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**AN EVALUATION OF THE RELATIONSHIP BETWEEN OIL PRICE AND
THE SHARE PRICES OF MANUFACTURING COMPANIES LISTED IN THE
NAIROBI SECURITIES EXCHANGE**

GILBERT KIPRONO BETT

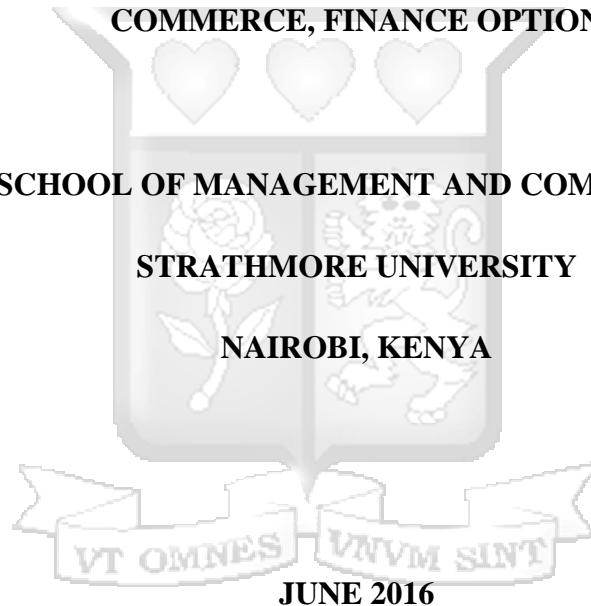
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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF
COMMERCE, FINANCE OPTION**

SCHOOL OF MANAGEMENT AND COMMERCE

STRATHMORE UNIVERSITY

NAIROBI, KENYA



JUNE 2016

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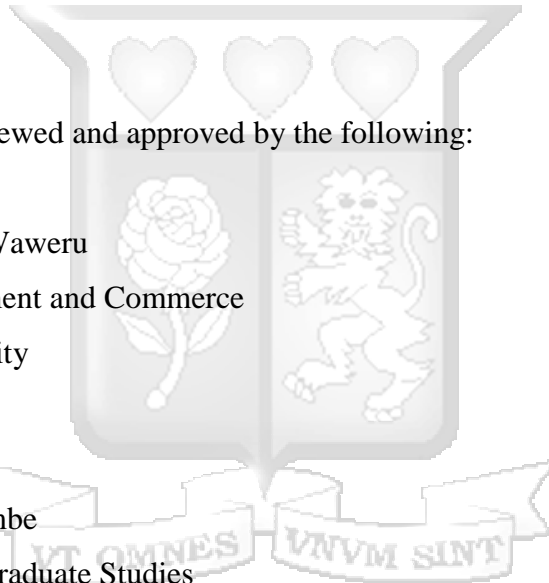
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Abstract

This is a study of the relationship between Oil price and the Share price of manufacturing companies listed in the Nairobi Securities Exchange. The theoretical rationale is that Share price is the the discounted sum of expected future cash-flows. Oil prices being a key component affecting future expected cash flow and the impact of Oil prices is therefore inevitable. This empirical study puts that economic theory to test using data from 2005 to 2014 within the context of the listed manufacturing companies. First the paper tests for traditional linear cointegration using the 1990 Johansen Co-integration test. Then it applies the Granger Causality test to determine the direction of the relationship. There's some evidence to support the long run relationship between the two variables within some of the companies. Amongst those that displayed a long run relationship between the variables, there's also evidence that the Oil price movement granger causes the Share price movements. These mixed results may have been impacted by the unique business and industrial processes run by the individual companies. The paper concludes that while there's evidence for oil price changes impacting the Share Prices, there's a need to understand why other companies within the industry aren't impacted. Outcome of the study advises the actions of management and portfolio managers in as far as their response to changes in oil prices are concerned.



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CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Whether the price of oil is too high or too low depends on the point of reference (Frías, 2000). As with any other commodity on the free market, sellers would want to charge higher prices, while buyers are looking to pay as little as possible. World Bank statistics show an increase from a price of 26 US Dollars per barrel in January 1985, USD 31 per barrel in 2004, USD 53 per barrel in January 2007 to USD 102 in January 2014. While this increase is notable over the long term horizon, Oil prices have also been characterized by strong fluctuation in the last two decades. Having fluctuated around US\$20 a barrel for much of the 1990s, Oil prices have risen sharply since 1999, peaking at US\$150 a barrel in mid-2008, before dipping below US\$30 by end-2008 (O'Brien & Weymes, 2010).

Oil price volatility is defined as the degree to which prices rise or fall over a period of time (Ayhan Kose, Prasad, & Terrones, 2005). This rapid rate of change as described by (Ebrahim, Inderwildi, & King, 2014) is measured by the standard deviation of Oil prices in a given period. Appendix 1 illustrates the fluctuation experienced in world Oil prices between 1988 and 2013. This is commonly measured by computing the standard deviation of changes in the Oil price over a specified period of time (Castillo, Montoro, & Tuesta, 2010). The standard deviation measures the amount of variation around an average. For instance, monthly volatility is calculated by taking the standard deviation of the 12 monthly price changes during that particular year. A low standard deviation indicates that the data points (i.e., the 12 monthly changes) tend to be very close to the average monthly change (meaning less month-to-month variability); a high standard deviation indicates that the data points are spread out over a large range of values (meaning more month-to-month variability). Thus a higher standard deviation can be interpreted as higher volatility and lower standard deviation as lower volatility. According to the Energy Information Administration, when market prices tend to change a lot over relatively a short time, the market is said to have high volatility. When relatively stable prices prevail, the market is said to have low volatility.

A number of studies, including (Ayhan Kose et al., 2005; Ebrahim et al., 2014; Energy Information Administration, 2001) have put forth evidence of how Oil price changes affect a country's economy. The sensitivity to Oil price movements differs across different industries depending on the nature of the sector's activity and the capacity of the industry to absorb and transmit the oil risk to its consumers and other economic sectors (M. Martin Boyer & Didier Filion, 2004; Shawkat Hammoudeh & Salim Al-Gudhea, 2006). The manufacturing sector is energy intensive, using electricity and oil as its main source of energy in its production processes, transport and distribution activities (Onuonga, Etyang, & Mwabu, 2011). The impact therefore of Oil price movements on the activities of manufacturing companies is profound. Several studies (Dhaoui & Khraief, 2014) show the effects of Oil price changes on consumers, producers and markets especially in terms of costs, trading strategies and incentives to launch new investment in technology or reorganize former ones and how they in turn affect the performance of manufacturing companies. Oil price changes have a direct impact on manufacturing companies (Onuonga et al., 2011)

Understanding the behaviour of stock prices and identifying the factors that affect their dynamics is an empirical question that has a significant impact on portfolio management, asset and firm valuations, investment decisions, and other issues addressed by finance literature. In their empirical study, (Huang, Masulis, & Stoll, 2006) opine that if oil plays an important role in an economy, one would expect changes in Oil price to be correlated with changes in stock prices. Previous studies on the relationship between Oil price changes and Share prices have yielded some mixed results. A number of studies confirm the influence of Oil price fluctuations on economic activity and financial sector (Hamilton, 2008; Jones & Kaul, 1996; Sadorsky, 1999), while others (Huang et al., 2006; Maghyereh, 2004) do not find a significant connection between Oil price shocks and stock returns for some specific markets. In addition, several studies document that Oil price changes affect economic activity and stock market returns in a nonlinear fashion (Arouri & Fouquau, 2009). There's been evidence that negative Oil price shocks (increases) tend to have a greater effect than positive price shocks do (Arouri, Foulquier, & Fouquau, 2011; Hamilton, 2008; Mork, 1989).

These inconsistencies in the findings provide additional motivation for this paper to examine the relationship between the Oil price and the stock price movements of manufacturing companies listed in the Nairobi Securities Exchange. The focus is on manufacturing companies since, due to the nature of their operations are more prone to the effects of Oil price changes.

1.1 Problem Statement

Studies done by various researchers (Baffes & Dennis, 2013; Ebrahim et al., 2014; Hamilton, 2008; Kilian, 2010; Mork, 1989) document quite extensively the transmission mechanism of the effects of Oil price changes onto the economies of net importing countries like Kenya. Since financial markets are more efficient than real markets and highly sensitive to news, it is reasonable to expect that stock markets absorb information about the consequences of Oil price changes and reflect it quickly into stock prices. This has been empirically tested by various researchers albeit with conflicting results. While studies by (Hamilton, 2008; Jones & Kaul, 1996; Park & Ratti, 2008; Sadorsky, 1999) display a negative relationship between Oil price and the Share prices, others, including (Al-Fayoumi, 2009; Huang et al., 2006; Maghyereh, 2004) show no significant relationship. Additionally (Arouri et al., 2011; Hamilton, 2008; Mork, 1989) have demonstrated that negative Oil price shocks (increases) tend to have a greater effect than positive price shocks do. So what really is the relationship between the Oil price and Share prices?

These studies by (Huang et al., 2006; Jones & Kaul, 1996; Maghyereh, 2004; Park & Ratti, 2008; Sadorsky, 1999) all focus on empirical evidence at the market level. They seek to determine, at an aggregate level, what the relationship is between the two variables. The challenge facing management, current and prospective shareholders, and academics is what the true nature of this relationship is within the local context, more so in the manufacturing sector.

1.2 Research objectives

1.2.1 General objectives of the study

The general objective of this paper is to study the relationship between the Oil price and the Share prices of the manufacturing firms listed in the Nairobi Securities Exchange.

1.2.2 Specific Objectives:

1. Establish the relationship between the Oil price and the Share prices of the manufacturing firms in Kenya.
2. Evaluate the causation relationship between the two variables.

1.2.3 Research Questions

1. Is there a significant association between the Oil price and the Share price movement of the NSE listed manufacturing companies?
2. What is the direction of the causation relationship for the two variables?

1.3 Significance of the study

This is an empirical study of the effect of Oil price movements on the Share price of the listed manufacturing companies.

Key stakeholders that stand to benefit from this study are:

Academia: By empirically testing in the local context, this study adds to the body of knowledge that seeks to understand the intuitive explanation of the connection between Oil price fluctuations and Share price movements.

Management teams of the manufacturing firms: It is important for them to understand how Oil price movements affect the Share price, so that they can anticipate and put in place countermeasures to reduce the adverse effects and magnify the positive ones. Additionally, Share price is a key metric upon which the performance of management is assessed, one they closely track.

From a portfolio management perspective, shareholders need to understand what Oil price movements mean for their portfolios. They need to understand their portfolio's sensitivity to Oil price changes so as to avoid losses, or benefit from any opportunities that may arise out of these fluctuations. Over the short term it is even more important for speculative investors to anticipate these effects and carefully track the Oil price vis a vis their shares.

Because the nature of this relationship is complicated and should vary considerably from one industry to another (Arouri et al., 2011), the focus is on the manufacturing industry

whose processes are heavily dependent on oil. Due to the nature of its operations, this sector is especially susceptible to Oil price changes and also because of its significance to the economy.

Studying the relationship between Oil price changes and stock prices by sector as opposed to the aggregate market is important for a number of reasons. For one, the stock prices of the aggregate market may dilute the heterogeneous performance of the various sectors. Additionally, a sector's sensitivity would depend on whether oil serves as a significant input to its operations.

1.4 Scope of the Study

This is an empirical study of the relationship between Oil price and Share prices of manufacturing companies listed in the NSE in the period between January 2005 and December 2014. This is the period after the withdrawal of the Oil price band was established by OPEC in a bid to achieving and maintaining price stability. The price band mechanism was introduced in the year 2000. This meant that if prices settled outside the limits of the band for a prescribed period, 20 consecutive days, above \$28 per barrel and 10 consecutive days below \$22 per barrel- then OPEC would take the appropriate measures to restore them to within the desired range. This helped to curb erratic price changes. At the end of 2004, the price band was removed leaving Oil prices to be determined fully by market forces. This study focuses on the period after the withdrawal of the price band which has been marked by high price fluctuations and as such makes it interesting to see how the stock markets have responded, if at all.

This paper takes a different approach from those of (Huang et al., 2006; Jones & Kaul, 1996; Maghyereh, 2004; Narayan & Narayan, 2010; Park & Ratti, 2008; Sadorsky, 1999), the study is specific to the manufacturing sector. This is important since the aggregate stock prices for the market may mask the different performances of the various sectors. Furthermore, as has been discussed in the introduction, the manufacturing industry is most vulnerable to the effects of frequent oil price change due to its dependence on oil as an input to its processes hence the focus on this sector. Additionally, focus on this sector is warranted given due its importance to the country's economy and its significant dependence on. The manufacturing sector is the second

largest user of petroleum products, after the transport sector, and the largest consumer of electricity (Onuonga et al., 2011). The level of electricity consumption is also of interest since Kenya still places a high reliance on thermal power plants that run on petroleum. Manufacturing firms are therefore sensitive to Oil price movements from an operational point of view. Management teams of such manufacturing companies have to be conscious of these fluctuations, anticipate and cushion the organization against adverse effects as well as taking advantage of any opportunities it may present. Manufacturing companies quoted in the NSE are B.O.C Kenya Ltd, British American Tobacco Kenya Ltd, East African Breweries Kenya Ltd, Mumias Sugar Co. Ltd, Unga Group Ltd, Kenya Orchards Ltd, Carbacid Ltd and A.Baumann Co Ltd.

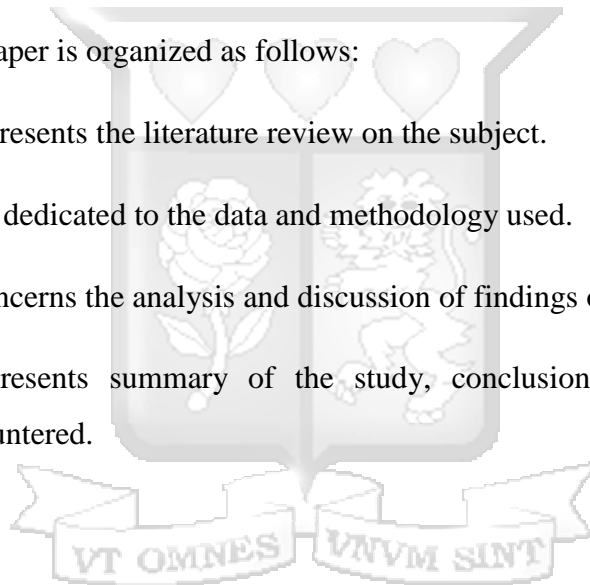
The rest of the paper is organized as follows:

Chapter two: represents the literature review on the subject.

Chapter three: is dedicated to the data and methodology used.

Chapter four: concerns the analysis and discussion of findings of the study.

Chapter five: presents summary of the study, conclusions, recommendations and limitations encountered.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews the causes of oil price fluctuations and presents the transmission channels through which Oil price shocks may affect macroeconomic variables and stock prices and discusses the related literature. Then, the paper explores the empirical studies done in regard to Oil price changes and its relationship with the Share price movements around the world. The literature review has revealed that many studies have been focused on the developed economies however; there's been a recent interest in emerging economies as well as developing countries.

2.1.1 Theoretical Review

There's a large and growing body of literature and statistics on the movement of Oil prices over time, which suggest that the price of oil will continue increasing steadily in the long term while fluctuating in the short term. Oil is the most globalized commodity (Ebrahim et al., 2014) and while numerous price changes are inherent in commodity markets, it has been observed to advance at a faster rate in the crude oil market in comparison to other commodities over the past decade. In a study of 65 developing countries, (Kojima, 2012) observed that the price of oil of has been increasing steadily since mid-2009. World Bank statistics indicate that between 1999 and 2008, world Oil prices more than quadrupled in real terms in about 170 countries worldwide, this puts in context its global impact. Similarly, (Saghaian & others, 2010) observed the several occurrences of extreme price hikes in the energy sector and an extreme commodity price movements.

However, the short-run demand and supply of oil are both strongly price inelastic , meaning that marginal changes in either oil demand or supply induce greater than proportional Oil price changes and, often, large price deviations (Ebrahim et al., 2014). Differing views have however emerged based on the work on Oil price of (Kadri, 2012).

Now, more than ever before, the determination of world Oil prices has become tremendously complex which further fuels its frequent price change and puts into

context the need to anticipate these changes and proactively deal with them. This is especially true of industries that are heavily dependent on petroleum products, such as manufacturing. (Ebrahim et al., 2014) noted that the dependency on oil-derived fuels in various sectors, most notably in mobility, has left the global economy vulnerable to several macroeconomic economic side effects. Similarly (Ayhan Kose et al., 2005) also noted that when energy markets are volatile, such as petroleum, the total costs can themselves pose a significant jolt to the economy. These opinions are similar to the findings of The Energy Information Administration who after a four year study concluded that all other things equal, the economy would most likely perform better with stable or predictable energy prices than when the price of energy fluctuates greatly (Energy Information Administration, 2001). Kenya is a net oil importer and continues to be dependent on oil as a source of energy in various sectors of the economy mainly transport, power production and manufacturing. The Oil price rise and fall forms one of the serious factors that really affect consumers, producers and Markets especially in terms of costs, trading strategies and incentives to launch new investment in technology or reorganize former ones.

2.2 Theoretical Framework

The impact of Oil prices on stock prices can be explained in two ways:

Firstly, through the *Transmission mechanisms*, by which effects of Oil price change are felt in the economies of net oil importers. This concept is explained in the work of (Al-Fayoumi, 2009; Ebrahim et al., 2014; Mork, 1989; Osoro & Ogeto, 2014)

Secondly, according to the *Equity pricing theory*, the price of equity at any point in time is equal to the expected present value of discounted future cash flows. This is supported by empirical work by (Huang et al., 2006; Jones & Kaul, 1996; Narayan & Narayan, 2010; Park & Ratti, 2008; Sadorsky, 1999).

2.2.1 The Transmission mechanism

In an extension of Hamilton's results, (Mork, 1989), provided the framework for understanding macroeconomic impact of Oil price fluctuations, stating that one reason that the changes in Oil prices matters fundamentally more in terms of economic output than the level of Oil prices is that these fluctuations have been found to amplify the response of economic activity to Oil price changes. He showed that Oil price increases have a proportionally greater (and negative) impact on economic activity than the corresponding positive impact of a decrease (Ebrahim et al., 2014). This is often witnessed in Kenya where commodity price increases quickly follow upward Oil price changes but rarely do they come down following a fall in world Oil prices.

A rise in Oil prices will have the effect of reducing disposable income, which may as well affect industrial production as demand falls, a notion supported by (Ebrahim et al., 2014) study that concluded that Oil price changes have a direct impact on consumption. While lower disposable income should have a negative impact on consumption of basic items, such as those used to determine the Consumer Price Index, because of the price inelasticity of such items, demand will not be impacted. This is consistent with the findings of (Baffes, 2007), who in a study of the impact of crude Oil price on consumption of food commodities, noted no impact in the reduction of demand for food due to Oil price increments. However, lower industrial production is expected to negatively affect the demand for raw materials thereby putting downward pressure on their prices.

The positive impact of crude Oil price increases on the prices of commodities, through increased production and transportation costs, is expected to overshadow the negative impact of reduced global consumption leading to inflation. This compares with the results of (Saghalian & others, 2010), who in a study of the inter-linkage between the energy and agricultural commodities sector found evidence of a causality relationship between the Oil price movement and corn, soybeans, and wheat prices. In the long term, (Munyua & Ragui, 2013) found that, sustained high price movements can lead to a reduction in Investment, leading in turn to a long term reduction in supply, higher prices, and even reduced macroeconomic activity. This is further reinforced by (Bernanke,

1980) who suggests that uncertainty about energy prices may induce optimizing firms to postpone investment decisions, thereby leading to a decline in aggregate output.

The fluctuation of Oil price matters fundamentally more in terms of economic impact than the level of Oil price, since these changes has been found (Ebrahim et al., 2014) to amplify the response of economic activity. In summary, studies carried out by (Bacon & Kojima, 2008; Ebrahim et al., 2014; Hamilton, 2008; Kilian, 2010; Mork, 1989) established how the following macroeconomic variable are affected by Oil price changes:

Consumption is expected to decrease due to the economic uncertainties brought about by oil price fluctuation which impact consumer confidence and leads to precautionary saving behaviour. This is mostly observed in low income groups (Bacon & Kojima, 2008), whose coping mechanisms are weakest. In his study, (Ebrahim et al., 2014) also observed that unemployment rates, in the short to medium term may increase in response to the decreased consumption and production levels.

Due to the uncertainty surrounding profitability of investments, (Bernanke, 1980) observed that *Real Investment* by manufacturing firms is expected to decline in the short to medium term in response to expected decreases in consumer spending and. This is also supported by (Kilian, 2010) who noted a shift in investment expenditure patterns driven by the uncertainty effect. Subsequently, over time, *Production* may remain constant or decrease depending on whether management choose to maintain current production levels while increasing retail prices. Alternatively, firms may reduce production levels in response to declining consumer demand (Hamilton, 2008). This effect would be more immediate in companies dealing with Fast Moving Consumer Goods (FMCG), due to the responsiveness of the markets.

Inflation may move either way depending on the severity of the change (Hamilton, 2008; Jones & Kaul, 1996). It may be that the deflationary pressure caused by the decreasing consumer demand outweighs the inflationary pressure of increased prices of goods.

This transmission mechanism explains the influence that Oil price change has on the business environment, which affects the performance of majority of the businesses operating in that environment.

The manufacturing sector is energy intensive, using electricity and oil as its main source of energy in its production processes, transport and distribution activities (Onuonga et al., 2011). Another local study carried out by (Keyiah, 2011) supports this notion. He recognizes that petroleum products have no close substitutes and that their prices have a major feedback effects on the Kenyan economy because it permeates every aspect of production and distribution in the economy. Therefore, rising prices of petroleum product would have significant implications on inflation, employment, poverty reduction and general long term growth prospects of an economy.

Like many countries in the region, Kenya is currently solely reliant on oil imports to satisfy its oil energy needs. The Ministry of Energy provides the policy leadership, while ERC provides regulatory stewardship of the sub-sector (Keyiah, 2011). The ERC, the industry regulator, has several functions as set out in the Act which include regulation of importation, exportation, transportation, refining, storage and sale of petroleum products, protecting consumer, investor and other stakeholder interests and monitoring fair competition in the energy sector (Ministry of Energy, 2006). While this body is charged with the responsibility of cushioning the country from exploitation by oil companies, the National Energy Policy of 2004 states clearly that government will let market forces determine prices. Therefore the Oil price fluctuations that happen globally are transmitted to the local economy. This is due to the fact that Kenya still operates the Open Tender System (OTS) in the importation of crude from the Gulf Region. The price of which is subject to global market forces. This was articulated by (Orondoh, 2014) who argued that price controls cannot effortlessly set prices as a free market would, there is always chance that such market intervention will create artificial support levels not matched by true fundamentals. The ERC price regulation uses a formula for pump prices which incorporates the international crude or refined product prices, freight, local transportation costs, financing, insurance, the refinery processing fees, taxes and a profit

margin (Katisya-Njoroge, 2010). Therefore changes in the international Oil price are directly transmitted and reflected in the local pump prices.

So far, the literature reviewed revealed how the global Oil price changes impact the global and national economy which in turn impacts the performance of organisations operating within that environment. A view supported by (Osoro & Ogeto, 2014), in their study of how macroeconomic fluctuations affect the financial performance of listed companies in Kenya. They validated the notion that the state of a country's economy affects the performance of its organizations (Osoro & Ogeto, 2014). Certain expectations develop depending on the trends of the macroeconomic variables such as exchange rate, rate of inflation, Oil prices, consumer price index, Gross Domestic Product, stock market index and interest rate. In response to the changing Oil prices, management is constantly engaged in a dilemma of whether to; increase prices during the spikes, which may affect their competitiveness if the competitors don't follow suit or; reduction of prices during the slump, which raises the question as to whether this is sustainable. It is therefore a careful balance that has to be maintained by management in the face of a competitive and ever price sensitive consumer base.

2.2.2 Equity pricing theory

The value of a stock is equal to the sum of discounted expected future cash flows. These cash flows could directly or indirectly depend on the Oil prices. For instance, if there is an unprecedented increase in the Oil price, the energy cost for many companies would increase. As a consequence, the earnings could fall. While valuing a stock, the investors and the analysts would predict further Oil price increases and estimate lower expected future cash flows, resulting in a lower stock value.

In an empirical study, (Huang et al., 2006) in a general and intuitive approach defined the stock prices as the discounted value of the expected future cash flows.

$$p = \frac{E(C)}{E(r)}$$

Where p is the stock price, c is the cash flow stream, r is the discount rate and $E()$ is the expectation numerator that factors in probability.

One rationale for using Oil price fluctuations as a factor affecting stock prices is that that, in theory, the value of stock equals the discounted sum of expected future cash-flows (Narayan & Narayan, 2010). These cash-flows are affected by macro-economic variables that may be influenced by Oil price changes (Arouri et al., 2011)

Future Oil prices can affect expected cash flows and possibly discount rates for various reasons. For example, expected cash flows are affected because oil is a real resource and is an essential input to the production of many goods, similar to labour and capital. As such, expected changes in energy prices cause like changes in expected costs and opposite changes in stock prices.

In theory, since financial markets are more efficient than real markets, these discounted cash-flows reflect instantaneously current and expected changes in economic conditions (e.g., inflation, interest rates, production costs, income, demand, economic growth, and investor and consumer confidence) and macroeconomic events likely to be influenced by Oil price fluctuations. Accordingly, Oil price changes may impact stock prices (Arouri et al., 2011)

Additionally, expected Oil prices also affect stock returns via the discount rate. The expected discount rate is composed of the expected inflation rate and the expected real interest rate (Huang et al., 2006), both of which may, in turn, depend on expected Oil prices.

This paper is anchored on the assertion that stock markets are efficient financial markets that absorb information in the economy and reflects it into stock prices. Indeed, in theory, the value of stock is equal to the discounted sum of expected future cash-flows (Arouri et al., 2011; Dhaoui & Khraief, 2014; Huang et al., 2006; Jones & Kaul, 1996; Narayan & Narayan, 2010). These discounted cash-flows reflect instantaneously current and expected changes in economic conditions (e.g. Inflation, interest rates, production costs, income, demand, economic growth, and investor and consumer confidence) and macroeconomic events likely to be influenced by Oil price fluctuations. Consequently, Oil price changes may impact stock prices (Arouri et al., 2011).

The work by (Ebrahim et al., 2014; Hamilton, 2008; Mork, 1989) considers the macroeconomic effects of Oil price fluctuations discussed above as the main channels through which Oil price changes may affect stock prices. As financial markets are more efficient than real markets and highly sensitive to news, it is reasonable to expect that stock markets absorb information about the consequences of Oil price changes and reflect it quickly into stock prices (Arouri et al., 2011). The negative reaction of real stock prices to the increase in Oil price is attributed, according several authors including (Arouri et al., 2011; Dhaoui & Khraief, 2014; Huang et al., 2006; Jones & Kaul, 1996; Narayan & Narayan, 2010) to the direct effects of this increase on cash flows and inflation. More so for manufacturing companies, Oil price does affect corporate cash flow since the Oil price since it constitutes a substantial input in production.

2.3 Empirical Review

Understanding the behaviour of stock prices and identifying the factors that affect their dynamics is an empirical question that has a decisive impact on portfolio management, asset and firm valuations, investment decisions, and other issues addressed by finance literature. Globally, several studies have been done that specifically modeled the impact of Oil prices on stock prices. (Jones & Kaul, 1996) investigated the impact of Oil prices on stock returns for the United States (1947–1991), Canada (1960–1991), Japan (1970–1991), and the UK (1962–1991) using regression models and found that Oil prices have a negative effect on stock returns for all countries. That study concluded that in the US and Canada, the reaction of the stock prices to Oil price change could be explained by its impact on real cash flows. While in Japan and UK Oil price changes appear to cause larger changes in Share prices than can be explained by changes in real cash flows or expected returns. Additionally, (Sadorsky, 1999) studied the relationship between Oil prices and stock returns in the United States by using monthly data for the period 1947:1–1996:4. His analysis reveals that stock returns fall in the short-term in response to a rise in Oil prices. A study by (Jones & Kaul, 1996) argue that the impact of Oil price changes to a country's economy of which reflected on stock returns are likely to vary across countries depending on their oil production and consumption level. This suggests that for net oil importers like Kenya, the impact is likely to be profound.

Some papers have focused on major European, Asian and Latin American emerging markets. They have shown a significant short-term link between Oil price changes and these emerging stock markets. For example (Papapetrou, 2009) finds a significant relationship between Oil price changes and stock markets in Greece.

In contrast to the above findings, (Huang et al., 2006), examined the correlations between daily returns of oil futures contracts and stock returns. The vector autoregressive (VAR) approach is used to examine the lead-lag relation, and its results showed that oil futures returns are not correlated with stock market returns. A study by (Maghyreh, 2004) also arrived at a similar conclusion. He studied the dynamic linkage between Oil price and stock returns in 22 emerging economies using daily data. There was little evidence of cointegration between Oil price and stock market returns. Further to this, a study by (Nandha & Hammoudeh, 2007) examined the effect of Oil price movements and exchange rate movements into stock markets returns in 15 countries in the Asia-Pacific region surrounding the Asia financial crises of 1997. They discovered that only the Philippines and South Korea are oil-sensitive to changes in the Oil price in the short run. No other country indicates sensitivity to Oil price measured in US dollar independently whether the oil market is up or down.

The reaction to Oil price changes has been studied by (Hamilton, 2008). He notes that negative Oil price shocks (increases) tend to have a greater effect than positive price shocks do. This is in line with earlier findings by (Mork, 1989) who found convincing evidence that the effects of an Oil price decline are different from those of price increases. This effect is evidenced in the work of various studies including (Bernanke, 1980; Park & Ratti, 2008; Sadorsky, 1999). Some explanations have been discussed for this puzzle such as investment uncertainty or sectorial shift channels. Additionally (Bernanke, 1980) shows how uncertainty about energy prices may induce firms to postpone investment decisions, because of the uncertainty about future investment climate. The basic mechanism that creates these asymmetric effects lies in the fact that Oil price hikes and falls increase Oil price fluctuations, which has a negative effect on the economy by the uncertainty and sectorial shock channels. The sectorial shifts channel advanced by (Lilien & Lilien, 1982) suggests that unemployment is, in part, the

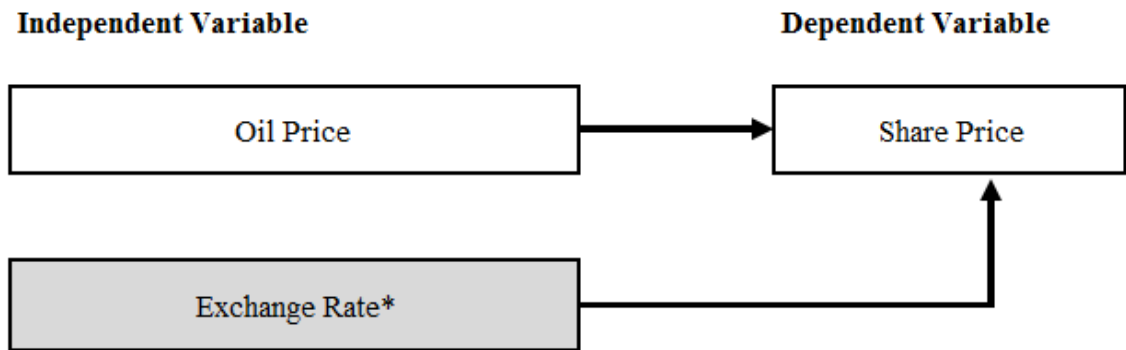
result of resources being reallocated from declining to expanding sectors of the economy. Furthermore, (Hamilton, 2008) shows that price shocks can reduce aggregate employment by inducing workers in adversely affected sectors to remain unemployed. Workers rather wait for the improvement of labour conditions in their sector than move to positively affected sector. Some explanations have been put forward for the asymmetry puzzle. A strand of the literature has tried to link the postponing of irreversible investment decisions caused by Oil price hikes. It is ideal for companies to postpone irreversible investment expenditures when they experienced increased uncertainty concerning the future Oil price (Bernanke, 1980). The tendency of falling energy prices to stimulate output may be dampened if firms are uncertain whether the fall in energy prices is permanent or transitory. Thus, Oil price increases tend to postpone investment decisions. In agreement with this, (Hamilton, 2008) opines that if that is indeed the mechanism by which oil shocks affect the economy, then a decrease in Oil prices would not confer a positive effect on the economy that mirrors the negative consequences of an Oil price increase. For instance, the non-linear reactions of monetary authorities to Oil price changes may nonlinearly affect stock prices through their impact on real interest rates and inflation (Arouri et al., 2011)

A sector's sensitivity to Oil prices depends on whether oil serves as its input or output, its exposure to indirect Oil price effects, competition and concentration, and its capacity to absorb and pass on Oil price risk to its consumers (Arouri et al., 2011). This paper studies the two variables taking into account the non-linear effect of a price increase and decrease. In keeping with (Jensen, 2002) theory of value maximization, management is expected to make decisions that increases the total market value of their organizations. Acting on these principles, management of manufacturing companies is expected to consider the effect of Oil price changes on their market value. An increase in Oil price means a rise in the company's manufacturing costs. This impacts profitability and in effect, reduces the shareholder value. To counter this, management may choose to increase the price at which its product retails or absorb the increased costs against its margins. If the company operates in a highly competitive market such as Fast Moving Consumer Goods (FMCG), then it has to be careful that the other industry players will respond in much the same way, else they may end up pricing their products out of the

market. It is therefore a delicate balance of how much of an increase the company can absorb while maximizing profits as opposed to how much they can pass on this cost to the customer while still keeping their market share.

2.4 Conceptual framework of Oil Price and Share price relationship

The variables based on the reviewed literature are presented in a visual map indicating the relationship the study intends to determine.



*Extraneous Variable

2.5 Research Model

This study focuses on probing recent equity and Oil price movements between January 2004 and December 2014 for evidence of long-run equilibrium relationship, responses, causality, interdependence among the variables, and impact of Oil price shock on the stock market returns.

This model was proposed by (Narayan & Narayan, 2010) and applied in various studies including (Al-Nahleh & Al-Zaub, 2011; Imarhiagbe, 2010; Le & Chang, 2011).

$$\ln SP_t = \alpha_0 + \beta_1 \ln OILP_t + \varepsilon_t \quad (1)$$

In equation (1),

$\ln SP_t$ - the natural log of stock prices at time t

$\ln OILP_t$ - the natural log of Oil prices at time t

α - Intercept

β -Coefficients

ε_t – Error term

Equation (1) is estimated for each of the eight companies in this study.

2.6 Operationalization of variables

This section presents the measurements used to operationalize the research variables.

2.6.1 Dependent Variable

2.6.1.1 Share price

This data accumulates as a result of daily trading activities at the Nairobi Securities Exchange and is obtained from the official NSE website.

Daily prices better capture the interaction of oil and stock price changes than weekly or monthly data. Monthly data may have some bearing on non-linearity in responses of stock returns to Oil price changes. This approach was also employed by (Arouri et al., 2011) in a similar study.

2.6.2 Independent Variable

2.6.2.1 Oil price

There are three main Oil price benchmarks, the UK Brent Crude Oil price, the West Texas Intermediate (WTI) and the Dubai/OPEC basket price (ICE Futures Europe, 2013). This variety is due to the many types and grades of oil, and therefore necessary for referencing them on the global oil market.

Brent Blend is mostly used in tracking spot price of oil traded in the leading exchange markets. This benchmark is heavily affected by the financialisation of the oil markets (Fattouh, 2011).

WTI refers to oil extracted from wells in the U.S and mostly for domestic use. The fact that supplies are land-locked is one of the drawbacks to West Texas crude – it's relatively expensive to ship to certain parts of the globe (ICE Futures Europe, 2013). This pricing benchmark is mainly used in the American markets.

OPEC, is the Organization of the Petroleum Exporting Countries is made up of the following countries: Algeria, Angola, Ecuador, Indonesia, Iraq, Iran, Qatar, Kuwait, Libya, Nigeria, Saudi Arabia, Venezuela and the United Arab Emirates (OPEC, 2015). The OPEC crude Oil price is defined by the price of the so called OPEC (Reference) Basket. This basket is an average of prices of petroleum blends, which are produced by the OPEC members. Some of these oil blends are, for example: Saharan Blend from Algeria, Basra Light from Iraq, Arab Light from Saudi Arabia, BCF 17 from Venezuela, etc. By increasing and decreasing its oil production (ICE Futures Europe, 2013)

According to KPRL, the main source of Kenyan Crude is Murban Crude from Abu Dhabi in the United Arab Emirates, making the OPEC Basket price, the most relevant for purposes of this study. The source of this data is OPEC.

The ERC price regulation uses a formula for pump prices which incorporates the crude or refined product prices, freight, local transportation costs, financing, insurance, the refinery processing fees, taxes and a profit margin. The changes in the international Oil price are reflected in the local price. This direct transmission makes the use of international Oil prices in tracking local price movements justified. This approach is employed in various studies including (Al-Nahleh & Al-Zaub, 2011; Dhaoui & Khraief, 2014b; Imarhiagbe, 2010; Le & Chang, 2011; Narayan & Narayan, 2010)

This however, makes it necessary to consider rate effects of Oil price movements. In his paper, (Narayan & Narayan, 2010) postulates that for a net oil importer, an Oil price increase will put a downward pressure on the country's exchange rate. From that study it emerged that both Oil price and exchange rate have significantly positive effects on the stock price. In order to get rid of the exchange rate differences, Oil prices are converted from USD into the local currency.

2.6.3 Extraneous Variable

2.6.3.1 Exchange Rate

The study considers exchange rate as an extraneous variable. As defined by (C.R. Kothari, 2004), here, the exchange rate is an independent variable that's not related to the purpose of the study, but may affect the dependent variable. It's included so as to

mitigate for the fact that changes in the exchange rates may have a positive or negative impact on the equity returns depending on whether the country is a major oil importer or exporter. Two studies by (Baffes, 2007) and (Narayan & Narayan, 2010) stated that an appreciation of the exchange rate of a producing country reduces competitiveness of exports with adverse effect on domestic stock prices. Likewise an appreciation of the exchange rate of a major consuming country reduces input costs thereby increasing domestic stock prices and vice versa. This applies in the case of Kenya, a net importer of oil. Higher Oil prices would cause the balance of payments to be adversely affected. The country would spend more shillings to buy the USD currency in order to pay for the commodity which could result in an increased domestic inflation rate. This increased interest rate leads to lower stock prices.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter defines the population and sample used in this study, data and data collection, variable and variable measurement and method of analysis.

3.2 Research Design

This is a descriptive research. Descriptive studies are usually the best methods for collecting information that demonstrate relationships as they are. In this case what is of interest is the nature of the relationship between the variables as it has occurred over the study period. The study involves the collection of quantitative information as has been observed over the course of time which is then subjected to rigorous quantitative analysis in a formal and rigid fashion (C.R. Kothari, 2004). This paper makes use of statistical analysis to obtain findings. This study is characterized by formal and systematic measurement and use of statistics (Marczyk, DeMatteo, & Festinger, 2005). It seeks to understand the relationship between the Oil price and Share prices of listed manufacturing companies. The results of which provides information regarding the relationship between two or more variables, which may serve as the basis for future studies (Marczyk et al., 2005)

3.3 Target Population

The target population comprises all the eight (8) companies that have been consistently listed in the Nairobi Securities Exchange under the Manufacturing and Allied category over the study period, 2005 to 2014. These companies are: B.O.C Kenya Ltd, British American Tobacco Kenya Ltd, East African Breweries Kenya Ltd, Mumias Sugar Co. Ltd, Unga Group Ltd, Kenya Orchards Ltd, Carbacid Ltd and A.Baumann Co Ltd. These are all the companies that have been trading as listed companies throughout the study period in the manufacturing category.

3.4 Data Collection Methods

This study makes use of secondary Share price, Oil price and exchange rate data collected from the various sources as follows: Oil prices used are OPEC Basket prices, the most relevant for purposes of this study. The source of this data is the OPEC website. The stock prices are from the Nairobi Securities Exchange website. Exchange rate data was obtained from the IMF online data library. For all three variables the data is daily data for each trading day over the 10 year study period.

3.5 Data Analysis

The study conducts the data analysis in a series of steps so as to address the set objectives. First, the Oil prices are converted to local currency at the daily opening exchange rates. This takes into account the fluctuation of the exchange rates in the economy. Thereafter, natural log is applied for both the daily Oil price and Share price data. It is common practice to apply natural logs when a change in the dependent variable is related with percentage change in an independent variable, or vice versa. The relationship is better modelled by taking the natural log of the variables. It also helps to avoid negative values that would have otherwise resulted if the differences in consecutive price observations were to be used. Since such economic data are usually non-stationary, unit root tests are then applied to determine the stationarity. The order of integration is determined by differencing the variables till stationarity is achieved. Cointegration tests are then performed to determine whether long run relationships exist along the variables. Finally, to establish the direction of the relationship between the variables, a causality test is performed. Gretl software is used for all statistical analysis.

The model equation that depicts this relationship is as below:

$$\ln SP_t = \alpha_0 + \beta_1 \ln OILP_t + \varepsilon_t \quad (1)$$

In equation (1),

$\ln SP_t$ - the natural log of stock prices at time t

$\ln OILP_t$ - the natural log of Oil prices at time t

α - Intercept

β -Coefficients

ε_t – Error term

3.6 Data Presentation

The qualitative information is presented using graphs, charts and tables after analysis. Each test and subsequent data analysis is linked to the specific objective that it attempts to meet.

3.7 Methodology

Firstly, natural logarithms of data have been taken before passing to the analysis process. Then, stationarity analysis has been performed for data pertaining to the variables used in the study. The most widely used unit root test, the Augmented Dickey-Fuller (ADF-1979) is applied as was done in the studies by (Bhunia, 2012; Maghyereh, 2004; Narayan & Narayan, 2010; Park & Ratti, 2008). The long term relationship between time series has been searched by applying co-integration test developed by (Johansen & Juselius, 1990). The direction of the relationship between variables has been examined with Granger causality test.

It is important to note that the choice of Oil price variable between world Oil price and national Oil price are difficult and relevant. National Oil prices are influenced by many factors such as price controls and taxes on petroleum products. Therein lays one of the limitations of the study. In as much as the ERC now sets the price locally, this practice only started in January 2011, and therefore local data was not available for the entire study period. However, close inspection of the ERC price reveals that they are anchored on the international import prices while carefully controlling the margins made by local importers in a bid to protect the end consumer. Taking that into account, the use of the international Oil price is justifiable to the extent that the price change experienced globally is reflected locally.

The time lag of the response to international price changes, as well as the variation of prices in country are areas for further future research but are outside the scope of this study.

The International Oil prices were converted to Kenya Shillings at the prevailing rates in order to get rid of the impact of exchange rates.

3.7.1 Unit Root Tests

These establish whether time series are stationary before making analysis with time series data. A series, which does not have unit root problem, is regarded as a stationary series. The Augmented Dickey-Fuller (ADF-1979) test is applied.

3.7.2 Johansen co-integration test

The Johansen co-integration test developed by (Johansen & Juselius, 1990) is applied to determine the long term equilibrium relationships between the variables. This test reveals whether non-stationary series in the level act together in the long term. In case of determination of co-integration relationship (co-integration vector) that shows the presence of long term relationship between variables.

3.7.3 Granger Causality

The Co-integration tests only give an indication of whether there exists a long- run relationship between Share prices and Oil price. However the direction of this relationship is of interest. The Granger Causality test is then performed to determine the direction of the relationship between the variables used in the model (Granger, 1969).



CHAPTER FOUR

DATA ANALYSIS

4.1 Introduction

This section is a presentation of the data that was analyzed with regards to the relationship between Oil price and the Share prices of manufacturing companies listed in the Nairobi Securities Exchange. The study incorporated the selected variables of each company into an unrestricted VAR (Vector Auto regression) system. This methodology provides a multivariate framework where it treats all its variables as jointly endogenous and imposes no a priori restrictions on structural relationships, if any, between the variables being analysed.

The study carries out the empirical test in a number of steps. Generally in VAR if the variables are stationary, then they are entered in the systems and processed as such. It is otherwise necessary to difference the variables to a level where they become stationary. Therefore the following steps are taken, first is the application of unit root tests, then the cointegration analysis which involves the determination of an optimal lag length and application of the Johansen cointegration test. This addresses objective one.

The second objective is to determine the direction of this relationship. If there exists a long run relationship, does the Share price depend on the Oil price or vice versa? To address this, the Granger Causality test is applied.

4.2 Establishing the relationship between Oil price and Share prices (Objective 1)

This objective is met in a series of steps. First the descriptive statistics are reviewed to get an understanding of the general properties of the data. A correlation matrix is then developed to check the linear relationship between the Oil price and the respective Share prices. Some informal tests of stationarity are performed to assess whether the data is likely to be non-stationary. Non-Stationary variables are then differenced and unit root tests applied to determine the integration order at which they become stationary. Lastly cointegration tests have been performed to check for long run relationships between share and Oil prices. Each step is explained in detail below:

4.2.1 Descriptive statistics

Table 4.2.1 below tabulates the descriptive statistics of the raw Share price and Oil price data. The study had a total of 2,482 observations as a result of all the trading days within the ten year period from 2005 to 2014.

Table 4.2.1: Descriptive Statistics: these are the vital descriptive statistics for each variable (the company's share prices and the oil price)

Company	Mean	Minimum	Maximum	Std. Dev.
A Baumann Ltd	12.946	8	37.5	4.9755
BOC Kenya Ltd	140.39	90	189	21.365
British American Tobacco	298.61	128	1047	185.15
Carbacid	121.94	20	307	36.18
East Africa Breweries Ltd	189.65	97	423	63.85
Kenya Orchards Ltd	7.029	3	190	20.378
Mumias Sugar Co Ltd	15.278	1.4	64.5	15.677
Unga Group Ltd	15.071	4.2	54.5	6.678
Oil price Kshs	6,640.5	2,571.3	11,410	2,305.5

The standard deviation is the absolute measure of a variable's dispersion from its mean. This is an indication of the level of price change. From the results in table 4.2.1 above, the BAT shares displays the highest price fluctuation amongst the shares. The Oil price has the highest price fluctuation amongst all the variables. Since all variables display different levels of price fluctuation, further tests needed to be conducted to assess whether the changes experienced in the share prices is in any way related to the price changes for oil.

Natural logs are applied on the on the Share prices and Oil price data. A correlation test is performed to view the relationship between the variables. This was done since a change in the dependent variable is related with percentage change in an independent variable, or vice versa, the relationship is better modeled by taking the natural log of either or both of the variables.

Table 4.2.2: Correlation Matrix: Shows the correlation coefficient of each of the company's Share price and with the Oil price

Natural Log of Company shares	l_OilPriceKshs
l_A_Baumann Co Ltd	-0.28305936
l_B_O_C Kenya Ltd	-0.63512619
l_British America	0.61120306
l_Carbacid Invest	-0.30693056
l_East African Breweries	0.76744734
l_Kenya Orchards Ltd	-0.1291195
l_Mumias SugarCo	-0.61340649
l_Unga GroupLtd	0.00507447

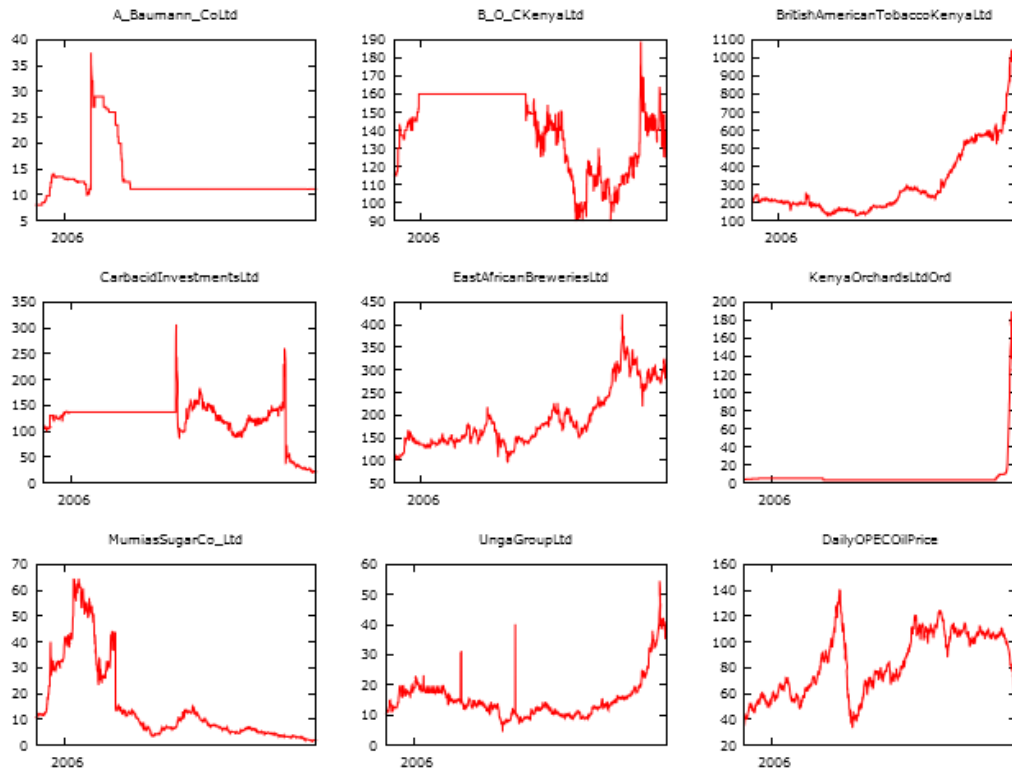
The Correlation Coefficient is a measure of the degree of linear relationship between the Oil price and the respective Share prices. Correlations between the Share price and Oil prices are displayed in table 2 above. Variables for 5 companies, Company 1, 2, 4, 6 and 7 display a negative correlation with the Oil price. While company 3 and 5 display a strong correlation with Oil price. A negative correlation implies that if the Oil price increases then the Share price decreases, while a positive correlation implies if the Oil price increases then so does the Share price. Correlation merely identifies if the variables move in the same or opposite directions. Therefore cointegration tests are performed to check the long run relationship between the variables. This test has been performed in the next steps.

4.2.2 Tests for Stationarity

Typically, time series data such as that used in this study tends to be non-stationary. In which case, it becomes necessary to check for stationarity before proceeding with the cointegration tests. First, some informal tests for stationarity are performed. This is

achieved by plotting the time series plots and visually observing whether the series are stationary.

Diagram 4.2.2.1 displays the time series plots of the variables' movement throughout the study period.



From this plot, it appears that all the variables are non-stationary. To confirm this, a formal unit root test is applied, the ADF root test.

Unit root tests are performed on the log levels and first differences of our variables. This is to determine the integrational properties of the data series. The Augmented Dickey-Fuller (ADF) test is applied, first on the log levels.

Appendix 2 displays the results of unit root tests without differentiation. The decision criteria for this test is such that if the P Value > 0.1, then the null hypothesis cannot be rejected.

Where: H_0 : the variable is non-stationary

In this case, all the variables are non-stationary and therefore have to be differenced to an order where they would turn stationary. The variables were subjected to ADF tests at various differential levels. The table 4.2.2.2 below displays the result of stationarity tests applied at several differentiation levels.

Table 4.2.2.2: Results of unit root tests at various levels of differentiation

Differenced Variables	ADF (P-Value)	Difference level
I_A_Baumann_CoLtd	0.02559	1 st Diff
I_B_O_CKenyaLtd	0.07118	1 st Diff
I_BritishAmerica	0.008841	2 nd Diff
I_CarbacidInvest	0.0001325	2 nd Diff
I_EastAfricanBre	7.94E-05	2 nd Diff
I_KenyaOrchardsL	6.97E-08	3 rd Diff
I_MumiasSugarCo	0.0001	2 nd Diff
I_UngaGroupLtd	2.38E-05	2 nd Diff
I_OilPriceKshs	0.002934	2 nd Diff

For two variables, company 1& 2, the series turned stationary after 1 differentiation, while the variables for company 3,4,5,7 and 8 and the Oil price were stationary at 2nd difference. Company 6 was stationary after the 3rd difference. These results seem to suggest a possibility of cointegrating relationships between Oil price and some of the Share prices, those whose variables are stationary at the same order of integration. To explore this further, cointegration tests were then performed on the variables with the same order of integration I(2)

4.2.3 Cointegration Analysis

The results of the previous section suggest that a long run relationship may exist between Oil price and Share price of the 5 companies that are of the same integration order. Therefore, Johansen cointegration tests are performed to test the existence of cointegrating relationships between the Oil price and the Share prices of the following 5 companies; 3,4,5,7 and 8. However, before these tests are carried out, the optimal lag lengths are required to be applied in the cointegration tests. This was necessary so as to obtain accurate results.

4.2.3.1 Optimal lag length selection

The share and Oil price variables are entered as levels into VAR models with different lag lengths and two indicators BIC (Schwarz Bayesian criterion) and the HQC (Hannan-Quinn criterion) give the optimal lag lengths. An arbitrary maximum number of 36 lags, as suggested by the Gretl analysis tool were used. This is the maximum number of lags the tool allows for VAR models. Appendix 3 displays the results of this test. These lag lengths were used in the cointegration tests discussed in the next section.

4.2.3.2 Johansen Cointegration test

To establish whether there's indeed a long run relationship between Oil price and Share prices, the Johansen cointegration test is carried out based on the lag periods established in the previous section. The Johansen Cointegration test produces two results for each variable.

Table 4.2.3.2: Displays the outcome of the Johansen Cointegration test on the relationship between Oil price and Share prices of the following companies.

Variable	Rank	Trace Test p-value	Maximum Eigen Value Test p-value	Reject H_0 ?	Outcome
Carbacid	0	[0.2383]	[0.2052]	No	No Cointegration exists between the variables
	1	[0.0570]	[0.0570]	Yes	
EABL	0	[0.0413]	[0.0690]	Yes	Cointegration exists between the variables
	1	[0.1145]	[0.1145]	No	
BAT	0	[0.0491]	[0.0417]	Yes	Cointegration exists between the variables
	1	[0.7952]	[0.7953]	No	
Mumias	0	[0.0403]	[0.0557]	Yes	Cointegration exists between the variables
	1	[0.1403]	[0.1403]	No	
Unga	0	[0.3187]	[0.3472]	No	No Cointegration exists between the variables
	1	[0.0867]	[0.0867]	Yes	

Note: Rank 0: H_0 There is no cointegration between the variables.

Rank 1: H_0 There is cointegration between the variables.

Decisions are made at 10% significance level.

Rank 0 tests the Null hypothesis that there's no cointegration between the variables (Company Share price and Oil price). Decision criteria for Rank 0 is, if P-value > 0.1 (10%), null hypothesis cannot be rejected. Therefore there's evidence that there's no cointegration between the variables.

Rank 1 tests the null hypothesis that there's cointegration amongst the variables. Decision criteria for Rank 1 is, if P-value > 0.1 (10%), the null hypothesis cannot be rejected. Therefore there's evidence of cointegration amongst the variables. The results above indicate that there's a long run relationship between the Oil price movements and the Share price movements of three companies; 3, 5 and 7. The Share prices of these three companies are cointegrated with the Oil price over the period of the study 2005-2014. This test successfully addresses the first objective of the study in as far as it establishes that there exists a relationship between Share price and Oil price.

4.3 Evaluate the causation relationship between Share price and Oil price (Objective 2)

The previous section 4.2 established that a long term relationship exists between Share price and Oil price. However, that cointegration does not necessarily imply causation. There's still a need to determine which variable change caused a change in the other. Is the Oil price dependent on the Share price movement or vice versa? This objective was addressed through the application of the Granger causality test in the next section.

Granger Causality Test

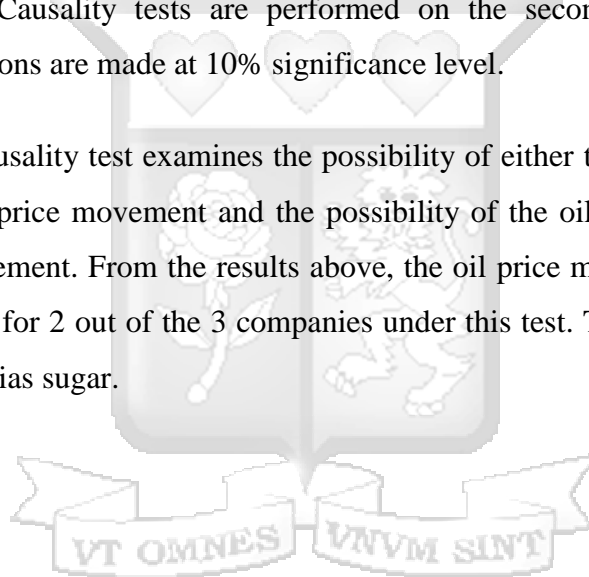
This test is applied to determine whether based on the past information, one variable would help in predicting the outcome of another. This gives an indication of the direction of the relationship. The test was carried out only for the companies whose Share price movements exhibited cointegration with the Oil price movements. Results as tabulated in table 4.3.1 below, demonstrate evidence of dependence of Stock prices on Oil prices for companies 3 & 5, however the test was inconclusive for company 7's prices.

Table 4.3.1: Outcome of the Granger Causality Tests

Null Hypothesis	No. of Observations	P-Value	Decision
East Africa Breweries Ltd (lag = 3)			
Stock price does not Granger Cause Oil price	2479	0.35079	Cannot reject
Oil price does not Granger Cause Stock price	2479	0.00383	Rejected
British American Tobacco (lag = 3)			
Stock price does not Granger Cause Oil price	2479	0.40344	Cannot reject
Oil price does not Granger Cause Stock price	2479	0.00095	Rejected
Mumias Sugar Co Ltd (lag = 5)			
Stock price does not Granger Cause Oil price	2477	0.40142	Cannot reject
Oil price does not Granger Cause Stock price	2477	0.55908	Cannot reject

Note: Granger Causality tests are performed on the second differences of logged variables. Decisions are made at 10% significance level.

The Granger Causality test examines the possibility of either the Share price movement causing the Oil price movement and the possibility of the oil price movement causing share price movement. From the results above, the oil price movement causes the share price movement for 2 out of the 3 companies under this test. The test is inconclusive in the case of Mumias sugar.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study sought to evaluate the relationship between Oil price and the Share prices of manufacturing companies in Kenya. To this end, secondary data on the two variables was collected and quantitative research methods applied. This chapter discusses the findings of the study and relates them to the set objectives. This chapter is organized into a discussion of the results of the data analysis, the conclusion of the findings, recommendations, suggestions for further research and limitations of the study.

5.2 Discussion

On the relationship between the Oil price and the Share prices of the manufacturing firms in Kenya, this paper has discussed the theoretical framework and looked at some empirical evidence from prior research. Secondary data on Oil price and Share price for the listed manufacturing companies was gathered for the period from January 2005 to December 2014. A three step empirical process was carried out to address the objectives of this paper.

First the variables were subjected to ADF unit root tests to establish the stationarity of the time series. Out of the 8 companies, only 5 had the same integration order as the Oil price, I (2). This meant that Share prices of companies 1, 2 and 6, had no cointegration relationship with Oil price, since they were of integration order 1 and 3 respectively. Share prices of companies 3,4,5,7 & 8 which had an integration order of 2, same as the Oil price, were the subjected to further tests to confirm cointegration and subsequently causation. This brings to the fore the question of whether the scale of a company's operations affects its operations sensitivity to Oil price movements. It could be argued that these three companies, 1, 2 and 6 i.e. BOC, Baumann and Kenya Orchards have a smaller scale of operations and hence not as sensitive to Oil price movements as their larger counterparts like EABL or BAT. Due consideration should also be given to the fact that while they may operate in the same economic environment, each of these

companies have their peculiarities in terms of their industrial processes which may also impact the results of this study.

After establishing the optimal lag lengths, the Johansen cointegration test was carried out. This revealed evidence of a long run relationship between Oil price movements and the Share prices of companies 3, 5 & 7. There was no evidence of Oil price cointegration with companies 4 & 8 Share prices. These results are in agreement with the studies carried out by (Huang et al., 2006; Jones & Kaul, 1996; Maghyreh, 2004; Park & Ratti, 2008; Sadorsky, 1999). In these earlier studies as well, some of the variables displayed a long run relationship with Oil price while others did not. Although the presumptions of Oil price-stock price relationship seem reasonable, in practice when one considers at a very broad data set, the results may be mixed. While all these companies are manufacturing entities, their individual oil consumption levels vary based on the industrial processes that they run. The industry overall may be more dependent on oil than other sectors, but even within the sector this consumption varies. Management teams of some of these oil dependent companies apply different hedging practices to shield themselves against adverse Oil price movements. These factors may have impacted the outcome of these tests. Further research efforts may shed light on the effectiveness of hedging practices on the company's performance. At this point, the paper had met the first objective albeit with mixed results.

The second objective was to determine the causality relationship between the Oil price and Share prices. The Granger causality test was performed on the Share price of the three companies 3, 5 & 7 that had displayed cointegration with Oil prices. There was a demonstrated evidence of Stock prices on Oil prices for companies 3 & 5. These results were in line with the established theoretical framework as postulated by (Hamilton, 2008). However, there was no evidence to support this in the case of company 7 which was counterintuitive since the expectation was that, if there's cointegration then surely that relationship is guided by Oil price. This may be partly down to the fact that this company has from 2009 been generating its own power from bagasse, one of the byproducts of its industrial process. This has reduced its dependence on oil powered generators and thermal produced electricity, which may have impacted its sensitivity to

Oil price changes for the second half of the study period. Another possibility is that there's another factor, not considered by this study that guides both the Oil and Share prices, such that they would show cointegration but no causation.

5.3 Conclusion

The findings of this study lead to the conclusion that indeed the Share prices of some local manufacturing companies are impacted by the Oil price changes. The evidence on the long run relationship between Oil price and Share price is in line with the theoretical framework and provides additional evidence to earlier studies such as the work by (Huang et al., 2006; Jones & Kaul, 1996; Maghyereh, 2004; Park & Ratti, 2008; Sadorsky, 1999). This is however not uniform throughout the industry. This therefore means that certain peculiarities such as the individual company's operations, industrial processes and management practices should be taken into account when assessing this. In addition to the long run relationship between Oil price and Share price, there is evidence to support the theory that it is the Oil price that influences the Share price movements. This causality relationship is well documented in economic theory and this paper has provided some additional evidence to support that within the local manufacturing industry.

5.4 Recommendations and implications

5.4.1 Management teams

Based on the results of this study, it is crucial for management to realise the role that Oil price change plays in their Share price determination. With this in mind they can institute various countermeasures to either shield the company from losing value or take advantage of opportunities where they lay. These countermeasures may include hedging against Oil price movements. They can also vary their level of activity depending on how severe the Oil price change is, such that they increase production levels when the prices are low and stack up on inventory at such times, while reducing production in high price period, while using the safety stock to meet market demand. This is obviously subject to the nature of operations, in as far as how quickly the company can respond to the change. The decision to consequently increase inventory has a cost consideration in terms of storage and also durability of the products, without affecting quality. The study

shows has also revealed that companies are impacted differently and they should be wary of the peculiarities in their operational processes that make them vulnerable to these changes.

5.4.2 Academia

The study adds to the growing body of knowledge in this area and provides additional evidence of the nature of the long run relationship between Oil price and Share price within the local manufacturing context. This research can serve as a source of reference for future studies in this area.

5.4.3 Investors

The outcome of this study informs the actions of investors and portfolio managers in the market. The evidence from this study points to a need to consider Oil price movements as one of the factors that affect Share prices of companies within the manufacturing industry. Investors should diversify their portfolio to include some stocks that are not subject to Oil price movements so as to hedge a risk of downturn due to Oil price increases. They should also be alert to the opportunity presented by Oil price declines. They can hence take up favourable positions with this information in mind. Nonetheless, it's also important to note that this should be taken in context since there are obviously other factors that influence Share prices.

Suggestions for Further Research

The main context for this study was on the manufacturing sector. It would be interesting to see how other sectors are impacted by Oil price changes. Future research may be able to provide some insights into that. It's been observed that companies are impacted differently, therefore it is also of interest to find out what management practices are being applied to actively manage the impact of Oil price changes and how effective they have been. Management teams would also find it useful to identify which business processes or operation practices make them vulnerable to these changes and how they can best manage that.

5.5 Limitations

The study focused on the Oil price and Share price relationship. However, there are other additional factors within the environment that impact the Share price, which were deemed out of scope for this study. This study did not consider the effect of inflation and other macroeconomic factors that may impact the Share prices. Future research may look at how this interaction happens and what impact it may have. The study also focused on the companies that were in operation throughout the 10 year study period. However there are other companies that have come up within this period that were left out of this scope.



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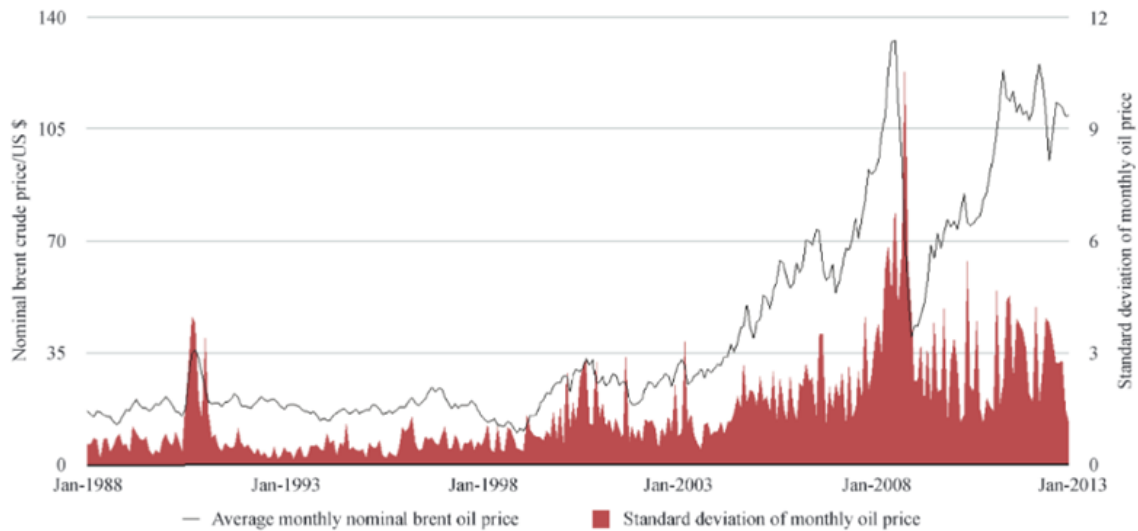
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APPENDICES

Appendix 1: Table depicting oil price movement between 1988 and 2013



Average monthly nominal Crude Oil PRICES (USD) and Standard Deviation from 1988 to 2013

Appendix 2: Results of unit root tests on the natural logs of the variables without differentiation

Natural Log of Company shares	ADF Result (P-Value)
I_A_Baumann_CoLtd	0.2589
I_B_O_CKenyaLtd	0.774
I_BritishAmerica	0.897
I_CarbacidInvest	0.9469
I_EastAfricanBre	0.3479
I_KenyaOrchardsL	1
I_MumiasSugarCo	0.1337
I_UngaGroupLtd	0.9986
I_OilPriceKshs	0.8634

Appendix 3: Optimal lag length as indicated by the BIC (Schwarz Bayesian criterion) and the HQC (Hannan-Quinn criterion)

Variable	Optimal Lag length
A Baumann Ltd	2
BOC Kenya Ltd	4
British American Tobacco	3
Carbacid	18
East Africa Breweries Ltd	3
Kenya Orchards Ltd	33
Mumias Sugar Co Ltd	5
Unga Group Ltd	2
Oil Price Kshs	3

This table references the company labels for the purposes of this study. This was done to avoid mentioning the company names in the text of the study.

Company	Variable Name
A Baumann Ltd	Company 1
BOC Kenya Ltd	Company 2
British American Tobacco	Company 3
Carbacid	Company 4
East Africa Breweries Ltd	Company 5
Kenya Orchards Ltd	Company 6
Mumias Sugar Co Ltd	Company 7
Unga Group Ltd	Company 8