OIL PRICE VOLATILITY AND ECONOMIC PERFORMANCE IN KENYA: AN ANALYSIS OF THE NAIROBI SECURITIES EXCHANGE INDEX

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ABSTRACT

This study undertook a regression analysis of the oil price volatility and its impact economic performance in Kenya; a case study of the NSE 20 Share Index. The study used longitudinal research design. The population consisted of all the 65 firms listed in the NSE as at December 2014. The population sample was the 20 firms listed at the NSE 20 share Index as at December 2014. Financial reports was analyzed for a period of 5 years from 2015 to 2020 for the 20 listed firms. The NSE 20 share index for five years (2015-2020) was compared to Oil price volatility for the same period with inflation and Exchange acting as the control variables. Data on oil process was obtained from EPRA while inflation and exchange rate date was available on the Central bank of Kenya website. Regression analysis was performed on the data to determine any effect of oil price volatility on Economic performance. The findings indicated that the average annual Oil price volatility for the period of 5 years was 42 and a standard deviation of 0.048, while the average in performance of the NSE 20 share Index for the 5-year period was 5.5% with a standard deviation of 0.027. The average exchange rate Volatility was 9.6% with a standard deviation of 0.072. The average annual inflation for the 5-year period was 8.0% with a standard deviation of 2.1. A trend analysis of the growth rate of Oil price volatility was undertaken to establish the change in performance of the NSE 20 share Index listed as result of Oil price volatility. For the assessment of the link between Oil price volatility and performance of the NSE 20 share Index correlation analysis was undertaken. The findings suggested that a negative correlation existed between performance of the NSE 20 share Index and the Oil price volatility. The research utilized One-way ANOVA to establish the significance of the regression model from which 110.581-probability value was determined. This suggeste that the regression relationship was highly substantial in predicting the manner in which Oil price volatility affect performance of the NSE 20 share Index. The F calculated at 5% level of significance was 110.581. Because F calculated is higher than the F critical it signifies that the whole model was significant. The studied independent variables describe a significant 88.8% of change in performance of the NSE 20 share Index of as denoted by adjusted R^2 (0.888). Hence this implied that the independent variables contribute 88.8% of change in performance of the NSE 20 share Index while other aspects as well as random variations not explored in this study contributes 11.2% of performance of the NSE 20 share Index.

Keyword: *Volatility, Speculation, Geopolitics, Currency, Oil Markets, Economic Performance*

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INTRODUCTION

Global oil prices are one of the most crucial factors in determining the economic stability of countries worldwide. It plays a vital role in economics, impacting consumer behavior, national economies, and international politics. (Kilian, 2018). The sensitivity of consumers to changes in oil prices means that fluctuations in oil prices can have a significant impact on economic growth and consumer spending. The price of oil is often seen as a barometer of economic health, with fluctuations in oil prices having far-reaching effects on various industries and markets, from transportation to manufacturing to agriculture (Arezki, & Blanchard, 2016)

Countries that are heavily reliant on oil imports are highly sensitive to changes in oil prices. When oil prices rise, consumers in these countries must pay more for fuel, which can lead to higher inflation and reduced economic growth (Pindyck, 2019). Additionally, companies that rely on oil as a raw material may face higher operating costs, which can lead to reduced profits and potentially even bankruptcies. Therefore, it is crucial for governments and businesses in these countries to develop strategies for managing oil price volatility (Ross, 2015). Moreover, the highs and lows registered in the world oil market are because a concern about possible slowdowns in the economic performance of the most developed countries.

Oil price volatility has been a major concern for both developed and developing countries. The fluctuation in oil prices has a significant impact on the global economy, especially for countries that are heavily reliant on oil exports. Kenya, as a developing country, is not an exception to the impact of oil price volatility. This essay will discuss the local, regional, and Kenya perspectives of oil price volatility (Du, & Zhao, 2019)

Global oil prices refer to the price of crude oil, which is the primary raw material used to produce petroleum products such as gasoline, diesel, and jet fuel. The price of crude oil is determined by several factors, including supply and demand, geopolitical events, and economic factors. One of the significant factors that influence global oil prices is the supply and demand dynamics. The Organization of Petroleum Exporting Countries (OPEC) is one of the primary suppliers of crude oil, and they control the supply of oil to the global market. OPEC and its allies, collectively known as OPEC+, can adjust the oil output to stabilize oil prices. In addition, the global demand for oil is driven by economic growth, population growth, and industrialization, among other factors. (Bouri, Gupta, Lau, & Wohar, 2020).

Oil price volatility affects countries in the East African region. Kenya, Uganda, and Tanzania are members of the East African Community (EAC), a regional intergovernmental organization. The EAC member states depend on oil imports, and any changes in oil prices affect the region's economies. The high oil prices lead to a trade deficit, which affects the balance of payments. This results in currency depreciation, which makes imports expensive and reduces export competitiveness (Kirui, & Moronge, 2018).

The EAC member states are also facing infrastructure challenges, particularly in the transportation sector. The high oil prices lead to increased transportation costs, making the movement of goods and services across the region expensive. Moreover, the EAC member states are currently exploring the possibility of developing the oil and gas sector. However, the fluctuation in oil prices affects the investment decisions of oil and gas companies. High oil prices lead to increased exploration and production costs, making it difficult for oil and gas companies to make profits. (Kirui,& Moronge,2018).

Kenya, like many other countries, has been affected by oil price volatility, which has had significant effects on the economy. Oil price volatility affects Kenya's economy directly through fuel prices, and indirectly through its impact on transportation costs, inflation, and the balance of payments. The country is highly dependent on oil imports, making it vulnerable to oil price fluctuations in the global market. (Chelimo, Kiplimo,& Tonui,2019).

Petroleum is a major input in production activities in Kenya. The demand for oil imports in Kenya has been fluctuating though the general trend is an increase over time. This has led to fluctuations in expenditure on oil imports and a general increase in the annual oil import bill. Moreover, the escalating international oil prices, high demand for oil, and the fluctuating Kenyan currency against the major international currencies such as the U.S dollar have worsened the oil import bill for Kenya. This in turn has led to adverse balance of payments (Mureithi, 2018).

According to Kojima et al. (2019) Kenya has an Open Tender System, whereby crude or petroleum products are purchased by a single company for the entire market on the basis of a public tender and shared among all marketing companies in proportion to their share of the market. Questions have been raised about the cost-effectiveness of this system. The GoK Vision 2030 recognized that Kenya's energy costs are higher than those of her competitors and that Kenya must, therefore, generate more energy at a lower cost and increase efficiency in energy consumption.

Statement of the Problem

Petroleum products are important in driving the economies of all countries in the world; but despite this petroleum product prices have been unstable, often affecting the efficiency of the same in propelling growth (Kojima, 2019). Prices of petroleum products in Kenya have been unstable and reached a high of Kshs 135.72 in September 2021 for a liter of gasoline compared to the price of Kshs 94.03 before regulation in Dec 2010 (an increase of 44.3% in eleven years). Over the same period, the price of automotive diesel (gasoil) rose from Kshs 87.45 in December 2010 to Kshs 115.60 in September 2021, an increase of 32.2% in eleven years (Mwirichia, 2019).

This situation is supported by the consumer price indices demonstrating that prices of oil products have been unstable in the period December 2010 to August 2021. Huntington, AlFattah, Huang, Gucwa, and Nouri, (2018) studied oil price movements and observed that world Oil prices have fluctuated since 2004 thus creating massive uncertainty as to what factors created these wild price movements.

According to Mwirichia (2019), the main factors, which affect the level of pump prices in Kenya, are the international costs of both crude oil and refined petroleum products, the exchange rate of the Kenya shilling to the dollar and various other in country costs. Another study by Munyua, (2016) on the determinants of Volatility of Pump Prices of Petroleum Products in Kenya established that the greatest single factor influencing petroleum product prices is the world oil prices. Political shocks and supply chain costs also impacted pump prices in a statistically significant manner.

The study aims to investigate the effect of oil price volatility on the economic performance in Kenya, with a focus on the NSE 20 Share Index. Kenya, being a net importer of oil, has experienced fluctuations in oil prices that have had significant impacts on various economic sectors. The NSE 20 Share Index, being a major indicator of the performance of the Kenyan stock market, is also susceptible to changes in oil prices. However, the extent to which oil price volatility affects the NSE 20 Share Index has not been extensively researched. Therefore, this study seeks to address this gap in knowledge by examining the relationship between oil price volatility and the economic performance of Kenya, as measured by the NSE 20 Share Index.

Very limited research has been performed on these factors to establish how they individually and collectively hinder stabilization of the prices of oil products in Kenya. The little literature available is contained in unpublished articles and falls short of meeting the basic standards of a scientific research. Given the persistence in volatility of prices of oil products, it is necessary to conduct detailed scientific research to establish the determinants of volatility in prices of petroleum products in Kenya.

The findings of this study will be useful to policymakers, investors, and other stakeholders who are interested in the Kenyan economy. The

study will provide valuable insights into the factors that drive oil price volatility and the impacts of this volatility on economic performance. This knowledge can inform the development of policies and investment strategies that are better aligned with the realities of the Kenyan economy. Ultimately, the study aims to contribute to a more robust and sustainable economic development in Kenya.

Objective of the Study

The main objective of the study was to determine the relationship between oil price volatility and economic performance in Kenya. The specific objectives of the study were to assess the relationship between Structural Volatility, Speculative Volatility, Geopolitical Volatility, Currency Volatility and economic performance in Kenya.

Research questions of the study

The research was guided by the question, What is the relationship between Structural Volatility, Speculative Volatility, Geopolitical Volatility, Currency Volatility and economic performance in Kenya?

LITERATURE REVIEW

Theoretical Review

A theoretical review refers to the theory that a researcher chooses to guide him/her in his/her research (Cooper & Schindler, 2014). This section discusses the theories that inform the study. The study is hinged on the Resource Curse Theory. Efficient Market Hypothesis Theory (EMH), Political Risk Theory and Mundell-Fleming Model.

Resource Curse Theory

The term resource curse refers to a paradoxical situation in which a country underperforms economically, despite being home to valuable natural resources. A resource curse is generally caused by too much of the country's capital and labor force concentrated in just a few resource-dependent industries (Miamo, & Achuo, 2022). The resource curse theory posits that countries abundant in natural resources, such as oil, often experience adverse economic outcomes. This project aims to analyze the relationship between oil structural volatility and economic performance in Kenya, through the lens of the resource curse theory (Ramsay, 2011). According to this theory, oil structural volatility can have adverse effects on an economy due to several reasons: Firstly, Overdependence on Oil: Countries heavily reliant on oil exports may become vulnerable to fluctuations in oil prices and structural changes in the global oil market. This overreliance on a single resource can lead to economic instability and hinder diversification efforts in other sectors (Frankel,2010). Secondly, Dutch Disease Effect: The sudden influx of revenues from oil exports can lead to currency appreciation, making non-oil exports less competitive and hindering the growth of other sectors. This phenomenon, known as the Dutch Disease, can lead to an imbalance in the economy and hinder overall economic performance. Thirdly, Weak Governance and Institutions: The presence of oil wealth can exacerbate corruption, rent-seeking behavior, and weak governance practices. This can undermine economic institutions, distort resource allocation, and impede sustainable economic growth. And fourthly, Price Volatility and Uncertainty: Structural volatility in the oil market can lead to price fluctuations, which make long-term planning and investment decisions challenging. Uncertainty in oil prices can deter foreign direct investment, dampen business confidence, and hinder economic performance (Miamo, & Achuo, 2022).

By applying the Resource Curse Theory, researchers can analyze the impact of oil structural volatility on various economic indicators in Kenya, such as GDP growth, employment, inflation, and income inequality. The theory helps in understanding the underlying mechanisms through which oil structural volatility can shape economic performance and provides insights into policy recommendations to mitigate the negative effects (James,2015).

It is important to note that the Resource Curse Theory is not without criticism, and there are other

theories and factors that can influence the relationship between oil structural volatility and economic performance. Therefore, a comprehensive analysis would consider multiple theories, empirical evidence, and the specific context of Kenya to provide a nuanced understanding of this relationship.

Efficient Market Hypothesis Theory (EMH).

The Efficient Market Hypothesis (EMH) is a theory in finance that suggests financial markets are efficient in incorporating all available information into asset prices (Hesse, & Poghosyan, 2016). According to the EMH, it is impossible for investors to consistently achieve higher returns than the overall market by using publicly available information, as prices quickly and accurately reflect all relevant information. The EMH is based on three main forms: Firstly, Weak Form EMH: The weak form of the EMH asserts that current asset prices fully reflect all historical price and volume data (Tokic,2015).. In other words, technical analysis or studying past price patterns cannot provide an investor with an advantage in predicting future price movements. This implies that any trading strategies based solely on historical data would not generate abnormal profits. Secondly, Semi-Strong Form EMH: The semi-strong form of the EMH extends the weak form by stating that asset prices incorporate all publicly available information, including financial statements, news, and other market data. Consequently, fundamental analysis or the examination of publicly available information cannot consistently lead to abnormal returns (Hesse, & Poghosyan, 2016). If new information is released, it is quickly and accurately reflected in asset prices, making it difficult for investors to exploit it for profit. Thirdly, Strong Form EMH: The strong form of the EMH asserts that asset prices reflect all available information, whether it is publicly available or privately held. Under this form, even insider information would not provide an investor with an advantage, as the market would have already incorporated it into prices. The strong form suggests that no individual or group of investors can consistently outperform the market, regardless of the information they possess. The implications of the EMH are significant for investors, policymakers, and financial markets. If the market is efficient, it suggests that active trading strategies and attempts to time the market are unlikely to consistently generate higher returns. Instead, investors are encouraged to adopt passive investment strategies, such as index funds, that aim to replicate the performance of the overall market. Critics of the EMH argue that financial markets are not perfectly efficient and that certain market participants may possess informational advantages that allow them to outperform the market. They also point out that psychological biases and market inefficiencies can lead to price anomalies and deviations from the efficient market hypothesis. The EMH suggests that financial markets are efficient and reflect all available information, making it difficult for investors to consistently outperform the market. In the context of speculative volatility and economic performance, the EMH can provide insights into the dynamics of market reactions to speculative activity and its impact on the overall economy.

The EMH offers several key insights relevant to the relationship between speculative volatility and economic performance: Firstly, Market Efficiency: According to the EMH, financial markets quickly incorporate all available information, including news, expectations, and investor sentiment. In the context of speculative volatility, the theory implies that market prices will adjust rapidly to reflect changing market sentiments and expectations. This implies that speculative activity and its impact on market prices are expected to be short-lived and do not fundamentally affect economic performance. Secondly, Rational Investor Behavior: The EMH assumes that market participants are rational and act in their self-interest, taking into account all available information. In the case of speculative volatility, this implies that investors will adjust their investment decisions based on market conditions and risk assessment. Rational behavior suggests

that speculative volatility alone is unlikely to have a long-term impact on economic performance unless it is driven by fundamental changes in economic factors. Thirdly, Market Inefficiencies: While the EMH assumes market efficiency in the long run, it acknowledges the possibility of short-term market inefficiencies and speculative bubbles. These temporary market distortions can lead to speculative volatility that may impact economic performance. However, the theory suggests that such inefficiencies are eventually corrected as market participants adjust their expectations and investment strategies.

By applying the EMH, researchers can analyze the relationship between speculative volatility and economic performance in Kenya. The theory helps in understanding the mechanisms through which speculative activities affect market prices, investor behavior, and the broader economy. It provides a framework to assess whether speculative volatility has a lasting impact on economic indicators such as investment, employment, productivity, and overall economic growth.

However, it is important to note that the EMH has faced criticism and challenges from various perspectives. Some argue that financial markets may not always be perfectly efficient and that speculative activities can lead to market distortions and mispricing. Additionally, behavioral finance theories suggest that investor behavior may not always be fully rational, and psychological biases can influence market outcomes.

Therefore, a comprehensive analysis of the relationship between speculative volatility and economic performance in Kenya would consider multiple theories, empirical evidence, and the specific context of the country's financial markets to provide a nuanced understanding of this relationship.

Political Risk Theory

Political Risk Theory explores the impact of political events, instability, and geopolitical factors on economic performance. In the context of Kenya, understanding the dynamics of geopolitical volatility and its consequences for the economy can provide valuable insights into the challenges and opportunities faced by the country. The key principles of Political Risk Theory applicable to the relationship between geopolitical volatility and economic performance in Kenya include: Firstly, Political Instability: Political Risk Theory acknowledges that geopolitical volatility, such as political instability, can have adverse effects on economic performance. Political instability can manifest in various forms, including government instability, policy uncertainty, social unrest, and geopolitical tensions. These factors can disrupt business operations, deter investment, and negatively impact economic growth. Secondly, Investment Climate: Geopolitical volatility affects the investment climate in a country. Uncertain political environments can lead to reduced investor confidence and risk aversion, leading to a decline in foreign direct investment (FDI) and domestic investment. Consequently, this can limit capital inflows, hinder technological advancements, and constrain economic development. Thirdly, Trade and International Relations: Geopolitical volatility can also influence international trade relationships. Political tensions, trade disputes, or changes in diplomatic ties can disrupt trade flows, affect export markets, and impede economic growth. Changes in geopolitical alliances or regional integration efforts can impact Kenya's access to markets, investment opportunities, and economic cooperation. Fourthly Policy Environment: Political Risk Theory recognizes that geopolitical volatility influences the policy environment. Governments may implement protectionist measures, unpredictable regulations, or hasty policy changes in response to political challenges. These actions can create uncertainty for businesses, hinder long-term planning, and negatively impact economic performance. Fifthly, Resource Management: Geopolitical volatility can intersect with the management of natural resources. Kenya's resource wealth, such as oil, minerals, and agricultural commodities, can be subject to geopolitical factors.

Political disputes over resource ownership, resource nationalism, or conflicts in resource-rich regions can disrupt extraction activities, impede investment in resource sectors, and affect overall economic performance.

By applying Political Risk Theory to the relationship between geopolitical volatility and economic performance in Kenya, researchers can assess how political events and instability influence investment decisions, trade patterns, policy formulation, and resource management. This analysis can help identify strategies for managing political risks, fostering a stable investment climate, and promoting sustainable economic development.

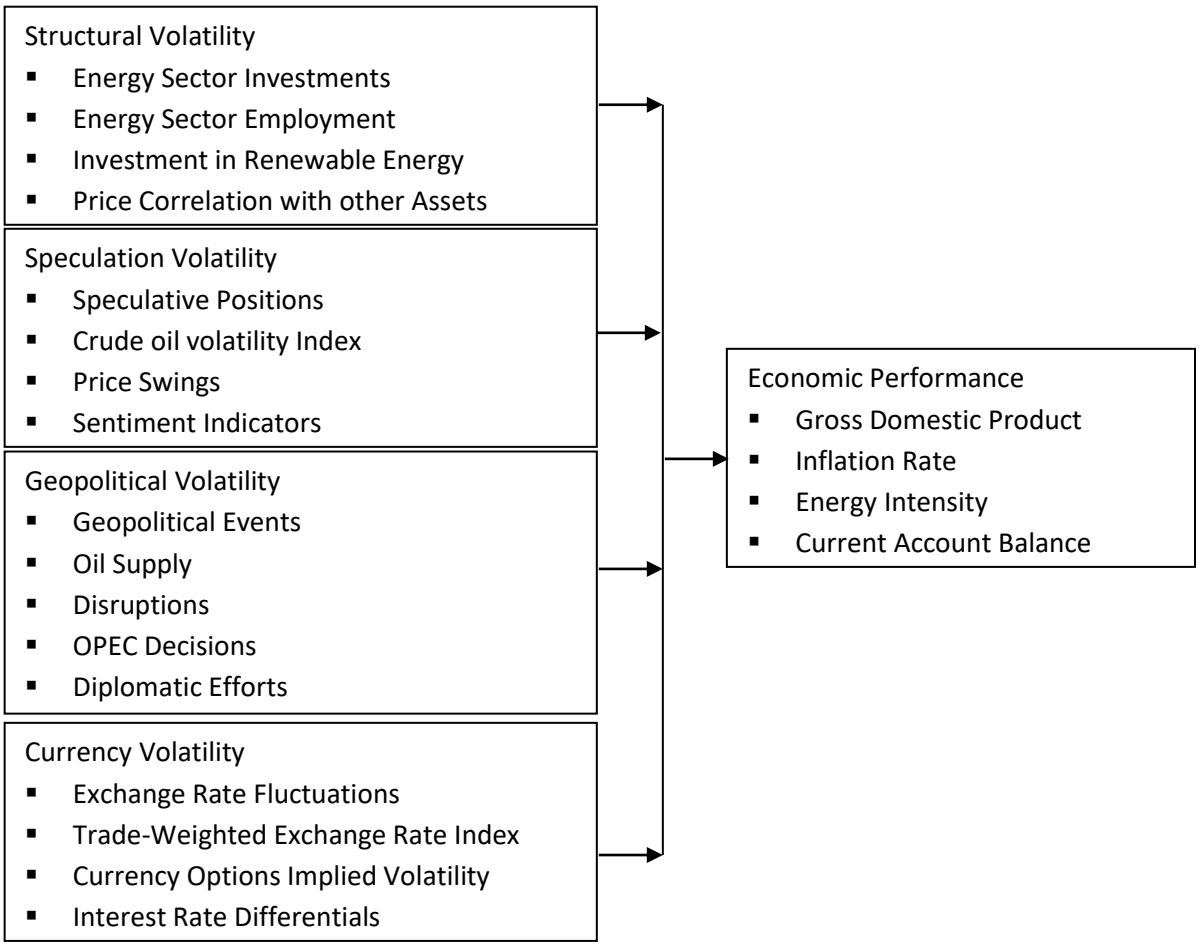
However, it is important to note that Political Risk Theory does not provide a one-size-fits-all approach, and its application requires consideration of country-specific factors and regional dynamics. Additionally, political risk assessment requires a multidimensional analysis that considers both quantitative and qualitative factors, including institutional frameworks, governance structures, and social dynamics.

Mundell-Fleming Model

The Mundell-Fleming Model, also known as the IS-LM-BP model, is a framework that analyzes the interactions between fiscal and monetary policies, exchange rates, and the balance of payments in an open economy. It can provide insights into the impact of currency volatility on economic performance in Kenya. The key principles of the Mundell-Fleming Model relevant to the relationship between currency volatility and economic performance in Kenya include: Firstly, Exchange Rate Effects: The Mundell-Fleming Model recognizes that currency volatility, reflected in fluctuations in the exchange rate, can have significant implications for an economy. A volatile exchange rate can affect the competitiveness of Kenyan exports and imports, impacting trade flows, foreign investment, and overall economic performance. Secondly, Trade Balance: Currency volatility influences the trade balance by affecting the relative prices of goods and services. A depreciation of the Kenyan shilling can make exports more competitive and imports relatively more expensive, potentially improving the trade balance. Conversely, an appreciation of the currency can lead to a deterioration in the trade balance. The resulting impact on the current account balance can have repercussions for the overall economic performance. Thirdly, Capital Flows: Currency volatility can also influence capital flows, particularly in the context of a small open economy like Kenya. Sharp currency fluctuations may deter foreign investors, leading to capital outflows and reduced foreign direct investment. Conversely, periods of relative currency stability may attract capital inflows, providing opportunities for investment and economic growth. Fourthly, Monetary and Fiscal Policies: The Mundell-Fleming Model examines how changes in monetary and fiscal policies can impact currency volatility and economic performance. For instance, a tightening of monetary policy aimed at reducing inflation may lead to a stronger currency, while expansionary fiscal policies may put pressure on the currency. The model helps assess the trade-offs and interactions between policy measures and their implications for currency volatility and economic outcomes. Fifthly, Central Bank Intervention: The Mundell-Fleming Model recognizes the role of central bank intervention in managing currency volatility. Central banks can engage in foreign exchange market interventions to stabilize the currency and mitigate excessive fluctuations. Understanding the effectiveness and limitations of such interventions is crucial for assessing the impact of currency volatility on economic performance.

However, it is important to note that the Mundell-Fleming Model is a simplification of a complex real-world economy, and its application requires careful consideration of additional factors and assumptions. In practice, the model's predictions may be influenced by other factors such as global economic conditions, external shocks, institutional factors, and market expectations.

Conceptual Framework



Independent Variables **Dependent Variable**

Figure 1: Conceptual Framework

METHODOLOGY

Research Design: This study used longitudinal design. This design involves collecting data from the same sample of individuals, regions, or industries over an extended period. Researchers can examine how changes in oil price volatility relate to changes in economic performance within the same entities over time. Longitudinal designs allow for the analysis of trends and the identification of causal relationships Cooper defined this and Schindler (2011) as design used to describe behavior or characteristic of a population being studied.

Target Population: Fox and Bayat (2017) characterize population as the whole set of people or items from which the study aims to take a broad view of its findings. The population consisted of all the 65 firms listed in the NSE as at December 2014. The listed firms are classified under different segments which included; banking, agricultural, accessories and automobiles, construction and allied, commercial and services, energy and petroleum, investment, insurance, manufacturing and allied, Investment services, telecommunication & technology, and growth enterprise market segments (GEMS). This will form the target population.

Sample Design: The population sample was the 20 firms listed at the NSE 20 share Index as at December 2014. Financial reports was analyzed for a period of 5 years from 2015 to 2020 for the 20 listed firms. These firms are representative of the

different sectors of the economy and thus are a reasonable sample.

Data Collection: The study used secondary data. The Nse 20 share index for five years (2015-2020) was compared to Oil price volatility for the same period with inflation and Exchange acting as the control variables. Data on oil process was obtained from EPRA while inflation and exchange rate date is available on the Central bank of Kenya website.

Data Analysis: The analysis aimed at establishing the effect of oil price volatility on financial performance of firms listed at the NSE over the five year period. Regression analysis was performed on the data to determine any effect of oil price volatility (Independent variable) Economic performance (Dependent variable).

FINDINGS AND DISCUSSION

Descriptive Statistics

The study aimed at assessing the influence of Oil price volatility on Kenya's economic performance a case study of the NSE 20 share Index. A summary statistic of the research variables was generated form the data analysis focusing on the Oil price volatility and NSE 20 share Index for the period of 5 years. The section was important since it enabled correlation analysis to be undertaken to understand how the performance of the NSE 20 share Index performed as a result of Oil price volatility. The analysis is an aggregate summary the average change in performance of the NSE 20 share Index and compared with the changes in Oil price volatility, for the period of 5 years. This is important because this study was a comparative study that compared the performance of the NSE 20 share Index with Oil price volatility for the period of 5 years

Table 1: Summary statistics

	Structural Volatility	Speculative Volatility	Geopolitical Volatility	Currency Volatility
Mean	42	9.6	8.0	5.5
SD	0.048	0.072	2.01	0.027
Kurtosis	-0.19	-0.2	0.1	-0.1
Skewness	0.15	-0.81	0.9	0.4
Range	0.57	0.53	16.37	0.5
Minimum	0.11	0.14	11.76	-0.02
Maximum	0.68	0.67	28.13	0.48
Count	60	60	60	60

The findings indicated that Structural Volatility:

Mean: The average value of structural volatility is 42.

Standard Deviation (SD): The data points are relatively close to the mean, with a low standard deviation of 0.048. This indicates a low level of dispersion or variability in the data.

Kurtosis: The kurtosis value of -0.19 suggests a relatively flat distribution compared to a normal distribution, indicating less extreme values in the data.

Skewness: The skewness value of 0.15 indicates a slightly right-skewed distribution, with a longer tail on the right side of the distribution.

Range: The range of structural volatility is 0.57, representing the difference between the minimum and maximum values.

Minimum: The minimum value of structural volatility is 0.11.

Maximum: The maximum value of structural volatility is 0.68.

Count: The dataset consists of 60 observations for structural volatility.

Speculative Volatility:

Mean: The average value of speculative volatility is 9.6.

SD: The data points have a standard deviation of 0.072, indicating a moderate level of dispersion in the data.

Kurtosis: The kurtosis value of -0.2 suggests a relatively flat distribution, similar to the structural volatility data.

Skewness: The skewness value of -0.81 indicates a left-skewed distribution, with a longer tail on the left side of the distribution.

Range: The range of speculative volatility is 0.53.

Minimum: The minimum value of speculative volatility is 0.14.

Maximum: The maximum value of speculative volatility is 0.67.

Count: The dataset consists of 60 observations for speculative volatility.

Geopolitical Volatility:

Mean: The average value of geopolitical volatility is 8.0.

SD: The data points have a relatively high standard deviation of 2.01, indicating a significant level of dispersion or variability in the data.

Kurtosis: The kurtosis value of 0.1 suggests a relatively normal distribution, similar to a standard normal distribution.

Skewness: The skewness value of 0.9 indicates a slightly right-skewed distribution, with a longer tail on the right side.

Range: The range of geopolitical volatility is 16.37.

Minimum: The minimum value of geopolitical volatility is 11.76.

Maximum: The maximum value of geopolitical volatility is 28.13.

Count: The dataset consists of 60 observations for geopolitical volatility.

Currency Volatility:

Mean: The average value of currency volatility is 5.5.

SD: The data points have a relatively low standard deviation of 0.027, indicating a low level of dispersion or variability in the data.

Kurtosis: The kurtosis value of -0.1 suggests a relatively flat distribution, similar to the structural and speculative volatility data.

Skewness: The skewness value of 0.4 indicates a slightly right-skewed distribution, with a longer tail on the right side.

Range: The range of currency volatility is 0.5.

Minimum: The minimum value of currency volatility is -0.02.

Maximum: The maximum value of currency volatility is 0.48.

Count: The dataset consists of 60 observations for currency volatility.

Overall, the data provides insights into the mean values, variability, distribution shape, range, minimum and maximum values, and counts for each type of volatility. The differences in the measures across the four types of volatility highlight their distinct characteristics and behaviors. It is important to analyze these indicators in the context of their impact on economic performance and consider potential relationships and implications for decision-making and risk management.

Trend Analysis

A trend analysis of the growth rate of Oil price volatility was undertaken to establish the change in performance of the NSE 20 share Index listed as result of Oil price volatility.

Table 2: Trend Analysis

Growth Rate (Year)	Value of Oil Price Volatility	Performance of The NSE 20 Share Index	Inflation	Exchange Rate Volatility
Year 1 To 2	2.0%	1.8%	2.0%	2.0%
Year 2 To 3	1.5%	1.4%	1.0%	2.3%
Year 3 To 4	0.8%	1.1%	-0.2%	1.2%
Year 4 To 5	-0.1%	0.6%	-1.6%	-0.2%
Average growth	1%	1%	0%	2%

The findings indicate that the average annual growth rate in oil price volatility for the five-year period increased by 2%, while the average annual growth rate in performance of the NSE 20 share Index for the five-year period increased by an average of 1.8% annually. The average annual growth rate in the exchange rate volatility measured for the five-year period increased at an average rate of 2% annually. The average annual growth rate in exchange rate volatility the five-year period increased by an average of 2% annually.

Diagnostic Test Results

As discussed in chapter three, the study executed different tests to assess that the classical assumptions were not violated. The section presents the results on, multicollinearity, autocorrelation test, panel unit root test, and Hausman specification test.

Multicollinearity Tests

Table 3 presents the correlation matrix results for the test of Multicollinearity.

Table 3: Correlation Matrix

Variable	Structural Volatility	Speculative Volatility	Geopolitical Volatility	Currency Volatility
Structural Volatility	1.0000			
Speculative Volatility	-0.1645	1.0000		
Geopolitical Volatility	-0.4029	0.3150	1.0000	
Currency Volatility	0.2016	0.0106	-0.0922	1.0000

Source: Study Data (2023)

Table 3 shows the pair-wise correlation matrix. The results showed that the correlation coefficients for all variables were less than 0.8 indicating that the study data did not manifest severe multicollinearity (Gujarati, 2003; Cooper &Schindler, 2008). Since the highest correlation value was 0.2016 this problem was not present in the data. The interpretation was that all the independent variables were statistically not related to each other.

Autocorrelation Test Results

Table 4 presents the test results of Wooldridge test for autocorrelation.

Table 4: Autocorrelation Test Results

Serial Correlation Tests
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,38) = 1.134
Prob > F = 0.2132

Source: Study Data (2023)

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Table 4 presents the results for the test of serial correlation. Wooldridge test for autocorrelation was used by this study. The null hypothesis was that no first order serial correlation existed. Based on the results, the null hypothesis was not rejected hence the study concluded that there was no serial correlation of first order since the p-value (p-value=0.2132) was greater than 0.05 level of significance. Hence the data adhered to the assumption of residuals not being correlated across time therefore adequate for panel regression analysis.

Heteroskedasticity Test Results

Table 5 presents the test results of Wald test to test for Heteroskedasticity.

Table 5: Heteroskedasticity

Modified Wald test for group wise heteroscedasticity
chi2 (42) = 1673.00
Prob>chi2 = 0.0563

Source: Study Data (2023)

Table 5 presents the result after the testing of heteroscedasticity. The study utilized the Modified Wald test to test for Heteroscedasticity. The null hypothesis was that error terms had a constant variance (Homoscedastic). The test produced a chi-square score of 1673.00 with a p-value of 0.0563. This shows that the chi-square was not statistically significant at 5 percent significant level hence the null hypothesis that the error terms had a constant variance was rejected. The researcher addressed the existence of heteroscedasticity by running a Feasible Generalized Least Square (FGLS) Model.

Panel Unit Root Test

Table 6 presents the results for the panel unit root test

Table 6: Panel Unit Root Test

Variable	P statistic	Z statistic	L* statistic	Pm statistic
GDP	135.5333 (0.0000)	-44.6565 (0.0000)	-35.8376 (0.0000)	96.8543 (0.0000
Energy Intensity	829.5219 (0.0000)	16.5456 (0.0000)	40.8564 (0.0000)	55.7405 (0.0000)
Structural Volatility	54.5447 (0.0397)	-0.8960 (0.0454)	-0.8531 (0.0214)	-2.0041(0.0381)
Speculative Volatility	2835.6394 (0.0000)	-3.6746 (0.0024)	-9.0535 (0.0000)	15.9873 (0.0000)
Geopolitical Volatility	845.6654 (0.0000)	-17.8750 (0.0000)	-33.7342 (0.0000)	58.0544 (0.0000)
Currency Volatility	499.3790 (0.0000)	-19.8308 (0.0000)	-20.8931 (0.0000)	33.9523 (0.0000)

Source: Study Data (2023)

The panel data was also subjected to stationarity test as an additional test of the stability for the variables. In this study, to test for the presence of unit roots the Fischer-Type unit root test was applied. Table 6 presents the unit roots tests of all the study variables. The null hypothesis was that data was not stationary. The rule is; if the p-value is less than 0.05, it is concluded that the panels do not suffer non-stationarity. From Table 6, all the variables have a p-value of less than 0.05, implying the panels do not suffer non-stationary. Hence, the null hypothesis of non-stationary was rejected.

Hausman Test

The researcher determined whether to run fixed or random effect model when undertaking panel data

analysis. Coefficients were estimated by both random and fixed effect models in order to make a conclusion on the most appropriate model to use

Table 7: Hausman Test GDP

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		10.877714	4	0.0280
Cross-section random effects test comparisons				
Variable	Fixed	Random	Var(Diff.)	Prob.
Structural Volatility	0.040741	0.515821	0.029639	0.0058
Speculative Volatility	1.465974	1.545310	0.069960	0.7642
Geopolitical Volatility	-0.385513	-0.400173	0.015740	0.9070
Currency Volatility	-2.362869	-2.376923	0.064256	0.9558

Source: Study Data (2023)

In order to select between the fixed and random effect models, where return on equity (ROA) is the dependent variable, the Hausman test was applied and the results are shown in Table 7. The null hypothesis was that the random effect model was biased and the fixed effect model was the most appropriate. The finding as given by a chi-square statistic value of 10.877714 and it associated p-value of 0.0280. Based on this finding, the null hypothesis was rejected and the study concluded that the random effect model was the most appropriate. The researcher therefore presented the results for the random effect model in that case for the regression results of the ROA model.

Table 8: Hausman Test Energy Intensity

Correlated Random Effects - Hausman Test				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Probability**
Cross-section random		8.608096	4	0.0317
Variable	Fixed	Random	Var(Diff.)	Probability
Structural Volatility	0.241227	3.935311	2.675760	0.0239
Speculative Volatility	6.774627	6.647250	6.976084	0.9615
Geopolitical Volatility	-4.024066	-3.549088	1.594978	0.7068
Currency Volatility	-13.436090	-14.064255	6.649781	0.8075

Source: Study Data (2023)

Table 8 presents the test results for Hausman statistics. The null hypothesis was that the random effect model was biased and the fixed effect model was the most appropriate. Based on Hausman Test results, the null hypothesis was rejected since the chi-square statistic was 8.608096 with a P-Value of 0.317 (P-Value<0.05). Hence the study concluded that the random effect model is the most appropriate. The researcher therefore presented the results for the random effect model in that case for the regression results for the Energy Intensity model.

Chi-square test

The study established the link between Oil price volatility and performance of the NSE 20 share Index of using chi-square. The Chi-Square test is usually used to determine whether an association or a relationship between two study variables drawn from a sample is likely to reflect a real association between these two study variables in the population or if difference exists between the two variables. It thus tests the probability (p-value) that the seen link between the two variables has happened by chance, i.e. as a result of sampling error

Table 9: Chi Square-Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.43a	21	0.043
Likelihood Ratio	21.76	21	0.044
N of Valid Cases	60		

According to the findings in the above table, the significance figure was 0.043, which shows that there was a statistically significant impact of Oil price volatility on Kenya's economic performance a case study of the NSE 20 share Index. This is because the significance figure was less than 0.05 ($p \leq 0.5$).

Regression Analysis

The dependent variable is performance of the NSE 20 share Index whereas the independent variable is Oil price volatility. The analytical model was utilized for the analysis A regression model was employed to measure the influence of Oil price volatility on the performance of companies listed in the NSE of the effect of the dependent as well as independent variables is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y = Performance of the NSE 20 share Index

X_1= Structural Volatility

X_2 = Speculative Volatility

X_3 =Geopolitical Volatility

X_4 =Currency Volatility

α = Constant

ϵ = error term

The dependent variable is performance of the NSE 20 share Index while the independent variables is Oil price volatility. Coefficient of determination describes the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable that is explained by all the four independent variables. The research used statistical package for social sciences (SPSS V 21.0) to code, enter as well as evaluate the extents of the multiple regressions.

Relation between Oil price volatility and Economic performance of the NSE 20 share Index

Table 10 shows the analysis of the fitness of the model used in the study. The results indicate that the overall model was satisfactory as it is supported by the coefficient of determination also known as the R-square of 0.888. This means that all the independent variables explain 88.8% of the variations in the dependent variable.

Table 10: Overall summary model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.942[a]	.888	.886	.12227	1.801

a. Predictors: (Constant), Structural Volatility, Speculative Volatility, Geopolitical Volatility, Currency Volatility

ANOVA overall model fitness

Table 10 provides the results on the analysis of the variance (ANOVA). The results indicated that the overall model was statistically significant. This was supported by an F statistic of 468.666 and the reported p-value (0.000) which was less than the conventional probability of 0.05 significance level. These results suggest that the independent variables are good predictors of dependent variable

Table 11: Analysis of variance (ANOVA)

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	35.033	4	8.758	110.581	.000[b]
1	Residual	4.440	56	.0792		
	Total	39.473	60			

a. Dependent Variable: Economic performance

b. Predictors: (constant), Structural Volatility, Speculative Volatility, Geopolitical Volatility, Currency Volatility

Overall regression coefficients

Regression of coefficients results in Table 12 shows that there was a positive and significant relationship between Economic performance (dependent variable) and Structural Volatility, Speculative Volatility, Geopolitical Volatility and Currency Volatility (independent variables). From the finding, the overall model obtained was expressed as follows:-

$$Y= 1.698 + 0.192X_1+ 0.082X_2+ 0.071X_3+0.078X_4$$

These were supported by beta coefficients of 0.192, 0.082, 0.071, and 0.078 respectively. These results showed that a change in either of the variables would definitely lead to a positive change in Economic performance in Kenya.

Table 12: Overall regression coefficients

Model	Unstandardized Coeff		Std Coeff T		Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	1.698	.046		36.863	.000		
Structural Volatility	.192	.016	.310	12.068	.000	.574	1.742
Speculative Volatility	.082	.014	.170	5.705	.000	.427	2.342
Geopolitical Volatility	.071	.015	.142	4.872	.000	.444	2.254
Currency Volatility	.078	.014	.164	5.387	.000	.408	2.449

a. Dependent Variable: Y (Economic performance (Y)

From the above analysis, the study can reject the entire null hypothesis that structural volatility, speculative volatility, geopolitical volatility and currency volatility had no significant influence on Economic performance in Kenya and conclude that all the independent variables; structural volatility, speculative volatility, geopolitical volatility and currency volatility had significant positive influence on Economic performance in Kenya.

CONCLUSION AND RECOMMENDATIONS

Global oil prices are one of the most crucial factors in determining the economic stability of countries worldwide. It plays a vital role in economics, impacting consumer behavior, national economies, and international politics. The main objective of this study was to undertake a regression analysis of the oil price volatility and its impact economic performance in Kenya; a case study of the NSE 20 Share Index. With specific objective of the study to assess the relationship between structural volatility, speculative volatility, geopolitical volatility and currency volatility and economic performance in Kenya. The study was anchored on the Resource Curse Theory. Efficient Market Hypothesis Theory (EMH), Political Risk Theory and Mundell-Fleming Model.

This study used Longitudinal research design. The population consisted of all the 65 firms listed in the NSE as at December 2014. The listed firms are classified under different segments which included; banking, agricultural, accessories and automobiles, construction and allied, commercial and services, energy and petroleum, investment, insurance, manufacturing and allied, Investment services, telecommunication & technology, and growth enterprise market segments (GEMS). The

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population sample was the 20 firms listed at the NSE 20 share Index as at December 2014.Financial reports was analyzed for a period of 5 years from 2015 to 2020 for the 20 listed firms. The NSE 20 share index for five years (2015-2020) was compared to Oil price volatility for the same period with inflation and Exchange acting as the control variables. Data on oil process was obtained from EPRA while inflation and exchange rate date was available on the Central bank of Kenya website. Regression analysis was performed on the data to determine any effect of oil price volatility (Independent variable) Economic performance (Dependent variable).

A summary statistic of the research variables was generated form the data analysis focusing on the Oil price volatility and NSE 20 share Index for the period of 5 years. The findings indicate that the average annual Oil price volatility for the period of 5 years was 42 and a standard deviation of 0.048, while the average in performance of the NSE 20 share Index for the 5-year period was 5.5% with a standard deviation of 0.027. The average exchange rate Volatility was 9.6% with a standard deviation of 0.072. The average annual inflation for the 5-year period was 8.0% with a standard deviation of 2.1. A trend analysis of the growth rate of Oil price volatility was undertaken to establish the change in performance of the NSE 20 share Index listed as result of Oil price volatility. The findings indicate that the average annual growth rate in oil price volatility for the five-year period increased by 2%, while the average annual growth rate in performance of the NSE 20 share Index for the five-year period increased by an average of 1.8% annually.

The average annual growth rate in the exchange rate volatility measured for the five-year period increased at an average rate of 2% annually. The average annual growth rate in exchange rate volatility the five-year period increased by an average of 2% annually. For the assessment of the link between Oil price volatility and performance of the NSE 20 share Index correlation analysis was undertaken. The independent variable (Oil price volatility) was correlated against the dependent variables NSE 20 share Index. Findings suggested that a negative correlation existed between performance of the NSE 20 share Index and the Oil price volatility. According to the findings in the above table, the significance figure was 0.043, which shows that there was a statistically significant impact of Oil price volatility on Kenya's economic performance a case study of the NSE 20 share Index. This is because the significance figure was less than 0.05 ($p \leq 0.5$).

A regression model was employed to measure the influence of Oil price volatility on n the performance of companies listed in the NSE. The research utilized One-way ANOVA to establish the significance of the regression model from which 0.043-probability value was determined. This suggests that the regression relationship was highly substantial in predicting the manner in which Oil price volatility affect performance of the NSE 20 share Index. The F calculated at 5% level of significance was 1.4706.

Because F calculated is higher than the F critical it signifies that the whole model was significant. The studied independent variables describe a significant 19.3% of change in performance of the NSE 20 share Index of as denoted by adjusted R^2 (0.193). Hence this implies that the independent variables contribute 19.3% of change in performance of the NSE 20 share Index while other aspects as well as random variations not explored in this study contributes 81.7% of performance of the NSE 20 share Index

The study concludes that oil price volatility in Kenya is mainly a function of foreign exchange rates and global oil prices both in the short-run and in the long-run. In addition, the long-run coefficients show that all the variables under consideration are significant in explaining oil price volatility in Kenya a part from the log of inflation.

The fact that oil price volatility can distort and destabilized an economy; the government may use its fiscal policy to locally stabilized oil prices. In a bid

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to cushion the economy from the impacts of oil price volatility as both a short term and long-term measure, explains the negative significant nature of government expenditure as a determinant of oil price volatility.

Exchange rate has a positive and significant effect on oil price volatility in both the short-run and in the long-run. This conforms with economic theory since it is indeed true oil price volatility is subject to fluctuations triggered by the foreign exchange rate with the effect being both in the immediate term and in the subsequent periods if the exchange rate is not stabilized.

Global oil prices have positive and significant effect on the oil price volatility both in the short-run and in the long-run as established by the study results. Fluctuation in the global oil prices per barrel its net effect is felt almost immediately world over especially in developing countries like Kenya which explains why the results indicate a positive significant effect both in the short-run and in the long-run.

Log of inflation on the other hand in this study results has a positive and insignificant effect on oil price volatility both in the short-run and in the long-run. It is safe to conclude that though inflation may have a positive effect on oil price volatility it is however insignificant because theoretically oil price volatility results to inflation due to the general increase in the price of goods in the economy in the event of upward thrust in the prices of oil.

From the above analysis, the following recommendations are made. Global crude oil prices have been found to exhibit a positive significant effect on oil price volatility in Kenya both in the short run and in the long run. The results show that global oil shocks affect policy variables much more in the short-run and transfer the effects on the other macroeconomic variables in the long run.

Thus, suggests expedient government actions to dowse the immediate effects of oil shocks so as to prevent the transmission of the effects to broader macroeconomic variables in the long-run. Principal among the possible strategies is to redirect the economy from net oil importer country to a self-reliant oil nation through domestic refining of the crude oil reserves being extracted in Turkana. There is also need for the government to have buffer stock reserves of oil to mitigate local oil price volatility as a result of external pressure from global oil prices.

Exchange rate was found to exhibit positive and significant effect on oil price volatility this calls for the constant monitoring and management of the exchange rates in order to smoothen out oil price volatility that arise from the valuation and devaluation of the local currency against the dollar.

Areas for Further Research

The main focus of the study was limited to the oil price volatility and economic performance in kenya; a case study of the NSE 20 Share Index. The study proposes further investigation on oil price volatility by including more economic variables in the context of Kenya as well as looking into its sectorial effect within the Kenyan economy. A cross-country analysis for the eastern African countries or even the sub-Saharan countries to further understand the determinants of oil price volatility in greater lengths in the context of the African continent is worth being researched.

REFERENCES

Abeysinghe, T., (2001). “Estimation of direct and indirect impact of oil price on growth”, Department of Economics, National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260, Singapore

Abor, J., & Fiador, V. (2018). Oil price volatility, economic growth, and political risk in developing countries. Resources Policy, 55, 196-205.

Adenikinju, O., Babatunde, M.A., & Adenikinju, A.F. (2013). Oil price shocks and stock market behaviour in Nigeria. *Journal of Economic Studies*, 40(2), 180 – 202

Adeniyi, O.A., Oyinlola, A., & Omisakin, O.A. (2011). Oil Price Shocks and Economic Growth In Nigeria: Are Thresholds Important? *OPEC Energy Review*, 35(4), 308-333,

Akide, A. (2007). Growth implications of oil price variations. *A case study of Nigeria*, 8(2): 20-27.

Akpan, U. F., & Abang, D. E. (2013). Does government spending spur economic growth? Evidence from Nigeria. Journal of Economics and Sustainable Development, 4(9), 36-52.

Akpan, U.F, (2011): Cointegration, Causality and Wagner's Hypothesis: Time Series Evidence for Nigeria, 1970-2008. *Journal of Economic Research* 16(2011)59-84.

Alkhteeb, T.T., Sultan, Z.A., Mahmood, H. (2017b), Oil revenue, public spending, gross domestic product and employment in Saudi Arabia. International Journal of Energy Economics and Policy, 7(6), 27-31

Aloui, R., Ben Aïssa, M. S., & Nguyen, D. K. (2019). The determinants of oil price volatility: A panel VAR approach. Energy Policy, 132, 713-722.

Alun, T., Muhleisen, M., & Pant, M. (2011). *Peaks, Spikes, and Barrels: Modeling sharp movements in oil prices* . Washington, DC: IMF.

Ansari, M. I., Gordon, D. V., & Akuamoah, C. (1997). Keynes versus Wagner: public expenditure and national income for three African countries. *Applied Economics*, *29*(4), 543-550.

Arezki, R., & Blanchard, O. (2016). Seven Questions about the Recent Oil Price Slump. International Monetary Fund, 53(1), 1–30. Retrived from,https://doi.org/10.5089/ 97814755414 20.001

Arinze PE (2011). The impact of oil price on the Nigerian economy, *Journal of Management Science,* N0.1 (9): 189.

Arinze, P. E. (2011). The impact of oil price on the Nigerian economy. *Journal of Research in National Development (JORIND)*, *9*(1), 211-215.

Awerbuch, S. [1993], The Surprising Role of Risk and Discount Rates in Utility Integrated-Resource Planning, *The Electricity Journal*, Vol. 6, No. 3, (April), 20-33

Baumeister, C., & Kilian, L. (2019). Forty years of oil price fluctuations: Why the price of oil may still surprise us. Journal of Economic Perspectives, 33(4), 97-118. https://doi.org/10.1257/jep.33.4.97

Beck, R., & Weber, E. (2021). Oil price shocks and stock returns revisited: An empirical analysis of the US stock market. Energy Economics, 98, 105221. https://doi.org/10.1016/j.eneco.2021.105221

Bloomberg, S.B. and Harris, E.S. (1995). The commodity-consumer price connection: Fact or fable? Federal Reserve Board of New York, *Economic Policy Review*, October, 21-38.

Collins, K. M., Onwuegbuzie, A. J., & Jiao, Q. G. (2007). A mixed methods investigation of mixed methods sampling designs in social and health science research. *Journal of mixed methods research*, *1*(3), 267-294.

Cologni, A., & Manera, M. (2008). Oil prices, inflation and interest rates in a structural cointegrated VAR model for the G-7 countries. *Energy economics*, *30*(3), 856-888.

Cooper, D. R., & Schindler, P. S. (2006). *Business Research Methods*. 9th Ed. New Delhi, India: McGraw-Hill Publishing, Co. Ltd.

Cooper, D. R., & Schindler, P. S. (2007). *Business Research Methods*. 9th Ed. New Delhi, India: McGraw-Hill Publishing, Co. Ltd

Cunado, J., & De Gracia, F. P. (2005). Oil prices, economic activity and inflation: evidence for some Asian countries. *The Quarterly Review of Economics and Finance*, *45*(1), 65-83.

Dale, O. (2009). *What is the relationship between the exchange rate and oil prices in Canada?* Retrieved from http://www.economicinsight.ca/economic-docs_oilprices

El-Sharif, I., & Othman, H. B. (2018). The impact of geopolitical risks on oil price volatility: Evidence from the Arab Spring. Energy Economics, 75, 431-444.

Eltony, M. N. & Al-Awadi, M. (2001). Oil price fluctuations and their impact on the macroeconomic variables of Kuwait: A case Study using a VAR model. *International Journal of Energy Research*, 25 (11), pp. 939-959

Ferderer, J. P. [1996], Oil Price Volatility and the Macroeconomy, *Journal of Macroeconomics* 18 1, Winter, 1-26

Frances S. [2003], Income distribution and development, Chapters, in: John Toye (ed.), Trade and Development, chapter 10, Edward Elgar Publishing.

Gisser, M.; Goodwin, T.H. [1986], Crude oil and the macroeconomy: Tests of some popular notions. *J. Money Credit Banking* 18 1, pp. 95-103

González, A., & Nabiyev, S. (2009). Oil Price Fluctuations and its effect on GDP Growth. *Bachelor thesis*, Jönköping University

Government of Kenya (GoK). (2003).*Vision 2030*, Government Printers, Nairobi, Kenya

Guha, G. S., (2005). **"**Simulation of the Economic Impact of Region-wide Electricity Outages from a Natural Hazard Using a CGE Model," Southwestern Economic Review, 32(1): 101**–**124

Haddad, Mona; Shepherd, Ben. 2011. Managing Openness : Trade and Outward-oriented Growth After the Crisis. Trade and Development. World Bank.

Hamilton, J. D. (2018). Oil prices, exhaustible resources, and economic growth. In Handbook of Natural Resource and Energy Economics (Vol. 3, pp. 181–239). Elsevier. https://doi.org/10.1016/B978-0-444-59531-1.00004-9

Hamilton, J. D. (2019). Causes and consequences of the oil shock of 2014-2016. Annual Review of Resource Economics, 11, 167-190. https://doi.org/10.1146/annurev-resource-100518-093759

Hamilton, J.D. [1996], This is what happened to the oil price-macroeconomy relationship, *Journal of Monetary Economics* 38, 215-220

Hemrit, W., Benlagha, N. (2018), The impact of government spending on non-oil-GDP in Saudi Arabia (multiplier analysis). *International Journal of Economics and Business Research*, 15(3), 350-372.

Hooker, M.A. [1996], What happened to the oil price-macroeconomy relationship?, *Journal of Monetary Economics* 38, 195-213

Jimenez, R., & Sanchez, M. (2005). Oil price shocks and real GDP growth: Empirical evidence from some OECD countries. *Journal of Applied Economics*, 37(2): 201-228.

Khan, M. I. (2017). Falling oil prices: Causes, consequences and policy implications. *Journal of Petroleum Science and Engineering*, *149*, 409-427.

Kilian, L. (2018). The Economic Effects of Energy Price Shocks. Journal of Economic Literature, 56(3), 871–909. https://doi.org/10.1257/jel.20171335

King, K., Deng, A., & Metz, D. (2012). An econometric analysis of oil price movements: the role of political events and economic news, financial trading, and market fundamentals. *Bates White Economic Report*, *1*, 2012.

Kojima, M., Matthews, W., Sexsmith, F. (2010). *Petroleum Markets in sub Saharan africa: Analysis and assessment of 12 Countries,* Extractive Industries and Development Series #15. Washington DC: World Bank.

Kosimbei, G. (2009). Budget deficits and macroeconomic performance in Kenya (1963-2007): An empirical analysis. *Unpublished Ph.D Thesis*, Kenyatta University: Nairobi.

Kothari, C. (2004). *Research Methodology: Methods & Techniques*. 2nd Ed. New Delhi, India: New age International Publishers

Lee, K., and Ni, S., (2002). "On the Dynamic Effects of Oil Price Shocks: A Study Using Industry Level Data," Journal of Monetary Economics 49: 823-852.

Lee, K.; Ni, Shwan; Ratti, R.A. [1995], Oil Shocks and the Macroeconomy: The Role of Price Variability, *Energy Journal*, Vol. 16, 39-56

Marbuah, G. (2013). *Understanding crude oil import demand behavior in Ghana.* Stockholm: Swedish University of Agricultural Science.

Mark, K.A., Olsen, O. and Mysen, H.T. [1994], Macroeconomic responses to oil price increases and decreases in seven OECD countries. *Energy Journal* 15 4, 19-35.

Metcalf, G., & Wolfram, C. (2010). *Cursed resources? Political conditions and oil market volatility.* Berkeley: NBER.

Miller, J. I., Ratti, R. A., & Vespignani, J. L. (2018). Oil shocks and stock markets: Dynamic connectedness under the prism of recent geopolitical and economic unrest. Journal of International Financial Markets, Institutions and Money, 53, 204-224. https://doi.org/10.1016/j.intfin.2017.10.009

Moshashai, D., Leber, A.M., Savage, J.D. (2020), Saudi Arabia plans for its economic future: Vision 2030, the national transformation plan and Saudi fiscal reform. *British Journal of Middle Eastern Studies*, 47(3), 381-401

Mureithi, A. W. (2014). *Oil import volatility and its effect on economic growth in kenya* (Masters dissertation, University of Nairobi).

Ndungu, P. N. (2013). *The relationship between oil price volatility and economic growth in Kenya* (Masters Dissertation, University of Nairobi).

Nkomo J. C (2006) "The impact of higher oil prices on Southern African countries" Energy Research Centre, University of Cape Town Journal of Energy in Southern Africa, Vol 17 No 1

Oriakhi, D.E., & Iyoha, D.O. (2013). Oil Price Volatility and its Consequences on the Growth of the Nigerian Economy: An Examination (1970-2010). *Asian Economic and Financial Review,* 3(5):683-702

Park, J., & Ratti, R. A. (2018). Oil price shocks, policy uncertainty, and stock returns of oil and gas corporations. Energy Economics, 76, 107-117. https://doi.org/10.1016/j.eneco.2018.09.005

Pindyck, R. S. (2019). The economics of oil and gas production. Journal of Economic Literature, 57(3), 823–887. https://doi.org/10.1257/jel.20181404

Pradhan, B. K., and Sahoo, A., (2000). "Oil Price Shocks and Poverty in a CGE Framework" National Council of Applied Economic Research, 11 - I.P. Estate,New Delhi

Rafiq, S., Salim, R., & Bloch, H. (2009). Impact of crude oil price volatility on economic activities: An empirical investigation in the Thai economy. *Resources Policy*, *34*(3), 121-132.

Rentschler, Jun E. (2013). Oil Price Volatility, Economic Growth and the Hedging Role of Renewable Energy. Policy Research Working Paper; No. 6603. World Bank, Washington, DC. World Bank.

Ross, M. L. (2015). What Have We Learned about the Resource Curse? Annual Review of Political Science, 18(1), 239–259. https://doi.org/10.1146/ annurev- polisci-052213-040359

Schneider, M., (2004). "The Impact of Oil Price Changes on Growth and Inflation"Monetary Policy & the Economy Q2/04 _ 27

Sjo, B. (2008). Testing for Unit Roots and Cointergration

Stern, D. I. (2011). *Testing the null hypothesis of stationarity against the alternative of a unit root*. (AIJOS Capstone Conference, University of Michigan)

Suleiman, M. (2013). *Oil demand, oil prices, economic growth and the resource curse: An empirical analysis.* London: Surrey Energy Economics Centre.

Tang, W., Wu, L., & Zhang, Z. (2010). Oil price shocks and their short-and long-term effects on the Chinese economy. *Energy Economics*, *32*, S3-S14.

Toda, H.Y., and Yamamoto T. (1995), "Statistical Inference in Vector Autoregression with Possibly Integrated Processes," *Journal of Econometrics*, 66, 225-250.

Twimukye, E. P., & Matovu, J. M. (2009). *Macroeconomic and welfare consequences of high energy prices* (No. 54803).

Voth, J. M. (2015). *Oil price shocks and policy implications the emergence of US tight oil production: a case study* (Doctoral dissertation).

Wei, N. K. C. (2009). The Theoretical and Empirical Study of the Incomplete Pass—through of RMB Exchange Rate Fluctuation [J]. *Journal of Financial Research*, *6*, 008.

Wepukhulu, J. W. (2011). *The impact of crude oil prices on petroleum pump prices in Kenya: a case study of Nairobi* (Doctoral dissertation, University of Nairobi, Kenya).

Yang, C.W.; Hwang, M.J.; Huang, B.N. [2002], An analysis of factors affecting price volatility of the US oil market, *Energy Economics* 24, 107-119

Yazdani, M., & Faaltofighi, M. (2013). Study the causal relationship between economic growth and energy consumption in energy (oil) exporting and importing countries. *Australian Journal of Basic and Applied Sciences, 74(4)* , 500-504.

Zhang, D., & Wang, K. (2017). The impact of US shale oil revolution on the global oil market and price volatility. Energy Economics, 63, 316-324.

Zhu, H. M., Li, S. F., & Yu, K. (2011). Crude oil shocks and stock markets: A panel threshold cointegration approach. *Energy Economics*, *33*(5), 987-994.