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Oil Income Shocks on Budget Deficit, Growth and Inflation for the Iranian Economy

İran Ekonomisi İçin Bütçe Açığı, Büyüme ve Enflasyona İlişkin Petrol Gelir Şokları

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ÖZ

Petrol gelirleri İran ekonomisi için stratejik öneme sahiptir. En büyük petrol üreticilerinden biri olan İran hem uluslararası pazarları hem de uluslararası pazarlardaki gelişmelerden etkileniyor. Petrol gelirleri kamu sektörü dengesi ve ekonomik faaliyet seviyesi için önemli bir konuma sahip olsa da petrol şokları İran ekonomisinin artan bütçe açıkları için çok önemli olmuştur. Bu çalışmanın amacı, 1970-2012 dönemi yıllık verilerini kullanarak İran'daki ekonomik büyüme, bütçe açıkları, enflasyon ve petrol gelir şokları arasındaki dinamik ilişkiyi SVAR Modeli ile incelemektir. SVAR tekniği ile yapılan yapısal etki-tepki fonksiyonları ve yapısal varyans ayrıştırma sonuçları, İran ekonomisindeki toplam petrol gelirlerini açıklayan en önemli değişken bütçe açıklarının olduğunu göstermiştir.

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ABSTRACT

Oil revenues are of strategic significance for the Iranian economy. Iran, one of the largest oil producers, affects both the international markets and is affected by the developments in international markets. Although oil incomes have an important position for public sector balance and economic activity level, oil shocks have been crucial for the increasing budget deficits of the Iranian economy. The purpose of this paper is to investigate the dynamic economic growth, budget deficits, inflation and oil income shocks relation in Iran by SVAR Model using annual data for the period 1970-2012. The structural impulse-response functions and structural variance decomposition results made by SVAR technique showed that budget deficits are the most important variable explaining total oil incomes in Iranian economy.

1. Introduction

Oil became an important source of energy, especially with using automobiles as the primary transportation source after World War II (Basnet and Upadhyaya, 2015). The Arab-Israel war, also called Yom Kippur in 1973, brought with it the oil crisis. Arab states have used their decision to cut prices and increase prices during the oil crisis in the course of prices. Six OPEC countries gathered in the Persian Gulf decided to increase oil prices at different rates compared to

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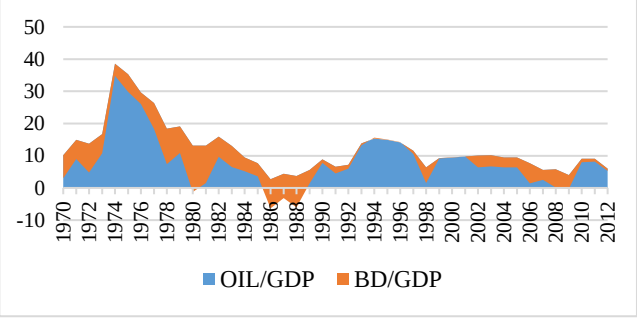
countries. Oil prices in Iran reached $ 17 at that time. In Figure 1, the increase in the share of Iranian oil revenues in GDP between 1973-1974 is remarkable. Consequently, oil prices, which were $ 1.8 in 1970, approached the level of $ 20 in early 1974. This situation led to an increase in oil revenues of oil exporting countries at that time. These price increases have been the mark of the beginning of the stagflation process for oil-importing countries.

Figure 1 shows the share of oil revenues and budget deficits in the GDP between 1970-2012. The first view of Figure 1 is that the course of oil revenues and budget deficits are in the same direction. Especially in the years of 1973-1974, the price decreases, the sharp decreases of 60% between the end of 1985 and June 1986, the effects of the 1998 Asian crisis and the effects of the 2008 global crisis are shown in the figure. It is possible to see the effect of the increase in oil prices in 2011 following the global crisis. In summary, Figure 1 reflects the effects of the crises experienced in 1970-2012 on oil revenues and budget deficits.

Figure 1: Oil Revenue and Budget Deficit: 1970-2012



Source: World Bank

The oil embargo in 1973/74, sharp increases in oil prices after the Iranian revolution led to stagnation and inflationary conditions (Kilian 2008). Oil shocks affect the economic territory through both supply and demand channels. Such an increase in oil prices has also led to a decrease in total supply by increasing input costs. The total supply shock in question led to an increase in the total trade volume and an increase in the debt burden, but also caused distortions in macroeconomic variables such as inflation, growth and balance of payments. Consequently, the reflection of the increase in costs to the consumer was inevitable. The increase in production cost is caused by the supply side effect, while demand-side effects are caused by decreasing the demand of households due to the decrease in real income.

Lardic and Mignon (2006) state that oil price increase affects economic activity level through six mechanisms:

(i). Costs increase is leading to an output fall.

(ii). Current account balance of oil-importing countries deteriorates.

(iii). Money demand increases

(iv). Inflation occurs

(v). Consumption, investment and stock price affected negatively.

(vi). A permanent shock leads to loss of employment

The increase in oil prices leads to money transfers from importing countries to exporting countries (Hamilton 1988, Cologni and Manera 2008). Oil incomes are an important source of financing social and physical infrastructure investments for oil-exporting countries. Oil incomes make a major contribution to the financing of investments and current account deficits without applying to external borrowing. High oil revenues lead to savings, investment and capital accumulation. The fact that oil revenues have such importance brings about the dependence on oil. Especially the oil shocks impact on macroeconomic factors shows the degree of dependence. Therefore, oil shocks have become the main source of macroeconomic fluctuations. Oil shocks affect both the oil exporter and the oil importer. It has significant effects on government expenditures, inflation, exchange rate, current account balance and money supply for oil-exporting countries (Strum et.al, 2009). The upward oil shocks cause the economic activity of the importing country to slow down and create an inflationary environment. In other words, the productivity level of the importing country decreases. Actually, oil is the main production input for production process results in a decrease in labour productivity (Jbir and Zouari-Ghorbel: 2009, 1041).

Oil revenues are of strategic significance for the Iranian economy. Iran, one of the largest oil producers, affects both the international markets and is affected by the developments in international markets. Although oil incomes have an important position for public sector balance and economic activity level, oil shocks have been crucial for the increasing budget deficits. The financing of the budget deficits includes treasury bills issuance, foreign borrowing and Oil Stabilization Funds and the addition of oil shocks to the increase in public spending creates significant problems for the budget deficit and the general level of prices (Farzanegan and Markwardt, 2009).

This study aims to evaluate the oil income shocks on economic growth, budget deficits and inflation. The effects of the structural shock were evaluated using a Structural Vector Autoregressive (SVAR) Model and structural impulse response analysis in this paper.

What makes this study different from similar studies is to reveal the structural breaks of the oil shocks story presented in Figure 1. In other words, a period of oil shocks is being studied: The Arab-Israel war of 1973, the Islamic Revolution of Iran in 1979, the invasion of Kuwait and the Gulf War of Iraq in 1990, the crisis of 1986 New resources, the 1997 Asian economic crisis, the Attack of 11 September 2001, 2003 Iraq War and 2008 Crisis. The explanatory nature of the fractures and shocks in the years, especially in oil shocks, is remarkable and meaningful. The rest of the paper continues as follows: Literature review explains the relationship between oil shock and macroeconomic

indicators theoretically Section 2 represents data and the methodology. Section 3 represents the empirical findings and discussions. The last section contains the conclusions of this paper.

2. Literature Review

There are many studies in the literature about the effects of oil price shocks on macroeconomic indicators. In this part of this study, a few of these studies are included.

Burbidge and Harrison (1984) predicted the effect of oil shocks on macroeconomic indicators for the selected OECD countries by multivariate VAR analysis. Oil shocks in the United States, Britain, Canada and Germany have a negative impact on national income. In Japan, oil shocks have a greater negative impact on national income.

Mork (1989) examined the effect of oil shocks on American gross domestic product through a regression model over the period 1949-1988. Mork's basic hypothesis is based on the proposition that price decreases do not have a significant impact on the economy unless there are oil price increases. The oil price effect change examined with four lags. The oil prices increase about 10% decreased the national income by 0.31, 0.15, 0.49 and 0.49, respectively. Oil price cutting have no meaningful and positive effect on national income.

Camarero and Tamarit (2002) investigated Spain's competitiveness in trade with ten EU member states. Oil prices and bilateral exchange rate variables of Spain with other countries. The exchange rate and oil prices relation become statistically insignificant as countries' dependence on oil decreases over time in the analysis. In the other case, the exchange rate is negatively affected by the oil price shock in Spain.

Jones et al. (2004) showed improvements of the macroeconomic outcomes of oil price shocks as a theoretically and empirically. The analyses testify to sectoral and intersectoral allocations in reaction to shocks, creating asymmetric effects for the oil prices. Oil shocks also harm economic growth for three periods.

Guo and Kliesen (2005) investigated the symmetrical and asymmetric impact of major changes in oil prices. Oil shocks have an impact on macroeconomic activities through many channels and most of them are symmetrical. In particular, the drastic change or increase in oil prices may temporarily reduce aggregate production because it can delay business investments by increasing uncertainty or encouraging high-cost sectoral resource allocation. Guo and Kliesen (2005) concluded that it had a negative and significant impact on future gross domestic product growth over the period 1984-2004 using daily crude oil transaction prices.

Akgün (2006) aimed to determine whether the changes in oil prices have any effect on the Istanbul Stock Exchange Composite 100 Index and if so, the extent and impact of the impact. The international oil prices did not have a direct effect on the ISE-100 index but it was a factor explaining the changes in the ISE-100 index according to empirical results. In addition, it was found that the changes in international oil prices positively affected the ISE-100 index, but the effect of the oil import amount was negative. The key finding is that the oil import amount, which is the cost of oil rather than the international oil prices, is more effective on the ISE-100 index.

Blanchard and Gali (2007) examined the macroeconomic activity in the industrialized economy following the 1970s and 2000s oil price shocks. There are four different proposals for the moderate effects of inflation and the rise in oil prices on economic performance. Firstly, there is no simultaneous negative shocks occur. The second is that oil has less share in the production process. Third is more flexible labour markets. Fourth is developments in monetary policy. As a result of the analysis, there are five main results.

(i). The oil price shocks effect must coincide with large shocks of different nature over time.

(ii). The impact of shocks in oil prices on prices and wages and production and employment change over time.

(iii). The reel wage rigidity is reduced.

(iv). The credibility of monetary policy is increasing.

(v). The ratio of oil in production and consumption decreases

Kumar and Managi (2009) examined the oil price and industrial production growth relation for the Indian economy over the 19751-2004. The results show that real oil prices increase affected industrial production growth negatively. The best performing statistical result is the SOPI model of all the specifications used in oil prices.

Ghosh (2009) investigated the crude oil imports and growth relation for India. It has been found that the income elasticity of long term and short-term price elasticities were found to be statistically significant. As a result of Granger causality test; It was determined that there was unidirectional causality from economic growth to crude oil imports.

Kapoor (2011) examined oil price shocks impact on emerging market economies. Kapoor (2011) tested the existence of an asymmetric relationship between oil prices and economic activity using the model developed by Hamilton (1988). Analysis results indicate that oil price shocks, measured in net increases, do not have a consistent effect on emerging markets. The oil shocks had a greater effect between 2000-2009 than 1974-2009.

Mehrara and Mohaghegh (2011) explored the price level, economic output and money supply impact on oil shocks. The analysis results indicate that oil shocks significantly affect the output level and money supply, and although the oil prices are high due to their shocks, domestic shocks, especially production and money shocks, affect the oil price in the world market to a great extent.

Wang et al. (2013) evaluated the oil price shocks and stock markets relation separately on oil-exporting / importing economies using the structural VAR model. It is concluded that the price shock varies depending on the demand/supply. The study also investigated the effect of uncertainty in oil prices on stock returns. As a result, the uncertainty of oil supply both oil-exporting and importing economies decreased stock exchanges. Demand uncertainty also has a negative effect on stock returns. Moreover, the impact of demand uncertainty is stronger and more lasting for oil-exporting countries.

Cavalcanti and Jalles (2013) found that petroleum-based import has increased quickly in the United States. The petroleum-based import has declined significantly for Brazil according to findings. SVAR was used to investigate the reaction of inflation and output increase to changes in oil prices. Despite the increase in oil import dependency of the increase in production volatility in the United States, the impression of shocks to volatility has decreased. These shocks do not have a net effect on growth and have a small impact on fluctuation in Brazilian inflation and growth.

Basnet and Upadhyaya (2015) showed that the macroeconomic indicators are cointegrated, indicating that they possess a similar trend in the long run for ASEAN-5 using SVAR. It has been argued that no oil price shock constitutes the biggest obstacle to economic growth in selected countries. Four different policy propositions developed as a result of empirical findings.

(i). Although macro indicators do not show significant changes in the long-term following oil price shocks, each of these countries needs to establish a protection mechanism to prevent the negative impact.

(ii). The oil prices shock does not have a meaningful impression on performance of ASEAN countries, mainly due to foreign direct investment inflows as well as the developing export sectors. For these reasons, these countries should implement a policy that appeal more foreign direct investment and encourage the external sector of the economy.

(iii). The Thai economy is more vulnerable to higher inflation rates due to oil prices.

(iv). Macroeconomic, social and political policies may be more useful to prevent oil price shocks and external shocks.

Chatterjee et al. (2016) analyzed the effect of sharply falling crude oil prices on the stock market indices of selected emerging economies. The crude oil prices and stock exchange indices are cointegrated only in Brazil and Russia according to cointegration results. However, there is no cointegration in India, China, South Africa and South Korea. For Brazil and Russia, the crude oil price has an important impact on Bovespa and MICEX. BSE Sensex is sensitive to changes in prices, not adapt to regulations in prices. Shanghai Composite is less sensitive to changes in prices but adapts to regulations in prices in the term. The FTSE SA index does not react to changes in prices and not adapt to the changes in short-term prices. KOSPI is sensitive to changes in crude oil prices and adapting much faster to regulations in crude oil prices to correct short-term imbalances.

Aktaş et al. (2018) investigated the impact of average and volatility spread from oil prices and dollar exchange rates to BIST100 index and compared the effect size in terms of oil prices and dollar exchange rates. As a result of the analysis, the shocks in the dollar exchange rate had a negative effect on the stock return and had an effect on increasing the stock volatility. Also, while shocks in oil prices increased stock returns, It has been determined that it has no effect on volatility. It is emphasized that this situation indicates that the money market is more effective in financial instability than commodity market. Fluctuations in exchange rates should be controlled to ensure stability in financial markets. Besides, investors are required to manage their investment processes by monitoring the volatility in the dollar exchange rate.

Nasir et al (2018) analyzed the effects of the shock on oil prices for BRICS economies. Structural vector autoregressive (TV-SVA) model was analyzed with quarterly data for 1987 - 2017 period. Empirical findings suggest that there are significant differences and heterogeneities in BRICS 'responses to oil price shocks in terms of internal and external balances of prices.

Boroumand et al. (2019) established a multi-dimensional DSGE model for an oil export economy based on the characteristics of the Iranian economy. By developing a three-part model, Boroumand et al. (2019) compared the responses of selected variables to external shocks and evaluated three alternative monetary policy rules for the Iranian economy. The analysis showed that the core inflation rule is the best monetary rule for stability in both macro variables and inflation from the first quarter of 1990 to the fourth quarter of 2014. It has been suggested that Iran adopt monetary policy to adopt the core inflation targeting framework.

The purpose of this research is to examine how macroeconomic indicators react to oil shocks and economic breaks that arise during the period studied in the Iranian economy. The coefficients of the structural shocks and the rates of influencing the variables were estimated using the SVAR analysis. As oil is an important raw material and an important income component for the Iranian economy, it is the main motivation of this study to demonstrate the power of external shocks in oil prices in explaining macroeconomic indicators. A shock in world oil prices can explain significantly on economic growth and budget deficit. This study is similar to the studies conducted for the economies of oil importers and exporters, especially the Iranian economy in terms of the method used. However, although it differs in terms of evaluating the selected macroeconomic indicators together, it contributes to the literature by revealing their capacity to explain changes in oil revenues during shock periods.

3. Methodology

All variables are endogenous and exogenous in the vector autoregressive model (VAR) (Sims, 1980). The degree of freedom arises since variables take place in equations with their lags (Equation 1). Sims (1986), Bernanke (1986), Shapiro and Watson (1988) developed the structural vector autoregressive (SVAR) model to eliminate the drawbacks of VAR model estimation results depending on the order of variables. The basis of the SVAR model is to distinguish error terms, which are a combination of external shocks, rather than determining autoregressive coefficients. In other words, SVAR focuses on exogenous shocks of the system. By restricting the dynamics of the variables in advance, others are considered exogenous shock. Also, SVAR demonstrates impulse-response functions with the help of short- and long-term constraints. The SVAR model based on the VAR model structure and one of the main advantages of the SVAR model is to obtain short-term and long-term constraints in the calculation process of the model and to obtain impulse response function (Breitung et. al., 2004 and Lütkepohl, 2005). Therefore, SVAR is a commonly used method to investigate the dynamic relationships between economic variables. The dynamic relationship between oil revenues, inflation, growth and budget deficits is demonstrated for the Iranian economy by using the SVAR method in this study.

3.1. SVAR Model

The basic structural var model contains a set of K endogenous variables such that k=1…K and yt = (y_{1t}, …, y_{kt}, …, y_{KT}). The p-dimension VAR (p) model is given by (1) equation (Emami and Adibpour, 2012; Farzanegan and Markwardt, 2009; Pfaff, 2008: 2):

$$A_{yt} = A_1^* y_{t-1} + \ldots + A_p^* y_{t-p} + B\varepsilon_t \quad (1)$$

A_i^* is the coefficient matrices (kxk) and ε_t $(kx1)$ dimensional structural error terms vector for each i=0,1,2…,p. The main diagonal elements of vector A are 1. The principal diagonal elements of the covariance matrix "$E = (\varepsilon_t \varepsilon_t') = \sum_\varepsilon$" are zero. It is due to the lack of co-integration between structural shocks (Pfaff, 2008:4). Under general conditions, Ai's OLS estimator is consistently and asymptotically distributed normally. Sims et al. (1990) explains that this applies to both stationary and non-stationary but possibly integrated variables in the VAR model.

By multiplying both sides of the SVAR model in (1) with the inverse of the matrix A, the following equation is obtained.

$$y_t = A^{-1}A_1^* y_{t-1} + \ldots + A^{-1}A_p^* y_{t-p} + A^{-1}B\varepsilon_t \quad (2)$$

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + u_t \quad (3)$$

There is a consensus in the literature that shocks cannot be observed directly. Therefore, some restrictions must be applied. To do this, multiply the $A^{-1}B\varepsilon_t$ in Equation 2 by writing the residual vector as follows:

$$u_t = A^{-1}B\varepsilon_t \quad (4)$$

$$Au_t = B\varepsilon_t \quad (5)$$

In order to estimate the effect of oil income change on these selected variables, we use a structural VAR (SVAR) model which includes oil income and economic growth, inflation and the budget deficit. An SVAR model can be used to identify and monitor shocks using IRA and/or FEVD with restrictions added to A and/or B matrices. Although the SVAR model is a structural model, it is derived from the reduced VAR (p) model and only restrictions can be added for the A and B matrices (Şengönül et al., 2018). In this study, only matrix A is used as the constraint matrix to examine the long-term relationship between series. The long-term restrictions matrix, which is the determinant of structural shocks, is given in the following matrix.

The matrix of our model consisting of oil income, inflation, growth and budget deficit can be expressed as follows and also Table 2:

$$\begin{bmatrix} \varepsilon_t^{OIL} \\ \varepsilon_t^{INF} \\ \varepsilon_t^{EC} \\ \varepsilon_t^{BD} \end{bmatrix} = \begin{bmatrix} 1 & \alpha_{12} & \alpha_{13} & \alpha_{14} \\ \alpha_{21} & 1 & \alpha_{23} & \alpha_{24} \\ \alpha_{31} & \alpha_{32} & 1 & \alpha_{34} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{OIL} \\ \mu_t^{INF} \\ \mu_t^{EC} \\ \mu_t^{BD} \end{bmatrix}$$

In the study, as with the Blanchard-Quah type SVAR model, the response of the dependent variable to the shocks in others in the model was calculated with the help of the impulse-response analysis. Similarly, using the variance decomposition analysis of the SVAR model, it has been revealed how much of the ratio of the dependent variable among the estimation errors are due to its shocks and how much to the other variables.

3.2. Data and Empirical Findings

The purpose of this paper is to investigate the dynamic economic growth, budget deficits (bd/gdp), inflation and oil income shocks (oil/gdp) relation in Iran using annual data for the period 1970-2012. The relevant period is preferred due to the budget deficit and up-to-date data on oil revenues. Data are obtained from Iran Central Bank and World Bank. The SVAR model was used to reveal the relationship between the series.

Firstly, the unit root test is applied for all variables using the Augmented Dickey-Fuller (ADF, 1979) and Philips and Perron (PP,1988) tests. The unit root tests results are presented in Table 1. According to the results, oil income (OIL) and budget deficits (BD) series are stationary at level and inflation (INF) and economic growth series (EC) are stationary at first level.

Table 1. Unit Root Test Results

	ADF		PP	
	Intercept	Intercept and trend	Intercept	Intercept and trend
OIL	0.3454	0.2486	0.2573	0.1940
ΔOIL	0.0000*	0.0001*	0.0000*	0.0001*
BD	0.1146	0.0946	0.1164	0.0799
ΔBD	0.0000*	0.0000*	0.0000*	0.0000*
INF	0.0018*	0.0088*	0.0100*	0.0411*
EC	0.0010*	0.0064*	0.0019*	0.0113*

* indicate significance at 5% level.

Since the SVAR model must be applied with an unrestricted VAR model, appropriate lag lengths must be determined for the variables used. The appropriate number of lags examined with the help of LR, FPE, AIC, SC, HQ criteria in the VAR analysis. The appropriate lag length criteria for the series determined to be 2. The stationary levels of the series used when building the SVAR model. The multiplier matrix obtained from the SVAR model is given in Table 2 to examine the responses of the variables in the model to the shocks determined by the restriction matrix.

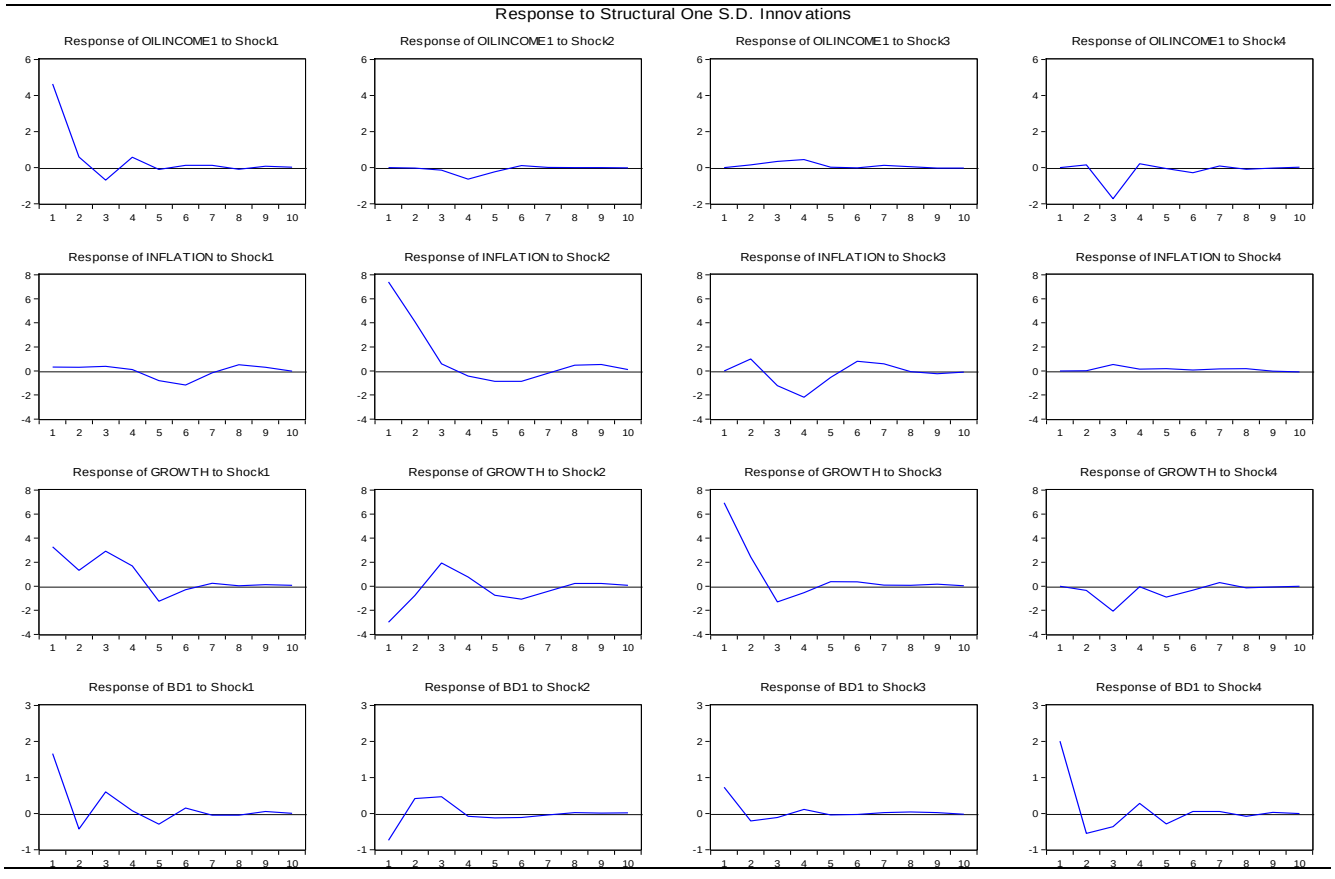
Table 2. Multiplier Matrix for SVAR Model

	ΔOIL	INF	EC	ΔBD
ΔOIL	4.643384	0	0	0
	(0.0000)			
INF	0.068272	7.398589	0	0
	(0.7864)	(0.0000)		
EC	0.731133	-0.405383	6.927493	0
	(0.0020)	(0.0062)	(0.0000)	
ΔBD	0.287791	-0.057749	0.105487	2.004853
	(0.0002)	(0.2161)	(0.0212)	(0.0000)

*values in parentheses indicate significance at 5% level.

It is seen that the coefficients obtained from the multiplier matrix are all significant except inflation-oil incomes and budget deficit-inflation relation. However, multiplier matrix coefficients cannot be interpreted as the VAR model. The coefficients signs only can be evaluated. Therefore, it is necessary to examine the impulse-response functions and variance decomposition to interpret the responses of the variables used in the analysis of structural shocks. In the SVAR model, the impulse response functions obtained by Structural Decomposition show the direction of the response of the variables to a standard deviation in structural shocks (Güneş et al., 2013: 11). Figure 2 represents the impulse-response obtained by using structural decomposition as a result of the SVAR model.

Figure 2. Structural Impulse-Response



The inflation shocks had a temporary negative shock on oil revenues, and then this shock was directed to zero levels. It was found that economic growth shocks were positive and stable, while budget deficits showed a tendency towards positive after a sharp negative shock. It has been determined that oil income shocks have negative and positive effects on inflation between periods, economic growth shocks vary between periods on inflation, and budget shocks have a positive and stable effect. The oil income shocks had positive and negative effects on growth for seven periods. Then this effect slowed down. Inflation shocks have a fluctuating effect on growth. While budget deficit shocks have a negative impact on growth, the effect towards the last period is zero. Although oil income shocks have different inter-period effects on budget deficits, the impact level has recently been zero. Inflation shocks tend to move from negative to positive. Growth shocks contribute to keeping budget deficits at zero levels.

Table 3 represents the structural variance decomposition obtained from the analysis. According to the variance research results, 85% of the changes in oil incomes were explained by oil shocks at the end of 10 periods, while 11% were explained by budget deficits and 4% by inflation and growth. While inflation shocks account for 86% of the changes in inflation rates, growth shocks account for 10% and oil shocks and budget deficit shocks for 4%. While growth shocks account for 54% of the changes in economic growth rates, 24% oil shocks and 15% inflation shocks affect 5% and budget deficit shocks for 5 %. While the budget deficit shocks account for 48% of the changes in the budget deficit, oil shocks account for 35% and growth and inflation shocks for 17%.

Table 3. Structural Variance Decomposition

OIL (1)					
Period	S.E.	OIL (1)	INF	EC	BD (1)
1	4.643384	100.0000	0.000000	0.000000	0.000000
2	4.685573	99.79424	0.003124	0.102542	0.100090
3	5.055244	87.59642	0.076548	0.556101	11.77093
4	5.151621	85.60378	1.606715	1.271241	11.51826
5	5.158114	85.42385	1.806160	1.271105	11.49888
6	5.168343	85.15210	1.844049	1.267430	11.73642
7	5.172261	85.08572	1.842548	1.324628	11.74711
8	5.174008	85.05454	1.841345	1.331266	11.77285
9	5.174789	85.05314	1.840845	1.334254	11.77176
10	5.174986	85.04909	1.841087	1.336051	11.77377
INF					
Period	S.E.	OIL (1)	INF	EC	BD (1)
1	7.405377	0.183255	99.81675	0.000000	0.000000
2	8.528970	0.271732	98.37099	1.357171	0.000104
3	8.661543	0.453257	95.83621	3.336563	0.373973
4	8.947497	0.440832	90.04119	9.142629	0.375346
5	9.044276	1.244149	89.04524	9.300276	0.410332
6	9.196932	2.839822	87.00131	9.755773	0.403095
7	9.221241	2.851844	86.59076	10.12262	0.434783
8	9.250792	3.151221	86.30988	10.06148	0.477422
9	9.274750	3.246517	86.20077	10.07675	0.475970
10	9.276527	3.245757	86.18444	10.08570	0.484104
EC					
Period	S.E.	OIL (1)	INF	EC	BD (1)
1	8.225279	15.77039	13.29618	70.93342	0.000000
2	8.718005	16.33485	12.62157	70.87950	0.164089
3	9.710202	22.19890	14.14321	58.96293	4.694961
4	9.901658	24.27010	14.20995	57.00313	4.516830
5	10.05701	25.08762	14.33301	55.40350	5.175868
6	10.13065	24.81092	15.26005	54.72829	5.200739
7	10.14757	24.78384	15.38438	54.55331	5.278472
8	10.15123	24.76665	15.42048	54.51816	5.294706
9	10.15598	24.76097	15.45287	54.49239	5.293778
10	10.15644	24.76292	15.45561	54.48817	5.293301
BD (1)					
Period	S.E.	OIL (1)	INF	EC	BD (1)
1	2.805465	35.12017	7.026193	6.784847	51.06879
2	2.927986	34.35661	8.480529	6.725037	50.43783
3	3.048931	35.56675	10.13858	6.334434	47.96024
4	3.065809	35.23401	10.09202	6.404747	48.26922
5	3.095929	35.44474	10.05225	6.296682	48.20633
6	3.102369	35.53949	10.13767	6.278673	48.04417
7	3.103554	35.53409	10.14387	6.280950	48.04109
8	3.105240	35.51875	10.13894	6.292977	48.04933
9	3.106113	35.53426	10.13500	6.296352	48.03440
10	3.106256	35.53164	10.13899	6.299369	48.03000

4. Conclusion

The effect of oil income shocks on inflation, economic growth and budget deficits analyzed for the Iranian economy with the SVAR model for 1970-2012 period. The structural impulse-response functions and structural variance decomposition results made by SVAR technique showed that oil income shocks play an important role in affecting especially economic growth and changes in budget deficits. There is no significant relationship between oil shocks and inflation. There is a significant relationship between oil incomes and economic growth and budget deficits.

The oil shocks fluctuation has an effect on macroeconomic indicators. It is a driving force, especially for economic growth. However, oil revenues are not channeled to finance budget deficits. Oil incomes are directed towards military, health, social and educational expenditures. Unexpected shocks in energy prices, in particular, force the economy to expand. The optimal use of oil incomes to finance investments and the budget deficit is important for the Iranian economy. The insufficient oil incomes to finance the budget deficits made it necessary to apply for foreign borrowing instruments. An unsustainable external borrowing cycle may also adversely affect economic growth. In this respect, oil incomes are important for macroeconomic indicators.

Although there were important oil shocks, some political, social and economic shocks specific to Iran (Islamic Revolution 1970, Iran-Iraq war 1980-1986 etc.) were also realized. However, although the duration of the shocks in the period studied varies, the shock effects on oil revenues are of similar magnitude. Therefore, although the resulting vulnerabilities differ fundamentally, they have similar effects as a result. Oil exporting countries, especially Iran,

need to establish a balancing mechanism to minimize the adverse effects of oil shocks. Another precaution is to keep the level of dependence on oil revenues to a minimum. Because the shocks that will arise from oil revenues also carry uncertainties and carry the risk of causing bad economic results. Therefore, policymakers should consider measures for a stable oil revenue trend and more efficient use of funds to avoid potential negative impacts. Considering that oil shocks will also change the spending behaviour of governments, the distribution of funds in a balanced way to social, educational, health and military expenditures is important for economic expansion.

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