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CRUDE OIL PRICES AND ECONOMIC DEVELOPMENT IN LIBYA

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ABSTRACT

This paper aims to examine the effects of oil price shocks on the economical development in Libya during the period 1968-2016, using annual data. A unit root test was conducted, in which the series was shown to be non-stationary in the level, and all variables became stationary in the first difference.. The co-integration model was applied, and the results indicated that there is a long-term relationship of oil prices on the economical development. Finally, this study concludes that increases in oil price did not significantly affect the manufacturing sector in aggregate terms. Moreover, the negative impact on the sector of agriculture Thus, this study has a significant impact in the Libyan economy in policy development on oil prices. The Libyan government needs to control the price to make sure that price volatility will not harm the manufacturing, agriculture and construction sectors.

Keywords: Crude oil price, Economical development, Johansen maximum likelihood method, Libyan, VECM, Granger.

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Contribution/ Originality

This study contributes in the existing literature by analyzing the effects of oil price changes on the economical development of Libya. This study also departs from previous studies relating Libyan economy and oil price changes by looking at the positive and negative impact of oil price changes on economical development.

1. INTRODUCTION

We can see that from the past recent years, oil prices have been quite volatile, the recent decline of crude oil prices since June 2014 is just one round of a series of fluctuations, in the form of fluctuations, in International oil prices. Nevertheless, a debate has arisen about the effect of this price decline on the world economy in general and on oil exporting countries in particular. The economy of Libya, the major oil exporting country, is not an exception in this matter of course.

There is a strong likelihood that sometimes oil prices will increase again, in addition to, many issues have emerged due to rising crude oil prices throughout the world. According to Moradkhani *et al.* (2010) that higher energy prices lead to other prices increase, such as crude oil, which plays an important role in determining the other goods. Also, the rise in oil prices caused the production costs increase, leading to a decline in production. In addition to higher International oil prices lead to increased productivity which negatively influence the economic performance.

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Several previous studies have proved that an increase in oil price can cause a slowdown in GDP (Husain *et al.*, 2015). The subsidy is typically provided to mitigate such problems and eschewal an economic crisis.

Many economic sectors, such as manufacturing, agriculture, transportation, construction, and use oil to produce outputs. Thus the decline in world oil prices is a reflection of weak economic sectors.

According to Aimer (2016) say that 10% rise in oil prices leads to a 54% increase in GDP of Libya. Furthermore, at the industrial level, low oil prices may not only bring down business expenditures for the manufacturing industries, such as logistic companies and aviation industries, but also affect prices on agricultural products as well.

The slowdown in the agriculture sector as a result of higher oil prices, as this agriculture sector inevitably consumes oil to run activities the field of agriculture. Thus, the high price of oil is causing increased expenditures for the agriculture sector, can trigger increased machinery costs and hardware that agricultural producers have to bear (Dhuyvetter and Kastens, 2005). In the context of the construction sector, oil prices high can also affect this sector as it pushes to the height the costs of raw materials.

Suppliers inevitably increase prices of raw material to contractors to cover the high costs of transport. It also caused higher prices higher shipping costs. In the construction sector, and the increase in oil prices leads contractors for higher raw material costs (Copiello, 2016). Similarly, the manufacturing sector is influenced an oil price increase through high production costs. This leads to a decline in the amount of production, which increases the price of products, thus reducing the demand for consumer goods. Rising oil price may impact on the quantity and cost of raw materials purchased principally for producers (Ee *et al.*, 2015) the transport sector is very energy intensive and thus the impact of rising oil prices translated into higher fuel prices is important. It is generally believed that demand for transport is very rigid and thus should be expected only minor modifications. According to Seth *et al.* (2016) explained that as increases in oil prices, transportation costs are affected, thus reducing the demand for transportation.

According to some economists Syed (2010); Ito (2008) and Mallik and Chowdhury (2011) Indicates that if economic growth is not affected fluctuations in the price of oil on economic growth prices policies are not necessary. But these researchers were not considering any nominated sector of the economy for policy making. Before any policy on oil prices, it should first be seen various economic sectors. Torul and Alper (2010); Hanson *et al.* (1993) Which sectors of the economy were taken into account had done so only to achieve the effects of one or two sectors. The manufacturing, agriculture, construction, and transportation sectors are the main economic sectors that substantially contribute to Libyan GDP. For that, this study is trying influence of oil price fluctuations on manufacturing, agriculture, construction, and transportation sectors.

Fluctuations in oil prices, and the important factors in the production process, which affects the financial performance and cash flows of the companies, in turn, impact on the dividend payments companies, retained earnings, and stock prices (Benli, 2008).

furthermore are important steps in this regard, for example, in Taiwan "renewable energy development plan" of the installed capacity of solar power generation capacity planned during the period 2002-2020 in accordance with the aimed to reach 10 percent (Kizgin *et al.*, 2013). This is due to the expansion of derivative financial instruments, which were often responsible for causing the financial crisis in 2008 (Ulusoy, 2011). According to costs Erdoğan (2011) businesses seeking capital, uncertainties affecting the cost of capital are beneficial because it eliminates and reduces compliance costs. Securities, which can be considered as an indication of the accounting standards indicating an increase temporary investments that are bought or sold to firms, the evaluation of the fair value method of marketable securities is another important issue (Erdoğan *et al.*, 2016). Hierarchical structure probably useful in the detection of the theoretical description of financial institutions and in the search of economic factors affecting special groups of stocks (Ulusoy, 2012). The figure 1 shows the annual series of the prices of crude oil (WTI) from 1986-2015.

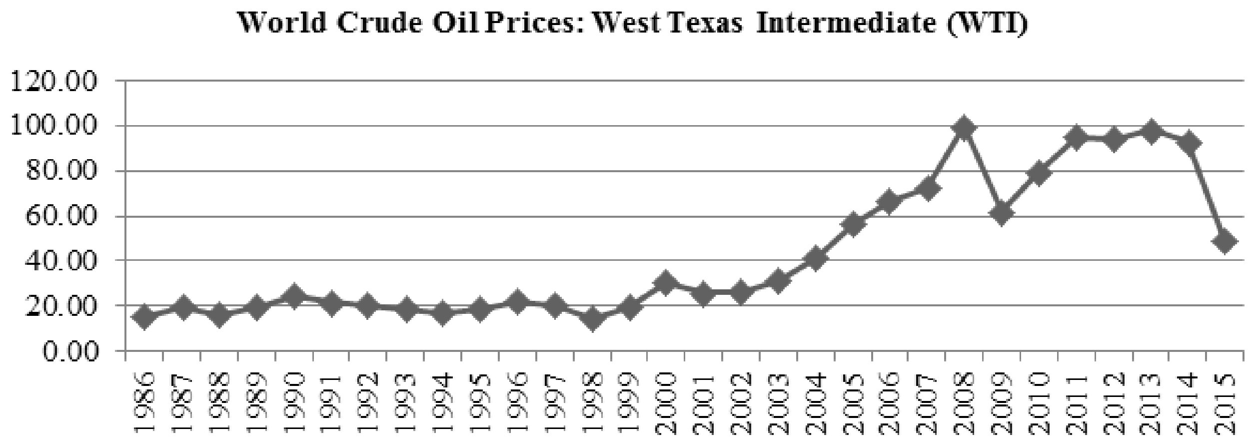

Figure-1. Trends of the Annually, World Crude Oil Price US dollars
Source: US. Energy Information Administration

Libya's is heavily dependent on crude oil exports, and thus fluctuations in oil price are a cause for concern. Resulting in no particular shock in oil prices can have a significant impact on government revenue and the Libyan economy. Thus, this will adversely affect the competitiveness and growth of the non-oil economy.

The main objective of this paper is to estimate quantitatively, in the economy of Libya, whether there exists an impact of oil price shocks on the output of the Industry, agriculture, construction and transport sector, and whether it is a positive or a negative relationship.

To fill out the gap in the literature that is examining the consequences of oil price shocks on this sector using annual data from 1986 to2016, the secondary data were used for the empirical analyses which were derived from the energy information administration. The remainder of this paper is organized as follows: Section II provides an overview of the literature review. The third section presents the methodology of econometrics. While section four describes results and discussion. It concludes with the final section of the paper with the study results.

2. LITERATURE REVIEW ON METHODOLOGY

The issue of fluctuating oil prices, many researchers to investigate the harmful effects of fluctuations in oil prices on the economy have attracted. Consequently, there are many models that have been used by previous research to study the effects of oil prices.

Guidi (2009) this study examined the effect of oil prices changes on the manufacturing and services sector in the UK, using a VAR model, found that positive impact of changes in oil prices on the manufacturing sector. In addition, the positive changes in oil prices determine the continued contraction in manufacturing. Negative changes in oil prices, showing that manufacturing output does not increase significantly despite the lower oil prices. And so much more affected by decrease in crude oil prices than increase. They found that the services sector is much less affected by changes in oil prices from the manufacturing sector.

Torul and Alper (2010) examined the relationship between oil price and the manufacturing sector in the Turkish economy, using the VAR model for the period of 1988 - 2006 data. The researchers concluded that increases in oil prices did not significantly affect the manufacturing sector in aggregate terms and negatively affected by some sub-sectors.

Fukunaga *et al.* (2010) analyze the influence of oil price changes on industrial output of the economies of the United States and Japan, and the results provided evidence that the inverse effect of changes in oil prices in industrial output in most cases seems to varying degrees, both in the oil industry-intensive industry or not.

Shaari *et al.* (2013) explore the effects of oil price shocks on economic sectors in Malaysia, using the Co-integration model, and the results indicated that the long-term effects of crude international oil prices on the manufacturing, agriculture, construction and transportation sectors. In addition, the researcher found that The construction sector depends on the fluctuations in oil prices.

Taghizadeh *et al.* (2015) the impact of volatility in oil prices on economic sectors in Japan. Using employ a VAR model by using quarterly data from Q1: 1990 until Q1: 2014. The researchers found that the industrial and transport sectors were strongly sensitive to sharp fluctuations in oil prices. Moreover, the researchers concluded that after the Fukushima disaster in 2011, which led to the closure of nuclear power plants in Japan, because of increased reliance on oil imports, decreased sensitivity of most sectors of the oil price volatility.

Riaz *et al.* (2016) investigate the impact of the uncertainty of oil prices on manufacturing sector of Pakistan. Using the analysis an EGARCH model. The findings revealed that manufacturing output is non-linearly related uncertainty of oil prices, as initially manufacturing production in Pakistan increases with an increase in oil prices uncertainty, but after a threshold level manufacturing production starts landing with increased uncertainty in oil prices. Moreover, impulse response function is shown short run effects of oil price uncertainty contractionary effects on industrial production.

Mahboub and Ahmad (2016) this study examined the effects of oil price shocks on the manufacturing sector in Saudi Arabia during the quarterly period 2002–2014. Using estimate a VAR model. The study showed that there is no long-term influence of shocks in oil price on the manufacturing sector. The results show that oil price shocks do not affect the manufacturing sector in the short run, and it may have an effect on the manufacturing sector after the tenth quarter.

Although oil prices plays a key role in industrial production and social and economic development of countries, many studies have focused on the existence relationship between oil price shocks and output. This paper will contribute to the existing knowledge through the study of the impact of oil price volatility on the manufacturing industry, agriculture, and construction sector. In addition, this paper is important because it is the first of its kind in Libya in terms of a more robust estimation technique. It would be interesting to discover whether the conclusions concerning the effects of oil prices shocks on output in the economies of oil exporting also apply to a country such as Libya. The aim of our study is to investigate the effects of oil price volatility on the economic sectors of Libya using Johansen co-integration test and vector error correction model (VECM) for a yearly time series data from 1986 to 2016.

3. METHODOLOGY

In this part of the study, the effect of volatility in oil prices on economic sectors by (VECM) model using time series methods of co-integration and Granger Causality techniques. For this purpose, the data set will be determined, thereafter time series properties of the series will be tested. This empirical analysis and focuses on variables (crude oil prices, agriculture, manufacturing, construction and transportation sector) in Libya by the annual time series data from 1986 and 2012. Where:

3.1. Data Analysis

The five variables used in this analysis are comprised of the crude oil price and the four economic sectors, all in logarithmic terms. Table 1 shows the variables and definitions of these variables.

Table-1. Variables and Definitions

Variable	Definition
Log (OIL)	LOG of oil price (WTI).
Log (MAN)	LOG of manufacturing sector GDP.
log (AGR)	LOG of agriculture, hunting, forestry and fishing sector GDP.
log (TRAN)	LOG of transport, storage and telecommunications sector GDP

Source: Authors' compilation.

GDP gross domestic product by economic sector 1986-2016 (At current factor income and in millions of LYD). All the data used were extracted from World Economic Outlook Database.

Table 2 shows the regression result for oil price shock and economic sectors in Libya. As both time series are non-stationary, we examine the interdependence between their annual logarithmic returns, which fulfill the condition of stationarity. The annual logarithmic returns are expressed by the equation: $r_t = \log(\frac{x_t}{x_{t-1}})$ (1)

Where, χ is the average annual value of the variable at time t or (t-1).

Table-2. The regression results for oil price shock and economic sectors in Libya

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMAN	0.472381	0.225227	2.097355	0.0455
LAGR	-0.956326	0.261229	-3.660879	0.0011
LCON	0.714447	0.257390	2.775736	0.0099
C	1.517914	0.874457	1.735837	0.0940
R-squared	0.809686	Mean dependent var		3.539156
Adjusted R-squared	0.788540	S.D. dependent var		0.664600
S.E. of regression	0.305615	Akaike info criterion		0.586934
Sum squared resid	2.521817	Schwarz criterion		0.771965
Log likelihood	-5.097479	Hannan-Quinn criter.		0.647249
F-statistic	38.29017	Durbin-Watson stat		1.397984
Prob(F-statistic)	0.000000			

Source: Computed using Eviews7.

Table 2 shows that the oil price shock has small opposite impact on the agriculture. In other words, Increased oil prices by 1% leads to a decline of $0.95 agriculture sector. Increased crude oil prices by 1% leads to increased manufacturing industry and construction of $0.47 and $0.71 respectively.

The R square value in the Linear Regression equation described that the independent variables describe the dependent variable oil price by almost 81%. The remaining portion of oil price is impacted through other macro-economic variables which is only 19%. The results are described by the following equation

LWTI = 0.472*LMAN - 0.956*LAGR + 0.714*LON + 1.517

This model shows the short- and long-term equilibrium relationship. In the long run, endogenous variables must converge to their co-integrated relations.

3.2. Stationary Test

The first stage, natural logarithms of the series have been taken. Then, stationarity tests have been performed for each series. We must test each of the variables in the levels and in I(1). All variables were tested in levels using the (ADF) test.

3.3. Co-integration Test

The Johansen co-integration test (Johansen and Juselius, 1990) is applied to study the long-run equilibrium relationship between the variables. This test reveals whether non-stationary series at the level act together in the long run. In case of determination of co-integration relationship (co-integration vector) that shows the presence of the long run relationship between variables.

$$x_t = c + \sum_{j=1}^{p} \Gamma_j \, \Delta x_{t-j} + u_t \qquad (2)$$

There are two types of Johansen test, namely; and maximal and trace eigenvalue statistics, both commonly use to ascertain the number of cointegration rank or in determining the number of cointegrating vectors. Both tests might not always indicate the same number of cointegrating vectors. A cointegrating vector is attained when obtained critical values are more the values for maximum and trace eigenvalue statistics.

3.4. The VECM

This is based on a vector autogressive framework; where an error correction term is incorporated into the model. The reason for the error correction term (ECT) is the same as with the standard error correction model, it measures any movements away from the long-run equilibrium and measures the speed of adjustment of the short-run dynamics to the long-run equilibrium time path. The coefficient is expected to be negatively signed, statistical significant and lie between zero and one.

Moreover, the (VECM) model treats all series endogenously thereby allowing the predicted variable to explain itself using its own lags, lags of independent variables, the ECT and the residual.
The VECM can be expressed as;

$$\Delta Y_{1t} = \alpha_0 + \sum_{j=1}^{k} \alpha_{1j} \, \Delta Y_{1t-j} + \sum_{j=1}^{k} \alpha_{2j} \, \Delta Y_{2t-j} + \lambda_1 ECT_{t-1} + \varepsilon_{1t} \qquad (3)$$

$$\Delta Y_{2t} = \beta_0 + \sum_{j=1}^{k} \beta_{1j} \, \Delta Y_{1t-j} + \sum_{j=1}^{k} \beta_{2j} \, \Delta Y_{2t-j} + \lambda_2 ECT_{t-1} + \varepsilon_{2t} \qquad (4)$$

ECT_{t-1} is the lagged value of the error correction model. Coefficients λ_1 and λ_2 show the equilibrium ratio. When Cointegration is considered, α_{1j} from the equation 6 and β_{1j} from the equation are tested whether they are significant in group of F-test and also coefficients of the error correction model λ_1 and λ_2 are tested whether significant or not.

3.5. Granger Causality Test

Causality is a kind of statistical feedback concept which is widely used in the building of forecasting models.
The cointegration tests only give an indication of whether there exists a long- term relationship between crude oil prices and economical development sectors. To determine the direction of the relationship using a Granger causality test (Granger, 1980).

Granger (1980) described one variable (X_t) to granger cause another variable (Y_t) if the lagged values of X_t can predict Y_t and vice-versa. The test is based on the equation below:

$$Y_t = \Upsilon_0 + \sum_{z=1}^{p} \Upsilon_z \, Y_{t-z} + \sum_{i=1}^{q} \lambda_i \, X_{t-1} + u_t \qquad (5)$$

$$X_t = \emptyset_0 + \sum_{z=1}^{p} \delta_z \, X_{t-z} + \sum_{i=1}^{q} \Psi_i \, y_{t-1} + v_t \qquad (6)$$

Testing the null hypothesis of H_0: $\lambda_1 = \lambda_2 = \ldots\ldots = \lambda_z = 0$, is a test that X does not Granger-cause Y. Similarly, testing the null hypothesis of H_0: $\Psi_1 = \Psi_2 = \ldots\ldots = \Psi_z = 0$, is a test that Y does not Granger-cause X. In each case, a rejection of the null hypothesis implies there is Granger causality.

4. EMPIRICAL RESULTS

4.1. Unit Root Test:

Table 3 and Table 4 presents empirical results of the unit root tests and indicate that the logarithms of the variables are all the first difference processes at 5% significance level. The null of unit root can therefore be rejected for the first differences of all variables. Table 2 and Table3 report the results of tests of cointegration.

Table-3. Augmented Dicky Fuller test Results

Variable	**At Level**			**First Difference**			**Order of Integration**
	Non	Intercept, Trend	Intercept	Non	Intercept, Trend	Intercept	
lnWTI	-0.496 (0.492)	-1.651 (0.747)	-1.438 (0.550)	-5.739 (0.0000)**	-5.629 (0.0004)**	-5.658 (0.0001)**	I(0)
lnAGR	0.764 (0.873)	-1.876 (0.641)	-1.956 (0.303)	-5.132 (0.0000)**	-5.692 (0.0004)**	-5.342 (0.0002)**	I(0)
lnCON	0.1.359 (0.9526)	-2.873 (0.1845)	-1.484 (0.5277)	-5.907 (0.0000)**	-6.217 (0.0001)**	-6.244 (0.0000)**	I(0)
lnMAN	0.1.296 (0.947)	-4.824 (0.004)***	-1.5530 (0.5044)	-7.953 (0.0000)**	-8.227 (0.0000)**	-8.258 (0.0000)**	I(0)

Note: *, ** and *** indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% Significance level.

Table-4. Phillips &Perron test Results

Variable	**At Level**			**First Difference**			**Order of Integration**
	Non	Intercept, Trend	Intercept	Non	Intercept, Trend	Intercept	I(1)
lnWTI	-0.459 (0.507)	-1.739 (0.708)	-1.420 (0.558)	-5.740 (0.0000)**	-5.631 (0.0004)**	-5.6661 (0.0001)**	I(1)
lnAGR	1.122 (0.928)	-1.711 (0.7211)	-1.952 (0.305)	-5.263 (0.0000)**	-11.123 (0.0000)**	-5.5212 (0.0001)**	I(1)
lnCON	1.966 (0.986)	-2.803 (0.206)	-1.248 (0.640)	-5.577 (0.0000)**	-10.903 (0.0000)**	-8.973 (0.0000)**	I(1)
lnMAN	2.164 (0.9910)	-3.569 (0.0499)***	-1.475 (0.5322)	-8.0412 (0.0000)**	-13.882 (0.0000)**	-10.383 (0.0000)**	I(1)

Note: *, ** and *** indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% significance level.

Note: D refers to first differences.

Source: Computed by using Eviews 7.

4.2. Cointegration Relations Test (Johansen CoIntegration Test)

The results of the previous section suggest that a long-term relationship may exist between crude oil price and economic sectors which are of the same integration order. Subsequently, Johansen cointegration tests are performed to test the existence of the cointegration relationship between the variables. The results are shown below:

Table-5. Cointegration Relations Test

Hypothesis		**Max-Eigen Statistic**	**Critical Value (Eigen) at 5%**	**Trace Statistic**	**Prob**
H_0	**H_1**				
r =0	$r \geq 1$	27.71566	47.85613	51.84195*	0.0201
$r \leq 1$	$r \geq 2$	13.91955	29.79707	24.12629	0.1952
$r \leq 2$	$r \geq 3$	8.531864	15.49471	10.20674	0.2652
$r \leq 3$	$r \geq 4$	1.674880	3.841466	1.674880	0.1956

Trace test indicates 1 Co-integrating eqn(Guidi) at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level.

Source: Computed by using Eviews 7.

According to the Trace test statistics in Table 4, that both of the trace statistics and the maximum-Eigen value statistics were statistically significant to reject the null hypotheses r=0, r≤1 and r≤2 is rejected by 5% against the alternative hypotheses r≥1 and r≤2. This indicates exists the long-run equilibrium relationship between oil price and all the variables used in the model. According to the Table above, there is one Co-integration, relation between variables (the manufacturing industry - construction - Agriculture - Oil prices) in the long run.

4.3. Vector Error Correction Model (VECM)

Premised on the results of the Johansen Cointegration test which suggests the existence of a long run Cointegration among series and coupled with the I(1) order condition in the series, we further employed (VECM) estimation to analyze the long-run dynamics in the series. Consequently, Table 6 below provides the results of the crude oil price effect on economic development sectors.

Table-6. Results of Vector Error Correction Model

Dependent Variable: DLNWTI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.036748	0.042695	0.860708	0.3976
DLN (agriculture sector's)	-0.912978	0.456351	-2.000604	0.0564
DLN(construction sector's)	0.506634	0.245887	2.060436	0.0499
DLN(manufacturing sector's)	0.158878	0.158036	1.005330	0.3244
DLN(transportation sector's)	1.453051	0.607049	2.393632	0.0266
U(-1)	-0.454946	0.181127	-2.511756	0.0188
R-squared	0.256072	Mean dependent var		0.035218
Adjusted R-squared	0.137043	S.D. dependent var		0.247284
S.E. of regression	0.229716	Akaike info criterion		0.047062
Sum squared resid	1.319231	Schwarz criterion		0.280595
Log likelihood	4.294073	Hannan-Quinn criter.		0.121771
F-statistic	2.151350	Durbin-Watson stat		1.631094
Prob(F-statistic)	0.104107			

Source: Computed by using Eviews 7.

DLN(Oil Prices) = 0.036 - 0.912DLN(agriculture sector's) + 0.506DLN(construction sector's) + 0.158DLN(manufacturing sector's) - 0.454U(-1)

From the above error correction model, the effects of oil price volatility on the agriculture sector's are found to be negative.

That is, a percentage increase in the agriculture sector's will induce a 0.94% decrease in the crude oil price and vice versa.

The effects of oil price volatility on the manufacturing sector's are positive, which satisfies a priori expectation.

Thus, a 1% increase in crude oil prices will cause about a 0.15% increase in manufacturing sector's. In addition, the relationship between the construction sector's and the oil price is positive which confirms that crude oil prices is also being driven by the growing demand from the emerging economies and from all other demanders of crude oil. Thus, a percentage increase in the construction sector's will trigger a 0.50% increase in the crude oil price. The R^2 shows that 25% variation in the oil price is captured in the model while the F-statistics shows the joint significance of all the explanatory variables in explaining the oil price.

The estimation of this model shows the existence of a long-term relationship between oil prices and economic development sectors. This is explained by the fact that the coefficient of error correction is negative and significant in the model. There is relationship in the short term between oil prices and the sectors of agriculture and construction.

In addition, there is a positive relationship between oil prices and the construction sector and agriculture sectors. And that the industry and the agriculture sector is linked to a negative relationship with crude oil price. which means that Libya is very vulnerable to external shocks, particularly the fall in crude oil price. Due to the high dependence on oil and the weakness of the economic base.

We can deduce that crude oil prices volatility have contributed enormously to the economic sectors volatility in Libya, These results are consistent with evidence found by the Kandil (2000) for the Arab States, Torul and Alper (2010) who all demonstrated that changes in oil price had a significant effect on the economic development sectors.

4.4. Granger Causality Test

When there is a Co-integration relationship between the model variables, there must be at least one way causal relationship among this variables. The null hypothesis of the first part is ‘‘Crude oil prices does not Granger cause each of the economic sectors (the agriculture, construction and manufacturing) and the alternative hypothesis states all of the economic sectors does not Granger cause the crude oil prices”. Table 6 provides the causality test results employ (VECM) model in Table 7.

Table-7. The results of pairwise Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob
Oil Prices does not Granger Cause Agriculture sector’s	30	14944	0.7021
Agriculture sector’s does not Granger Cause Oil Prices	30	1.49104	0.2326
Oil Prices does not Granger Cause Construction sector	30	2.51797	0.1242
Construction sector does not Granger Cause Oil Prices	30	1.64669	0.2103
Oil Prices does not Granger Cause Manufacturing sector’s	30	4.33202	0.0470
Manufacturing sector’s does not Granger Cause Oil Prices	30	2.37639	0.1348

Note: *, and ** denote statistical significance at the 1%, and 5% level, respectively.

Source: Computed by using Eviews 7.

Table 7 shows the Granger Causality between the oil price volatility and manufacturing sector, agriculture, and construction. The Granger causality test was performed on the four economic development sectors with crude oil price. There was a demonstrated evidence of economic sectors on oil prices for the four economic sectors. These results were in line with the established theoretical framework as postulated by Hamilton (2008).The results of the Granger causality test show that the oil price Granger cause the construction and agriculture sector. Besides, that a unidirectional causality runs from oil prices in the manufacturing sectors.

However, the results of the Granger causality test showed that crude oil prices does not Granger cause each of agriculture and construction sectors. These results are consistent with economic theory.

4.5. Impulse Response Function (IRF)

The paper uses an impulse response function (IRF) as an additional check of the cointegration test findings. The response of variables to a shock or impulse from one of the other variables can be analyzed via IRF. Therefore, the impulse-response function provides an avenue to estimate other variables’ responses to the shocks that may occur in the future. Impulse response functions are shown in Figure2.

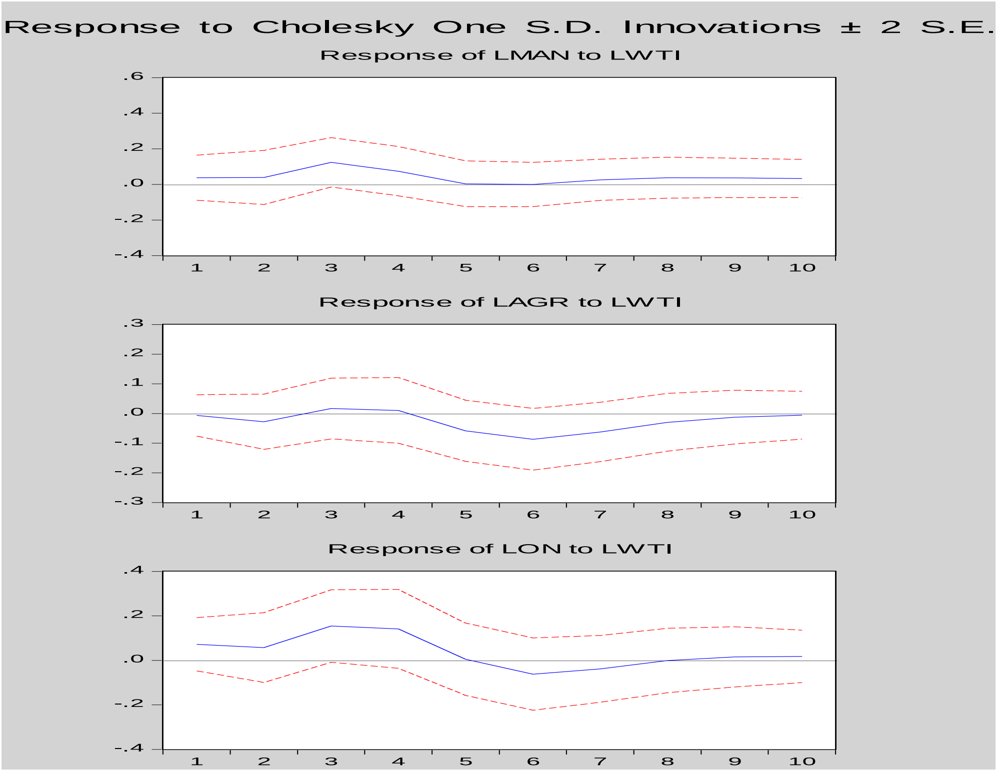

Figure-2. Response of Libya's Economic Sectors to an Oil Price Volatility,1986–2016

Source: Computed by using Eviews 7.

Based on the graph in (Figure 2) leads us to conclude that oil prices has positive effect on the manufacturing sector during the next 10 Periods.

Interestingly, that a one standard deviation shock to the oil price variation lower the agriculture sectors 3 years after the shock and returns to increase it weakly after this date.

Also, oil prices has positive effect on the construction sector during the first five years, then became negative

5. CONCLUSION

This study sought to examine the impacts of oil price volatility on the economical development in Libya using a sample of observations from 1986 to 2016 through using a vector error correction methodology. To this end, a unit root test was conducted, in which data were shown to be non-stationary in all levels, and stationary in the first difference for all variables. Moreover, the cointegration model was applied, and the results showed that one cointegrating equation exists, suggesting the long-term effects of crude oil price on the agriculture, construction and manufacturing sectors. Based on the Granger causality test, oil price volatility can affect agriculture. Crude oil prices instability also effects the performance of the agriculture sector. Besides, the construction sector was found to be dependent on crude oil price. Our study found results that are similar with those of Torul and Alper (2010); Mehrara and Sarem (2009). Based on the results of this paper, this paper has an important implication for the Libyan economy in formulating policies on crude oil price fluctuations. The Libyan government must policies take that grow dramatically and diversify their economic base. This should go hand in hand with measures needed to enhance their capacity to withstand adverse external shocks and reduce their exposure to the fluctuations, reduce dependence on oil.

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REFERENCES

Aimer, N.M., 2016. The impact of oil price fluctuations on the exchange rate in Libya. Imperial Journal of Interdisciplinary Research (IJIR), 2(12): 599-609. *View at Google Scholar*

Benli, T., 2008. Mali Tablolar Analizi: 1-28. Retrieved from http://www.nadirkitap.com/mali-tablolar-analizi-tahir-benli-kitap4369946.html.

Copiello, S., 2016. Economic implications of the energy issue: Evidence for a positive non-linear relation between embodied energy and construction cost. Energy and Buildings, 123: 59-70. *View at Google Scholar | View at Publisher*

Dhuyvetter, K. and T. Kastens, 2005. Impact of rising diesel prices on machinery and whole-farm costs. Manhattan, Kansas: Kansas State University.

Ee, C.Y., A.S. Gugkang and N.H. Husin, 2015. The effect of oil price in Malaysia economy sectors. Labuan Bulletin of International Business and Finance (LBIBF), 13: 1-9. *View at Google Scholar*

Erdoğan, M., 2011. VUK'ndan TFRS'na GEÇİŞ REHBERİ, MUMEYEK Vakfı Yayını:01, İstanbul.

Erdoğan, M., K. İbrahim and G. Salih, 2016. Transferıng marketable securıtıes account group of tucoa to opennıng fınancıal statements accordıng to new Turkısh trade code as of Tfrs. Kastamonu Üniversitesi, İktisadi Ve İdari Bilimler Fakültesi Dergisi, 11: 181-232.

Fukunaga, I., N. Hirakata and N. Sudo, 2010. The effects of oil price changes on the industry-level production and prices in the US and Japan (No. w15791). National Bureau of Economic Research, 20: 1-23.

Granger, C.W., 1980. Testing for causality: A personal viewpoint. Journal of Economic Dynamics and Control, 2: 329-352. *View at Google Scholar | View at Publisher*

Guidi, F., 2009. The economic effects of oil prices shocks on the UK manufacturing and services sector. MPRA Paper No. 16171, 12: 1-35. Retrieved from http://mpra.ub.uni-muenchen.de/16171/.

Hamilton, J.D., 2008. Understanding crude oil prices (No. w14492). National Bureau of Economic Research: 1-52.

Hanson, K., S. Robinson and G. Schluter, 1993. Sectoral effects of a world oil price shock: Economywide linkages to the agricultural sector. Journal of Agricultural and Resource Economics, 18(1): 96-116. *View at Google Scholar*

Husain, M.A.M., M.R. Arezki, M.P. Breuer, M.V. Haksar, M.T. Helbling, P.A. Medas and M. Sommer, 2015. Global implications of lower oil prices (No. 15). International Monetary Fund: 1-41.

Ito, K., 2008. Oil price and the Russian economy: A VEC model approach. International Research Journal of Finance and Economics, 17: 68-74. *View at Google Scholar*

Johansen, S. and K. Juselius, 1990. Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. Oxford Bulletin of Economics and Statistics, 52(2): 169-210. *View at Google Scholar | View at Publisher*

Kandil, M., 2000. Macroeconomic shocks and dynamics in the Arab world. In 7th Annual Conference of Economic Research Forum (ERF).Trends and Prospects for Growth and Human Development, Amman, Jordan.

Kizgin, Y., K. Karaosmanoglu, G. Hiz and T. Benli, 2013. A field study on the determination of the credit card users' awareness of the products/services offered with credit cards: Turkey case. International Journal of Business and Management, 8(13): 13-29. *View at Google Scholar*

Mahboub, A.A. and H.E. Ahmad, 2016. The effect of oil price shocks on the saudi manufacturing sector. The effect of oil price shocks on the Saudi Manufacturing Sector, 18(2): 185-200.

Mallik, G. and A. Chowdhury, 2011. Effect of inflation uncertainty, output uncertainty and oil price on inflation and growth in Australia. Journal of Economic Studies, 38(4): 414-429. *View at Google Scholar | View at Publisher*

Mehrara, M. and M. Sarem, 2009. Effects of oil price shocks on industrial production: Evidence from some oil-exporting countries. OPEC Energy Review, 33(3-4): 170-183. *View at Google Scholar | View at Publisher*

Moradkhani, N., Z.A. Rashid, T. Hassan and A.M. Nassir, 2010. The impact of increasing energy prices on the prices of other goods and household expenditure: Evidence from Malaysia. In Paper Submitted for the 18th International Conference

On Input-Output Techniques, Sydney, Australia. Retrieved from http://www.Iioa.Org/Files/Conference-1/91_20100424051_Sentone.28feb.Doc. Accessed on 2010 Oct 21.

Riaz, M.F., M.H. Sial and S. Nasreen, 2016. Impact of oil price volatility on manufacturing production of Pakistan. Bulletin of Energy Economics (BEE), 4(1): 23-34. *View at Google Scholar*

Seth, D., B.S. Giridhar and S. Krishnaswami, 2016. Impact of crude oil price changes on select Indian industries. International Journal of Social Sciences and Management, 3(2): 87-92. *View at Google Scholar | View at Publisher*

Shaari, M.S., T.L. Pei and H.A. Rahim, 2013. Effects of oil price shocks on the economic sectors in Malaysia. International Journal of Energy Economics and Policy, 3(4): 360-366. *View at Google Scholar*

Syed, N.I., 2010. Measuring the impact of changing oil prices and other macro economic variables on gdp in the context of Pakistan's economy. International Research Journal of Finance and Economics, 52: 40-49. *View at Google Scholar*

Taghizadeh, H.F., E. Rasolinezhad and Y. Kobayashi, 2015. Oil price fluctuations and oil consuming sectors. An empirical analysis of Japan, ADBI Working Paper, July 2015, 539: 1-17. Retrieved from http://www.adb.org/publications/oilprice-fluctuations-oil-consuming-sectors-empirical-analysis-japan/.

Torul, O. and C.E. Alper, 2010. Asymmetric effects of oil prices on the manufacturing sector in Turkey. Review of Middle East Economics and Finance, 6(1): 90-105. *View at Publisher*

Ulusoy, T., 2011. Financial power analysis of countries: Transmitters (Adsorbents). Setters and Unresistants African Journal of Business Management, 2011. Bahar Döneminde Yayında, 5(22): 9088-9108. *View at Google Scholar*

Ulusoy, T., 2012. Complexity of major UK companies between 2006 and 2010: Hierarchical structure method approach. Physica A: Statistical Mechanics and its Applications, 391(21): 5121-5131.