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Calculation of Government's Fiscal Policy Index in TVP-FAVAR Models

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Abstract: This study attempted to calculate the government's fiscal policy index in the Iranian economy using the quarterly data from 1988-2012 in a model consisting of a combination of the Factor-Augmented Vector Autoregressive (FAVAR) and the Time-Varying Parameter (TVP) models. In this modeling, the variables of GDP growth, investment growth, inflation, exchange rate changes, private consumption expenditure growth and the government's fiscal policy entered the model as latent variables. Based on the results of the study, it was found that the proposed model led to better accuracy in modeling the Iranian fiscal policy index compared to the two-stage FAVAR Model proposed by Doz and the Principal Component Analysis (PCA) Model.

Key words: Fiscal policy, economic growth, state-space equation, (PCA), Iran, FAVAR

INTRODUCTION

In experimental studies, there is no consensus on the effects of fiscal policy. The results of different studies indicate different effects of fiscal policy on the macroeconomic variables in the developing countries. With the publication of Giavazzi and Pagano (1990), the subject of the efficiency of fiscal policy entered a new stage and the non-keynesian effect of fiscal policy was stressed in different studies. Based on the results of the prior research, the adoption of a contractionary fiscal policy may have an expansionary effect on consumption, investments and/or production (Giavazzi and Pagano, 1990, 1996; Perotti, 1999; Giavazzi *et al*., 2000). Some of the studies rejected the non-keynesian effect of fiscal policy (Hjelm, 2002; Schclarek, 2005). Since 1990, most studies conducted examined the effects of fiscal policy in the industrial nations, the results of which cannot be certainly generalized for the developing nations and there is no robust evidence supporting these results in such countries (Giavazzi *et al*., 2000; Schclarek, 2005). Based on the experimental literature, main reasons for the lack of agreement on the efficiency of fiscal policy in different time and space circumstances can include interruptions in the identification, decision making, implementation and the efficiency of fiscal policy. According Stock and Watson (2008), one of the main problems of the previous models was that they could not provide a proper analytic framework over time. The theoretical and experimental literature indicated that one cannot study the efficiency of fiscal policy without the key features the general atmosphere of the national economy; therefore, the linear models show a weakness in examining the effects of fiscal policy.

This study made use of the Factor-Augmented Vector Autoregressive (FAVAR), proposed by Bernanke *et al*. (2005) and the Time-Varying Parameter (TVP) models together to calculate the fiscal policy index. Different econometric models have been introduced in order to assess FAVAR and TVP-FAVAR Models (Bernanke and Mihou, 1998; Korobilis, 2009, 2013). Due to the large volume of programming, it is difficult to calculate such assessment methods (Bayesian Models used in the Markov Chain Monte Carlo (MCMC). Therefore, new experimental studies have used the Kalman Filter and other filtering algorithms in order to assess the models. The TVP-FAVAR Model in this study is a new algorithm, which is an expansion by Doz *et al*. (2011). It used the variables of GDP growth, investment growth, inflation, exchange rate changes, private consumption expenditure growth and the government's fiscal policy in order to model the Iranian economy. It also used the determining variables of the government's fiscal position in order to assess the latent variable of fiscal policy.

MATERIALS AND METHODS

TVP-FAVAR Model: The TVP-FAVAR takes the form:

$$x_t = \lambda_t^y y_t + \lambda_t^f f_t + u_t \begin{bmatrix} y_t \\ f_t \end{bmatrix}$$

$$= c_t + B_{t,1} \begin{bmatrix} y_{t-1} \\ f_{t-1} \end{bmatrix} + \ldots + B_{t,p} \begin{bmatrix} y_{t-p} \\ f_{t-p} \end{bmatrix} + \varepsilon$$

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