Oil prices dynamic effect on the economy

Effat University
Oil Prices Dynamic Effect on the Economy
An Impulse Response Functions Analysis of Oil Price Effect On Key Elements of the Saudi Economy

A Thesis Submitted in Partial Fulfillment of the Requirements for the Master Degree in Islamic Finance Management

by

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22/07/1436 H. / 11/05/2015 AD.

Declaration

This work is original and has not been previously submitted in support of any degree qualifications or course.

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This thesis, written by Samar Abbaq under the direction of her thesis supervisor and approved by her thesis committee, has been presented to and accepted by the Dean of Graduate Studies and Research on Oil Prices Dynamic Effect on the Economy, An Impulse Response Functions Analysis of Oil Price Effect on Key Elements of the Saudi Economy, in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Management of Islamic Finance

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ABSTRACT

Oil is one of the most important factors that affects the economy of Saudi Arabia heavily, as oil forms a major share towards economic growth. Past studies showed that oil prices can affect the economic growth especially in oil exporting countries like Saudi Arabia.

This study aims to investigate the dynamic effect of oil price variations on Saudi Stock Market Index, Economic Growth, Real Exchange Rate, and Inflation. The study uses monthly data starting from January 1994 to September 2014 to see the impact of oil price on relevant variables. The Granger Causality test, Variance Decompositions analysis, and Impulse Response Functions are used for the analysis.

Our findings show that the causality moves from oil prices to the variables of interest. Furthermore, Oil price fluctuations have a positive impact on the variables of interest. The variables had a positive response to oil price shock.

This study improves the understanding of the interaction between oil prices and key variables of the Saudi Arabia economy. It extends the literature by involving an updated period and applying new model application. It provides more clarification to financial regulators and policy makers in formulating economic and financial policies.

PREFACE

Past studies show that oil prices have a long term relation to the growth of the economy. This paper's goal is to investigate the dynamic effect of oil prices on key variables of the economy of Saudi Arabia. As Saudi Arabia is a major oil exporter, the price fluctuations dynamic effects ought to be investigated to know what to expect in the future events.

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CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND

Oil is one of the most important factors that affect the economy of Saudi Arabia. Previous studies showed that oil prices can affect the growth of the economy, especially in oil exporting countries like Saudi Arabia. As oil represents approximately 90% of the exports, and almost 75% of government revenues (International Business Publications, 2008), and with the recent prices decline, the study of the dynamic effect of oil prices volatility is of great importance.

The global economic performance remains highly correlated with oil prices. Oil prices increase leads to a transfer of wealth from importing to exporting countries through a shift in the terms of trade. The magnitude of the direct effect of a given price increase depends on the share of the cost of oil in national income, the degree of dependence on imported oil and the ability of the end-user to reduce their consumption and switch away from oil (International Energy Agency, 2006).

This study aims to investigate the dynamic effect of oil price variations and Saudi Stock Market Index, Economic Growth, Exchange Rate, and Inflation. The study uses monthly data starting from January 1994 to September 2014. The Granger Causality test, Variance Decompositions (VDCs), and Impulse Response Functions (IRFs) analysis.

Augmented Dickey–Fuller “ADF”, Phillip Perron “PP” tests are unit root tests to assess if the data has unit root. Then, the Granger Causality test is to evaluate the direction of causality. The VDC is to test the variance of the time series data. The Impulse Response Function analysis (IRF) is used to give us a figure of the force for several periods in the future. The predictable impulse response allows investigation into how the variables respond to innovations from other variables in the system. Our findings show that the oil prices have a dynamic effect on the variables of interest. The causality moves from oil prices to the variables of interest, and oil price fluctuations has a positive impact on the variables of interest in the Saudi economy.

1.2. SAUDI ARABIA ECONOMY OVERVIEW

Saudi Arabia is a large country with an area of: 2,149,690 KM, The economy is highly dependent on oil. It has the largest oil reserve in the world at 25.6%. It occupies the top place in the oil exporting countries.

Saudi Arabia action comes from its primary role in the Organization of Petroleum Exporting Countries OPEC. The oil revenues represent 90% of the total returns of the economy and the sectors of oil and gas for about 25% of the kingdom's revenues and 45% of the gross domestic product.

“The economy of Saudi Arabia in the twentieth century developed into a modern economy led by the petroleum sector and petrochemical industry .The agriculture, trade and banking sector are booming strongly and steadily. The law of foreign investment in Saudi Arabia is considered to be the most prominent event regarding the economic affairs in the kingdom, as well as the establishment of the General Authority of Investment.

The significant points of the system of foreign capital and other regulations related to the encouragement of the foreign investments are:

1. Reduction of taxes imposed on foreign investors and adoption of principle of carrying over the loss to the next years without specifying a certain period.
2. The foreign investors have the opportunity to get loans from the industrial development fund.
3. The ownership of the investment activity is allowed, including necessary property to engage in the activity; as well as there is no expropriation of the project, except for public purposes provided that there will be a fair compensation.
4. The period for obtaining a license for investment is restricted to be one month only.
5. The information on investment in Saudi Arabia is available and transparent.
6. The investor has the right to sponsor himself and his employees on his private firm and he will receive national treatment.
7. The law includes regulations for resolution of disputes and ensures the right of intellectual property.

According to the report of facilities of practicing business issued by the international bank, Saudi Arabia occupied the thirteenth rank in 2009 during the last fifth years where it occupied the 67 ranks in 2005 among 181 countries. Foreign investment amounted to 552 billion dollars at the end of 2009 and the total increase of foreign and joint investments amounted 1,126 billion dollars rising from 279 billion dollars in 2005" (Economy of Saudi Arabia,2015)

Saudi Arabia exports are many, and the most important of them are: oil, products of plastics, petrochemicals, minerals, paper and their products. Some of the important imported goods are: machineries, equipment, electrical equipment, food items, textiles, wood and wood products.

1.3. PROBLEM STATEMENT

Oil price increase leads to a transfer of wealth from importing to exporting countries through a shift in the terms of trade. Saudi Arabia is a major oil exporting country that is affected by the oil price variation. Furthermore, the global economic performance remains highly correlated with oil prices.

The price of oil per barrel has risen from $27.29 in January 2001 to $97.24 in March 2013 with a maximum of $113.39 on 29 April 2011. On the other hand, the prices began to drop from $97.5 January 2014 and reached 91.17 on September 2014. The un-expected decline in the price in the year 2014, forced the oil exporting countries to review their budget and adjust it according to the new price. Exploring the effect(s) of the price variation is of great importance in Saudi Arabia since the country major income is generated from exporting oil.

This study's aim is to investigate the dynamic effect of oil prices fluctuation on key variables of the economy of Saudi Arabia. This investigation is analyzed by including the recent drop period in the international prices. The time series collected for this study include the Industrial production, Stock market index, Real exchange rate, and Inflation. The investigation is conducted on monthly time series data starting from January 1994 to September 2014.

1.4. RESEARCH OBJECTIVES

This study expands our understanding of the oil prices dynamic effect and relation causality with specific key variables of the economy of Saudi Arabia. There have been many studies investigating the long term relation of oil prices with stock market Index, and with the economy growth.

The objective of the study is to analyze the following:

1. Oil prices impact on economy growth. As well as, the causality between them.
2. Oil prices impact on stock market index. As well as, the causality between them.
3. Oil prices impact on inflation. As well as, the causality between them.
4. Oil prices impact on exchange rate. As well as, the causality between them.

1.5. RESEARCH QUESTIONS

Subsequent to the research aim and objectives, the research main questions to be investigated are as follows:

1. Does oil price cause economy growth.
2. Does oil price cause stock market index.
3. Does oil price cause inflation.
4. Does oil price cause real exchange rate.
5. Does the variation of oil price affect economy growth?
6. Does the variation of oil price affect stock market index?
7. Does the variation of oil price affect inflation?
8. Does the variation of oil price affect exchange rate?

1.6. HYPOTHESIS

This research is conducted in the light of the following hypothesizes:

1. Oil price causes economy growth.
2. Oil price cause stock market index.
3. Oil price causes inflation.
4. Oil price cause real exchange rate.
5. An increase in oil prices affects economy growth positively.
6. An increase in oil prices affect stock market index positively.
7. An increase in oil prices affects inflation positively.
8. An increase in oil prices affect exchange rate positively.

1.7. RESEARCH SIGNIFICANCE

The majority of the past studies on Saudi Arabia conducted regarding oil prices were focusing on estimating the long or short relationship with economic growth, using quarterly time series of gross domestic "GDP" to measure the growth of the economy

This study attempts to fill the gap by examining oil prices dynamic effect on several variables of Saudi Arabian economy and that would be of great interest to the industrial sectors or individual analysts.

This paper improves the understanding of the interaction between oil prices and the economy in Saudi Arabia. It investigates the dynamic effect of oil prices on key economic variables of Saudi Arabia economy as well as its causality.

1.8. LIMITATIONS & DIFFICULTIES

The time series data regarding Saudi Arabia are hard to reach. First, the official data recording did not start until recent years. Second, there are no available resources to search for the data. Third, there are some variables that are not available or do not apply to? Therefore, the time series data employed in the research does not have a long period span.

Investigating Saudi Arabia as major oil exporting country is different than investigating another oil importing country. Thus, the nature of the country under study should be taken into consideration. The time limit is the biggest limitations that arise for this paper, as the final research must be submitted in an approximately 4 month's duration.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

Since its discovery, oil has had major attention from researchers due to its high income and effect on the economy. Below are some studies relevant to the topic according to the study geographical area of investigation. The studies are organized in this structure because investigating Saudi Arabia as major oil exporting country is different than investigating another oil importing country. Thus, the nature of the country under study should be taken into consideration.

2.2. INTERNATIONAL BASED STUDIES

Brian DePratto, Carlos de Resende, and Philipp Maier studied the effect of oil prices on macro-economy in Canada and United Kingdom using New Keynesian general-equilibrium open economy model on quarterly data from 1971Q1 to 2008Q1 of interest rate, inflation, output gap, and exchange rate. and found that by studying the supply side, energy prices have high effects on the economy and there was no considerable effect from the demand side. There was temporary negative effect of high prices on growth and on the output gap of the economy leading to continues reduction in the level of actual output. (Brian DePratto, 2009)

Another paper investigated the association between industrial production and Oil price in some of the OECD countries using monthly data from 1997:1 to 2008:12 of the oil price and the industrial production and applying the Vector Auto Regression (VAR) framework.

The investigation resulted in proving that there is statistical short term causality from crude oil prices to industrial production in all the sampled countries except France. In France, they found that the causality is from industrial production to crude oil prices in the short term. In the United State, they found that the causality is from oil price to industrial production in the long term. (Ibrahim Halil EKSI, 2011).

The study of the impact of the oil sector on commodity prices in terms of correlation and /or causation in the U.S used monthly time-series data, collected from 1996:01 to 2008:12 for the following variables: ethanol prices, crude oil prices, corn prices, soybean prices, and wheat prices. Employing the VAR and the VECM models. The finding shows that in spite of the strong correlation between oil and commodity prices, the data proofed that the relation between oil and commodity prices is mixed meaning that it is positive in some period and negative in the other period. (Saghaian, 2010)

The macroeconomic effects of oil price shocks on the U.S. by Olivier J. Blanchard *and* Jordi Gal, they studies the effect of oil price on GDP, and inflation using yearly data starting from 1960 to 2005. they study conducted via the VAR model concluded that the increase in the oil prices is due to several aspects among them are the labor market, the monetary policy.

Jose Vill and Frederick Joutz studied the relation between Crude Oil and Natural Gas Prices in U.S. using monthly data from 1989 to 2005. The variables are: natural gas and oil prices. They found that oil prices increase may conflict in its effects on natural gas supply, and therefore, prices. Production of natural gas may increase as a co-product of oil, or may decrease as a result of higher-cost productive resources. (A & L., 2006).

The relationship between oil prices and long term interest rate in the U.S. examined by Christopher P. Reicher (2010). Where he found a strong relation between oil prices and long-run nominal interest rates which conclude that oil prices forecasts a strong relationship, if inflation and oil prices were driven by monetary policy.

The paper titled: "The relationship between oil prices and long-term interest rates" studied the relationship between Oil, exchange rates and commodity prices in the U.S they used monthly data from 1955:1 to 2009:3 for the following variables: oil price, corn price, cotton price, soybeans price, and wheat price. Employing the VAR and the ECM models. They found that the commodity prices are linked to oil for the corn, cotton, and soybeans, except for wheat. (Ardian, 2009)

The asymmetric effects of oil shocks on an oil exporting economy in Venezuela were examined by Omar Mendoza, and David Vera using the GARCH model for the period starting from 1984:1to 2008:3. the variables used are oil price shock, and GDP. The study shows that the oil prices unforeseen increases had high effects on the economy's output than the unforeseen decreases. The results are in accordance with the historical findings. In Addition, there are asymmetric effects on output growth in oil exporter country.

The paper titled “The Weak Tie between Oil and Natural Gas” studied the relation between Natural Gas and Oil Prices in U.S. using VAR and VECM model on several measures of Crude oil prices, and natural gas prices. The study shows that there is high volatility in natural gas prices in the short term. Therefore, any relationship between the prices will leave a large portion of the natural gas price unexplained. The co integrating relationship is not constant. (J. & John, 2012)

(Michael) 2004, Investigated the following question: do high oil prices influence inflation in the G5 countries using Benchmark Model and Hamilton Net Price Model using quarterly data from1980 to through 2001. The variables used are: interest rates, inflation, unemployment rate, and oil price. He found that the monetary policy did not support the change in the inflation and that oil prices are expected to have a low effect on inflation.

Shigeki Ono studied the oil prices shocks impact on stock market of Brazil, China, India and Russia using the VAR model using the following variables: oil price, and stock market returns. and found that the real stock returns positively related to some of the oil price indicators “with statistical significance for China, India and Russia, those of Brazil do not show any significant responses. In addition, statistically significant asymmetric effects of oil price increases and decreases are observed in India. The analysis of variance decomposition shows that the contribution of oil price shocks to volatility in real stock returns is relatively large and statistically significant for China and Russia.” (Ono, 2011)

2.3. GCC BASED STUDIES

The paper titled :' Further evidence on the Responses of Stock Prices in GCC Countries to Oil Price Shocks" provided evidence on the responses of stock prices in GCC countries to oil price shocks using VECM model using the following variables: oil price, and stock market. The period of the study starts from June 2005 to October 2008. The result shows that there is a link between stock market prices and oil prices in the GCC countries. A sector analysis of this link would be informative. Second, evidence from international equity markets should be obtained to examine the robustness of the findings. Third, the methodology applied in this article could be used to examine the effects of other energy products such as gas and other petroleum-related products.

In addition, the dynamic co-movements between oil prices and stock market returns in the GCC countries were investigated by Zainab Alhayki using monthly data from May 2005 to December 2011 of oil price, and stock market returns. The study employs the wavelet analysis model. He concluded that there is a low correlation in the short term and high correlation in the long term. Signifying that oil has a high effect on stock returns the longer the period is. Furthermore, with the exception of Bahrain's stock market returns, a cause and effect relation exists between oil and all other GCC stock market returns. (Alhayki, 2014)

In Addition, another study by Sauh studied the dynamic relationships between oil price shocks and Indian stock market. The study used daily data for the period starting from January 2001 to March 2013. The variables used are: oil prices, and stock market index. In this study, Johansen's co-integration test, vector error correction model (VECM), Granger causality test, impulse response functions (IRFs) and variance decompositions (VDCs) have been applied to exhibit the long-run and short-run relationship between them. The co-integration result indicates the existence of long-term relationship. Further, the error correction term of a VECM shows a long-run causality moves from Indian stock market to oil price. (Sahu, 2013)

The paper titled: “A Variance Decomposition for Stock Returns” shows that unexpected stock returns must be associated with changes in expected future dividends or expected future returns. A vector autoregressive method is used to break unexpected stock returns into these two components. In the United States monthly data in from 1927 to 1988, one-third of the variance of unexpected returns is attributed to the variance of changing expected dividends, one-third to the variance of changing expected returns, and one-third to the covariance of the two components. Changing expected returns have a large effect on stock prices because they are persistent: a 1% innovation in the expected return is associated with a 4 or 5% capital loss. Changes in expected returns are negatively correlated with changes in expected dividends, increasing the stock market reaction to dividend news. During the period 1952-88, changing expected returns account for a larger fraction of stock return variation than they do in the period 1927-51. (Campbell, 1990)

The paper titled: “Return and Volatility Transmission between World Oil Prices and Stock Markets of the GCC Countries” studied the volatility transmission between the oil prices and the stock markets of the GCC countries, using the VAR-GARCH Approach using daily data from 2005 to 2010. The finding shows that there are “substantial return and volatility spillovers between world oil prices and GCC stock markets” (Arouri, 2011)

2.4. SAUDI ARABIA BASED STUDIES

The recent research conducted by Samontaray on Saudi Arabia investigated the effect of the Macroeconomic variables on the returns of the stock market using monthly data from December 2003 to December 2013. By applying the regression analysis and ANOVA, they concluded that "the variables are found to be highly correlated with TASI at the 1% level of significance, whereas Oil WTI and TASI are significantly correlated at the 5 % level. Step-wise regression analysis of the data revealed that the multiple regression models are significant at the 1% level and the variable PE ratio was the most important determinant of TASI followed by Oil WTI and Saudi Exports. Further, the three independent variables explained about 93% of variation in the TASI Last Price." (Samontaray, 2014).

Another study by Kalyanaraman studied the subsistence of the long term link between oil prices and the stock market prices using monthly data from October 2008 to October 2013. The Johansen test and Gregory-Hansen test and the error correction model were exercised in this analysis. The variables used in the study are: oil price, and stock market price. The result "confirms the presence of long-run and short-run association between oil prices and stock prices. The study offers important inputs for decision-making for investors and policy makers in Saudi Arabia." (Kalyanaraman1, 2014)

The study titled: "A Vector Autoregressive Model of The Saudi Arabian Economy" investigated the effect of the Saudi policies and world inflation on the growth. The study results imply that the Saudi economy is influenced by the oil policies and by world inflation. (Rosser, 1995)

Sayed Basher and Perry Sadorsky analyzed the stock markets and energy prices by studying the impact of oil price changes on stock market returns. The paper uses an international multi-factor model. This study results shows strong evidence that oil price risk impacts stock price returns in emerging markets. Results for other risk factors like market risk, total risk, skewness, and kurtosis are also presented. These results are useful for individual and institutional investors, managers and policy makers. (Basher&Sadorsky, 2006)

The paper published by the European Central Bank titled: "Crude Oil Price Fluctuations and Saudi Arabia's Behavior" states that: "this study attempts to explain why crude oil prices fluctuate, the main cause being the quota regime, which characterizes the OPEC agreements. Given that the Saudi oil supply is inelastic in the short term, a shock in the oil market is accommodated by an immediate price change. By contrast, a dominant firm behavior in the long term causes an output change, which is accompanied by a smaller price change. This explains why oil prices overshoot. The results of a general equilibrium model applied to Saudi Arabia support this analysis. They also indicate that Saudi Arabia does not have any incentive for altering the crude oil market equilibrium with either positive or negative supply shocks, as its welfare declines; and that it has an incentive (disincentive) for intervening if a negative (positive) demand shock hits the crude oil market.

A second set of simulations is designed to understand what kind of OECD policy might help to bring down prices. A tax cut would worsen the situation, whereas policies that can increase the price elasticity of demand seem to be very effective." (European Central Bank, 2003)

2.5. CONCLUSION

The literature review chapter demonstrates the related past studies. This chapter is important to acquire the required understanding of the theoretical background of the topic and the needed empirical analysis.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter demonstrates the methodology used in the analysis used to perform the investigation, including the Impulse response function (IRF) and the Variance Decomposition (VDCs) analysis. The variable selection se that display the variable theoretical background. The data display the time series data gathered to conduct the research.

3.2. MODEL

This study examines the dynamic effect of oil prices and the above mentioned economic variables of Saudi Arabia. It employs the Impulse Response Function Model analysis (IRFs) demonstrate how the variables respond to innovation in the oil price variable. The Augmented Dickey–Fuller "ADF" test and the Philip Peron "PP" test are used to assess if the data is stationary. Then, the Granger Causality test is to evaluate the direction of causality and the VDC is to test the variance of the time series data.

3.2.1. IMPULSE RESPONSE FUNCTION

This paper investigates the dynamic effect of oil prices on the key variables of the Saudi economy. For that purpose, the Impulse Response Functions of Structured Vector Auto Regressive Model is used.

The VAR model is used when there is no certainty on which of the variables are considered as explanatory variables and which are considered explained variables. Each variable will have the same regressors. “Taking for example: A p-th order vector autoregressive, or VAR (p), with exogenous variables x can be written as:

$$y_t = v + A_1 \; y_{t-1} + \ldots\ldots\ldots\ldots. + A_p \; y_{t-p} + B_0 x_t + B_1 B_{t-1} + \cdots \ldots\ldots\ldots + B_s x_{t-s} + U_t$$

Where y_t a vector of K variables, each is modeled as function of p lags of those variables and, optionally, a set of exogenous variables xt. We assume that E (U_t) = 0, E ($U_t \; U_{0t}$) = Σ and E ($U_t \; U_{0s}$) = 0 $\forall_t$6=s” (Baum, 2013)

As this model is very suitable for our analysis, its advantages and disadvantages should be considered. Some of the advantages include that it is not a complicated model, its estimation is straightforward, it’s obtained forecasts are better than the ones obtained from more complex simultaneous VAR models. Moreover, some of the disadvantages include that it does not rely on economic theory. Estimating a large number of parameters, without a sufficient number of observations can cause the loss of degrees of freedom.

The general formula of the vector auto regressive model for two variables:

$$y_t = \beta_{10} - \beta_{12} x_t + y_{11} y_{t-1} + y_{12} x_{t-1} + \varepsilon_{yt} (1)$$

$$x_t = \beta_{20} - \beta_{21} y_t + y_{21} y_{t-1} + y_{22} x_{t-1} + \varepsilon_{xt} (2)$$

Equation (1) and (2) represent a first order VAR model. In this VAR model Y is the first variable, X is the second variable, and E is the error term. The standard form of the VAR model is:

$$y_t = \alpha_{10} + \alpha_{11} y_{t-1} + a_{12} x_{t-1} + e_{1t} \text{ (3)}$$

$$x_t = \alpha_{20} + \alpha_{21} y_{t-1} + a_{22} x_{t-1} + e_{2t} \text{ (4)}$$

The oil price variable -in our analysis- is considered as the independent variable that affects the other variables under the study in this research. The oil prices dynamic effect is analyzed using the Impulse Response Functions to estimate the response of the dependent variables to chocks in the error term.

The Impulse Response Functions is suitable for our case of analysis, where we observe how one variable responds to a one standard deviation shock of another variable. A criticism of IRFs is: "they give the effect over time of a one-time unit increase to one of the shocks, holding all else constant." (Baum, 2013)

The VAR model must be applied to stationery data and for that we must apply the unit root test. The model for our analysis is written as follows:

$$\Delta CPI_t = C_{111} + C_{11}\Delta CPI_{t-1} + C_{11}\Delta CPI_{t-2} + C_{13}\Delta IND_{t-1} + C_{14}\Delta IND_{t-2} + C_{15}\Delta OIL_{t-1} + C_{16}\Delta OIL_{t-2} + C_{17}\Delta REEX_{t-1} + C_{18}\Delta REEX_{t-2} + C_{19}\Delta STK_{t-1} + C_{110}\Delta STK_{t-2} \text{ (5)}$$

$\Delta IND_t = C_{211} + C_{21}\Delta CPI_{t-1} + C_{22}\Delta CPI_{t-2} + C_{23}\Delta IND_{t-1} + C_{24}\Delta IND_{t-2} + C_{25}\Delta OIL_{t-1} + C_{26}\Delta OIL_{t-2} + C_{27}\Delta REEX_{t-1} + C_{28}\Delta REEX_{t-2} + C_{29}\Delta STK_{t-1} + C_{210}\Delta STK_{t-2}$ (6)

$\Delta REEX_t = C_{411} + C_{41}\Delta CPI_{t-1} + C_{42}\Delta CPI_{t-2} + C_{43}\Delta IND_{t-1} + C_{44}\Delta IND_{t-2} + C_{45}\Delta OIL_{t-1} + C_{46}\Delta OIL_{t-2} + C_{47}\Delta REEX_{t-1} + C_{48}\Delta REEX_{t-2} + C_{49}\Delta STK_{t-1} + C_{410}\Delta STK_{t-2}$(7)

$\Delta STK_t = C_{511} + C_{51}\Delta CPI_{t-1} + C_{52}\Delta CPI_{t-2} + C_{53}\Delta IND_{t-1} + C_{54}\Delta IND_{t-2} + C_{55}\Delta OIL_{t-1} + C_{56}\Delta OIL_{t-2} + C_{57}\Delta REEX_{t-1} + C_{58}\Delta REEX_{t-2} + C_{59}\Delta STK_{t-1} + C_{510}\Delta STK_{t-2}$ (8)

Referring to equations (5), (6), (7), and (8):

- OIL represents the oil price.
- CPI represents the consumer price index.
- IND represents the industrial production.
- REEX represent the real exchange rate.
- STK represent the stock market index.

3.2.2. UNIT ROOT TEST

Testing whether the time series data in hand are stationary or not is the first step to be taken into consideration because upon the result acquired different decisions should be made along with the test of non stationary that is unit roots which is very practical today. The non-stationary time series are integrated of order e.g. 3 if it is stationary or not after being differentiated 3 times. This notion is usually denoted by X~I (3). The time series are tested for the probable order of difference stationary.

The Augmented Dickey-Fuller (ADF) test is another test used to know whether the series are stationery or not. The (ADF) is a unit root test that evaluates the integration level of the data which is calculated with a constant and a constant plus a time trend. The null hypothesis of this test regarding the non-stationary data and the alternative of its opposite.

Hypothesis:

Null hypothesis: H_0 variable is not stationary or got unit root

Alternative hypothesis: H_1 variable is stationary

The ADF test equations are:

$$\Delta Y_t = \beta_1 + ZY_{t-1} + \alpha_i + e_t (9)$$

Equation (9) has an intercept only

$$\Delta Y_t = \beta_1 + \beta_{2t} + ZY_{t-1} + \alpha_i + e_t \ (10)$$

Equation (10) has a trend and an intercept

$$\Delta Y_t = ZY_{t-1} + \alpha_i + e_t \ (11)$$

Equation (12) has neither trend nor an intercept

3.2.3. GRANGER CAUSALITY TEST

The Granger causality test present information regarding the direction of the causality only and with IRF and VDC analysis the investigation is completed by giving us the response of the selected variables to the impulse in the other variables in the system.

For example, investigating the causality direction between the inflation rate and the interest rate using the granger causality test, the result will give us the direction of the causality only but not the magnitude of it. However, utilizing the Impulse Response Function (IRF) and the Variance Decompositions (VDC) analysis with the granger causality test will give us complete results. The results will demonstrate which variable changes cause the other variable to change and react positively or negatively.

3.2.4. VARIANCE DECOMPOSITION

The Variance Decompositions (VDCs) analysis must be applied on stationary data. Also, the lag selection must be known from the lowest Akaike Information Criterion (AIC) and Schwarz information criterion (SIC). “It measures the fraction of the forecast error variance of an endogenous variable that can be attributed to orthogonal zed shocks to itself or to another endogenous variable.” (Baum, 2013). This test determines the percentage of how much of the error variance of each variable can be explained by a shock to the other variable.

3.3. VARIABLES SELECTION

The oil price have an impact on the overall economy as many studies have examined the effect of it on the GDP and stock market returns by utilizing various models. This study included these two variables is to compare the results of this study with the results of the previous studies results that were obtained from different methodologies.

The oil prices increase is expected to have a positive effect on the industrial production of Saudi Arabia as an oil producing country and vice versa. According to Hamilton, oil price increases seem to be one of the main cause of recessions in U.S.A. prior to 1972 (Hamilton, 1983:228-248) using a VAR model.

The exchange rate is an essential element in any economy that enables the researchers to evaluate the price competitiveness of a country. At the same time, it is a key factor in determining the revenues derived from exports' as well as other activities.

The real exchange rate is difficult to forecast because of its high volatility (Meese and Rogoff, 1983; Obstfeld and Rogoff, 2000). The effective exchange rate is the nominal effective exchange rate, a measure of the value of a currency against a weighted average of several foreign currencies divided by a price deflator or index of coast.

Saudi Arabia currency is the Saudi Riyal. The Saudi Riyal is pegged to the U.S. Dollar meaning that the exchange rate is fixed at: 1 U.S. dollar = 3.75 riyals. That's why the real exchange rate is used instead of the exchange rate for this study.

There is a positive relationship between the oil prices and the inflation denoted by the consumer price index when it doubled in the U.S. from 41.20 to 86.30 in the period from 1972 to 1980 accompanying the oil price increase $3 before the 1973 oil crisis to around $40 during the 1979 oil crisis. The consumer price index reflects the change in prices for the average consumer of a constant basket of consumer goods.

3.4. DATA

For the empirical analysis mentioned earlier, this paper employs the monthly time series data starting from January 1994 to September 2014. All the time series data employed are gathered from World Development Indicator published by the World Bank. However, Oil Price data are extracted from the Energy Information Administration (EIA), and Market Index data, represented by the Tadawul All Share Indices in Saudi Arabia (TASI) is collected from Bloomberg.

3.5. CONCLUSION

The Research Methodology Chapter demonstrated the theory and the origin of the applied the Impulse Response Function (IRF), the Variance Decompositions (VDC) analysis, and the tests (ADF, PP, granger causality). This chapter is important to explore the process to be applied. E.g. Exploring the VAR model accomplished that it must be applied on stationary data, which is measured using ADF and PP.

CHAPTER FOUR

EMPIRICAL RESULTS

4.1. INTRODUCTION

This paper's purpose is to investigate the dynamic effect of oil prices on key variables of the economy of Saudi Arabia as well as the relation causality. Following Chapter Three, The Research Methodology, comes Chapter Four: Empirical Results, that displays each test and model resulted reports and figures, In addition to the interpretation and analysis of each of them.

4.2. UNIT ROOT TEST

The first test is the unit root test using the Augmented Dickey-Fuller (ADF) and Phillips Perron test. The null hypothesis is that the data has unit root. The guideline for it is that if the probability is higher than 5%, then we can’t reject the null hypothesis. If the probability is lower than 5%, then we reject the null hypothesis.

Table 1: The ADF test probability results for the data at level

	Consumer Price Index	Industrial production	Oil Prices	Real Exchange Rate	Stock Market
Constant	0.999	0.171	0.330	0.482	0.651
Constant and Linear trend	0.989	0.116	0.085	0.657	0.556
None	1.000	0.820	0.396	0.441	0.658

Table 2 : The PP test probability results for the data at level.

	Consumer Price Index	Industrial production	Oil Prices	Real Exchange Rate	Stock Market
Constant	0.9997	0.0001	0.3577	0.5308	0.6297
Constant and Linear trend	0.9825	0.0000	0.0974	0.8250	0.5227
None	1.0000	0.7683	0.4231	0.3588	0.6398

Referring to tables 1, and 2 we can observe that the probability of each variables at the constant, Constant and linear trend, and none are all higher than 0.05. according to the variables probability guideline of the ADF and the PP tests, all the variables null hypothesis that they have a unit root are rejected. Thus, all the variables are not stationary.

4.2.1 GRAPHICAL REPRESENTATION OF THE DATA AT THE LEVEL

The time series data are tested for the unit root test using the E-views program. In addition, the graphical representations of the each variable at the level demonstrate its trend which is further evidence that it is not stationary.

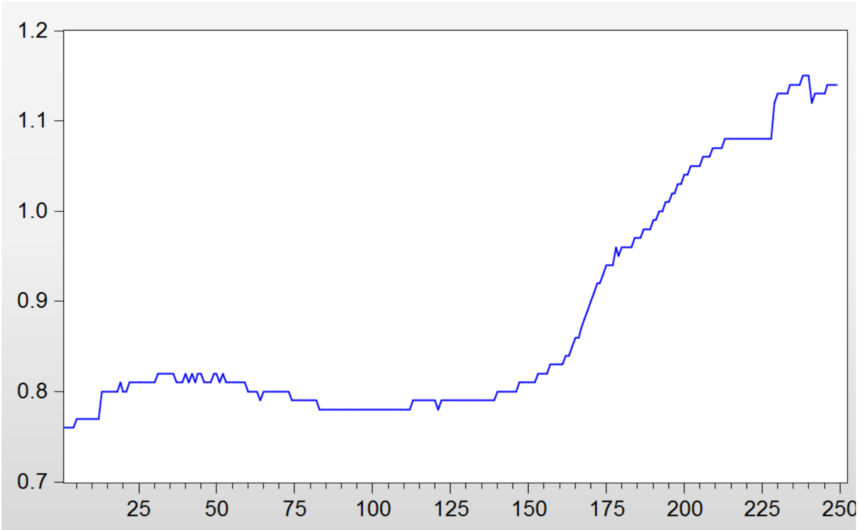

Figure 1: Consumer Price Index graphical representation at level

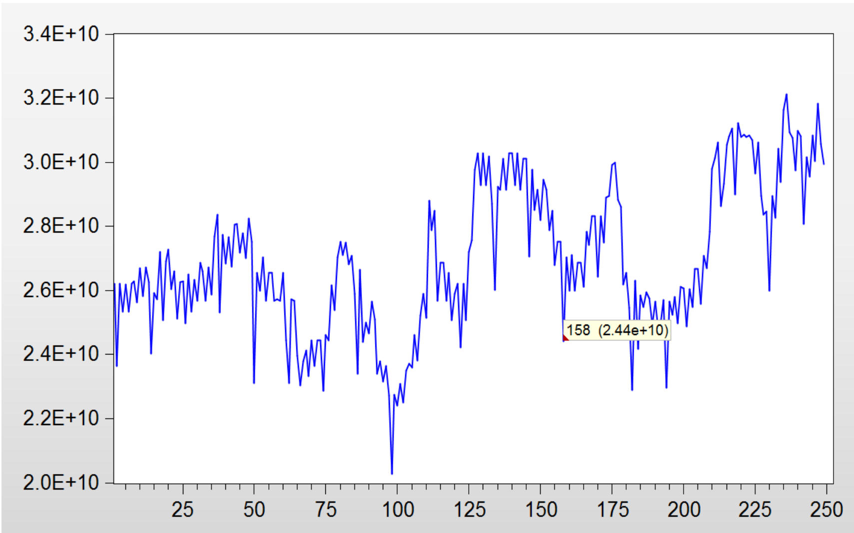

Figure 2: Industrial production graphical representation at level

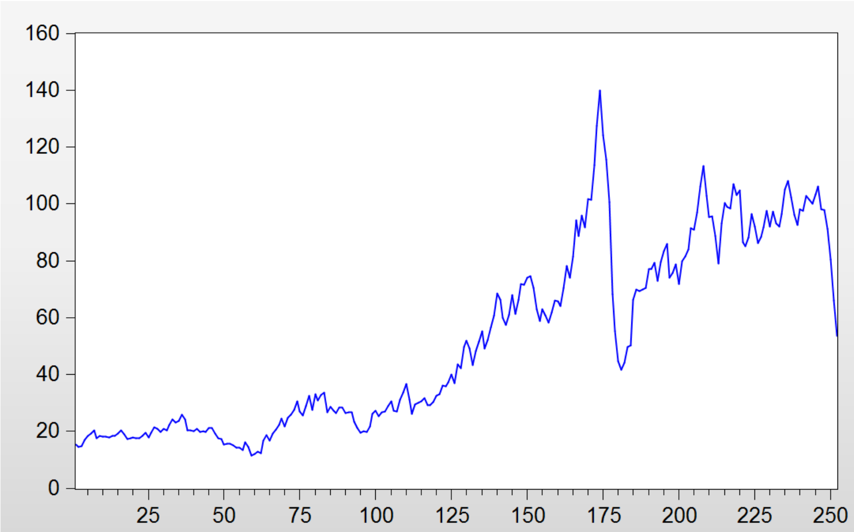

Figure 3: Oil Prices graphical representation at level

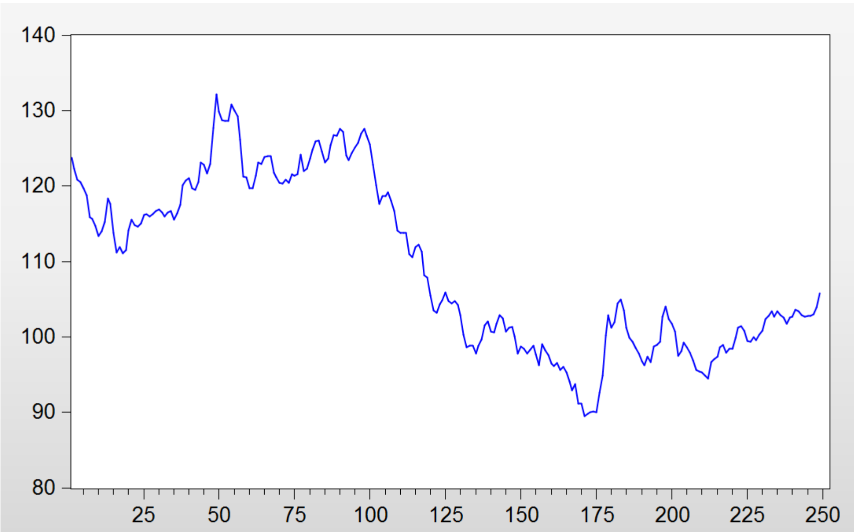

Figure 4: Real Exchange Rate graphical representation at level

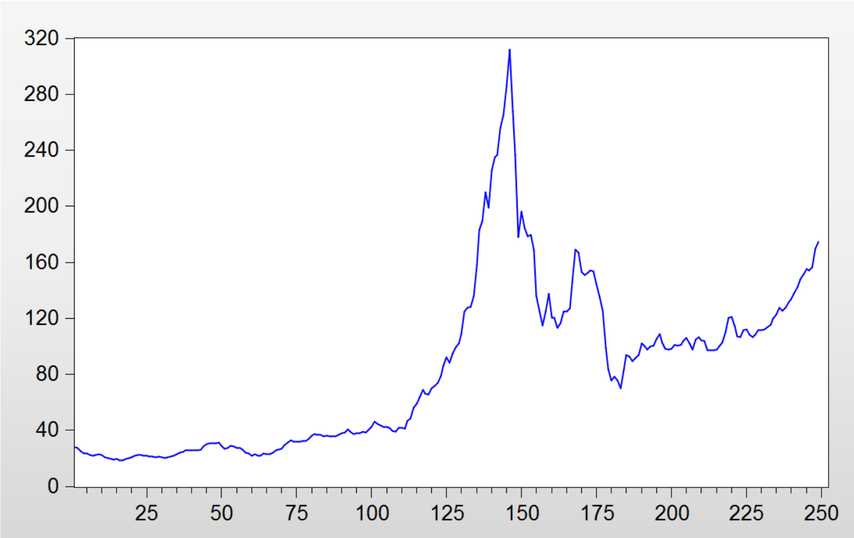

Figure 5: Stock Market graphical representation at level

After establishing that all the variables are not stationery at level, we proceed to test the data at the first difference:

Table 3 : The ADF Test probability results for the data at the first difference.

	Consumer Price Index	Industrial production	Oil Prices	Real Exchange Rate	Stock Market
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
Constant and Linear trend	0.0000	0.0002	0.0000	0.0000	0.0000
None	0.0000	0.0000	0.0000	0.0000	0.0000

Table 4: The PP Test probability results for the data at the first difference.

	Consumer Price Index	Industrial production	Oil Prices	Real Exchange Rate	Stock Market
Constant	0.0000	0.0000	0.0000	0.0000	0.0000
Constant and Linear trend	0.0000	0.0000	0.0000	0.0000	0.0000
None	0.0000	0.0000	0.0000	0.0000	0.0000

Referring to tables 3 and 4 we can observe that the probability of each variables at the constant, Constant and linear trend, and none are all lower than 0.05. according to the variables probability guideline of the ADF and the PP tests, all the variables null hypothesis that they have a unit root are accepted. Thus, all the variables are stationary.

4.2.2 GRAPHICAL REPRESENTATION OF THE DATA AT THE FIRST DIFFERENCE

The time series data are tested for the unit root test using the E-views program. In addition, the graphical representations of the each variable at the first difference demonstrate that its stationery which is further evidence that it is stationary.

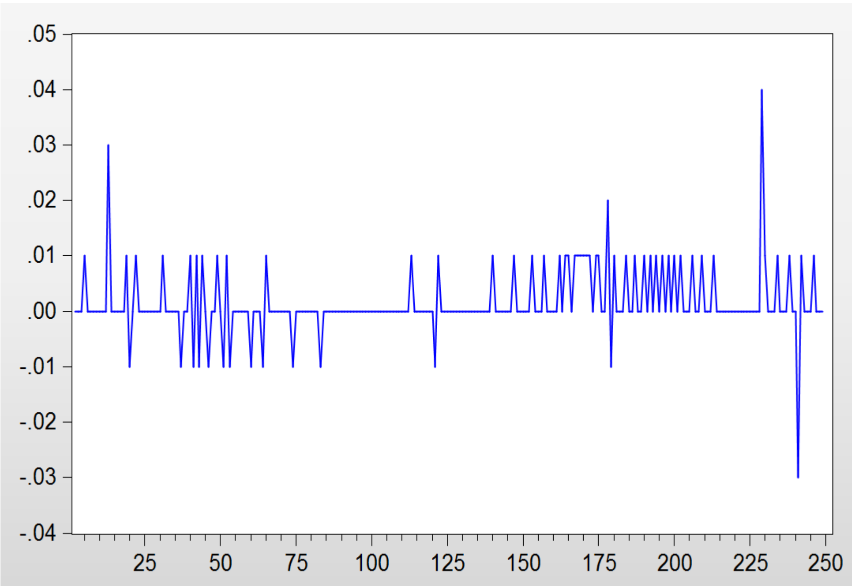

Figure 6: Consumer Price Index graphical representation at first difference

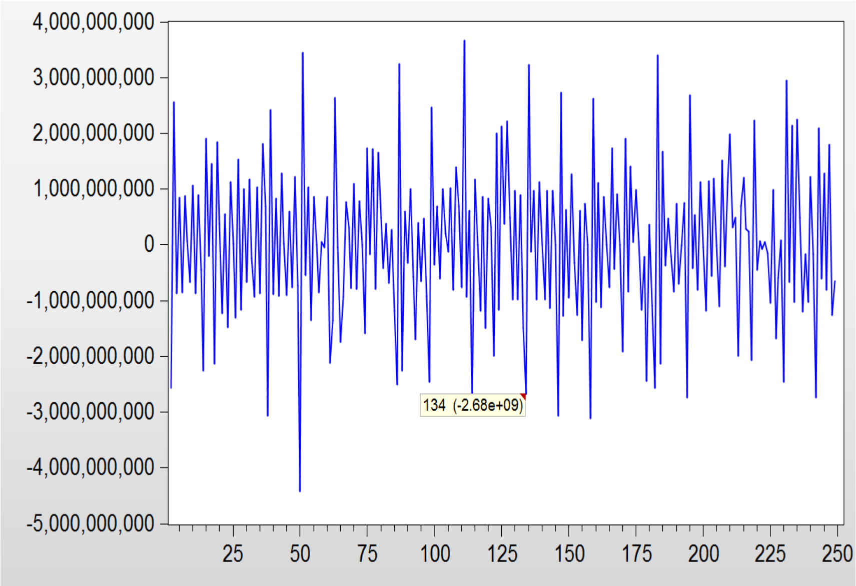

Figure 7: Industrial Production graphical representation at first difference

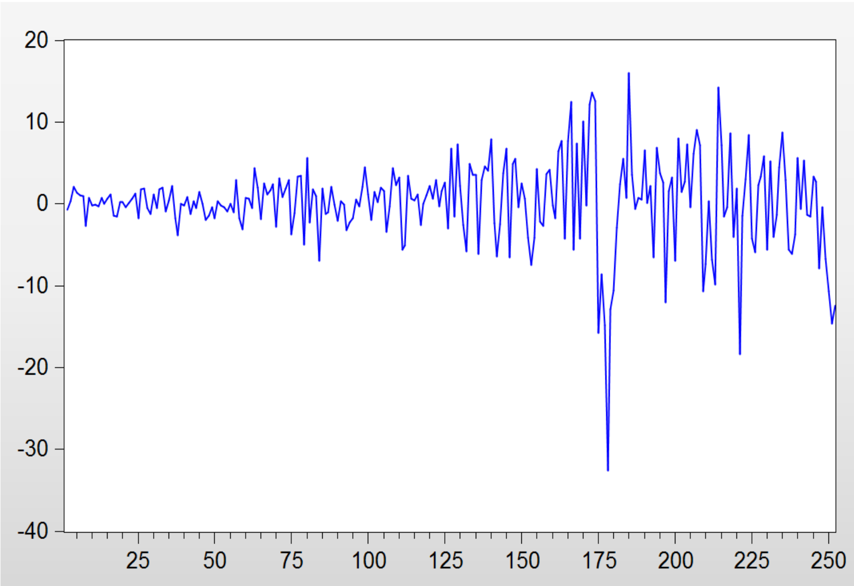

Figure 8: Oil Prices graphical representation at first difference

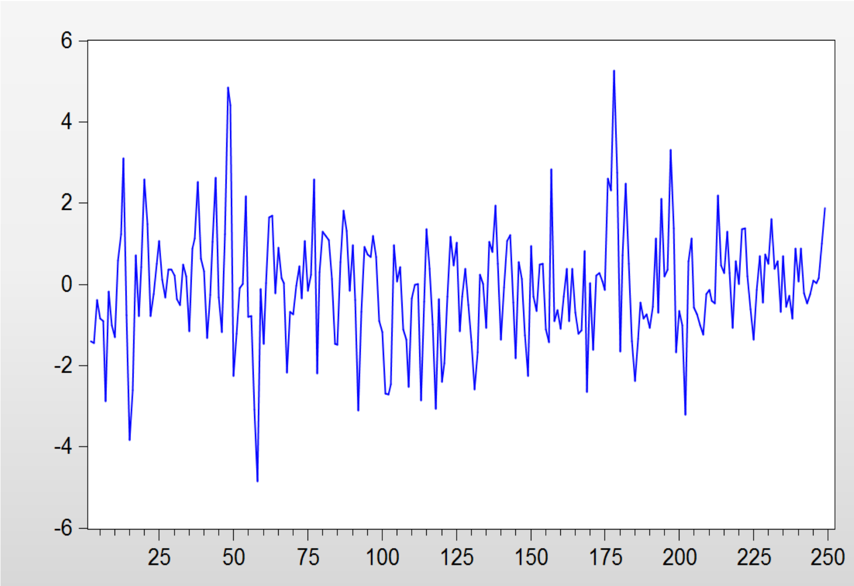

Figure 9: Real Exchange Rate graphical representation at first difference

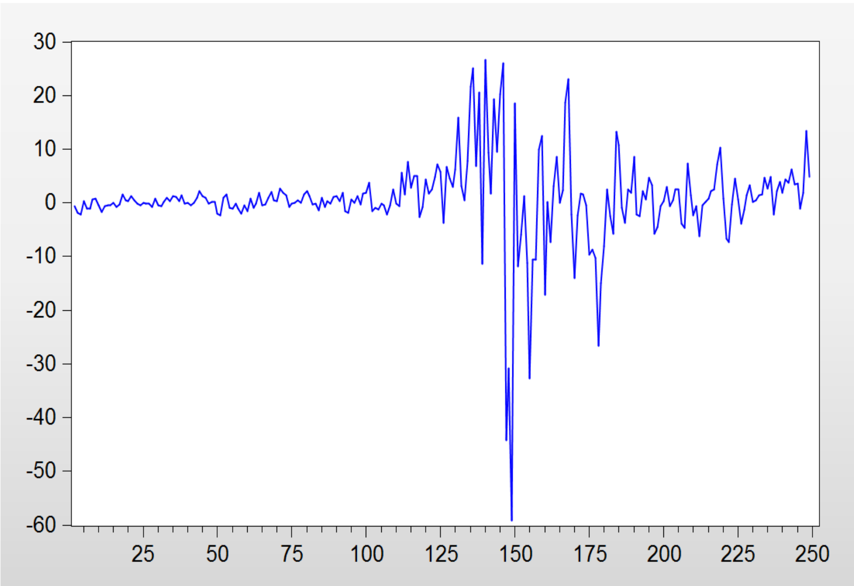

Figure 10: Stock Market graphical representation at first difference

Referring to table 3 and table 4 and graphs 6, 7, 8, 9, 10, we can conclude that all the variables are stationary at the first difference.

4.3. LAG LENGTH SELECTION

Table 5 : AIC and SIC lag length selection

Lag	AIC	SIC
0	68.99138	69.06367
1	54.10155	54.53534
2	53.65981	54.45510
3	53.69439	54.85117
4	53.80423	55.32250
5	53.90621	55.78598
6	53.88159	56.12285
7	54.00071	56.60346
8	54.08002	57.04427

Referring to tables 5, the guiding rule in selecting the lag length of the analysis is to choose the lowest Akaike Information Criterion and Schwarz information criterion (SIC). According to the table, the SIC and SC Suggest a lag length of 2. Thus, this is the lag length used.

4.4. GRANGER CAUSALITY TEST

After converting the time series data to be stationary and confirming lag length, the Granger causality test can be employed to examine the causality direction.

Table 6: Granger causality null hypothesis results

Null Hypothesis	Probability	Conclusion
Oil Prices does not Granger Cause Consumer Price Index	0.0870	Reject
Oil Prices does not Granger Cause Industrial Production	0.0001	Reject
Oil Prices does not Granger Cause Real Exchange Rate	0.0003	Reject
Oil Prices does not Granger Cause Stock Market Index	0.0565	Reject

Referring to table 6, the null hypothesis stating that the oil price does not granger cause industrial production, which is our proxy of the economic growth, is rejected because its corresponding probability is lower than 0.05. This means that oil prices variation cause the industrial production to change. This is consistent with the literary view. The economy of Saudi Arabia is highly dependent on oil and the majority of the income is generated from it and the petrochemicals industries. Thus, when the price variation occurs it impacts the industrial production.

The null hypothesis stating that the oil Prices variable does not granger cause real exchange rate which is variables to represent exchange rate is rejected because its corresponding probability is lower than 0.05. This means that oil price variation cause real exchange rate to change. It is consistent with the literary view. The exchange rate represents the value of the currency. It is helpful in evaluating the price competitiveness of a country, at the same time; it is a key factor in determining the revenues derived from exports. Thus, when the price variation occurs it impacts the real exchange rate.

The null hypothesis stating that the oil prices variable does not granger cause stock market index which is Tadawul All Share Index (TASI) in Saudi Arabia is rejected because its corresponding probability is lower than 0.010. This means that oil price variation cause Stock Market Index to change. It is consistent with the literary view. As the Stock Market Index represent the wealth and strength of the economy. Thus, when the price variation occurs it impacts the real exchange rate.

The null hypothesis stating that the oil Prices variable does not granger cause consumer price index which is the measurement of inflation, is rejected because its corresponding probability is lower than 0.010. This means that oil price variation cause Consumer Price Index to change. It is consistent with the literary view. As the consumer price index reflects the change in prices for the average consumer of a constant basket of consumer goods e.g. when the income generated from petrochemical industries exports is higher, this means more income for the employee which leads to inflation. Thus, when the price variation occurs it impacts the real exchange rate.

4.5. VARIANCE DECOMPOSITION TEST

Table 6: Variance decomposition result.

Variance Decomposition of DCPI						
Period	S.E.	DCPI	DIND	DOIL	DREEX	DSTK
4	0.006188	96.94545	0.097195	2.128102	0.540593	0.288664
8	0.006193	96.85680	0.123951	2.177108	0.550748	0.291397
12	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
16	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
20	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
24	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
Variance Decomposition of DIND						
4	1.41E+09	1.496749	95.32472	2.697322	0.328680	0.152526
8	1.41E+09	1.548235	95.20510	2.752250	0.329076	0.165336
12	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
16	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
20	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
24	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
Variance Decomposition of DOIL						
4	5.369142	1.033179	0.497431		0.433096	0.600327
8	5.373259	1.040775	0.509767		0.437470	0.634663
12	5.373270	1.040775	0.509769		0.437468	0.634910
16	5.373271	1.040775	0.509769		0.437468	0.634912
20	5.373271	1.040775	0.509769		0.437468	0.634912
24	5.373271	1.040775	0.509769		0.437468	0.634912

Variance Decomposition of DREEX						
4	1.452327	0.962951	0.190320	12.69169	85.95462	0.200425
8	1.452583	0.964157	0.193429	12.69333	85.94037	0.208718
12	1.452583	0.964156	0.193431	12.69337	85.94029	0.208757
16	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
20	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
24	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
Variance Decomposition of DSTK						
4	8.645949	1.197124	0.959587	6.206039	0.831190	90.80606
8	8.660530	1.248452	0.963870	6.222174	0.828823	90.73668
12	8.660601	1.248729	0.963895	6.222192	0.828813	90.73637
16	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
20	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
24	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637

Referring to table 8, we can observe that oil price can explain the other variables changes. Applying a shock to oil price is the main factor that affects the other variables. Oil price effect is similar in the long term and the short term. We can conclude that industrial production; consumer price index, stock market index, and real exchange rate can be interpreted based on the oil price variation. This means that oil prices should be monitored by the government and monetary agency officials in order to take the necessary action when needed.

In period 4, a shock or impulse in the CPI account for 96.94545 percent variation of the fluctuation in CPI. In period 24, a shock or impulse in the CPI account for 96.85670percent variations of the fluctuation in CPI. In period 4, a shock or impulse in the oil prices accounts for 2.128102 percent variation of the fluctuation in the CPI. In period 24, a shock or impulse in the oil prices accounts for 2.177164 percent variation of the fluctuation in the CPI. And the shock of the other variables causes minor variation or none.

In period 4, a shock or impulse in the industrial production account for 95.32472 percent variation of the fluctuation in industrial production. In period 24, a shock or impulse in the industrial production account for 95.20498 percent variation of the fluctuation in industrial production. In period 4, a shock or impulse in the oil prices accounts for 2.697322 percent variation of the fluctuation in industrial production. In period 24, a shock or impulse in the oil prices accounts for 2.752323 percent variation of the fluctuation in industrial production. And the shock of the other variables causes minor variation or none.

In period 4, a shock or impulse in the real exchange rate account for 85.95462 percent variation of the fluctuation in real exchange rate. In period 24, a shock or impulse in the real exchange rate account for 85.94029 percent variation of the fluctuation in real exchange rate. In period 4, a shock or impulse in the oil prices accounts for 12.69169 percent variation of the fluctuation in real exchange rate. In period 24,

A shock or impulse in the oil prices account for 12.69337 percent variations of the fluctuation in real exchange rate. And the shock of the other variables causes minor variation or none.

In period 4, a shock or impulse in the stock market index account for 90.92030 percent variation of the fluctuation in stock market index. In period 24, a shock or impulse in the stock market index account for 90.73639 percent variation of the fluctuation in stock market index. In period 4, a shock or impulse in the oil prices accounts for 6.130767 percent variation of the fluctuation in stock market index. In period 24, a shock or impulse in the oil prices accounts for 6.222191 percent variation of the fluctuation in stock market index. And the shock of the other variables causes minor variation or none.

4.6. IMPULSE RESPONSE FUNCTION

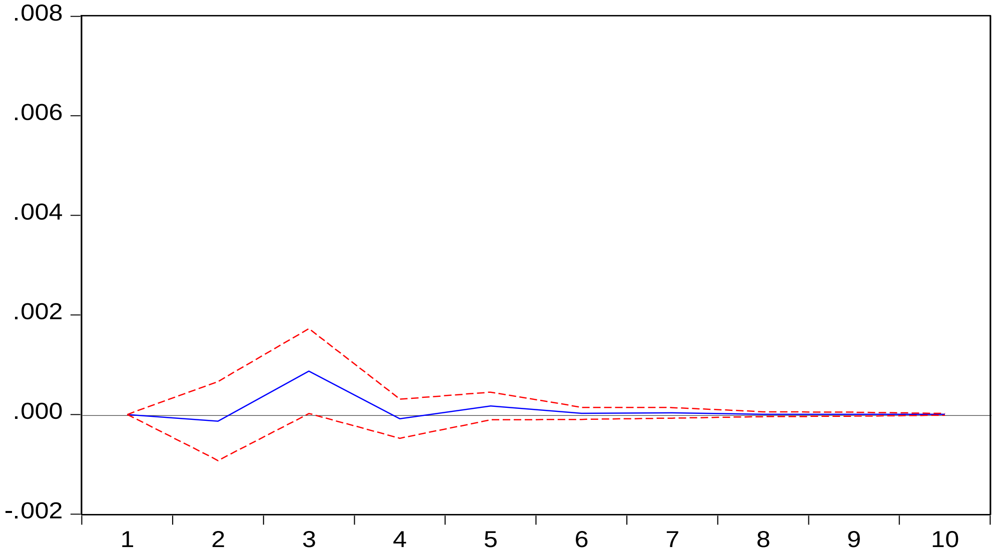

Figure 11: Impulse response of consumer price index to shock in oil price

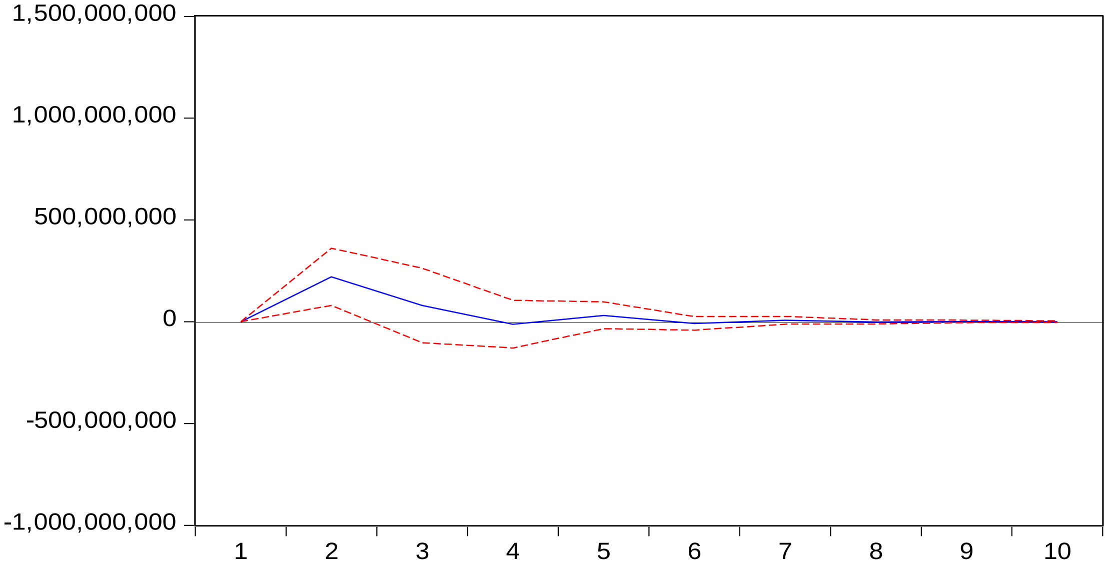

Figure 12: Impulse response of industrial production to shock in oil price

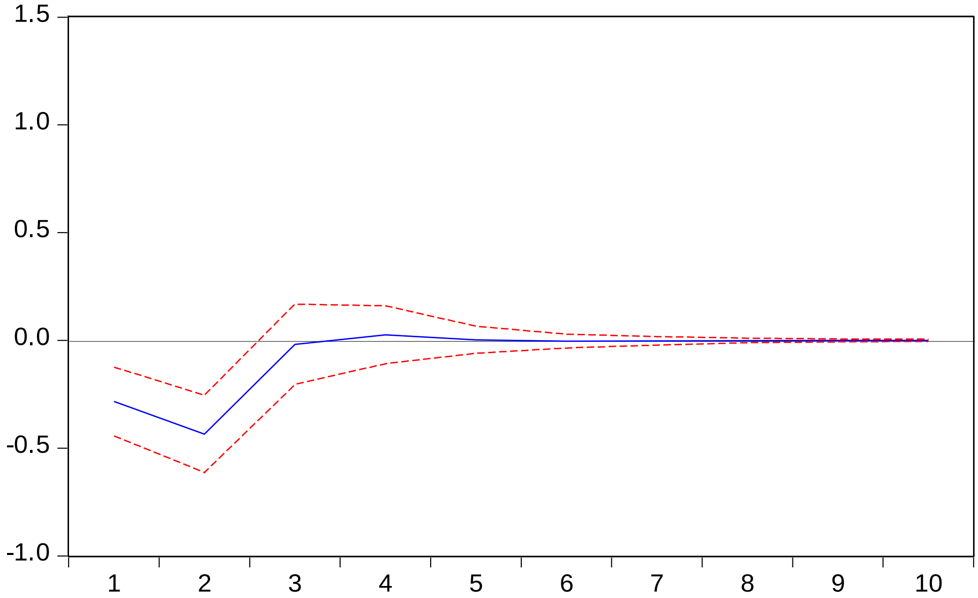

Figure 13: Impulse response of real exchange rate to shock in oil price

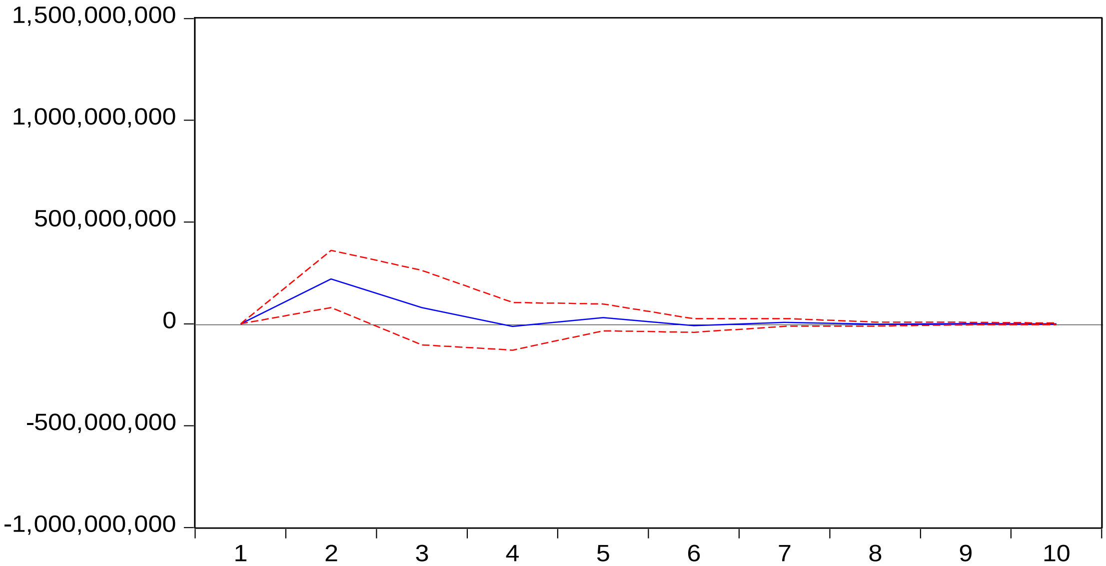

Figure 14: Impulse response of stock market to shock in oil price

The method used for ordering the variables is the cholesky-dof method as selected automatically by the E-views program. The graphs 11, 12, 13, and 14 demonstrate the reaction of each variable when a unit shock is applied to the oil price.

Consumer price index response positively to one unit of shock in oil prices. Industrial production response positively in response to one unit of shock in oil prices. Real exchange rate response negatively to one unit of shock in oil prices. Stock market index response positively in response to one unit of shock in oil prices. This result is consistent with the granger causality test result that rejected the null hypothesis stating that an oil price doesn’t granger cause: industrial production, real exchange rate, and stock market index.

From the Impulse Response Function analysis, we can observe the response of the variables to one standard deviation shock in oil price. The responses generated from a positive shock on oil prices are very small but noticeable as the applied chock return back to zero. The responce on the following variables: stock markets index, consumer price index, and industrial production is showen in graphs 11, 12, 13, and 14. This is consistent with the previous results of the Granger causality test and Variance Decomposition analysis that the oil prices dynamically affect stock market index, industrial production, consumer price index, and real exchange rate.

The positive movement of stock market index, consumer price index, and industrial production is an indication of better performance of these variables when the positive oil price occurs.

If the oil price increases, the income generated from the exports will increase as well. The price per barrel has risen from $27.29 on January 2001 to $97.24 on March 2013. The price reached a high level of $113.39 on 29 April 2011 that lead to higher income generation at that period which reflected positively on the key variables of the economy. On the other hand, when the international prices of oil began to drop from $97.5 January 2014 and reached 91.17 on September 2014. This impacted the above mentioned variable negatively. The real exchange rate response was negating to a one standard deviation shock in oil price variable. This was an unexpected result and further analysis is required to understand the different outcome.

CHAPTER FIVE

CONCLUSION

5.1. CONCLUSION

A high portion of Saudi Arabia economy is dependent on the income from oil, and in light of the recent events and OPEC's decision not to reduce its oil production, which led to a predictable fall in the oil prices as its supply is more than its demand.

This study investigates the dynamic effect of oil price on industrial production, stock market index, real exchange rate, and consumer price index using the data for the period starting from January 1994 to September 2014. The Impulse Response Function, the Granger Causality test, and the Variance Decomposition Analysis were used for conducting this study.

The results of the empirical analysis for the Granger causality test suggests that the changes in oil prices cause stock market index, industrial production, real exchange rate, and consumer price index to change. A shock or impulse in the oil prices accounts for approximately 6.2 percent variations of the fluctuation in the stock market index. A shock or impulse in the oil prices accounts for 12.6 percent variation of the fluctuation in real exchange rate. A shock or impulse in the oil prices accounts for approximately 2.1 percent variations of the fluctuation in the consumer price index. A shock or impulse in the oil prices accounts for approximately 2.7 percent variations of the fluctuation in industrial production.

We can conclude that industrial production; consumer price index, stock market index, and real exchange rate can be interpreted based on the oil price variation. This means that oil prices should be monitored by the government and monetary agency officials in order to take the necessary action when needed.

Industrial production, stock market index, and consumer price index have a positive response to a one unit shock in oil prices. The real exchange rate has a positive response to a one unit shock in oil prices.

As oil price have a higher effect on stock market index, and real exchange rate the responsible officials should monitor the prices variation closely to take the necessary actions to counter out its effects.

This study improves the understanding of the interaction between oil prices and key variables of the Saudi Arabia economy. It extends the literature by involving an updated period and applying new model application. It provides more clarification to financial regulators and policy makers in formulating economic and financial policies.

Market Officials should think about oil prices as a factor to be considered in making investments decisions and portfolio formulation. The SAMA officials should monitor the price to be prepared with counter measures to stabilize the economy when needed through implementing expansionary fiscal and monetary policy actions.

The next step is to explore the dynamic effect of oil prices on other variables such as, political and macroeconomic variables to help in understanding the relationship between the variables. Moreover, the study can be expanded by including other countries in the region to compare if the result would be consistent.

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APPENDIX A: VECTOR AUTO REGRESSION ESTIMATES

Vector Auto regression Estimates

	DCPI	DIND	DOIL	DREEX	DSTK
DCPI(-1)	-0.105832	-4.48E+09	45.27506	-13.98144	-31.12477
	(0.06468)	(1.2E+10)	(55.7220)	(14.0263)	(85.7724)
	[-1.63612]	[-0.36451]	[0.81252]	[-0.99680]	[-0.36288]
DCPI(-2)	0.095501	1.04E+10	74.16457	-6.442644	-127.0608
	(0.06460)	(1.2E+10)	(55.6494)	(14.0081)	(85.6607)
	[1.47832]	[0.84998]	[1.33271]	[-0.45992]	[-1.48330]
DIND(-1)	-1.00E-13	-0.632491	-2.88E-10	3.58E-11	5.87E-10
	(3.4E-13)	(0.06428)	(2.9E-10)	(7.3E-11)	(4.5E-10)
	[-0.29692]	[-9.83913]	[-0.98737]	[0.48843]	[1.30892]
DIND(-2)	-2.27E-13	-0.156165	-2.61E-10	-4.39E-11	-1.04E-10
	(3.3E-13)	(0.06358)	(2.9E-10)	(7.3E-11)	(4.4E-10)
	[-0.67924]	[-2.45614]	[-0.90489]	[-0.60556]	[-0.23347]
DOIL(-1)	-1.24E-05	41349777	0.180994	-0.064743	0.211957
	(7.8E-05)	(1.5E+07)	(0.06691)	(0.01684)	(0.10300)
	[-0.16023]	[2.79952]	[2.70499]	[-3.84394]	[2.05791]
DOIL(-2)	0.000213	28866736	0.039128	0.030412	0.007034
	(8.2E-05)	(1.6E+07)	(0.07078)	(0.01782)	(0.10895)
	[2.59509]	[1.84760]	[0.55283]	[1.70698]	[0.06456]
DREEX(-1)	0.000199	12155777	0.035390	0.347062	-0.388122
	(0.00030)	(5.8E+07)	(0.26222)	(0.06601)	(0.40364)
	[0.65487]	[0.21000]	[0.13496]	[5.25798]	[-0.96156]
DREEX(-2)	0.000251	-58380479	-0.291352	-0.120496	0.450472
	(0.00029)	(5.6E+07)	(0.25304)	(0.06370)	(0.38950)
	[0.85612]	[-1.04517]	[-1.15141]	[-1.89176]	[1.15653]
DSTK(-1)	5.50E-06	5234777.	0.015373	0.001410	0.250338
	(4.9E-05)	(9377992)	(0.04248)	(0.01069)	(0.06539)
	[0.11161]	[0.55820]	[0.36185]	[0.13184]	[3.82811]
DSTK(-2)	-4.20E-05	5842867.	0.042056	-0.005884	0.100087
	(4.9E-05)	(9234243)	(0.04183)	(0.01053)	(0.06439)
	[-0.86585]	[0.63274]	[1.00534]	[-0.55880]	[1.55434]
C	0.001556	-6508778.	0.012744	1.11E-05	0.574463
	(0.00042)	(7.9E+07)	(0.35798)	(0.09011)	(0.55104)
	[3.74401]	[-0.08237]	[0.03560]	[0.00012]	[1.04250]
R-squared	0.053047	0.339068	0.066396	0.189120	0.148646
Adj. R-squared	0.012751	0.310943	0.026669	0.154614	0.112418
Sum sq. resids	0.008535	3.09E+20	6333.523	401.3103	15006.78
S.E. equation	0.006026	1.15E+09	5.191451	1.306791	7.991159
F-statistic	1.316440	12.05582	1.671284	5.480851	4.103097
Log likelihood	914.0188	-5474.876	-748.5974	-409.2555	-854.7027
Akaike AIC	-7.341616	44.60062	6.175588	3.416711	7.038234
Schwarz SC	-7.184873	44.75736	6.332331	3.573454	7.194976

APPENDIX B: GRANGER CAUSALITY TESTS

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
DIND does not Granger Cause DCPI	247	0.13651	0.7121
DCPI does not Granger Cause DIND		0.17266	0.6781
DOIL does not Granger Cause DCPI	247	0.02920	0.8645
DCPI does not Granger Cause DOIL		0.62770	0.4290
DREEX does not Granger Cause DCPI	247	0.05616	0.8129
DCPI does not Granger Cause DREEX		0.75311	0.3863
DSTK does not Granger Cause DCPI	247	0.02014	0.8873
DCPI does not Granger Cause DSTK		0.20785	0.6489
DOIL does not Granger Cause DIND	247	12.2300	0.0006
DIND does not Granger Cause DOIL		0.20759	0.6491
DREEX does not Granger Cause DIND	247	2.44808	0.1190
DIND does not Granger Cause DREEX		1.32005	0.2517
DSTK does not Granger Cause DIND	247	2.28922	0.1316
DIND does not Granger Cause DSTK		4.48038	0.0353
DREEX does not Granger Cause DOIL	247	0.11745	0.7321
DOIL does not Granger Cause DREEX		13.5316	0.0003
DSTK does not Granger Cause DOIL	247	0.53147	0.4667
DOIL does not Granger Cause DSTK		6.08124	0.0144
DSTK does not Granger Cause DREEX	247	0.06255	0.8027
DREEX does not Granger Cause DSTK		1.83385	0.1769

APPENDIX C: VARIANCE DECOMPOSITION TEST RESLUTS

Variance Decomposition of DCPI:

Period	S.E.	DCPI	DIND	DOIL	DREEX	DSTK
1	0.006026	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.006064	99.74548	0.034812	0.035566	0.179051	0.005093
3	0.006184	97.04491	0.090916	2.082762	0.495556	0.285852
4	0.006188	96.94545	0.097195	2.128102	0.540593	0.288664
5	0.006193	96.86884	0.118022	2.174200	0.548166	0.290776
6	0.006193	96.86097	0.122143	2.174834	0.550782	0.291274
7	0.006193	96.85697	0.123781	2.177104	0.550749	0.291392
8	0.006193	96.85680	0.123951	2.177108	0.550748	0.291397
9	0.006193	96.85670	0.123991	2.177159	0.550748	0.291398
10	0.006193	96.85670	0.123993	2.177163	0.550748	0.291398
11	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
12	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
13	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
14	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
15	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
16	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
17	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
18	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
19	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
20	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
21	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
22	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
23	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398
24	0.006193	96.85670	0.123993	2.177164	0.550748	0.291398

Variance Decomposition of DIND:

Period	S.E.	DCPI	DIND	DOIL	DRE EX	DSTK

1	1.15E+09	1.761173	98.23883	0.000000	0.000000	0.000000
2	1.37E+09	1.421692	95.96537	2.504970	0.018149	0.089816
3	1.40E+09	1.465460	95.35581	2.705373	0.324811	0.148544
4	1.41E+09	1.496749	95.32472	2.697322	0.328680	0.152526
5	1.41E+09	1.539197	95.22057	2.747508	0.328826	0.163900
6	1.41E+09	1.546570	95.21034	2.749311	0.329025	0.164753
7	1.41E+09	1.547994	95.20545	2.752270	0.329078	0.165210
8	1.41E+09	1.548235	95.20510	2.752250	0.329076	0.165336
9	1.41E+09	1.548243	95.20500	2.752320	0.329077	0.165359
10	1.41E+09	1.548245	95.20498	2.752321	0.329077	0.165372
11	1.41E+09	1.548245	95.20498	2.752322	0.329078	0.165374
12	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
13	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
14	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
15	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
16	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
17	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
18	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
19	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
20	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
21	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
22	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
23	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375
24	1.41E+09	1.548245	95.20498	2.752323	0.329078	0.165375

Variance Decomposition of DOIL:

Period	S.E.	DCPI	DIND	DOIL	DRE EX	DSTK
1	5.191451	0.128265	0.003618	99.86812	0.000000	0.000000
2	5.297020	0.404018	0.407122	99.12642	0.010372	0.052072
3	5.358194	1.035433	0.488538	97.57403	0.365631	0.536364
4	5.369142	1.033179	0.497431	97.43597	0.433096	0.600327
5	5.372621	1.040125	0.509257	97.39330	0.435836	0.621487
	5.373085	1.040821	0.509484	97.38061	0.437429	0.631657

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7	5.373218	1.040780	0.509775	97.37788	0.437476	0.634086
8	5.373259	1.040775	0.509767	97.37733	0.437470	0.634663
9	5.373267	1.040776	0.509768	97.37716	0.437469	0.634832
10	5.373270	1.040775	0.509769	97.37710	0.437468	0.634890
11	5.373270	1.040775	0.509768	97.37708	0.437468	0.634906
12	5.373270	1.040775	0.509769	97.37708	0.437468	0.634910
13	5.373271	1.040775	0.509769	97.37708	0.437468	0.634911
14	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
15	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
16	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
17	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
18	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
19	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
20	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
21	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
22	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
23	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912
24	5.373271	1.040775	0.509769	97.37708	0.437468	0.634912

Variance Decomposition of DREEX:

Period	S.E.	DCPI	DIND	DOIL	DREEX	DSTK
1	1.306791	0.687089	0.006832	4.688840	94.61724	0.000000
2	1.447037	0.639191	0.106669	12.75330	86.49497	0.005869
3	1.450082	0.875433	0.167845	12.71063	86.13697	0.109123
4	1.452327	0.962951	0.190320	12.69169	85.95462	0.200425
5	1.452516	0.963218	0.192859	12.69095	85.94495	0.208025
6	1.452576	0.964146	0.193423	12.69305	85.94105	0.208327
7	1.452581	0.964146	0.193429	12.69329	85.94050	0.208625
8	1.452583	0.964157	0.193429	12.69333	85.94037	0.208718
9	1.452583	0.964157	0.193430	12.69337	85.94030	0.208744
10	1.452583	0.964156	0.193431	12.69337	85.94029	0.208753
11	1.452583	0.964156	0.193431	12.69337	85.94029	0.208757

12	1.452583	0.964156	0.193431	12.69337	85.94029	0.208757
13	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
14	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
15	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
16	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
17	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
18	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
19	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
20	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
21	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
22	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
23	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758
24	1.452583	0.964156	0.193431	12.69337	85.94029	0.208758

Variance Decomposition of DSTK:

Period	S.E.	DCPI	DIND	DOIL	DREEX	DSTK
1	7.991159	0.243451	0.144693	2.261882	0.531958	96.81802
2	8.407123	0.515394	0.605917	5.270959	0.651420	92.95631
3	8.613370	1.202934	0.923821	6.130767	0.822181	90.92030
4	8.645949	1.197124	0.959587	6.206039	0.831190	90.80606
5	8.656775	1.243761	0.964509	6.202262	0.829248	90.76022
6	8.659625	1.244652	0.963910	6.221786	0.828886	90.74077
7	8.660342	1.248426	0.963807	6.221632	0.828845	90.73729
8	8.660530	1.248452	0.963870	6.222174	0.828823	90.73668
9	8.660583	1.248695	0.963890	6.222156	0.828814	90.73644
10	8.660596	1.248714	0.963895	6.222191	0.828814	90.73639
11	8.660600	1.248727	0.963896	6.222191	0.828813	90.73637
12	8.660601	1.248729	0.963895	6.222192	0.828813	90.73637
13	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
14	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
15	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
16	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637

17						
18	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
19	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
20	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
21	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
22	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
23	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637
24	8.660601	1.248730	0.963895	6.222192	0.828813	90.73637

Cholesky Ordering:
DCPI DIND DOIL
DREEX DSTK

جامعة عفت

جدة ، المملكة العربية السعودية

عمادة الدراسات العليا و البحث العلمي

قام بكتابة هذه الرسالة الطالبة سمر عباق ، تحت إشراف المشرف المكلف بالإشراف على رسالتها ، وتم إجازتها من قبل لجنة التحكيم، و تم تقديمها إلى عميدة الدراسات العليا و البحث العلمي بجامعة عفت بعنوان التأثير الديناميكى لأسعار النفط على الاقتصاد: تحليل وظائف الاستجابة النبضية لأسعار النفط على العناصر الأساسية للاقتصاد السعودي ، كجزء من متطلبات الحصول على درجة الماجستير في العلوم، برنامج الإداره المالية الإسلامية ، وقد تم الموافقة على الرسالة و إجازتها بتاريخ: ١٤٣٦/٠٧/٢٢ هـ

أعضاء لجنة التحكيم

المشرف على الرسالة

الإسم:.................................

التوقيع:...............................

المشرف المشارك (إن وجد)

الإسم:.................................

التوقيع:...............................

العضو الخارجي

الإسم:.................................

التوقيع:...............................

عضو

الإسم:.................................

التوقيع:...............................

رئيسة القسم

الإسم:.................................

التوقيع:...............................

عميدة الكلية

الإسم:.................................

التوقيع:...............................

عميدة الدراسات العليا والبحث العلمي

الإسم:.................................

التوقيع:...............................

الخلاصه

النفط هو احد أهم العوامل التي تؤثر على اقتصاد المملكة العربية السعودية بشكل كبير، حيث يشكل النفط نسبة كبيرة من النمو الاقتصادي. وقد أظهرت الدراسات السابقة أن أسعار النفط يمكن أن تؤثر على النمو الاقتصادي وخاصة في البلدان المصدرة للنفط مثل المملكة العربية السعودية.

وتهدف هذه الدراسة إلى التعرف على أثيرات اسعار النفط الديناميكيه على مؤشر أسهم السوق السعودية ، النمو الاقتصادي، سعر الصرف، والتضخم. وتستخدم هذه الدراسة البيانات الشهرية اعتبارا من يناير ١٩٩٤ إلى سبتمبر ٢٠١٤ لمعرفة تأثير أسعار النفط على المتغيرات ذات الصلة. يتم استخدام اختبار جرانجر السببي، تحليل التباين، وظائف الاستجابة النبضية للتحليل.

وتشير النتائج المتوصل إليها أن العلاقة السببية تتحرك من أسعار النفط المتغيرات ذات الصلة. وعلاوة على ذلك، وجد ان تقلبات أسعار النفط لها تأثير إيجابي على معظم المتغيرات ذات الصلة.

هذه الدراسة تحسن من فهم التفاعل بين أسعار النفط والمتغيرات الرئيسية في الاقتصاد السعودي. فهي تزيد على الدراسات السابقه إشراك فترة زمنيه حديث وتطبيق جديد لنموذج تحليل البحث المختار. فهاذا يوفر المزيد من التوضيح للمنظمين الماليين وصناع السياسات في صياغة السياسات الاقتصادية والمالية.

جامعة عفت

التأثير الديناميكى لأسعار النفط على الإقتصاد

تحليل وظائف الإستجابة النبضية لأسعار النفط على العناصر الأساسية للإقتصاد السعودي

رسالة مقدمة لاستكمال متطلبات الحصول على درجة الماجستير

في الإداره المالية الإسلامية

إعداد

سمر عباق

إشراف

د. شبير أحمد

٢٠١٥/٠٥/١١ م ١٤٣٦/٠٧/٢٢ هـ