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The Impact of Oil Price Shocks on Economic Growth (A Case Study; Selected Six OPEC Countries) During The Period (1995-2014) Panel-Data Models

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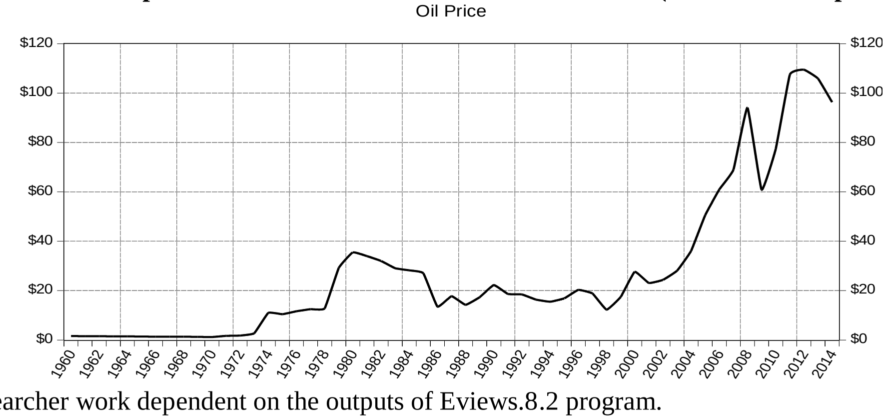
Abstract: This paper examines the impact of oil price shocks on economic growth in selected six OPEC countries. In this regard, we extracted the Petroleum Exporting Countries Data. Variables of the model are GDP, oil price, government expenditure, foreign direct investment, inflation, exports and imports. An annual data for the period 1995 to 2014, for six OPEC countries, including Iraq, Iran, Saudi Arabia, Kuwait, Algeria and Nigeria have been collected. The study uses Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests to establish Stationarity of the Panel Data models. Ordinary Least-Square (OLS), Fixed-Effects Model (FEM) And Random-Effects Model (REM) were used to find out Impact of Oil Price on GDP. To choose between Fixed-Effects Model and Random-Effects Model the Hausman test was applied because it has an asymptotic chi-square distribution. The results of Hausman test indicated that the Random Effect Model was the most appropriate model for the study. The empirical results of the study indicated positive and a significant impact of oil price shocks on economic growth (GDP) of selected six OPEC countries.

Key Words: Oil price shocks, OPEC Countries, GDP, Panel-DataModelsandUnit RootTest**.**

1. Introduction

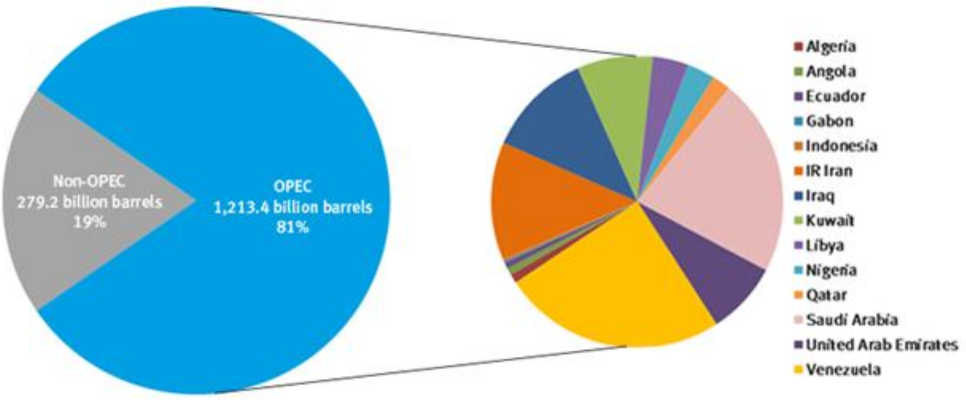
The oil price shock of the economists was considered because of the large impact on macroeconomic variables. The world economy has witnessed various negative and positive changes in the oil price. These changes and fluctuations in world oil prices have impacted on the macroeconomic variables and seriously it has been challenged the economic cases of these countries and has forced them to think of alternatives in order to feel secure about the Negative impacts of such shocks so that the oil-exporting countries which are prone (highly vulnerable) to negative shocks to oil prices, have established the institutions for saving the excess foreign exchange revenues from sales of crude Petroleum at high prices to make use it in the time of incidence of the adverse shocks to Petroleum prices for their own purposes. A high upward trend in the global price of crude oil in recent years, which rose to a record of nominal higher price of US $147 in the mid-2008, has become a major source of concern among economist and policy makers in oil exporting countries and world at large, especially its implication on the macroeconomic performance. oil prices have risen since mid-1999, and continued improvement in oil prices in terms of oil prices exceeded $147 a barrel in mid-2008, but due to financial crisis December 2008 decreased demand for oil, which affected the oil prices during this financial crisis.

Figure 1.Annual nominal prices for OPEC crude oil from 1960 to 2014 (in U.S. dollars per barrel)



Source1: Researcher work dependent on the outputs of Eviews.8.2 program.
Source2: Data from (OPEC, 2016).

Figure2.OPEC Share of World Crude Oil Reserves, 2015



OPEC proven crude oil reserves , at end 2015 *(billion barrels, OPEC share)*

Venezuela	300.88	24.8%	Kuwait	101.50	8.4%	Qatar	25.24	2.1%	Indonesia	3.23	0.3%
Saudi Arabia	266.46	22.0%	United Arab Emirates	97.80	8.1%	Algeria	12.20	1.0%	Gabon	2.00	0.2%
IR Iran	158.40	13.1%	Libya	48.36	4.0%	Angola	9.52	0.8%			
Iraq	142.50	11.7%	Nigeria	37.06	3.1%	Ecuador	8.27	0.7%			

Source: OPEC Annual Statistical Bulletin 2016.

2. Theoretical Framework

Theoretically, higher oil price necessitates the transfer of income from the oil importing to the oil exporting countries. The extent of the direct effect of increase in oil price largely depends on the share of oil on national income, whether the final users will be able to switch to the alternative source or they can be able to reduce their consumption, it also depends on how much the price of Gas rises because of a rise in the oil price, the gas intensity of the economy and the impact of higher price of other alternative energy sources that compete with, in the case electricity are generated from the gas, the bigger the increase in the price of oil, the bigger the macroeconomic implication (Majidi, 2006).

3. Empirical Framework

Mendoza and Vera (2010) following, Mork (1989), Lee et al (1995) and Hamilton (2003) In the case of Venezuela, studied the asymmetric impacts of oil price shocks on an Oil-exporting Economy using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model data used over the period 1984 to 2008. The results of the researcher showed a significant positive impact of oil price shocks on economic growth. Moreover, the results indicated that the economy of Venezuela has been more responsive to positive the oil price shocks as compared to negative shocks.

IMF (2000) examined the impact of oil price shocks (specifically oil price increase) on the global economy, the study found that impact of an oil price of U.S. $5 has greater consequence on the economy of developed countries than for developing nations in group, with variation in term of the relative size of oil importing to exporting nations accounting for much of the disparity; while oil price fluctuation was specifically lower the aggregate demand there by transferring income from the net oil importing countries to the net oil exporting countries. The result further indicates that the degree of openness, oil intensity level in domestic production, exports and imports accounted for some of the discrepancies. The result also concludes that there is a positive correlation between oil price changes and economic growth of oil-producing nations.

Blanchard and Gali (2007) Using VAR model analysis, found that relationship between oil price fluctuation and output in England, US, France, Germany, Japan and Italy changes from negative to become positive from 2000s oil shocks as compared to 1970s and 1980s shocks. Also, there is a minimal impact on GDP, consumer price index and wages during the period under review. Lardic and Mignon (2006) on twelve European countries found that higher oil price affects aggregate economic activity better than lower oil price. In 2007, a study on US economy shows that a 10% increase in oil price leads to a decrease of 1.4% of its real GDP. Nevertheless, oil price increase has no significant effects on US inflation.

Yahia and Metwally (2007) examined the effect of oil prices shocks on Libyan economic growth using data during the period 1963-2004 and applied a Koyck distributed lag scheme, also used Cointegration analysis to examine the long run trade relationship between Libyan oil exports and its GDP. The results indicated that are spread impacts from oil exports to the rest of the economy. The results of Cointegration analysis suggested that there is no long run linkage between Libyan non-oil GDP and oil exports.

Ito (2008) and Ito (2010) in the case of Russia studied the impact of oil prices on the inflation level and real GDP. In the former study, the author used the model Vector Autoregressive (VAR) model during the period

1995 to 2007 and the results indicated that the inflation and real GDP responded positively oil price when increase the oil price a positive relationship between them. In a later study, the data during the period 1997 Q1-2007 Q2; using Vector Error Correction approach the author came up with a similar result. The examination leads to the finding that a 1 percent increase in oil prices leads to real Gross domestic product responds growth by 0.25 percent over the next 12 quarters, whereas that to inflation by 0.36 percent during the corresponding periods.

Mehrara (2008) investigated the asymmetric impacts of oil revenues on output growth in 13 oil-exporting economies, namely; Algeria, Libya, Kuwait, Iran, Nigeria, Saudi Arabia, Qatar, United Arab Emirates, Ecuador, Indonesia, Mexico, Colombia and Venezuela using applying two different oil shocks measures and a dynamic panel framework and annual data over the period 1965 to 2004, the researcher found that positive oil shocks were dominated by negative shocks. The adverse impacts of the oil bust on economic growth and continued over a long while a limited role has been played by oil booms in stimulating economic growth.

Samimi and Shahryar (2009) examined the impact of oil shocks on output and inflation in 6 OPEC members, including Saudi Arabia, Nigeria, Iran, Venezuela, Kuwait and Indonesia using annually data from 1970 to 2005, includes on three variables which are real oil price growth, inflation real output growth and using applying structural vector autoregressive (SVAR) method. The results showed that in long term, the effect of oil price shocks on the real economic growth was positive for all the countries, but not Kuwait. In Kuwait, this effect was negative in the long-term, but positive in the short-term. The real Gross Domestic Product was positively impacted by supply side shocks in each economic and for Saudi Arabia, Iran and Kuwait; in long term, this effect was more permanent as compared to the others. In long term, there was a permanent impact and more positive of demand side shocks on inflation as compared to supply side shocks.

Monjazeb, Souri and Shahabi (2013) examined the effect of oil price shocks and economic growth of Petroleum Exporting Countries applying the annual data over the period of 1990 to 2009 for 26 oil-exporting economies, namely; Sweden, America, Germany, Iran, Netherlands, Australia, Brazil, Belgium, Britain, Denmark, France, Kenya, Japan, Norway, Singapore, Canada, Bangladesh, Egypt, Indonesia, Italy, Norway, Mexico, Kazakhstan, Malaysia, Venezuela and Thailand using the panel data regression model with both fixed and random method. Variables of the method are GDP growth, gross capital formation, employment ratio, the real price and the actual price of oil and gas. The results showed that the negative shocks of oil prices have a negative impact and the positive shocks of oil prices have a positive impact on the GDP growth of oil exporting countries.

Edirneligil and Mucuk (2014) examined the impacts of oil price on Turkish economic growth, using annual data during the period 1980 - 2013. Applying the VAR model, unit root test (ADF) to stationarity data, Impulse-Response Function, Variance Decomposition tests and Johansen Cointegration Test. The results indicated no relationship between in the long-run; oil price shock has a negative effect on GDP in the short run and short-term relationship between oil price and GDP.

Monesa and Qazi (2014), investigated the impacts of oil price fluctuations on economic growth of oil-exporting economies, using variables GDP growth, investment, exchange rate and the inflation of six OPEC countries using annual data during 1980 to 2013, Applying Augmented Dickey-Fuller (ADF) to establish Stationarity of the time series and Ordinary Least Squares (OLS) model with Vector Autoregressive (VARX) to estimate the impacts of oil price shocks on GDP growth of the six OPEC economies during the period 1980 - 2013. The results indicated a significant negative effect of oil shock on economic growth of Algeria, a significant positive effect of oil price shock on economic growth of Venezuela, a significant positive effect of oil shock on inflation rate of Iran and a significant negative effect of oil shock on inflation rate of Venezuela, whereas, results for rest of the countries and variables were found insignificant.

Kurihara (2015), examined the relationship between economic growth and oil prices in Developed Countries using VAR model, included on three variables real GDP,real effective exchange rate and oil price, using Quarterly data during the period 1990 to 2015(q1). The empirical analysis found a positive relationship, oil price increases cause significant economic growth in the European Union, Japan, and the United States. Also, the results also show that appreciation to all local currencies brings economic growth.

4. Research Methodology

4.1. The Unit Root (Stationarity) Test

Unit root test is used to find out the integration degree in time-series of economic variables under study to see if it is stable or not. The most contemporary methods in determining the stability of the data is a unit root tests, and its idea depend on the following equation:

$y_t = y_{t-1} + \varepsilon_t$ …….(1)

Where:

y_t:the variable at time (t),
ε_t: disorder standard which is characterized bywhite noise, with mean equal to zero (μ)=0, Cov =(ε_t)=0, and Var=(σ^2=1).
When (P=1) statistically acceptable, it refers to instability case, and the data suffers from (unit root), therefore we must processing each data which in instability case, by taking differences, and processing the (yt), if it's in instability case, by taking differences of degree (1st d, 2nd d)to make it stationary, Therefore, we say about the time-series (integrated) from degree (d) and we mentioned symbol yt ~ I(d). (Razakand Al-Jubouri, 2012). To find out the Unit Root (Stationarity) we can use tests:

4.2. Augmented Dickey-Fuller Test

The distribution of test Dickey-Fuller Expanded based on the assumptions that the random error term is independent statistically and includes a constant variance. So when you use a method of Dickey-Fuller expanded, we must make sure that the error term is unlinked and it includes a constant variance.(Carlos &Bera, 1980), (Ljung& Box, 1978), (Enders & Wiley, 1995) & (Shapiro. &Wilk, 1965). The ADF's equation after the addition of slowing the values of the dependent variable:

$$\Delta y_t = \beta y_{t-1} + \sum_{j=1}^{k} \beta_j \, \Delta y_{t-1} + \varepsilon_t \quad \text{.......} (2)$$

This test basically depends on estimating the following models:

A) Without Constant and Trend:

$$\Delta y_t = (\rho - 1) y_{t-1} + \sum_{j=1}^{k} \rho_j \, \Delta y_{t-1} + \varepsilon_t \quad \text{.......} (3)$$

B) Without Trend:

$$\Delta y_t = \alpha + (\rho - 1) y_{t-1} + \sum_{j=1}^{k} \rho_j \, \Delta y_{t-1} + \varepsilon_t \quad \text{.......} (4)$$

C) With Constant and Trend:

$$\Delta y_t = \alpha + \beta T + (\rho - 1) y_{t-1} + \sum_{j=1}^{k} \rho_j \, \Delta y_{t-1} + \varepsilon_t \quad \text{.......} (5)$$

Where:
Δ : is the first difference operator,α : is a constant, T : is a Trend Time and K : is a Slowdown period
In sum, the Augmented Dicky-Fuller Test basing on the following hypotheses:
∗ H_o: p=1
∗ H_1: p<0
Where: ∗ H_o: is the null hypothesis (i.e. y_t has a Unit Root).
∗ H_1: is the alternate hypothesis (i.e. y_t does not have a Unit Root).

4.3. Phillips-Perron (PP) Test

Phillips and Perron (1988) have developed and generalization of the Dickey-Fuller Expanded method, where they allowed the existence of a autocorrelation in error term, and Phillips-Perron method is a modification of a Dickey Fuller test which takes into account the restrictions less on error term, where permitted the random error term to be non-independent in a few, with homogeneous distribution. This test is based on the account (unit root) first and then statistical value is converted to eliminate the effects of autocorrelation on the probability distribution of the statistical test (Perron, 1988).This test is conducted in four stages (Ahmed & Sheik, 2013).

1- Estimate by OLS of the three models to test Dickey–Fullerwith an account Statistics.
2- Estimate the short-term variance $\sigma^2 = \frac{1}{n} \sum_{t=1}^{n} e_t^2$ .... (6)
3- Estimate correlation coefficient (Su^2) which is called long-term variance extracted through common variances of residuals previous models, where: $Su^2 = \frac{1}{n} \sum_{t=1}^{n} e_t^2 + 2 \sum_{i=1}^{L} (1 - \frac{i}{L+1}) \frac{1}{n} \sum_{t=i+1}^{n} e_t \, e_{t-1}$ .... (7)

In order to estimate the variance, it is necessary to find the number of delays (L) estimated in terms of observation (n).

4- Statistic account Phillips Peron $t^* = \sqrt{K} \frac{P-1}{\sigma} + \frac{n(K-1)\sigma}{\sqrt{K}}$ .... (8)

Where: $K = \frac{\boldsymbol{\sigma^2}}{Su^{\mathbf{2}}}$ .... (9)

Phillips Perron's test, is used the same formulas and values tabular, which takes in test Dickey – Fuller, where the first formula takes without constant and time trend, the second without trend time, by assuming that the average time-series not equal zero and the third with constant and trend time, if (t) calculated is greater than the (t) Tabulated it means that the time-series is stable.

5. Panel Data Models

The panel-data models come in three main forms:

1- Pooled(OLS) Model (PM).
2- Fixed Effects Model (FEM).
3- Random Effects Model (REM).

Suppose we have (N) of Views in cross-section measured in (T) of time periods; in this case the panel-data model writes as follows:

$y_{it} = \beta_{o(i)} + \sum_{j=1}^{k} \beta_j X_{j(it)} + \varepsilon_{it}, \quad i=1,2\ldots..,N \quad t=1,2\ldots..,T$ …….(10)

Where: yit is the dependent variable value in the observation (i) in the time period (t), βo(i) is the value of the intersection point in the observation (i), βjis the value of the slope of the regression line, Xj(it) is the independent variable value(j) in the observation (i) in the time period (t), $\varepsilon_{it}$is the error value in observation (i) in the time period (t), It is worth to mentioning here that (i) is means number of countries under study (six Petroleum Exporting Countries (OPEC)).

5.1. Pooled (OLS) Model

This model is one of the simplest models in panel-data, where all parameters ($\beta_{o(i)}, \beta_j$) are constant (reject any effect of time). When rewrite the model in the equation (10) we will get Pooled Regression Model OLS as in following formula:

$y_{it} = \beta_o + \sum_{j=1}^{k} \beta_j X_{j(it)} + \varepsilon_{it}, \ i=1,2\ldots..,N \ t=1,2\ldots..,T$ …….(11)

Where $Var(\varepsilon_{it})=\sigma\varepsilon^2$ and $E(\varepsilon_{it})=0$

Using ordinary least squares method to estimate model parameters in the equation (1) (Greene, W., H, 2012) after rearranging the values of the dependent variable and independent variable, starting from the first cross-sectional data set, with number of observations and by amount of (N*T).

5.2. Fixed-Effects Model (FEM)

Is a mathematical or econometric model that presumes variables observed as independent variables and treat them as if they occurred not by chance, it has an ability to control individual differences caused by factors that doesn't change over time (such as culture, gender religion). One of it is set – back is that it cannot be used for the variable that does not change over time (time–invariant) to determine their impact on the dependent variable. But its advantage is that those features that do not change over time are treated as an exceptional to the individual and doesn't compare it to any other individual's features. If residuals are interrelated, fixed effect is not the deserve model to be use, because, the generalization perhaps be incorrect and there is a need to model that relation (Kohler Ulrich, 2008).

In the fixed effects model the target is knowledge of the behavior of each data set, separately by making parameter of the section β_o varying from set to other, with the survival of slope coefficients $\beta_j$constant of each data set (Which means we will deal with Heteroscedasticity case, between sets), Accordingly; the fixed effects model will give the following formula:

$\mathbf{y}_{it} = \beta_{o(i)} + \sum_{j=1}^{k} \beta_j X_{j(it)} + \varepsilon_{it}, \ i=1,2\ldots..,N \ t=1,2\ldots..,T$ …….(12)

Whereas Var(εit) =σε2 and E(εit) =0

The fixed effects concept means, that parameter for each cross-sectiondo not change over time (time invariant), but the only change happens in data set (Gujarati, 2003). For the purpose of estimating the parameters of model in the equation (2), and allow the parameter of βo to change between cross-sections, usually use Dummy Variables its value (N-1) to avoid the perfect multicollinearity (Greene, 2012), Then use OLS regression. The fixed effects model called (Least Squares Dummy Variable Model). After adding dummy variables D to the equation (2), the model becomes as follows:

$yit = \alpha 1 + \sum_{d=2}^{N} \alpha dDd + \sum_{j=1}^{k} \beta j \ Xj(it) + \varepsilon_{it} \quad , i=1,2\ldots..,N \ t=1,2\ldots..,T$ …….(13)

Where an amount ($\alpha 1 + \sum_{d=2}^{N} \alpha dDd$) is a change in cross-sections of partβo

And the model also can be written in equation (3) after deleting α1 as follows (Gujarati, 2003), (Greene, 2012):

$yit = \sum_{d=1}^{N} \alpha \ dDd + \sum_{j=1}^{k} \beta j \ Xj(it) + \varepsilon_{it} \quad , i=1,2\ldots..,N \ t=1,2\ldots..,T$ …….(14)

5.3. Random-Effects Model (REM)

In Random effects model, will be treated with coefficient $\beta_{o(i)}$ as arandom variable has a μ value, i.e.

$\beta_{o(i)} = \mu + V_i \ , i=1,2\ldots..,N$ …….(15)

By substitution Equ (15) in Equ (12) we get a random effects modelas follows:

$\mathbf{y}_{it} = \mu + \sum_{j=1}^{k} \beta_j X_{j(it)} + V_i + \varepsilon_{it}, \ i=1,2\ldots..,N \ t=1,2\ldots..,T$ …….(16)

Where $V_i$represent error term in the cross-section data set (i). The random effects model sometimes called (Error Components Model), because of that the model in equation (6) it contains two (2) components for error V_i&ε_{it}.

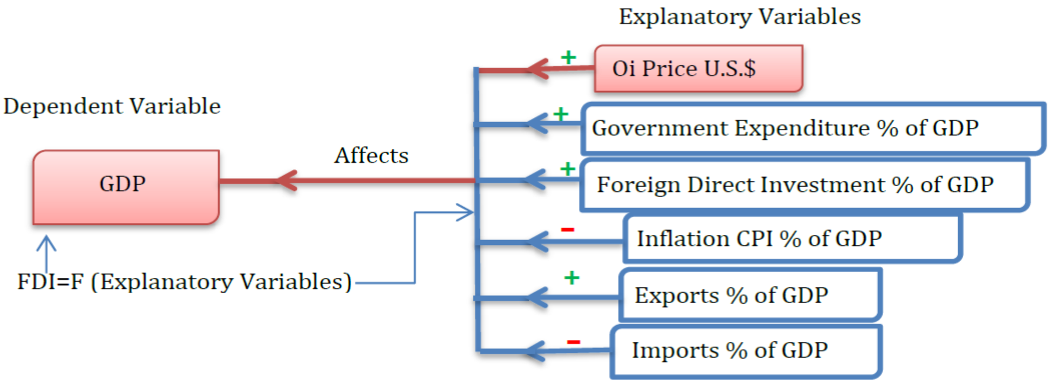
The random effects model has mathematical properties, one of them that:
$Var(\varepsilon_{it})=\sigma_{\varepsilon}^{2}$, $E(\varepsilon_{it})=0$, $Var(V_i)=\sigma\varepsilon^2$, $E(V_i)=0$.
Suppose we have(Composite Error Term) as follows:

$W_{it} = V_i + \varepsilon_{it}$ .... (17)
Where:
$E(W_{it})=0$ .... (18)
$Var(W_{it})= \sigma_V^2+\sigma_\varepsilon^2$ .... (19)
(OLS) Ordinary least squares method, fail to estimate the parameters of random effects model, because it gives incompetent estimates and has standard errors incorrect, which affect in the parameters test, that's because of covariance between $W_{it}$and$W_{is}$is not equal to zeroi.e.
$Cov(W_{it}, W_{is})= \sigma_V^2=0$,t=s .... (20)
For the purpose of estimating random affects model parameters,usually used, Generalized Least Squares (GLS), (Green, 2012).

6. Model Specification

Regression equationapplying is following:
$GDP_{it} = \beta_0 + \beta_1 OP_{it} + \beta_2 GE_{it} + \beta_3 FDI_{it} + \beta_4 IN_{it} + \beta_5 X_{it} + \beta_6 I_{it} + □_{it}$ .... (21)
Where:
GDP= Gross Domestic Product.
OP= Oil Price.
GE= Government Expenditure.
FDI= Foreign Direct Investment.
IN= Inflation.
X= Exports.
I = Imports.
□= Error Term.

Figure3.The Conceptual Framework of Relationships between Variables:



7. Empirical Results

7.1. Descriptive Statistics

Table1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Years	120	2004.5	5.790	1995	2014
Country code	120	3.5	1.127	1	6
Log GDP	120	25.489	1.014	21.337	27.348
Log oil price	120	3.837	0.690	2.583	4.733
Government Expenditure	120	16.081	6.289	2.331	32.191
Foreign Direct Investment	120	1.353	1.658	-1.315	8.496
Inflation	120	15.481	32.718	-19.576	295.36
Exports	120	41.944	16.372	005.0	77.898

Imports	120	28.618	11.499	015.0	76.841

Source: Author's computation using Stata 9.2 program.

7.2. The Unit Root (Stationarity) Test

Table2. Summary results of the Unit Root (stationarity) test:

Variables	**ADF** test (constant and a general trend)	**Prob**	**PP** test (constant and a general trend)	**Prob**	**Results**
GDP	36.03	0.0003*	55.83	0.0000*	1St Difference
OP	21.22	0.0005*	34.68	0.0472*	1St Difference
GEX	19.21	0.0835***	24.88	0.0154**	At Level~ I(0)
FDI	36.22	0.0003*	79.87	0.0000*	1St Difference
INF	47.27	0.0000**	100.29	0.0000**	At Level~ I(0)
EX	34.84	0.0005**	25.51	0.0126**	At Level~ I(0)
I	23.52	0.0236**	20.22	0.0629***	At Level~ I(0)

Source: Researcher work dependent on the outputs of Eviews 8.1 program.
Note: *Significant at 5% level and Integrated, when taking (1St,d)(1)
**Significant at 5% level and Integrated, from the zero degree I(0)(2)
***Significant at 10% level and Integrated, from the zero degree I(0) (3)

From the table 2 shows that according to ADF test and PP test with a constant and a general trend (trend and intercept), that the time-series of GDP, Oil price, Foreign direct investment; are not given the degree of stillness identical at level, but it becomes identical after taking the first difference to them. And also significant at level 5%, which means Integrated, from the degree …I(1st… d).Inflation rate and exports are stable at the level with significant at level 5% and while imports and Government Expenditure showed stable at the level 10%, we say (integrated, from the zero degree)... I(0). These results indicate that all data (time-series) integrated and stable.

7.3. Pooled (OLS) Regression

Table3. Pooled Regression Results:

Log GDP	**Coef.**	**Std. Err.**	**T.statistics**	**P>|t|**
Log oil price	0.928***	0.091	10.19	0.000
Government expenditure	0.028***	0.010	2.63	0.010
Foreign Direct Investment	0.057	0.036	1.59	0.115
Inflation	-0.009***	0.001	-4.82	0.000
Exports	-0.007	0.005	-1.48	0.142
Imports	-0.023**	0.007	-3.35	0.001
Constant	22.525	0.421	53.38	0.000

Note:*** Significant at 1% level.** Significant at 5% level. * Significant at 10% level.

The estimate regression equation as follows:
Log GDP = 22.525 + 0 .928 log(OP) + 0.028 (GE) - 0.057 (FDI) – 0.009 (IN) -0.007 (X) - 0.023 (I)

7.4 Fixed-Effects (Within) Regression

Table4. Fixed Effects (within) Regression Results:

Log GDP	**Coef.**	**Std. Err.**	**T – value**	**P>|t|**
Log oil price	0.931***	0.054	17.18	0.000
Government Expenditure	0.021*	0.011	1.95	0.053

(1) EViews 8.1 program outputs, See: (1St d) means: the data integrated when taking the first-difference.
(2) I(0) means: the data Integrated from the zero degree, which means significant at levels (5%).
(3) I(0) means: the data Integrated from the zero degree, which means significant at levels (10%).

Foreign Direct Investment	-0.045*	0.025	-1.79	0.075
Inflation	-0.007***	0.001	-6.46	0.000
Exports	0.010**	0.004	2.42	0.017
Imports	-0.017***	0.005	-3.23	0.002
_ Cons	21.801***	0.313	69.46	0.000

Note: *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.
Probability > F = 0.000. R-sq = 0.82

LogGDP =21.801 +0.931 log(OP) + 0.021 (GE) - 0.045 (FDI) – 0.007 (IN) +0.007 (X) - 0.017 (I)

7.5 Random-Effects (Within) Regression

Table5. Random Effects (within) Regression Results:

Log GDP	Coef	Std. Err.	z-value	P>|t|
Log oil Price	0.928	0.091***	10.19	0.000
Government Expenditure	0.028	0.010***	2.63	0.009
Foreign Direct Investment	0.057	0.036	1.59	0.112
Inflation	-0.009	0.001***	-4.82	0.000
Exports	-0.007	0.005	-1.48	0.139
Imports	-0.023	0.007*	-3.35	0.001
_ Cons	22.525	0.421***	53.38	0.000

Note: *** Significant at 1% level. ** Significant at 5% level.* Significant at 10% level.
Probability > chi2 = 0.000. R-sq= 0.73

LogGDP=22.525 +0.928 log(OP) +0.028 (GE)-0.057 (FDI) -0.009 (IN) -0.007 (X) -0.023 (I)

8. Hausman Test

H0: Fixed Effect Model is appropriate (Null Hypothesis).
H1: Random Effect Model is appropriate (Alternative Hypothesis).

Table6. TheHausman Test

Log GDP	B Fixed	B Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Log Oil price	0.931	0.928	0.002	.
Government Expenditure	0.021	0.028	-0.006	0.0026403
Foreign Direct Investment	-0.045	0.057	-0.103	.
Inflation	-0.007	-0.009	0.001	.
Exports	0.010	-0.007	0.017	.
Imports	-0.017	-0.023	0.006	.

Source: Author's computation using Stata 9.2

Probability > chi2 = -48.40

From the table 6 above shows the result of Hausman test. The probability value is not significant at all respective levels of significance (that is, Probability > chi2 = - 48.40). The criteria here is that, if probability value is significantat 0.05 level, fixed effects should be accepted as valid model otherwise it is random effect model should be accepted. Therefore, with regards to this research, random effect results are accepted.Here the p-value for the test is - 48.40 is less than 0.05 but not significant levels; consequently, we reject Null hypothesisand that the alternative hypothesis is accept. Hence, Random effect model is the most fitting according to this test.

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9. Diagnostic Tests:

9.1. Testing for Random Effects Breusch-Pagan Lagrange Multiplier (LM)

Table7 Random effects Test:

Breusch and Pagan Lagrangian multiplier test for random effects:
LogGDP [countycode, t] = Xb + u[countycode] + e[countycode,t]

Estimated results:

Estimated results:	Var	sd = sqrt(Var)
Log GDP	1.028	1.014
E	0.129	0 .359
U	0	0

Test: Var(u) = 0 Chi2 (1) = 263.60 Prob> chi2 = 0.000

- Null hypothesis, H0: Random effect is not appropriate and ordinary least square (OLS) is appropriate.
- Alternative hypothesis, H1: Random effects are appropriate and ordinary least square (OLS) is not appropriate.

If P – value < 5% and conclude that Random effect are appropriate, therefore we acceptance alternative hypothesis (H1) and reject (H0) null hypothesis.

For this study the P – value is less than 5% which's equal to 0.000 indicating significance, as it is shown in Table7 above, therefore the decision is to acceptance alternative hypothesis (H1) which states that the Random effects are appropriate and ordinary least square (OLS) is not appropriate. Hence we reject the Null hypothesis (H0). Random effect is not appropriate and ordinary least square (OLS) is appropriate. Hausman test and Breusch-Pagan Langrangian Multiplier tests both indicated Random effect to be the most fitting and suitable model to estimate our data. Therefore, the Random Effect result presented above is the appropriate and accurate estimation for this analysis.

9.2. Testing for Cross-Sectional Dependence/Contemporaneous Correlation Using Breusch-Pagan LM Test of Independence:

Cross – Sectional Test of Independence using Breusch-pagan LM
CORRELATION MATRIX OF RESIDUALS:

	__e1	__e2	__e3	__e4	__e5	__e6
__e1 Iraq	1.0000					
__e2 Iran	0.6302	1.0000				
__e3 Saudi Arabia	0.5319	0.7812	1.0000			
__e4 Kuwait	0.5404	0.7724	0.8335	1.0000		
__e5 Algeria	0.4682	0.8098	0.8299	0.8206	1.0000	
__e6 Nigeria	0.4099	0.5601	0.6453	0.4477	0.4662	1.0000

Breusch-Pagan LM test of independence: chi2 (15) = 128.542,Prob = 0.0000
Based on 20 complete observations over panel units

The correlation matrix above shows the result of correlation of the residuals among the countries. The idea is to find out whether one country residuals have a relationship to other country residuals. It has null hypothesis of H0: residuals across countries are not correlated and alternative hypothesis of H1: residuals across countries are correlated. The decision, is to reject null hypothesis if P – value < 5% critical value. Therefore, from the results, null hypothesis was rejected and conclude that residuals across countries are correlated.

9.3. HeteroscedasticityTest

Modified Wald test for group wise heteroscedasticity
In fixed effect regression mod

H0: sigma (i) ^2 = sigma^2 for all i
H1: sigma (i) ^2≠ sigma^2 for all i
chi2 (6) = 38.09
Prob> chi2 = 0.0000

Therefore, from the result null hypothesis can be rejected and conclude that the error terms didn't have constant variance (that is, error terms are heteroscedasticity).

10. Conclusion

This research investigated the impacts of oil price shocks on economic growth in six selected oil exporting (OPEC) countries: Iraq, Iran, Saudi Arabia, Kuwait, Algeria and Nigeria. In this study the annual data on seven macroeconomic indicators (GDP, oil price, government expenditure, foreign direct investment, inflation, exports and imports) of six OPEC economies have been used for analysis over the period 1995 to 2014. Base on the results found from the data analyzed. The following conclusions were made:

To choose between Fixed Effect Model (FEM) and Random Effect Model (REM) the Hausman test was applied because it has a distribution asymptotic Chi-square. The results of Hausman test indicated that the probability value (Probability chi2 = -48.40) is not significant and less than 5% meaning that the null hypothesis is rejected and that the alternative hypothesis is accepted, which imply that, the Random Effect Model (REM) is more appropriate model to find out the effect of Oil Price on GDP of oil exporting countries.

Base on the results found from the data analyzed. The following conclusionswere made after choosing best model in this study is Random Effects Model:

The result of Random Effect Model of the study also shows that,oil Price and Government Expenditure had a positive significant impact on GDP, also Foreign Direct Investment a positive but not significant in our case. It was found that Inflation and Imports are negative significant on GDP, also Exports negative but not significant in our case. Increase in Oil Price has a positive impact on the GDP of oil exporting countries. Because Increase in Oil Price is considered good for oil exporters as it could increase revenues of OPEC(oil-exporting) countries.

The empirical findings of the study indicated a significant positive impact of oil price shocks on economic growth proxy, which is GDPof selected six OPEC (oil-exporting) countries. This result supports the studies conducted by Umar and AbdulHakeem (2010) and Ito (2008 and 2010).

11. Recommendations

- Policy makers in oil exporting countries must to focus on how to stabilize the macroeconomic structure such as GDP of oil exporting countries through diversification of the economy to reduce heavy dependence on the oil.
- Fiscal discipline through the reduction of monetization of the oil proceeds.
- Aggressive saving of the oil proceeds during the oil boom so as to cushion the effect of the future negative oil shocks.

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