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Nominal Feedback Rules in Iranian Monetary Policy: An Investigation of the McCallum Rule

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Abstract

Consequent to the financial crises, nominal feedback rules received considerable attention consideration from many of the monetary authorities in many countries. The innovation of these rules is a feedback mechanism that allocates precise adjustments to the monetary policy instruments where target variable deviates from its desired path. Mc Callum's rule can be taken as one of the most prominent feedback models in monetary economics. In the present study, the experimental behavior of the policymakers in the Iranian Central Bank will be investigated applying nonlinear Mc Callum's rule in the period of 1368:4 (1990:1) to 1396:4 (2018:1) using Markov-switching model. Considering that the Iranian Central Bank does not announce the precise production and inflation targets, the model estimation will be carried out based on the assumption of unobservable target variable. In this regard, for estimation of the two unobservable variables of nominal production growth and inflation, Bayesian Kalman filter will be employed. Then model will be stimated with markov switching approach in different rejime. The analysis of the model coefficients shows that the central bank during the recession assigned more weight to the nominal output growth variable and in the boom period more weight was assigned to the inflation gap variable. This illustrates the correct response of the central bank of Iran to these variables base of theoretical expectation. Therefore, in this paper and base on estimation results of nonlinear McCallum rule, the asymmetric behavior of the central bank with respect to the monetary reaction function is confirmed.

Keyword: Nominal Feedback Rule, Mccallum Rule, Baysian kalman filter, Markov switching.

JEL Classification: C11, E52, E58

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1. Introduction

After Taylor's rule, McCollum's rule is the most well-known monetary rule in economic literature for the analysis of the function of monetary reaction. In the rule introduced by McCallum (1984), the monetary base is a policy tool that can be changed by the central bank in the short term. Therefore, this rule can be a good policy tool for emerging economies or countries with underdeveloped financial markets (Taylor, 2000). Considering the central bank's loss function in the secondary form and the linear supply function were two important assumptions for extracting linear monetary rules in the past decades. Over the past time, many economists have challenged this assumption (Ahmed; 2016) (Gogas et al., 2018).

Price stability and sustainable stability in the financial system of the economy is one of the most important goals of the Central Bank of Iran. While the study of the behavior of key economic indicators including inflation and economic growth shows that the central bank has not been very successful in achieving these goals (Mojtahed, 2009). Therefore, because of the persistence of inflation and recession, it is important to investigate the monetary policymaker behavior.

2-Theoretical Foundations

Nominal feedback rules were first raised by McCallum (1984) and have been recently considered by policymakers after the financial crisis. In fact, the Taylor and McCallum rule can be regarded as one of the feedback models. The significance of such rules is the feedback mechanism considering explicit adjustments for monetary policy tools when the target variable is deviated.

According to the studies of Peterson (2007), Gogas et al. (2018), etc., the behavior of the Central Banks is generally nonlinear. In this regard, the only target variable in the classical McCallum rule is the nominal production growth. Therefore, according to the target variable, it cannot reflect the monetary base response to inflation directly. However, many experimental studies indicated that money supply and inflation have a high correlation coefficient. Based on the studies of McCallum (2000) and Orphanides (2003) and conforming the co-movement of money supply and inflation, the generalized McCallum rule can be considered to solve this problem.

$$\Delta B_t = \beta_1^{S_t} + \beta_2^{S_t}\left(\Delta x_t - \Delta x_t\right) + \beta_3^{S_t}\left(\pi_t - \pi_t\right) + + \beta_4^{S_t}\Delta V_{B_t} + \beta_5^{S_t}\left(oil_t - oil_t\right) + u_t s_t = e, r$$

In the above Equation, B_t represents monetary base logarithm, X_t indicates nominal production logarithm, and $\beta_1$is the nominal production growth of the target (). In addition, π_t ,π_t ,ΔV_{B_t}, oil_t, and ooil_t indicate inflation, target inflation, average velocity of money, Iranian oil price growth, and its equilibrium rate, respectively.

3- Methodology

Due to the important challenges of the monetary system in Iran and the lack of independence in the Central Bank, it can be argued that the Central Bank of Iran

fails at following a specific monetary rule explicitly (Tavakolian; 2015).Therefore, this study made appropriate adjustments to the McCallum rule to evaluate the experimental behavior of monetary policymakers and this rule was examined nonlinear. In this regard, the Markov switching model and Markov switching Garch was used to examine the discretionary behavior of the Central Bank. In fact, using this method, both in terms of considering different regimes and the uncertainty of target inflation and target production, reflects the discretionary behavior of the Central Bank and the lack of full adherence to monetary rules

The methods used in this study include the Bayesian Kalman filter and Markov switching model. Thus, initially the target variables, including nominal production growth and inflation, are assumed to be invisible and according to Scott and Barry's (2017) study, the Bayesian Kalman filter method is used to estimate them. Two state variables are considered in the modeling, and the Bayesian approach is used to simultaneously and accurately estimate the state variables according to the sample size and number of parameters. Also Markov Switching and Markov Switch Garch methods are used to model the behavior of the monetary policymaker.

4- Findings

Regarding the algebraic sign of the model parameters, the coefficients of inflation gap during the recession and boom and the nominal production growth gap during the inflation are positive and only the coefficient of nominal production growth gap during the recession is negative. In fact, the reaction of the Central Bank to the production gap during the recession is not in line with theoretical expectations. Further, the absolute value of the McCallum model coefficients reveals that the Central Bank has given more weight to the nominal production growth gap during the recession and more weight to the inflation gap during the boom which is in line with expectations.

The results of this study confirm the non-linear and asymmetric behavior of the monetary policymaker and show that the behavior of the central bank in the form of the macroeconomic rule is asymmetric. In fact, the monetary policymaker’s response to target variables was not the same during the recession and boom period.

5- Conclusion

In the present study, the nonlinear behavior of the monetary policymaker was examined in the form of the McCallum rule. According to the results, the asymmetrical behavior of the monetary policymaker during the recession and boom period is confirmed. For future research, study of non-linear behavior of the central bank in the form of various monetary rules including Taylor's rule, McCallum's rule, etc., considering more target variables in the function of monetary reaction and using systemic methods to estimate and estimate the model comparably is recommended.

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