

## Monetary Policy and Labor Markets: A Dynamic Stochastic General Equilibrium Model

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### Abstract

**Goal:** In this paper we try to present a version of the standard New Keynesian model with a real labor market for which we notice to the both side of labor market (supply and demand) for defining unemployment.

**Methodology:** Following Javan, Afshari and Tavakolian (1396), a dynamic stochastic general equilibrium model with unemployment is designed. In their study, they present a general dynamic stochastic general equilibrium model of the New Keynesian type for the Iran, which used the Gali approach to define unemployment (in terms of labor market distortions and staggered wage and price based on the Calvo approach). The model presented in this paper, in addition to commodity market disturbance, has also focused on labor market disturbances. Furthermore, wage markup is identified and the imbalance in the labor market is according to the both supply and demand side of labor market. Monetary policy in Iran does not follow an interest rate rule, so we try to use a modified Taylor rule that is based on monetary base growth rates rather than the interest rates.

We assume that economic agents include household, final goods producer, intermediary goods producer and government and central bank. This study assumes that labor is indivisible, i.e. in each period any given individual either works a fixed number of hours or does not work at all. As a result, all variations in labor input take place at the extensive margin. As in Gali (2010) and Javan et al (1396), we assume full risk sharing within the household. Given this parability of preferences, this implies the same level of consumption for all household members, independently of their work status. We assume that the wage for each labor type  $W_t(i)$  is set by the workers specialized in that type of labor (or a union representing them), whereas the corresponding employment level  $N_t(i)$  is determined by the aggregation of firm's labor demand decisions (and allocated uniformly across households). Thus, both  $W_t(i)$  and  $N_t(i)$  are taken as given by each individual household.

We estimate our model on Iran data for the sample period 1384Q1-1393Q4 using Bayesian method. The data used in this paper is seasonal adjusted data of consumer price index, GDP, government consumption expenditure, total investment expenditure, economic participation rate, construction service wage index, and Liquidity. After estimating the parameters, we examine the effects of technology, monetary and labor supply on the dynamics of macroeconomic variables. Then, in order to investigate optimal policy and optimal simple rule, a loss function was introduced and based on its amount; the losses of different rules were investigated. Following Gali (2010), we have a loss function based on a

second order approximation to the utility of the representative household. Therefore, the loss function is a function of the output gap, inflation, and wage inflation.

In this study, presence of market power in the labor market reacted in the wage markup and accounts for the existence of positive unemployment, even in the absence of wage rigidities. On the other hand, fluctuations in unemployment are a consequence of variations in the wage markup. Under the assumptions made above, wage markup variations are the result of nominal wage rigidities.

**Results:** Results of impulse response functions indicate that a negative labor supply shock, a positive monetary shock and a negative technology shock will reduce unemployment. In addition, the implications of optimal policy and optimal simple rule (OSR) are considered and compared to the results of the estimated model.

**Conclusion:** Output gap fluctuations have been shown to be costly as such in terms of utility, the corresponding welfare losses associated are substantial. The optimal simple rule results as estimated model imply that monetary authorities should respond to output fluctuations more than price inflation fluctuations. Furthermore, the results indicate that the impulse response functions under optimal policy and optimal simple rule are quite similar to each other; it means that the optimal simple rule and Ramsey's optimal policy follow the same path.

**KeyWords:** Monetary policy, Unemployment, Nominal Stickiness, Dynamic Stochastic General Equilibrium.

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