QUANTITATIVE ANALYSIS OF OIL TRADE
AND ECONOMIC DEVELOPMENT

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SIGNATURE PAGE

PROJECT: QUANTITATIVE ANALYSIS OF OIL TRADE AND ECONOMIC DEVELOPMENT

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ABSTRACT

Oil trade is a significant part of most countries share on international trade. However, its price keeps changing affecting economies of both net importers and net exporters. The current paper sought to investigate the impact of changes in oil prices during oil trade on the GDP growth of China and United States. A review of existing literature reveals that most researchers assume a linear relationship between GDP and oil price fluctuations in the market. As such, a rise in oil price will lead to decline in the GDP growth of net importers. However, a new cadre of literature reveals that the relationship between GDP and oil prices is not linear hence the need to evaluate the effect of declining oil prices on a country. The current project made use of the research Onion model for business research. The paper tissues a positivist view in the undertaking the research, a deductive approach, and longitudinal tie horizon. Data used in the paper is entirely derived from the World Bank and it is annual in nature. VAR model is used with 23 observations subjected to Granger causality and frequency repines tests. The paper established that for both China and the U.S, a rise in oil price has a dampening economic growth in the short run while the effect states in the end. Inflation in such also traces a similar path. The paper affirms the assertion that oil price has profound effect on the key macroeconomic factors of China and U.S.A.
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Chapter 1

Introduction

Oil trade has remained the primary source of energy for most countries. Since the invention of internal combustion engine, oil has become an important commodity as it drives motor vehicles, thermal generators, heavy machinery, airplanes, and ships among others. The huge value of oil has made an oil trade one of the biggest international trade with the trade amounting to $1.72 billion in 2015 after the sale of 34 billion barrels of oil globally (Desjardins [5], 2016). To this end, oil trade has had a huge impact on the economies of the world as the price changes. Baker [1](2011) provides a rule of thumb that suggests that a price of $10 per barrel of will make the economic growth decline by 0.5% in two years. Though the theory has not been quantified using data from the field, it is evident that oil trade has a huge impact on the economic growth of a country measured by gross domestic product (GDP). Central to oil trade is the stability of oil prices in the oil market. With large sectors of any economy depending on the stability of oil prices, price fluctuations in the oil market has huge impacts on economic growth. Surprisingly, few researchers have dwelled into quantifying the impact of oil trade on economic growth of select countries. Therefore, the current study seeks to quantify to which extent change in
oil prices affects the economic growth of net importers.

1.1 Historical Review

Before the invention of oil, home used to light their homes using oils from alcohol, land or whale oil, or turpentine from wood. However, in 1859, Edwin Drake succeeded in extracting the first commercially usable crude oil after drilling a 69-foot well (Hamilton [13], 2011). The discovery resulted into excitement in the market after the realization that one could obtain an inexhaustible supply of crude oil by drilling wells. The news hit the market hard as drilling activities increased leading to overproduction that saw the price of a barrel of oil drop to 10 cents by 1861. However, on the onset of the 20th century, the importance of oil starts to dawn as mass production of oil began driven by Ford. The rise in demand for oil renewed exploration thereby making oil to become an increasingly important trading commodity (Hamilton [13], 2011).

As oil became increasingly important, any disruption in production resulted in an economic crisis of its kind. For instance, during the Korean War, the supply of oil in the international market declined when the world boycotted Iranian oil after Mohammad Mossadegh nationalized Iran oil companies (Hamilton [13], 2011). The boycott removed 1 billion barrels of oil resulting to acute shortage of oil in Europe and U.S.A. that responded by cutting oil delivery to civilian flights by 30%. The shortage in oil prices reduced the mobility of people hence slowed economic growth. Similarly, automakers downsized as demand for vehicles fell and oil dealers had to survive with reduced business. However, the first oil shock happened in 1973 when Organization of Arab Petroleum Exporting Countries (OPEC) instituted an oil embargo due to U.S. involvement in the Yom Kippur War. The reduced oil supply in the oil market resulted in slowed
economic growth in the United States and Europe. Long lines were common at gas stations as oil shortage bite. A similar crisis happened in 1979 as Iranian revolution set in. Oil price more than doubled to $39.5 per barrel resulting in an economic recession. A similar scenario repeated itself during the Iran-Iraq war that began in 1980 sending U.S. and Europe into an economic recession (Hamilton [13], 2011). Such economic depression shows that oil trade has a high impact on the economic growth of either an oil exporter or an oil importer.

1.2 Problem Statement

The historical review shows that a disruption of the oil trade has a great impact on the economic performance of importing countries. However, few quantitative explanations exist to measure how changes in oil prices affect the economy. While much theory seeks to explain and offers compelling links between oil trade and economic growth, they lack the robustness offered by using the data to reinforce their assertions. As such, there have arisen a problem in answering in quantitative terms, the effect of oil trade on economic growth. Consequently, the current research paper seeks to undertake a quantitative analysis of effects of oil trade on the economic development of a country.

1.3 Research Question

The current research paper seeks to answer the following research question: What is the effect of oil trade on the economic development of a country as measured by gross domestic growth?
1.4 Purpose of the Study

The current paper seeks to investigate in quantitative terms the effect of on economic development. Oil price variations in the international market keep varying mainly in terms of price. Due to a research gap in testing how the two-phenomenon using quantitative terms, the current paper seeks to make use of quantitative statistical measure to link oil trade to the economic development of the United States and China and use the findings to form a generalized model for the entire world economies.

1.5 Project Structure

The project has four key sections. First, it features a literature review revisiting recent literature on oil trade and economic development. The second section discusses the research methodology utilized to undertake the research. The third section covers the Data analysis and findings. The final section covers discussions and conclusion.
Chapter 2

Literature Review

2.1 Introduction

An expansive literature exists studying both economic development and oil prices. However, much of the current research has been biased towards qualitative approaches. The sections revisit the past academic literature to identify gaps that the current research seeks to evaluate. First, the section reviews economic growth and oil price trends in the past. Secondly, the section reviews past literature linking economic growth and oil prices for net oil exporters and net oil importers. Further, the section revisits effect of oil prices on financial market performance in the past and the measures for economic development.

2.2 Link between Economic Growth and Oil Price Trends

Adelman observes that in modern times, oil has served as a formidable indicator of the stability of an economy mainly due to the overreliance on oil as the primary source of energy. As depicted in figure 2.1, declining oil prices corresponds with higher growth in the world’s GDP. Adelman attributes the pattern to the role of oil in running major econ-
omy. The study finds out that despite electricity rising as a formidable source of energy used in production activities, transportation of end products remains largely dependent on oil (Ghalayini [9], 2011). Further, applications such as infrastructure buildings, other construction works, heavy machinery production, and production of steel that require extensive use of energy remain largely dependent on energy supplied by crude oil. To that end, any shocks in the oil trade affect key sectors of the global economy hence leading to slowed growth of the economy. Finn [7](2000) had similar observations while studying the effects of oil shocks on the global economy. A fundamental observation by the study was the fact that other forms of energy such a natural gas, coal and biofuels have failed to substitute oil as the primary form of energy. As such, a drop in oil prices leads to reduced product prices meaning that customers have more disposable income. As Ghalayini [9](2010) study observed, an increase in disposable income creates demand that serves as the driver for renewed economic growth. Contrarily, increased oil prices lead to inflation that reduces consumption leading to a slump in productivity of the economy.
Table 2.1: Historical trends in oil price and economic growth

![Graph showing historical trends in oil price and economic growth](image)

Source: (Ghalayini [9], 2011)

However, Cobb [3](2016) ponders on whether the trend is under challenge going with the recent trends in the United States economy. For instance, the economy grew by 5% in the fourth quarter of 2014 when oil price was as high as $100 per barrel. In line with the past trends, the economy would grow at a higher rate when the oil price came dropping. Contrarily, as the oil price has dropped to the range of $40 range, the economy has been underperforming (Cobb [3], 2016). For instance, in the last quarter of 2016, the country annualized economic growth had dipped to 1.2 percent. Hamilton [13](2011) had similar observations noting that even as the scholarly world assume that oil prices have a direct relationship with the economic growth, statistical tests are key to understanding the interplay of other factors that will lead to more revelation of other interplaying factors.
2.3 Oil Prices Relationship with Economic Growth

Previous researchers have made use of neoclassical theory in examining the economic importance of oil trade. Much of the researchers are concentrated to the period preceding and after the oil crisis of 1973, 179, and 1980. A study by Hamilton [11](1983) established that as oil price rose rapidly, the economy of United States went into a downturn. Finn (2000) study sought to link oil price on the macro economy. The study made use of wage dispersion as the key macroeconomic factor. The study established that oil price shocks were a key contributor of employment dispersion established by David Lillien study that sought to explain wage dispersion across the industry. Finn [7](2000) concludes that oil trade is a key contributing factor to unemployment. A year later, Davis and Haltiwanger [4](2001) conducted a similar study seeking to evaluate the effect of changes in oil prices on sectoral job creation and destruction. The study limited itself to the manufacturing sector in the United States. The study found out that 25 to 25 percent in job variability could be explained by oil price shocks. The response occurred into years time, and the variations increased with the industry’s capital intensity, product durability, and energy intensity. Further, the study established that employment creation rate response was asymmetrical to oil price fluctuations as well as triggering considerable job reallocation activity that Finn [7](2000) has regarded as employment dispersion. Despite the positive correlation between oil price changes during oil trade and key macroeconomic factors, other studies have found lesser significance between variations of price during oil trade and levels of economic activity. In a study measuring the whether the U.S. economic activity levels varied with the changes in oil prices, Mork [16](1989) had a different observation. The study treated oil price rise and decline as two independent variables as key indicators of the response of U.S. economy to changes in oil price in the market. Though the study found that oil price drop had a pos-
itive correlation with economic growth rates, oil price decline did not exhibit symmetric trends in the level of economic activities. The finding helped shows that the relationship between oil price changes and economic development is not linear as assumed in previous studies. Jiménez-Rodríguez [14](2004) replicated the findings of Mork [16](1989). Jiménez-Rodríguez study made use of Granger causality test and multivariate vector autocorrelation to test the effect of oil price rise and decline on Organization for Economic Co-operation and Development (OECD) countries. The investigation established that whereas some countries exhibited a positive correlation between oil price and key macroeconomic variables from some OECD countries, the relationship was rather non-linear with respect to U.S. economy. Hamilton (2008) study that sought to discuss oil and the macroeconomy had similar challenges of determining the missing link between macroeconomic indicators and changes in oil prices. Contrary to previous studies that argue oil prices have a linear relationship with economic growth, the relation may be fallacious as there seems to be a statically undetectable factor affecting both oil prices and economic development.

2.4 Oil Price Change on Net Oil Exporters

Whereas most of the researchers have adopted a more generalized approach while investigating the relationship between oil prices and economic development, some researchers have attempted to conduct similar studies in the context of net oil exporter. A study by Hamilton [12](2005) best exemplifies the effect of oil price changes on oil exporter countries. The analysis leverages the supply-demand curve and links the findings to a country’s economic growth. From a demand-supply standpoint, higher prices of oil mean the supplier will generate better revenues if the demand remains the same. As such, as the
prices of oil rise, the national income of oil exporting countries will increase in the short-
run as the balance of trade acts to their advantage. The rise in national income implies an
expanding economy. However, too much rise in the oil prices and their subsequent stag-
nation may work to the disadvantage of oil exporters. As Ghalayini [9](2011) observes,
the too high price will compel the importing countries to reduce their consumption of
fuel as inflation drives the cost of goods and services high. Further, if the price remains
high for prolonged periods, importing countries may develop alternative sources of en-
ergy to cushion themselves from the high prices of oil. Resultantly, the economy of the
exporting countries would suffer. To this end, the oil traders in the international mar-
ket give a balanced price that outweighs the benefit of investing in the development of
alternative sources of energy.

## 2.5 Effects on Importing Countries

### 2.5.1 Direct Effect

The impact of fluctuation in prices of oil the in the oil market to importing countries oc-
curs in two phases according to Davis and Haltiwanger (Davis and Haltiwanger [4]2001).
The first phase features the direct impact that is characterized by income losses. The
study establishes that the effect of income loss will depend on the level of dependence on
oil for production as well as the level of price elasticity. If the country is heavily depen-
dent on oil for production, the income loss through inflation would be higher. Hamilton
[12](2005) adds that the income loss would be higher if oil is used to produce other forms
of energy such electricity. In such situations, the consumers will bear the higher cost of
goods and services that will, in turn, eat into their income as savings.
2.5.2 Adjustment Effect

After the importing country deals with the direct effects of rising in prices oil and oil products may offset cost allocation. If the economy of the importing country makes use of oil extensively will increase the costs of input. Since not all costs the company can pass to the customers, the company may need to reallocate inputs reduce the effects of inflation on the company’s revenue. The usual victims of reallocation include labor and capital. Ghalayini [9](2011) adds that as the price changes take effect, the customers and producers will tend to adjust their activities, so they are in tandem with the new prices of oil. While the consumers may reduce their consumption to limit the effect of their income loss, the producers will reduce production causing loss of business. In the long-term, price increases will disrupt consumer savings patterns which in turn deficiencies their desire for investment.

2.5.3 Effects of changes in Oil Price on Financial Markets

Financial markets are key indicators of the performance of the economy as Davis, and Haltiwanger (Davis and Haltiwanger [4]2001) observe. Equity market at the international level if largely affected by exchange rate volatility and the general outlook of the economy. In a robust economy, exchange rate tends to be more stable while equity performance is all time high. As such, through observing the behavior of equity performance at different periods of oil price changes in the international market, it is possible to estimate the effect of oils price changes to the economic development of a country. The effect of oil shocks affects old importing countries more negatively (Ftiti et al. [8]2016). Most oil deals during the oil trade deals in the oil market make use of U.S. dollar. Rising cost of fuel will increase demand for the dollar that would, in turn, increase the rate of exchanging the dollar relative to that of oil importing or exporting countries. However,
oil importing countries will suffer most since as the cost of acquiring the dollar rises, the cost of servicing sovereign debt follows a similar trend. Such is the case given that sovereign debt is specified in dollar terms (see Ftiti, Guesmi, Teulon, and Chouachi, Ftiti et al. [8]2016).

Equity market of the oil importing countries would also suffer a great deal from an increase in oil prices in the oil trade. As the level of economic activity suffers from rising oil prices, so does the level of corporate earnings. If the countries do not take the necessary monetary policies, investors in equity will lose much of their equity value held in local currency as inflation yields increasing pressure on the currency. The reduction in overall investment attractiveness of the oil importing countries would reduce given most of them run huge current account deficits (Ftiti et al. [8]2016).

2.6 Conclusion

The section has revisited past literature seeking to link oil trade to economic development. First, the chapter gave a brief overview of historical trends in oil prices and the economic growth. Secondly, the chapter has revisited past literature seeking to give generalized links between oil prices and economic development. Further, the chapter has narrowed down to review manners in which oil trade affects net oil exporters and net oil importers. The review reveals that past literature agrees that oil importers are the biggest casualties of price fluctuations while trading on oil.
Chapter 3

Methodology

Gathering data is key to the realization of the observation needed to realize the goals of the paper. As such, the methodology is key to guiding in data collection and analysis. The research onion model is used as the blueprint for the current paper research methodology. The model depicted in figure 3.1 shows the several elements of undertaking research ranging from choosing a research philosophy, deciding on the research approach strategy, choosing a research strategy, identifying the time horizon of the study and collecting and analyzing data.
Figure 3.1: The Research Onion Model

Source: (Picture is derived from: https://www.slideshare.net/nasirkt/deciding-on-the-research-approach-and-strategy-4)
3.1 Research Philosophy

Research philosophy is knowledge creation and development approach used by researchers. The key goal of the current paper is to develop knowledge regarding the effect of oil trade on the economic growth of two countries selected for comparison. To this end, there a set of beliefs obtained from the pre-existing literature that serves as the guiding philosophy to the current paper. The current paper will make use of positivist in investigating the relationship between oil trade and economic growth. Positivism assumes philosophy that any assertions held regarding any topic could be verified scientifically using logical mathematical or statistical proof. Such a philosophy will add robust to the current investigation in three key ways. First, the paper will rely on the collection and analysis of credible data using statistical tools to quantify the effect of oil prices on economic growth of the sampled countries. Secondly, the philosophy helps undertake the current research in a value-free way implying that personal bias will have little or no effect on the credibility of the research outcome. Lastly, by assuming a positivist view, the current study will be highly replicable.

3.2 Research Approach

The research approach is the way a researcher approaches the process of making new knowledge after undertaking research. The current paper makes use of deductive approach in undertaking the current paper. The current paper seeks to test hypothesis hence the need to make use of statistical tools to test the validity of the assumptions. Current literature has resulted into the generalizations that rise in oil prices in the international oil market result to slowed economic growth mainly in net oil importing countries. However, there is need to make specific observations from the generalizations. As such, the
use of deductive approach helps the current paper to overcome the weakness of one fit all model assumed by an inductive approach through narrowing down to the effects of changes in oil prices to the economy of Japan and United States.

### 3.3 Research Design

Essentially, one could make use of a single research design or a mixture of them as Saunders, Lewis and Thornhill [17](2011) observes. However, unique nature of the current paper call or the use of mixed research method to add robustness to the nature of the created knowledge. The mixed research method is essential in providing a blueprint for data collection, measurement, analysis, and interpretation of the analysis findings. To this end, the mixed method of research comprises of case study and quantitative research design with a key goal of conferring a more understanding of the multilevel perspectives of oil trade and economic growth. As Green and Thorogood [10](2013) observes, such a mixed research design will be key to conferring and deep understanding of the connection between economic growth and oil trade among selected countries.

### 3.4 Research Strategy

Bryman and Bell [2](2015) and Saunders, Lewis and Thornhill [17](2011), a researcher has a wide variety of research strategies one could employ in undertaking the research. The current research makes use case study research proposed by Yin [18](2012). Case study research entails making use of existing literature on a basis for testing and interpreting data collected from secondary sources. The current paper leverages a testing model used in a previous research seeking to link oil trade to the economic growth of a country. As such, the current paper benefits from well-tested models while identify-
ing shortcomings in pre-existing models and addressing them in the current paper. To this end, the current paper will be highly accurate and robust making its findings highly replicable.

3.5 Time Horizon

Time is a key factor while deciding the type of data one will use to undertake the analysis needed to meet the requirements of the research. As Bryman and Bell [2](2015) observes, a researcher may make use of longitudinal research or cross-sectional research depending on the length of the observation. Cross-sectional research is valuable for business researchers that spread over a short period hence making it easy to take a snapshot of the data and make use of it for testing hypothesis. However, the current paper makes use of longitudinal research approach where the period of observation spreads over several years. The data utilized in the current research spans over decades to make it easy pinpoint patterns in the relationship between changes in oil prices and economic growth. Such a long-term data makes it easy to assure the integrity of the findings through subjecting the data to time-series analysis to ascertain its integrity. Further, the long period of observation helps to make distinct patterns in the relationship and reduce the chances of making conclusions based on coincidental observations.

3.6 Data Collection

Secondary sources of data are solely utilized for the current paper. Such is the case due to the existing time limitations and the amount of data needed to undertake the current analysis. There are key benefits of utilizing data from secondary sources. First, it saves on the cost needed to collect and analyze data from primary sources making the data
ideal for university research papers where financial resource is a key constraint as Green and Thorogood [10](2013) argues. Secondly, data from secondary sources tend to have a quality guarantee as it is collected and processed by competent organizations such as the World Bank. Lastly, secondary data used in the current research reduces the overall time needed to complete the research hence ideal for meeting course obligations within the specified timelines.

3.7 Data Analysis Approach

Decades of research has seen the emergence of numerous models used to estimate the relationship between oil price and economic growth during research. Whereas Schorderet (2004) proposed a separation of a time series into negative and positive partial sums, Priestley and Tong (1973) proposed the use of coherence function between two-time series (Maeda [15]2008). However, the current paper employs neither of the models. Rather, papers employ the VAR model to measure the relationship between oil prices and economic growth in USA and Japan. The VAR model is of order p represented by the equation

\[ y_t = c + \sum_{i=1}^{p} \phi_i y_{t-i} \epsilon_t \]

where

\[ y_t = (y_{1t}, y_{2t}, \ldots, y_{mt}) \]

Where \( y_t \) vector comprising of n predictor variables (Du, Yanan and Wei [6]2010). The second part of \( y_{t-i} \) is the corresponding lag terms of order \( I \) and phi are the matrix made of autoregressive terms.

The chosen model comprises of four key endogenous variables that include real GDP, inflation, short-term interest rates, and oil price for the United States and Japan. Essen-
tially, GDP and oil prices are the two key variables of interest. However, the other two variables are used for control purposes. The control variables help to detect indirect effects to GDP and oil prices that may be affected by monetary policies like increase in interest rates that correspond with inflation (Du, Yanan and Wei [6]2010). Annual time series data is used running from 1990 to Q4 of 2017.
Chapter 4

Results and Findings

The current section discusses the empirical results after analyzing the data using the proposed model. Two key tests are performed to determine the relationship between oil prices and GDP growth in the context of China and the United States. Granger Causality Test and Impulse-response functions are utilized to detect the relationship. Further, to ensure that the time-series data is stationary to allow performance of statistic tests on it, the data is subjected to unit root test to pinpoint whether it is stationary or not.

4.1 Unit Root Test

In time series data like the one used in the current paper, a key assumption is that the series is stationary. Such an assumption is essential to ensure the data is qualified for statistical testing hence easy to make predictions (Du, Yanan and Wei [6] 2010). Therefore, if data is stationary, it means that it will possess future characteristics similar to those of the past.

To this end, the current data was subjected to stationary testing by means of unit root test depicted in Table 4.1. The null hypothesis in a while undertaking the test is that the
series possesses no unit root hence shows a systematic pattern that is predictable over time. The substitute premise is that the series is stationary. Specifically, Augmented Dickey-Fuller (ADF) test is used to test the presence of a unit root. However, since the method tends to have high type 1 error, Phillips-Perron (PP) test is also used to address the weaknesses of ADF test.

Table 4.1 shows ADF test results showing that all other series are non-stationary hence not suitable for statistical analysis. As such, the first log difference of the variables is taken to add more accuracy to the testing and determine whether the series are stationary. As Table 1 depicts, the null hypothesis about the presence of a unit root on the series is rejected at levels below 1% for all variables when the first log difference is taken to account. To this end, the current analysis makes use of the first log difference for all the variables since none of them is stationary at the level form.
<table>
<thead>
<tr>
<th>Variables</th>
<th>In Level</th>
<th>In first Log Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF Test</td>
<td>PP Test</td>
</tr>
<tr>
<td>GPD</td>
<td>-2.89</td>
<td>-2.95</td>
</tr>
<tr>
<td>Inflation</td>
<td>-3.75</td>
<td>-3.4</td>
</tr>
<tr>
<td>Interest rate</td>
<td>-1.9</td>
<td>-1.6</td>
</tr>
<tr>
<td>Oil Price</td>
<td>-1.24</td>
<td>-1.24</td>
</tr>
</tbody>
</table>

Table 4.1: ADF Test result

*** shows that the series is stationary at below 1% levels

Sources: (Data from world bank)

4.2 Granger Causality Test

In a move meant to deviate from the usual regression analysis, the current paper makes use of granger causality test to determine whether GDP and oil price has an impact on each other. The analysis approach proposes by Clive Granger observes that while regression analysis merely points to correlations between variables (Du, Yanan and Wei [6]2010; Maeda [15]2008). Granger causality approach helps economists to forecast future values of a time series through leveraging its past values. According to the Granger Causality test, a time series Y is said to Granger-cause x if it is possible to show they Y values provide information that is statistically significant to predict the future values of Y. The current test makes use of t-tests and F-test on the lagged values of Y together with Lagged values of X to show whether either of the chosen variables Granger-cause each other for China and US data.
Table 4.2 shows the relationship between the variables in the model subject to Granger-Causality Test. The null hypothesis should be rejected when significance levels are below 0.05 (Saunders, Lewis and Thornhill [17]2012). For the case of United States, interest rates and GDP cannot predict changes amongst themselves or changes in other variables hence the hypothesis is accepted. As such, GDP changes cannot explain the changes in the oil price, inflation, and interest rates. Two variables Granger-causes GDP. First, inflation Granger-causes GDP at 0.0013 level that is a very high level of significance showing that on the positive edge, rising GPD causes are a rise in inflation. Secondly, the analysis shows that oil price Granger-causes GDP at a very high significance level of 0.0007 showing that oil price changes have a profound effect on the GDP of the United States. Therefore, the alternative hypothesis that oil price changes result in changes in GDP of the US is adopted affirming previous researchers that reduction in oil price will lead to increase in GDP.
Table 4.2: Causality Test for the USA

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>DINFLATION does not Granger Cause DGDP</td>
<td>23</td>
<td>9.9059</td>
<td>0.0013</td>
</tr>
<tr>
<td>DGDP does not Granger Cause DINFLATION</td>
<td></td>
<td>1.2252</td>
<td>0.3170</td>
</tr>
<tr>
<td>DINTEREST does not Granger Cause DGDP</td>
<td>23</td>
<td>2.1302</td>
<td>0.1478</td>
</tr>
<tr>
<td>DGDP does not Granger Cause DINTEREST</td>
<td></td>
<td>1.4563</td>
<td>0.2593</td>
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<tr>
<td>DOILPRICE does not Granger Cause DGDP</td>
<td>23</td>
<td>11.0595</td>
<td>0.0007</td>
</tr>
<tr>
<td>DGDP does not Granger Cause DOILPRICE</td>
<td></td>
<td>0.29946</td>
<td>0.7447</td>
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<tr>
<td>DINTEREST does not Granger Cause</td>
<td></td>
<td>2.30378</td>
<td>0.1286</td>
</tr>
<tr>
<td>DINFLATION does not Granger Cause DINTEREST</td>
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<td>0.319</td>
<td>0.7309</td>
</tr>
<tr>
<td>DOILPRICE does not Granger Cause</td>
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<td>DINTEREST does not Granger Cause DOILPRICE</td>
<td></td>
<td>0.80883</td>
<td>0.4609</td>
</tr>
</tbody>
</table>

All variables are in their first difference

Sources: (Data from world bank)
Table 4.3 shows the causality analysis for the case of China. The causality test shows that for China, inflation cannot explain changes in the country’s GDP. Similar to the United States, GDP Granger-causes inflation with a high significant level of 0.0108. Similarly, the country’s inflation rate can explain changes in the country’s interest rate. Surprisingly, the country’s oil price Granger causes interest rates in the country. Such results align with those of Ghalayini [9](2011) who argued that while it was true that oil price causes changes in GDP or its indicators in a country, their patterns were different for different countries.
### Table 4.3: Granger Causality Rest For China

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>Statistic</th>
<th>Prob</th>
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</thead>
<tbody>
<tr>
<td>DINFATION does not Granger Cause DGDP</td>
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<td>0.5310</td>
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<td>0.6277</td>
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<td>0.0059</td>
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<td>DOILPRICE does not Granger Cause DGDP</td>
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<td>0.799</td>
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<td>DGDP does not Granger Cause DOILPRICE</td>
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<td>0.0481</td>
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<tr>
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<td>0.8757</td>
</tr>
</tbody>
</table>

All variables are in their first difference form

Sources: (Data from world bank)
Figure 4.1 shows the response of endogenous variable against oil price shocks in the short run for the United States. The graphs show an initial rise in oil prices results in negative GDP growth as depicted by the blue line. However, the effect eventually neutralizes after a long period with the GDP growth leveling off despite decrease or rise in the oil price. Inflation traces a similar trend. However, interest rate shows no relationship with changes in the prices of oil either in the long or short term.

Sources: (Data from world bank)
Regarding China, the findings are quite different with GDP showing a small change in the negative direction initially before rising marginally as oil price rises and dropping marginally as the oil prices decline. The findings are in consistency with Du, Yanan and Wei [6](2010) who found out that increase in oil prices was surprisingly increasing the economic growth rate of the Chinese economy. Contrary to GDP, Chinese inflation rose as oil prices rise and declining as oil prices decline as showing in figure 4.2 showing that being a net importer of oil, the rise in prices of the commodity in the international market made the price of goods rise in the country.
Chapter 5

Conclusion and Discussion

Trading in oil has great ramifications for China and U.S. that are the world’s two economic powerhouses. Such is the case due to the increased dependence of the two countries on imported oil to meet their domestic energy demands. The current paper sought to investigate the effect of oil trade measured by changes in the price of oil on the economy of US and that of China. Leveraging the VAR model proposed by Du, Yanan and Wei [6](2010), the analysis undertook Granger causality and impulse response functions to estimate the effect of oil price to the economy of the two countries. The tests show that both US and Chinese economic growth and other key macroeconomic factors fail to impact on the prices of oil on the international market showing that the two countries have less power in garnering any sizeable control. However, GDP and inflation rates for the two countries emerge to be positively correlated with the oil prices according to impulse response analysis plots. Therefore, the paper affirms the existing literature disposition that oil price in the international market has a huge impact on the macroeconomic factors of leading world economies of China and U.S.A.
Bibliography


Data References

GDP Data:

Inflation Data:

Interest Rate Data

Oil Price Data: