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How Macroeconomic Variables in Iran Did Respond to Oil Sanctions: An Application of Bayesian TVP-SVAR Approach

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Abstract

This paper investigates the responses of Iran's macroeconomic variables to the oil embargo against Iran. The article applies a Bayesian time-varying parameter SVAR model along the quarterly data of oil export, real exchange rate, inflation, real GDP and money supply of Iran over the period of 1991:Q2-2020:Q2. Applying time varying parameters in this study helps us to consider the economic structural changes and transition mechanism in analyzing the response of macroeconomic variables to oil embargo. The oil embargo against Iran has been intensified since 2012. To consider the effect of the oil embargo on Iranian macro variables, the model has been estimated in two different periods of time, before and after 2012. The results indicate that the escalation of the oil embargo from 2012 has caused a stagflation period and ends in a decline in real GDP and national currency depreciation. In addition, it has intensified money supply and triggers existing inflation. These results have some policy implications to overcome difficulties raises when the economy faces sanction.

Keywords: Oil Embargo, Stagflation, Bayesian TVP-SVAR, Iran.
JEL Classification: F51, E03, C11

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1. Introduction

Sanctions are a kind of foreign government arranges that impose barriers on developing process of affected countries. Restrictions arising from embargos isolate the home country and create difficulties for economic performance (Cortright, Lopez, 2000). After the Second World War, the economic embargos are substantial instruments for war in order to impose tensions and constraints to object country. Although natural resources are a strong point of a country, however, as their economies mostly depend on oil revenue; then it seems that oil is a major threaten to economic development, social equality and peace in oil-exporting countries. Consequently, oil shocks induced from oil embargos may adversely affect a country's macroeconomic performance. Iran is one of those countries which experiences variety of embargos over the last four decades and in the year 2012 an oil embargo has imposed on the Iranian oil sector by 27 members of the European Union and the United States. According to this sanction, the countries are prohibited from importing Iranian oil. These sanctions against Iran operates as a destructive factor in macro-economic performance, which leads to numerous economic fluctuations. Surely speaking, Iran has an oil-based economy and oil exports constitutes a major part of Iranian export revenues, therefore oil shocks will influence economic performance and the effects of the oil embargo are unavoidable. Oil shocks may cause oil prices to be unstable, budgets to be stretched thinner and thinner, the value of domestic savings are quickly disappearing and industrial structures would be weakened. The domestic currency depreciates and foreign exchange reserves depleted, then that is why the Iran's Central Bank limits the supply of dollar to individuals, and a growing black market for foreign exchange emerges rapidly and it simultaneously means even further depreciation of the Rials. This in turn contributes to more inflation because retailers set prices based on the free market price of the dollar. Obviously, any oil shock, such as oil embargo, will have direct and indirect long-term and short-term effects on macroeconomic variables, and it is important to study the response of macroeconomic variables as GDP, exchange rate and inflation to oil shocks.

Recently some related studies investigated the impact of oil sanctions on Iranian economy. Some of them consider its effect in a descriptive way or from theoretical and political point views. Some other investigates its effect on the performance of knowledge-based firms or on stock market, GDP and foreign direct investment, as the study of Fakhari et al. (2013), Yahya Abadi et al. (2013) and Kazerooni et al. (2014). This paper contributes to the literature in two main dimensions as follows. On one hand, there is no comprehensive study which considers the effect of oil embargo on the key macroeconomic variables in a system of interrelated equations. On the other hand, Ning (2013) and Primiciri (2005) confirms that there exist structural breaks in oil effects on macroeconomic variables and the effect of oil shocks on macroeconomic variables are changed over time because of changing in economic structures (Blanchard and Simon, (2001), Stock and Watson (2003) and Blanchard (2007)). It means that adoptive rational behavior of agents and their forward looking and some additional modifications in the transmission mechanism cause instabilities in the oil-macro relationship over time. Then economic agents do a slow-moving but continuous adjustment to oil shocks and they tend to react in pattern with smooth changes. This line of reasoning suggests that the appropriate modeling approach is a TVP-VAR model which shows a smooth evolving coefficients and heteroscedasticity in the innovations. But there is no research that considers the transition mechanism in the response process of Iranian macro variables to oil shocks. In order to close up these gaps in the literature, the main objective of this study is to analyze the effect of oil shocks which results from oil embargo on Iranian economy by using a time varying parameter (TVP) model. Applying a TVP structural VAR (SVAR) model has the advantages of drawing structural impulse responses for different years and analyzing the time varying effect of each selected event and applying priors and leads to a better model estimation. According to Wu et al. (2011) and Fernandez Villaverde et al. (2007), as oil shocks are endogenous indicator for economy, using time varying parameter would overcome the endogeneity and predictability problems of oil shocks.

The rest of the paper is organized as follows: the theoretical framework is presented in section 2. Section 3 discuses methodology of Bayesian TVP-SVAR

model. The results are reported in section 4, and finally section 5 concludes the paper.

2. Theoretical framework

Many theorists approve that countries which endowed with natural resources grow slower than other countries (Collier and Goderis, 2007). For oil exporting countries, the oil export revenues are key to the overall economy and any action limiting oil revenues (as oil sanctions) can adversely influence economic performance through different channels (Kitus et al., 2013). As oil exports forms a big share of government revenues and are positively and directly accounted in GDP, then in the first step, the reduction of oil exports caused by oil sanctions, arises the expectations of GDP reduction. In addition, the deficiency of petrodollars in exchange market, causes financial problems and limits the ability of most of companies in importing their intermediate inputs, where this situation will worsen with the exchange rate depreciation (Farzanegan et al., 2015). However, the oil petrodollars constitutes big buck of public budget and the oil revenue fluctuations can transmit to the fiscal policy and unstable real exchange rate (MehraraandOskui, 2007). Oil shocks causes inflation in the first place and this is a direct and short-run effect of oil shocks which comes up rapidly and it's magnitude depends on share of energy goods in consumer price index (CPI) and the long-run increase in CPI is the indirect effect of oil shocks that comes next (Peersman and Robays, 2009). The CPI increment effects could be decomposes into cost effect, second-round and demand effects. In fact, rising CPI leads to decline employees' purchasing power and they would demand for higher wages and the production costs of firms even further increases and the firms will rectify this condition by additional increase in prices. So this mechanism is a cyclical one and causes higher inflation levels (Zytsev ,2010).

There are bulk of studies that examined the effects of oil shocks on different macroeconomic variables in oil exporting countries. for example: Dawson (2007), Coudert et al. (2008), Ozturk et al. (2008), Rickne (2009), Mehrara and Oskui (2007), Farzanegan and Markwardt (2009), De Gregorio, Landerretche, and

Neilson (2007), Chen (2009), and Blanchard and Gali (2007) examined the effects of sanctions from different perspectives. In addition, Keshavarz Hadad et al. (2020) by applying a VARMAX GARCH-in-Mean Asymmetric BEKK model in terms of structural failure of the conditional variance, have investigated the effect of sanctions and oil price (revenue) fluctuations on the country's economy. They used real non-oil GDP, Iranian heavy oil exports, exchange rates, total stock market index and sanctions index data over 1991:Q2 to 2018:Q1. The results illustrated that a shock of oil revenue or sanctions index affected activities in all of three sectors. The increasing sanctions pressure lead to a spillover effect of uncertainty to all sectors under study and a decline in production activities and national currency depreciations. Besides, Tayebi and Sadeghi (2017) have explored the effect of mutual sanctions imposed mostly in 2012 on Iran's exchange market through its cross effects on oil exports and government budget deficit and then, impacts of the sanctions before 2012 is also evaluated. To this end, the paper has employed the ARDL method to this exploration using relevant time series data from 1980 to 2014. The obtained results indicated that the sanctions imposed before 2012 have exerted directly a weak effect on the exchange rate while they have affected volatilities of exchange rate more strongly after 2012. Moreover, Garshasbi and Yusefi (2016) by offering a new index for representing the sanction in economic modeling and applying three-stage least squares (3SLS) method for a small macroeconomic model, they have examined the contribution of the sanctions on major economic variables such as economic growth, trade, investment and employment. According to their findings, the direct effects of sanctions are only significant in growth and term of trade equations. It is also worth noting that some studies focus on the issue of that respond of macroeconomic variables to oil shocks and the change of transition mechanism over time. for example Ferraro et.al (2012), Jo (2012), Baumeister and Peersman(2012) applied TVP-VAR models in examining the effect of oil shocks of macroeconomic performance and they showed that the reaction of the macroeconomic variables to oil shocks has been changed over time. Also Ning (2013) and Primiciri (2005) showed that there exist structural breaks in oil effects on economy and oil shocks perform as an endogenous factor in domestic

economy. Then this study considers the possible transition mechanism in the response process of macroeconomic variables to oil shocks and applies a time varying VAR model which has been explained in the next section.

3. Methodology of Bayesian TVP-VAR models

Empirically, after 1980s great moderation of business cycles and volatility of many macroeconomic variables and recession of May 2008 led to change in the VAR parameters. These events end in presentation of new econometric methods which considers parameter changes as Markov Switching VARs, Regime-switching VARs and TVP-VAR. This study uses the most popular one, TVP-VAR models. This approach firstly has been presented by Litterman (1986), Doan, Litterman and Sims (1984), Sims (1989) and Canova (1993). This model focuses on error covariance matrix multivariate stochastic volatility and time varying parameter models which let coefficients be time variation.

According to Koop, Korobilis (2010) estimating VAR models without using some prior information might lead to unreliable estimates. Bayesian VAR models suggest priors in order to shrink relevant parameters and avoid over-parameterization problem. Choosing the types of priors depends on the objective of researchers; whether they want to verify validity of a theory or to make the Bayesian inferences. Using a natural conjugate prior leads to analytical estimations and reduction of computational burden and non-conjugate priors help to carry out recursive forecasting exercise using a Markov Chain Monte Carlo (MCMC) method (Sarantis, 2013). In practice natural conjugate priors don't allow for some extensions in VAR models such as: containing different explanatory variables in different equations, varying coefficients over time and heteroscedasticity of error terms. In order to overcome the weakness of natural conjugate priors, researchers of Minnesota University developed a new set of Minnesota priors. They used $\sum\hat{}$ instead of $\sum$ and they assumed a diagonal matrix for it, ignoring uncertainty in $\sum$ is disadvantage of Minnesota prior. Independent normal Wishart prior is a set of priors which allow for equations in a VAR system to contain different explanatory variables (restricted VAR). In this way, the prior

covariance matrix can be chosen by the researcher. In above mentioned priors, researchers are required to add substantial prior input in order to obtain restricted or unrestricted VAR. Yet there is another prior that automatically mange the number of shrinkages and only asks for a minimum prior input from researcher. This prior called stochastic search variable selection (SSVS). SSVS clearly describes hierarchical priors[1] which are widely used in state space models[2]. Since TVP-VAR model known as a state space equation, then the basic TVP-VAR model is written as follow:

$$y_t = Z_t\beta_t + \varepsilon_t$$
$$\beta_{t+1} = \beta_t + u_t \qquad (1)$$

This model treats the entire variable endogenous and considers the nonlinearities and time variability of parameters. The above regressions are flexible and can be written for a variety of non-linear functions. TVP-VAR models contain two structures of error variance. The first model includes homoscedasticity (if $\varepsilon_t \sim N(0,\sum)$) and the second one includes heteroscedasticity(if $\varepsilon_t \sim N(0,\sum_t)$).As mentioned before, there is a proliferation problem in VAR models, this problem is more severe with time varying parameter VAR models. In order to solve this problem, the hierarchical prior or a combination of hierarchical prior with other priors can be used. According to Ning (2013), a time varying coefficient of VAR (P) model can be specified as:

$$y_t = c_t + B_{1,t}y_{t-1} + B_{2,t}y_{t-2} + \cdots + B_{p,t}y_{t-p} + u_t \qquad t = 1,2,\dots,T \qquad (2)$$
$$u_t \sim N(0,\Omega)$$

Where $y_t$is a n*1 vector of endogenous variables at time of t, c_t is a n*1 vector of constant terms, p is the number of lags in vector y_t, $B_{p,t}$ is a n*n matrix of coefficients for p=1, …, p. u is a n*1 vector of unobserved shocks. In this model the coefficients, covariance and volatilities are allowed to vary along time. Then the Cholesky decomposition of $\Omega_t$is written as follows:

$$\Omega_t = D_t^{-1}\sum_t \sum_t' D_t^{-1} \qquad (3)$$

[1]. In order to obtain more information about hierarchical prior refer to Koop, Korobilis (2012).
[2]. For more information about Bayesian TVP-VAR models refer to Heidari (2008).

Where D_t is a lower triangular matrix with diagonal 1:

$$D_t = \begin{pmatrix} 1 & 0 & \dots & 0 & 0 \\ d_{21,t} & 1 & \dots & 0 & 0 \\ . & . & \dots & . & . \\ d_{n1,t} & d_{n2,t} & \dots & d_{nn-1,t} & 1 \end{pmatrix} \quad (4)$$

And $\sum_t$ is a diagonal matrix of standard error corresponds to each $y_{i,t}$

$$\Sigma_t = \begin{pmatrix} \sigma_{1,t} & 0 & \dots & 0 \\ 0 & \sigma_{2,t} & \dots & 0 \\ \dots & \dots & \dots & \dots \\ 0 & 0 & \dots & \sigma_{n,t} \end{pmatrix} \quad (5)$$

Now based on above phrases, equation 1 can be written as:

$$y_t = X_t' B_t + D_t^{-1} \sum_t \varepsilon_t, \quad X_t' = I_n \otimes \left[1, y_{t-1}', \dots, y_{t-p}'\right] \quad (6)$$

Where B_t is coefficient state, D_t is covariance state and $\sum_t$ is the volatility state which all of them are random walks such that:

$$B_t = B_{t-1} + \nu_t$$
$$d_t = d_{t-1} + \xi_t$$
$$log\sigma_t = log\sigma_{t-1} + \eta_t \quad (7)$$

The random walk residuals and innovation variances are independent with each other,

$$\text{V} \equiv \text{var}\begin{pmatrix} \varepsilon_t \\ \nu_t \\ \xi_t \\ \eta_t \end{pmatrix} = \begin{pmatrix} I_n & 0 & 0 & 0 \\ 0 & Q & 0 & 0 \\ 0 & 0 & S & 0 \\ 0 & 0 & 0 & W \end{pmatrix} \quad (8)$$

The priors are as the same of Primiceri (2005). Each state has a multivariate normal distribution where innovation variances have Inverse Wishart distribution.

Now each parameter has a linear state space representation and the posteriors of parameters obtain as follows:

$$p(B^t|y^t, D^t, \sum^t, V) = p(B_t|y^t, D^t, \sum^t, V) \prod_{t=1}^{T} p(B_t|B_{t+1}, y^t, D^t, \sum^t, V) \quad (9)$$

The posteriors of D^T and $\sum^T$ are derived in the same way. After obtaining priors and posteriors, each parameter would draw using Gibbs sampling method. The order of Gibbs sampling is as follows: first initializing $D^T, S^T, \sum^T$ and V then sampling B^T from $p(B^t|y^t, D^t, \sum^t, V)$ and sampling D^T from $p(D^t|y^t, B^t, \sum^t, V)$, sampling S^T from $p(S^t|y^t, D^t, \sum^t, V)$, sampling $\sum^t$ from $p\left(\sum^t|y^t, B^t, D^t, S^t, \quad V\right)$ and sampling V from $(Q, W, S|y^t, B^t, D^t, \sum^t)$. Actually the Gibbs sampling would

iterate for about 1000 times and the first 2000 iterations would be treated as burn-in data.

The period under consideration in this study is from 1991:Q2-2020:Q2. The quarterly data consists of 140 observations. In order to ascertain the effect of oil embargos, the estimates are reported for two different sample period: before and after year 2012. The date of escalating oil sanction against Iran is chosen as breaking point for our data.

4. Results

4. 1. Structural Break Point Test in the Iranian Oil Exports

Existing of structural breaks in economic regime causes unstable and insignificant coefficients in regressions. Then in the case of structural breaks, VAR models can't estimate the robustness of coefficients, therefore the TVP-VAR technique should be applied. Considering major political, economic and international events that occurred over the past 50 years like 1970s oil price shocks, the Islamic revolution of 1979, destructive 8-year war with Iraq, economic sanctions, and other international outbreaks have isolated Iran, it is expected to have several structural breaks in Iranian oil exports. This study applied the Bai and Perron structural break tests (1998, 2003) to test for structural breaks in the data. The results of the tests shown in table 1. According to the results, there is at least one breakpoint in the oil export of Iran in the period of 1991-2020. The results of multiple breakpoint tests sequentially determinate breakpoints show that there are 5 breakpoints in the parameters. Then this study considers the feature of the time-varying parameter in the estimation process.

Table 1: Multiple breakpoint tests

Breaks	# of Coefs.	Sum of Sq. Resids.	Log-L	Schwarz* Criterion	LWZ* Criterion
0	1	6.90E+12	-1603.512	24.84987	24.88562
1	3	1.29E+12	-1506.182	23.25371	23.36118

2	5	1.11E+12	-1497.280	23.18218	23.36170
3	7	1.10E+12	-1497.278	23.26412	23.51600
4	9	1.10E+12	-1497.277	23.34606	23.67065
5	11	1.10E+12	-1497.278	23.42804	23.82567

* Minimum information criterion values displayed with shading

Estimated break dates:
1: 1995Q3
2: 1995Q3, 2012Q3
3: 1995Q3, 2008Q2, 2012Q3
4: 1996Q2, 2003Q2, 2008Q2, 2012Q3
5: 1995Q3, 1999Q3, 2003Q3, 2008Q2, 2012Q3

*. Significant at the 0.05 level

4. 2. Posterior Mean of the Standard Deviation in the Oil Export

Figure 1 shows the posterior means of the standard deviation of residuals for oil exports in Iran. The fluctuations in this figure indicate the most important oil shocks over the last three decades. The figure shows that oil supply shocks have high volatility during the last 40 years; the oil embargo, the Iranian revolution, eight years of the Iran-Iraq War has led to high volatility in oil export. After the war and in the period of reconstruction the volatility gradually declined (1991-2020). The plot in figure 1 exhibits a coincidence with oil embargos imposed by the US, Europe and United Nations organizations in 1996 and oil supply volatility which gradually increases. Coincidence oil price boom in 2000, oil exports reached their peak. As the pressure of oil embargos against Iran declined in 2001-2012, the oil export volatilities decreased. Extension and renewing of oil sanctions in 2012 also caused increasing volatility in oil shocks after 2012.

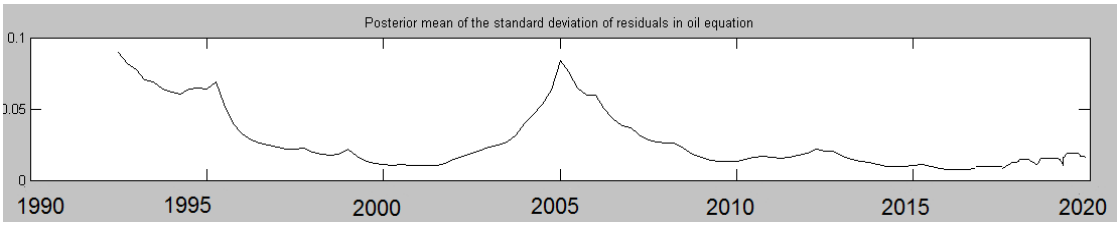

Fig. 1: Posterior Mean of the Standard Deviation in Oil Export

4. 3. Convergence Diagnostics for Hyper Parameters and Volatilities

Geweke (1992) proposed a convergence diagnostic in the Markov Chain process is based on a test for equality of the means of the first and last part of a Markov Chain. If the samples are drawn from a stationary distribution of the chain, then the two means are equal and Geweke's statistic has an asymptotically standard normal distribution. Then if $|Z| > 1.96$, iterates from the "early" segment were not yet drawn from the target distribution and should be discarded. In addition $|Z| < 1.96$ indicates that the Markov Chain is converged. The results of Geweke convergence diagnostics show that the parameters are converged[3].

4. 4. Impulse Response Functions of Economic Variables to Oil Shocks

In order to capture the effect of the oil embargo on macroeconomic performance, this study classifies all mentioned embargos into 3 classes, according to the intensity of the sanctions named limited, moderate and extensive sanction, based on Hufbauer (2003) criteria. According to Hufbauer classification, the embargo on Iran has been exacerbated after 2012 up to now. Thus, this study considers the effect of the oil embargo in two periods of before and after the year 2012. Impulse response functions of real GDP, inflation, real exchange rate and money supply to oil embargo are presented in figures 2, 3, 4 and 5, respectively. The dynamic effects of oil shocks on the other variables are normalized in terms of the median response of the variables to a 1 percent decrease in oil exports as well as 16^{th} and 84^{th} percentiles of the posterior distribution of the relevant variables. In order to avoid complicated figures, just the responses in median percentiles have been presented here[4]. According to the figures, there is a clear distinction between the effects of oil shocks on the economy in two periods before and after the oil embargo. This demonstrates the importance of time variations in studying the dynamic effects of oil export shortfall on the economy. Figures 2 and 3 show the median impulse response function of real GDP and inflation to the oil shocks.

[3]. Detailed results are available from the author upon the request
[4] The 16^{th} and 84^{th} percentile confidence bands are available from the authors on request.

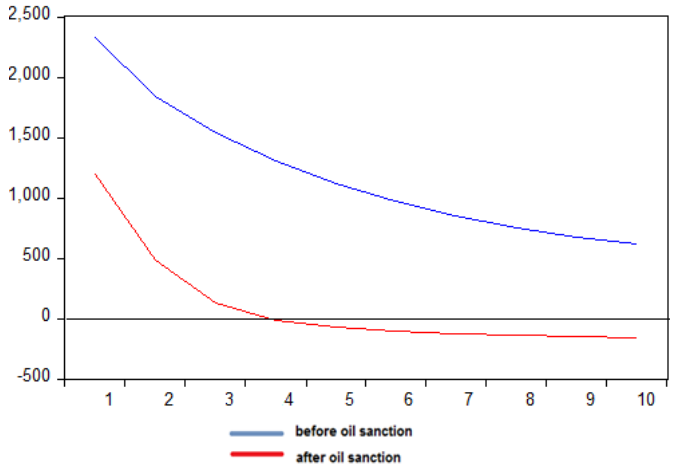

Fig. 2: Median impulse response function of real GDP

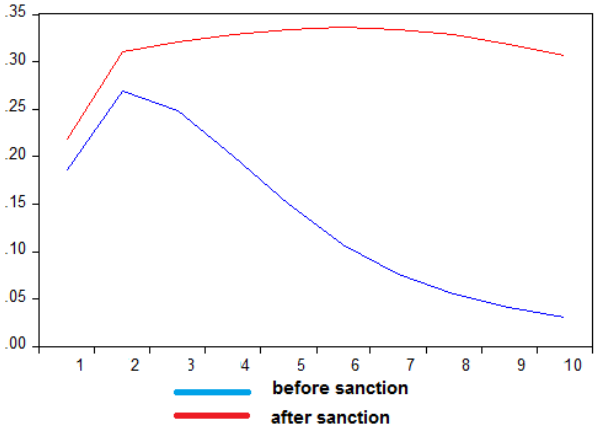

Fig. 3: Median impulse response function of inflation

As figure 2 indicates, the effect of oil shocks on real GDP is negative and it causes an immediate decline in economic activities. In the embargo period, this decline has been deeper and its effect doesn't seem to die out in the short period. It shows that oil has an important role in the Iranian economy. The dependency of the economy on oil exports also is a matter of inflationary pressures. In fact, the oil embargo reduced oil revenues and enforced the government to impose some restrictions on importing goods and services. For instance, importing capital goods and raw materials are vital for the production process constitutes a major part of imports; the restrictions on the imports have an adverse effect on domestic output. Consequently, the inevitable outcomes of this kind of policy would be

stagflation. As implied in figure 3 (inflation trend), where the shock in oil exports is measured in terms of one standard deviation, will create higher inflation in the early years. The response of inflation is more pronounced after imposing an oil embargo on rising and climbed considerably in the oil embargo period. According to figure 3, the impact of oil shocks on inflation is disappearing over time and completely wipe out after 10 periods before the oil embargo, but the effect of oil shocks on inflation is increasing in the oil embargo period and its effect doesn't vanish. This indicates the larger effect of oil shocks on inflation in the post period of the oil embargo. This is emphasizing again that the combination of a temporary fall in economic activities and a temporary rise in inflation create stagflation which is exacerbated after the oil embargo.

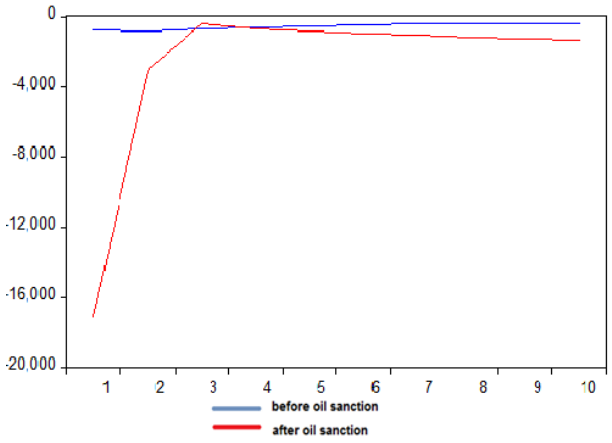

Fig. 4: Median Impulse Response Function of Real Exchange Rate

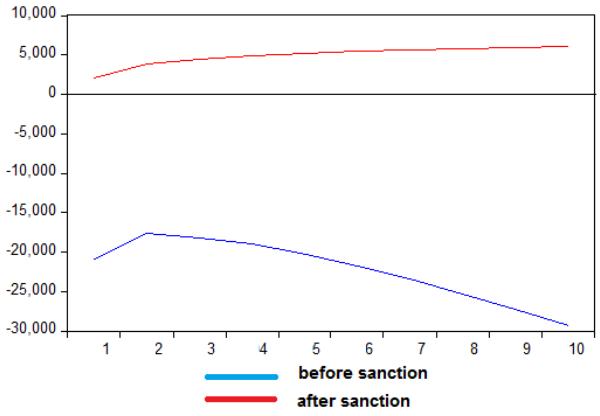

Fig. 5: Median impulse response function of money supply

Figure 4 shows the median impulse response function of the real exchange rate to oil export before and after the oil embargo. According to this figure, oil exports caused domestic currency appreciation before the oil embargo, but after a year when the oil embargo caused oil exports to reduce, the depreciation of domestic currency gradually has occurred over time. In other words, declining oil exports has created a financial deficit for the government and consequently led to large money liquidity and resulting in high inflation. This means a higher foreign exchange rate. According to figure 5, the shortfall of oil export in the oil embargo period causes an increase in the monetary base. It indicates that a reduction in oil revenues; enforce the government to borrow more money from the central bank (print more money) to finance the public expenditures.

5. Conclusion

As a result of the intensification of economic sanctions against Iran, Iran's oil exports have sharply declined and due to the high dependency of the economy, especially the state budget and foreign trades on the petro dollars, the whole economy of Iran faced a stagflation condition. Then investigating the transition mechanism of oil embargo on Iranian macroeconomic variables by considering changes in economic structure of the country over time has been the main objective of this study. In order to reach this goal, the study uses a BTVP-SVAR model that considers the time variation features in transmission mechanism. According to the results oil embargo has had an adverse effect on macroeconomic variables. The real GDP declines deeply in the oil embargo period and inflation has been intensified and this result is in line with Keshavarz et al. (2020) and Garshasbi and Yusefi (2016) findings. However, the mentioned studies just confirm a weak effect or just one period effect of sanction on inflation. To put it another way, as to our findings, the effect of oil embargo shock on inflation dose not vanished in short run and inflationary consequences are significantly positive in the post period of oil embargo. That is because declining in oil revenues forced government to borrow from banking system to finance the government expenditure and in this way the monetary supply has been expanded and caused

depreciation of domestic currency and this scenario and result is in congruence with Tayebi and Sadeghi (2017) study. Moreover, exchange rate fluctuations and a multiple exchange rate system created uncertain environment for foreign investors which has led an adverse effect on overall economic performance. It is evident that despite of Iranian efforts to reduce its dependence on oil income, the Iranian economic activities are critically depends on oil shocks, and oil revenues plays a predominant role in economy. These results are important for policy makers in central bank to set up stabilization policies to overcome difficulties in the post period of oil embargo. For example Iran could stabilize economic performance by stabilizing oil production. Iran can neutralize the effect of oil shocks by reducing the share of oil revenues in government budget or settling oil revenues to national development found can reduce oil shocks role in economic activities. The national development found also should be independent of government intervention. To conclude, preventing exchange market volatility, moderating the accelerated growth of liquidity, regulating the market for certain goods and services, and managing inflation expectations are priority targets and policies in dealing with sanctions.

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متغیرهای کلان اقتصاد ایران به تحریم‌های نفتی علیه ایران چگونه واکنش نشان داده‌اند؟
کاربردی از مدل VAR ساختاری با پارامترهای متغیر در زمان

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چکیده
هدف از این مطالعه بررسی چگونگی واکنش متغیرهای کلان اقتصاد ایران به تحریم‌های نفتی علیه ایران است. بدین‌منظور این مطالعه از متودولوژی VAR ساختاری با پارامترهای متغیر در زمان بهره گرفته و از داده‌های فصلی بین سال‌های Q2:1991-Q2:2020 برای پنج متغیر اساسی شامل: صادرات نفت، نرخ ارز واقعی، تورم، تولید ناخالص داخلی واقعی، و عرضهٔ پول استفاده کرده است. براساس مطالعات «نینگ» (۲۰۱۳)، «پریمیچری» (۲۰۰۵) و «بلانچارد» (۲۰۰۷) در فرآیند واکنش متغیرهای کلان اقتصادی به تحریم‌های نفتی اغلب کشورها، شکست ساختاری وجود دارد. بدین‌معنا که به‌علت بروز برخی تعدیلات و تغییرات در ساختارهای اقتصادی کشورها در طی زمان، مکانیزم انتقال در روابط بین شوک‌های نفتی و متغیرهای کلان اقتصادی ناپایدار بوده و واکنش متغیرهای کلان اقتصادی به تحریم‌های نفتی در طی زمان متغیر می‌باشد؛ درواقع بسیاری از فعالین اقتصادی سعی می‌کنند بتوانند نسبت به شوک‌های نفتی واکنشی ملایم‌تر نشان‌دهند، بدین‌منظور دست به ایجاد تعدیلاتی آهسته اما مداوم در مقابل شوک‌های نفتی زده و به مرور زمان تمهیداتی مناسب برای مقابله با شوک‌های نفتی در پیش می‌گیرند. تاکنون مطالعات زیادی در زمینهٔ بررسی آثار تحریم‌های نفتی بر متغیرهای کلان اقتصادی ایران انجام شده است، اما هنوز مطالعه‌ای که بتواند مکانیزم انتقال در واکنش متغیرهای کلان اقتصادی به شوک‌های نفتی ایران را مدنظر قرار دهد، صورت نگرفته است؛ لذا این مطالعه بر آن است تا بتواند با بهره گرفتن از متودولوژی TVP-SVAR این کمبود در مطالعات قبلی را جبران نماید.

کلیدواژگان: تحریم‌های نفتی، رکود تورمی، BTVP-SVAR، ایران.
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