

Determining an Optimal Fiscal Policy for the Iranian Economy: A Dynamic Stochastic General Equilibrium (DSGE) Approach

Tavakolian, H.^{1*}, Siami Araghi, E.²

Abstract

In recent years, the use of fiscal rules to influence fiscal policy and macroeconomic environment has been expanding in the economic literature, so that many countries have set various fiscal rules to maintain macroeconomic stability and prevent extreme budget deficits. In Iran, this started from the Fifth Development Plan with the allocation of the oil revenues to the National Development Fund, but in recent years its goals of stabilizing the economy have not been attained. In the present study, using a Dynamic Stochastic General Equilibrium (DSGE) model, the appropriate rule for Iran is examined using three scenarios: baseline, revenue fiscal rule and budget balance rule. The results showed that the budget balance rule can lead to a good performance considering the structure of Iran as an oil exporting country and minimize the policy-making loss function.

Keywords: Fiscal policy, Fiscal rules and Dynamic Stochastic General Equilibrium (DSGE).

JEL Classification: E62, H62, C63.

1. Introduction

Fiscal rules are widely used to constrain fiscal policy discretion and promote fiscal discipline. More than 90 countries are using fiscal rules today. Their main goals are to commit policymakers to fiscal sustainability, enhance transparency, and signal to financial markets the course of fiscal policy (Eyraud et al., 2018). The main goals of these rules are to control the budget deficit, prevent excesses in current government spending, countercyclical fiscal policy, smooth fluctuations in natural resources and create an intergenerational balance. Before the financial crisis, fiscal rules were simple and flexible and there was little emphasis on enforcement. After the financial crisis, however, certain fiscal rules were introduced in the EU that could be enforced and were simple and flexible. According to international experience, fiscal rules are used to prevent excessive deficits that would arise under unconstrained policy discretion. This begs the question as to why legitimate governments would ever embark on financially unsustainable policies in the first place. After all, the intertemporal budget constraint is always binding ex post, and ignoring it ex ante invariably leads to very costly measures to restore it (debt restructuring, default, high inflation). In

1. Associate Professor, Department of Economics,
Allameh Tabataba'i University

Email: tavakolianh@gmail.com

2. PhD student in Economics, Allameh Tabataba'i
University

Email: ebrahimsiami@gmail.com

practice, however, countries can easily get away with unsustainable policies for a long time before the budget constraint starts biting (Wyplosz, 2013). Another major problem for oil-rich countries, including Iran, is the existence of revenues from oil exports, which exposes the economy to four major challenges: Dutch disease, cyclical fiscal policies, high inflation, and long periods of boom and bust. A review of the government's past performance in the Iranian economy and development plans shows that fiscal policies have not been implemented in accordance with development plans, and as a result of the non-implementation of these policies, the emphasized fiscal rules have not been properly observed. However, according to the Sixth Development Plan, 30 percent of oil revenues are to be deposited in the National Development Fund (NDF) to create economic stability and intergenerational justice, and two percentage points must be added each year (Sixth Development Plan Law, 2017). However, a review of annual budgets in recent years shows that there is no adherence to this rule of oil revenues and this rule is not observed in practice and, therefore, the choice of a rule that can help the economy to achieve the aforementioned goals in fiscal rules seems necessary. So the main question in this article is which of the two rules (i.e., revenue rules and budget balance rules) has the least loss function for policymakers? To answer this question, a DSGE model was designed for Iran's economy in such a way that it explains the conditions of the country's economy. Due to the oil-dependent nature of Iran's economy, the model was designed as a small open economy. The reason for why this question was raised is that the choice of fiscal rules is generally different based on the case criteria of each country and should be selected based on modeling and accepted conditions in the economy.

2. Model and data

In this article, the dynamic stochastic general equilibrium (DSGE) model includes the household, firms, central bank (monetary authority), government, oil production and foreign sector. The household consists of two types: Ricardian (household access to the financial market) and non-Ricardian (households that do not have access to the financial market). Households maximize a utility function consisting of consumption, leisure and money. However, in our open economy model, the households consume a basket consisting of domestically produced goods and imported goods. These products are supplied by domestic and importing firms, respectively. Firms are divided into three groups: 1- Domestic firm, which in fact constitute the non-oil sector of the economy and part of the production of this sector is exported by the exporting firm, 2- importing firms 3- oil production. The firms (domestic, importing and exporting) all produce differentiated goods and set prices according to an indexation variant of the Calvo model. By including nominal rigidities in the importing and exporting sectors we allow for (short-run) incomplete exchange rate pass-through to both import and export prices. In this

model, some real and nominal rigidities including investment, prices and wages are considered to match the results of the estimate with the conditions of Iran's economy. In this study, log-linear equations have been made before estimating the parameters. The Bayesian approach and the Metropolis-Hastings algorithm have been used to estimate the desired parameters. The data used in this article includes GDP at a constant price in 2011, consumer inflation, importer inflation, exporter inflation, monetary base, wage and income tax, consumption tax, corporation tax, import tax, oil revenues, other government revenues, oil production, oil prices, wage price index, inflation of trading partners and GDP of trading partners have been used. In the present article, the data used are considered quarterly and from 2005 to 2017. Due to the seasonal nature of the data after seasonal adjustment using the $x-12$ method, the data were logarithmized and then separated from each other using the Hodrick and Prescott filter except cyclic and the trend of each of the considered variables.

3. Results

The results of the policymaker's loss function show that the scenario of implementing revenue rules for the fiscal policymaker will have the highest amount of loss for the policymaker. This is well illustrated in empirical evidence and a limited number of countries use these rules to reduce economic fluctuations and prevent severe budget deficits. The baseline scenario, which has a discretionary nature in implementing fiscal policies, is in a better position than the revenue rule in terms of the loss function. Ultimately, the budget balance scenario will do the least loss to policymakers, and as noted, many developing countries use this rule for fiscal policy making.

Table (1): The results of the policymaker's loss function

	Baseline	Revenue rules	Budget balance
Policy loss function	10.585	12.390	8.035

Source: Research Findings

4. Conclusion

The use of fiscal rules as a fiscal policy tool to prevent budget deficits and business cycles has been considered by many developing and developed countries. According to the International Monetary Fund report, out of the 96 countries that use fiscal rules, 87 have used budget balance rules. Only nine countries have used revenue rules. According to theoretical principles, the main reason for why countries do not use revenue rules is that there is no control over government spending, and this can affect the government debt sustainability in the long run. Revenue rules can lead to the formation of cyclical fiscal policies. Also, studies on fiscal rules show that the use of fiscal rules in the countries exporting raw materials prevents cyclical fiscal policy (Kumhof & Laxton,

(2013)). According to the results, the budget balance rule leads to a favorable performance in the Iranian economy and has minimized the policy-making loss function compared to the other two scenarios (baseline and revenue rule).

References

- Ghasemi, M., Mohajeri, P. (1394). "Investigating the cyclical behavior of fiscal policy in Iran". *Journal of Economics*, 15(56), 75-104.
- Adolfson, M., Laséen, S., Lindé, J., & Villani, M. (2007), "Bayesian Estimation of an Open Economy. DSGE Model with Incomplete Pass-through." *Journal of International Economics*, 72, 481-511.
- Alesina, A. and Drazen, A. (1991). "Why Are Stabilizations Delayed?", *American Economic Review* 81, 1170-1188
- Alesina, A. (2000). "The Political Economy of the Budget Surplus in the United States". *Journal of Economic Perspectives*, 14(3), 3-19.
- Alesina, A. (2007). "Bureaucrats or Politicians? Part 1: A Single Policy Task." *American Economic Review*, 97, 169-179.
- Alesina, A., and Tabellini, G. (1990). "Voting on the Budget Deficit", *American Economic Review*, 80(1), 37-49.
- Calvo, G. A. (1983). "Staggered Prices in a Utility-Maximizing Framework", *Journal of Monetary Economics*, 12(3), 983-998.
- Eyraud, L., Debrun, X., Hodge A., Duarte, V., Pattillo, C. (2018). "Second-Generation Fiscal Rules: Balancing Simplicity", *Flexibility and Enforceability Economic Modelling*, Volume 52, Part B, 630-649
- Giovanni Melina, Shu-Chun S. Yang, Luis-Felipe Zanna, Debt sustainability, public investment, and natural resources in developing countries: The DIGNAR model, Leeper, E. M., Walker, T. & Yang, S. C. (2010). "Government Investment and Fiscal Stimulus", *Journal of Monetary Economics*, (57), 1000-1012.
- Lorenzo Forni, Libero Monteforte, Luca Sessa. (2009). "The general equilibrium effects of fiscal policy: Estimates for the Euro area", *Journal of Public Economics*, Volume 93, Issues 3-4, 559-585.
- Kumhof, M., Laxton, D. (2013). "Simple fiscal policy rules for small open economies", *Journal of International Economics*, Volume 91, Issue 1, 113-127.
- Persson, T., and Tabellini, G. (2000). *Political Economics: Explaining Economic Policy*. Cambridge, MA: The MIT Press.
- Samimi, A., Khiabani, N., Mila Elmi, Z., Akbarpour Roshan, N. (2017). "The Impact of Fiscal Policy on Macroeconomic Variables: New Evidence from a DSGE Model". *International Journal of Business and Development Studies*, 9(2), 29-54. doi: 10.22111/ijbds.2017.3703
- Schwarz Müller, T. and Wolters, M. (2015). *The Macroeconomic Effects of Fiscal Consolidation in Dynamic General Equilibrium*, No 43, Dynare Working Papers, CEPREMAP.
- Suescun, R. (2019). *A tool for fiscal policy planning in a medium-term fiscal framework: The FMM-MTFF model*, Economic Modelling.

- Wyplosz, C. (2013). "Fiscal Rules: Theoretical Issues and Historical Experience." In *Fiscal Policy after the Financial Crisis*, edited by A. Alesina and F. Giavazzi. Chicago: University of Chicago Press.
- von Hagen, J., and I. J. Harden. (1995). "Budget Processes and Commitment to Fiscal Discipline". *European Economic Review*, 39, 771-779.