MONETARY POLICY AND INFLATIONARY DYNAMICS: THEORY AND EVIDENCE

Synopsis

Thesis submitted in partial fulfilment of the requirements for the award of the Degree of Doctorate of Philosophy in Arts at Jadavpur University, Kolkata

By

KRISHNENDU MAJI

Centre for Studies in Social Sciences, Calcutta (CSSSC)
Jadavpur University
Kolkata – 700032

2024

Ph.D. Synopsis

Title of the Thesis: Monetary Policy and Inflationary Dynamics: Theory and Evidence

Name of the PhD Scholar: Krishnendu Maji

Name of the Supervisor: Prof. Pranab Kumar Das

Institute: Centre for Studies in Social Sciences, Calcutta

Introduction

Monetary policy refers to the central bank's policy for macroeconomic management by influencing and/or targeting money supply, or to be specific credit supply, through the adjustment of policy rate in response to observable variations in inflation and output. Monetary policy has traditionally been seen as the most important tool for ensuring price stability. In this context, it should be mentioned that, central bank utilises a list of quantitative as well as qualitative tools or instruments for monetary management or credit control. The quantitative tools include open market operation, reserve requirement and policy rate. The qualitative tools include credit rationing, changing margin requirements, regulating consumer credit, moral suasion, etc. This thesis is primarily focused on and evolved around policy rate as the key monetary policy instrument. In addition to that, central banks utilize a number of unconventional monetary policy tools to regulate the macroeconomic environment, such as: asset purchase programs or quantitative easing, negative interest rates, targeted long-term refinancing operations, credit easing, etc. However, discussion of all these unconventional monetary policy tools is beyond the scope of this thesis.

In the context of India, the quantitative monetary tools include open market operation, bank rate, reserve requirements (i.e., Cash Reserve Ratio and Statutory Liquidity Ratio), Liquidity Adjustment Facility, which includes key policy rates, i.e., repo rate and reverse repo rate. In addition to that, the RBI utilises a list of qualitative tools for macroeconomic management, such as Margin Requirements, Consumer Credit Regulation, Moral Suasion, Rationing of Credit, Priority Sector Lending, etc.

A well-regulated monetary policy rule is one of the key ingredients of desired macroeconomic stability for any modern economy. The macroeconomic circumstances are the primary determinant of the direction and magnitude of policy intervention. Therefore, the evolving economic environment is supposed to cause certain alterations in the monetary policy impulse. However, the magnitude of the impact of monetary policy impulses on a desired set of variables varies across countries over time. Therefore, both identifying a proper monetary policy response as well as understanding its potential impact on the desired set of variables is necessary. This thesis broadly incorporates both of these aspects of the monetary policy, i.e., impact of monetary policy on key macroeconomic variables as well as the monetary policy response function.

As far as the monetary policy response function is concerned, identifying monetary authorities' reactions to changes in fundamental macroeconomic variables has long been a focus of the academicians as well as policymakers. The latter includes central banks, governments, international agencies such as International Monetary Fund, World Bank etc. Much of the existing literature on this area is based on Taylor's (1993) monetary policy rule. Taylor presents a basic monetary policy rule in which the monetary authority changes the policy rate in response to observable variations in inflation and unemployment rate or equivalently deviation of aggregate output from its potential, i.e., output gap, in the economy. Taylor proposes that variation in inflation and the output gap induce the monetary authority to change its policy rate. Taylor, however, made it clear that the rule he proposed, was not meant to be a precise formula. The proposition was subsequently formalized in studies by Taylor (1996) and Svensson (1997, 2003). Taylor (1996) points out a number of reasons behind using a well-defined monetary policy rule to recommend policy response. The study also recognises the requirement of discretionary actions by central banks under specific circumstances. However, as the study suggests, well-defined rule should be emphasised more than the discretionary actions by central banks. Svensson (1997) illustrates the derivation of reaction function of the central bank given its objective (i.e., minimizing social loss) and knowledge about the structure of the macroeconomic environment or state variables (i.e., structural form of output gap and inflation). Svensson (2003) suggests a number of key points to achieve a good monetary policy rule. A well-regulated monetary policy rule is one of the key ingredients of desired macroeconomic stability for any modern economy. This rule, as specified by Taylor, is extensively used in the relevant literature to demonstrate the policy rule in any macroeconomic models. Alternatively, central banks may prefer to define explicit objectives or goals and follow some decision-making processes that involve a robust technique and analysis of available relevant historical data to achieve those objectives. The evaluation of the optimality and robustness of such rule-based policies could become a horizon to the concerned literature. What should be the appropriate objective for a central bank to strive for when acting in society's best interest? Given economic frictions, the welfare of representative agents is supposed to be optimized by an optimal monetary policy.

The impact of monetary policy on key macroeconomic variables remains a major area of research in the field of macroeconomics and the central banking system. Research is being conducted both theoretically and empirically to examine the channels and strength of the monetary policy transmission mechanism. Accurate assessment of the potential impact of such a policy is a key ingredient of successful policy implementation. Any central bank has two possible choices or goals as the policy objective: control of inflation and a lower level of unemployment. During recessionary periods, in order to address sudden increase in unemployment, monetary policy instruments are being used to accelerate economic activity in the economy.

However, pursuing all the goals mentioned above simultaneously is an impossible task for any macroeconomic policy instrument, specifically in the short run using monetary policy. In this context, the success of any policy is largely defined by its goals. Having a definite goal can help the policy maker to assess the effectiveness of its policy as well. After setting up the goal, the next step should be to identify the appropriate policy instrument, its desired magnitude and the direction of its impulse. In order to perform that, policymakers should have an accurate prior understanding of potential impact of policy impulse on a set of variables that are part of the objective function of the policymaker.

As mentioned earlier, most of the current studies on understanding the behaviour of central banks are based on Taylor's (1993) monetary policy rule. The extensive discussions on Taylor's monetary policy rule are given in the subsequent chapters. Taylor (1996) points out six reasons behind using a well-defined monetary policy rule to recommend policy response, namely, (i) time consistency, (ii) forward-looking behaviour in macroeconomic agents, (iii) reducing policy uncertainty, (iv) instruct goal-seeking policymakers to take appropriate action, (v) educate and inform students and general public and (vi) accountability of policymakers. Finally, Taylor discouraged absolute discretionary approach in monetary policymaking.

Svensson (2003) is one of the foundational studies that explores the behaviour of central banks using a micro-foundational approach. The study attempts to bridge the gap between representing monetary policy rule by a simple linear equation and the actual policy rule practiced by inflation targeting central banks. The study argues that, it is impossible to represent the monetary rule using a simple linear equation, especially under inflation targeting. The study suggests a number of key points to achieve a good monetary policy rule: (1) target variable(s) (e.g., output gap, inflation) and target level should be well defined along with its weight in the loss function, (2) estimate the sacrifice ratio between or among the potential target variables, (3) identify an operational and simple target rule that approximately optimize the loss function,

(4) identify or estimate the marginal impact of policy rate on the target variable(s), (5) set the policy rate according based on understanding of target levels and sensitivity of target variable(s) with respect to policy rate, (6) repeat the process until the desired target(s) is not achieved and finally (7) maintain transparency in the system.

Chapter Divisions

The chapters of the thesis have been organized as follows:

Chapter 1: Introduction and Review of Literature.

Chapter 2: A Comparative Study of the Impact of Monetary Policy on Macroeconomic Variables: A Panel Data Analysis.

Chapter 3: Asymmetry in the Conduct of the Monetary Policy in India.

Chapter 4: Asymmetric Policy Response of RBI using Reinforcement Learning Algorithm.

Chapter 5: Conclusion.

Summary of Chapters

Chapter 1

This chapter focuses on introducing the reader to the broad area of research in the field of monetary policy and introduce the core area of research of this thesis. This chapter discusses all the concepts that is important to highlight before moving on to the three key chapters of this thesis. The chapter also carries out a review of literature and connects our work to the existing literature, finding the research gaps and discussed how our study addresses this gap. The chapter concludes by mentioning the structure of the thesis.

Chapter 2

Examining the extent of impact of monetary policy on inflation and output for a group of developed and developing market economies is the primary goal of this chapter. It is possible to demonstrate the effectiveness of monetary policy by showing the impact of monetary policy impulse on output growth and inflation control. Monetary policy can affect general price level either proportionately (i.e., Classical Case: monetary policy has no impact on real variables) or less than proportionately (i.e., rigidities in key macroeconomic prices causing real variables to change). There is a need to study the impact of monetary policy on emerging market economies because of ambiguity in the findings of different empirical studies regarding effectiveness in stabilizing inflation and accelerating output. In addition to that, it is important to compare the impact of monetary policy on key macroeconomic variables for emerging and advanced economies. One of the earliest attempts to study the effectiveness of monetary policy for a set of emerging market economies using a panel vector autoregression technique came from Jawadi et al. (2016). The study showed that monetary policy shocks induced expected macroeconomic consequences for BRICS nations during the period from 1990 to 2013. In addition to that, the study attempts to analyse the spillover effects between monetary and fiscal policy shocks. The study found empirical evidence of existence of an "accommodative stance" between the two types of policy shocks.

This chapter explores an unbalanced panel of ten emerging market economies and eleven advanced economies to understand the impact of monetary policy on inflation and output. The set of countries includes emerging market economies: Brazil, Chile, Colombia, Hungary, India, Indonesia, Mexico, Russia, South Africa, Czech Rep. and Advanced Economies: Australia, Canada, Denmark, Iceland, Japan, New Zealand, Norway, South Korea, Switzerland, United Kingdom, and the United States.

The current chapter evaluates the macroeconomic effects of monetary policy using a panel vector autoregression (PVAR) model. In order to understand the impact of the shock to a particular policy variable, typically policy rate, on the other macroeconomic variables of interest Impulse Response Functions (IRFs) are computed and plotted. It also shows the persistence of the impact of the shock, whether temporary or permanent, on the endogenous variables. The Forecast Error Variance Decomposition shows the relative importance of own shoch vis-a-vis other shock in the variability of the impact on the endogenous variables. In this context, it should be mentioned that, PVAR methodology used in this study is a reduced form PVAR technique. Similar to traditional time series technique it also can treat all the variables in the system as endogenous with advantage of having in control of unobserved individual heterogeneity. The panel framework increases efficiency by avoiding possible bias generated out of relatively low degree of freedom under country-level VARs. Panel data econometrics is a continuously evolving field of study. The exponential growth in availability of data observed on cross-sections of units and over time induced emergence of a number of advanced empirical methodologies exploiting this double dimensionality to manage some of the typical challenges associated with macroeconomic data, e.g., with respect to unobserved heterogeneity. Panel data techniques have a number of statistical superiorities or advantages over time series techniques; e.g., (i) they usually contain more degrees of freedom and more sample variability than cross-sectional data and thus improve the efficiency of econometric estimates; (ii) panel models provide greater capacity for capturing the complexity of individual behaviour than a single cross-section or time series data, (iii) panel models often simplify the computation and statistical inference. It is noteworthy that, most of the empirical studies which were attempted to assess the macroeconomic impact of monetary policy are country-specific studies or time series analysis. Whereas, very few panel data studies are available in the literature in this context, specifically for emerging market economies. This chapter is intended to bridge that gap in the literature.

The list of variables used in this chapter includes seasonally adjusted real GDP growth rate, rate of inflation, government spending growth rate, monetary policy related interest rate as endogenous variables and growth rate of crude oil price as exogenous variable. The oil price shock is part of this study to introduce a proxy for exogenous supply-side shocks assuming the fact that, monetary authorities cannot entirely isolate their economies from the impact of oil-price shocks and choose appropriate actions to determine the consequence of such a shock to the economy. On the other hand, the presence of fiscal policy shock in the model helps us to compare the impact of fiscal policy and monetary policy shocks side-by-side. In addition to that, it helps us to evaluate the possible spillover between monetary and fiscal policy shocks. The time horizon for this study is from 2001Q1 to 2022Q4.

The estimated PVAR equations reveal a number of noteworthy observations. Firstly, advanced economies are following some form of interest rate smoothing monetary policy rule. However, no such pattern can be identified for EMEs. Secondly, exogeneous oil price movement significantly influence monetary policy rule for both emerging as well as advanced economies. However, the direction and magnitude of impact differs. Thirdly, fiscal policy found to have significant impact on real output growth rate of EMEs. No such impact can be identified for advanced economies. Fourthly, movement in the output growth rate is significantly associated with oil price movement for both types of economies. Fifthly, monetary policy found to have desired directional impact on inflation for both advanced and emerging market economies. Similarly, for both types of economies, oil price movement found to have expected directional impact on inflation. However, strength or magnitude of impact is more in case of EMEs for both monetary policy and oil price shocks. Finally, for advanced economies fiscal policy found to remain unaffected by movement in any of the variables in the system. However, monetary policy does have significant impact on fiscal policy in case of emerging market economies.

The analysis of all the IRFs in this study suggest that, the magnitude of impact of both monetary and fiscal policy on all the concerned variables are always greater in emerging economies relative to that of advanced ones. In addition to that, IRFs of the EMEs show oscillatory behaviour. Finally, except impact of monetary policy impulse on inflation for advanced economies, none of the policy impulse on any other variable for any categories of country set (i.e., advanced and the EMEs) shows signs of persistence. All the results on IRF analysis are cross validated by the LOOCV technique. The LOOCV technique suggests a similar pattern in the IRFs, i.e., supports the results generated from estimated models on complete datasets.

Finally, the FEVD is used to investigate the fraction of the fluctuations in the endogenous variables that is due to fiscal and monetary policy. The result suggests, unexplained variation in the policy rate explained a sizable amount of variation in the output growth rate and inflation in advanced economies. Similar cannot be said in case of emerging market economies. However, as far as fiscal policy is concerned, it is responsible for relatively greater proportion of variation in output growth in case of emerging economies than advanced ones. The opposite is true for inflation.

Chapter 3

The Chapter 3 is primarily focused on detecting the existence of asymmetric behaviour over the choice of policy rate of the RBI. Over the past two decades, there have been major changes in the objective, methodology, and instruments of RBI's monetary policy. In this context, the RBI is currently following a flexible inflation targeting regime by maintaining a headline CPI inflation target of 4% with an upper and lower tolerance bound of 6% and 2% respectively.

Unprecedented capital inflows created new problems for monetary management, which led to a modification in how monetary policy was conducted. In this context, the development of a full-fledged Liquidity Adjustment Facility (LAF) from June 2000 facilitated the modulation of liquidity conditions on a daily basis. In this mechanism, while liquidity was absorbed at the reverse repo rate (floor), liquidity injection was done at the repo rate (ceiling) by the RBI. There are other policy rates and ratios of which repo rate has become the most important since 2001. The earlier monetary policy rate was bank rate, which still exists. Nowadays, the repo and reverse repo rates are the key policy rates of RBI, which are closely interconnected to each other. In order to affect the general monetary and credit conditions in the economy, the RBI modifies policy rate. As a result, RBI significantly rationalized its refinancing facilities and decreased its reliance on Cash Reserve Ratio (CRR) for operations involving liquidity management. However, the Bank Rate is still used to indicate the direction of policy over the medium term.

Identifying central bank's reactions to changes in fundamental macroeconomic variables has long been a focus of monetary economists. Much of the current material in this area is based on Taylor's (1993) monetary policy rule. Taylor presents a basic monetary policy rule in which the monetary authority changes the policy rate in response to observable variations in inflation rate and unemployment rate or equivalently output gap in the economy. Taylor proposed that variation in inflation and the output gap induce the monetary authority to change the policy rate. The rule can be summarised mathematically using the following linear stochastic equation:

$$i_t = \gamma_0 + \pi_t + \alpha_1(\pi_t - \pi^*) + \beta y_t + \gamma_1 i_{t-1} + \gamma_2 i_{t-2} + \varepsilon_t \qquad (1)$$

Where, i_t is monetary policy linked nominal rate of interest (i.e., policy rate), π_t is rate of inflation, π^* is the targeted rate of inflation, y_t is the output gap measured as percentage deviation of real GDP from its trend values, and γ_0, γ_1, γ_2, β, α_1 are parameters of the model. The lagged values of the interest rate in the Taylor rule equation show the central bank's intention to smooth out fluctuations in interest rates over time and give the system some inertia.

For the purpose of estimation, the Taylor rule equation can be further reduced to the following equation:

$$i_t = \alpha_0 + \alpha\pi_t + \beta y_t + \gamma_1 i_{t-1} + \gamma_2 i_{t-2} + \varepsilon_t \quad (2)$$

Where, $\alpha_0 = (\gamma_0 - \alpha_1\pi^*)$ and $\alpha = (1 + \alpha_1)$. As specified earlier, $(\gamma_1 + \gamma_2)$ represents the degree of interest rate smoothing.

The debate over asymmetric monetary policy frameworks was introduced, and approximated Taylor rules have gained popularity as a way to describe the behaviour of the monetary authority. The concerned literature can be summarised by two questions. Firstly, has the central banks' actions been symmetric during high inflation and/or low-income vis-a-vis low inflation and/or high-income regimes? Secondly, Should the central bank react asymmetrically?

Given the policy response function, as depicted by Taylor, the central banks are expected to behave symmetrically in response to changes in major macroeconomic indicators. That is, the strength of the monetary policy response is independent of whether important macroeconomic indicators deviate from some threshold level in a positive or negative direction. However, under some specific circumstances, the rationale for asymmetric monetary policy might be considered as valid and desirable. For example, following the implementation of the inflation targeting regime, central banks may legitimately fear difficulties in securing inflation expectations (risk of credibility loss), which may lead them to employ asymmetric handling of inflation targets. Such asymmetry would imply that, central banks would react more sensitively when inflation forecasts were above the target than in a scenario where inflation forecasts were below the target level. Bunzel and Enders (2010) investigated the possibility of threshold nature of the monetary policy rule; i.e., the central bank acts sensitively in some circumstances than in others (e.g., high inflation scenario or positive output gap) using Threshold Autoregressive

Model for the US economy for the period 1965Q3 to 2007Q3. The empirical result supported the view that the Taylor rule is a threshold process that is consistent with the hypothesis of opportunistic monetary policy.

A standard threshold autoregressive (TAR) model describing the asymmetric monetary policy rule can be represented as follows:

$$i_t = (1 - I_t)(\beta_0 + \beta_1 \pi_t + \beta_2 y_t + \beta_3 i_{t-1} + \beta_4 i_{t-2}) + I_t\left(\alpha_0 + \alpha_1 \pi_t + \alpha_2 y_t + \alpha_3 i_{t,1} + \alpha_4 i_{t-2}\right) + \varepsilon_t \quad (3)$$

Where, $I_t = 1$ if $x_{t-d} > \tau$ and 0 otherwise, and x_{t-d} is the magnitude of the threshold variable with delay of periods d. β_i and α_i are the parameters of the model. If $\beta_i = \alpha_i$ for all i, the model is linear, i.e., symmetric.

For this chapter the dataset consists of quarterly values of seasonally adjusted GDP deflator, seasonally adjusted real GDP and repo rate. The time horizon used in these studies starts at 2001Q2 and ends at 2023Q1. The Hodrick-Prescott (HP) filter is used to transform the Real GDP and eventually to estimate the output gap.

Preliminary exploratory study of this chapter supports the presence of nonlinearities in the preference of the RBI and thus support use of the TAR model to explore the preference pattern empirically with one period lag of inflation as the threshold variable. Estimated TAR models corresponding to a number of sub-samples suggests that, the estimated threshold level of lag of inflation always lies above the upper tolerance level inflation target, i.e., 6%.

In addition to finding the evidence supporting the presence of asymmetry in the response of the RBI, this study finds out a number of interesting results. Firstly, the RBI is more responsive to contemporaneous movements in output gap whenever inflation exceeds the threshold inflation level than otherwise. Secondly, The RBI is persistently following an interest rate smoothing policy. Thirdly, the study found no clear signal regarding responsiveness of policy rate with respect to change in inflation, i.e., sign, magnitude and statistical significance of concerned parameters varies across sub-samples. Finally, the study concludes by applying conventional recursive estimation technique, post 2021Q2, the RBI becomes much more tolerant with respect to inflation, whereas, it responded sharply whenever inflation level crosses that increased tolerance or threshold level. Under such circumstances, the RBI compromised with interest rate smoothing behaviour as well.

Chapter 4

This chapter is dedicated to exploring the desirability aspects for the asymmetric monetary policy response function in Indian context. The primary objective of the Chapter 4 is to identify or estimate the optimal monetary policy response function of the RBI given its knowledge about the economy and its own preference over the structure of the policy response function. This chapter incorporates two distinct policy response functions, i.e., symmetric and asymmetric policy response functions. In addition to the objective mentioned above, this study also going to compare the relative performance of symmetric and asymmetric policy response of monetary authority. Therefore, the goal of this chapter is to introduce a mechanism to identify and evaluate the optimal monetary policy response of the RBI. In this context, this chapter utilizes a Reinforcement Learning (RL) algorithm to identify the exact form of a well-defined deterministic policy response function.

The subject matter of the RL can be summarized as a problem of optimizing the discounted present value of future flow of reward of an individual (i.e., agent) or a group of individuals within a modelling environment. Therefore, the idea behind RL is to learn behavioural rules or policies based on state observations, that induce expected reward optimizing agent's action. The algorithm is model-free, i.e., complete knowledge of the model equations is not required for implementing such algorithms. The choices under RL are induced by past experiences, thus reduces model uncertainty. Finally, the algorithm does not suffer from the curse of dimensionality, i.e., it is possible to include as many states or control variables in the analysis as necessary without any restrictions. Although, incorporating an additional variable in the problem can increase the computational complexity of the problem by many folds. In a similar study, Hinterlang and Tänzer (2021) implemented the Deep Deterministic Policy Gradient (DDPG) algorithm, as suggested by Lillicrap et al. (2015), to identify the optimal monetary policy reaction function for the US. The study incorporates 1987Q3 to 2007Q2 in order to estimate the transition equations. The result suggested that, the Reinforcement Learning based monetary policy rule outperforms other common rules as well as the actual federal funds rate. This study is one of the key starting points for this chapter. In this chapter we are going to use the same algorithm to estimate the optimal values of the parameters of the deterministic policy functions of the RBI.

This study can be best described as a sequence of two distinct steps for each type of policy response functions: (a) estimating macroeconomic transition equations using appropriate empirical model and (b) estimating the parameters of the policy response function given its structure and understanding about the external environment.

While defining the shape of policy function of the RBI, stabilization rules, as described in the Taylor rule, play the key role. In addition to that, central banks generally follow a short-term interest rate smoothing behaviour, that causes policy rate to move at a relatively sluggish pace. Evidence of such preference of the RBI is demonstrated in the previous chapter (i.e., Chapter 3). In addition to the objectives of stabilizing output and inflation, this pattern in the behaviour of the monetary authority can be understood as including the goal of limiting interest rate volatility within its objective function. Finally, due to computational reasons the assumption of Zero Lower Bound (ZLB) of policy rate is introduced in this study. According to Keynesian frictions, optimal nominal interest rate is bound to be positive, i.e., to have a ZLB. In practice, a number of advanced economies experienced a phenomenon of positive but almost zero monetary policy linked rate of interest for a brief period of time. The exploration for an optimal monetary policy function is intended to find a policy rate which is sufficiently low to maintain a deflationary pressure in the economy along with satisfying the binding ZLB and goal of macroeconomic stabilization and inflation rate target. Under such a circumstance finding an optimal monetary policy response path becomes a vital area of research in the field of macroeconomics.

This chapter utilizes the same set of variables, i.e., inflation, output gap and policy rate; and the methodology to compute those variables as of last chapter (i.e., Chapter 3). Although, this chapter uses a marginally different time horizon. To be specific, in this chapter we are using same time horizon as that of Chapter 3 excluding the COVID period, i.e., from 2001Q2 to 2019Q4. Such exclusion was necessary to remove outliers from the dataset.

The exploratory study of Chapter 4 identifies a number of interesting results. Firstly, the optimized reaction function under asymmetric policy rule marginally out-performs optimized standard symmetric policy rule in terms of social loss with significant overlapping region. Which indicates, monetary authority can achieve similar level of welfare using either of the reaction function. Secondly, a greater emphasis on interest rate smoothing should be given under symmetric monetary policy regime. As far as asymmetric reaction function is concerned, interest rate smoothing should not be considered by the RBI while setting policy rate when inflation rate is less than the target level of 4%. On the other hand, it should be emphasised when realized inflation is more than the target level. Thirdly, as expected, for usual symmetric policy function, rising price level should be followed by contractionary monetary policy. For asymmetric policy regime, monetary policy response should remain irresponsive to change in inflation rate if it is less than the target level. But if it exceeds the threshold, the contractionary policy response of the RBI should be sharper than in case of symmetric policy. Finally, the monetary authority should always consider stabilization of output gap, irrespective of policy regime. Although, the emphasis on output gap stabilization should be reduced if inflation exceeds its target level under asymmetric monetary policy regime.

Chapter 5

The final chapter of this thesis concludes and summarises all the results and findings of this thesis. In addition to that, the chapter provide light on possible policy implications of this thesis along with few potential future research in the field of monetary policy.

Bibliography

Bunzel, H., & Enders, W. (2010). The Taylor rule and "opportunistic" monetary policy. Journal of Money, Credit and Banking, 42(5), 931-949.

Das, S. (2023). Art of Monetary Policy Making: The Indian Context, RBI Bulletin September 2023

Hinterlang, N., & Tänzer, A. (2021). Optimal monetary policy using reinforcement learning. Deutsche Bundesbank Discussion Paper No. 51/2021

Jawadi, F., Mallick, S. K., & Sousa, R. M. (2016). Fiscal and monetary policies in the BRICS: A PVAR approach. Economic Modelling, 58, 535-542.

Lillicrap, T. P., Hunt, J. J., Pritzel, A., Heess, N., Erez, T., Tassa, Y., Silver, D. & Wierstra, D. (2015). Continuous control with deep reinforcement learning. arXiv preprint arXiv:1509.02971.

Svensson, L. E. O. (2003). What is wrong with Taylor rules? Using judgment in monetary policy through targeting rules. Journal of Economic Literature, 41(2), 426-477.

Taylor, J. B. (1993, December). Discretion versus policy rules in practice. In Carnegie-Rochester conference series on public policy (Vol. 39, pp. 195-214). North-Holland.

Taylor, J. B. (1996). How should monetary policy respond to shocks while maintaining long-run price stability?–Conceptual issues. Achieving Price Stability, 181-195.