OIL PRICE FLUCTUATIONS IMPACT ON THE LEBANESE ECONOMIC WELL BEING

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Abstract

This paper investigates the impact of oil price fluctuation on the Lebanese economic well being during the period from 1988 to 2018 using multivariable ordinary least square method with annual time series. taking the Lebanese GDP per capita as proxy for the economic wellbeing as dependent variable and the crud oil average annual prices as proxy for oil price fluctuations with Labor and gross fixed capital formation as two control variables. The test results show a significant and positive impact for the oil price fluctuations on the Lebanese economic well being and the significant results for control variables. In testing the stationarity for the model using ARMAX and LAD, the tests show good for the models and proof stationarity. Based on the results the Lebanese policy makers should work to minimize the negative impact for the oil price fluctuations on the Lebanese economic well being mainly through refereeing to green investments.

Keywords

1. INTRODUCTION

In the macroeconomic perspective, the increase in fuel oil price usually follows by a decrease in production volume. In aggregate, it will cause a decrease in total production as well as national income and an increase in unemployment. These conditions are unexpected by the government, business people, or the society in general. The fluctuation will surely influence the macroeconomic condition, especially national income, inflation, poverty, and job opportunity. Lebanon as oil importing country and expected offshore oil exploration in the coming years,the impact of fuel price fluctuation varies. Several studies have been conducted after oil price crisis in 1970s indicated that the increase in fuel price shock had negative and significant influence on national income. Since 1991, after the end of the Lebanese civil war, the Lebanese government in its reform and restructuring strategies has made several policies to stimulate economic growth. For this purpose, the Lebanese government debt increased rapidly and the major reason for this increase beside the high public debt service rate is the government expenditure on electricity sector which relay directly over 95 % on imported fuel. Beside on this fact,the oil price fluctuation would highly affect the Lebanese economy. In macro-economy, however, the governmentstill faces some major problems represented as the increase deficit in the state budget, and the slight incremental increase in economic growth. An increasing budget deficit gives pressure to state budget, especially in expenses side since the government should pay principal repayments and the interest. Oil price shocks have different influence on the economies due to which the oil price increase cause an increase in the manufacturing production cost thus decrease the production supply potential and off course increase in unemployment (Lardic and Mignon, 2008; Akhmad and Amir (2018). Accordingly, the increase in the oil prices would lead to negative impact on consumption and investment. One important and most harmful impact for the oil price increase in the economy is the increase in inflation rate. As a result, this inflation increase would lead toincrease the demand for a wage raise (Lardic and Mignon, 2008). In treating the above topic, this paper is composed of 5 sections, the first is the introduction followed by overview on the Lebanese economy and global oil prices. The third section is the methodology followed by the results and findings and finally the conclusions.

2. LITERATURERE VIEW

Several studies focused on testing the relationship between the oil price fluctuation and economic growth due to the important role for oil in the global economy. The impact for oil price fluctuation on the economic growth varied between developing and developed and between oil importing and oil exporting countries. Buetzer et al. (2012), Backus and Crucini (2000) in studying the US economy as developed country, showed that oil price shocks resulted a recession in the economy. In the other hand, Farzanegan and Markwardt (2009) in studying the Iranianeconomy as developing economy found a positive impact for the oil prices fluctuation and the industrials output and the government expenditures. Oil price fluctuation would have different influence in the economy rather it isoil importing or oil exporting countries.

Economic well being indicator took different dimensions. Some studies consider the real GDP per capita as the indicator of overall economic well being and also per capita consumption is also used as another quantitative indicator in measuring the economic well-being improvement (Pradhan (2001), Arora (2013)).

In studying the impact for oil price fluctuations on the economic growth varied in results between developed and developing countries and between oil importing and oil exporting countries. In studying the impact of oil price inthe Nigerian economy as oil exporting country, Madueme and Nwosu (2010) found out that oil prices have positive national economic growth. In the same vein, in studying the impact of oil price changes on the Kuwait's economy as oil exporting country, Eltony and Al-Awadi (2001) found a high correlation between oil price changes and macroeconomic variables and mainly a positive impact on economy's inflation during oil shocks.

Some empirical studies showed a positive relationship between oil price fluctuations and economic growth such as Aremo et al. (2012), Riman et al. (2013), Ijirshar (2015), Ademola et al (2015). In contrary, other studies showed a negative relationship between the oil price fluctuations and economic growth such as Baghebo and Atima (2013). Despite the fact that several studies for oil price fluctuations and economic

growth for developing and developed countries, researches in the middle east country and mainly Lebanon as oil importing and highly oil depended economy is still far from being completely covered. Thus, this study will add to existing empirical studies by testing some more variables affecting the economic well being beside the oil price fluctuations. This constitutes agap in literature which the study intends to fill.

3. OIL PRICE FLUCTUATION AND ECONOMIC WELL BEING IN LEBANON

Theoretical and empirical researches proofed a valid relation between the economic growth and oil pricefluctuation. Whereas, the economic growth would lead to increase the oil demand which lead to push up its prices and vice versa. In the other hand the increase of oil price would have positive impact for the oil exporting economies and negative one for the oil importing economies. Lebanon, as oil importing, offshore oil exploring and heavily oil depending country would be a could example.
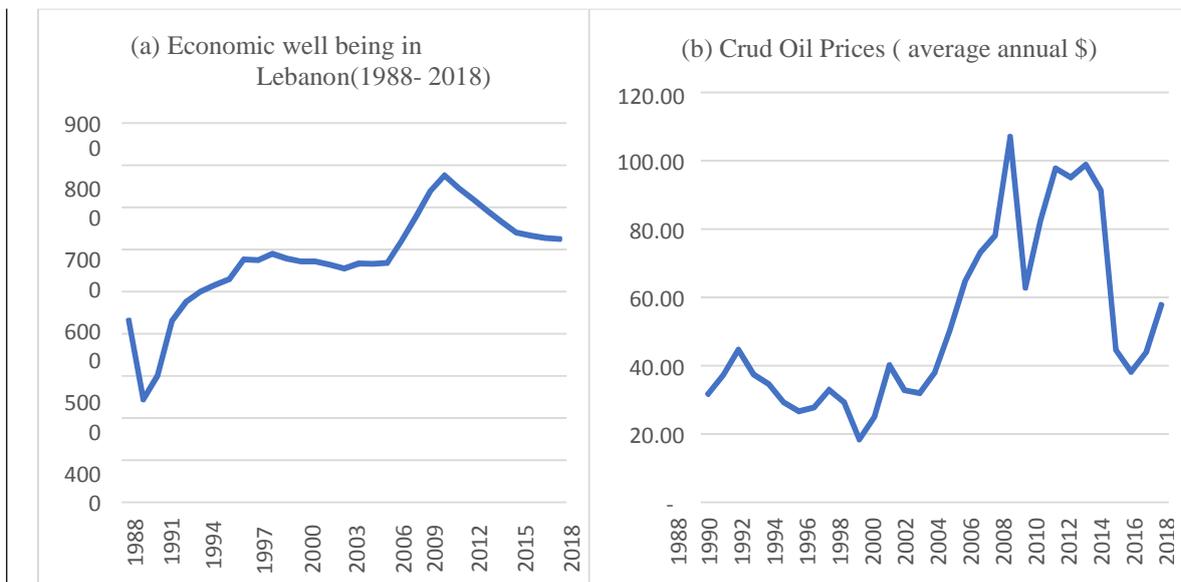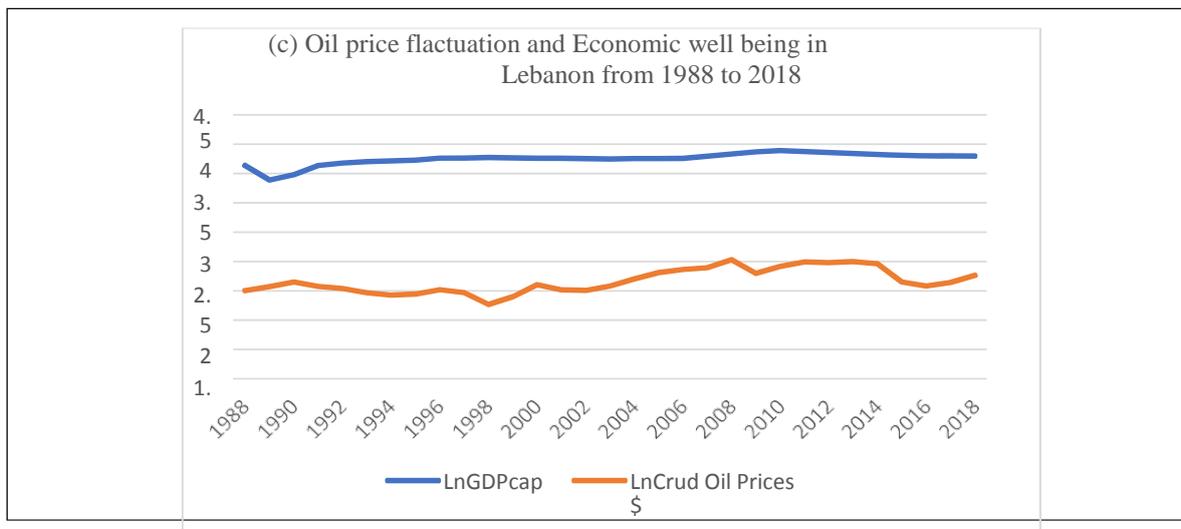

Source, World bank WDI and EIA 2019

Fig.1: Crude oil price fluctuations and economic wellbeing in Lebanon (1990- 2018)

In 1988 to 1990, the period of the end of the Lebanese civil war, the Lebanese economy passed by sharp decline accompanied by massive increase in crud oil prices as shown in figure 1. After the end of the Lebanese civil war, the Lebanese economy reform strategies started to take place with gradual improvement with moderate fluctuations in the oil prices. However, in 2008 and during the international financial crisis the remarkable increase the oil price reaching it maximum level since 1988 the 107$ for the crude oil Lebanese economic growth showed a remarkable increase with 6781 $ as GDP per capita (WDI and EIA, 2019). The Lebanese economy continued to grow benefiting from the international financial crisis due to increase in the financial inflows to Lebanon to reach 77814 per capita in 2010 before it starts to decline. Noting that this decline could be justified by the Syrian war that transferred several political and economic problems and especially the around 2 million refugees about half the Lebanese population. Therefore the, sharp decrease in oil prices in 2016 with around 38 $ didn't hold a clear positive impact to the Lebanese economic wellbeing (figure 1 a, b, c).

4. DATA, METHODOLOGY, AND RESULTS

In studying the impact for the oil price fluctuation on the Lebanese economic wellbeing, ordinary multivariable least square method is adopted. Followed by testing the model fitness and stationarity by applying LAD and ARMAX methods. The dependent variable used for the economic wellbeing is the GDP per capita Y) as proxy while the crude oil annual average oil price used as proxy for oil price fluctuations (OPF) beside the two control variables as (K) real gross fixed capital formation (K) in constant 2010 U.S. dollars and the total labor force (L)were taken as control variables. Data were been collected on annual bases for the period from 1988 to 2018 with 30 observations from the World Bank (WDI World Development Indicators 2019) and the Uniste4d Stateds Energy Information Administration (EIA 2019). After regressing the variables through OLS, regression robustness check applied through LAD Least Absolut deviation and ARMAX for the model stationarity. Accordingly, the research model is formulated a follow:

$$LnY = \alpha 0 + \beta 1 LnOPF + \beta 2 LnK + \beta 3 LnL + \varepsilon t \qquad (1)$$

Based on the equation above, α is the regression constant variable and β is considered as the Coefficients for each variable, while εt is considered as the error term.

4.1. Results and Findings

According to the above econometric model, using the multi-regression OLS model the Lebanese real GDP per asproxy for the economic well-being is considered as the dependent variable and regressed with the Crud annual average oil prices as proxy for oil price fluctuations, and the two control variables labor force as (total labor force in % of population), and gross fixed capital formation in constant 2010. all regressed variables used in natural logarithm. The regression model summary is clear in table 1. Based on the above model, we regress the natural logarithm for the Lebanese real GDP per capita as the dependent variable on the crud oil prices, labor force, and gross fixed capital formation (see table 1).

Table 1: OLS, using observations 1990-2018 (T = 29)
Dependent variable: l_Yc

	Coefficient	Std. Error	t-ratio	p-value	
const	9.33619	1.39846	6.676	<0.0001	***
l_COP	0.343357	0.0537640	6.386	<0.0001	***
l_K	0.303891	0.0389392	7.804	<0.0001	***
l_L	−0.594567	0.0951118	−6.251	<0.0001	***

Mean dependent var	8.672386	S.D. dependent var		0.185685
Sum squared resid	0.053935	S.E. of regression		0.046448
R-squared	0.944132	Adjusted R-squared		0.937428
F(3, 25)	140.8279	P-value(F)		8.74e-16
Log-likelihood	50.01617	Akaike criterion		−92.03233
Schwarz criterion	−86.56315	Hannan-Quinn		−90.31945
rho	0.539928	Durbin-Watson		0.877965

Source, author calculation based on World bank WDI and EIA 2019

According to results in table 1, all explanatory variables are statistically significant 1% and have the expected sign. Mainly, the crude oil prices as proxy for oil price fluctuation show a significant at 1% with positive coefficient this reflect that the increase of oil prices lead to increase in economic growth. As control variables the results suggest that the labor total force and the gross fixed capital formation are statistically significant also at 1% with positive impact on real GDP per capita. These findings are on Table 1. Based on the above regression results thataffirm the empirical studies that showed a positive impact for the oil price fluctuations on economic well-being. In order to confirm the test results, we need to check the model stationarity and robustness.

4.1.1 Robustness check

In order to the check the model stationarity and robustness, first we run LAD Least absolute deviation, illustrate the baseline regression estimation with respect to the oil price fluctuation, labor force, gross fixed capital formation which clearly explain its robustness (table 2). We check the model robustness by using Least Absolut deviation and Quantile estimates tests. Whereas, the robustness testing illustrates the regression results with respect to all variables and clearly explain its robustness (see table 2 and 3).

Table 2: LAD, using observations 1990-2018
(T = 29)Dependent variable: l_Yc

	Coefficient	Std. Error	t-ratio	p-value	
const	9.09011	1.79837	5.055	<0.0001	***
l_COP	0.343728	0.115636	2.973	0.0064	***
l_K	0.378525	0.0779027	4.859	<0.0001	***
l_L	−0.695999	0.185879	−3.744	0.0010	***

Median depend. var	8.658888	S.D. dependent var		0.185685
Sum absolute resid	0.898245	Sum squared resid		0.063691
Log-likelihood	51.66238	Akaike criterion		−95.32477
Schwarz criterion	−89.85559	Hannan-Quinn		−93.61189

Source, author calculation based on World Bank WDI and EIA 2019

Table 3: ARMAX, using observations 1990-
2018 (T = 29)Dependent variable: l_Yc
Standard errors based on Hessian

	Coefficient	Std. Error	z	p-value	
const	12.1294	3.55070	3.416	0.0006	***
phi_1	0.480869	0.287893	1.670	0.0949	*
theta_1	0.430812	0.224476	1.919	0.0550	*
l_COP	0.467995	0.140750	3.325	0.0009	***
l_K	0.297592	0.0582498	5.109	<0.0001	***
l_L	−0.805534	0.226805	−3.552	0.0004	***

Mean dependent var		8.672386	S.D. dependent var	0.185685
Mean of innovations		0.001010	S.D. of innovations	0.033064
Log-likelihood	57.29859		Akaike criterion	−100.5972
Schwarz criterion	−91.02611		Hannan-Quinn	−97.59964

	Real	Imaginary	Modulus	Frequency
AR				
Root 1	2.0796	0.0000	2.0796	0.0000
MA				
Root 1	-2.3212	0.0000	2.3212	0.5000

Source, author calculation based on World Bank WDI and EIA 2019

Another method to check the model robustness is by running the ARMAX. According to results for the ARMAXtest results in table 3, the ARMAX test results confirm the results of the OLS multi- regression results mainly to the tested variables coefficients signs in table 1. The ARMAX results in table 3 also show the model stationarity with respect to the values of AR and MA. Due to which both moduli AR and MA root of correlation is greater than one in absolute value therefore, the ARMAX model test results proof the good fit for the regressed model.

5. CONCLUSIONS

This research studied the impact of oil price fluctuations on the Lebanese economic wellbeing taking GDP per capita as proxy over the period of 1988 to 2018 limited to the availability of data, using multi-regression OLS model. The results showed that all regressed variables were statistically significant at 1% with positive impact for the oil price fluctuation on the Lebanese economic wellbeing. Also, the labor total force and the gross fixed capital formation showed to have significant and positive impact on the Lebanese economic wellbeing. The Lebanese economy passed by different unstable circumstances make the influence of the oil price fluctuations varied accordingly. As oil importing country with future expectation of gas offshore exploration, Lebanese policy makers should build a long-term economic strategy to attract green investment and to foster the fiscal policies and improve the Lebanese infrastructure. Most importantly the Lebanese authority should work heavily in releasing the negative influence for the Syrian crisis on its economy and build a long-term investment strategy to treat the latest financial and monetary instability.

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