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# Comparison of the effect of capital adequacy changes on Iran's economy and banking system in the context of Basel II and III (DSGE approach)

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**EXTENDED ABSTRACT**

The purpose of this study is to analyze the effects of changes in capital adequacy ratio as a Macroprudential tool on the behavior of macroeconomics as well as the Iranian banking system. For this purpose, a Dynamic Stochastic General Equilibrium (DSGE) model is used and according to structural shocks, four observable variables including output gap, bank capital adequacy, inflation, and money base growth rate in the period spring 2004 to winter 2020, Along with some other pre-set parameters have been used in the Bayesian estimation process. Finally, the Impulse response functions of the model are interpreted in two scenarios Basel II or III on capital adequacy ratio. The results show that strengthening and improving the capital adequacy ratio in the short and medium term will have positive effects on economic growth and a significant reduction in inflation. The results also showed that Iranian banks react immediately to the strengthening of the capital adequacy ratio and try to adjust this ratio again by increasing lending. Therefore, in the medium and long term, we cannot hope to stabilize or reduce the process of creating liquidity and increase the money supply by strengthening the capital adequacy ratio of banks. Another finding of the model is that in the Iranian banking system, if the Capital adequacy ratio deviates from its equilibrium values, in the hypothetical conditions of the establishment of Basel III,

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macroeconomic variables and also the components of banking operations will face fewer  fluctuations compared to Basel II.

## INTRODUCTION

Modeling macroeconomic policies and generally including the financial and banking sectors in empirical macroeconomic analysis in Iran is a category that has received less attention from researchers. According to the requirements of the Iranian banking system and the applicability of various tools, in this study we will use prudential tools based on capital and focusing on the capital adequacy ratio. The principle of capital adequacy is one of the most important principles of the Basel committee standards, which emphasizes the maintenance of a certain proportion of capital in each bank. Capital adequacy is one of the necessary conditions to maintain the health of the banking system, and each bank and credit institutions to ensure the stability of their activities must always establish a proper ratio between capital and risk in their assets. Therefore, in this study, using a DSGE model, the effects of changes in capital adequacy ratio as a modeled macroeconomic prudential tool on macroeconomics as well as the behavior of the Iranian banking system will be analyzed.

## METHODOLOGY

According to the structural shocks of the model, four observable variables including the gap of production variables, capital adequacy of banks, inflation, and the growth rate of the monetary base in the period from spring 2004 to winter 2020, have been used in Bayesian estimation process. In Bayesian estimation of model parameters, the distribution, mean, and standard deviation of the prior criteria considered for the parameters must first be determined. The prior distribution for each parameter is selected based on the properties of that parameter and the characteristics of the distribution. By considering the initial values for the mean and standard deviation of the parameters, the parameters can be estimated using the Bayesian method. Model estimation is done in Dynare space under Matlab software. For this purpose, the Metropolis-Hastings algorithm has been used.

## FINDINGS

In the case of Basel II regulations, with the occurrence of a shock in the ratio of capital adequacy to a standard deviation, the level of GDP increases by a very small amount (0.012%) and in a short time (less than 4 quarters) the

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effect is quite It becomes neutral. However, changes in this variable are associated with an increase of 1.3 percent in the beginning, which will increase by 2% in the next two quarters. However, in the hypothetical conditions of the establishment of Basel III regulations, the reaction of both mentioned variables to the capital adequacy shock is much less than before. In general, in response to the capital adequacy ratio shock, the bank can balance its profitability level by changing the amount of its deposit and lending, as well as changes in the interest rates of the facility and the interest rate paid to depositors.

## CONCLUSION

1. Under the Basel II regulations, any change in the capital adequacy ratio in a way that strengthens and enhances this ratio will have positive effects on the economic growth rate in the short and medium term as well as a significant reduction in the inflation rate.

2. Strengthening the capital adequacy ratio, as it is accompanied by their immediate reaction to re-adjust it by increasing lending, in the medium and long term can not be considered a serious obstacle to creating liquidity and increasing the money supply. However, in the context of the establishment of Basel III regulations, policymakers can have more hope in this regard.

3. Excluding the capital adequacy ratio from its equilibrium values in the Iranian banking system in the hypothetical Basel III conditions, macroeconomic variables as well as components of banking operations such as lending capacity, deposit absorption and interest rates compared to the conditions of Basel II principles. It experiences less fluctuations.

4. As a result of deviating the capital adequacy ratio from its equilibrium values in the hypothetical conditions Basel III regulations, macroeconomic variables as well as banking operations components are less volatile compared to Basel II conditions.

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