

Oil Prices, Economic Growth And International Reserves: Evidence From Middle-Eastern And African Oil-Importing Countries During The Period (2000-2013).

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ABSTRACT

The aim of this paper is to examine the impact of the oil price volatility on the economic growth in addition to testing the relationship between oil prices and international reserves in a number of oil importing countries during the period (2000-2013). The study finds that an increase in oil prices has a negative impact on economic growth on these economies during the study period. The study also finds that an increase in oil prices increases the consumer price index and the international reserves. The study uses the descriptive and analytical methods, and so relying on Panel VAR Model and Panel Data model.

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1. INTRODUCTION

Since the discovery of oil early in 1800, such product has become extremely significant for all world economics. Therefore, the significance of oil is considered through the standpoint that if the world suddenly runs out of oil, what will happen? Certainly, all economic activities and systems would fail and the global economics would collapse. In general, the forces of supply and demand which set such product prices in the market. The increase of oil prices, particularly during the period from 2007-2008, was one of the greatest shocks the world has seen, as it affected the economies of all countries positively and negatively whether such countries are oil-producing or oil-importing ones.

Thus, oil is one of most significant factors of macroeconomic levels in the global economy, as crude oil market is the biggest commodity market in the world, changes and volatilities happen in its prices is the most interesting matters among economists and specialists not only due to their direct effect on the economic activity, but also because such changes might reflect the occurrence of changes in stabilization expectations for the entire countries, bar none. One of the main differences between oil as a commodity and other commodities is that oil is most likely to be the only one production entry which can affect the economic growth positively or negatively, and it can even lead to an economic recession or an economic recovery. Moreover, the volatilities occur in oil prices have significant consequences on the economic activity, varying between oil-producing and oil-importing countries. While the increase in oil prices is considered as good news for oil-producing countries, it is considered as bad news for oil-importing countries, as the increase in oil prices leads to transfer the resources through imports into the oil-producing countries by changing the commercial exchange rates and vice versa in case of a decrease in oil prices.

Regarding this, the researcher found that it is necessary to study the effect of changes in oil prices on the economic growth, and whether there is a relationship between international reserves and consumer price index (CPI) on oil prices in several Middle-Eastern and African oil-importing countries including Jordan, Egypt, Lebanon, Tunisia, Morocco and Turkey during the period (2000-2013), as these countries are considered a small-size economies which are open to the outside world and affected by the surrounding environment, shocks occur in the outside world and external circumstances.

The study uses the Descriptive Approach including the theoretical background and literature review as well as the Standard Analytical Approach to analyze the effect of oil prices on the economic variables under investigation through the use of Panel Vector Autoregression Model VAR and Panel Data Model.

2. LITERATURE REVIEW

Jawad (2013), finds that the fluctuations in oil prices have a positive effect on the GDP and economic growth rates in Pakistan. The 1% change in oil prices results in an increase in GDP growth rates with a percentage of 16.3%. The study also finds that the investments of private

and public sectors have a positive effect on GDP growth rates. In regard to the Balance of Trade, it has an adverse effect on GDP growth rates.

Gokce (2013), shows that that the fluctuations of oil prices have an adverse effect on the economic growth in Turkey in the long term, since the rise in oil prices by 1% reduces actual growth rates of gross domestic product by 1.64%.

Creti (2013), Chittedi (2012) and Jones et al (2004) showed that the effect of the increase in oil prices is reflected in the financial sector through its indirect influence on stock market, as the increase in oil prices might increase inflation and production costs, which forces monetary authorities to raise interest rates, so that this is reflected in new investments and reduces current profit levels of facilities, so that the average of dividends and the yield of bonds increase. Therefore, there is an inverse relationship between oil prices and stock market.

Nooreen et al (2007), also argued that fluctuations in oil prices, particularly when they increased, have adverse effects on local and international financial markets, as well as their effect on stock prices. There is also a tangible effect on companies directly or indirectly through their revenues or cash flows received.

Moshiri et al (2012) test the non-linear relationship between oil prices and the gross domestic product growth of six oil-exporting countries, and find that changes in oil prices have a direct impact on gross domestic product through their influence on the components of aggregate demand and aggregate supply. also the positive changes in oil prices have negative effects on which is called Dutch Disease theory.

Mehrara et al (2011) argued that movements in oil prices have a strong impact on the general level of prices, and that rising of oil revenues is always followed by expansionary monetary policies that increase the production and the general level of prices. also, changes in aggregate demand affect the general level of prices, but their impact is simple and limited compared to the impact of monetary factors and variables on the general level of prices, and that inflation is a purely monetary phenomenon.

Jamali et al (2011) presented that volatilities and shocks occurred in oil prices have significant and clear effects all world countries, which might provide policy-makers with a greater role in constructing policies related to oil demand which include enhancing energy usage quality, finding and urging to use renewable energy resources in order to reduce the influence of oil price volatilities on economies. Oil prices might affect macroeconomics and economic growth through several ways. First, the increase in oil prices transfers the income from the oil-importing economies into the oil-exporting ones in accordance with Terms and Conditions of International Trade, which might reduce the actual income of oil-importing economies. Second, the increase in oil prices reduces the industrial production due to the increase of industry cost average relative to GDP. Third, it might increase inflation through an increase in the prices of imported commodities, products and petroleum items. As a result, inflation increase would obligatorily force the monetary authorities to raise interest rates.

Farzanegan (2011) and Eifert et al (2002) took under consideration the impact of oil prices on oil-importing countries by taking under consideration the hypothesis which includes the fact that when oil prices decrease, there is a specific inverse effect on the economic performance of such countries. The reason behind this is that the increase in oil prices does not result in any long-term economic growth at the beginning due to the nature of financial policies adopted by such countries which are often fiscal policies of a cyclical nature. Therefore, in case of an increase in prices, governments of such countries increase the expenditures on capital and social projects significantly, which results in an economic growth and inflation but temporarily. Due to the lack of transparency and competitiveness in project distribution as well as management weakness and the dominance of natural resources without rent seeking behavior, no positive effects associated with investment process would occur, so that economic growth sustainability would be obstructed. Moreover, when a decrease in oil prices occurs, most projects which have already been initiated stop and it could not be possible to complete them, and the continuous governmental expenditure increases the governmental costs and obligations, which might result in an inflationary volatility in economy.

Elder et al (2010) thought that the increase in oil prices might increase the overall level of prices which reduces actual cash balances held by individuals and facilities, then such a reduction might be reflected through a corresponding reduction in cash aggregate demand. As oil demand is not flexible in regard to commodities, it can be regarded as a characteristic represented by the transmission of transfers from oil-importing into oil-exporting countries, so that the arising effects of shocks and volatilities in oil prices are symmetric effects, i.e. the positive shocks in oil prices (the increase in oil prices) reduce economic growth, while adverse shocks in oil prices (the decrease in oil prices) have a positive effect on economic growth.

Frankel (2010) and Husain et al (2008); concentrate on asymmetric effects in case of oil-exporting countries which depend on the significance of such countries' governments and their monopolistic role in controlling petroleum revenues, as the governments are the decision makers of unemployment reduction, increasing investments, and participating in other economic activities. In addition, financial policies of such countries are cyclical and they are not set to encounter countercyclical volatilities.

Frankel (2010) and Poelhekke et al (2007) confirmed the intention of the Dutch Disease Theory, as they suggest that the fluctuations in oil prices restrain the economic performance of oil-exporting countries. Thus, the fluctuations in oil prices occur due to the inflexibility of oil demand and supply in the short-term. Therefore, few changes or fluctuations whether in demand or in supply might cause great changes in prices in order to achieve a new economic equilibrium. Demand is inflexible because the changes in energy consumption require a change in capital stock which takes a period of time to be achieved. Supply is also inflexible (or of low flexibility) because the production of much energy also requires a capital and takes a period of time to be expanded. The changes of oil prices in some oil-exporting

countries led to the establishment of the so called “Oil Reserve Fund” in order to reduce adverse effects of oil prices on the performance of their economics.

Kilian (2009) pointed that the increasing demand of oil is a result of doubts about a deficit in future oil supplies which represent the supply aspect of market. Apparently, recent volatilities of oil prices might significantly prove this, as such volatilities appeared due to the increase in oil demand due to the uncertainty of having available future oil supplies which influence inflation and increase production costs, so that the monetary authorities represented by central banks increase interest rates, and this also affects economic growth. But, if the volatilities are only a result of demand aspect, inflation would increase but only in short-term parts and without the existence of any effects on economic growth rates.

According to Hausmann et al (2007), Chalk (1998) and Rosser et al (1995) it is notable that the governments of oil-exporting countries are the monopolists of oil revenues which receive and spend such revenues immediately, i.e. the behavior of governments dominates and controls the economy. Therefore, financial and monetary policies adopted by the monetary authorities of such countries would depend on the changes in oil prices. And, in case such governments take any preventive measures in economy, the changes in prices would directly affect their currency exchange prices. Thus, any changes in oil prices (whether an increase or a decrease) are not permanent, and the revenues derived from such changes inject the instability of economy, a case which is economically called “Resource Curse”, a concept which includes the fact that the increase in oil prices raises governmental expenditures significantly through the dependence on oil revenues. Overtime, such a strategy makes economies more fluctuated and affected by fluctuations in oil prices, especially in case of Capital Stock Imperfections.

Regarding Siddiqui (2005) as market forces set the global prices of oil, it is difficult for governments of countries to control and define the prices (whether sale or purchase rates) since defining the prices in terms of their increase - for example - by such countries would raise the inflation rates in other countries which, as a result, would reduce profit levels of the facilities that produce commodities and several services and depend on oil as a raw material in their production. This eventually leads to a reduction of economic growth rates of all countries whether they are oil-producing or oil-importing. Therefore, governments have to examine all proposed choices carefully before making any decision of increasing oil prices.

Pindyck (2004) showed that fluctuations in oil prices are the main determinants affecting the prices of commodities and financial markets, as the fluctuation in the oil price behavior is a significant determinant to assess financial derivatives and prudential resolutions taken by facilities, individuals and governments due to the effect of such fluctuations on the production marginal cost, the alternative opportunity cost as well as production choices. Therefore, the fluctuations in oil prices result in an economic instability in both oil-exporting and oil-importing countries.

Balasubramanian (2004) explained that predominantly, when oil demand, as a commodity, increases by the oil-importing countries, such an increase in demand would be bigger than the production capacity of oil-exporting countries. Generally speaking, the prices increase when the oil reserves of oil-importing countries decrease, but the entire required quantity is not covered due to the restrictions set by the Organization of the Petroleum Exporting Countries (OPEC) on the produced quantity. Furthermore, oil supplies (the quantity supplied) might decrease due to other factors such as infrastructure, shipment, oil supplies' delivery facilities through pipelines, as well as weather, terroristic violations, wars, and laws enforced by governments such as tax rates, policies and actions. All such factors lead to volatilities of oil prices.

Yang et al (2002) and Ferderer (1996) attempted to examine the relationship between stocks and oil prices mainly on oil-importing countries, especially the USA. They found that the increase in oil prices affects strongly and inversely on the economies of oil-importing countries, and that such countries suffer from economic recession due to the increase in oil prices. In contrast, the increase in oil prices has a positive effect on oil-exporting countries in terms of the balance of payment (BOP) level enhancement, economic growth and economic development, and, vice versa, in case of a decrease in oil prices in regard to both oil-importing and oil-exporting countries.

Dornbusch et al (2001) argued that the mechanism through which oil prices affect economy is unified through the price and the market forces represented by supply and demand. Thus, the increase in oil prices results in the increase of its supply (the increase of oil supplies) which reduces the productivity level of economy, the labor level, and available job opportunities. On the other hand, the increase of oil demand increases its prices, so that the prices of products, intermediate commodities and production entries increase, then the oil demand begins to decrease gradually which might result in a gradual decrease in oil and other commodities' prices for long periods of time.

Corden et al (1982) showed that the effect of changes in oil prices on the economic growth in oil-exporting countries belongs to the Dutch Disease Theory, which suggests that the increase in oil prices have an inverse effect on the economic performance through changing the entire economic structure in favor of petroleum and non commercial sectors, and such a change would not be in favor of manufacturing and agricultural sectors. However, the increase of petroleum revenues during an oil boom might lead to an increase in the local currency value and, therefore, an increase in foreign revenues of intermediate commodities and consumer goods. This makes such economies greatly dependent on imports, which causes an abuse of local industries due to their inability of competition against imported commodities when oil prices are high. Also, when oil prices are low, local industries cannot preserve their production levels. Hence, according to the Dutch Disease Theory, the sudden and temporary rise of such countries' currency exchange prices is rather damaging and harmful for such economies.

3. EMPIRICAL ANALYSIS

In order to infer the relationship between economic growth and oil prices, and to find out whether oil prices affect total economic variables or not, the study will use the following economic variables:

1. Growth rate in real gross domestic product. This variable will be computed firstly by calculating real gross domestic product (GDP) by dividing the gross domestic product (GDP) by GDP deflator, and then growth rate in real gross domestic product will be calculated following this equation:

$$\frac{RGDP_t - RGDP_{t-1}}{RGDP_{t-1}}$$

2. Oil prices: Brent Oil Price Index was adopted, and it was obtained by referring to the website of Brent oil index prices.

3. Consumer price Index (CPI), in order to know whether the fluctuations of oil prices led to a higher inflation in the study sample countries or not.

4. International Reserves (IR). The oil-importing countries of the study sample pay the prices of oil by using the available foreign currency. Thus, it is necessary to find out whether oil prices affected this variable or not. Does the rise of oil prices lead to decrease the international reserves of oil-importing countries or lead to increase them because of the increasing grants that are given to them?

The data related to the study were obtained from the World Bank (WB) and the International Monetary Fund (IMF) on annual data basis during the period (2000-2013). For the purpose of analysis, the data were expressed by taking their logarithm except for growth rate in real gross domestic product.

First: The relationship between growth rate in real gross domestic product and oil prices will be analyzed by using (Panel VAR) model as explained before. Before starting model estimation, some necessary tests must be developed, The most important tests are:

A. Unit Root Test :

Unit Root Test is one of the most important well-known tests for theorists of measurement in order to examine the study sample whether it is stationary or it has a unit root. This is applied by using Levin, Lin and Chu test which is related to Panel test. The test results showed that the study sample is not stable at the level but it is stable at the first difference as shown in table 1 below:

Table (1) Results of Levin, Lin and ChuTest

Method	Level		1st difference	
	Statistics	Prob	Statistics	Prob
Levin Lin and Chu test	2.94935	0.9984	-11.7372	0.000

Breitung t- stat Test was also conducted. The study results showed that the sample is stable at the level and at the first difference, as shown in Table 2 below:

Table (2) Results of Breitung t-stat Test

Method	Level		1st difference	
	Statistics	Prob	Statistics	Prob
Breitung t-stat	-3.75710	0.0001	-9.58868	0.000

B. Cointegration Test

The Cointegration test figures out the relationship between the variables under study, and whether there is a cointegration relationship in the long term between those variables or not, and this is applied by using Johansen Cointegration Test .The test results showed a cointegrated relationship in the long term between the variables of the study of the first degree I(1), as shown in table (3) below.

Table (3) Results of Cointegration Test

Hypothesized No of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob
None	0.352531	65.70721	15.49471	0.000
At most 1	0.313752	30.49777	3.841466	0.000

C. Granger Causality Test

This test aims to find out the causality relationship between the variables under investigation, so as to find out whether the variables affect each other or not. Table 4 shows the results of the test between variables using this test. The test results indicate that there is not any causality relationship between real growth rate in real gross domestic product and oil prices.

Table (4) Results of Causality Test

Null Hypothesis	Obs	F-Statistics	Prob
GDP growth does not granger cause Oil prices	82	2.71113	0.0367
Oil Prices growth does not granger cause GDP		1.92382	0.1159

VAR Test:

Since the relationship between the study variables is a cointegrated relationship, Panel VAR model can be used as represented in the following equation:

$$Y = C + \sum \theta Y_{t-1} + \varepsilon_t \quad \dots(1)$$

Where:

C: Constant Term in the equation

θ : Matrices of Autoregressive Coefficients

Y_{t-1} : Vector of endogenous variables

ε_t : Error Term

It is assumed by VAR model that errors are uncorrelated serially, their mean equals zero and that the variance is constant. Equation (1) can be rewritten as follows:

$$\text{GDP GROWTH} = f(\text{Oil Prices}) \dots(2)$$

Table (5) below shows the results of VAR Test:

Table (5) shows the results of Panel VAR Test

Variable	GDP	OIL Prices
GDP(-1)	0.172283 (-0.113) [1.52457]	0.683118 (-0.96716) [0.70632]
GDP(-2)	-0.93915 (-0.1125) [-0.34802]	0.875984 (-0.96286) [0.90978]
Oil Prices(-1)	-0.00637 (-0.01302) [-0.48901]	0.77904 (-0.11147) [6.98872]
Oil Prices(-2)	-0.01595 (-0.01328) [-1.20135]	-0.17441 (-0.11365) [-1.53459]

C	5.286569 (-1.04924) [5.03848]	19.52323 (-8.97998) [2.17408]
R- Square	0.094969	0.472279
Adj R- Square	0.047954	0.444865

Standard Errors in () and t- statistics in []

The study concluded the following results:

1. There is a positive relationship between growth rate in real gross domestic product in the current
1. period (t) and the previous period (t-1) and this relationship has a statistical significance
2. There is a positive relationship between growth rate in real gross domestic product (GDP) in the current period (t) and the previous period (t-2)
3. and this relationship has a statistical significance There is an inverse relationship between growth rate in real gross domestic product (GDP) and oil prices in the two previous periods :(t-1) and (t-2) and this relationship has a statistical significance

Second: Testing the relationship between the oil prices, international reserves and the general level of price index by using Panel Model for the same period (2000-2013).So, the relationship between the oil prices, the international oil reserves, and the general level of price index will be studied. As for the standard model used to estimate this relationship, it can be expressed by the following equation:

$$\text{OilP} = f(\text{IR}, \text{CPI}) \dots(1)$$

Where:

OilP: Brent Crude Oil Index prices

IR: Represents the international reserves of foreign currency excluding gold

CPI: Represents the general index of prices level.

Equation (1) can be rewritten as follows:

$$\text{OilP} = a + B_1\text{IR} + B_2\text{CPI} + e_{it} \quad (2)$$

Before starting the standard test, the following tests must be to conducted:

Panel Unit Root Test

This test aims to make sure whether the study data is stable or have a unite root. After making the test ,it was clear that the study sample is not stable at the level , but it is stable at the first difference. Table (6) shows the results of (Levin Lin and Chu) test, and the results of (Breitung) test which are related to unit root tests of panel data.

Table (6) shows the results of Unit Root Test for the study data

Method	Level		1st Difference	
	Statistics	Prob	Statistics	Prob
Levin, Lin & Chu t*	3.25099	0.9994	-12.154	0.0000
Breitung t-stat	1.55343	0.0602	-11.6865	0.0000

Cointegration Test of Pedroni and Kao

These two tests are conducted to see whether there is a complementary

relationship between the study variables or not. According to Pedroni test there are two complementary relations between the study variables out of 11 Statistics, as shown in table 7 below:

Table (7) shows the results of Cointegration Test of Pedroni

Pedroni Residual Cointegration Test					
Method	Statistics	Prob	Weighted Statistics	Prob	
Panel v-Statistic	1.946095	0.0258	0.646521	0.259	
Panel rho-Statistic	-0.789	0.2151	0.877006	0.8098	
Panel PP-Statistic	-3.58223	0.0002	0.749101	0.7731	
Panel ADF-Statistic	-0.46956	0.3193	0.441892	0.6707	
	Statistics		Prob		
Group rho-	1.867527		0.9691		

Statistic		
Group PP-Statistic	0.826596	0.7958
Group ADF-Statistic	1.237155	0.892

Kao test also shows the existence of a complementary relationship between the study variables of the study, as shown in table 8 below.

Table (8) shows the results of Cointegration Test of Kao

Kao Residual Cointegration Test		
	Statistics	Prob
ADF	-1.665786	0.0479
Residual Variance	0.007335	
HAC Variance	0.014974	

After making the standard test by using Data Panel model, and as shown in table (9) below, the following results were found:

Table (9) shows the results of the standard test By using Panel Data model

Dependent Variable: OilP				
Method: Panel Least Square				
Sample: 2008 2013 Periods included:14 Cross-sections included:6				
Total panel (balanced) observations: 84				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IR	-0.177454	0.045455	3.903926	0.0002
CPI	1.231768	0.145626	8.458440	0.0000
C	-5.888715	1.108435	-5.312638	0.0000

R-squared	0.577283	Mean dependent var	4.032360
Adjusted R-squared	0.566846	S.D. dependent var	0.558667
S.E. of regression	0.367683	Sum squared resid	10.95048
F-statistic	55.30886	Durbin-Watson stat	0.445016
Prob(F-statistic)	0.0000		
Akaike info criterion	Schwarz criterion	Hannan Quinn criterion	
0.871872	0.958687	0.906771	

The study found the following results:

1. There is an inverse relationship between the rise of oil prices and international reserves of importing-oil countries of the study sample. The rise in oil prices by 1% leads to a decrease in international reserves by 0.18%.
2. There is a direct correlation between the rise of oil prices and the general level of the price index, which means that the rise in oil prices by 1% leads to a rise in the general level of the price index by 1.23%.

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