An Empirical Analysis of the Sensitivity of Bangladesh's Inflation and Output Gap to Taylor Rule Parameters

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Abstract

The analysis explores the bidirectional influence between monetary policy shifts in Bangladesh and fluctuations in output and prices. Specifically, the study attempts to identify the impact of the Taylor Rule parameters on inflation and output gap. Estimated by standard production function (Cobb-Douglas) and Hodrick–Prescott (HP) filter, output gap accounting is conducted from yearly data of 1990 to 2024. The monetary policy reactions were identified by estimating a Structural Vector Autoregression (SVAR) model consisting of output gap, inflation and real policy rates. Analysis of the structural shocks to the equations indicates that the aggregate demand shocks are smoothly absorbed by the economy within the medium term. Secondly, the aggregated supply shocks impact sluggishly on the price levels, indicating significant price rigidity in the Philips Curve. Thirdly, the monetary policy sensitivity towards the output gap and inflation are not found to be counter-cyclical, rather the reaction seems to be slow and pro-cyclic, especially against inflation. The recent high inflationary persistence of Bangladesh provides an impetus for undertaking a rule based countercyclical monetary policy adoption.

Keywords: Inflation, Output gap, Taylor rule, Philips curve, Monetary policy.

JEL Classification: E52, E58, E31, E32, C32

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1. Introduction

Economic growth and price stability are the two major policy objectives that the monetary policy of Bangladesh tries to achieve. It is customary that the macroeconomic policy undertaking along with fiscal policy stances of the Government are coordinated for informed decision making. However, as economies are becoming more complex due to various financial innovations and diversities, the debate of taking rule based monetary policy decisions has become prominent (Mishkin, 2018; Taylor, 2011). Like Bangladesh, many countries target monetary expansion as the main policy variables, which may lack transparency accountability and equity for the economic agents (Friedman, 1976). The argument, however, against rule-based monetary policy undertaking is that it is very stringent and does not provide enough flexibility, especially during uncertainty in the real economy. Mishkin (2018) states that rigid policy stance eventually bars policymakers from taking discretionary actions for unforeseen events. In this backdrop, the primary objective of the study here is how the monetary policy decisions have been aligned with the overall macroeconomic goals of the country. In doing so, the study addresses two specific questions: i) Could it had been an efficient trade-off between inflation and growth if Taylor Rule were used? ii) Is it possible to improve the policy reaction of the central bank by following Taylor principles for policy undertaking?

Analyzing some of the past studies and Monetary Policy Statements (MPS), it is found that in most instances monetary policy in Bangladesh is undertaken by a combination of monetary targeting with prudential guidelines aimed at limiting the extend of credits expansion for the Banks and Non-Bank Financial Institutions (Alam, 2015). Although there is an implicit target for inflation in the policy undertaking, the policy instruments in most of the cases turn out to be targeting broad money (M2) instead. In recent years, however, Bangladesh Bank has started making an explicit announcement on inflation targeting in the policy statements. The underlying assumption here is that the policy signals from the money market transmit to and from the goods market with reasonable ease. Although, Alam (2015) has showed in an analysis that monetary policy of Bangladesh is not efficient in impacting the short run economic fluctuations. This study, however, undertakes that analysis

with recent data stretching up to 35 years. Based on the relationships among inflation, Gross Domestic Products (GDP) and monetary policy the study tries to find if there is any definite pattern in the monetary policy undertaking. Specifically, the analysis tries to disentangle the response of monetary policy due to change in price levels and output gap of Bangladesh.

While this study tries to identify the policy reactions of the Central Bank due to wider macroeconomic changes, it is also imperative to understand how economic growth and inflation interact among themselves in different phases of economic expansion and contraction. To do that a description of the Philips Curve is given in the context of Bangladesh. The analysis delves into the nature of inflation by evaluating the linear relationship between output gap and inflation over the 35-year period. As this analysis requires output gap data, this study undertakes the task of computing that by widely used Cobb-Douglas production function and filtering approaches.

The study is conducted by a New Keynesian Model for Bangladesh consisting of a simple univariate demand function, an aggregate supply equation and the Taylor Rule interest principle for monetary policy. As the variables of these three equations are endogenous in the economy, they are combined into a Structural Vector Autoregression (SVAR) modeling with appropriate identification restrictions. The impulse response functions, variance decomposition and estimation of the model are discussed to understand how monetary policy is undertaken and what are the consequences of such policies.

After starting with the introductory section, the paper provides an analysis of the monetary policy adoption by the Central Bank of Bangladesh. Subsequently, an account of inflation and output gap is discussed to understand how Bangladesh economy has evolved over supply and demand shocks. The following section provides with a SVAR modeling of Bangladesh economy where output gap, inflation and real policy rates are taken as the key variables. The modeling consists of three main equations namely, output equation, a Philips Curve relationship and Taylor principle for real policy rates. The paper concludes with results, discussion and policy implication for Bangladesh economy.

2. Macroeconomic trends and monetary policy in Bangladesh

Bangladesh Bank, immediately after establishment in 1972 adopted a highly interventionist monetary policy to address post-independence reconstruction (Ahmed, 2007). The government nationalized all banks on March, 1972 under the Bangladesh Banks (Nationalisation) Order, 1972, which enabled the state with direct control over the financial sector to channel resources into rebuilding the war-torn economy. This is done by imposing interest rate controls, selective credit allocation, and administrative directives, all under the explicit direction from the Government (Afrin, 2017; Barkawi & Monnin, 2015).

State-led development priorities during this period focused on rehabilitating key industries, particularly jute and textiles, and expanding agricultural production. These objectives were outlined in the First Five Year Plan, launched in July 1973, which targeted an annual GDP growth rate of 5 percent (Alam, 2016). To realize these goals, directed lending through nationalized commercial banks was implemented, with 75 percent of total advances in the 1970s allocated to the public sector and trade (Mollik & Bepari, 2009). Bangladesh Bank's intervention was further supported by concessional foreign aid and credits, such as the first IDA loan of 50 million US Dollars from the World Bank in November 1972, aimed at reconstructing vital sectors including agriculture, industry, transport, and telecommunications (IDA, 1972).

In 1980-1990, the government of Bangladesh took the first initiative to liberalize monetary policy by appointing the National Commission on Money, Banking and Credit in July 1984 and crucially, issuing Bangladesh Bank's interest-rate deregulation circular on November 1989 that replaced fixed rates with floor-and-ceiling bands and began phasing out directed credit ceilings (Choudhury & Raihan, 2000). In that regime a wave of private financial institutions was established and proliferated rapidly (Jahan & Muhiuddin, 2020; Watanagase, 1990). The non-bank segment also expanded for longer term investment (Ahmed & Chowdhury, 2007). During this period policy directives used to communicated solely through internal circulars to banks, with no formal Monetary Policy Statements or systematic disclosure of objectives, targets or data (Nawaz & Chowdhury, 2014). Throughout this period, there was an explicit strategic emphasis on expanding the banking sector

through the rapid expansion of new private and non-bank financial institutions, without focusing on macroeconomic stabilization or developmental targets (World Bank, 1990).

Bangladesh Bank's prolonged reliance on administered instruments—credit ceilings, interest-rate caps and selective lending has encountered increasing challenges in containing inflation and stabilizing exchange rate, as underscored by the IMF and World Bank (Canton, 2021; Maimbo & Henriquez Gallegos, 2014). In response, the Financial Sector Reform Program (FSRP) was launched in June 1990 under IDA's Financial Sector Adjustment Credit, marking a gradual shift toward market-based monetary management. This reform process included the liberalization of interest rates in April 1992, the adoption of indirect monetary tools such as periodic adjustments to the Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) to manage liquidity and the implementation of Open Market Operations (OMS). Additionally, the policy framework shifted focus toward targeting monetary aggregates, specifically broad money (M2), with annual growth ceilings set at 14 percent for 1991–1995. As a result, the average annual growth rate of broad money moderated to 12.9 percent during the 1990s, accompanied by a decline in inflation to 5.7 percent (Islam, 2008; Mujeri & Younus, 2009). To further align monetary policy with market signals, Bangladesh adopted a floating exchange rate regime on May 2003, primarily to enhance export competitiveness and better absorb external shocks. This move was part of broader efforts to liberalize trade and allow the domestic currency to adjust freely against foreign currencies (Dalton, 2007). Finally, the introduction of biannual Monetary Policy Statements (MPS) in January 2006 institutionalized transparency and predictability in the Central Bank operations (Bhattacharya & Khan, 2009).

Despite limited exposure to international financial markets, the economy of Bangladesh faced challenges from global financial crisis of 2007-2008 through reduced export demand, declining remittances and global commodity prices volatility. Bangladesh Bank responded that by reducing the repo rate from 6.0 percent to 4.75 percent and cut the CRR from 5.5 percent to 4.0 percent in March–April 2009. Despite the introduction of the 13 percent lending rate cap in FY2008-09, Bangladesh achieved approximately 6.0 percent GDP growth while

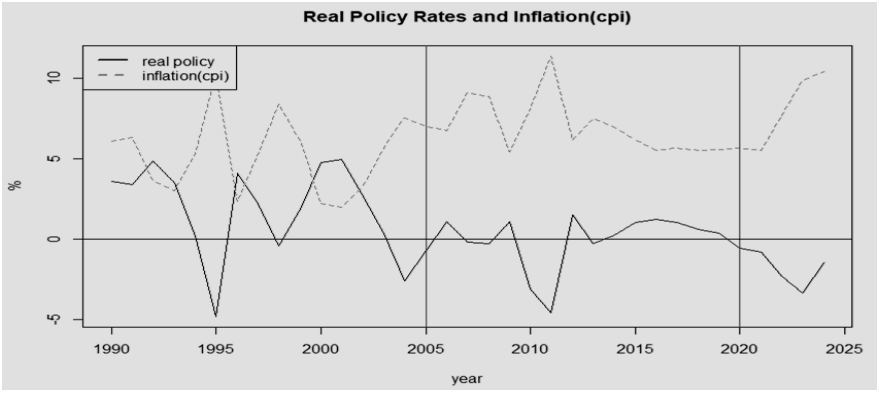
maintaining manageable inflation (ADB, 2009; Bhattacharya & Khan, 2009). Research conducted by Bangladesh Bank in 2012 suggesting that a threshold inflation level of 7-8 percent was optimal for Bangladesh's economic growth. The findings provided empirical support for the government's inflation target of 7.5 percent set in the FY2012-13 (Younus, 2015). Simultaneously, institutional development and wider financial inclusion, including the launch of the Bangladesh Automated Clearing House (BACH) in 2010 and the Bangladesh Electronic Funds Transfer Network (BEFTN) in 2011, paved the way for further digital transformation in the financial sector (BangladeshBank, 2013).

From 2016 to 2021, Bangladesh Bank continued an accommodative stance with policy rates around 6.0–6.75 percent and inflation targets of 5.5–5.7 percent. The most consequential development was the implementation of interest rate caps in April 2020, introducing a 9 percent lending rate ceiling that remained in effect until May 2024, significantly undermining monetary policy effectiveness (Bangladesh Bank, 2022). The period from 2022 onwards marked a fundamental transformation as persistent inflation emerged as the primary challenge, with point-to-point inflation surging from 6.15 percent in FY22 to 10.49 percent in August 2024. This has prompted the most aggressive monetary tightening cycle in Bangladesh history by increasing the repo rate from 5.0 percent to 10.0 percent through 11 successive increments. The transition to interest rate-based monetary policy was formalized in July 2023 with the introduction of the Interest Rate Corridor (IRC) system, marking a significant departure from monetary aggregate targeting to inflation targeting (Asia & Pacific Dept, 2024; BangladeshBank, 2024).

An examination of the key financial indicators over time illustrates the implications of different monetary policy regimes to the real economy. Figure 1 below shows the relationship between real policy rates and consumer price index (CPI) during 1990 to 2024. In early 1990s, the central bank managed to keep real rates slightly positive as inflation fluctuated around 5 percent, demonstrating some counter-inflationary resolve. However, by the mid-1990s, real policy rates declined to around (-) 5 percent when inflation spiked above 10 percent, reflecting policy accommodation that contributed to price pressures. From year 2000 to

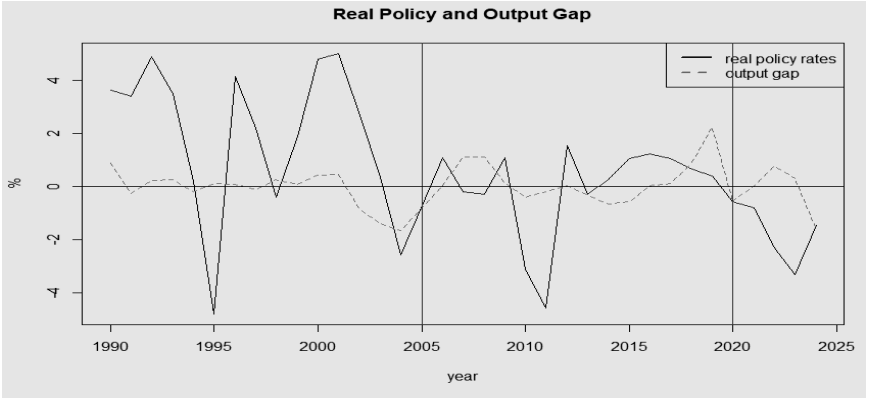
2005, the real policy rate and inflation briefly converged as the policy rate rises marginally above inflation, but after 2005 the real policy rate remained persistently negative or near zero while inflation stayed elevated above 5 percent, even breaching 10 percent again in the 2010s and early 2025.

Figure 1: Real policy rate and Inflation (1990-2024)



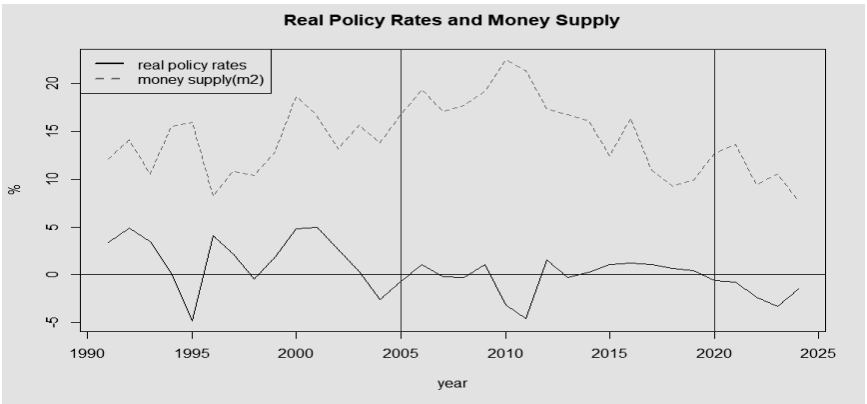
The prolonged period of near-zero or negative real interest rates despite high inflation indicates that Bangladesh Bank has not systematically adjusted the nominal policy rate in response to deviations of inflation from target, as prescribed by Taylor's rule. This is consistent with empirical evidence showing that Bangladesh Bank's monetary policy during 1972-2016 responded pro-cyclically to output rather than counter cyclically to inflation, producing a pro-inflationary bias (Zayed, 2018).

Figure 2: Real policy rate and Output Gap (1990-2024)



Illustrated in Figure 2, the positive real policy rates in early 1990s coincided with modestly positive output gaps, suggesting limited monetary tightening in response to output surge. By the mid-1990s, real rates fell sharply to around (–)5 percent during negative output gaps, reflecting a countercyclical easing intended to support the economy in downturns. From year 2000 to 2005, real policy rates rose significantly, reaching the highest level, while output gaps were slightly positive or near potential, indicating that tighter policy coincided with a strengthening economy. After 2005, real policy rates stayed near zero regardless of output fluctuations, signaling a neutral stance that did not respond actively to either overheating or slack. During the 2007-08 crisis, the Central Bank continued cutting real policy rates even as output gaps closed, showing a clear bias toward supporting growth and maintaining liquidity.

Figure 3: Real policy rate and Money Supply (M2) (1990-2024)



Now to understand the evolution of money circulation in the economy, it is seen that in early 1990s, real policy rates remained slightly positive while broad money (M2) growth moderated around 12 to 15 percent, indicating some restraint on money creation (Figure 3). However, by the mid-1990s, large negative real policy rates coincided with surging M2 growth above 15 percent, reflecting a very relaxed monetary policy stance that fueled high liquidity with upward price pressures. Growth of money supply has reached the highest level after 2010 owing to one of the lowest real policy rates stances of the Central Bank in that period. After that until the year 2020 the real policy rates remain positive in most of the time which helps control the upward spiral of money growth in the

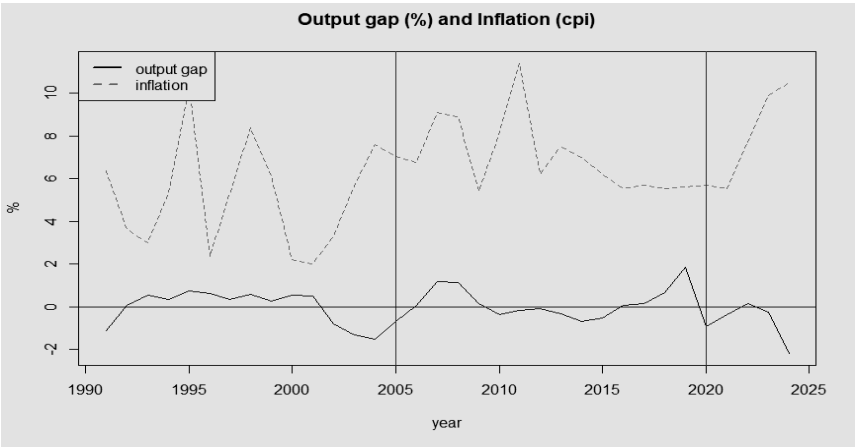
economy. The post COVID monetary growth shows somewhat counter intuitive trend as both real policy rates and money growth are subsiding simultaneously. This is an indication that the sensitivity of the interest rates signals to the money growth are now somewhat reduced to some degrees at the latter part of the study period.

In general, it is seen that there are some divergences among monetary policy, output gap and inflation in Bangladesh. These variations may arise when the policy instruments are mostly focused towards short-term liquidity management alone.

3. Inflation and output gap dynamics in Bangladesh

Like any small and open economy, inflation in Bangladesh is not only a monetary phenomenon rather the supply side of the economy has a significant impact on the general price level. To conduct this analysis output gap and inflation are taken for discussion. From 1990 to 2024 the relationship between the two variables reveals a negative correlation of (–) 0.18, indicating that inflation tends to rise when the output gap is negative. This finding is somewhat counterintuitive, as conventional macroeconomic theory often suggests that higher economic growth (a positive output gap) is associated with increased inflationary pressure. For comparison, a recent study on South Africa finds a positive relationship between GDP growth and inflation, although the inflationary impact of growth shocks diminishes when inflation is already low (Ndou & Gumata, 2024). The Figure 4 below illustrates this inverse relationship between inflation and the output gap in Bangladesh.

Figure 4: Output Gap and Inflation (1990-2024)



As shown, inflation in Bangladesh tends to decline when output exceeds its potential and rises when output falls below the natural level. This pattern is especially evident in 2024, when inflation surged during a period of negative output gap. Similarly, the Phillips Curve relationship between inflation and unemployment appears weak in the context of Bangladesh. While A. W. Phillips (1958) first demonstrated an inverse relationship between inflation and unemployment in the UK, later studies in the U.S. by Samuelson and Solow supported the same finding. However, Friedman and Phelps in the late 1960s argued that the trade-off between inflation and unemployment would eventually disappear as expectations adjust. Recent empirical research in Bangladesh also challenges the Phillips Curve hypothesis. Ruhia et al. (2024), using data from 1991 to 2022, find no significant relationship between inflation and unemployment. Instead, they report a strong positive correlation between money supply growth and inflation.

The concept of the non-accelerating inflation rate of unemployment (NAIRU) is critical to this discussion. Blanchard (2021) explains that when unemployment falls below NAIRU, inflation rises, and vice versa. Gondal et al. (2014), in a panel data analysis of five SAARC countries covering the period 1971 to 2012, estimate Bangladesh's NAIRU to be 7.85 percent. They argue that if unemployment remains below this threshold, wage pressures intensify, contributing to inflation. Conversely, if unemployment exceeds the NAIRU despite positive output, slack in the labor market results in subdued inflation. These findings suggest that labor market conditions significantly influence inflationary dynamics and highlight the importance of job-creating policies to maintain supply-side stability.

Persistent supply-side disruptions are widely recognized as a key driver of recent inflation in Bangladesh. The Monetary Policy Statement 2025 identifies prolonged disruptions and market inefficiencies as critical contributors to inflation (MTMPS, 2025). Events such as the COVID-19 pandemic, the Russia–Ukraine war, and global food price volatility have amplified these challenges. However, inflation began to moderate in late 2024 due to a tighter monetary stance, stabilization efforts, and improvements in supply chain operations.

Hossain et al. (2025), using monthly data from 2018 to 2024, find that both short- and long-term inflation in Bangladesh are influenced by exchange rates, import volumes, global food prices, and consumer expectations—consistent with demand-pull and cost-push inflation theories. Given the country's dependency on food imports, inflation is especially sensitive to exchange rate volatility and food availability perceptions. Alam (2015) used a structural vector autoregression (SVAR) model to illustrate that monetary policy tools in Bangladesh—such as repo, reverse repo, CRR, SLR, and the call money rate—have limited effectiveness in curbing inflation due to structural inefficiencies. These include underdeveloped financial markets, high government borrowing, and reliance on microcredit. Moreover, the CPI inflation index may be distorted due to its heavier weighting on rural consumption and food items, particularly rice, as noted by Rahman et al. (2009).

Roy et al. (2023) report that policy interest rates have limited transmission effects on large-scale industries and small enterprises. Large firms are more responsive to exchange rate dynamics, while smaller businesses are less reliant on formal bank credit. These findings reinforce the idea that supply-side shocks have a more dominant influence on inflation in Bangladesh than interest rate policies. In early 2025, the government introduced tariff cuts and import facilitation measures during Ramadan to ease inflationary pressure—demonstrating that supply-side policies can have an immediate disinflationary effect. Some economists argue that monetary policy alone is insufficient to contain inflation in Bangladesh. While high policy rates may temporarily suppress demand, long-term inflation control requires structural reforms to improve supply chain efficiency and reduce market distortions (Khatun, 2024). Experts emphasize on addressing market syndication, improving value chains, and enforcing regulatory measures are crucial (BonikBarta, 2025).

4. Modeling

Based on the discussion above, this section provides a generic modeling framework where the interactions of the variables can be analyzed in the specific context of Bangladesh economy. To accomplish that a brief theoretical discussion is given, and after that the model specification is

provided. Then the identification strategy is presented followed by an elaboration on data and descriptive statistics.

4.1 Theoretical construction

In shaping the policy framework for economic stability and growth, the interaction between key macroeconomic variables such as output gap, inflation, and real interest rates are significant. Output gap signifies the extent of over or underperformance of the economy. While inflation in the economy shows price stability which may stem either from output shocks or monetary shocks in the economy. The real interest rates, on the other hand, are the reaction functions of the central bank to keep the economy aligned with the policy priorities. The interactions of these variables are important for achieving long-term growth and stability, which eventually are the principal objectives of any monetary policy undertaking. To explore the dynamic relationships between output gap, inflation and real interest rates, this study uses a Structural Vector Autoregression (SVAR) model. SVAR has a large empirical literature where understanding the effectiveness of monetary policy shocks is discussed at lengths (Bernanke & Mihov, 1998; Gerlach & Smets, 1995; Sims, 1992). To leverage from this econometric process, this study combines these endogenous variables to identify how they interact in a dynamic environment. As the combination of a typical economic relationship in a dynamic simultaneous equation model becomes difficult for identification, the class of SVAR modeling helps avoid those problems by imposing certain identifying restrictions with appropriate theoretical supports (Sims, 1980). This modeling allows to study both contemporaneous and lagged relationships among variables. By imposing restrictions on the contemporaneous structure, one can identify shocks and trace their effects over time through the lag dynamics of the system.

4.2 Model specification

In this exercise a New Keynesian approach of macroeconomic modeling is constructed, where a set of three equations consisting of an aggregate demand curve (AD), an aggregate supply curve (AS) and a Monetary Policy (MP) rule are brought together to construct the macroeconomic

foundation for Bangladesh economy. The underlying assumption in sequencing the variables in the data vector $[x_t]$ shows that output gap $[y_t]$ is not contemporaneously affected by real interest rates $[r_t]$; and inflation $[p_t]$ can react to output gap, but not to the real interest rate shocks instantly. Finally, real interest rates respond immediately to both the output gap and inflation.

The data series is in the following 3×1 vector:

$$x_t = [y_t \quad p_t \quad r_t]'$$

In equation (1), A is a 3×3 matrix of contemporaneous impact coefficients with one along the diagonal, μ is a 3×1 vector of intercepts, $B_j,\ j = 1,2,3 \ldots q,$ is a 3×3 is a matrix of autoregressive coefficients, and ε_t is a 3×1 vector of serially and mutually uncorrelated structural noises. This structural specification implies that the impact of an exogenous shock can be identified by the shocks to the vector ε_t.

$$Ax_t = \mu + \sum_{j=1}^{q} B_j\, x_{t-j} + \varepsilon_t \quad \text{---------- (1)}$$

The equation (2) is a demand equation where output gap is shown as a recursive process where only the lag variables of the $[x_t]$ vector determine the current output gap $[y_t]$ in the system.

$$y_t = \mu^{(1)} + \sum_{j=1}^{q} B_j^{(1)}\, x_{t-j} + \varepsilon_t{}^{ad} \quad \text{---------- (2)}$$

The equation (3) is a Philips Curve for supply side economy where inflation is determined by output gap and past lag values of the endogenous variables $[x_t]$ in the system.

$$p_t = \mu^{(2)} + \alpha_{py} y_t + \sum_{j=1}^{q} B_j^{(2)}\, x_{t-j} + \varepsilon_t{}^{as} \quad \text{---------- (3)}$$

Equation (4) is a modified Taylor Rule, generally used by the Central Banks to set policy rates in response to the changes in inflation and output gap.

$$r_t = \mu^{(3)} + \alpha_{ry} y_t + \alpha_{rp}\, p_t + \sum_{j=1}^{q} B_j^{(3)}\, x_{t-j} + \varepsilon_t{}^{tr} \quad \text{----- (4)}$$

This rule was first introduced by economist John B. Taylor in 1993. The idea here is that when inflation rises above target and output gap is positive the Central Bank should lower interest rates and vice versa. This rule-based system is systematic and transparent which allows both price stability and economic growth at the same time. The specification

indicates here that the current real interest rates are determined by output gap, inflations and other lag endogenous variables of the system.

4.3 Model Identification

To identify the structural model, cross-equation restrictions are imposed in the upper triangle of A matrix of the equation (1). Based on the economic reality, it can be assumed that price levels do not impact the supply of output in the same year, which implies that price signals transmit to the goods markets with lag effects. For similar reasoning the interest rates signal of the Central Bank is assumed to be impacted with only lags as well. The underlying assumption here is that current demand can be impacted by previous level of income. Because of these restrictions, inflation and real interest rates will not be able to impact output gap contemporaneously. Similarly, real policy rates will not be able to impact inflation in the same year. Based on these assumptions, the model identification by imposing restriction can be summarized as follows:

a) $\alpha_{12} = 0$, Inflation cannot impact output gap contemporaneously;

b) $\alpha_{13} = 0$, Real interest rates cannot impact on output gap contemporaneously;

c) $\alpha_{23} = 0$, Real interest rates cannot impact inflation contemporaneously;

d) $\alpha_{21} = \alpha_{py}$, Output gap can impact inflation contemporaneously;

e) $\alpha_{31} = \alpha_{ry}$, *Output gap can impact real interest rates contemporan*eously;

f) $\alpha_{32} = \alpha_{rp}$, Inflation can impact real interest rates contemporaneously;

After imposing the above restrictions and specifications, the A matrix is transformed as below:

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \alpha_{py} & 1 & 0 \\ \alpha_{ry} & \alpha_{rp} & 1 \end{bmatrix}$$

The contemporaneous coefficient α_{py} indicates the impact of output gap on inflation on the economy in the same year. According to Philps Curve

a positive output gap brings about higher inflations in the economy and a negative one induces lower inflation, which indicates the sign of the coefficient is expected to be a positive one. Similarly, the contemporaneous coefficients α_{ry} and α_{rp} are for impact of output gap and inflation on real interest rates respectively. If the response of monetary policy is contractionary to a positive output gap, then the sign of α_{ry} will be positive or vice versa. In this case the policy signal from the real economy may come from the targeted output growth in the economy along with other determining factors. In the same note, if the reaction of monetary policy to higher inflation is elevated interest rates, then the sign of α_{rp} will be positive. In this case inflation targeting of that economy will determine the nature of the coefficient.

The structural shock of the equation (1), ε_t is a 3×1 vector where individual shock for each equation can be identified separately.

$$\varepsilon_t = [{\varepsilon_t}^{ad} \quad {\varepsilon_t}^{as} \quad {\varepsilon_t}^{tr}]'$$

Even after imposing restrictions on the structural equation (1), the identification is not possible until the equation is converted back to reduced form. The equation (5) is a representation of reduced form, where the inverse of the *A* matrix of equation (1) is factored into all the components of the right-hand side of the equation.

$$x_t = A^{-1}\mu + \sum_{j=1}^{q} A^{-1}B_j\, x_{t-j} + A^{-1}\varepsilon_t \text{ ---------- } (5)$$

Now the equation (5) can be re-written as reduced form as equation (6), which can be estimated easily.

$$x_t = v + \sum_{j=1}^{q} \varphi_t\, x_{t-j} + \delta_t \text{ ---------- } (6)$$

$$\text{Here, } v = A^{-1}\mu, \varphi_t = A^{-1}B_j, \delta_t = A^{-1}\varepsilon_t$$

In such specification, the impact of any structural shock coming from outside the system through the ε_t vector can be isolated by estimating the reduced form of equation (6). To accomplish that Impulse Response Functions (IRFs) are generally used for dynamic evaluation of the shock's propagation in response to impulse of the other variables in the system. Specification testing with model stability and variance decomposition are shown in the Appendix.

4.4 Data

This study uses a set of macroeconomic data from 1990 to 2024 from multiple sources, including the Bangladesh Bureau of Statistics (BBS), Bangladesh Bank and the World Bank's World Development Indicators (WDI). The inflation data are taken from the point-to-point Consumer Price Index (CPI), computed monthly by the BBS, which is converted to a 12-month average to represent yearly CPI movement. BBS recently introduced a new base year: 2021–22 = 100, replacing the previous base of 2015–16. This update was made for a better assessment of current consumption patterns, rural-urban shifts, the composition of economic growth, and changes in household expenditure behavior. During the study period, the average inflation rate was 6.37 with standard deviation of 2.29.

In addition to inflation, data on real output and capital formation are also taken from the National Income Accounts of the BBS to compute the output gap for this study. Since the base years were changed on three times during the study period, the data have been re-based using the most recent base year of 2015–16. This harmonization facilitates accurate calculation of potential output and output gap estimates utilizing the Cobb–Douglas production function and Hodrick–Prescott (HP) filter. Throughout the study period, a steady growth of both real GDP and investment was observed. As the BBS does not produce yearly labor data, these data are taken from the World Bank's World Development Indicators (WDI) database for this study. The trend in labor force participation in Bangladesh is seen to be increasing during this period.

The interest rates are sourced from the policy rates of Bangladesh Bank (including bank rates, repo rates, etc.). During the study period, the policy rates remained relatively stable, with a slight increase following the COVID-19 pandemic. The policy rates generally ranged from 6 percent to 7 percent with 1.31 standard deviation. Real interest rates are computed by adjusting the Central Bank's policy rates with corresponding CPI inflation rates. This study also uses the growth of broad money (M2) in the economy, which is taken from Bangladesh Bank. The output gap is calculated by the authors using relevant variables from Table 1.

Table 1: Descriptive statistics

Variables (from 1990 to 2024)	Mean	ST. DV
Real output (million BDT)[a]	14,683,738	8,356,332
Capital formation (million BDT)[a]	4091799.73	3076725.59
Labor (million)[b]	54.92	11.90
Output gap (%)[d]	-0.003	0.78
Inflation (CPI) (12-month average)[a]	6.37	2.29
Policy rates (%)[c]	6.93	1.31
Broad money growth (M2) (%)[c]	14.33	3.70
Real policy rates (%)[d]	0.56	2.51

Sources: *a: Bangladesh Bureau of Statistics, b: World Development Indicators (WDI), c: Bangladesh Bank, d: Authors' calculation*

5. Estimations and results

Based on the theoretical construction, model specification, identification strategy and data, the following sections provide empirical estimation of the Structural Vector Autoregression (SVAR) system with model fitting for Bangladesh economy. Along with other macro variables, this study incorporates output gap data in the SVAR estimation. As this data is not available in the public domain, this study estimates output gap for Bangladesh economy.

5.1 Output gap estimation

This study estimates output gap for Bangladesh where different factors of production are brought together to compute the economic output. Three types of production factors are considered, namely, physical capital, human labor and human capital. Physical capital includes buildings, machinery and equipment, usable natural resources; employment includes labor force and labor force participation rate; and human capital includes knowledge and skills of the labor force widely known as Total Factor Productivity (TFP). TFP is the amount of technical "know-how" available, and the economic structure determine how efficiently capital and labor are used to produce goods and services. Potential output

growth depends on the long-term developments of the factors of production.

In this study, output gap for Bangladesh is estimated by Cobb-Douglas production function approach as follows:

$Y_t = A_t \cdot K_t^{\alpha} \cdot L_t^{1-\alpha}$ ---------- (7)

After log transformation:

$ln\, Y_t = ln\, A_t + \alpha\, ln\, K_t + (1-\alpha)\, ln\, L_t$ ---------- *(8)*

Here,

- $0 < \alpha < 1$ is output elasticity of capital or capital share of the income;
- Similarly, $(1-\alpha)$ is the output elasticity of labor or labor share of the income;

The assumption here is that since capital and labor share of income is unity $[\alpha + (1-\alpha) = 1]$, the economy has constant returns to scale meaning doubling capital and labor doubles the output. With perfect competition, the share of national income that accrues to capital should equal α and the share for labor should equal $(1-\alpha)$. The estimation of capital stock in the economy is done by perpetual inventory method where an estimate of the capital stock (K) in a given initial year assumed, and subsequently the capital stock series builds up from that date with additional investment each year as shown below:

$$K_t = (1-\delta)K_{t-1} + I_t \text{ ---------- } (9)$$

Here:

I_t, is investment in year t

δ, is a depreciation rate in the economy

For estimating labor inputs in the production function, an approximation of actual and active labor force is essential. There are three possible ways to do that which may be estimated from the working age population or from the labor force participation rates or total work hours by the working age population. In this study the first approach is adopted where the working age population is estimated to be from 14 to 60 years from the World Development Indicators (WDI).

The third factor of the production function is TFP, also known as Solow residual, calculated from equation (7) as follow:

$$A_t = \left[\frac{Y_t}{L_t^{1-\alpha}.K_t^{\alpha}}\right] \text{---------- (10)}$$

After identifying the constituent elements of the production function, the individual ingredients are then transformed into log function and pass them through under HP-Filter to separate the trend and stochastic components of each variable. Then the de-trend variables are transformed back to level from log, which eventually become potential variables of the corresponding ones. Subsequently, with the potential elements of the production function potential output is computed from the following equation:

$$Y_t^* = A_t^*.K_t^{*\alpha}.L_t^{*(1-\alpha)} \text{---------- (11)}$$

Where, Y_t^* is potential output, A_t^* is potential TFP, K_t^* is potential capita and L_t^* is potential labor. The indices α and $(1-\alpha)$ are potential capital and labor share of the output respectively.

Finally, the output gap is calculated as:

$$Y_t^{OG} = \left[\frac{Y_t}{Y_t^*} - 1\right] \times 100\ \% \text{---------- (12)}$$

For computing output gap for Bangladesh as above, the following assumptions are taken:

i) In 1991 Capital-Output (K/Y) ratio was 2.06;

ii) Capital depreciation per year is, $\delta = 5\%$*;*

iii) In computing the Total Factor Productivity (TFP) by Cobb-Douglas equation capital share of output is, $\alpha = 0.5$ and labor share of output is, $(1-\alpha) = 0.5$ *;*

5.2 Model estimation

Estimation of A-matrix

The SVAR specification assumed that the output gap is the most exogenous in the short run, meaning it is not contemporaneously affected by inflation or interest rate shocks (at least within the same period).

Inflation is partly endogenous as it can contemporaneously respond to shocks in output gap, but not yet to interest rate within the same period. The interest rate is the most endogenous because it can contemporaneously react to both output gap and inflation shocks. The variables are tested with Augmented Dickey Fuller (ADF) and Phillips–Perron (PP) tests and found them to be stationary in level. The VAR stability is also tested and found that all the roots are less than one indicating a stable system. The estimates of the SVAR as specified above are as follows:

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \alpha_{py} & 1 & 0 \\ \alpha_{ry} & \alpha_{rp} & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 \\ .24(.17) & 1 & 0 \\ -.03(.18) & 1.1(.17) & 1 \end{bmatrix}$$

Note: Standard Errors are in parenthesis ($p < .001$***, $p < .05$**, $p < .1$*)

The estimation of the supply side of the economy shows that a positive shock in the output gap on average will in turn increase inflation contemporaneously. This indicates that economic growth also comes up with inflationary pressure in the economy which supports the classical Philips Curve relationship. Although looking at the linear progression of the two variables in Figure 4 of section 3 does not provide enough evidence in favor to this obvious relationship, the estimation of the structural equations decuples the influences of other variables on inflation in this analysis. Regarding the statistical significance level (0.17) of the estimates, the fact may need to be considered that the sample size of the data is only 35 years' observation.

The estimation of the monetary policy equation (Taylor Rule) shows the probable relationship between real interest rates and inflation on average. According to the estimation, a positive shock to inflation leads to a positive reaction on average from monetary authority. This is to notice that the average positive reaction does not indicate how quickly the reaction is taken along the period. The reaction time of such an action can be traced by the impulse response functions (IRFs) discussed afterwards. The second structural parameter of the Taylor Rule is the monetary reaction of the central bank to the output gap in Bangladesh. Like the relationship of these two variables shown in Figure 2 in section 2, there is little relationship revealed during their co-movement which is

supported by a very small coefficient size (-.03). The negative sign here indicates a positive output shock leads to decrease in real policy rates indicating a procyclical nature of policy undertaking.

IRFs of contemporaneous coefficients

The major shortcomings of analyzing the elements of the contemporaneous coefficient matrix (A-matrix) are that they provide an average impact of the variables under consideration but hide the true nature of the relationship and how they behave in the medium to long term. Therefore, it is crucial to discuss the impulse response functions (IRFs) which can answer these questions in an instructive way. The relationship between the output gap and inflation as shows in Figure 5(D) indicates that the impulse of output shock in Bangladesh produces a very minor reaction to inflation along the medium-term. Although the initial reaction started with a reduction in inflation, it ends up being positive after around two years' time. This gives an indication that the inflations in Bangladesh in general is not a supply side issue so long as the volume of supply is concerned. Although it is possible that the distribution in the supply side may cause variation in inflation, the scope of the study will not allow to analyze that claim.

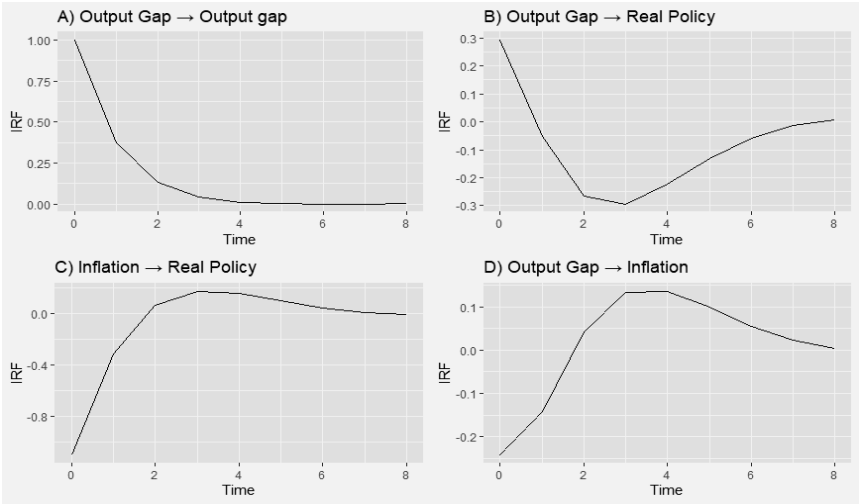
Turning to the demand side of the model, it is seen that identification restrictions are imposed on the aggregate demand (AD) equation in such a way that both inflation and real policy rates cannot impact the output gap contemporaneously. Therefore, the AD equation becomes an autoregressive (AR) process where its own lags impact recursively. The impulse response for a positive AD shock shows a self-reinforcing dynamic loop, which stays elevated for medium to long term (Figure 5A). This persistence suggests that the initial stimulation in demand is not just a sudden effect to the economy rather the feedback loops create this lasting impact in the economy. These shocks may arise from unexpected fiscal stimulus, increase in consumer confidence, or windfall endowments of natural resources. The smooth propagation of the of the demand shock for Bangladesh also implies a resilient economy with a sustained increase in growth.

From the discussion of supply and demand sides of Bangladesh economy from above, it is evident that the demand side is more sensitive towards

outside shocks compared to supply side. This may be because output gap has very little influence over inflation in Bangladesh economy. In this situation the inflationary events in Bangladesh are needed to be explained mostly by monetary policy of the central bank. As such, the Taylor principle becomes relevant in explaining the influence of economic growth and domestic price level movements on the policy undertaking by the Central Bank. As discussed in section 2, the transmission of monetary policy through money supply (M2) to the economy requires some time which eventually may impede the policy objectives. In such cases, a very quick or preferably preemptive monetary policy reaction is important. To achieve that a counter cyclical monetary policy may make sure that the economy falls back on to the medium-to- long-term potential output trajectory by minimizing any positive or negative output gaps. The policy reaction of the central bank of Bangladesh due to an inflation shock can be observed from Figure 5C, which displays that a positive inflation shock eventually leads to an expansionary monetary policy stance for around there years before reaching into a positive real policy rates territory. One of the explanations for the counterintuitive monetary policy undertaking during such cases is that due to inflation adjustment, the real policy rates become negative when the economy faces high inflation. Another explanation maybe that the Central Bank is not very aggressive in response to inflation due to other economic reasons.

The policy reaction of the central bank to a positive output shock is another important area of discussion for Taylor principle of monetary policy. The impulse response function here shows that with a positive output shock; the central bank temporarily reacts with slight positive policy rates before falling back to the negative real policy rates territory for medium-to-long term (Figure-5B). In this case, the policy stance for a positive output shock allows the economy to run above potential instead of bringing it back to potential output trends. The adverse consequence of such a stance is that large credit accumulation, wasteful investment proposition and inefficient usage of resources.

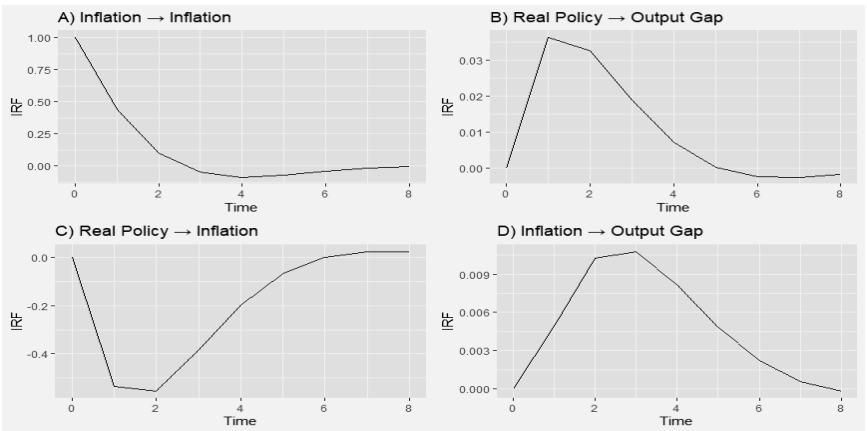
Figure 5: SVAR Impulse Response (Contemporaneous)



IRFs of lag coefficients

Due to identification restrictions, the contemporaneous impulse response from inflation and policy rates to output gap could not be assessed. However, the impulse response of the lags of these variables can be evaluated. It is seen from Figure 6D that like the contemporaneous impact of output gap on inflation, a positive shock to the lags of inflation has little or no impact on the output gap. This again implies that inflation in Bangladesh is not a supply side phenomenon or at least not related to the volume of production in the economy.

Figure 6: SVAR Impulse Response (Lag dynamics)



Now to see how the past policy action impacts the real economy, it is observed that positive policy shocks do not subdue output rather than the impulse response shows a slight increment in the output which remains in the positive territory in the periods ahead (Figure 6B). This remind the possibility that the vast portion of the GDP is not directly connection to the formal financial system of Bangladesh demanding greater role of financial inclusion. One of the most important findings, however, from the impulse of the past real policy rates is that higher policy rates lead to decrease inflation substantially in the medium term (Figure 6C). This is also an indication that the transmission of monetary policy may take some time before actual results are produced.

6. Discussion and policy

Monetary policy in Bangladesh operates through a comprehensive framework combining policy rates with regulatory and prudential guidelines, including reserve requirements, liquidity facilities, targeted credit programs, refinancing schemes, and open market operations. The analysis reveals that policy rate responses by the central bank, based on prevailing consumer price levels, exhibit significant transmission lags in the real economy. This finding aligns with empirical evidence showing that aggregate supply shocks impact price levels sluggishly, indicating substantial price rigidity in the Phillips Curve relationship. The delayed adjustment mechanism suggests that preemptive monetary policy actions can effectively reduce inflationary pressures over the medium term, as demonstrated by the impulse response functions in the structural model. It is seen, anecdotally, that the high inflationary pressure started after COVID pandemic in Bangladesh has been slowed down in early part of the year 2025 by a decision taken for an increment of policy rates back in 2024.

Another significant insight from the study is the weak responsiveness of prices to fluctuations in real output, which appears to challenge the efficient market hypothesis. The analysis indicates that variations in output volume do not produce predictable inflationary trends. Moreover, inflation shocks do not significantly affect production in subsequent periods. These findings suggest a structural market segmentation between the supply and demand sides of the economy. Producers may face price discrimination or encounter market access challenges in the

absence of supportive input pricing mechanisms. To address these issues, government interventions have included enhancing storage infrastructure, expanding food subsidy programs, and ensuring minimum support prices for agricultural producers (FPMU, 2021). Additionally, measures such as subsidized fertilizer distribution aim to reduce input costs and ease supply-side constraints. Infrastructure development is supported by expedited fertilizer import subsidies, where the government absorbs a significant portion of the subsidy cost on urea imports, ensuring that farmer prices remain affordable despite rising import costs. This integrated policy framework represents approximately 1.43 percent of GDP in FY2025-26 (MOF, 2025).

While monetary policy, particularly real policy rates adjustment, plays a role in inflation management, it must be complemented by strategies that foster employment generation. Elevated interest rates may deter private investment, leading to adverse effects on economic growth. Therefore, policy initiatives that incentivize investment i.e., income tax relief, duty-free importation of capital machinery, improved port logistics, and streamlined public service delivery for businesses, need to be prioritized. Recent reforms, such as the adoption of a floating exchange rate in April 2025, have so far stabilized foreign exchange markets and enhanced investor confidence. To further encourage foreign direct investment, policies ensuring profit repatriation and regulatory predictability are necessary. Given Bangladesh's large working-age population, job creation remains an essential pillar for building economic resilience and inclusive growth which eventually will bring the price levels to a sustainable zone.

However, the analysis reveals significant disconnects in monetary transmission mechanism of Bangladesh, which explain the persistent expansion of the M2 money supply without corresponding output gains. Over the period from 1990 to 2024, M2 growth averaged 14 percentage points annually, while the output gap remained virtually unchanged at (-)0.06 percentage point. This indicates an inefficacy in the traditional money-output relationship. Contributing factors include sluggish aggregate supply shock impacts on price levels, reflecting substantial price rigidity within the Phillips Curve, which limits the economy's responsiveness to monetary policy. Additionally, banking sector inefficiencies, with non-performing loans accounting for around 38

percentage points of total financial assets, create liquidity traps where increased money supply fails to flow into productive lending. Furthermore, the implementation of interest rate caps from April 2020 to May 2024 undermined the transmission mechanisms, fostering artificial credit expansion without productive investment. The reliance on discretionary liquidity management rather than systematic interest rate policies has highlighted the need for comprehensive structural reforms to restore effective transmission channels and ensure that monetary policy can drive sustainable economic growth.

Overall, the findings of this study underscore the potential benefits of incorporating inflation and output gap targeting into the monetary policy framework. The observed procyclicality of policy responses may stem from institutional lags or delayed decision-making. Incorporating rule-based frameworks—such as Taylor's Rule—could enhance the responsiveness and consistency of monetary policy. Aligning policy instruments with inflation trends and output dynamics may yield more effective outcomes. However, the efficacy of such policies hinges on deeper financial inclusion, accurate GDP measurement, and a conducive business environment. Moreover, policy formulation must adopt a dual focus on both aggregate supply and demand dynamics to ensure macroeconomic stability and sustained growth.

7. Conclusion

The paper started with an analysis of the Central Bank's monetary policy undertaking to assess whether it follows Taylor principle or any other rules while setting policy rates. To understand the supply side of the economy, a historical evaluation of inflation and output gap is conducted to see the pattern in the data ranging from 1990 to 2024. For this analysis, the computation of output gap was conducted by classical production function and HP filtering method. With the help of a New Keynesian approach consisting of output gap, inflation and real policy rates, SVAR modeling was conducted to find the dynamic nature of the relationships among the variables. The estimates along with the impulse response functions (IRFs) provide evidences that positive demand shocks reinforce a feedback loop in the economy making smooth absorption of the shocks over the medium-term. The supply side, however, shows sufficient price rigidity indicating that inflation in Bangladesh is not

primarily caused by production volume but instead by shortcomings in the functioning of efficient market mechanisms. Regarding the monetary policy reaction of the Central Bank, the analysis shows that during high inflation, the real policy rates were very lenient and slow in responding. To validate the effectiveness of the stringent policy stance during high inflation, the past positive shocks from real policy rates adoption show an improvement in inflation for the medium-term. The analysis may help adopting the Central Bank of Bangladesh a rule based monetary policy.

References

ADB. (2009). Asian Development Outlook 2009 Update: Broadening Openness for a Resilient Asia.

Afrin, S. (2017). Monetary policy transmission in Bangladesh: Exploring the lending channel. *Journal of Asian Economics*, *49*, 60-80.

Ahmed, H. A. (2007). Bangladesh bank reform: changes and challenges.

Ahmed, M. N., & Chowdhury, M. I. (2007). Non-bank financial institutions in Bangladesh: An analytical review. *Policy Analysis Unit, Bangladesh Bank*.

Alam, M. R. (2015). Effectiveness of monetary policy in Bangladesh. *The Journal of developing areas*, *49*(2), 363-372.

Alam, S. (2016). Development Planning in Bangladesh: 7th Five Year Plan and SDG Implementation. *General Economics Division, Planning Commission, Government of the People's Republic of Bangladesh*, 3-33.

Asia, I. M. F., & Pacific Dept. (2024). Bangladesh: Technical Assistance Report-Interest Rate Corridor Adoption. *Technical Assistance Reports*, *2024*(051), A001. https://doi.org/10.5089/9798400 278181.019.A001

BangladeshBank. (2013). *Annual Report 2012–13* (Payment and Settlement Systems, Issue. https://www.bb.org.bd/pub/annual/anreport/ar1213/chap11.pdf

BangladeshBank. (2022). Impact Assessment of Interest Rate Caps and Potential Policy Options: Bangladesh Perspective.

BangladeshBank. (2024). *Monetary Policy Review 2023-24*. Bangladesh Bank Retrieved from https://www.bb.org.bd/pub/halfyearly/monetaryprev/monetary%20 policy%20review%202023-24.pdf

Barkawi, A., & Monnin, P. (2015). Monetary policy and sustainability: the case of Bangladesh. *CEP Discussion Note*, *1*.

Bernanke, B. S., & Mihov, I. (1998). Measuring monetary policy. *The Quarterly Journal of Economics*, *113*(3), 869-902.

Bhattacharya, D., & Khan, T. I. (2009). *Recent Monetary Policy Statement of Bangladesh Bank (July 2009): An Analytical Commentary*. Centre for Policy Dialogue.

Blanchard, O. (2021). MACROECONOMICS Eighth Edition Global Edition. In: Pearson Education Limited.

BonikBarta. (2025). গ্রাহক বা আমানতকারীদের স্বার্থ বিবেচনা না করা হলে ব্যাংক খাত পুরোটাই ধসে পড়বে. *BonikBarta*. https://bonikbarta.com/editorial/kaiZRlsemCxibMW7

Canton, H. (2021). International Monetary Fund—IMF. In *The Europa Directory of International Organizations 2021* (pp. 342-350). Routledge.

Choudhury, T. A., & Raihan, A. (2000). Structural adjustment participatory review initiative Bangladesh, study theme 2 (C): implications of financial sector reforms. *The World Bank, Government of Bangladesh and Civil Society*, 1-132.

Dalton, J. (2007). From Fixed to Float in Bangladesh. *Building Monetary and Financial Systems: Case Studies in Technical Assistance*, 135.

FPMU. (2021). *National Food and Nutrition Security Policy*

Plan of Action (2021-2030) Ministry of Food Retrieved from https://bnnc.portal.gov.bd/sites/default/files/files/bnnc.portal.gov.bd/policies/eed9a250_f715_4b19_819b_e99ae390042e/2022-01-09-07-20-299dd6227a2500df767582f679566f4a.pdf

Friedman, B. M. (1976). Targets, instruments, and indicators of monetary policy. *journal of Monetary Economics*, *1*(4), 443-473.

Gerlach, S., & Smets, F. (1995). The monetary transmission mechanism: evidence from the G-7 countries.

Gondal, S. A., Hussain, Z., & Khan, R. E. A. (2014). Measurement and policy implications of NAIRU in SAARC countries. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *8*(3), 867-886.

Hossain, M. R., Iqbal, M., Mia, M. M., & Hossain, M. E. Determinants of Monthly Food Inflation in Bangladesh: A Ramadan-Centric Analysis Through a Cost-Push and Demand-Pull Framework.

IDA. (1972, November 24, 1972). *$50.0 million credit for Reconstruction Program in Bangladesh* https://documents1.worldbank.org/curated/en/608831604316518870/pdf/Announcement-of-Fifty-Million-Dollars-Credit-for-Reconstruction-Program-in-Bangladesh-on-November-24-1972.pdf

Islam, M. E. (2008). Money Supply Process in Bangladesh: An Empirical Analysis. *Bangladesh Bank, Policy Analysis Unit (PAU), Working Paper Series: WP*, *805*.

Jahan, N., & Muhiuddin, K. (2020). Evaluation of banking sectors development in Bangladesh in light of financial reform. *arXiv preprint arXiv:2005.11669*.

Khatun, F. (2024). Monetary policy alone is not enough to curb inflation. *The Business Standard*. https://cpd.org.bd/monetary-policy-alone-is-not-enough-to-curb-inflation/

Maimbo, S. M., & Henriquez Gallegos, C. A. (2014). Interest rate caps around the world: still popular, but a blunt instrument. *World Bank Policy Research Working Paper*(7070).

Mishkin, F. S. (2018). Improving the use of discretion in monetary policy. *International Finance*, *21*(3), 224-238.

MOF. (2025). *National Budget Speech 2025-26*. Ministry of Finance Retrieved from https://mof.portal.gov.bd/sites/default/files/files/mof.portal.gov.bd/page/b1d603c0_0d69_4aaa_ab22_162ee52d0502/English.pdf

Mollik, A., & Bepari, M. K. (2009). Banking System in Bangladesh: Stable or Vulnerable?-A Macroprudential Assessment. *Journal of Business Administration*, *34*(3&), 4.

MTMPS. (2025). *Medium Term Macroeconomic Policy Statement FY2025-26 to FY2027-28*. Retrieved from https://mof.portal.gov.bd/sites/default/files/files/mof.portal.gov.bd/page/25c498f7_1455_4a4c_abcf_09ba184c51c6/MTMPS_2025-26_English_Final%20Print.pdf

Mujeri, M. K., & Younus, S. (2009). An analysis of interest rate spread in the banking sector in Bangladesh. *The Bangladesh Development Studies*, 1-33.

Nawaz, M. A., & Chowdhury, A. U. M. (2014). Bangladesh Bank Independence and Governance: Lessons from Reserve Bank of Australia. *Journal of Business Studies*, *35*, 209-238.

Ndou, E., & Gumata, N. (2024). Should the South African Reserve Bank lower the inflation target band? Insights from the GDP-inflation nexus. *Journal of Policy Modeling*, *46*(3), 638-654.

Rahman, M. H., Akhtaruzzaman, M., & Kashem, M. A. (2009). *Inflation in Bangladesh: Does the Changing Consumption Pattern Affect its Measurement?*

Roy, R., Bashar, O. H., & Bhattacharya, P. S. (2023). The cross-industry effects of monetary policy: New evidence from Bangladesh. *Economic Modelling*, *127*, 106479.

Ruhia, S. B., Tithia, F. A., & Ahmedb, F. (2024). The Empirical Evidence of the Phillips Curve in Bangladesh during 1991-2022: An Econometric Approach. *Available at SSRN 4700648*.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: journal of the Econometric Society*, 1-48.

Sims, C. A. (1992). Interpreting the macroeconomic time series facts: The effects of monetary policy. *European economic review*, *36*(5), 975-1000.

Taylor, J. B. (2011). Legislating a rule for monetary policy. *Cato J.*, *31*, 407.

Watanagase, T. (1990). Banks in Distress: The Case of Bangladesh.

WorldBank. (1990). *Bangladesh Review of the Experience with Policy Reforms in the 1980s*. https://documents1.worldbank.org/curated/en/575131468206036918/pdf/Bangladesh-Review-of-the-experience-with-policy-reforms-in-the-1980s.pdf

Younus, S. (2015). *Estimating growth-inflation tradeoff threshold in Bangladesh*.

Zayed, N. M. (2018). Testing Taylor's Rule to Examine Monetary Policy Regarding Bank Rate, Inflation and Output gap of Bangladesh: 1972-2016. *Academy of Accounting & Financial Studies Journal*, *22*(1).

Appendix

1. Stationarity of the variables:

Phillips-Perron Unit Root Test

Variables	Z-statistics(P-value)	Stationarity
Real Policy Rates	-22.14(0.02)	I(0)
Output Gap	-19.77(0.04)	I(0)
Consumer Prices Index (CPI)	-22.86(0.01)	I(0)

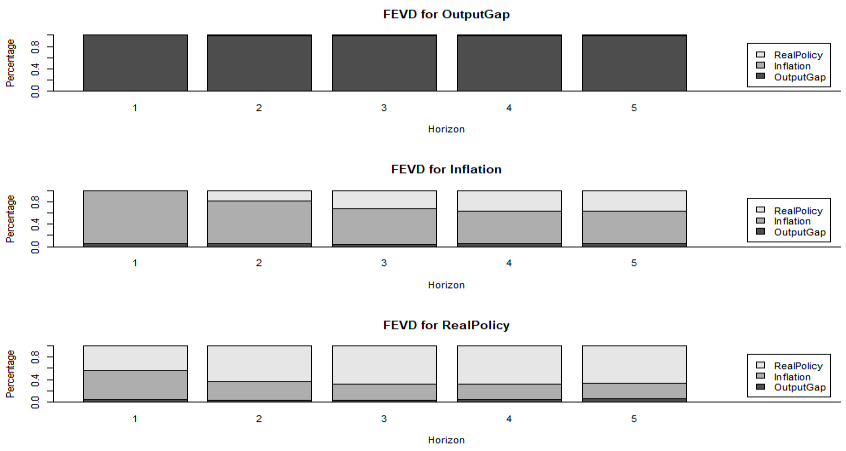
Augmented Dickey-Fuller Test

Variables	Z-statistics(P-value)	Stationarity (k=1)
Real Policy Rates	-4.26(0.01)	I(0)
Output Gap	-3.52(0.06)	I(0)
Consumer Prices Index (CPI)	-3.88(0.03)	I(0)

2. VAR Model stability:

Roots of the VAR system	Values	Stability
Root 1	0.5968147	Stable
Root 2	0.5968147	Stable
Root 3	0.3827380	Stable

3. Variance Decompositions



4. IRF of Cholesky decomposition