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**THE RELATIONSHIP OF MACROECONOMIC FACTORS AND FINANCIAL
PERFORMANCE OF THE FIVE FIRMS LISTED IN THE ENERGY AND
PETROLEUM SECTOR OF THE NSE**



MASTER OF BUSINESS ADMINISTRATION

2016

DECLARATION

I declare that this work has not been submitted previously and approved for award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Desmond Tutu Rao

May 2016

Approval

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ABSTRACT

Potential investors in any sector seek to establish the profitability of the sector prior to investment. The key factors that would affect the variability of the expected returns ought to be taken into consideration and appropriate measures taken to mitigate any inappropriate conditions. The total risk of the return of any investment is determined by the effect of its systematic risk as well as the unsystematic risk. Systematic risk is vulnerability to events that affect all sectors of an economy and can be summed as macroeconomic factors and is the focus of this research. On the other hand, unsystematic risk refers to microeconomic factors which are unique to a particular industry. The key macroeconomic variables used in this research include inflation rate, interest rate, exchange rates, the GDP growth and oil price. The aim of this study is to analyze the impact of macroeconomic factors on the financial performance of the five companies listed in the Energy and Petroleum sector of the NSE. The period of study was from the year 2004 to 2015. A descriptive research constituting collection and analysis of secondary data. The Earnings Per Share was used as a measure of the financial performance. The Arbitrage Pricing Theory model was used to analyze the panel data obtained after which various statistical tests were carried out on the data. Key findings from the research were that there was a significant relationship between the financial performance of firms listed in the Energy and Petroleum sector of the NSE and the macroeconomic variables. The oil price and interest rates have a significant effect on the financial performance. This study will go a long way in guiding decision making in the Energy and Petroleum sector both at the entrant level and those with a going concern. This should guide managers in formulating and executing strategic decisions in terms of timing and actions to undertake so as to enhance their future performance and survival within the industry.

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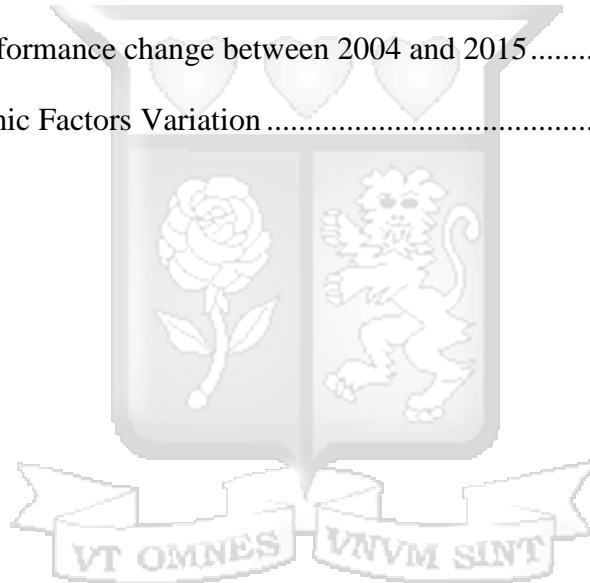
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ACRONYMS

APT	- Arbitrage Pricing Theory
BRIC	- Brazil, Russia, India and China
CAPM	- Capital Asset Pricing Theory
CBK	- Central Bank of Kenya
CBR	- Central Bank Rate
CMA	- Capital Markets Authority
CPI	- Consumer Price Index
KNBS	- Kenya National Bureau of Statistics
NASDAQ	- National Association of Securities Dealers Automated Quotations System
NSE	- Nairobi Stock Exchange
NYSE	- New York Stock Exchange
OLS	- Ordinary Least Squares
OPEC	Organization of Petroleum Exporting Countries
ORB	- OPEC Reference Basket
PPI	- Producer Price Index
ROA	- Return on Asset
ROE	- Return on Equity
S&P	- Standard & Poor's 500 Index
SSE	- Shanghai Stock Exchange
WTI	- West Texas Intermediate

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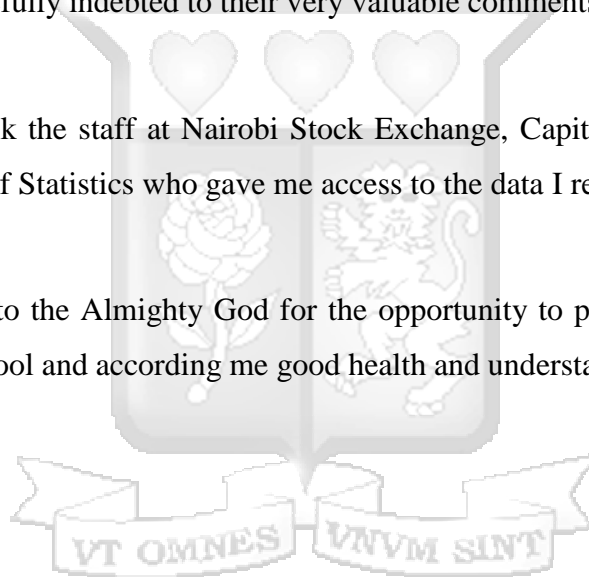
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CHAPTER 1: INTRODUCTION

1.1 Background to the Study

Organizations within a country contribute to the economic growth of a country. As the country economy performs better, companies in that country are expected to equally perform better financially. The key measures of economic performance include the consumer price index, unemployment, Gross Domestic Product, stock market index and the interest rates. The stability and gradual improvement of these economic variables are the basis for business growth over time (World Bank Group, 2015a). These variables constitute some key criteria for potential investors in predicting the return they have on their equity at the stock exchange.

The growth rate of the worldwide economy when expressed in in 2010 Purchasing Power Parity terms has been gradually increasing over the years. The global economic growth was on the increase between 2012 and 2015 from 3.1 per cent to 3.4 per cent (*Global Economic Prospects*, 2015). The key emerging shifts show that high-income countries are expected to recover while developing countries are expected to be slowing down. Developing countries are largely affected by low commodity prices over the medium-term while monetary conditions are tightening leading to the appreciation of the U.S dollar. There is hence a downward pressure on the capital flows to developing countries.

The Kenyan economy has remained robust, growing from 5.7% in 2013 to 5.3% in 2014. The energy segment plays a central role in the socio-economic development of a nation and serves as a “key enabler to achieving the country’s aspirations captured in the country’s development blue print, the Vision 2030” (Energy in Kenya, 2014).

In Kenya, the main energy drivers of the economy are petroleum and electricity, while in rural communities’ biomass is mainly used. Currently the oil industry within the Energy and Petroleum sector depends fully on the importation of all petroleum needs. With the discovery of oil and gas in Kenya in 2012 this trend was expected to change but this is yet to be a reality with the drop in

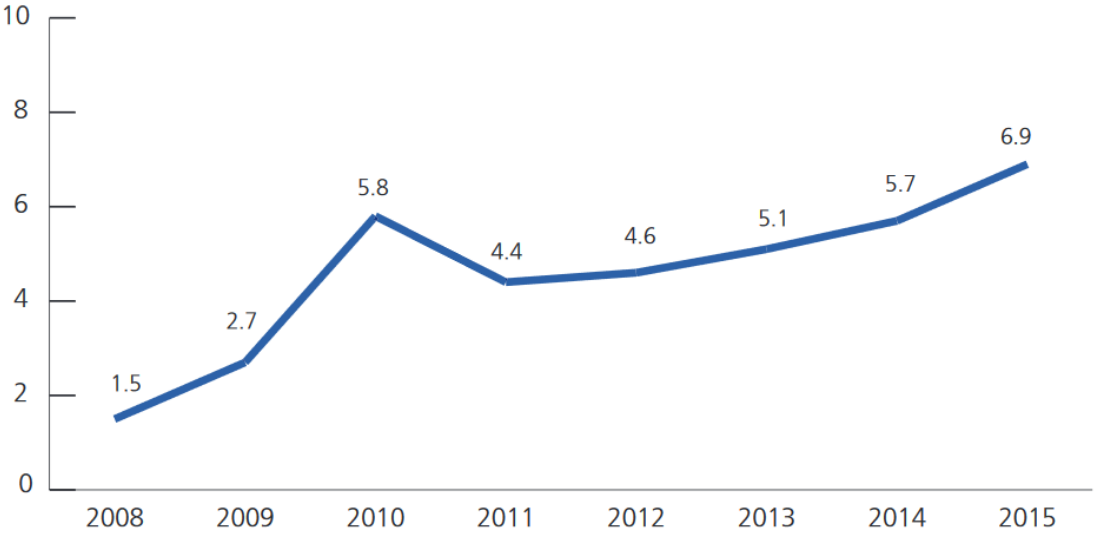
global oil prices. Energy deficiencies and supply disturbances combined with high cost remain genuine snags to economic activity (National Energy and Petroleum Policy, 2014) .

1.1.1 Macroeconomic Fluctuations

1.1.1.1 Growth Domestic Product

As shown in Figure 1.1 Kenya’s annual GDP growth has been on a steady increase since 2011 at 4.4% to 6.9% in 2015. This was attributed to increased government and private financial consumption, low oil prices, increase in export of goods and services, and the stability of the Kenya shilling against major currencies despite a slight depreciation to the dollar (Kenya Economic Survey, 2016). The key sectors driving the economy were agriculture and forestry, wholesale and retail, transport and communication, manufacturing, financial intermediation and construction which attained increased growth in the year (Osoro, Satchu, & Gadhoke, 2013).

Figure 0.1: Kenya's GDP Growth – the diagram shows Kenya has been on a steady GDP Growth over the period 2011 to 2015.

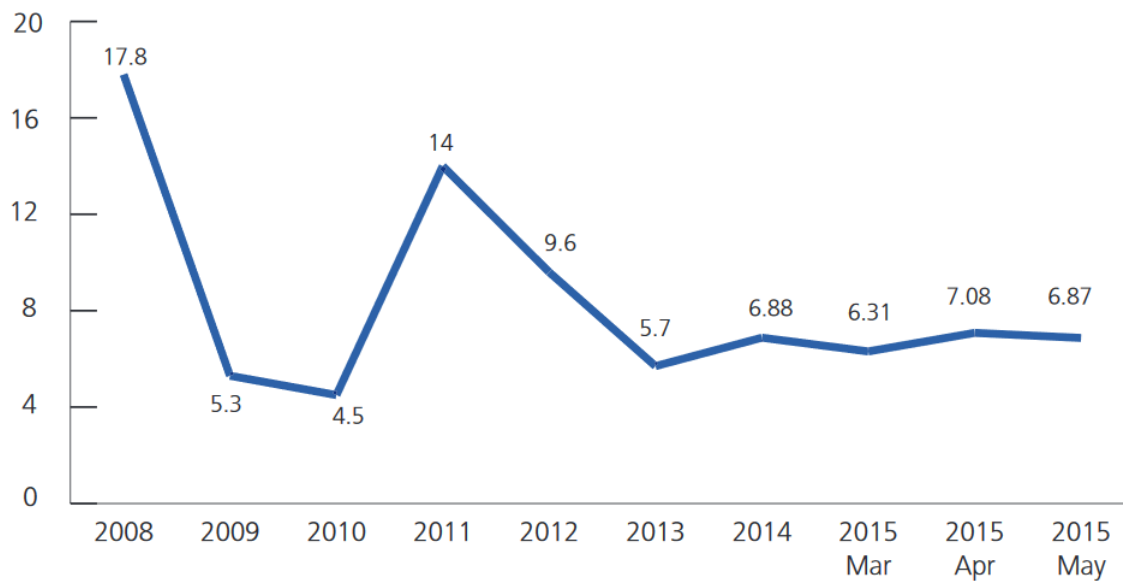


Source: Kenya National Bureau of Statistics 2015

1.1.1.2 Inflation Rate

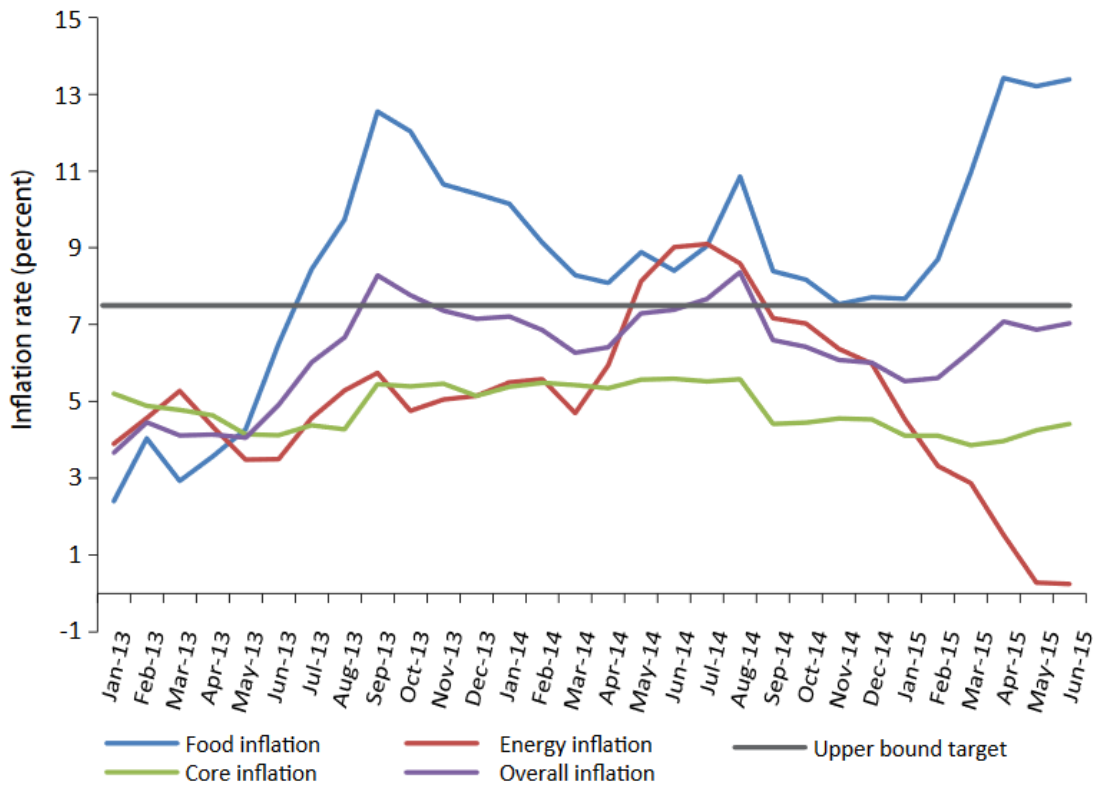
Figure 1.2 shows Kenya's Inflation Rate has been on a steady rise since 2013 at 5.7% to 6.87% in 2015. This upward movement is attributed to a rise in the food prices. The overall inflation has remained below Central Bank of Kenya's target of 7.5% while core inflation, which excludes food and fuel prices has remained below the CBK's target of 5% as shown in Figure 1.3. CBK has managed to keep the inflation within its target by keeping the Central bank rate at 8.5%. Worldwide decreases in oil prices have triggered contributed to the contained inflation since food and fuel prices are the key contributors to inflation fluctuations (World Bank Group, 2015a).

Figure 0.2: Kenya's Inflation Rate (%) – The figure shows a rise in inflation since 2013 to the period May 6.87.

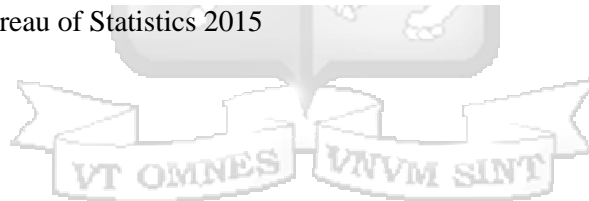


Source: Kenya National Bureau of Statistics 2015

Figure 0.3: Kenya's Inflation Components – The figure shows overall inflation has remained below Central Bank of Kenya’s target of 7.5% while core inflation, which excludes food and fuel prices has remained below the CBK’s target of 5%.



Source: Kenya National Bureau of Statistics 2015



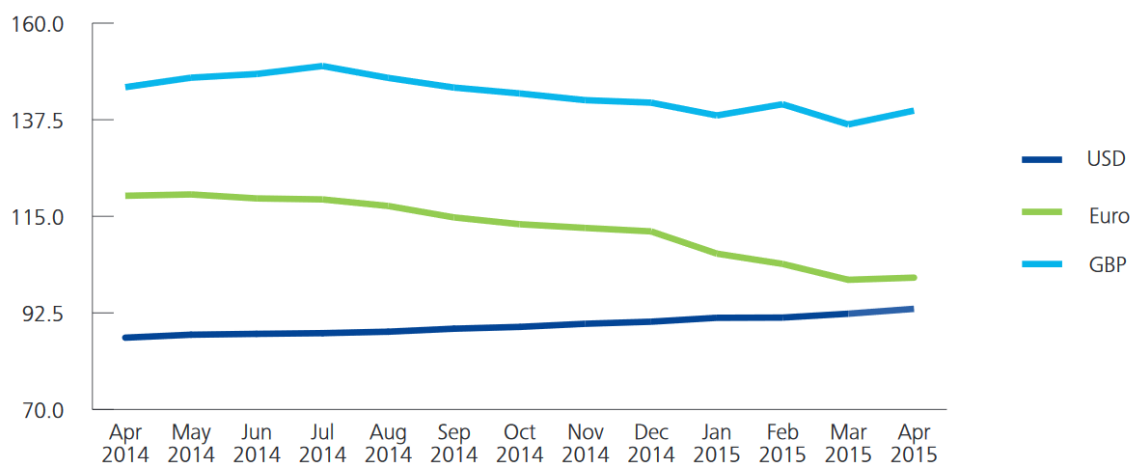
1.1.1.3 Exchange Rate

According to Kurt, (2003) variation of the exchange rate has been a key source of macroeconomic uncertainty that has affected firms. Reports from the Central bank of Kenya (CBK) indicate strengthening of the Kenya shilling from January 2012 against major currencies worldwide as shown in Figure 1.4. This was attributed to monetary policy actions, mainly through open monetary operations where the CBK issued the sovereign bond in June 2014. The Kenya Shilling gained by 4.3% against the US Dollar between January and May of 2013. During the same time CBK foreign exchange reserves increased cushioning the foreign exchange market against domestic and international shocks. The appreciation in the Kenyan currency since 2008 was also

attributed to a rise in investor confidence after the general election though it had quite weakened as the elections approached (Osoro et al., 2013).

The Shilling has hence weakened against the dollar and as at March 2015 it was trading at Ksh. 93.48. The recent weakening of the shilling against the dollar has been attributed to tightening of monetary conditions in the United States by raising short-term interest rates thus reducing the attractiveness of borrowing thus leading to less dollars in circulation (*Global Economic Prospects*, 2015).

Figure 0.4: Kenya's Exchange Rates – The diagram indicates appreciation of the Kenya shilling from January 2012 against major currencies worldwide.



Source: Kenya National Bureau of Statistics 2015

1.1.1.4 Interest Rate

A decrease in real cash balances in a country could occur when monetary authorities fail to meet the increasing demand for money resulting in a general increase in price levels which trigger an increase in the interest rates for an equilibrium to be established (Kurt, 2003). The Central Bank of Kenya (CBK) uses the interest rate as a monetary policy instrument. Figure 1.5 shows the first half of 2012 was plagued with high interest rates which slowed down the economy. As from March 2013 the Central Bank lending Rate (CBR) declined leading to a decline in the interest rates. The CBK kept a tough policy having clipped the Central Bank Rate four times since July 2012 to 8.5% in May 2013. The average commercial bank deposit was at 6.4% while the lending rates were at 17.9% as at April 2013. The T-bill rate stood at 10.3% as at April 2013 which was low triggering lower lending rates by lenders who are the main investors in the short term Government

paper. Commercial lending rates however lagged behind the CBR move and have continued to trend lower in turn supporting the economy (CBK Annual Report, 2015).

Figure 0.5: Kenya's Interest Rates (%) – The figure shows the CBK kept a tough monetary policy since May 2013 by the Central Bank Rate which clipped the interest rate four times since July 2012 to 8.5% in May 2013

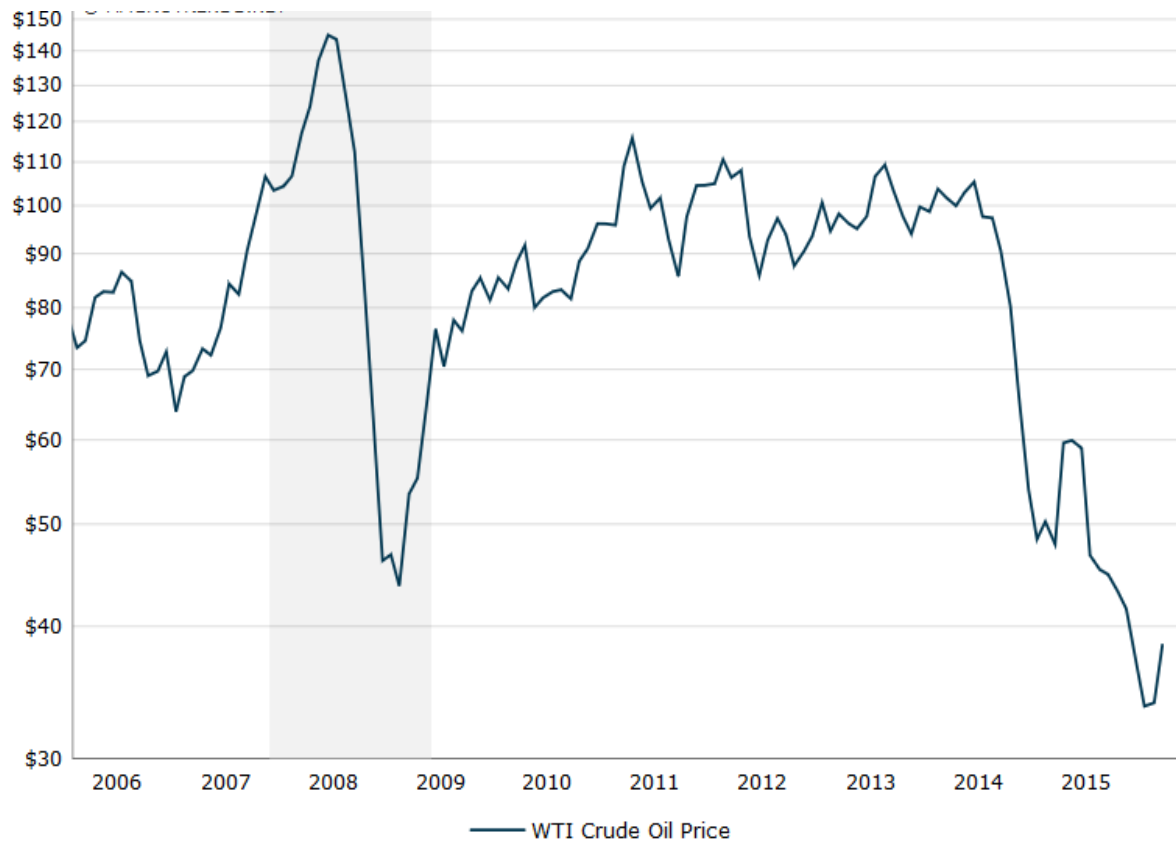


Source: Kenya National Bureau of Statistics 2015

1.1.1.5 Oil Prices

As shown in Figure 1.6 the West Texas Intermediate (WTI) Crude oil prices worldwide have been dropping and as at January 2016 the Organization of Petroleum Exporting Countries (OPEC) Reference Basket (ORB) had declined by 21% to average at \$26.5 per barrel. This price erosion as shown in Figure 1.6 was due to the ongoing excess supply and slowing down of the Brazil, Russia, India and China (BRIC) economies which have been major importers of oil (Omar S & Hojatollah, 2016). The world oil demand in 2015 averaged at 92.6 million barrels per day (mb/d) and is forecast to 94.21 mb/d in 2016. Non-OPEC oil supply growth in 2015 was 1.32 mb/d and is projected to decline by 0.7 mb/d in 2016 mainly due to announced Capital Expenditure (CAPEX) cuts by international oil companies. OPEC Natural Gas Liquids (NGL) production grew by 0.15 mb/d and is expected to further grow by 0.17 mb/d in 2016. In January 2016 OPEC crude production was an average of 32.33 mb/d.

Figure 0.6: OPEC Oil Prices (USD/Barrel) – the figure shows erosion of oil prices worldwide since the year 2014



Source: OPEC Basket Price

1.1.2 Macroeconomic Fluctuations and Performance of the Energy Industry

The energy industry is equally impacted by fluctuations in various macroeconomic factors. Zhu (2012) conducted a research to evaluate the effects of macroeconomic factors on the stock return of the Energy sector in the Shanghai Stock Exchange (SEE). The study concluded that exchange rate, exports, foreign reserve and unemployment rate have an impact on the return of the energy sector in the SEE. A positive relationship was seen between the stock return of the energy sector and the exchange rate as the Chinese currency was depreciated against the US dollar 1 point. In addition, a positive relationship exists between the stock return of the Energy and Petroleum sector and the foreign reserve. A negative relationship however was found to exist between export and stock return.

There is a cyclic effect between the performance of certain industries and the fluctuations of macroeconomic factors. Performance of and activities in the energy industry contribute to fluctuations in various macroeconomic variables. Magali (2013) noted for energy exporting countries, an increase in the energy price leads to an appreciation of the local currency. Cologni & Manera (2005) from their study concluded that unexpected oil price shocks led to a contractionary monetary response so as to curb inflation. The increasing interest rates have a ripple effect on the real economy by reducing the output growth and the inflation rate. This study focused on the effect of macroeconomic fluctuations on the performance of companies listed in the Energy and Petroleum sector of the NSE.

1.1.3 Energy Industry in Kenya

Energy in Kenya is considered to be a key enabler in achieving the Vision 2030 dream. Energy is vital to key sectors of the economy namely commerce, transportation and agriculture. The energy industry in Kenya has five firms listed in the Energy and Petroleum sector. Almost every product or service that is consumed has some energy in it and hence is considered a major source of inflation. The energy consumption within the country consists of 68% from wood fuel and biomass, 22% from petroleum and 9% from electricity (Energy in Kenya, 2013). The electricity demand in 2014 stood at 1,191 MW as per a KIPPRA report yet the country's effective capacity stood at 1.429MW. The increasing demand for electricity is attributed to the economic growth being experienced. As at 2010 the petroleum products imported into the country constituted about 3.8 million tons from 4.2 million tons in 2009 hence a drop by 7%. The import bill however for petroleum products was on the rise from Ksh 160 billion to 200 billion registering a 25% increase. Considering the years 2011 to 2012 the import bill fell by 3.2% from 337 billion to 327 billion due to a drop in the domestic demand by 5.7%.

As per the Ministry of Energy and Petroleum, sales of petroleum in Kenya were 4,639,573 cubic meters in 2013. This is a growth of 5.4% over the past decade and is equal to a mean of 3,954,754 cubic meters per year (National Energy and Petroleum Policy, 2014). There has been a 5% annual

growth over the last ten years. Different industries have varied energy requirements and those that are heavy energy users such as steel, cement, paper production and pulp face a higher impact with increasing cost of energy. The cost of energy determines the competitiveness of goods manufactured domestically to those of imports. High energy costs hence impede domestic wealth creation, creation of employment and balance of trade. In Kenya economic activity is crippled by shortages in energy supply alongside the inherent disruptions. Tax policies have been used “to encourage investment in oil and gas, exploration, coal and geothermal exploitation, development of hydroelectric power” coupled with renewable energy forms including wind, biomass and solar (National Energy and Petroleum Policy, 2014). In 2014 the Energy and Petroleum sector was allocated KSh. 43.6Bn to grow energy production and decrease the cost of energy (KPMG, 2014).

1.2 Research problem

Potential investors in any sector seek to establish the profitability of the sector prior to investment. The key factors that would affect the variability of the expected returns ought to be taken into consideration and appropriate measures taken to mitigate any inappropriate conditions. There are a number of studies globally that indicate the existence of a relationship between the financial performance of a firm and the various macroeconomic factors. These factors have been changing from time to time and vary from one business environment to another hence affecting the performance of various economic sectors with great variation. Professional investors coupled with investment advisers have focused on such relationships across various countries. In addition few studies have been done in the Energy and Petroleum sector in Kenya. Neglecting such a significant sector that’s a key driver for the vision 2030 has been of utter surprise.

The nature and degree to which various macroeconomic factors affect industries vary from industry to industry within the same economy. Willy (2012) conducted a research to investigate the effect of macroeconomic factors on the performance of manufacturing firms listed in the stock market and assumed that they would have a similar impact across companies in the NSE. The results however concluded that there was significant variability from one industry to another.

This study is based on the fact that there exists a scholarly gap on the impact of fluctuations of

various macroeconomic factors on the financial performance of the Energy and Petroleum sector in Kenya. The research will strive to bridge the research gap in this area and make a significant contribution to the empirical evidence in this particular area. This should hence complement other scholarly efforts to establish an empirical foundation on which appropriate models that show the dependence of the Energy and Petroleum sector financial performance on some key macroeconomic factors.

1.3 Objectives of the Study

The overall objective of the study is to investigate the effect of macroeconomic factors on the financial performance of firms that are listed in the Energy and Petroleum sector of the Nairobi Stock Exchange (NSE). The study's specific objectives were:

1. To investigate the effect of macroeconomic factors which include foreign exchange, interest rate, inflation rate and GDP on the financial performance of firms listed in the Energy and Petroleum sector of the NSE.
2. To investigate the effects of oil price on the financial performance of firms listed in the Energy and Petroleum sector of the NSE.

1.3 Research Hypotheses

H01: There is no significant effect of macroeconomic factors on the financial performance of firms listed in the Energy and Petroleum sector of the NSE.

H02: There is no significant effect of the oil price on the financial performance of firms listed in the Energy and Petroleum sector of the NSE.

1.4 Value of the Study

The management within an organization observes the microeconomic factors within an industry in order to know which strategy to adopt. Local and foreign investors closely examine the macroeconomic factors of countries as a signal of the stability of various economies. These factors combined constitute the total risk of a sector which constitutes the systematic as well as unsystematic risk of the particular sector (Menike, 2006). This study seeks to provide a guide for investors in the Energy and Petroleum industry to evaluate the expected returns on the same.

Policy makers within the Energy and Petroleum sector seek to offer reasonably priced, sustainable and dependable source of energy that will fuel high and continued economic growth resulting in greater incomes, more employment and reduced poverty. In addition the Energy infrastructure defines the speed of industrial growth in the country (Energy in Kenya, 2013). A proper understanding of the effect of various macroeconomic factors would inform policy makers in this sector by providing insight on the effects of the various macroeconomic factors.

The consumption of energy within Kenya varies across industries and sectors. Furthermore within each sub-sector industries can be categorized as either high, medium or low energy consumers depending on their monthly unit consumption. The energy balance for various organizations is hence key (Oimeke, Njeur, Mbogori, & Otieno, 2013). Companies must hence decide an appropriate energy mix in the face of fluctuations in macroeconomic variables.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter was a review of key theories that explain the returns of capital assets with a variable structure which will govern this research. Key studies that are related to this study were reviewed as a basis of establishing the research gap. Key variables that affect the performance of firms listed in the Energy and Petroleum sector were identified as the basis of this research. Furthermore the interrelationships among the variables were explained from existing literature.

2.2 Review of Theories

The theories guiding this study that described the return on assets included the arbitrage pricing theory and the capital asset pricing theory.

2.2.1 Arbitrage Pricing Model

The arbitrage pricing theory (APT) has been used to examine the effect of macroeconomic forces on stock return globally. APT specifies how the expected return on an investment change in response to other factors and the sensitivity the investment has to that factor. Initially, the APT was applied by Ross (1976, 1977) to explain stock return in the U.S market through the examination of seven macroeconomic variables which were terms structure, industrial production, risk premium, inflation, market return, consumption and oil price. The findings revealed the significant relationship between the macroeconomic variables and stock return especially in terms of industrial production, changes in risk premium, and twist in the yield curve. APT is hinged on the fact that the absence of arbitrage by extension implies a near linear relationship between the expected returns and the betas of various risk factors (Shanken, 1992). The APT Model is stated as follows:

$$r_s = r_f + \beta_1 r_1 + \beta_2 r_2 + \dots \dots \beta_n r_n + \varepsilon$$

Where

r_s = Return on a specific investment

r_f = Return on the risk free investments

β = The change in returns in response to a change in a variable

r = The variables that influence returns on an investment

ε = an error variable that accounts for temporary market deviations

n = the final value in the sequence of terms in the equation

The assumptions of APT include all securities have a finite expected range of values and variances, some agents have the ability to form portfolios that are well diversified, there are no transaction costs no taxes levied.

2.2.2 Capital Asset Pricing Theory

The Capital Asset Pricing Model (CAPM) was originally proposed by Sharpe (1964) and Lintner (1965). CAPM is used in pricing risky securities by putting into consideration the time value of money as represented by the risk-free rate of a market portfolio and the returns derived from the riskiness of the particular investment. A risk measure i.e. beta is a ratio of the returns of the particular asset to that of the market portfolio over a duration of time and finally this ratio multiplied by the market premium gives the additional risk component (Bollerslev, Engle, & Wooldridge, 1988).

$$R_a = R_f + \beta_a(R_m - R_f)$$

Where

R_f = Risk Free Rate

β_a = Beta of the Security

R_m = Expected Market Return

$R_a = \text{Expected Return of the Security}$

CAPM is pegged on three assumptions namely: all investors choose portfolios with a mean variance, are efficient and within a horizon of one period. Secondly, investors have similar subjective expectations on a portfolios means, variance and covariance of returns. Finally investors are dealing in a fully efficient market with no restriction of transfer of stocks that could be due to transactional costs, taxes, restrictions on lending or borrowing at a risk-free rate as well as indivisibilities.

2.2.3 CAPM vs APT

Both the Capital Asset Pricing Model and the Arbitrage Pricing Theory factor in the systematic risk of any given investment. CAPM however is pegged on the market equilibrium which is based on interplay of demand being equal to supply. This however connotes the market portfolio must be efficient and that at any one time an investor holds the market portfolio. In addition CAPM is considered as a special case of the APT in that CAPM uses a single factor beta as sensitivity to the market price changes while the APT has multiple factors thus appropriate for evaluating the effect of individual macroeconomic factors. The Arbitrage Pricing Theory however doesn't put into consideration the supply of the asset and is derived from an arbitrage argument. CAPM is found to be rather restrictive due to the existence of multiple factors affecting a stocks return. To this extent APT has been applied to investigate the impact of the macroeconomic factors on the financial performance of an investment (Zhu, 2012).

2.3 Determinants of the Returns of Capital Assets

Exchange rate variations affect some industries contrarily than others since some of the industries are more export (or import) reliant than others (Kurt, 2003). The interest rate which is used as the discount

rate in discounted cash flow techniques does affect the present value of cash flows. Energy is a major input in most goods and services. Increasing energy prices drives up inflation which in turn hikes interest rates. High interest rate which doubles up as a discount rate thereby diminishes the present value of cash flows. For energy firms that can easily pass on the price increase to consumers assuming that demand is not affected the effect may be minimal. Thus increasing energy prices be it for oil or electricity ought to have a positive and significant impact on the energy firms equity returns. It should also be noted that emerging economies are more energy intensive and hence more exposed to price fluctuations (Ramos & Veiga, 2011).

2.4 Measurement of Financial performance

Varied financial performance ratios are used in different studies. The choice of performance measure to use is determined by the accessibility of data and the specific entity under study. Basha (2014) while investigating the “Impact of Increasing the Crude Oil Prices on the Financial Performance of Pharmaceutical Companies Operating in Jordan for the Period 2002” to 2011 used Return on Assets (ROA), Return on Equity (ROE) and Net Profit Margin as measures of financial performance. Willy (2012) who conducted a study on the Macroeconomic Variations Effects on the Financial Performance of Listed Manufacturing Firms in Kenya used annual profits as a measure of profitability and Average Market Price per Share as a measure of stock market performance. Pirog (2012) while studying the Financial Performance of the Major Oil Companies for the period 2007-2011 used net incomes as a measure of the financial performance. From the above the net income is a key measure of financial performance and is equally reflected in the use of the various performance ratios including ROA and ROE.

2.5 Review of Empirical Studies

A number of studies have been carried out to evaluate the effect of various macroeconomic variables on performance of various stocks. These studies are presented in this section.

According to Nerlove (1968) in their study “factors affecting differences among rates of return on investments in individual common stocks” concluded it is not possible to predict the returns on stocks in general on the basis of information contained in the past balance sheets and profit and loss statements of corporations. The study was conducted for the period 1950 to 1964 at the Cowles Foundation for Research in Economics at Yale University and financed by the National Science Foundation. An attempt has been made to show that a great part of the variability of ex post rates of return is due to disequilibrium in the capital market. Justifications of the random walk theory of stock prices are derived from the emphasis placed by mutual funds and investment trusts on the in-depth study analysis of the companies in which they invest. The existence of relatively high ex post rates of return on some investment requires a great deal of ignorance on the part of many people and only a little ability to learn on the part of a few hence riding on the market efficiencies and information asymmetries. This study hence illustrated the difficulty of predicting the value of stock based on technical analysis which contradicts the premise of our study that seeks to establish the same.

According to Shiller (1981) from the review of other previous studies argued based on data from the New York Stock Exchange (NYSE) revealed that the stock market volatility levels were too high compared to the fluctuations in the dividends which were a key input in valuation when the discounted cash-flow technique was used. The studies revealed that the S&P 500 index were much more volatile than the rational measures of the average changes of the inflation-adjusted earnings let alone the dividends-per share for the period 1900 to the 1970s. These tests challenged the school of efficient markets though were subject to many criticisms both substantive and methodological. This study revealed that different measures of performance would be affected differently due to the different motives that the stakeholders have. This means it is essential to select a performance measure of which stakeholders interest are consistent over time.

Karolyi (2001) in his paper “Why stock return volatility really matters” discussed the extent to which the amount of trading drives the volatility of the stock market. The research analyzed the monthly stock return volatility for the S&P 500, Ibbotson small indexes and IBM since 1981 to

1999. Based on the premise that movement in price of various stocks was tied to arrival of new information and the price adjustment was meant to fit in the new information in the current market prices. News could either be considered to be private or public. Public news entailed announcement of earnings, statistics of unemployment among others while private information would entail how the public information would be perceived to affect the firm among others. Such information would trigger demand for certain stock and equally the need to sell of certain stocks altering the demand and supply which is reflected in the price as an equilibrium state is achieved. The study revealed “systematic patterns in the relationship between stock return volatility and trading volume, the number of transactions, the bid-ask spread and market liquidity in general”. The study focused on information asymmetries within the economy and as such relates informs our study which focuses on NSE data which is viewed as public data.

According to a study by Flannery & Aris Protopapadakis (2002) only two inflation measures affect the level of market portfolio's returns namely the Consumer Price Index (CPI) and the Producer Price Index (PPI). The research was carried out for the period beginning 1980 to 1996 using data obtained from the NYSE and National Association of Securities Dealers Automated Quotations System (NASDAQ) based on the Standard & Poor's 500 (S&P) index. Furthermore three real factor candidates namely balance of trade, unemployment and housing affects only the returns conditional volatility. A monetary aggregate i.e. M1 affects both the returns and conditional volatility. The study revealed three real factors do significantly increase stock market trading volume while the others do not. Conditional variance ought to be taken care when dealing with panel data and as such informs the various tests that have to be taken in our study including testing for fixed effects, random effects and any cross-sectional dependence.

Zaytsev (2010) conducted a research on “the impact of oil price changes on the macroeconomic performance of Ukraine” for the period 1996 to 2006. The variables considered included nominal foreign exchange rate, CPI, real GDP, interest rate, monetary aggregate M1 and average world price of oil. The study revealed “that oil price increases tend to deteriorate real economic activity in the short run (though with one month lag) as opposed to the long run”. The study also revealed

a symmetric response of real GDP to oil price decrease or increase in the short run.

Izedonmi & Abdullahi (2011) conducted a study on the effect of three macroeconomic variables namely inflation, exchange rate and market capitalization on the performance of 20 sectors of the Nigerian Stock Exchange for the period 2000 to 2004. The research was a unique one and revealed that the macroeconomic factors considered had no significant influence in the Nigerian stock exchange market. The research however noted that the extent to which each factor affected various sectors of the economy varied from sector to sector. This showed that it was possible that while a macroeconomic factor would affect one sector positively it would in turn affect another negatively.

Zhu (2012) conducted a research to evaluate “the effects of macroeconomic factors on the stock return of the Energy and Petroleum sector in the Shanghai Stock Market” for the period beginning January 2005 to December 2011. The study concluded that exchange rate, exports, foreign reserve and unemployment rate have an impact on the return of the Energy and Petroleum sector in SEE. A positive relationship was seen between the stock return of the Energy and Petroleum sector and the exchange rate as the Chinese currency is depreciated against the US dollar by 1 point. In addition a positive relationship exists between the stock return of the Energy and Petroleum sector and the foreign reserve. A negative relationship however was found to exist between export and stock return. This study mirrors our study only that a few factors included in the study by Zhu (2012) are not included in our study including exports, foreign reserve and the unemployment rate.

Pan et al. (2012) conducted a study to research on the existence of a relationship between the stock return and macroeconomic factors with a focus on the Indonesian Domestic Economy. The findings from the study indicated the existence of “a long term cointegrating relationship and short run dynamics that adjust back to their long run equilibrium”. The studies further indicated the existence of two cointegrating relationships between the Jakarta Composite index and the macroeconomic variables. In addition the research led to the development of a model indicating short run deviations return to their long run properties. The study was meant to aid both investors

that sought opportunities for investment in the Indonesian market as well as help policy officials.

Ekmekcioglu (2012) conducted a research on the macroeconomic effects of world crude oil price changes in Turkey. The research reveals a strong relationship between the demand for crude oil and the rate of global economic growth. Generally countries that produce crude oil post more significant economic growth than those that do not. Kenya which is where this study is based is a net importer and hence its economic growth over time expected to be lower.

Ratti & Vespignani (2015) conducted a study on the relationship between oil prices and global factor macroeconomic variables. The research was conducted for the period 1999-2013 focusing on various global variables including global interest rate, global M2, global output and global CPI. The countries studied include U.S, China, the Euro area, India and Japan. The study revealed that “causality is found to go from global liquidity to oil prices and from oil prices to the global interest rate, global output and global CPI”. To this extent, “monetary tightening showed by positive innovation in central bank discount rates results in significant and continued decreases in oil prices”. The research also revealed the different economies had varied effect on the global variables with only the U.S and China economy significantly affecting all the four variables.

2.6 Summary of Literature Review

From the various research conducted previously it should be noted that various sectors are impacted by the same macroeconomic variables to varied degrees. In addition while some sectors may be positively affected some may be negatively affected by the same variable. Consequently the same sector can be impacted positively by one variable while simultaneously be impacted by a different variable negatively.

The impact of the same variable on the same sector could also vary from region to region. This showed the uniqueness between various countries. Certain differences could be pegged on the fact that while some countries are predominantly exporters of certain vital commodities such as oil and petroleum products some were predominantly importers.

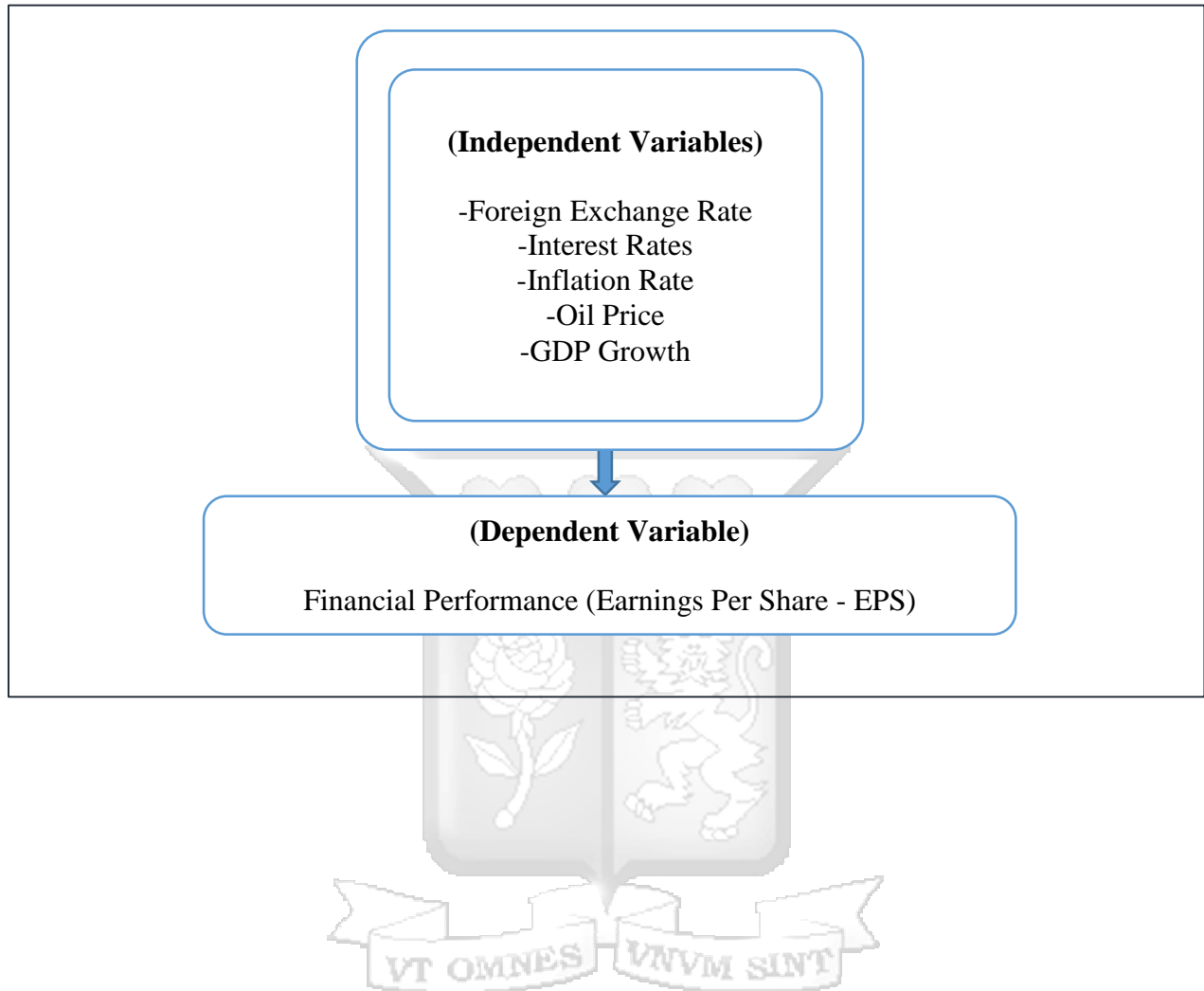
It was also showed that stock returns were based on the market efficiency. The price of various stock returns was but a reflection of an incorporation of the information available in the market be it privately or publicly. This in turn was responsible for driving the amount of trading within a particular market be it based on the available facts or buyers perception of the facts.

It could hence be concluded from the conducted literature review that empirical studies ought to be done on the impact of macroeconomic variables on the financial performance of various companies across various sectors and countries. Due to the importance of the oil and petroleum industry in Kenya a gap of a study of this nature in this sector necessitated this proposed study.

2.7 Conceptual Framework

From the literature review the key variables that this research will focus on include oil prices, foreign exchange rate, interest rate, inflation rate and the GDP growth as shown in the Figure 2.1. In various researches the CPI is considered as a key variable but since this is related to inflation, inflation was used in this particular study. Money supply measures including M1, M2 and M3 used in some researches are tied to the interest rates and hence the interest rate was considered as a key variable. The dollar exchange rate was used as the dollar is considered as the common international currency. From reviewed research oil prices have an impact on the various macroeconomic variables which eventually affect the returns from various stocks. Hence the impact of oil price will be compared to that of other macroeconomic variables. The measure of financial performance from the reviewed studies is financial performance measures that incorporate the net profit for the year. Financial performance will be measured using the Earnings per Share (EPS) since all companies seek to maximize shareholder wealth which is reflected in the EPS.

Figure 0.1: Conceptual Framework – The figure shows the independent and dependent variables that this study will focus on.



CHAPTER 3: RESEARCH METHODOLOGY

This chapter outlines the research methodology to be used to carry out the study. The areas covered in this chapter include the research design, research population, data collection, data analysis and data presentation techniques .

3.1 Introduction

A literature review was carried out exploring factors attributable to the performance of the Energy and Petroleum sector. The identified factors that affect performance of companies listed in the Energy and Petroleum sector of the NSE were the exchange rate, interest rate, inflation rate, GDP fluctuation and oil prices. This chapter hence highlights the method of research adopted in carrying out this study.

Research entailed formulation of the problem, establishing a research design, determining methods to be used to collect data, evaluation and reporting of the outcome by way of a report. This study was a case study focusing on the companies listed in the Energy and Petroleum sector of the NSE. The unit of analysis was an individual company in the listed category. The aim of the research was to evaluate the effects of macroeconomic factors on the performance of listed energy firms in the NSE. Upon discussion of the method of design to be employed, the methods of data collection and analysis were discussed.

3.2 Research Design

The research design is of fundamental significance since it determines if a successful research will be carried out. The research design gives a logical arrangement that guides the gathering and examination of data with the aim of responding to the research questions earlier stated. A research design is a comprehensive plan of how to conduct a research study– operationalizing variables in a way they can be measured, gathering data to be used so as to test hypotheses and evaluating the outcomes. The study will entailed collection of both secondary and primary data.

The research was of a quantitative approach by design. This entailed collection of secondary data for the macroeconomic variables listed including interest rate, GDP growth, exchange rates and inflation. These were collected from various sources including the NSE and Kenya National Bureau of Statistics (KNBS). This enabled a study of the macroeconomic variables across various time horizons over the past decade. Data was compared across the various companies since 2004 to 2011. Both a longitudinal and cross-sectional analysis of the listed energy companies were done hence constituting panel data analysis. The data that was utilized for this research was secondary data and an archival research strategy was applied.

3.3 Population and Sampling

This research entailed a case study of companies that are listed within the Energy and Petroleum sector of the NSE. There were five firms listed in the Energy and Petroleum sector of the NSE including: Kenol Kobil Limited, Total Kenya Limited, KenGen Limited, Kenya Power & Lighting Company Limited and Umeme Limited. An individual company was the unit of analysis of this research. The macroeconomic data was obtained from historic secondary data. The data collected covered the years 2004 to 2015 on a yearly basis so as to do an analysis over the past decade. The financial performance was measured using the Earnings per Share (EPS) since all companies sought to maximize shareholder wealth and the EPS was hence reported in the annual financial statements.

3.4 Data Collection

Secondary data was collected as the macroeconomic measures of this study were available from historical records. Yearly data was collected for the period 2004 to 2015 hence a period of 12 years. The financial performance data for the various companies under investigation were drawn from financial statements of companies listed in the Nairobi Securities Exchange and available in the Capital Markets Authority (CMA) library. The macroeconomic data and oil prices were drawn from KNBS yearly Kenya Facts and Figures publication.

3.5 Data presentation

Tables and graphs were used where necessary in the presentation of data collected and analyzed in the study. A report was written with the recommendations following the research carried out.

3.6 Data Analysis

The data collected shall was subjected to correlation analysis and Panel data analysis. The analysis was done using both descriptive and inferential frameworks. Panel data analysis was incorporated in the data analysis stage. Analysis of this study was done based on the APT model for which the macroeconomic factors were analyzed as follows:

Macroeconomic variables:

$$Y_{it} = \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \beta_4 X + \beta_5 X_{it} + \alpha_i + U_{it}$$

The symbols represent the following variables

α_i ($i = 1 \dots 5$) – the unknown intercept for each entity

Y_{it} – Financial Performance of a listed energy firm i at time t

X_{it} – Value for the corresponding independent variable at the point in time

β_1 – Foreign Exchange rate coefficient

β_2 – Interest Rate fluctuation coefficient

β_3 – Inflation Rate coefficient

β_4 – GDP fluctuation coefficient

β_5 – Oil price coefficient

U_{it} – Error term

Y = Financial Performance of a listed energy firm. The performance measure chosen for this research was the Earnings per Share (EPS).

$$EPS = \frac{Net\ Profit}{No.\ of\ Shares}$$

In order to standardize the returns across the companies the percentage change in the EPS with a reference year of 2004 was used. The EPS of the companies under study was available as part of the annually published financial statements. EPS was an ideal measurement of performance as all companies sought to maximize shareholder wealth and the EPS is the best indicator of the same to the shareholders.

3.6.1 Panel Data Analysis

Panel data involved the pooling of observations on a cross-section of units over a number of time periods and provided outcomes that are simply not noticeable in pure cross-sections or pure time-series studies. This method was appropriate as the analysis involved information from different companies over a twelve year period. Panel data analysis was also appropriate as it helps control for variables that cannot be observed for example different company policies or business practices.

The two methods of panel data analysis to be considered were-;

- i) Fixed Effects
- ii) Random Effects

3.6.1.1 Fixed Effects

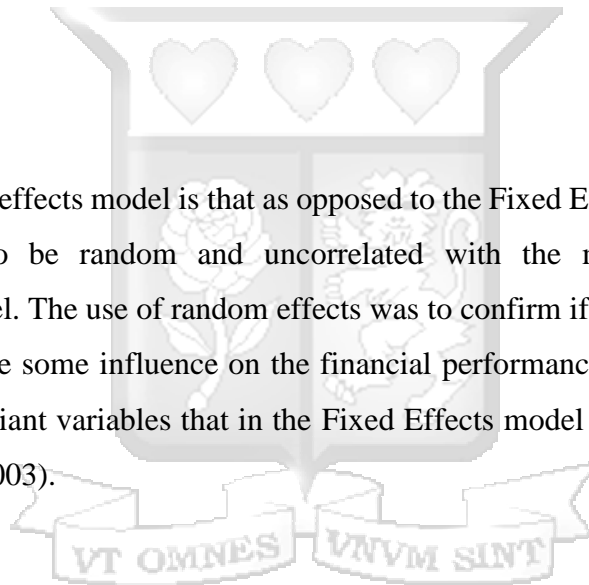
This was an appropriate method as the study considered the effect of variables over a 12 year period. Fixed Effects was used to explore the relationship between the macroeconomic variables and financial performance within the listed firms. Each listed firm has its own characteristics that may or may not influence the financial performance. When using Fixed Effects we assumed that something within the firm may impact the financial performance and we needed to control for this. This was the rationale behind the assumption of the correlation between the firm's error term and

the macroeconomic variables. Fixed Effects removed the effect of this time invariant characteristics so that we could evaluate the net effect of the macroeconomic variables on financial performance (Wooldridge, 2003).

Another key assumption of the Fixed Effects model is that the time invariant characteristics are exceptional to the listed firm and should not be correlated with other firm characteristics. Each firm is unique thus the firm's error term and the constant (that denotes the discrete features of the firm) should not be correlated with the other firms' characteristics. If the error terms were correlated then Fixed Effects was not suitable since conclusions may not be correct. We thus modeled the relationship (using random-effects) and carried out the Hausman test to determine the viability of the Fixed Effects model.

3.6.1.2 Random Effects

The basis for the random effects model is that as opposed to the Fixed Effects, the variation across listed firms is taken to be random and uncorrelated with the macroeconomic variables encompassed in the model. The use of random effects was to confirm if the differences within the different listed firms have some influence on the financial performance of the listed firms. This would include time invariant variables that in the Fixed Effects model would be observed as the intercept (Wooldridge, 2003).



3.6.2 Testing the models

Various tests were carried out on the models selected. These included the following:-

3.6.2.1 Hausman test

In order to decide whether to use the fixed or random effects, the Hausman test was carried out. While carrying out this test the “null hypothesis was that the preferred model was random effects verses the alternative the Fixed Effects. It basically tested whether the unique errors (ε_{it}) are correlated with the regressors, the null hypothesis is that they were not”.

3.6.2.2 Breusch-Pagan Lagrange multiplier (LM)

This test was carried out to decide “whether to use random effects regression or the Pooled OLS regression. The null hypothesis in the LM test was that variances across entities were zero meaning there was no significant difference across units (i.e. no panel effect)”.

3.6.2.3 Pasaran CD test

Pasaran Cross-sectional Dependence (CD) test was used to evaluate if the residuals were correlated throughout all entities. “Cross-sectional dependence could result to bias in tests results (also called contemporaneous correlation). The null hypothesis is that residuals were not correlated”.

3.7 Research Quality

The research quality was evaluated in three levels i.e. internal validity, external validity and construct validity. In order to ensure internal validity i.e. that changes in the outcome were not attributable to other factors, the Fixed Effects model was to be used. This eliminated any time invariant factors and assessed the results within the different firms.

External validity was ensured by selecting a sample that is representative of the total population i.e. 5 firms out of a possible 5 listed firm in the Energy and Petroleum sector of the NSE.

The construct validity was established by selecting appropriate measures of financial performance. This included the EPS which is derived from the net profit as a measure of profitability.

3.8 Ethical Considerations

The data on the macroeconomic variables and returns of the public listed companies was in the public domain. A referral letter from University administration as provided by the Ministry of Education was presented to the NSE, KNBS and the companies listed as part of this study. The listed companies in the Energy and Petroleum sector of the NSE will thereafter be provided with the outcome of the research.

3.9 Data Validity and Reliability

Using data from the CMA, NSE and KNBS ensured that accurate data was obtained on the various measures required. This ensured reliability so that any other researcher who carries out a similar study based on the same duration can achieve the same results and hence conclusion. This data being factual mitigated any possible human imposed biases.

The measure of performance chosen was the EPS which can be obtained for all public listed companies. This was the best measure captures the entire returns from a company. Restricting the companies of study to listed companies ensured that data used from the various company accounts are those regulated by the CMA. This guaranteed internal validity of the research so that credible conclusions could be drawn from the conducted research.

External validity ensured generalization of the study, however from this research the findings were generalizable to the extent of energy companies listed in the NSE and as such can be comparable to similar studies for other sectors in the NSE. The generalization will be possible since the sampling space was the entire set of companies listed in the Energy and Petroleum sector of the NSE hence external validity of the study.

CHAPTER 4: PRESENTATION OF RESEARCH FINDINGS, DATA ANALYSIS AND DISCUSSION

The presentation of research findings and discussion begins by giving the descriptive statistics. Yearly data was collected for the period 2004 to 2015 hence a period of 12 years. The yearly macroeconomic data was collected for the independent variables including oil price in dollars per barrel, GDP growth, interest rate, the exchange rate of the dollar and the inflation rate. Company performance data was only collected for the four out of five companies listed in the NSE Energy and Petroleum sector. Among the four companies included in the study were Kenol Kobil, Total Kenya, KPLC and KENGEN leaving out Umeme Ltd as it is domiciled and has all its operations based in Uganda. Umeme Ltd being cross listed in the NSE is thus not affected directly by the Kenyan macroeconomic variables as are the other companies domiciled in Kenya.

This chapter proceeds to present the correlation analysis between the independent variables (macroeconomic factors) and dependent variable (company performance). The Hausman test is carried out to determine whether to analyze the data using fixed or random effect procedures. The results of this test guide us to run the Fixed Effects model. The Breusch-Pagan Lagrange multiplier test is carried out in addition and confirms that fixed treatment is appropriate. Another test that is carried out to test for cross sectional dependence is the Pasaran CD test. Discussions are presented in the subsequent sections.

4.1 Descriptive Statistics

Table 4.1 provides a summary of the descriptive statistics of the dependent and independent variables for the firms under study. The performance of the firms is measured by Earnings per Share (EPS). The companies registered an average drop in performance of 49% of the industry earnings over the past 12 years. On one hand this may suggest a gradual maturation of the industry over time which is signaled by a decrease in returns.

Data on the five macroeconomic variables under study included oil price, GDP growth, interest rate, the exchange rate and inflation rate for the past 12 years. Of the five the oil price had the

lowest volatility with a standard deviation of 0.17. On the other hand the exchange rate of the dollar had the highest volatility with a standard deviation of 9.06.

Table 0.1: Descriptive statistics on the variables – the table shows substantial variation in the various variables with the exchange rate having the highest standard deviation.

Variables	Observations	Mean	Standard Deviation	Min	Max
Oil Price(\$)	12	1.16	0.17	0.87	1.39
Gdp Growth(%)	12	5.34	1.59	1.98	8.21
Interest Rate(%)	12	7.83	2.60	2.96	12.76
Dollar Exchange Rate	12	80.69	9.06	67.22	99.21
Inflation Rate(%)	12	10.71	5.53	3.85	26.16
EPS Change (%)	48	-49%	0.38	-151%	21%

Source: Study data

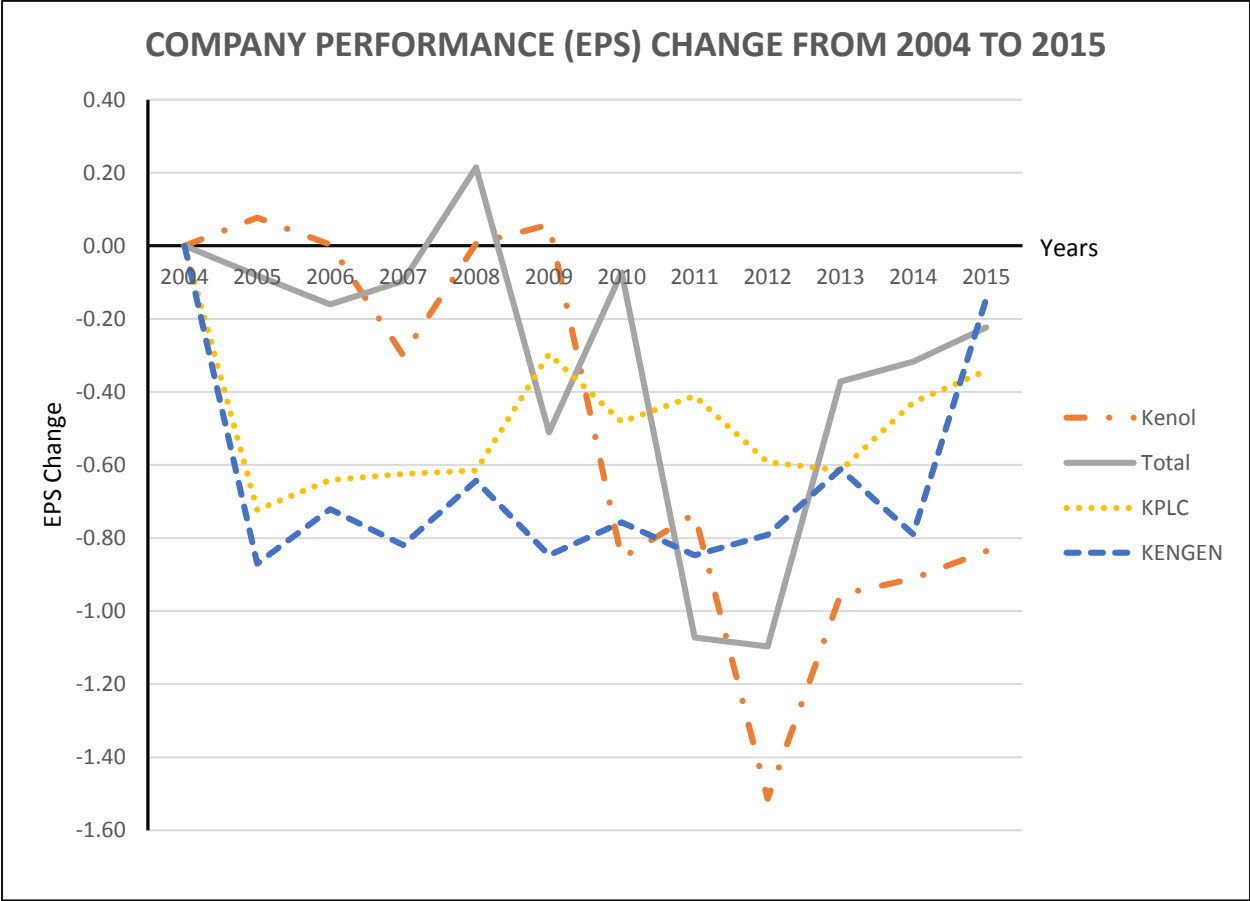
Table 4.2 shows a summary of the individual company performance over the period 2004 to 2015 while figure 4.1 gives a graphical view of the year on year EPS change for the various companies. Over the period of study, Kenol Kobil registered its highest EPS of KES 8.96 in 2005 and its lowest EPS of KES -4.27 in 2012. Total Kenya registered its highest EPS of KES 4.02 in 2008 and its lowest EPS of KES -0.32 in 2012. KPLC on the other hand registered its highest EPS of KES 5.79 in 2004 and its lowest EPS of KES 1.6 in 2005. Finally KenGen registered its highest EPS of KES 6.13 in 2004 and its lowest EPS of KES 0.8 in 2005. There has been a general drop in company performance over the years as depicted in Figure 4.1. This is in line with the expected decline in the returns from industries as they mature. From the figure 4.1 a sharp decline in financial performance is seen in 2010/2011 period in Total Kenya and Kenol Kobil which are in the petroleum sector. This is due to the energy price regulation in Kenya by the ERC which started off in 2010 so as to pass on the price drop benefits to consumer.

Table 0.2: Descriptive statistics of the Company performance – The table shows a summary of the variations in company performance with KenGen registering the highest change in EPS over the period of study.

Company	Observations	Mean EPS	Mean EPS		
			change	Max EPS	Min EPS
Kenol	12	4.19	-0.50	8.96	-4.27
Total	12	2.27	-0.32	4.02	-0.32
KPLC	12	3.01	-0.48	5.79	1.605
KenGen	12	2.13	-0.65	6.13	0.8

Source: Study data

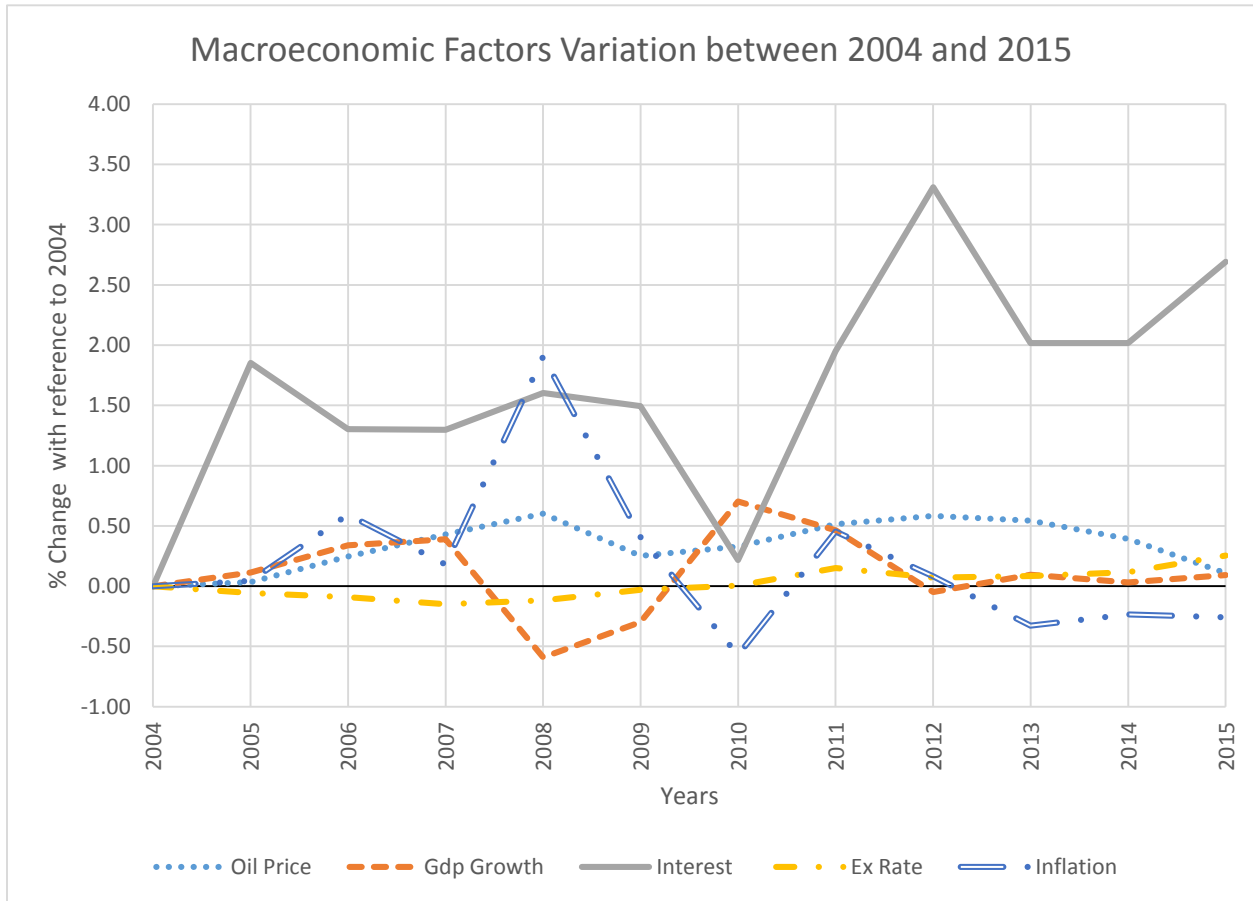
Figure 0.1: Company performance change between 2004 and 2015 – The figure shows a general decline in performance and a major drop for the petroleum companies for the year 2010/2011 due to ERC oil price regulation.



4.2 Macroeconomic Variables Analysis

The change in macroeconomic variables was plotted with 2004 as the base year to show the general movements of the variables over the years 2004 to 2015 as shown on the figure 4.2.

Figure 0.2: Macroeconomic Factors Variation – The figure shows highest change to be in the interest rate over time while oil prices have a cyclic variation.



Source: Study Data

The highest percentage change is seen in the interest rates which shows Central Banks active regulation of the monetary policy. In Kenya, interest rates decisions are made by The Monetary Policy Committee (MPC) of the Central Bank of Kenya. Since August 2005 the official interest rate is the Central Bank Rate (CBR), which replaced the 91-day Treasury Bill (TB) rate. For this research the TB rate was used since it has been in use since the onset of the period of study in this research unlike the CBR which got into use in 2005.

The lowest GDP growth was registered during the 2008 world economy crisis and subsequently the highest inflation over the period of study showing that Kenya's economy is in line with global macroeconomic trends. This however could have been driven further by the fact that Kenya had a post-election violence in the year 2008.

Oil prices seem to oscillate between low and high price cycle and are currently on a low equivalent to the lowest prices registered in 2004 as seen over the period of this study. The oil price plunge in Kenya is in line with the worldwide oil price drop as indicated in Understanding "The Plunge In Oil Prices: Causes, Consequences, and Policy Responses" published by the World Bank Group (2015b). According to the article the drop in oil prices is partly a catching up to a global trend of commodity price declines that has been ongoing jointly instigated by increase in oil supply prompted by oil production in the US. In addition OPEC had a change in policy to abandon price targeting and has hence kept oil production at 30 mb/d since December 2011 and hence no longer acting as the swing oil producer keeping supply and demand out of balance.

4.3 Correlation Analysis

Correlation is a measure of the strength and direction of the linear relationship between any two variables (Levine, Berenson, Stephan, & others, 1999). In this test a strong relationship is undesired between macroeconomic variables. Any value above absolute 0.7 is regarded as a strong relationship and is undesired.

Table 4.3 shows the company performance (EPS) is negatively and weakly correlated with the oil price, GDP, interest rate and exchange rate but weakly and positively correlated with the inflation rate. The oil price is weakly and negatively correlated with the GDP growth and exchange rate but positively and weakly correlated with the interest rate and inflation rate. The GDP growth is weakly and negatively correlated with the interest and inflation rates but positively and weakly correlated with the exchange rate. The negative relationship between GDP growth and interest rate is in tandem with Jordaan, (2014) who carried out a study on the impact of interest rate changes on South African households for the period 1995 to 2010. The study revealed that as interest rates increase it makes the cost of money more expensive crowding out private demand leading to a decrease in aggregate demand and hence lower GDP. The positive relationship between GDP

growth and exchange rates is in agreement with Samuel & Teddy (2014) who carried out a research on the Analysis of the Effect of Inflation, Interest Rates, and Exchange Rates on Gross Domestic Product (GDP) in Indonesia for the period 2005 to 2013. Samuel & Teddy (2014) states economic growth is usually caused by high levels of investments since there will be a higher conversion of USD into local currency strengthening the local currency and foreign exchange gain is translated into increased profits then even more outputs generated. The interest rate is weakly and positively correlated to the exchange rate and inflation rate. The exchange rate is weakly and negatively correlated to the inflation rate. From the above it can be inferred that low oil prices trigger a positive GDP growth since oil is considered as a key cost within the Energy and Petroleum sector. The Central Bank of Kenya monetary policy does affect the performance of companies as the higher the interest cost the lower the profitability of the companies in the Energy and Petroleum sector. In addition high exchange rates of the dollar translate to higher exchange rate losses of the companies and increases the general cost of imports purchased in USD that may be required by the various companies.

Table 0.3: Correlation Analysis Results – The table shows all correlation values were below 0.7 showing weak correlation among regressors.

	Co. Performance (EPS)	Oil Price	GDP Growth	Interest Rate	Exchange Rate	Inflation Rate
Company Performance (EPS)	1.00					
Oil price	-0.38	1.00				
GDP Growth	-0.17	-0.12	1.00			
Interest Rate	-0.38	0.39	-0.27	1.0		
Exchange Rate	-0.24	-0.02	0.14	0.48	1.0	
Inflation Rate	0.18	0.34	-0.61	-0.03	-0.49	1.0

Source: Study Data Analysis in Stata

4.4 Fixed Effects vs Random Effects Determination

In order to decide whether to use the fixed or random effects method, the Hausman test was carried out. While carrying out this test the null hypothesis is that the preferred model is random effects verses the alternative method being the Fixed Effects. It basically tests whether the unique errors (u_i) are correlated with the regressors, the null hypothesis is they are not (Wooldridge, 2003).

Table 4.4 however shows the Hausman test was not successful since the observations made were too few. This hence required using both the fixed and random effects methods after which further tests were conducted so as to determine which of the two would be the appropriate method. Each method will then be compared with the Ordinary Least Squares (OLS) method to determine if the Pooled OLS method would be sufficient.

Table 0.4: Hausman Test Results – the table shows the Hausman test failed and hence could not be used to determine whether to carry out a fixed or random effects test.

	Coefficients		Difference (b-B)	S.E
	Fixed (b)	Random(B)		
Oil Price	-0.7837	-0.7837	0	-
GDP Growth	-0.0476	-0.0476	0	-
Interest Rate	-0.0538	-0.0538	0	-
Exchange Rate	0.00195	0.00195	0	-
Inflation Rate	0.01371	0.01371	0	-

b = Consistent under Ho and Ha;

B = inconsistent under Ha, efficient under Ho;

Test: Ho: difference in coefficients not systematic.

Source: Study Data Analysis in Stata

4.5 Determination of Random Effects

The Breusch-Pagan Lagrange Multiplier Test LM helps decide between a random effects regression and a simple Pooled OLS regression. The null hypothesis in the LM test is that variances across entities is zero hence no significant differences across the various companies (Wooldridge, 2003).

Table 4.5 shows the probability of Chi2 is 0.1051 which is more than 0.05. This test hence failed to reject the null hypothesis, concluding that Random Effects is not appropriate. It hence suggests use of either a Pooled OLS method or the Fixed Effects method.

Table 0.5: BPLM Test Results - the table shows the probability obtained for the Chi2 null hypothesis test.

	Variance	Standard Dev = sqrt (Var)
Company Performance (EPS)	0.1480	0.3847
e	0.0965	0.3107
u	0.0110	0.1049

Test: Var(u) = 0

chibar2(01) = 1.57

Prob > chibar2 = 0.1051

Source: Study Data Analysis in Stata

4.6 Determination of Fixed Effects vs Pooled OLS

Having disqualified the random effects method a further test was done to determine which would be appropriate between a Fixed Effects test and the Pooled OLS test (Wooldridge, 2003). This is verified through an F-test as shown in Table 4.6. The F-test conducted gave a probability of 0.0856 hence accepting the null hypothesis which states that there are no differences in intercepts between the companies. This hence endorses the Pooled OLS method. This shows the variations across the

various companies being studied are random and uncorrelated with the macroeconomic variables included in the model.

Table 0.6: F-Test Results - The table shows the probability obtained for the F-test null hypothesis test being more 0.05.

Company Performance (EPS)	Coefficient	Std. Err	t	P> t
Oil price	-0.7837	0.3108	-2.52	0.016
GDP Growth	-0.0476	0.0389	-1.22	0.229
Interest Rate	-0.0538	0.2388	-2.25	0.030
Dollar Exchange Rate	0.0019	0.0069	0.28	0.779
Inflation Rate	0.0137	0.6788	1.16	0.251
Sigma_u	0.1380			
Sigma_e	0.3107			
Rho	0.1647 (fraction of variance due to u_i)			

F test that all $u_i = 0$: $F(3, 39) = 2.37$

Prob >F = 0.0856

Source: Study Data Analysis in Stata

4.7 Cross-sectional Dependence Check

Cross-sectional dependence is a problem in panel data whereby performance of one company affects the performance of one or more other companies. This may lead to a bias referred to as contemporaneous correlation and is tested using the Pasaran CD test (Wooldridge, 2003). The null hypothesis in the Pasaran test is that the residuals across entities are not correlated. From the Table 4.7 Pasaran's test of cross sectional independence gave a probability of 0.0823 which is more than 0.05 hence we accept the null hypothesis meaning there is no cross-sectional dependence.

Table 0.7: Pasaran CD Test Results - the table shows the probability obtained for the Pasaran CD null hypothesis test.

Pasaran's test of cross sectional independence = -1.738	Pr = 0.0823
Average absolute value of the off-diagonal elements =0.479	

Source: Study Data Analysis in Stata

4.8 Regression of Results

Pooled panel data assumes all companies are the same and that there is no heterogeneity among the companies under study. The Pooled OLS regression was run with the dependent variable being the EPS change and independent variables being the macroeconomic variables. As a result the Pooled OLS model in Table 4.8 only shows the causes of change in performance within all companies under study.

Table 0.8: Pooled OLS Test Results - the table shows the probability obtained for the two sided P-test for each of the variables as well as the F-test probability for the entire model.

Company Performance (EPS)	Coefficient	Std. Err	t	P> t
Oil price	-0.7837	0.3257	-2.41	0.021
GDP Growth	-0.0476	0.0408	-1.17	0.250
Interest Rate	-0.0538	0.0250	-2.15	0.037
Dollar Exchange Rate	0.0019	0.0072	0.27	0.788
Inflation Rate	0.0137	0.0135	1.01	0.317

Constant	0.7919	0.7123	1.11	0.273
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$F(5, 42) = 4.73$

Prob > F = 0.0016

R-squared = 0.360

Adjusted R-squared = 0.2840

Root MSE = 0.32556

Source: Study Data Analysis in Stata

From the Pooled OLS test output the following were inferred. The F test probability for the entire model is 0.0016 which is less than 0.05 and as such approves the model as okay. It shows that jointly all the coefficients in the model are not zero. The R-square of the model is 0.3602 showing that about 36% of the variance of company performance can be explained by the macroeconomic factors included in the model. The two-tail p-values test for each coefficient denoted by $P > |t|$ tests whether the corresponding coefficient for the independent variable is equal to zero. The hypothesis is rejected if the p-value is less than 0.05 showing that the corresponding variable is significant. From the model above only the oil price and the interest rate have a significant influence on the financial performance as their p-values are less than 0.05. The other macroeconomic variables namely GDP growth, the exchange rate and inflation rate have no significant influence on the financial performance of Energy and Petroleum companies under study.

4.9 Application of the Results to the APT Model

Macroeconomic factors play an important role in determining the financial performance of companies listed in the NSE. The following model was derived using the Pooled OLS method to explain the performance of companies listed within the Energy and Petroleum sector of the NSE.

$$Y_{it} = 0.002X_{1it} - 0.054X_{2it} + 0.014X_{3it} + 0.048X_{4it} - 0.784X_{5it} + \alpha_i + U_{it}$$

The symbols represent the following variables

$\alpha_i (i = 1 \dots 5)$ – the unknown intercept for each company

Y_{it} – Financial Performance of a listed energy firm i at time t

X_{it} – Value for the corresponding independent variable at the point in time

X_{1it} – Foreign Exchange value at that time and for company i

X_{2it} – Interest Rate value at that time and for company i

X_{3it} – Inflation Rate value at that time and for company i

X_{4it} – GDP fluctuation value at that time and for company i

X_{5it} – Oil price value at that time and for company i

U_{it} – Error term

From the test of hypothesis only two variables are significant in explaining the performance of the firms listed in the Energy and Petroleum sector. The two variables are oil price and interest rates. The results are in agreement with a study carried out by Basha (2014) on the “Impact of Increasing the Crude Oil Prices on the Financial Performance of Pharmaceutical Companies Operating in Jordan” for the Period 2002 to 2011. Basha (2014) stated that there is a significant relationship between the increase in oil prices and that of various performance measures including Return on Asset (ROA), Return on Equity (ROE) and Net Margin. As for the interest rates the findings contradict Ouma & Muriu (2014) who focused on the impact of macroeconomic variables on stock market returns in Kenya for the period 2003 to 2013. Ouma & Muriu (2014) concluded that interest rates is not important in determining the long run returns in the NSE while this study concluded that interest rates are significant in determining the financial performance of companies listed in the Energy and Petroleum sector. This difference could be explained by the heterogeneity between the sectors in the NSE. Furthermore, this study’s findings are in line with those of Willy (2012) who conducted a study on the Macroeconomic Fluctuations Effects On The Financial Performance Of Listed Manufacturing Firms In Kenya. The study revealed that the foreign exchange, interest rate and inflation rate have significant effects on the performance of firms in the construction and manufacturing sectors of the NSE.

There is a significant negative relationship between the oil price and the financial performance of the companies in the Energy and Petroleum sector of the NSE. The oil price indicated is the oil price per barrel in dollars. This negative relationship is expected as oil is a key cost in the sector

hence the lower its cost the more profitable firms in this sector become since it greatly increases the gross profit. This findings are in agreement with Shaari, Pei, & Rahim (2013) who conducted a study on the Effects of Oil Price Shocks on the Economic Sectors in Malaysia for the period 2000 to 2011. The findings revealed that oil price fluctuations affected the financial performance of certain sectors namely agriculture, construction and manufacturing sectors excluding the transportation sector which were under study. This is in line with a premise of this study that different sectors are affected differently by the variations in the same macroeconomic variables.



CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the conclusion of the study and recommendations. It also highlights the limitations of the study and areas of further study. The macroeconomic factors affecting financial performance of any industry are important considerations for any business organization. These are important since they contribute to the non-diversifiable risk that affects industries. At best this may dictate the right timing to enter an industry or make such strategic decision as the macroeconomic variables keep fluctuating over time. In addition various industries in Kenya are reliant on the Energy and Petroleum sector industry products and services. Being able to predict the performance of companies in this sector can foster better relations and proper positioning to harness the opportunities that come with the fluctuations of the macroeconomic variables e.g. negotiating better oil prices when the prices are low.

5.2 Conclusion

Based on the study results, we reject the null hypothesis H01 and accept the alternative hypothesis that states that there is a significant relationship between the financial performance of firms listed in the Energy and Petroleum sector of the NSE and fluctuations in macroeconomic factors. We equally reject the null hypothesis H02 and accept the alternative hypothesis that states that there is a significant relationship between the financial performance of firms listed in the Energy and Petroleum sector of the NSE and the fluctuations in oil price.

Of the independent variables studied only the oil price and interest rate have a significant effect on the performance of the firms under study. This study results reveal a significantly negative relation between oil price and financial performance. These findings imply that an increase in oil price is associated with a decrease in financial performance; thus, the higher the oil price, the poorer the financial performance of the firms listed in the Energy and Petroleum sector of the NSE.

The findings of this paper contradict with prior empirical study by Zhu (2012) which was based on energy firms listed in the Shanghai Stock market. Zhu (2012) found the exchange rate had a

significant effect which was not the case in this study. This may be because of the difference in the balance of payments between the two countries. China is a net exporter with surplus in USD reserves while Kenya is a net importer with a deficit in USD reserves. As a result the Kenyan shilling has been depreciating to the US dollar while the Chinese Yen has been appreciating to the dollar.

5.3 Recommendations

Based on these results the following recommendations are suggested:-

- i Firms listed in the Energy and Petroleum sector of the NSE must consider constantly monitoring the oil prices and prevailing interest rates. This will aid in the appropriate timing of various strategic decision such as financing decisions especially where debt is involved. When the interest rates are high, firms in this sector seeking to raise capital should consider equity funding or floating corporate bonds both locally and on the international market.
- ii New entrants into the industry must pay heed to the oil price and interest rates as these significantly affect the expected returns. This can be essential for making the necessary projections or comparing various operating environments to establish the best suitable environment for expansion.
- iii Purchasing decisions for oil as regards timing should be duly informed by the model developed in this study. Since the higher the oil price the lower the financial performance, measures should be taken to ensure that industries in this sector enjoy the lowest prices by using financial instruments such as hedging.

5.4 Limitations of the study

There were significant gaps in the availability of quarterly data for the financial performance of firms listed in the Energy and Petroleum sector of the NSE. Much as submitting of quarterly returns is a CMA requirements it was noted that most companies do not comply with the same. The data set being very few may have affected the findings and as such a much longer period of study should be considered in the absence of quarterly data. In addition Umeme Limited was listed in the NSE

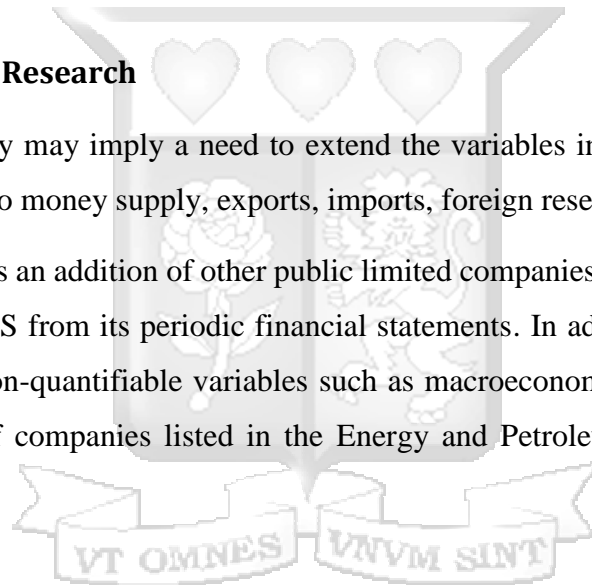
in 2012 and hence missing substantial data. In addition Umeme Limited is domiciled in Uganda and is only cross listed on the NSE thus its financial performance is not affected by the Kenyan macroeconomic factors hence it was eliminated at the data analysis stage. A lag on exchange rate ought to have been considered due to the delay between order placement and actual deliver of consignments for oil. This was however difficult since Kenya has a one month lag yet the study was based on yearly data hence minimal effect.

The companies considered in this analysis may also have different company policies and different business practices that may affect the profitability. In order to control for this differences, panel data analysis is incorporated in this research.

5.5 Areas of Further Research

The findings of this study may imply a need to extend the variables included in the research to factor in but not limited to money supply, exports, imports, foreign reserves and unemployment.

The study also commends an addition of other public limited companies in Kenya not listed in the NSE by analyzing its EPS from its periodic financial statements. In addition research should be done to establish how non-quantifiable variables such as macroeconomic factors may affect the financial performance of companies listed in the Energy and Petroleum sector of the NSE in Kenya.



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APPENDIX

NSE COMPANIES LISTED IN THE ENERGY & PETROLEUM SECTOR

Kenol Kobil Ltd

Total Kenya Ltd

KenGen Ltd

Kenya Power & Lighting Company Limited

Umeme Ltd.

