Investigating the positive and negative impulses of financial policy on the economy; DSGE model (Case study: Iranian economy)

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Abstract

Financial policies, which are applied with the means of government spending and tax revenues, are among the government's effective levers on macroeconomic variables, which are carried out in order to stabilize economic fluctuations or accelerate economic growth. And for the effectiveness of financial policies, through the application of positive and negative impulses in government spending, to investigate the asymmetric effects of these policies on the variables of total production, private sector production, public sector production, private sector consumption and sector investment. private, using dynamic stochastic general equilibrium models, during the time period of the first quarter of 2019 to the fourth quarter of 2013. The general purpose of this research is to design a stochastic dynamic general equilibrium model for the Iranian economy in order to investigate the effects of fiscal policy impulses on the real production of the Iranian economy. ?" It seems that the effects of positive and negative financial policy impulses on economic growth are significant. The technique used in this research is the Dynamic Stochastic General Equilibrium (DSGE) model, and in order to analyze the data, the dynare program was used in Matlab and Eviews software. The result of the research shows that the positive and negative impulses of government spending have significant but asymmetric effects on macroeconomic variables. Also, the negative impulse effect of government spending (contractionary fiscal policy) is decreasing and greater than the increasing effect of a positive impulse of government expenditures (expansionary fiscal policy).

Keywords: asymmetric effects, fiscal policy impulse, Iranian economy, Dynamic Stochastic General Equilibrium
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1 Introduction

Today, many studies have been done in Economic and Business [1, 5, 13, 17]. Many article of the Constitution broadly defines the sovereignty and ownership of the state. According to this principle, natural resources and national wealth such as barren lands, deserts, mines, seas, lakes, riverbeds, natural forests, virgin lands and pastures, ownerless

property and The properties whose ownership is not known are in the possession of the Islamic State, which will determine the best way to use them for national interests. (Constitution of the Islamic Republic of Iran) With such extensive ownership and sovereignty, the government can be considered as the main responsible in Iran's economic policies. But on the other hand, due to the lack of a strong, pioneering and competitive private sector in Iran's economy, the public sector economy has allocated a high share of domestic production, income and expenditure. The expansion of the public sector in the past caused an increasing increase in government expenses due to the following reasons: Each of the budget components are both the cause and the effect of economic growth (Wagner's law). Barro [8] raised the importance of government spending in forming the general infrastructure of economic growth, then states that the growth of per capita income in any economy will increase the ability and range of social choice of households. This higher power of choice will increase the choice of higher education and private healthcare for the household. Since social services and public goods are luxury goods, the demand for them will also increase. Technical changes in the economy and the need for government support in this regard are among the needs of modern industrial societies. Romer [21] emphasized the dependence of research and development expenditures and economic growth and states that investment in human and physical capital affects long-term growth and financial policies affect the level of production and long-term growth. puts On the other hand, the deepening of political differences between countries and the formation of an atmosphere of military competition and deterrence can be seen as another part of the reasons for the tendency to increase government spending in this sector, especially after the Second World War. Other reasons for the need to increase the role and share of government expenses in the economy can be attributed to the low productivity of the public sector, the increase in the relative costs of public services, and the strong need to redistribute income in the economy in a situation where the natural process of growth This makes the distribution unequal and the government's intervention is needed to balance it, he said. The growth of administrative bureaucracy as well as the change of social environment from tax-paying citizens to voters whose support can choose and support governments are all causes that cause over time the role and The government's expenses should have a suitable growth [10]. On the other hand, governments that directly enter the income from oil sales into their annual budgets have more motivation to increase their share in the economy and expand their involvement in the economic affairs of the society. Therefore, it can be expected that over time, due to the expansion of social needs and expectations, all governments have to consider higher costs as annual budgets and assume a greater role. Therefore, in the new economic literature, financial policy can no longer be seen as carrying out the usual social expenses based on growing needs, rather governments generally look at increasing this growth or reducing its scope in the field of the government's role. They show In other words, to achieve economic growth and development and even to control economic fluctuations, especially periodic fluctuations, it is necessary to implement monetary and financial policies by the government. The flow of payments and receipts of the government, which is revealed in the form of the budget, constitutes the main variables of the government's financial policy. The main advantage of financial policy is a faster impact on economic variables as well as orientation in the direction of growth and development by achieving allocation, distribution and stabilization goals [2]. On the other hand, the use of financial policies has recently increased for two reasons: 1- The effectiveness of monetary policy in dealing with the instability of business cycles is limited. 2- In European countries, monetary power has decreased uniquely. Therefore, the discussion about the desirability and effectiveness of financial policies is raised [19]. In addition, since the beginning of the recent global financial crisis, there has been a renewed interest in using financial policies as a stabilizer of economic fluctuations. In the midst of people's concern about the prolongation of the low growth period, Keynesian financial packages have been a lifesaver and since the middle of 2008, large stimulus packages have been implemented by the governments in many advanced countries to deal with the economic recession [12]. Therefore, with the change in the state of the economy and the attitude of the policy makers and designers of the development programs, the amount of government spending has always been higher or lower than an acceptable average, and these changes are the impulses of the financial policy. shows In fact, the size of the government's role in the economy is related to the structure and state of the economy and the structured set of economic institutions of the society. Therefore, it is expected that the impulse effects of the government's financial policies will be different in different times and places, and the financial coefficients will change during the business cycle [9], that is, applying these positive (expansionary fiscal policy) and negative (contractionary fiscal policy) impulses can have different effects on real variables such as economic growth or nominal variables such as inflation. Economists believe that the effects of these impulses may not be in the same direction. This difference in terms of its effect and size is interpreted as the asymmetric effect of financial policy impulses. Normally, budget surplus tends to increase during economic prosperity.

2 A brief overview of the trend of the main variables of the model in Iran's economy

Examining the economic performance of Iran shows that the instability of the indicators affecting the performance of the economy leads to the instability of the performance indicators of the Iranian economy. In the period related

to the use of the foreign exchange reserve account, the effect of instability of oil revenues on Iran's economy was reduced to some extent, but the instability of monetary and financial policies, especially in recent years, has caused instability in the performance of Iran's economy, which in Changes in inflation rate, unemployment rate, employment level and economic growth rate have been shown. Based on this, monetary and financial calculations and increasing the efficiency of the foreign exchange reserve account in the management of oil revenues can play a dominant role in stabilizing Iran's economy. Economic growth is one of the most important components of measuring and evaluating the state of the economy in the country. Economic growth is calculated from changes in GDP. An increase in production makes a country's income better, and as a result, it will increase investment or consumption. Therefore, if economic growth increases continuously in a period, the welfare level for people in countries will also increase. For example, countries like China and South Korea achieved high and stable growth with a specific planning and were able to raise the level of welfare in the society. But by examining the statistics of Iran's economy, it can be seen that the economic growth had a fluctuating behavior and the average level of economic growth was less than 3%. The economic growth in the country has changed under the influence of foreign impulses and capital assets rather than being endogenous and exogenous. On the other hand, a low and stable level of inflation is one of the criteria of a healthy economy, although many countries have overcome the concern of high inflation, but the review of inflation statistics in recent decades shows that solving this challenge is always a problem for Iran's economy. It has become fundamental. 3- Previous studies [15] investigated the comparative analysis of the effects of monetary impulses and government financial expenditures in partial and full reserve banking in Iran: DSGE approach. After determining the input values of the model and estimating the parameters using quarterly data of the Iranian economy during the period of 1991-2019 by the Bayesian estimation method, the results of the simulation show the validity of the model in describing the fluctuations of the Iranian economy. Examining the dynamics of the model shows that the positive momentum of consumption expenditure and government investment under partial reserve banking will increase production, money volume and decrease consumption, but in full reserve banking, it will increase consumption, production and decrease money volume in the Iranian economy. The response of the mentioned variables to the oil impulse under partial reserve banking is the opposite of full reserve banking. [16] investigated the consequences of ignoring the non-Ricardian household on the optimal monetary policy of Ramzi and macro variables (in the form of the DSGE model). The results of the research show that the higher the percentage of non-Ricardian households in the model, the monetary policy maker moves away from the targeting of monetary variables and gives more importance to the production targeting, and if the optimal monetary policy is chosen without considering the non-Ricardian households in the model. [11] examine banking, monetary target policy and stock market shock. Journal of mathematics and modeling in financial affairs. This research has investigated the economic and balance sheet effects of targeting the growth rate of money. Based on the financial statements of the banking network and national accounts, using dynamic general equilibrium and dynamic Keynesian statistics and statistical data for the period 1991-2019. New Keynesian DSGE model and Bayesian method have been used to estimate the parameters. This paper confirms the validity of the model by analyzing the impulse response functions and the Brooks and Goleman test. The results of the model indicate that the negative effect of targeting the growth rate of money will reduce deposits, reduce loan interest rates, reduce bank resources, bank lending, and then the health of banks will be endangered. In this way, investment and production are reduced. It is also the effect of increasing stock prices, decreasing deposits, loans and increasing investment and production. Therefore, this research shows that the policy of negative targeting of money growth rate coincides with the policy of interest rate increase and stock price increase. Armaghan et al. [7] investigated the impact mechanism of impulses from the oil price, currency price and investment, taking into account the adjustment costs on the stock price index. The results also show that an impulse from the oil price increases the stock price index by 33%, and an impulse from the exchange rate causes a 7% increase in the stock price index and an impulse from the investment area respectively. Taking into account the adjustment cost, it causes a 40% decrease in the stock price index, and an impulse from the business cycle and production gap causes a 17% decrease in the stock price index. Also, based on the results of variance analysis among model variables; Considering the adjustment cost, investment, oil price impulse, currency impulse, real interest rate impulse, and production gap respectively have the highest percentage of explanation of model changes during the period under review. Therefore, reducing adjustment costs in investment by applying different policies such as; Distribution of skills and support for unemployed workers, development of technical and professional education, reduction of labor transfer costs between industries, use of trade liberalization policies can be useful in providing macroeconomic stability and stock price index and stock market.

Pellegrino et al. [18] examine uncertainty and monetary policy during the Great Recession. We use a nonlinear VAR framework and an advanced identification strategy to document the large response of real activity to a financial uncertainty shock during and after the Great Recession. We replicate this evidence with a DSGE estimation framework that has an uncertainty concept comparable to that in our VAR. We then use the estimation framework to quantify the output loss due to the large uncertainty shock that occurred in the 2008 quarter. We find such a shock to explain about

60% of the output decline in the period 2008–2014. The same estimated model reveals the successful role of the Federal Reserve in limiting the output losses that would otherwise have occurred if monetary policy had been conducted as in normal times. Finally, we show that the estimated rule during the Great Recession is able to provide an economic outcome closer to the flexible price than the rule describing the Fed's behavior in normal times. Rahmani et al. [20] investigated the impact of financial and monetary policies on the Iranian stock market using the DSGE model. This article examines the impact of financial and monetary policies on Iran's stock market by using a dynamic stochastic general equilibrium model. The results show that a positive monetary shock leads to an increase in production, stock price index and inflation. Also, the response of stock demand to money supply shock is negative. We find that a positive shock to government spending led to an increase in output and inflation. The response of stock demand and stock price index to government expenditure shocks is negative. In addition, the results show that the stock market shock leads to an increase in output and inflation. Akbari Dehbaghi et al. [3] investigated the impact of domestic and foreign monetary policy on Iran's economy: global modeling. The results of domestic monetary policies on Iran's macroeconomic variables show a form of price puzzle on how monetary policy shocks affect inflation in Iran. The effects of positive domestic interest rate shocks on Iran's real GDP are negative. The reaction of the real exchange rate of Iran to the positive shock of the domestic interest rate is negative and significant. The results regarding the impact of foreign monetary policies on Iran's macroeconomic variables show that only the effects of a positive shock to China's interest rate on Iran's inflation are significant and negative. In addition, Iran's real GDP is significantly independent of the monetary policy shocks of Iran's other trading partners. Also, the response of the real exchange rate of Iran to positive monetary shocks in the European Union and Turkey is at a positive and significant level. The results indicate that due to Iran's closed economic structure, global economic crises that lead to recession in other countries have had the least impact on Iran's economy. Alavi Bajgani et al. [4] investigated the asymmetric effects of financial policy on economic growth in Iran: the quantile regression approach. Monetary and financial policies are among the most important policy tools that affect economic activities through the decisions of economic authorities. The aim of this study is to investigate the asymmetric effects of financial policy on economic growth in Iran with the quantile regression approach during the period of 2015-2016 using seasonal data. The results of this study show that tax, investment and foreign trade had a positive and significant effect on economic growth. In a study, Kaviani et al. [14] evaluated the impact of monetary base shocks on stock price returns of listed companies (DSGE approach) by taking into account some facts observed in the Iranian economy, and then after optimization and Obtaining the first-order conditions of the agents was obtained by using Ehlig's method, the linear-logarithmic form of the equations. The analyzed sample contains seasonal data from 1381 to 1395. In the end, the instantaneous reaction functions of financial variables against monetary and investment base shocks were investigated. The results show that the monetary base shock first has a positive effect on the price return of the companies' shares and then returns to its equilibrium and stable state in the following periods with the reduction of this shock. Also, the investment shock due to the supply of more shares of companies in the capital market first reduces the stock price return because more shares are offered in the market, but in the following periods, the stock price due to the expected profitability of this investment. increased and subsequently the price efficiency increases. Finally, by comparing the moments of the variables present in the model of this article and the moments of real data in the Iranian economy, it shows the relative success of the model in the realities of the Iranian economy. Sefidbakht and Ranjbar [24] in a study investigated the spillover of fluctuations between oil price, exchange rate, gold price and stock market under time intervals and structural failure: using Garch model (BEKK) and ICSS algorithm and also with VAR model and then the relationship between them was investigated through the Granger causality test. The results show that if we ignore the calculation of structural failure in the equations, exchange rate changes do not affect the price of oil, but it has a significant effect on the price of gold and the stock index, in this case, the changes in the oil price do not affect any of the studied variables. On the other hand, gold price changes can affect the stock index and stock changes can also affect the exchange rate. But when structural failure is used in the equations, the results will be different.

2.1 Economic growth rate

Economic growth rate shows the rate of increase or decrease of GDP and consequently the rate of improvement or decrease in the level of well-being and enjoyment of the people. The growth rate of Iran's economy has experienced many ups and downs in the post-war period, especially in the construction period. The historical trend of Iran's economic growth rate is shown in fig. 1. As can be seen from the figure, the economic growth rate has appeared very fluctuating and has experienced a total of -2.5% to 14%. The highest economic growth of Iran after the revolution was achieved in 1361, the rate of economic growth in this year was equal to 22.8 percent. But in the following years, the economic growth figure was again in the negative range. This trend continued until the end of the 1960s, but the economic growth in 1369 with a record of 14% and in 1370 with a record of 12.3% showed two significant levels of economic growth. The downward trend of the economic growth rate started at the beginning of the construction

period, so that in 8 years, except for two years 1369 and 1375, the economic growth trend has been downward. At the end of this period, this rate has been reduced to zero percent. The main reason for the upward trend of the economic growth rate in the first year of the construction government can be attributed to the empty spaces of the country's economy due to the 8-year war. Also, the growth achieved in 1975 was also due to the increase in oil and gas exports in this year. The overall economic growth rate in the eight-year period of construction was 5.5% on average. At the beginning of the reform period, we see the end of the downward trend of economic growth and the stable increase of this variable in the following years. In the first period of reforms, the economic growth rate has been maintained in the range of less than 5% and in the second period in the range of more than 5%. In total, the economic growth rate during the eight-year reform period was 4.9% on average. In the second period of reforms, firstly, the economic growth rate reached 8% in an upward trend with a significant increase in 1381, and it has been stable and constant in the range of 8% until the first half of 1383. After that, in a downward trend, it reached less than 5% in the second half of 2004. The economic growth rate in the post-reform period has entered a downward path, and except for three years, it has experienced a steep downward trend in the rest of the years. In five years of this eight-year period, the growth rate was lower than its three-decade average, and two years of negative economic growth were experienced. From the second half of 2004, with expansionary monetary and financial policies, the upward trend of the economic growth rate started again and reached its highest level (9 percent) in the third part of 2005. After that, the economic growth rate decreased to 6-7% in 2016 and reached less than 4% in the first half of 2018. From the second half of 1387 to 1391, the Central Bank of the Islamic Republic of Iran has not reported the statistics of GDP and economic growth. However, according to the report of the International Monetary Fund, the economic growth rate of Iran faced a sharp decline; In such a way that at the end of 2017 it reached about 1% and at the end of 2018 it reached about 1.1%. The economic growth rate in this period until the end of 1988 was equal to 5.1% on average [25]. Among the most important reasons for the sharp decline in economic growth in 1387 are the significant increase in the inflation rate, the application of contractionary monetary and financial policies in order to curb inflation, and the decrease in the competitive power of domestic producers against competitors. foreigner in the domestic and foreign markets due to the decrease in the real exchange rate and the increase in imports and finally the occurrence of the global financial and economic crisis and its recessionary effects on the Iranian economy. Although Iran's economy has experienced a slight improvement in 2018, it has not been able to reach a suitable growth rate. The country's economy has had a favorable performance in 2009. In 2019, the gross domestic product will grow by 5.8% at constant prices. The results of the estimation of the country's economic added value indicate that this year the groups of agriculture, oil, industries and mines and services have enjoyed a growth rate of 1.9, 8.8, 9.3 and 4 percent respectively. In this year, the GDP without oil grew by 1.6%, which was higher than the growth of the GDP by 0.3 units. The reason for the higher performance is the low growth rate (1.9 percent) of the added value of Naft Group at constant prices. Also, in 2010, the acceleration of economic growth was reduced compared to the previous year, and according to the announcement of the Central Bank - of course, after 17 months from the end of 2010 - the economic growth rate, including the added value of the oil sector, was three percent, which compared to in 2019, it decreased by 2.8%. In this year, the economic growth rate without oil was also announced as 2.3%. In 2019, the economic growth rate continued to decrease. In the end, according to the estimates of the central bank, Iran's economy set a new record. So that the economic growth in 2011, including oil, was reported as minus 5.8% and without oil, minus 1.3%, as a result, Iran's rank in 2012 reached 23rd among the top 24 countries, and in the world The best state was ranked 164.
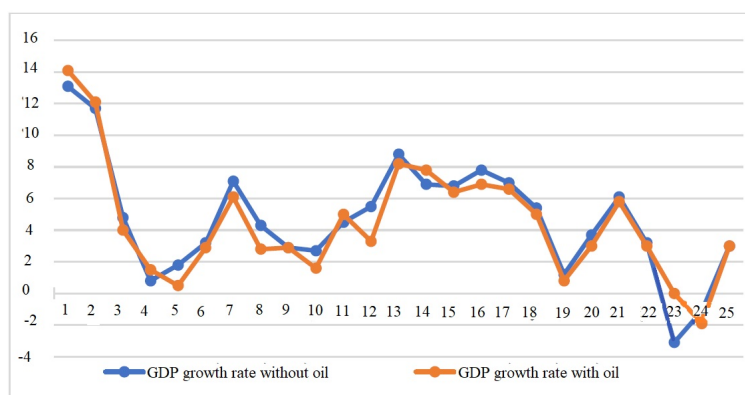

Figure 1: Historical trend of Iran's economic growth rate

2.2 Model design

The economy examined for the model of this research includes households with unlimited planning horizons, companies producing final goods, the oil sector, and the government as a financial and monetary authority. In the following, we will describe the mentioned sections in more detail.

2.3 Model estimation and analysis

The balance of the economy can be checked when the households and companies solve their optimization problem and the government fulfills its budget constraint and all the markets are settled. That is, the balance of rational expectations includes a sequence of exogenous variables that provide the set of equations resulting from optimization, the condition of the government budget and the condition of market settlement as a whole. The collection mentioned in this research, after the variables have been manipulated using the usual methods and in accordance with the relationship $\widetilde{X} = \frac{X_t}{\eta_t}$, is the following system of nonlinear equations with 23 variables and 23 equations:

$$\widetilde{W}_t = \frac{\psi_l}{l_t} . \widetilde{C}_t \tag{2.1}$$

$$\frac{\eta}{\widetilde{C}_t} = \beta E_t \frac{1}{\widetilde{C}_{t+1}} (r_t^{kp} + 1 - \delta_P) \tag{2.2}$$

$$\frac{\psi_m}{\widetilde{m}_t} = \frac{1}{\widetilde{C}_t} - \beta E_t \frac{1}{\eta \widetilde{C}_{t+1}} \left(\frac{1}{\pi_{t+1}} \right) \tag{2.3}$$

$$\widetilde{Y}_t^P = A_t (\widetilde{K}_t^P)^{a_{kp}} (\widetilde{K}_t^G)^{a_{kgp}} (\eta^t L_t^P)^{a_{lp}} \tag{2.4}$$

$$\widetilde{W}_t = (1-\tau) a_{lp} \left(\frac{\widetilde{Y}_t^P}{L_t^P} \right) \tag{2.5}$$

$$r_t^{kp} = (1-\tau) a_{kp} \left(\frac{\widetilde{Y}_t^P}{\widetilde{K}_t^P} \right) \tag{2.6}$$

$$\eta \widetilde{K}_{t+1}^p = (1-\delta^P) \widetilde{K}_t^P + \widetilde{I}_t^{Pa} \tag{2.7}$$

$$\widetilde{I}_t^{Pa} = \widetilde{I}_t^P + \widetilde{F}_t \tag{2.8}$$

$$L_t = L_t^P + L_t^G \tag{2.9}$$

$$\widetilde{Y}_t^G = A_t (\widetilde{K}_t^G)^{a_{kg}} (L_t^G)^{a_{lg}} \tag{2.10}$$

$$\widetilde{W}_t = a_{lg} \left(\frac{\widetilde{Y}_t^G}{L_t^G} \right) \tag{2.11}$$

$$\eta \widetilde{K}_{t+1}^G = (1-\delta^G) \widetilde{K}_t^G + \widetilde{I}_t^{GE} \tag{2.12}$$

$$\widetilde{TR}_t = (1 - \O_f - \O_{NIOC} - \O_{DEP}) \widetilde{Y}_t^{oil} + \widetilde{Ta}_t + a_m \left(\widetilde{m}_t - \frac{\widetilde{m}_{t-1}}{\eta \pi_t} \right) \tag{2.13}$$

$$\widetilde{I}_t^G = \O_{ig} \widetilde{TR}_t \tag{2.14}$$

$$\widetilde{Ta}_t = \tau \widetilde{Y}_t^P \qquad (2.15)$$

$$\exp(G_t^{sh}) * (\widetilde{I}_t^G + \widetilde{G}_t^C) = \widetilde{TR}_t \qquad (2.16)$$

$$G_t^{sh} = \rho_G G_{t-1}^{sh} + (1 - \rho_G)\bar{G}^{sh} + \varepsilon_t^G \qquad (2.17)$$

$$\mu_t = \eta \frac{\widetilde{m}_t}{\widetilde{m}_{t-1}} \pi_t \qquad (2.18)$$

$$\widetilde{Y}_t = \widetilde{Y}_t^{noil} + \widetilde{Y}_t^{oil} \qquad (2.19)$$

$$\widetilde{Y}_t^{noil} = \widetilde{Y}_t^P + \widetilde{Y}_t^G \qquad (2.20)$$

$$\widetilde{I}_t = \widetilde{I}_t^{Pa} + \widetilde{I}_t^G \qquad (2.21)$$

$$\widetilde{Y}_t = \widetilde{C}_t + \widetilde{I}_t + \widetilde{G}_t^C \qquad (2.22)$$

$$Ln(G_t^{sh}) = (1 - \rho_G)Ln(\bar{G}^{sh}) + \rho_G Ln(G_{t-1}^{sh}) + \varepsilon_t^G \qquad (2.23)$$

For the empirical analysis of the model, the endogenous variables extracted from the set of above equations, which are:$\{C_t, L_t, A_t, m_t, I_t^p, W_t, r_t^{kp}, K_t^P, L_t^P, L_t^G, I_t^{Pa}, K_t^G, I_t^{GE}, TR_t, Y_t^P, Y_t^{oil}, I_t^G, G_t^C, Y_t^G, I_t, Y_t, Ta_t, \mu_t, \pi t\}$ Rewrite in terms of deep parameters of the model, including: $\eta, \psi_l, \psi_m, \delta^P, a_{kp}, a_{kgp}, a_{lp}, a_{kg}, a_{lg}$. In this way, by valuing the parameters, the initial values for all variables are obtained in a stable state. With this method, "Diner" program under "MATLAB" software starts solving the model with a system of nonlinear equations. We know that the solution of these models is done by linearization, which is generally done based on the first-order approximation. In order to consider the asymmetric effects, the solution based on the second-order approximation is used to reach the solution.

2.4 Statistics and data

In this research, the required data for the period after the war until the information is available, includes time series from the first part of 1369 to the fourth part of 1393 at constant prices of 1383. The source of data related to Iran's GDP and private sector investment at constant prices in 2013 is the time series database of the Central Bank of the Islamic Republic of Iran. The source of the country's total capital balance data at constant prices of 2013 is estimated in [6]. Statistics related to the country's employment rate from the Iranian Statistics Center, data related to government spending and liquidity, the source of which is the time series database of the Central Bank of the Islamic Republic of Iran.

2.5 Econometric methodology

As mentioned earlier, there are different methods for estimating and evaluating DSGE models in economic literature. As stated by Schorfheide [23], these methods are quantization method, generalized method of moments (GMM), full information likelihood based on estimation, Bayesian estimation and minimum distance estimation based on the distance between impact functions. The reaction received from VAR and DSGE model are well known. Quantification method is used in this study.

- Valuation (calibration) of model parameters

In this study, we replaced the stable value of the variables whose stable state is available in the time period from 1:1369 to 1393:4, using the system of constrained nonlinear equations, to value the parameters. In order to select the parameters of the exogenous processes of fiscal policy impulse, using the detrended data of government expenditures, the following model has been estimated for the time period of the first part of 2019 to the fourth part of 2013:

$$\log\left(\frac{X_t}{\bar{X}}\right) = \rho_x \log\left(\frac{X_{t-1}}{\bar{X}}\right) \tag{2.24}$$

The value of ρ_x is entered as the autoregressive coefficient and the standard deviation of the residual of the above regression as the standard deviation of the government expenditure variable in the model. Other parameters of the model such as subjective discount rate, labor supply elasticity, money demand elasticity, capital depreciation and the share of capital and labor in production functions are used from the study of [22]. It should be noted that in calculating the stable state of the variables, the GDP at constant prices of 2013 was normalized to one and the ratios of the variables to the GDP in the above time period were used as the stable state of the variables. The stable states calculated from this method are considered as the initial values for the numerical solution of the system of nonlinear equations in the Diner program. In table 1, you can see the calibrated values of the parameters of the research model.

Table 1: Calibrated values of model parameters

value	symbol	parameter
0.3986	ψ_l	Labor supply coefficient in the utility function
0.987	β	mental retardation factor
0.029	δ^P	Depreciation rate of private capital
0.030	$delta^G$	Depreciation rate of government capital
1.013	η	Economic Growth Rate
0.50	a_{kp}	The share of private capital in the production of private goods
0.10	a_{kgp}	The share of state capital in the production of private goods
0.65	a_{kg}	The share of state capital in the production of public goods
0.4625	ψ_m	Interest elasticity of money demand
0.35	ρ_G	Coefficient of autocorrelation of impulse of government expenditure

3 Examining different impulses in the model

In order to investigate the mechanism of the impact of positive and negative impulses of government spending from the path of financial policies on macroeconomic variables, which is the main goal of this thesis, we imagine an expansionary fiscal policy for the government, and once We are drawing a contractionary financial policy for the government. For the negative shock mode, a negative number has been introduced instead of a positive number in the corresponding software code. That is, by using the equation $G_t^{sh} = \rho_G G_{t-1}^{sh} + (1-\rho_G)G_t^{sh} + \varepsilon_t^G$ the impact of the random impulse of government spending on the variables of private sector consumption, liquidity volume, inflation, capital return rate Private sector investment, private sector investment, private sector production, public sector production, and total non-oil production are applied and checked, and the reaction function of the impulses of the aforementioned equations is calculated with respect to the variables. Finally, the reaction shock function of the variables is drawn, and the length of the time period for the variables of the equations to return to the stable path is determined.

Table 2: parameters defined in the reaction function of government expenditures

negative financial momentum	Positive financial momentum	
−0.5	+0.5	The weight of government expenditure situation

4 Assessment of model fit

After setting the parameters and running the model designed by the Diner program, we should check the correctness and goodness of fit of the set model. For this purpose, we compare the first and second order torques obtained from the endogenous variables of the model with the torques of the real world data. For this purpose, the average value and standard deviation of four variables of oil production, non-oil production, consumption and government expenditure are presented in table 3.

Table 3: Comparing the torques of the model with the torques of the studied sample

deviation from the standard		The average		Variable name
Real data	model	Real data	model	
0.0791	0.0714	0.2706	0.2690	Oil production
0.2268	0.214	0.7239	0.7314	Non-oil production
0.0864	0.0966	1	1.005	Total production
0.0219	0.0208	0.1482	0.1467	Government consumption
0.0333	0.0312	0.5986	0.5977	expenditure household consumption of goods

As can be seen from the above table, the comparison of the moments of real data and the moments obtained from the software shows that the research model has been able to simulate the periodic behavior and fluctuations of the variables for Iran's economy. It is worth mentioning that the Diener program has simulated these values by selecting random numbers from the normal distribution of white particles in the random equations of the model.

4.1 Shock functions

Impulse reaction of government spending The shock-reaction function shows the dynamic reaction of the variables due to the introduction of an impulse. In this section, the shock-reaction functions are simulated for 9 key variables of the economy with the names of private sector consumption, liquidity volume, wages, Inflation, return rate of private sector investment, private sector investment, private sector production, public sector production and total non-oil production are given against two positive and negative financial impulses of government spending. The dynamic response of the variables to the impulse of government spending is clear in two time horizons, long-term and short-term.
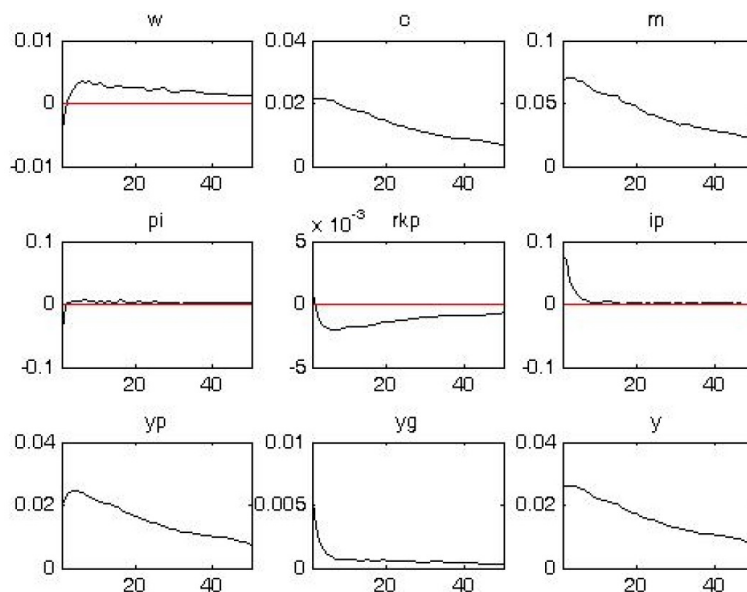

Figure 2: Impact functions - the reaction of simulated variables in the model against the positive impulse of government spending

4.2 Shock functions

In the next part, in line with the objectives of the research, we will examine the impact of the positive and negative impulse of government spending on each variable. Here, we are only satisfied with the diagram. Also, in the section on the results of the study, we will explain that the graphs of the simulated shock-reaction functions for the variables are completely consistent with the theoretical topics.

Examining shock functions - reaction to the negative impulse of government spending According to graph 3, the shock functions are the reactions of 9 variables to the negative impulse of government spending in Iran's economy.

Comparison of the effect of two negative and positive financial impulses The asymmetric effects of negative and positive impulses of government spending on the variables are clear from the values of the intensity of the impulses, the slope of the adjustment path of the impulses in the long term, and also in terms of the depth and sharpness
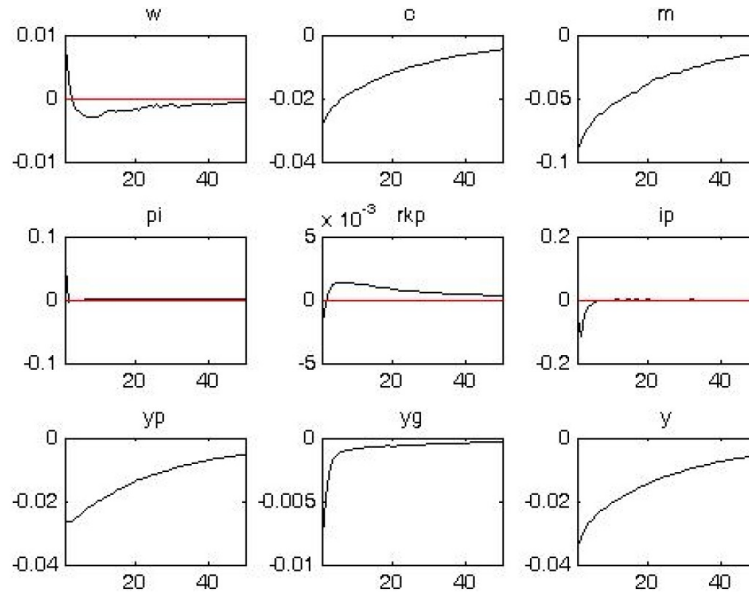
Figure 3: Impact functions - the reaction of simulated variables in the model against the negative impulse of government spending

of the troughs and peaks of the variables in the diagrams. Since people's expectations have always been formed in line with the increase in government spending, regarding the effect of positive impulses of government spending, the society's reality is the matching of comparative and rational expectations. In other words, in the positive impulses of government spending, less elasticity is observed in the behavioral variables of households and companies; So that the shock-reaction functions also indicate less change in economic variables and this social and economic reality. But the negative impulses of government spending are often not expected. Households and companies rarely expect a reduction in government spending - especially with the strong dependence on oil revenues and other resources of the country on the one hand, and also due to the large size and structure of the government in Iran's economy on the other hand - and often Consumption and investment planning is applied based on the increase of annual government expenses and therefore involving its economic consequences in decision-making functions. Therefore, the effect of negative impulses on the economic behavior of different sectors of the economy is stronger and more attractive than positive impulses. Another type of asymmetry is also evident in terms of the difference in the slope of the simulated shock-reaction functions affected by the positive and negative impulse of government spending. So that the downward trend has a greater and more stable slope than the upward trend of the variables. The general shapes in relation to negative and positive momentum for shock-reaction functions indicate asymmetry in the dynamic pattern of the variables, and only two shapes of the graphs do not prominently show the asymmetry at first sight: rkp and Yg, even in it, if we look at the reaction rate in different time horizons, asymmetries can be seen, even if a little.

5 Conclusion

The level of government spending as one of the most important indicators of the government's financial policy is one of the effective factors in determining the performance of Iran's economy. Government spending has a significant contribution to the total demand composition of the economy. According to this issue, it can be said that the instability of the government budget and its expenditures leads to the instability of the demand of the entire economy and, as a result, economic growth. In addition, the government's budget is dependent on oil revenues, and an important part of the government's expenses is provided not through taxes but from oil revenues. The effect of government spending on production and economic growth can be examined in two time horizons, short-term and long-term. In the long run, the effect of government spending on production and economic growth is affected by the financing of government spending on the one hand and the way it is allocated on the other. Considering that in Iran's economy, a major part of government expenditure is financed by oil revenues, therefore it can be expected that the effects of government expenditure outsourcing in Iran will be limited, but in contrast, the way government expenditure is allocated in Iran's economy is not very efficient and the government It has spent a lot of money on sectors and projects that the private sector was able to carry out. But in the short-term time horizon, government spending fluctuations are of great importance for production and economic growth. Since government spending is one of the most important components of the total demand of the economy, it is clear that the instability of government spending leads to the instability of

production and economic growth in the short term by creating instability in the total demand. When the government expenditure increases, first through direct increase in aggregate demand, production and economic growth temporarily increase, but in the following periods, the externalizing effects of government expenditure on private consumption and investment appear and the effect of the initial increase to some extent It is neutralized. (As mentioned, the way of financing the government expenditure will have a decisive effect on the intensity of the export effect) In contrast to the reduction of the government expenditure, it first reduces the production and economic growth by reducing the demand, but then by increasing the investment and consumption. In the private sector, the decrease in production is partially compensated. Examining the government's production and expenditure trends empirically confirms such a relationship and shows that the financial instability of the government is one of the main factors of the instability of production and economic growth and the creation of business cycles in Iran's economy. Therefore, considering the high role of the government of Iran in all economic sectors of the country, including the household sector, the corporate sector (private sector producers) and the foreign sector, the present study examines the asymmetric effects of fiscal policy impulses on macroeconomic variables in the form of an equilibrium approach. General Dynamic Stochastic (DSGE) is considered. Therefore, in the first part, the general and partial goals of the research were stated, which are: Designing a stochastic dynamic general equilibrium model for the Iranian economy to investigate the effects of financial policy impulses on the real production of the Iranian economy. Considering the successful expansion of the use of financial incentives in other countries to deal with the economic recession that more or less affects all countries, in Iran it is also possible to determine the symmetry or asymmetry in the effect of financial policies. used more efficiently to deal with recession as well as existing inflation. In addition, by determining the amount, intensity and stability of the impact of the negative impulse of fiscal policy compared to the positive impulse of fiscal policy on the real variables of the Iranian economy, better decisions can be made in the combined policies. Therefore, by determining the extent and manner of the effect of financial impulses on the real variables of Iran's economy, it is possible to put the variables of the welfare economy on the path of the goals of the development programs with appropriate solutions. In line with these goals, the research questions are presented as follows: 1. Do fiscal policy impulses affect the production growth of Iran's economy? 2. Are the effects of financial policy impulses on economic activities asymmetric? (Is the effect of financial policy tools on economic variables similar in equal conditions?) 3. Are the economic effects of negative fiscal policy impulses greater, or positive fiscal policy impulses? Also, the following hypotheses have been proposed in accordance with the research questions: 1- The effects of positive and negative financial policy impulses on economic growth are significant. 2- The effects of positive and negative financial policy impulses on production growth are asymmetric. 3- The effect of negative fiscal policy impulses is greater than the effect of positive fiscal policy impulses. In the second part, the effect of financial policies on variables and different economic sectors and the effect of financial impulses specifically on the variables, and the sources of asymmetric response of the supply and demand sectors of the economy affected by the incoming impulses were examined. Government expenditure was also defined as a financial policy tool of this research and the relationship between government expenditure impulse and macroeconomic variables was analyzed. Various studies have been conducted in this field in order to find empirical evidence. In the second part of this part, we reviewed the historical trend and the current state of the main variables of the model, including economic growth rate, inflation rate, government expenditure growth rate and liquidity growth rate. Using the time series data extracted from the statistical sources of Iran Statistics Center and Central Bank, the trend diagram of these variables is shown. The revealed facts have been presented in four cases in continuation of the historical process of the variables.

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