implies that favourable macroeconomic environment will improve stock market performance and vice versa. The macro-environment variables are thus a great determinant on how the organizations and the overall economy performs.

4.2 Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) was introduced by William Sharpe (1964) and John Lintner (1965), who built on the earlier work of Harry Markowitz (1959), the developer of the mean-variance model or model of portfolio choice. The variation through time in expected returns is common in securities and is related in plausible ways to business conditions. This model was then developed almost simultaneously by Mossin (1966), while Black (1972) extended and clarified it further. This model is used to determine a theoretically appropriate required rate of return of an asset, and thus its price, if firms can estimate the expected cash flows from the asset, CAPM describes the relationship between risk and expected return that is used in the

pricing of risky securities. The theory assumes that the variance of returns is an adequate measurement of risk. The model also assumes that all active and potential shareholders have access to the same information and agree about the risk and expected return of all assets, homogeneous expectations assumption (Mitchell and Stafford, 2000).

CAPM has been tested extensively, for over three decades, in various forms primarily in both the developing and well developed markets. Early work in this area including Black, Jensen and Scholes (1972), Fama and MacBeth (1973) and Blume and Friend (1973) who supported the application of CAPM. These studies found that the return generation process also depends on other variables like size, book to market ratio and earnings price ratio. The CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios four decades later (Fama, 2004). But empirical evidence from literature suggests a deviation of the model from its formal theory. It has been observed that the stock return distribution is time variant in nature and hence, the subjective expectation of moment differ from one period to another. This implies that the investor expectations of moments behave like random variables rather than constant as assumed in the traditional CAPM for stock returns. This shows that the macro economic variables are not the sole determinants on how the economies perform. The theory thus implies that stock market returns of firms in the energy and petroleum sector listed in the Nairobi securities exchange will not necessarily be determined by macroeconomic variables or inherent risk facing the stocks. That is to say that stock returns will fluctuate with changes in the risk facing the stock. Thus, macroeconomic variables do not have a relationship with stock market returns of firms in the energy and petroleum sector listed in the Nairobi Securities Exchange unless they affect the risk of the stock.

4.3 Arbitrage Pricing Theory (APT)

The Arbitrage pricing theory is an economics theory proposed by Stephen Ross (1976) and latter extended by Huberman (1982), Chamberlain and Rothschild (1983), Chen and Ingersoll (1983) Connor (1984), Chen (1983), Connor and Korajczyk (1988) and Lehmann and Modest (1988).. The theory aims to provide an understanding on how the macroeconomic variables are interrelated. The theory holds that individual stock returns depend on both anticipated and unanticipated factors (Chen and Ross 1986). The identification of these risk forces for measuring the risk return relationship is based upon the available literature for guidance. The basic idea of APT is that in equilibrium all the factors are selected from among the set of assets under consideration and are called arbitrage portfolios. The theory assumes that asset returns are explained by systematic factors, investors can build a portfolio of assets where specific risk is eliminated through diversification and that no arbitrage opportunity exists among well-diversified portfolios.

Ever since its introduction, researchers have attempted to test the theory with market data and have found multiple ways to access its application. To begin with, Connor (1982) employed a competitive equilibrium assumption to show that the elimination of infinite security assumption does not change the pricing relation if the market portfolio is well diversified in a given factor structure. Chen and Ingersoll (1983) reached the same conclusion provided that a well diversified portfolio exists in a given factor structure and this portfolio is the optimal portfolio for at least one utility maximising investor. Specifically, stock portfolios that have a higher correlation with the benchmark will be bid up and have a lower expected return (Arun, 2002). This is a very

important step in the direction of a relative theory, in that this simple single period analysis does not incorporate the analysis of luck versus skill and whether such an arrangement is optimal for the pension fund or the asset manager. However, the CAPM's simplicity lies in the assumptions it makes about the representative investor and therein lies the problem and the pathway to the new paradigm for asset pricing. A major problem in testing Arbitrage Pricing Theory is that the pervasive factors affecting asset returns are unobservable.

The theory has thus faced criticism for being too general in its use in determining the factors which influences expected returns. Additionally, Arbitrage pricing theory does not identify the common factors (or even their number). In spite of these, the suitability of the theory in explaining most macro-economic situations is that it permits the researcher to select whatever factors and provide the best explanation for the particular sample at hand (Groenewold and Fraser, 1997). The theory predicts a relationship between the returns of a portfolio and the returns of a single asset through a linear combination of many independent macro-economic variables. APT uses the risky asset's expected return and the risk premium of a number of macro-economic factors. APT requires that returns on any stock should be linearly related to a set of multi-factors. This study will use the APT framework which calculates expected return by taking into account various factors and their sensitivities that might affect stock price movement. Thus, allows selection of factors that affect stock prices largely and specifically.

5. CONCEPTUAL FRAMEWORK

The purpose of conceptual framework is to help the reader quickly see the proposed relationship between variables in the study (Mugenda and Mugenda, 2003). The conceptual framework of this study spells out the relationship between foreign exchange rate, interest rate and inflation rate (independent variables) and stock return volatility (dependent variable) as measured by NSE 20 share index. The study therefore sought to investigate the effect of independent variable fluctuations (Interest rate, exchange rate and inflation rate) on dependent variable (Stock market return).

Independent Variable

Dependent Variable

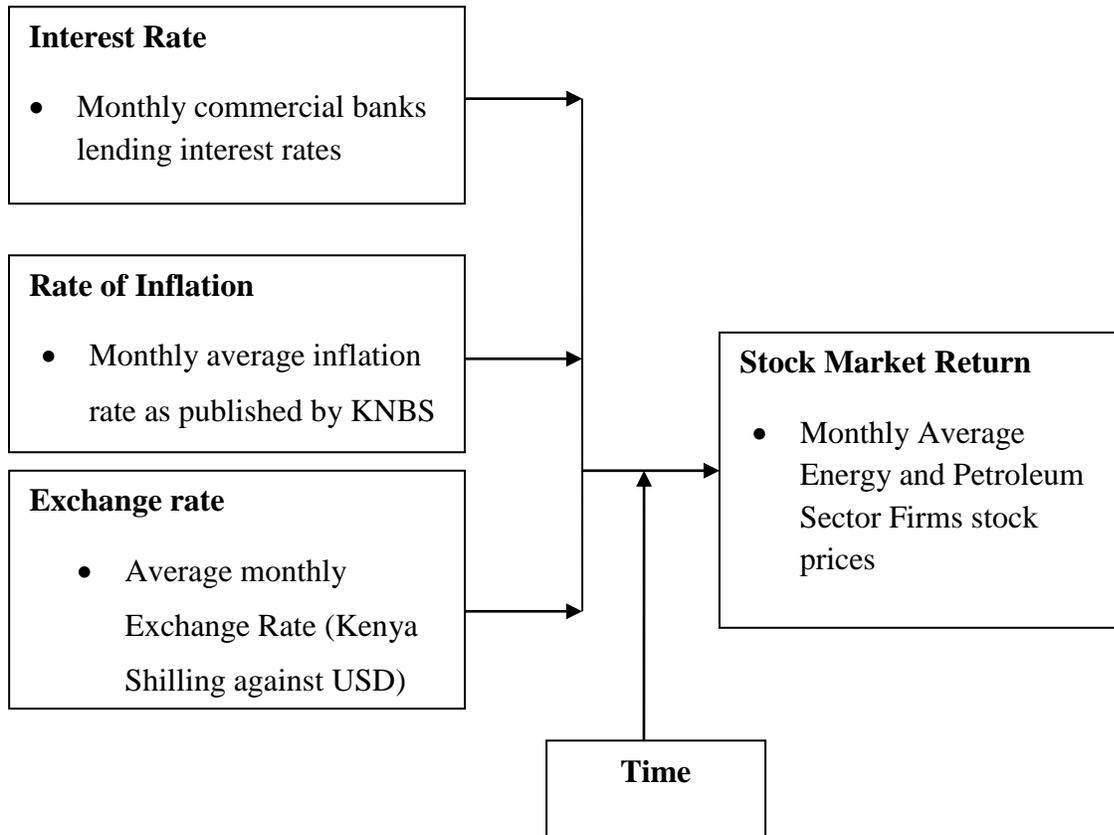


Figure 2.3: Conceptual Framework

6. RESEARCH METHODOLOGY

Causal research design was adopted in this study to establish the effect of macroeconomic variables on the stock market returns of firms in the energy and petroleum sector listed in the Nairobi Securities Exchange, Kenya. Causal research design investigates into an issue or topic that looks at the effect of one thing or variable on another. For example, might be used in a business environment to quantify the effect that a change to its present operations will have on its future production levels to assist in the business planning process. A longitudinal research design was also used because the study used data gathered for seven years. The population in this study consists of all the firms in the energy and petroleum sector listed at the NSE, Kenya during the period January 2010 to June 2017.

For this study, secondary data was used as collected by the secondary data collection Sheet. The data for stock returns was obtained from the Nairobi Securities Exchange. Exchange rate statistics and interest rates was obtained from the Central Bank of Kenya and inflation statistics from the Kenya National Bureau of Statistics. Data on stock returns was collected on daily basis and summarized on monthly basis while that of other variables was obtained on monthly basis. Seven years period (2010-2017) was considered by the study. The data collected was sorted and input into STATA. Regression analysis was used to test the significance of the independent variables (interest rate, exchange rate and rate of inflation) on the dependent variable (stock

market returns). Regression analysis was performed using the regression model specified below to estimate and provide empirical evidence on the nature of relationship between the stock returns and the macroeconomic factors.

7. DATA ANALYSIS RESULTS

7.1 Correlation Analysis

To establish the relationship that existed between the research variables, Karl Pearson's coefficient of correlation was employed by the study. This method entails the measure of the strength of a linear association between two variables and is denoted by R. The results obtained are shown in Table 1 below.

Table 1: Correlation Analysis

| | | Share Prices | Inflation | Interest Rate | USD/ER |
|---------------|---------------------|--------------|-----------|---------------|--------|
| Inflation | Pearson Correlation | -.326** | | | |
| | Sig. (2-tailed) | 0.002 | | | |
| Interest Rate | Pearson Correlation | -.492** | 0.145 | 1 | |
| | Sig. (2-tailed) | 0.000 | 0.173 | | |
| USD/ER | Pearson Correlation | -.658** | 0.163 | -0.07 | 1 |
| | Sig. (2-tailed) | 0.000 | 0.126 | 0.51 | |
| | N | 90 | 90 | 90 | 90 |

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

The study established that Inflation has a negative and significant influence on the share prices at the oil and energy companies in Kenya ($r=-0.326$, $P=0.002$). This relationship is due to the higher inflation rate raising the cost of living and thus causes a shift of resources from investments to consumption, the demand for market instruments falls leading to reduction in the volume of stocks traded. This however tends to contradict Tripathi and Kumar (2014) who established the relationship between inflation and stock returns to conflicted, for example, Russia showing a significant negative relationship, while India and China exhibited a significant positive relationship.

The study established that interest rate has a negative and significant influence on the share prices at the oil and energy companies in Kenya ($r=-0.492$, $P=0.00$). An increase or decrease in interest rates may affect the investment decisions of an investor if considered as the cost of capital (Adam & Tweneboah, 2008). As such, the high interest rates are likely to curb business investments and innovation and also increase loan defaults in the banking system and bank vulnerability, drive the cost push inflation due to medium term increase in prices associated with higher costs of business financing price (Kisaka, 2009). This is similar to Olweny and Omondi

(2011) who investigated the effect of Macro-economic factors on the stock return volatility in the Nairobi Securities Exchange, Kenya.

The study established that exchange rate has a negative and significant influence on the share prices at the oil and energy companies in Kenya ($r=-0.658$, $P=0.00$). This relates to Ibrahim and Aziz (2003) who concluded that the exchange rate was negatively associated with stock prices in the Malaysian equity market. Similarly, Agrawal, Srivastav & Srivastava (2010) investigated the relationship between Indian stock market returns and exchange rates using daily closing indices between 2007 and 2009 and found that correlation between Nifty returns and exchange rates was negative. On the contrary, Barasa (2014) examined the economic performance indicators and stock returns among companies listed in NSE, Kenya and established a positive significant relationship between inflation, economic growth, interest lending rate and stock returns.

This means that all the variables, namely Inflation Interest Rate and USD/ER have a negative impact on the share prices due to the negative coefficients obtained. This thus implies and increase in these variables will cause a decrease in the share prices at the oil and energy companies in Kenya. The influence is significant as their p values were less than 0.05 at the 5% confidence level. Hence they can be used to describe a change in the share prices at a particular time interval.

7.2 Regression Analysis

Regression analysis was used to find the equation that represents the relationship between the variables. In this study, the results of this regression were obtained using e-views which is best for time series data.

Table 2: Model Summary

| Source | SS | df | MS | Number of obs | 90 |
|----------|----------|----|---------|---------------|--------|
| Model | 15054.45 | 3 | 5018.15 | F(3, 86) | 30.15 |
| Residual | 14315.88 | 86 | 166.46 | Prob > F | 0.000 |
| Total | 29370.33 | 89 | 330.00 | R-squared | 0.5126 |
| | | | | Adj R-squared | 0.4956 |
| | | | | Root MSE | 12.902 |

As shown by Table 2, the macro economic variables namely; interest rates, inflation and exchange rates explain 51.26% of the total variations in the share prices in the oil firms ($R^2=0.5126$). This implies that only 48.74% of the variations in the share prices may be accounted for by other variables not present in the model. The results further show that the model $F_{(3, 86)} = 30.15$, $P < .001$ is valid in explaining the relationship that exists between the dependent and independent variables of the study.

Table 3: Coefficients

| Share Prices | Coef. | Std. Err. | P>t | [95% Conf. Interval] | | |
|--------------|----------|-----------|-------|----------------------|----------|----------|
| Inflation | -0.96087 | 0.3464 | -2.77 | 0.007 | -1.64949 | -0.27224 |
| Interest | -3.2915 | 0.675847 | -4.87 | 0.000 | -4.63504 | -1.94796 |
| Exchange | -1.17754 | 0.166049 | -7.09 | 0.000 | -1.50763 | -0.84744 |
| Constant | 188.2602 | 19.06382 | 9.88 | 0.000 | 150.3626 | 226.1579 |

The results in Table 3 indicate that based on the model coefficients obtained, all the variables namely: Inflation ($\beta_1 = -0.96087$, $P = 0.007$), Interest rates ($\beta_2 = -3.2915$, $P = 0.000$) and Exchange rates ($\beta_3 = -1.17754$, $P = 0.000$) have a negative but significant effect on the share prices of the oil firms. The constant was also significant ($\alpha = 188.2602$, $P = 0.000$). The predictive model thus adopted by the study is $Y = 188.2602 + -0.96087X_1 + -3.2915 X_2 + -1.17754X_3$ Where: Y = Value of the dependent variable (stock return), X_1 = Inflation, X_2 = Interest rate and X_3 = Exchange rate.

7.3 Moderated Effect of time on the relationship between macroeconomic variables and share prices of oil and energy firms.

In this study, moderated multiple regression analysis was obtained using SPSS to confirm the findings and the fact that time affects this relationship. The results obtained as shown by Table 4, when the time was introduced into the model as a moderating variable, there were minimal variations in the relationship that exist. The macro economic variables namely; interest rates, inflation and exchange rates explain 74.3% of the total variations in the share prices in the oil firms ($R^2 = 0.743$). When time was introduced, the resultant R^2 change in model improved to 0.785 and added value to the model which was significant ($\Delta R^2 = .052$, $P = .000$).

Table 4: Model Summary on Moderated Regression

| Model | R | R Square | Adjusted R Square | Std. Error of Estimate | R Square Change | F Change | Change Statistics | | |
|-------|-------|----------|-------------------|------------------------|-----------------|----------|-------------------|-----|---------------|
| | | | | | | | df1 | df2 | Sig. F Change |
| 1 | .862a | 0.743 | 0.734 | 1.27284 | 0.743 | 82.753 | 3 | 86 | 0.000 |
| 2 | .891b | 0.795 | 0.785 | 1.14391 | 0.052 | 21.479 | 1 | 85 | 0.000 |

a. Predictors: (Constant), USD/ER, Interest Rate, Inflation

The results in Table 4 shows that model one, $F_{(3,86)} = 82.753$, $P < .001$ is valid for further analysis. When time was introduced as a moderating variable, the new model two, $F_{(4, 85)} = 21.479$, $P < .001$. R2 changed from 73.4% to 78.5% indicating that time had effect on the relationship between independent and dependent variables. P-value of F-change was also significant showing that time had moderating effect between macroeconomic variables, energy sector share prices.

Table 5: Model ANOVA

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|--------|-------|
| 1 | Regression | 402.208 | 3 | 134.069 | 82.753 | .000a |
| | Residual | 139.33 | 86 | 1.62 | | |
| | Total | 541.538 | 89 | | | |
| 2 | Regression | 430.314 | 4 | 107.579 | 82.214 | .000b |
| | Residual | 111.224 | 85 | 1.309 | | |
| | Total | 541.538 | 89 | | | |

a. Predictors: (Constant), USD/ER, Interest Rate, Inflation

b. Predictors: (Constant), USD/ER, Interest Rate, Inflation, Time

c. Dependent Variable: Share Prices

The results in Table 5 indicate that before time was introduced to as a moderating variable, all the macroeconomic variables namely, Inflation ($\beta_1 = -0.086$, $P = 0.013$), Interest rates ($\beta_2 = -0.622$, $P = 0.000$) and Exchange rates ($\beta_3 = -0.197$, $P = 0.000$) have a negative and significant effect on the share prices. After time was introduced as a moderating variable, the same negative and significant effect of the macro-economic variables namely; Inflation ($\beta_1 = -0.163$, $P = 0.000$), Interest rates ($\beta_2 = -0.558$, $P = 0.000$) and Exchange rates ($\beta_3 = -0.069$, $P = 0.000$) was still retained. The F-statistic which shows the goodness of fit changed from 82.753 to 82.214 with introduction of time as a moderating variable. This implies that time ($\beta_4 = -0.549$, $P = 0.000$) has moderating effect on how the macroeconomic variables influence the share prices of the oil and energy firms.

Table 6: Model Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|-------|---------------|-----------------------------|------------|---------------------------|---------|-------|
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | 43.76 | 1.881 | | 23.268 | 0.000 |
| | Inflation | -0.086 | 0.034 | -0.142 | -2.526 | 0.013 |
| | Interest Rate | -0.622 | 0.067 | -0.518 | -9.336 | 0.000 |
| | USD/ER | -0.197 | 0.016 | -0.671 | -12.052 | 0.000 |

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|-------|---------------|-----------------------------|------------|---------------------------|--------|-------|
| | | B | Std. Error | Beta | T | Sig. |
| 2 | (Constant) | 34.079 | 2.687 | | 12.683 | 0.000 |
| | Inflation | -0.163 | 0.035 | -0.268 | -4.676 | 0.000 |
| | Interest Rate | -0.558 | 0.062 | -0.465 | -9.073 | 0.000 |
| | USD/ER | -0.069 | 0.031 | -0.236 | -2.218 | 0.029 |
| | Time | -0.549 | 0.118 | -0.487 | -4.635 | 0.000 |

a. Dependent Variable: Share Prices

The coefficient for the unmoderated regression analysis were: Inflation -0.086 ($p > 0.05$), Interest Rate -0.622 ($p < 0.05$) and USD/ER -0.197 ($p < 0.05$). with the introduction of the moderating variable (time), the coefficients obtained were Inflation -0.163 ($p < 0.05$), Interest Rate -0.558 ($p < 0.05$), USD/ER -0.069 ($p < 0.05$) and Time -0.549 (0.05). Notably, all coefficients became significant with introduction of time. Time also had a significant coefficient confirming the moderating effect of time on the relationship between macroeconomic variables and share prices.

8. CONCLUSIONS

The study found out that exchange rate has a negative and significant influence on the share prices at the oil and energy companies. The study concludes that share price movements on the stock market also affect aggregate demand through wealth, liquidity effects and indirectly the exchange rate. The study found out that Interest rate has a negative and significant influence on the share prices at the oil and energy companies. The study thus concludes that prevailing interest rates are of much concern to many firms because of indexing of interest rates in some borrowing arrangement and continue to affect a firm for the whole period that the borrowing arrangement is outstanding. Therefore maintenance of fairly constant interest rates by the regulatory bodies such as CBK is concluded to have an influence in stabilizing the share prices of the oil and energy firms and the stock market returns at the NSE.

The study found out that Inflation has a negative and significant influence on the share prices at the oil and energy companies in Kenya. The study thus concludes that inflation has a positive effect on stock return of firms in energy and petroleum sector in Kenya. This is because a change in the inflation rate would have a significant effect in the purchasing power of money. This increases the cost of production hence reducing profitability. Therefore, unfavourable inflation conditions are concluded to cause the stock returns of the firms in the energy and petroleum sector to be low. The found out that when the time was introduced into the model as a moderating variable, there were minimal variations in the relationship that exist. The study thus concludes that time has a moderating effect on the relationship between macroeconomic variables and stock market returns of the firms in energy and petroleum sector listed in the Nairobi Securities Exchange, Kenya.

The study established a significant effect of macroeconomic variables on the stock market returns of the firms in energy and petroleum sector listed in the Nairobi Securities Exchange, Kenya. The study thus concludes that share prices, hence stock returns are determined by some fundamental macro economic variables such as interest rates, inflation and exchange rate. The study further concludes that the energy sector firms are expected to be highly affected by macroeconomic variables considering that energy sector firms require a lot of working capital

and deal with imported products. Hence, an increase in the stock market returns is concluded to be only attained when the macroeconomic variables volatility are well addressed.

9. RECOMMENDATIONS

The study established the volatility in the macroeconomic variables which have adverse effects on the stock market returns. As such, The government may use the interest rate as a monetary policy tool and other policies to control other macroeconomic variables like investment, inflation and unemployment. The study therefore recommends that Central Bank of Kenya, Treasury and Capital Markets Authority to come up with macroeconomic policies that will enhance economic growth and stability in the country. Specifically, the study recommends the Central Bank of Kenya should adequately put measures to safeguard the value of the domestic currency, so as to control fluctuating inflation rates. Study also recommends that Central bank of Kenya should contain inflation through sound policy measures while the study recommends that the lending interest rate levels to be controled through measures such as interest capping and interest control. The Capital Market Authority should formulate stock market regulations and guidelines that will caution the energy sector from adverse volatility in exchange rates.

The study recommends that in order for energy and allied sector firms to improve their performance, there is need for the management in these firms to come up with ways of curbing the macro-economic variables volatility. As such, the firms should not only be able to respond to any changes in the macroeconomic environment but also be able to anticipate any future threats likely to be experienced. This will enable the firms to be able to fully maximise the available resources and significantly improve the returns leading to overall economic development in Kenya. The energy sector firms should maintain past, current and projected macroeconomic data and use the data to plan for the future earnings. The firms should not ignore macroeconomic variables but should plan adequately to ensure their earnings are not negatively affected.

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