

Reviewing the Effects of Oil Shocks on Economic Growth

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Abstract: The goal of this study is reviewing the effects of oil shocks on economic growth in eight selected countries of Middle East. Firstly by using of hoodric-prescott Filter method the oil price was calculated and then the effect of oil price shocks on the variants was estimated by application of VAR. On the basis of the results all these countries except Saudi Arabia has negative reaction to the shocks imposed by oil price. The most reaction by the shocks were due to the variants that it made the most impress on Kuwait and the least effect was related with Saudi Arabia, also the most explanative of oil shocks in growth differential were about Iran, Qatar and Iraq while the least rate returns to Lebanon and Bahrain. The most share belongs to Bahrain by 100% at the beginning of the period that this volume decreases during the period and after that Iran by 91.58 locates in the second rank.

Key words: Oil shocks, filter hodric-prescott, VAR model, shocks, Iran

INTRODUCTION

Oil price shocks in the history of oil industry is an motive for the economist and analyzers till to research in applicable theories grounds. Most of these researches to analyze the relationship between oil price crisis and economic dullness in advanced countries and specially in United states of America.

In fact the economic crisis is applied for decreasing of revenue due to sudden increasing of oil price. Following two oil shocks in the years of 1973-74 and 1978-79 and results of economic growth declined in industrial countries.

Some of economists believe that the main factor of this dullness is not only increasing oil price but necessary conditions for this dullness are the changes of industrial economic structures and increasing of the oil price has not been the only reason changing in energy prices impress economic activities in two ways, firstly by impressing on total demand which occurs in short time. The word of demand has been used due to this matter that capacity of offering an economy (abundance of capital, labor, raw material and fruition) in short time insignificantly changes, therefore, these sever vacillations in energy price could be leaded to unemployment and immobility of production factors except energy section. The second way that the shocks occur due to energy price could impress the economy by impressing on offers in other words by impressing on capacity of production since, the expert and abundance of capital, labor, raw material and fruition of production grows slowly therefore,

the effect of offers would be slowly and is felt in a long time and economic growth appears more slowly instead of one sharp economic dullness.

Anyway, it is not clarified that the effects of energy price shocks on offering has special importance. In fact some of economists believe that the share of energy section in national gross production is so insignificant that energy price shocks has had little effect on economic growth. Now, it should be noted that if energy price shocks could impress on economical activities in the side of offering of economy and finally on economic growth? The most important way that energy price shocks could impress on offer is impressing on fruition. Many of economic analyzes that has studied the effects of oil shocks have shown production function relationship of the product with the data of capital, labor and energy. One exogenous decreasing on energy offering causes decreasing of the product directly through declining of fruition and unsuccessful outcomes and going down the wages indirectly and in result requiring for labor decreases and production declines.

The studies show that increasing of energy price during the decade of 70 caused industrial section which was oil consumer to save the energy, with a little patient in Iran's economical structure and other exporters of oil which are dependent to oil selling, this opinion got strength that the origin of so many of imposed shocks would be due to oil impulses.

In fact all economical specifications and relationships of these countries has shape in the manner of which each kind of price shocks or oil revenue impulses has effects on inside gross production growth directly

and also monetary system, commercial stability and government budget balance indirectly and through this canal some money functions and circulations occur for the economy of the country.

The direct effect of oil price changes on economic growth both for the exporters and for importers of oil at the beginning of the phase is the oil price changes specially increasing of it that causes inflation conditions which is in its turn, it could impress the process of changing of interest rates and investing but, the manner of effect on inner gross production from changing oil price in indirectly way could be through budget balance.

so that oil which is one important goods for exporting for importer countries and is one important importing goods for the industries, it enters in the reaction functions of their export and import, therefore, price changing of them impresses reaction functions and in conclusion commercial stability and their inner gross production would change.

In the current article by using of economic measuring the relationship of oil shocks and economic growth to be surveyed and the impresses of oil price shocks on economic growth in Iran, Bahrain, Saudi Arabia, Lebanon, Kuwait, Iraq, Qatar and Oman have been noted in the years of 1980-2013.

Hamilton (2003) was the first person who surveyed the effect of oil shocks on commercial circles and inner Gross Production growth (GDP) of USA in the years of 1938-78 he used of causative test of Grenjer for testing inner oil prices and applied for the least ordinary squares method for studying the relationship between substantive, oil prices and huge variants, the results indicate that positive impulses of oil price after 3 up to 5 periods of cease effects on inner gross production and the growth rate declines.

Abeyasinghe (2002) in an article studied monthly oil price shocks effect on economic growth of four countries in the representation of two groups of oil importer and in the second group England and Canada to be considered as exporters of oil then by using of ARDL pattern surveyed the effects of oil price shocks (positive and negative) on economic growth of the mentioned countries.

The result of research indicated that oil positive shocks leads to declining of inner gross production and stagnancy both in the countries of exporter and in the countries o importers but for exporters was mild.

Srleis (2002) reviewed the relationship between oil prices and the prices of industrial products prices in the countries of NAFTA in the period time of 1963-97 and co-assembling tests were used. The used method was

VAR. They proved that the effect of oil price shocks on the index of consumer prices of advancing countries such as Mexico is more that advanced countries.

Aliyu (2009) surveyed the effect of vacillations of oil price and the exchange rate on gross production grow in Nigeria in the years of 1986-2007 and applied Yuhanson test and Grenjer causative test. The results showed that oil price and exchange rate are the reason of GDP but in the opposite direct this relationship only holds true with exchange rate.

The effect of oil price vacillation on economic growth is more than exchange rate vacillation. Aliyu for short time analysis used of vector error correction and concluded that inner production of Nigeria returns to balanced amount lesser than two years and by a middle speed and it would be done on the basis of adjustment mechanism after getting problem with the vacillation of oil price.

Mehrara and Kamran (2005) reviewed the effects of running oil shocks on huge economical variants in Iran, Kuwait, Saudi Arabia and Indonesia by using of SVAR model. They used annual data of the years 1960-2003 and concluded that the effect of oil price on GDP of all countries are positive.

Brojerdian (2005) surveyed the effects of oil shocks on Iran's economic growth in the years of 1960-2004 and the results showed that oil price shocks has strong and interpretable effects on economic growth but negative shocks are bigger and more stable that positive shocks.

Imami and Mehdi (2008) in a research noted the effects of unsymmetrical effects of oil shocks on production. The results showed that the effect of oil shocks in short and long time is on unsymmetrical production and in short time the effect of positive shocks are more than negative shocks but in long time the effect of negative shocks is more than positive shocks, further more the effect of these positive shocks on production by passing the time and negative shocks to be reinforced.

MATERIALS AND METHODS

Applied variants in this research include inner gross production growth and oil price shock. Related data of inner gross production growth was collected of World Development Indicator (WDI), also price oil was obtained from Opec. Geographical district by considering to maximum of all the data in this study include Iran, Saudi Arabia, Lebanon, Qatar, Kuwait and Bahrain in the period time of 1980-2013.

Different methods for calculation of economic variants shocks exist. One of the method for calculating of shock is hoodric-prescott filter. This method was discussed by Hoodric and Prescott in 1980 for analyzing

USA commercial periods after second world war, this filter separates successive hearsay related to circles from time series variant and also to make closer the particle of rotation time series variant to real amounts.

It is so important and has the most application. In current study for calculating the shock Hoodric-PreScott method has been used. This filter obtains by to make the least of total radical of variant deviation Y from Y_t^r formula. In fact the amount of mentioned formula are the numbers which to make least the relationship of Eq. 1:

$$\sum_{t=1}^T (Y_t - Y_t^r)^2 + \lambda \sum_{t=2}^{T-1} [(Y_{t+1}^r + Y_t^r) - (Y_t^r - Y_{t-1}^r)]^2 \quad (1)$$

which the quantity of observations and x parameter is the factor of coordinat that to specify the level of the procedure and for annual amounts of 100 and for seasonal data acquires 1600. This two sides ' filter would be symmetry and to remove the problem of period phase changing. In this research by using of VAR, instantaneous reaction function and variance analysis to survey the relationship between inner gross production growth and oil price shock.

In the researches about time series, surveying of constant of the variants has special importance because application of economic measuring such as OLS (the Least of Ordinary Squares) is comprising this hypothesis that the variants are constant. Among all the tests for constancy of variants, Fuller-Diki test (ADF) by total configuration of relationship Eq. 2 has more application:

$$\Delta Y_t = \alpha + \beta_t + \rho y_{t-1} + \sum_{i=1}^p \theta_i \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

Where:

Y_t = The considered series,

Δ = The reactor of the differential of the first phase, it is line process

ε = The incident intrigue

The above mentioned equivalent could be used without entering process particle. If $H_0: \rho = 1$ to be rejected in this case the considered series would be constant and on the other hand, it would be inconstant.

Also through using systemically of the pattern justified relationship in long time among the variants to be reviewed and long time coefficients to be obtained. Also, the effect of shocks as time schemed to be valuated. For this affair multiple reaction function to be used by using of this criterion the time of impressing the shock and the most effect after the occurrence the shock could be specified then variance analysis criterion could be used for specifying the share of each variant in error prediction of other variants of the pattern.

Also causative relationship among the variants in one system VAR (p) could be shown which the matrix of M_i would be the representative of moveable average:

$$y_t = \mu + V_t + M_1 V_{t-1} + \dots = \mu + \sum_{i=0}^{\infty} M_i V_{t-i} \quad (3)$$

$$M_0 = I, M_i = \sum_{j=1}^{\min(p,i)} \Theta_j M_{i-j} \quad i = 1, 2, \dots \quad (4)$$

$V_\mu = E[y_t] = (I - \Theta_1 - \dots - \Theta_p)^{-1}$, when the covariance Σ from one positive process VAR (p) has been obtained. There is one individual matrix such as P that $pp = I$ with one matrix from MA process that could be rewritten as relationship Eq. 5:

$$Y_t = \mu + \sum_{i=0}^{\infty} M_i P^{-1} P V_{t-i} = \mu + \sum_{i=0}^{\infty} \Psi_i w_{t-i} \quad (5)$$

That the vector $w_t = (w_{1t}, \dots, w_{mt})' = p v_t$, $\Psi_i = M_i P^{-1}$ has this property that it's elements have unit variance and are not correlated to themselves. The matrixes Ψ_i are indicator of system reactions Y_t to one shock unit inside the w_{mt} :

$$\begin{aligned} \Sigma(h) &= \Sigma v + M_1 \Sigma v M_1' + \dots + M_{h-1} \Sigma v M_{h-1}' \\ &P^{-1} P \Sigma v p' [(p^{-1})^{-1} + M_1 P^{-1} P \Sigma v p' (p^{-1}) M_1' + \\ &\dots + M_{h-1} P^{-1} P \Sigma v p' (p^{-1}) M_{h-1}' P^{-1} P \Sigma v p' \\ &(p^{-1}) M_{h-1}' + \dots + \Psi_0 \Psi_0' + \Psi_1 \Psi_1' + \dots + \Psi_{h-1} \Psi_{h-1}' \end{aligned} \quad (6)$$

The effect of the shock in the j of variant of this MSE is relation Eq. 7:

$$\Psi_{mj,0}^2 + \Psi_{mj,1}^2 + \dots + \Psi_{mj,h-1}^2 \quad (7)$$

which m & $\Psi_{mj,n}$ is the element of Ψ_j that this is prediction error variance analysis method or MSE toward the element obtained from the shocks in individual variants.

RESULTS AND DISCUSSION

For testing the constancy of variants, the test of Diki Fuller to be used. This test in all the variants shows constancy of them in the level. Zero hypothesis is not refundable on the existing of unit root in time series in the levels of 10.5 and 1%. On the basis of Table 1 all the variants except Iran's inner gross production growth and the Oman are filled of (1) and other variants are filled of zero degree (0).

In this study, the analysis of the obtained results from the shocks to be noted. Instantaneous reaction functions shows the behavior of equivalent system variants during the time and at the time of imposed shocks

Table 1: The results of generalized Diki-Fuller test

Parameters	The amount of computational statistics	Crisis amount (%)			Amount calculated statistical	Crisis amount (%)		
		1	5	10		1	5	10
Bahrain inner Gross production growth	4.25	3.64	2.95	2.61	10.31	3.65	2.95	2.61
Iran inner Gross production growth	0.76	3.65	2.95	2.61				
Iraq inner Gross production growth	5.10	3.65	2.95	2.61				
Kuwait inner Gross production growth	5.14	3.64	2.95	2.61				
Lebanon inner Gross production growth	5.14	3.64	2.95	5.36				
Qatar inner Gross production growth	5.14	3.64	2.95	5.08				
Saudi Arabia inner Gross production growth	5.14	3.64	2.95	3.83				
Oman inner Gross production growth	3.26	3.64	2.95	2.61				

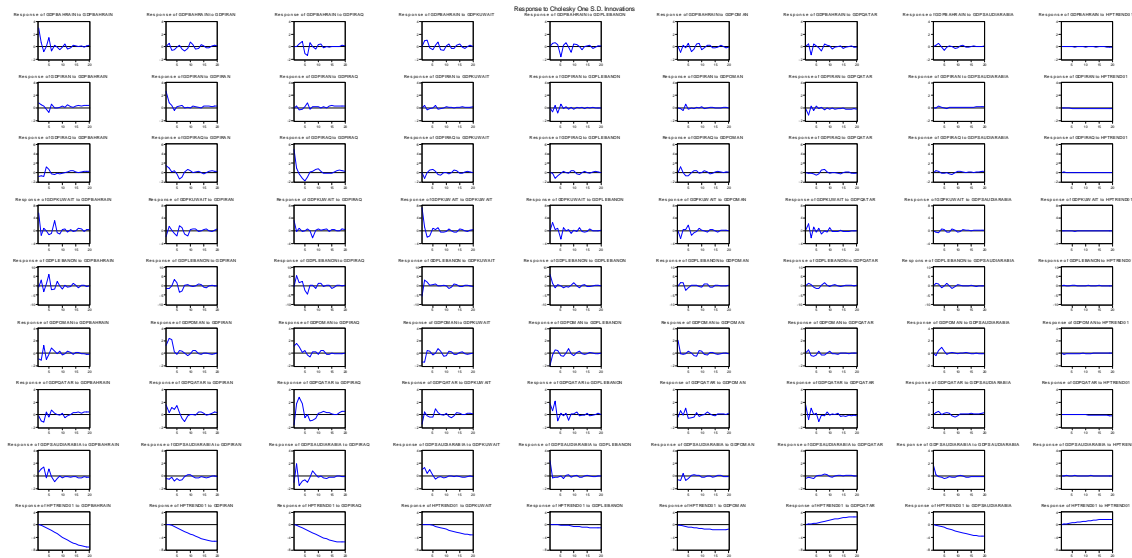


Fig. 1: The results obtained from instantaneous reaction

in the extent of criterion deviation. It means in the case of existing a shock in the extent of criterion deviation in independent variants of equivalents, changing of variant related to pattern takes place. In continuation, the results due to instantaneous reaction functions have been indicated, also the considered period of surveying is 20 years.

It should be mentioned totally that the effect of imposed shocks from independent variants in the pattern are faced with speedily reaction and short time from dependent variant. All considered countries except of Saudi Arabia had negative reaction toward imposed shock due to oil price shock. The most reaction due to imposed shock from the variants themselves shows that Kuwait made the most and Saudi Arabia the lesser effect.

Regarding Iran due to the shock from the side of variants growth, Iraq, Bahrain, Oman, Iran's growth changes in the rate of 0.78, 0.82 and 0.59%. Related diagrams in relation with instantaneous reaction have been shown in Fig. 1.

In the test of variance analysis, strength prediction error of Grenjer causative chain with the exterior variants beyond the sample to be measured, therefore, variance analysis could be called the Grenjer causative beyond the sample. In this method in fact the share of each exterior variant in imposed shocks to be surveyed.

The weakness of this Grenjer test is in evaluation of the strength of one variant which if the variants of the right hand of equivalent not to be vertical on each other, for example Z is one constitutional variant that is the cause of X and X itself also leads to Y changes, then the Z variant in the test equivalent which includes X would not sense. (even if Z is the main basis of the changes).

For this reason Symz insist on variance analysis as criterion for measuring the prediction of strength the variant (Mehrra, 2010). Table 2 is the rate and explanative procedure of oil price shock in relation with economic growth vacillations of selected countries. Controlling column by explanation of oil shocks shows the amount in the beginning and ending of the period.

Table 2: The procedure of inner gross production growth vacillations by oil shocks explanation

The procedure of oil shock	The extent of oil shock explanation	Country
Increase	0.030	Bahrain
Increase	0.420	Iran
Increase	0.080	Iraq
Increase	0.040	Kuwait
Increase	0.020	Lebanon
Increase	0.050	Oman
Increase	0.060	Qatar
Increase	0.070	Saudi Arabia

As it is observed in Table 2, explanation of oil price shock in economic growth vacillation of all studied countries during the period of time are increasing. The most explanation of oil shocks in growth vacillation belongs to Iran, Qatar and Iraq while the least rate returns to Lebanon and Bahrain. In description of their country's growth in explanation the vacillation in the period of time is declining.

The most share has been allocated to Bahrain by 100 percent at the beginning of the period that this amount decreases during the time and after that Iran with a figure equal with 91.58% is located at the second rank. The least share belongs to Qatar by 22.85% at the beginning of the period.

In connection with Iran, the most share of vacillating explanation after the variant itself belong to Bahrain, Lebanon and Qatar by the shares of 15.79, 10.32, 11.36%.

CONCLUSION

Oil shocks in recent decades has had deep effect on economic growth of the countries. The importance of oil on the economic or exporter countries which consists an considerable exchange revenue and even in the countries of importing oil reckon as one of the most important production laid that is not deniable. Therefore, in the current study, the effects of oil price shocks on economical growth of eight countries from Middle East were surveyed. For this intention, inner gross production growth and oil price in the years of 1980-2013 were applied. On the basis of the results of all studied countries except of Saudi Arabia showed negative reaction to imposed impulse due to oil price shock. The most reaction

from imposed impulse from the variants show which Kuwait have made the most and Saudi Arabia the less effect, also the most explanation of oil shocks in growth vacillation have been about Iran, Qatar and Iraq while the least rate returns to Bahrain and Lebanon. The explanation of the countries' growth in vacillation describing during the period is declining. The most shares have been allocated to Bahrain by 100% at the beginning of the period that this amount declines during the period and then Iran by the figure equal with 91.58% locates in second rank. By using of the obtained results, it could be mentioned that for decreasing economic dependence of oil and in conclusion decreasing damaging, financial and exchange policies should be exerted. Decreasing of this damage means declining the governments' revenue, therefore, it is proposed that the governments to consider replacing revenues that the most important of them is tax incomes in annual budgets.

REFERENCES

Abeysinghe, T., 2000. Modeling variables of different frequencies. *Intl. J. Forecasting*, 16: 117-119.

Aliyu, S.U.R., 2009. Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation. *Res. J. Intl. Stud.*, 11: 4-15.

Brojerdian, S., 2005. Surveying the oil shock effects on economic growth. MSc Thesis, Economic Faculty, Tehran University, Tehran, Iran.

Hamilton, J.D., 2003. What is an oil shock? *J. Econ.*, 113: 363-398.

Imami, K. and A.P. Mehdi, 2008. Surveying unsymmetrical effects of oil shocks on production. *Econ. Model. Chapter*, 1: 4-26.

Mehrara, M. and N.O. Kamran, 2005. Oil shock & the effects of it on economical huge variants. *Chapter Commer. Researching*, 32: 1-40.

Mehrara, M.H., 2010. Surveying comparative economic vacillations in oil exporter countries. *Energy Stud.*, 1: 29-17.

Srleis, A.C.J., 2002. Oil Shocks in NAFTA Countries, the asymmetric global economy. *Growth Investment Public Policy*, 3: 29-38.