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**BOOK REVIEW: „Monetary Policy,
Inflation, and the Business Cycle:
An Introduction to the New
Keynesian Framework and its
Applications“, Princeton University
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by Jordi Galí**

1. Introduction

New Keynesian economics is a school of economic thought which has had a strong influence as of the last decade of 20th century. Nowadays, a great number of economists who are heads of international economic institutions or chief advisers or economists in national economic institutions declare themselves as New Keynesians.

Their power in the modern economic theory is supported by real economic tendencies and it is based on the acceptance of some assumptions which are *conditio sine qua non* in the modern macroeconomic theory. The most important is acceptance of rational expectations.

In addition, the contribution of New Keynesians to the macroeconomic theory is obvious. Introduction of the concept of nominal and real rigidities opens the door for hypothesis rejection of the economic policy inefficiency in the case of rational expectations (Dimitrijević & Fabris, 2007, p. 141).

Although the New Keynesian theory is in some segments based on the Real Business Cycle theory, especially on the DSGE methodology, there are some crucial departures:

1. Monopolistic competition in all markets;
2. Nominal rigidities;
3. Short run non-neutrality of monetary policy (Galí, 2015, p. 5).

The book *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and its Applications* which is the object of this analysis explains the New Keynesian theory of economic policy, therefore, it is a significant contribution to the presentation of models of this kind to the academic public.

Jordi Galí is professor and researcher at CREI institute, Pompeu Fabra University in Barcelona and Barcelona Graduate School of Economics. The areas of his interest are macroeconomic theory and monetary economics. He is among the most cited economists in the world. O. Blanchard (2012, p. 594) ranked him with Keynes, Friedman, Barro, Lucas in small group of the most influential economists. Thomson Reuters considers him on of the future Nobel laureates.

By presenting this book which has been published relatively recently, we wanted to instigate all researchers in this area to read it because of its contribution to the economic theory. A combination of the concepts of economic theory (both micro and macro), mathematical economics, economic policy, and econometrics in the postulates of the New Keynesian model will awake the interest of readers for this capital publication among economic literature.

The specific motive for this book review was that I have had the honour to cooperate with prof. J. Galí during the Barcelona Macroeconomics Summer School 2016 organized by the CREI institute (Pompeu Fabra University in Barcelona and Barcelona Graduate School of Economics). He makes understandable concepts from his book even more clear by numerous discussions and analysis of different solutions. On that note, he has shown that seemingly complex problems have simple solutions.

2. Classical monetary model

The classical model which focuses monetary policy is based on the two important assumptions, which substantially influence the character of the equilibrium.

Namely, it assumes full flexibility of the prices and perfect competition in the all markets. Besides these assumptions, the author of the book starts with this model because of its value as a benchmark in the later New Keynesian model development.

As a common classical model, it starts from the problem of optimization of a representative household. It maximizes the utility with constraint in the form of budget constraint. The common feature of the book is return on the micro postulates of macro models. For that reason, the author very rigorously proves propositions which are well established in the macroeconomics, but have origins in the microeconomics. Therefore, this book gives a deeper view in the genesis of the model, which is rarely seen in other similar books.

On the other side, firms maximize profit, taking the prices and wages as given. The constraint is represented in the form of production function. By the similar procedure as in the case of households, the author derives the solution, which is well-established in the economic literature.

The key step is the introduction of monetary policy in the model. J. Galí presents all possible ways of this introduction although not all are common in practice. But they deserve attention in theory. This gives the span to the book. He rejects the exclusivity of any model *a priori*, but the models are ranked *ex post* by their features based on the calibration of the parameters. The author gives many examples of policy making based on monetary policy rules to show which types of the rules provide the price level indeterminacy.

What needs to be highlighted here is the fact that the author demonstrates knowledge necessary for a great economist. Economic theory, economic history, econometrics, mathematical economics overlap in this book.

3. New Keynesian model

The basic New Keynesian model, which is the basis for further extensions in this book, is introduced with two assumptions in focus. First one is that goods market is not perfectly competitive, therefore, monopolistic competition is assumed. In addition, there is no full flexibility of prices.

Although the non-flexibility of prices can be introduced in many ways in these kinds of models, J. Galí decided to do this in a way proposed by Calvo (1983). According to that model (staggered price setting), only a fraction of firms can

reset their prices in one period with probability of $1-\theta$, while other firms cannot do that (probability θ). According to this, θ represents a natural index of price stickiness, and the aggregate price level is the weighted average of prices of firms that did not change the prices and firms that did that, with weights θ and $1-\theta$, respectively (all prices are in logs).

The result of this problem is that firms find an optimal solution which is characterized by the feature that prices are higher than marginal costs because of the mark-up. The first important solution can be derived from this. Inflation is a consequence of the purposeful adjustment of prices of those firms that can do it, for the many periods ahead (discounted at the current moment). It implies the forward-looking character of inflation.

Before we introduce the key equations of the New Keynesian model, it is important to notice that the author defines the output gap as the deviation of the current output from the natural level of output. It is in contrast to common literature in macroeconomics where output gap is defined as the deviation of the current output from potential output, which is calculated using the econometric techniques. The author defines a natural level of output as the level of output which will prevail in case of fully flexible prices. It is not influenced by preference shocks or monetary policy, but by technology shocks.

The key non-policy block of the New Keynesian equations which are the basis for this analysis is composed of New Keynesian Phillips Curve (NKPC) and Dynamic IS Curve (DIS) (J. Galí, 2015, p. 63).

NKPC has the formulation like the equation 1 and it presents a positive correlation between inflation on one side, and expected inflation and output gap on the other side.

$$\pi_t = \beta E_t \{ \pi_{t+1} \} + k \tilde{y}_t \quad (1)$$

DIS has the formulation like the equation 2 and represents the dependence of the output gap on one side, and difference between real interest rate and natural real interest rate, on the other side. Of course, expected value of the output gap is an important part of the equation.

$$\tilde{y}_t = -\frac{1}{\sigma} \left(i_t - E_t \{ \pi_{t+1} \} - r_t^n \right) + E_t \{ \tilde{y}_{t+1} \} \quad (2)$$

Solving the equation 2 forward gives the simple equation 3. It shows that output gap is negatively related to the sum of the current and expected deviations of the real interest rate from its natural counterpart.

$$\tilde{y}_t = -\frac{1}{\sigma} \sum_{k=0}^{\infty} E_t \{ r_{t+k} - r_{t+k}^n \} \quad (3)$$

Furthermore, the author introduces monetary policy in the model, assuming various monetary policy rules or exogenous money supply. Necessary and sufficient conditions for the existence and uniqueness of the equilibrium are rigorously derived, and based on the calibration of the model in the presence of various economic shocks (monetary policy shock, technology shock, preference shock, discount rate shock) the conclusions are assumed about tendencies in the macroeconomic variables.

If we assume that a natural level of output is efficient, then that kind of distortions are not present, so it is simply to determine which form of the rule guarantees the best solution. The author gives different forms of the monetary policy rules and for all of them analyses features and calibrated values of the observed variables related to the welfare. These rules can be divided into two groups: optimal monetary policy rules and simple rules. From the theoretical aspect, the optimal monetary policy rules seem to be convenient for the monetary policy making, but in the practical sense they are not easy to implement because of the unobservability of natural levels of the variables. For that reason, simple rules like the Taylor rule are much more common in practice.

4. The extensions of the model

On the postulates of the basic New Keynesian model developed in the first few chapters of the book, J. Galí gradually cancels the rigorous assumptions made in the basic model development. Along the way he creates the basis for comparison and, through the model evolution and reaching the real assumptions, he indicates possible effects of the assumptions on the final solution.

One of the assumptions is steady state efficiency. When it is not the case, the character of the solution is different because of the different model postulates. The equations which are presented in the previous section have to be modified in order to incorporate the level of this kind of distortions. However, the basic logic behind this block of equations need not be changed.

After the relaxation of this assumption, all necessary criteria for the analysis and comparison of monetary policy making based on discretion or commitment are met. The author clearly indicates that discretionary monetary policy quickly brings back the variables to their planned values in case of shocks, but with higher costs than the policy based on commitment. The possibility of a central bank to commit to planned way of the monetary policy pursuit gives better effects, despite the persistent effects on the macroeconomic variables. That is the consequence of the equation's features and their forward-looking nature.

The author makes further extensions on the model development by assuming the rigidity of wages in the same manner as prices. Therefore, he introduces the notion of wage inflation in an analogous manner as in the case of price inflation. The aggregate level of wages is equal to the weighted average of wages of the workers who changed their wages and those who did not. With specific modifications in the model representation, the author comes up with important conclusions related to the monetary policy. Namely, in the presence of price and wage rigidities, stabilization of the price inflation is no longer optimal. The optimal monetary policy has to focus on the composite index of the price and wage inflation. This is in contrast to the observed modern practice in central banks, but from the normative aspect, it is clear which model gives better results.

Besides these extensions, J. Galí goes one step further by introducing unemployment in the standard New Keynesian model. One of the key contributions is the development of the New Keynesian Wage Phillips Curve. Its formulation is similar to the standard curve, and wage inflation is dependent on the expected wage inflation and the difference between the current and natural rate of unemployment.

$$\pi_t^w = \beta E_t \{ \pi_{t+1}^w \} - \lambda_w \varphi (u_t - u^n) \quad (4)$$

In his other papers, the author shows empirical validity of the New Keynesian Wage Phillips Curve in the case of the USA wherefrom he has derived a monetary policy rule that is optimal in this specific situation and which encompasses unemployment.

Finally, one chapter is dedicated to small and open economies. He shows the implications of the introduced models with some modifications related to an open economy.

5. Instead of the conclusion: The scientific contribution of the book

By further developing the theory of New Keynesians, especially in the area of monetary policy, the author of this book has been very successful in the presentation of normative and positive implications of New Keynesian models in a unique way. Overrun by the economic policy efficiency critique in the presence of the rational expectations gives the motive to New Keynesians to show the counter-arguments which are valid especially in the short run and are based on nominal and real rigidities. Central bank cannot influence natural levels of macro variables (those which will exist in the case of flexible prices), but can influence the current values, resulting in the gap reductions and social welfare improvements.

The central problems of the J. Galí view on the monetary policy are the existence of equilibrium, its uniqueness, and the most important monetary policy design. We argue that all these aspects are presented carefully and in a detailed manner. J. Galí gives scientific validity to his book, by firm reliance on the macro- and microeconomics theory, followed by rigorous mathematical derivations of the solutions.

As he said, the key departures from the classical models are attachment of the expectations importance and the importance of natural levels of the macro variables (J. Galí, 2015, pp. 261 and 262). All these are consequence of the introduction of rational expectations in the economic theory.

The abandonment of assumed inefficiency of economic policy in the short run, stressing the market imperfections by nominal rigidities, and simulations of the various models and monetary policy rules are the key features of this book. Possible modifications of the models in the future are certain, but as J. Galí concludes in the last sentence in the book, it is certain that quantitative macro modelling will be present in the process of economic policy making. If we have all these in mind, the inspiration for writing this book review is obvious, with the faith of popularization of this valuable publication among interested readers.

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