

THE INFLUENCE OF THE OIL PRICE FLUCTUATION ON THE MACROECONOMICS ACTIVITIES: THE CASE STUDY OF LIBYA

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Abstract: Early, there is a significant quickly increase in the incomes from the exports of oil to be around US\$ 625 million in year 1967 from almost US \$40 million in year 1962 means around fifteen-fold. The Libyan oil is a “sweet” crude, which means that it has a low proportion of impurities – a very favorable attribute. Because of that Libya moved from deficit of the balance payment to surplus of the balance payment country. In the same direction, Energy Information Administration, 2013 stated that 96 % of the Libyan economy depend on the hydrocarbon production. EIA, 2013 provides also that Libya around 98 % of all export revenue which represents around US \$4 billion per month (EIA, 2013). In the same direction, Ycharts site (2016) showed that the production of the Libyan Oil fell suddenly in 2013 because of the unstable political situation. Regarding the Ycharts site (2016), Libya produces around 332.000 barrels per day during the first half of year 2016. In the same context, Mills (2008) stated that that Libya is an important member of the (OPEC) Organization of Petroleum Exporting Countries producing country. Libya’s potential as a supplier has been dropped because of the instability political situation. Consequently, the Libyan oil production decreased from a peak of 3.4 million barrels per day in year 1970 to be around only one million barrels per day in 1987. In 2002 and 2006, the oil production reached to 1.4 and 1.8 million barrels per day, respectively. In the same context, Yuan, Kang, Zhao and Hu (2008) point out that the factors "labor, capital, and energy consumption" are important factors underlying gross domestic product which is consisted with (Shaari, Hussain and Ismail, 2013). Moreover, oil prices have a significant contribution to explain the investment by improving the firms’ costs. In the same direction, Ycharts site (2016) showed that the production of the Libyan Oil fell suddenly in 2013 because of the unstable political situation. In the same direction, when the oil prices go down, there are winner and losers. The downstream businesses is one of the winners in a low oil price scenario the because it utilizes crude oil as an input in their factories and marketing processes. Decreasing the oil price leads to lower fuel expenditure for these businesses, increasing their refining limitations and effectiveness. Generally, Petroleum companies are likely to enjoy higher profits in the coming months due to lower oil prices. The cost of the oil for the airline’s operating cost can be estimated approximately 30% of the general cost. Means, decreasing the prices of the oil cost in the producing countries such as Libya that has positive impact on increasing the Since the airline’s operating companies. Because, this drop-in price will decrease the total expenses for the airline’s operating. On the other hand, there are losers from decreasing the oil prices, such as, the exploration and production (E&P) companies, Integrated Oil & Gas Companies and Oilfield Services Companies. These companies will be affected negatively by falling the prices of the oil and gas sector. The Vector autoregression (VAR) model will be used to estimate the impact of the oil prices fluctuations on the macroeconomic variables in Libya over the period 1991 through 2014. The VAR model is developed by Sims (1980) based on Granger causality test. Increasing the oil prices affect negatively affect the unemployment rate. Thus, increasing the cash in Libya opens new opportunity for the governments for investment and constructing new projects which decrease the unemployment rate.

Keywords: oil price, Libyan GDP, unemployment, exchange rates, Stock Capital

1. INTRODUCTION

Libya is facing many issues in banking problems which are increasing with the passage of time. More importantly, the Libyan government should spend more investments and facilities for infrastructure issues which have important impact on increasing the investment in the country. The sea ports of Libya are not enough for the carriage of huge capacity which is another drawback of this country. The Guardian (2011) showed that changing the current strategies is important to attract more investor for enhancing the investment in Libya. The oil and gas sector provide many opportunities for the government and peoples of Libya. Increasing the oil price should be invested to build up its infrastructure through revenue of petroleum sector. Increasing the price oil and gas should increase the employment rate at a maximum level in the country. Increasing the price oil and gas should be invested to build new strategies for attracting new global oil and gas companies such as chevron etc. The Libyan authorities should invest these advantages to explore new oil and gas reserves in the country. Like the previous point, Mainwaring (2013) proposed that the Libyan authorities could invest these advantages find the latest techniques and tools for exploration and production of oil and gas.

It is not the only research to study the relationship between the prices of the oil and macroeconomic variables. Among others, Brown and Yücel (2002), Jones, Leiby and Paik (2004) and Lardic and Mignon (2006) showed that

the changing in the prices of the oil may have influence on economic activity. the authors concluded that increasing in the prices of the oil affect the macroeconomic variables such as employment, profits and investment and core inflation. In the same context, Yahia and Metwally (2007) studied the relation between the fluctuations in oil prices and Libyan economic growth in terms of the gross domestic product. The authors show the percentage of the oil exports as percentage of the Libyan gross domestic product. The oil exports represent around 65% of the Libyan GDP in 2004 which increase from 20 % in 1998. It is important to mention that this percentage changed from 0.47 in 1963 to be 62 % in 1974. Berument, Nildag and Nukhet (2010) stated that there is a statistically significant and positive impact on the outputs in different countries such as, Libya, Egypt, Qatar, and Syria. Koronen and Juunkkala (2007) showed that increasing the oil prices affect positively on increasing the real gross domestic product as well as the earning of exports which create the terms-of-trade effect. Griffin, and Teece (1982) showed that decreasing the prices of the oil and gas in OPEC countries affect directly the gross domestic product in these countries in negative way. Moreover, the economical political Behaviour in these countries will be affected. Apart from the economic factors, the unemployment rate will be increase as well as the inflation will be influenced as direct result of the oil price effects. Libyan government should increase its expenditure as apart from oil sector to build better infrastructure for the peoples of Libya and can be used also as tourism investment to enhance the tourism flows to Libyan destinations. It generates up to 90% of revenue for the government of Libya whereas around 95 percentage of export earnings are through selling of oil and gas. Moreover, oil and gas sector is contributing 80% of GDP in economy of Libya. Oil and the sector is a primary reason for foreign investment in the country. A lot of companies of oil and gas are intending to invest in Libya with the purpose of exploration and production of oil and gas. Finally, we conclude that increasing (decreasing) the oil and gas prices has a significant influence on the economic development generally in Libya and on the macroeconomic indicators, such as gross domestic product, monetary policy, the unemployment rate, and the inflation rate in the country.

2. LITERATURE REVIEW

In this section, the literature review about the association between the oil price fluctuations and the economic is presented. Starting with Farzanegan and Markwardt (2009), the authors investigated the dynamic association between oil price fluctuations and Iran's economy using vector autoregressive model (VAR) over the period from 1975 through 2006. The author showed the descriptive analysis for the co-movement between GDP per capita and oil price over the period 1975: II– 2006: IV. Moreover, they reviewed some selected studies on industrial and developing economies. The model contains the gross domestic products per capita, public consumption expenditures, imports, effective exchange rate, inflation, and real oil prices changes. Also, the author included also five categorical variables such as the Iranian revolution (1979), the Iraq–Iran war (1980–1988), the Iraq–Kuwait war (1990), the financial crisis of South East Asia (1998), the terrorist attacks on the USA (2001) and the Iraq war (2003). The estimated model revealed that the irregular influences of oil price fluctuations. For instance, positive and negative shocks in oil prices lead to significant high inflation. In addition, that there is a significant positive relationship between shocks in oil price and Iranian gross domestic product. Using the same methodology, A Variance Autoregressive (VAR) Model, Umar and Kilishi (2010) investigated the influence of the oil price fluctuations on economic of Nigeria. The authors examined the impact of the explanatory variables Real Gross Domestic Product; unemployment; Consumer Price Index; money supply and crude oil prices. The results show that movements in oil price has contributed to explain the variation in the macroeconomic variables such as the real gross domestic product, money supply, and unemployment. On the other hand, Consumer Price Index is not affected by the oil price.

In the same context, the influence of shock in oil prices on the GDP growth of selected Middle East and North Africa countries (MENA¹⁶) is investigated using a VAR approach over the period 1952-2004. Berument, Ceylan and Dogan (2010) stated the model including the explanatory variables such as Gross Domestic Product, Consumer Price Index, Ratio of Oil Exports to Crude Oil Production, Ratio of Net Oil Imports to the GDP, Oil Price, real Exchange Rate, Inflation and Output Growth. The study showed that movements in oil prices did not have a significant effect on the outputs of oil-importing countries. on the other hand, the authors showed the positive impact of oil prices on output in oil-exporting countries. As one of the most important study, Tang, Wu, and Zhang (2010) examined the effect of the Oil price shocks and their short- and long-term effects on the Chinese economy from June 1998 to August 2008. The authors started with the relation between the oil prices and the economic activities. After that, they stated the econometric model considering the real oil-price, consumer/producer price index, rate of return for industrial companies, real interest rate, real investment toward industry and real industrial. Tang, Wu, and Zhang

¹⁶ Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Libya, Morocco, Oman, Qatar, Syria, Tunisia and UAE

(2010) concluded that high oil prices, negative effect on output and investment, and a positively on the interest rate and inflation rate in China's economy. Concerning the influence of the oil price movements on the macroeconomic factors in Turkey, Akas, Özenc and Arica (2010) used the VAR model to investigate the impact of the oil price fluctuations on the GNP, inflation, unemployment and the ratio of exports to imports over the period 1991:Q2 through 2008:Q2. The results indicated that oil prices are negatively associated with unemployment and the ratio of exports to imports. Also, In Turkey Aydın and Acar (2011) confirmed the economic impact of movements in the oil prices on Turkish economy indicators such as GDP, trade balance, indirect tax revenues, CPI, and carbon emissions. In the same context, Eryigit (2012) shows the fluctuating in oil price in Turkey is associated positively with the stock market and negatively with interest rates and exchange rates. The author used the Variance Autoregressive model over the period 2005: I – 2008:X.

Regarding the Arab countries, starting with Saudi Arabia, Abdalla (2013) mentioned that the oil price fluctuation has a pioneering role to explain the variation in the stock returns. After that, Ftiti, Guesmi, Teulon and Chouachi (2016) showed the association between the oil price fluctuations and economic growth in in Organization of the Petroleum Exporting Countries (OPEC)¹⁷ over the period from 2000 through 2010. The results revealed that the oil price shock short-term and medium-term during the period of fluctuations in financial turmoil and the global business cycle impact on economic growth. Using (VAR) model for the period 2000-2014 in Sudan, Rahma, Perera and Tan (2016) investigated the effect of the of oil prices movements on the GDP growth and unemployment rates. The authors concluded that the oil price has a greater impact on shocks have a negative influence on the gross domestic product growth and the unemployment rate.

3. MODEL STRUCTURE AND DATA

The Vector autoregression model allows the examination of the association of selected variables with each other. Before applying the Vector autoregression model analysis, the stationarity of series is investigated with the Dickey Fuller Unit Root Test, then the first difference of the series are taken out and they made stationary.

Model variables:

In the selection of the included variables, theoretical and empirical studies in the literature are taken as a starting point. The following variables are included in the model.

- 1) Libyan gross domestic products (GDP_i), the variable represents the real gross domestic products in Libya over the period 1991-2014 with US \$ Billion. The data for these variables is available on the World Bank data base.
- 2) stock of labour (SL_i) This variable is an important variable which supposed to effect on the real gross domestic products Libya. The date is available on Index Mundi, 2018. Labor Force, from 1991-2014.
- 3) Stock Capital (SC_i) This variable which represents stock capital in Libya. The date is available on Index Mundi, 2018. Labor Force, from 1991-2011.
- 4) Libyan Oil Price (OP_i): The variable also represents the oil price in Libya which also is supposed to effect on increasing the real gross domestic products Libya over the studying period. The date is available on Libyan annual statistics book various issues.
- 5) Unemployment, total (% of total labor force), the variable represents the unemployment rate (UR_i) of the Libyan total labor. Source is International Labour Organization, ILOSTAT database. Data retrieved in December 2019.
- 6) Inflation (IR_i): The variable is weighted average of prices for different goods. The variable refers to the percent change of the CPI compared to the same month of the previous year. Source is World Bank database.

4. RESULTS AND DISCUSSION

Many macro-economic time series contains a unit root. Therefore, the data need to be made stationary to make a VAR analysis. Unit root tests are important in the examination of the stationarity of a time series. Because, the presence of non-stationary regressors makes many standard hypothesis tests invalid. The following table shows the integration order of the variables using Augmented Dickey-Fuller unit root test (ADF) is used to measure the stationarity of series.

17 United Arab Emirates, Kuwait, Saudi Arabia, and Venezuela

Table 1: the unit root tests for variables in current level and with first differences

Variables		Variables in current level		Variables with the first differences	
		constant	constant and trend	constant	constant and trend
SL _i	C.V	-2.10	-2.59	-5.27	-5.13
	T.V	-3.00	-3.60	-3.00	-3.60
SC _i	C.V	-1.97	-3.38	-7.00	-6.90
	T.V	-3.00	-3.60	-3.00	-3.60
GDP _i	C.V	-1.34	-2.99	-6.78	-6.89
	T.V	-3.00	-3.60	-3.00	-3.60
IR _i	C.V	-3.75	-3.70	-5.42	-5.29
	T.V	-3.00	-3.60	-3.00	-3.60
UR _i	C.V	-0.94	-2.06	-3.10	-3.09
	T.V	-3.00	-3.60	-3.00	-3.60
OP _i	C.V	-0.58	-2.61	-5.15	-5.08
	T.V	-3.00	-3.60	-3.00	-3.60

Source : author's calculation

The previous table shows that all variables are integrated from the first order. Means, the Variables in current level are non-stationary using constant and both constant and trend unit root tests. On the other hand, all variables are stationary after taking the first difference. So, the first difference for all variables will be used in the suggested model (VAR). the following table presents the lag order selection criteria for VAR model formed by GDP_i, SL_i, SC_i, OP_i, UR_i and IR_i variables.

Table 2: The lag order selection criteria for VAR model

VAR Lag Order Selection Criteria						
Endogenous variables: DGDPI DOPI DSCI DSLI DURi DIRI						
Exogenous variables: C						
Date: 01/15/20 Time: 23:13						
Sample: 1 24						
Included observations: 21						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-252.8669	NA	2053.207	24.65399	24.95242	24.71876
1	-214.2890	51.43721	1882.006	24.40847	26.49752	24.86185
2	-120.1064	71.75812*	22.04220*	18.86728*	22.74693*	19.70926*

Source: author's calculation

Table 2 reveals that that appropriate lag order corresponding to the lowest value of LR, FPE, AIC, SC and HQ data criteria is 2 (two). Moreover, the following table examines the relation between the variables using VAR Granger Causality. The null hypothesis can be stated that the oil price cannot cause the Libyan gross domestic product. On the other hand, the alternative hypothesis can be stated that the oil price can cause the Libyan gross domestic product. Similarly, the null hypothesis for other independent variables. The following table shows Vector Autoregression Estimates.

Table 3: Vector Autoregression Estimates

Vector Autoregression Estimates

Sample (adjusted): 4 24

Included observations: 21 after adjustments

Standard errors in () & t-statistics in []

	DGDPI	DIRI	DOPI	DSCI	DSLI	DURI
DGDPI (-1)	0.727335 (0.59006) [1.23265]	-0.006673 (0.09696) [-0.06882]	0.063001 (1.13432) [0.05554]	0.044643 (0.03843) [1.16172]	0.034141 (0.02877) [1.18665]	-0.089107 (0.03941) [-2.26128]
DIRI (-1)	4.352117 (1.90217) [2.28797]	-0.318747 (0.31256) [-1.01981]	-1.481283 (3.65672) [-0.40509]	0.271249 (0.12388) [2.18957]	0.054754 (0.09275) [0.59034]	-0.320829 (0.12703) [-2.52558]
DOPI (-1)	-0.738493 (0.30578) [-2.41514]	-0.015576 (0.05024) [-0.31000]	-0.271286 (0.58782) [-0.46151]	-0.019871 (0.01991) [-0.99783]	-0.008457 (0.01491) [-0.56718]	0.044706 (0.02042) [2.18925]
DSCI (-1)	-9.596471 (9.05160) [-1.06020]	0.883820 (1.48731) [0.59424]	4.982967 (17.4007) [0.28637]	-1.104194 (0.58950) [-1.87310]	-0.620770 (0.44136) [-1.40651]	1.633031 (0.60449) [2.70151]
DSLI (-1)	7.104463 (6.06441) [1.17150]	-0.095854 (0.99647) [-0.09619]	11.48338 (11.6582) [0.98501]	-0.203994 (0.39496) [-0.51650]	-0.091135 (0.29570) [-0.30820]	-0.371201 (0.40500) [-0.91655]
DURI (-1)	1.711319 (5.67654) [0.30147]	0.456365 (0.93274) [0.48927]	11.94703 (10.9125) [1.09480]	-0.587467 (0.36969) [-1.58906]	-0.021260 (0.27679) [-0.07681]	0.982188 (0.37909) [2.59089]
C	0.580850 (2.49452) [0.23285]	0.239347 (0.40989) [0.58393]	8.980287 (4.79544) [1.87267]	-0.153482 (0.16246) [-0.94474]	-0.119227 (0.12163) [-0.98022]	-0.031931 (0.16659) [-0.19168]
R-squared	0.866040	0.783138	0.442646	0.877651	0.448597	0.777129
Adj. R-squared	0.665100	0.457846	-0.393385	0.694127	-0.378507	0.442822
Sum sq. reside	614.6215	16.59441	2271.382	2.606918	1.461286	2.741148
S.E. equation	8.765140	1.440243	16.85001	0.570846	0.427388	0.585358
F-statistic	4.309945	2.407490	0.529461	4.782214	0.542371	2.324600
Log likelihood	-65.25079	-27.32541	-78.97573	-7.890996	-1.813049	-8.418181
Akaike AIC	7.452456	3.840516	8.759594	1.989619	1.410767	2.039827
Schwarz SC	8.099066	4.487125	9.406203	2.636228	2.057376	2.686436
Mean dependent	2.392381	0.058095	3.795238	0.117619	-0.048095	-0.131429
S.D. dependent	15.14612	1.956026	14.27462	1.032162	0.364014	0.784196
Determinant resid covariance (dof adj.)		1.223763				
Determinant resid covariance		0.003740				
Log likelihood		-120.1064				
Akaike information criterion		18.86728				
Schwarz criterion		22.74693				
Number of coefficients		78				

Source : author's calculation

The previous table is exploring the dynamics of the Variance Autoregressive system. As it is obvious from the table that the first lag of the inflation rate affects the Libyan gross domestic product. More importantly, the second lag of the oil price has a significant influence on the Libyan gross domestic products, the stock capital, and the unemployment rate. These results can be revealed from the Variance Autoregressive Granger Causality as provided in the following table. The previous table reveals that the oil prices fluctuations have a significant influence on the

most macro-economic variables in Libya. Precisely, the oil price movement affect the Libyan gross domestic products. Moreover, the stock capital and unemployment rate are sensitive to the fluctuation in oil prices in Libya. On the other hand, the oil price variable does not have impact on the inflation rate in Libya. The results are consistent with previous literature (Aydın and Acar, 2011; Umar and Kilishi, 2010). In the same context with the impact of the oil prices on the gross domestic products, Negi (2015) confirmed the concerning findings by studying the impacts of oil price shocks on gross domestic product in different countries (India, Russia, Brazil, and China). Regarding the unemployment rate, the results is consisting with Rahma, Perera and Tan (2016) investigated the effect of the of oil prices movements on the GDP growth and unemployment rates. Regarding the inflation rate, there are various findings in this concern. for instance, there are studies are Consisting with our findings (e.g. Akas, Özenc and Arica (2010). On the other hand, Farzanegan and Markwardt (2009) and Tang, Wu and Zhang (2010) concluded that the inflation rate is not sensitive for the oil price fluctuations in in Iran.

5. CONCLUSION

This study aimed to investigate the association between the oil price fluctuations in Libya and the macroeconomic indicators (e.g. gross domestic products, the unemployment rate, the inflation rate, the stock capital, and stock labour). Moreover, the VAR model is used over the period 1991 through 2014. According to obtained results, there is no relationship between the variables in the long run. Impulse response functions showed that movements in oil prices has a positive effect on gross domestic product in the short run, means, increasing the oil prices leads to increase the cash income, and this will affect all the GDP components. Furthermore, Finally, more resources and latest techniques should be utilized. Moreover, the government would build strong relationship with European countries. The safety and security are the most important issues for new investors. thence, the Libyan authorities would offer better security on and off responsibility employees. It is important to recognize all obtainable recourse for future improvement in this future investment. The Libyan authorities would try eliminating or reduce the deficit of the balance payment by using the recourses of oil and gas sector

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