# Effectiveness of Monetary Policy on Inflation Control and Economic Growth in Bangladesh: A Comparison Between Reserve Requirement and Bank Rate

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*Abstract*

*The question of the monetary policy effectiveness and the choice of appropriate policy tools to control inflation and promote economic growth has been the subject of long-standing debate. This comes after highly divergent empirical results on this topic in both rich and developing nations. Particularly in emerging nations like Bangladesh, where financial markets are still in their infancy, the problem is more acute. The purpose of this study, thus, is to complement the extant literature by further assessing the efficacy of monetary policy instruments in Bangladesh. The study specifically looks into how 'bank rate' and 'reserve requirement' affect inflation and economic growth. Using data on Bangladesh from 1972 to 2021, we run a regression applying a system of two equations that takes into account the simultaneity of inflation and GDP growth. Additionally, we estimate a vector autoregressive (VAR) model to see their responsiveness to a shock in 'bank rate' and 'reserve requirement'. The study found bank rate to have a positive effect on inflation as well as GDP growth, suggesting that tight monetary policy is counter-effective in curbing inflation in Bangladesh. While the reserve requirement negatively affects GDP growth, it does not exert any impact on inflation. The findings suggest that the monetary authority should combine different policy instruments rather than relying just on one particular policy tool to concurrently achieve its dual goals of promoting economic growth and price control.*

**Keywords:** Monetary policy, reserve requirements, VAR, VEC

## 1. Introduction

Monetary policy plays a key role in many economies in addressing short-run fluctuations. An analysis of effectiveness of monetary policy by changing its instruments is crucial to comprehend how monetary policy instruments support in achieving the goals of a central bank. The basic objective of monetary policy is to promote sustainable growth while preserving price stability. In order to decide on the appropriate monetary policy tools, it is essential for the monetary authorities to comprehend

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when and how their policy-induced changes in monetary variables affect aggregate output and inflation through different channels (Mishkin,1996).

While monetary policy aims at closing the output gap and curbing inflation, the challenges for developing countries differ from those facing advanced economies. In Bangladesh, monetary policy usually works in a weak monetary transmission channel (Huh and Lee, 2021). In addition, Bangladesh's financial markets have some intrinsic characteristics, such as coexistence of conventional and Islamic banking systems, poor governance, an underdeveloped capital market, and direct government control. With some limitations, monetary policy strategy of Bangladesh has historically focused on both conventional and unconventional methods to achieve the goals of price stability and higher growth.

The Bangladesh Bank, the country's central bank, is the monetary authority of the country which is responsible for formulating and implementing monetary policy. According to the Bangladesh Bank Order (1972), the three major goals of monetary policy are to (i) maintain price stability; (ii) secure a stable position in balance of payments and uphold the competitiveness of domestic currency against foreign currency; and (iii) enhance output and employment to achieve sustained economic growth.

During the 1970s and 1980s, the Bangladesh Bank's monetary policy was administered through directly controlling the interest rates and exchange rates (Hossain, 2010). Moreover, Bangladesh Bank actively managed the flow and volume of credit during that period. Bangladesh Bank had an active control over the volume and direction of credit flows. In the late 1990s and early 2000s, extensive reforms had been made. Following the Financial Sector Reform Program in the 1990s supported by International Monetary Fund (IMF), the framework of monetary policy was mostly formed on the market-based policy instruments by the Bangladesh Bank. The purpose of this revised framework is to influence the relevant target variables through supply and demand tools. Bangladesh Bank can adjust market-oriented direct instruments (bank rate, CRR, and SLR) and indirect instruments (repo, reverse repo agreements, and Treasury bill auctions) to affect the credit and money supply even though it has no direct control over either. For example, a decrease in reserve requirement introduces money into the system through increase in availability of credit and decrease in rate of interest. An increase in bank rate – the lending rate to commercial banks – reduces overall cash flow of the money market and results in decline in output growth.

The Bangladesh Bank currently aligns its effective monetary policy strategy with attaining the major goal of controlling inflation with the highest possible sustained growth in output. To attaining these goals, it is crucial to explore which policy variables in Bangladesh could serve as effective instruments of monetary policy. This study uses reserve requirement and bank rate as policy instruments to achieve the two objectives of monetary policy, namely price stability and sustained economic growth. Hence, this research seeks to answer the question: "How effective are the monetary policy instruments of Bangladesh Bank (the bank rate, the reserve requirement) in achieving the monetary policy objectives?" Following the literature on this topic, however, the study controls for few more factors to assess the strength of the relationship between the policy instruments and the target variables (inflation and GDP growth).

The paper is organized as follows. Following the introduction, the second Section presents a survey of literature and the third Section outlines the goals of the study. The methodology is described in Section 4, and Section 5 discusses the empirical findings. Finally, Section 6 concludes the paper, which also makes some policy recommendations.

## 2. Review of Literature

Although the Bangladesh Bank frequently conducts monetary policy as a mechanism for stabilizing the economy, there is a paucity of literature regarding the effectiveness of monetary policy with reference to its policy instruments in Bangladesh. A small number of research, basically accomplished by the Bangladesh Bank personnel, has largely emphasized on the transmission mechanism and the monetary policy's effectiveness in general (Ahmed and Islam, 2004; Rahman, 2005; Islam, 2008; Kayum, 2016). A study by Ahmed and Islam (2004) examining the influence of reserve money shock on output and price levels from 1979 to 2005 found no significant effect of monetary policy on these variables. According to research conducted by Chowdhury et al. (1995) covering 1974–1992, contractionary monetary policy is followed by a decline in aggregate output.

Treasury bill is another policy instrument in affecting GDP, inflation, and exchange rate. For instance, the value of the Bangladeshi currency rises, and aggregate output falls when the interest rate on the three-month Treasury bills suddenly rises (Alam, 2015). In fact, both the money

supply and the policy rate significantly affect the economic growth and inflation in Bangladesh (Younus, 2017).

However, Goswami and Ahmed (2017) found inflation to be considerably affected by inflation expectations but marginally by changes in money supply. Policy variables (i.e. bank credit and currency rate) were found to be significantly correlated with GDP and inflation in Afrin (2017), who employed the Structural Vector Autoregression (SVAR) method to analyze monthly data from 2003 to 2014.

It is not always the case that every monetary policy tool works the same way in every nation. In different nation, different policy tools work well. For example, applying vector error correction model (VECM) and impulse response functions (IRFs) for India, Bhattacharya et al. (2011) found interest rate (a policy rate) hikes having no direct impact on GDP. But, as India's interest rate increased, the exchange rate appreciates. They also explored that a rising exchange rate lowers the level of prices in general. Similar evidence has also been discovered in an additional research in India (Ghosh & Rajan, 2007). According to Kapur and Behera (2012), interest rates (policy rates) have been demonstrated to be important in determining prices and output growth.

There could also be interactions between policy variables. The nominal interest rate may be affected by the way reserve requirements influence banks' portfolio decision. The manner in which reserve requirements impact banks' portfolio decisions may have an impact on the nominal interest rate (Gomis-Porqueras, 2002). A decline in reserve requirements might cause an increase in loans, which could ultimately result in higher level of production. Similar evidence has also been found for China for 2002–2017 period (Friedman and Kuttner, 2010). Further, the tools that affect money supply would also affect economic activity.

According to Kashyap and Stein (1994), monetary instruments operate as a transmission mechanism for central bank operations that aim to achieve non-inflationary growth. Taylor (1995) and Belke and Klose (2011) assert that changes in real GDP and inflation are a result of monetary policy transmission mechanism.

There could be an intense debate on the relative effectiveness of varying the reserve requirement and bank rate to achieve the two main objectives of price stability and sustainable growth. It is crucial for the Bangladesh Bank policy makers to know a shock to a policy instrument (i.e. reserve

requirement or bank rate) on these intended outcomes for successful conduction of monetary policy. However, to the best of the researchers' knowledge to date, there is no such comprehensive study accomplished in the context of Bangladesh or elsewhere. Moreover, the studies reviewed in this paper fail to include enough recent data, and have not applied VAR and IRFs in the Bangladesh context. An endeavor of the researchers is to overcome these shortcomings answering our research question: How does an increase in bank rate or reserve requirement affect price level and GDP growth? To come up with a more perspicuous scenario on it, the study uses different econometric techniques, such as the simultaneous equation technique, VAR, and IRFs.

## 3. Objectives of the Study

The study's main goal is to assess how Bangladesh's monetary policy performs in controlling inflation and fostering economic growth. This study aims at specifically:

- assessing the relative efficiency of Bangladesh's bank rates and reserve requirements;

- determining the impact of bank rate and reserve requirement innovations on price stability and GDP growth in Bangladesh;

- suggesting policy makers and stakeholders so that they can attempt to formulate appropriate policies.

## 4. Methodology

### 4.1 Data

In this study, we investigate how the instruments of monetary policy in Bangladesh – the bank rate and the reserve requirement – affect price stability and GDP growth. For the regression analysis, the study uses a time series for Bangladesh from 1972 to 2021. The basic information has primarily been collected from secondary sources, which include the World Development Indicators (WDI) database and Bangladesh Bank. Bank rate, reserve requirement, consumer price index (CPI), exchange rate, broad money (M2), real GDP, and lending interest rate were the variables for which information was gathered for the aforesaid duration. A list of the variables used in the analysis along with their definitions and sources is given in the appendix table A1.

## 4.2 Theoretical Background and Hypothesis Development

The purpose of this research is to investigate how well the bank rate and the reserve requirement, two instruments for monetary policy, affect inflation and GDP growth. Most economists today believe that monetary policy has little or no long-term impact on real variables. In the long run, any changes to the policy simply influence prices, with no impact on output – usually measured by gross domestic product (GDP). The policy may, however, have a short term influence on real activities because prices and wages are not fully flexible i.e. they do not adjust immediately (Ireland, 2008). Hence, monetary policy can be seen as a worthwhile policy tool for achieving both price stability and growth objectives.

The conventional view among economists is that interest rate and inflation tend to be inversely correlated. When interest rates are low, individuals and businesses tend to borrow more from banks and saving less, thereby increasing the money supply. As a consequence, inflation goes up. However, it is critical to examine whether the observed movement in them exhibits any causality or if it is merely a coincidence. To counter an abnormally rising price level, a central bank may set the short-term borrowing rate (often referred to as the bank rate) or the reserve requirement for commercial banks. The cost of commercial banks borrowing money from central banks increases when the bank rate rises. Similarly, a higher reserve requirement reduces banks' capability to advance loan. In both cases, commercial banks increase their lending rate. As a result, borrowing for individuals and businesses becomes more expensive and they tend to borrow less and save more. The result is a decline in money supply which brings inflation under control. The bank rate and reserve requirement are therefore assumed to have a negative impact on inflation.

According to a new classical theory based on the rational expectation theory the levels of output and employment in the economy cannot be systematically managed by monetary policy. New Keynesian economists, however, contend that an expansionary monetary policy that lowers the cost of borrowing leads to higher investment activity and the purchase of consumer durables. In addition, banks will ease lending policy in anticipation of further increase in economic activity, which would then enable business and households to increase spending. According to economic theory, the interest rate and bond price are inversely related. A low interest-rate, therefore, makes stocks more attractive to buy,

increasing households' financial assets that support higher consumer spending, and making companies' investment projects more attractive. On the other hand, in an open economy, a low interest rate will lead to capital flight, which will cause the local currency to weaken. Therefore, it is critical to investigate if the interaction of these factors boosts economic growth or not. However, we anticipate that the monetary policy instruments taken into account in this study will have a favorable impact on economic growth.

## 4.3 Econometric Model Specification

The objective of the study is to investigate, while controlling for other pertinent factors, the relative contribution of bank rate and reserve requirement to price level and economic growth. To this end, we first run time series regressions of 'GDP growth' and 'inflation'. Based on the factors mentioned earlier, and also listed in Table 1, the regression model for GDP growth and inflation can be specified as follows:

$$y_t = \sum_{i=1}^{n} x_{it}\beta_i + u_t$$

where, $y_t$ refers to GDP growth or inflation, $x_t$ stands for the vector of regressors (bank rate, reserve requirements, exchange rate, interest rate, board money), $u_t$ is the disturbance term, $j$ is the number of regression coefficients, and $t$ serves as subscript for the time series. The regression of both 'GDP growth' and 'inflation' considers the same set of predetermined variables.

The study also recognizes and attempts to account for potential endogeneity between GDP growth and inflation. Applying simultaneous equations techniques can help address this issue. Alternatively, lagged values of endogenous variable can be thought of as a regressor, since their past values cannot be affected by the current values of the regressand, assuming that reverse causality is contemporaneous only, and that it operates with a single period lag only (Bellemare, Masaki, & Pepinsky, 2017). However, we adopt the former approach here in this study. Since both the equations share the same set of instrumental variables, we apply the three-stage least squares (3SLS) technique (Zellner & Theil, 1962) to address simultaneity problem.

## 5. Empirical Findings and Discussion

This section discusses the empirical findings of the study, including descriptive statistics, time series characteristics, diagnostic tests, and estimation results.

### 5.1 Descriptive Statistics for Variables

Table 1 provides descriptive statistics on bank rate, reserve requirement, CPI, exchange rate, broad money (M2), real GDP, and interest rate (lending). The statistics include minimum, maximum, mean, standard deviation, skewness and kurtosis, and the respective p-values.

**Table 1: The descriptive statistics**

|  | Bank rate | Reserve requirement | Exchange rate | Real GDP | CPI | Interest rate (lending) | Broad money (M2) |
|---|---|---|---|---|---|---|---|
| Mean | 7.06 | 10050.81 | 47.09 | 9.79e+10 | 63.38 | 12.06 | 1049958 |
| Std. Dev. | 2.24 | 17007.86 | 25.10 | 7.20e+10 | 55.24 | 1.81 | 3497017 |
| Median | 6.50 | 2115.5 | 42.84 | 7.05e+10 | 45 | 12.62 | 48158.9 |
| Maximum | 11.25 | 61642.27 | 85.08 | 2.85e+11 | 200.44 | 14.85 | 1.62e+07 |
| Minimum | 4 | 27.28 | 7.7 | 2.67e+10 | 3.79 | 7.32 | 699.21 |
| Skewness | 0.54 | 1.911343 | 0.04 | 1.13 | 1.02 | -0.40 | 3.72 |
| Kurtosis | 1.87 | 5.334825 | 1.66 | 3.22 | 2.90 | 2.61 | 15.10 |

Source: Authors' calculation

Table 1 shows that the bank rate had a mean of 7.06 and a standard deviation of 2.24. During that time, the minimum rate was 4% and the highest was 11.25%. With a mean of 10050.81 and a standard deviation of 17007.86, the reserve requirement ranged from 27.28 to 61,422.27. The abnormally large difference between the highest and lowest values suggests a sharp increase in bank deposits during the time period under review. Furthermore, the significant standard deviation of this measure suggests excessive volatility. The average exchange rate over the period is 47.09, the standard deviation is 25.10, the minimum is 7.7 and the maximum is 85.08. This generally indicates a rising trend in the exchange rate. With a mean value of 97.9 billion and a standard deviation of 72.0 billion, GDP varied between 26.7 billion and 285 billion. The standard deviation is very high indicating that GDP was extremely volatile even if it showed an overall upward trend during the study period. The CPI had a wide range, from 3.79 (the minimum) to 200.44 (the maximum), with a mean of 63.38 and a standard deviation 55.24. This suggests that the

precision of time-predictability of price level is very small in Bangladesh. The range of interest rates for loans was between 7.32 and 14.85%. This rate was volatile as well, with a mean of 12.06% and a standard deviation of 1.8. The broad money (M2) had a standard deviation of 3497017, which was larger than the mean of 1049958, suggesting that the variable contained outliers.

## 5.2 Pre-estimation Test

As a preliminary check the study verifies whether the series are stationary or not. To this end, the study performs a *unit root test* – augmented dickey-fuller (ADF) test – of the data series, the result of which presented in Table 2.

### Table 2: Unit root tests

| Variable | Stationary at |
|---|---|
| ln $GDP$ | First difference |
| ln $CPI$ | Level |
| BR (Bank Rate) | First difference |
| ln $RR$ (reserve requirement) | First difference |
| ln $ER$ (nominal exchange rate) | Level |
| ln $M2$ (broad money) | First difference |
| IR (interest rate [lending]) | First difference |

Source: Authors' calculation using STATA

## 5.3 Discussion of Regression Results

In order to analyze the relationship between inflation and GDP growth, a multivariate simultaneous-equation regression was run, assuming that there is reverse causality between inflation and GDP growth. Table 3 shows the regression results for the simultaneous equation model.

Table 3 shows that while the regressors under consideration explains more than 97% of variation in inflation in Bangladesh, they can explain only around 55% of variation in GDP growth.

In the inflation equation, a strong evidence is found in favor of the so-called Neo-Fisherian view that lower inflation can be achieved by setting lower policy rates. In this study, consistent with the hypothesis, exchange rate (here, price of dollar in terms of taka) is found to positively affect inflation at less than 1% level of significance. That is, the depreciation of taka contributes to increase in price level in Bangladesh, theoretically which is quite sensible. Lending interest rate affects inflation negatively at 5% level of significance. This is not unexpected, because a rise in lending rates reduces borrowing for investment and consumption purposes, abating the inflationary pressures. As anticipated, growth rate

is found to have a statistically significant positive impact on inflation, suggesting that policies that can cause the economy to overheat contribute to a rise in price level. The model, however, appears to be inconsistent with the conventional view among economists that higher interest rates reduce inflation.

**Table 3: 3SLS regression (Simultaneous-equations model [Zeller and Theil (1962)])**

| Equation | $R^2$ | $\chi^2$ | $p$ |
|---|---|---|---|
| $\ln CPI$ | 0.9738 | 1562.44 | 0.000 |
| $\ln GDP$ | 0.5546 | 51.37 | 0.000 |

| | Coefficients | Standard Error | $p > |z|$ |
|---|---|---|---|
| $\ln CPI$ | | | |
| $BR$ | 0.095 | 0.031 | 0.002 |
| $\ln RR$ | − 0.017 | 0.138 | 0.902 |
| $\ln ER$ | 1.440 | 0.048 | 0.000 |
| $IR$ | − 0.073 | 0.029 | 0.013 |
| $\ln M2$ | − 0.114 | 0.454 | 0.802 |
| $\ln GDP$ | 3.520 | 1.613 | 0.029 |
| $Cons$ | − 1.741 | 0.200 | 0.000 |
| $\ln GDP$ | | | |
| $BR$ | 0.004 | 0.003 | 0.093 |
| $\ln RR$ | − 0.028 | 0.011 | 0.010 |
| $\ln ER$ | − 0.003 | 0.018 | 0.862 |
| $IR$ | − 0.001 | 0.002 | 0.569 |
| $\ln M2$ | 0.116 | 0.035 | 0.001 |
| $\ln CPI$ | 0.016 | 0.012 | 0.170 |
| $Cons$ | − 0.014 | 0.026 | 0.607 |

Endogenous variables: $\ln CPI$, $\ln GDP$
Exogenous variables: $\ln RR$, $BR$, $\ln ER$, $IR$, $\ln M2$

Source: Authors' calculation using STATA

In the growth equation, the result suggests that contractionary monetary policy in the form of raising reserve requirement reduces the investment fund and, as a result, dampens economic growth. Broad money growth and reserve money affect GDP growth at 5% level of significance. Money growth positively affects GDP growth while reserve money affects it negatively.

## 5.4 Response of GDP Growth and Inflation to Changes (a shock) in Bank Rates and Reserve Requirements

The second objective of the paper was to identify the effects of changes in bank rates and reserve requirements on inflation and GDP growth in Bangladesh. For this purpose, the study derived impulse response functions (IRFs) from the estimated VAR model. Although the coefficients of the VAR model cannot be interpreted directly because they are not derived from the structural model, they are worthwhile to get the IRF. The IRFs are used to map out the dynamic reaction of an endogenous macro variable to an exogenous shock (an impulse).

### 5.4.1 VAR Specification

Assuming an $n$-variable VAR with lags up to order $p$, the $n$ equations of the VAR can be presented as:

$$y_t^i = \beta_{i0} + \sum_{j=1}^{n}\left(\sum_{s=1}^{p} \beta_{ijs}y_{t-s}^j\right) + v_t^i, \qquad i = 1, 2, \ldots, n.$$

where $y^1, y^2, \ldots, y^n$ are the variables of the system.

Hence, the VAR to be estimated for this study can be specified as

$$\begin{bmatrix} \ln CPI_t \\ \ln GDP_t \end{bmatrix} = \beta_{i0} + \beta_{ij1}\begin{bmatrix} \ln CPI_{t-1} \\ \ln GDP_{t-1} \end{bmatrix} + \cdots + \beta_{ijp}\begin{bmatrix} \ln CPI_{t-s} \\ \ln GDP_{t-s} \end{bmatrix} + \begin{bmatrix} v_t^i \end{bmatrix}$$

$\beta_{i0}$ is a vector of intercept terms and from $\beta_{ij1}$ to $\beta_{ijp}$ are each a 2×2 matrices of coefficients.

We apply the Stata *varsoc* command with a maximum lag length of two to determine the optimal lag length, $\rho$. We use a lag length of 1 for the VAR of this study, as suggested by the likelihood ratio, the Akaike information criterion (AIC), the HQIC, the Schwarz's Bayesian information criterion (SBIC).

### 5.4.2 Impulse-Response Functions (IRF)

For assessing the validity of our VAR, we look into the VAR stability as well as autocorrelation test for the residuals. The Lagrange-multiplier test (see the Table A2) suggests that there is no autocorrelation at the lag. The stability condition, which evaluates the dynamic stability of the system, is shown in Table A3. Since no eigenvalue is close to 1, our system can be considered stable. Since VAR satisfies stability condition, one-time shocks shouldn't have long-lasting impacts because the IRFs ought to converge to zero over a long period of time after the shock. We can interpret system residuals as structural shocks only if they are contemporaneously uncorrelated.

### 5.4.3 The Response of Inflation to A Shock in the Bank Rate

Figure 1 depicts the impact of a bank rate shock of one standard deviation on inflation and traces the dynamic responses of price stability across an eight-period time frame.

**Figure 1: IRF of inflation to the bank rate innovations**
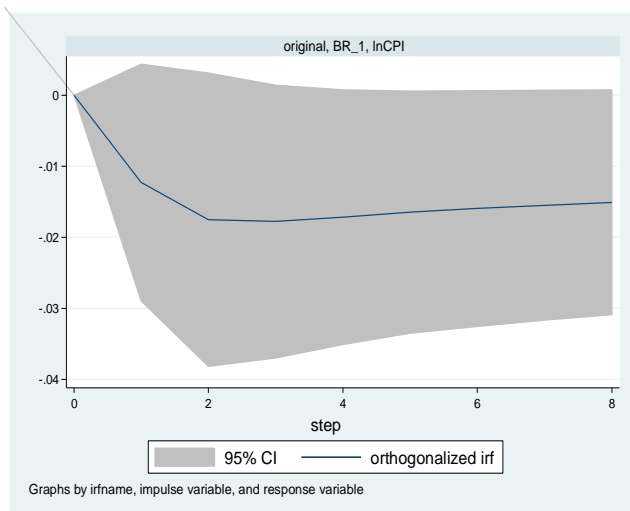


Source: Authors' calculation using STATA

The bank rate as a monetary policy tool is set to curb inflation. The results suggest that inflation falls below zero when there is a one-standard deviation innovation shock to the bank rate. It implies that a bank rate shock of one standard deviation to inflation has a long-lasting detrimental effect. When bank rate rises, borrowers have to pay more to get money, and less cash enters circulation. A smaller money supply mitigates inflationary pressures because of decreased consumer and investment spending.

### 5.4.4 The Response of Economic Growth to A Shock in the Bank Rate

Figure 2 depicts the impact of a bank rate shock of one standard deviation on the GDP and traces the dynamic responses of GDP growth across an eight-period time frame.

Figure 2 shows that a bank rate innovation shock of one standard deviation on bank rate leads GDP growth fluctuates about zero up to the fifth period. The IRF closely follows the zero line after five periods, suggesting that there is a very limited impact of bank rate innovation on

GDP growth. A rise in bank rates reduces consumer spending, investment, and exports but increases imports through the exchange rate channel. A rise in bank rates thus has two significant impacts on the economy. On one hand, it reduces the inflationary pressure, which leads to economic growth. On the other hand, it shrinks economic growth as exports and investments slow down. That is, two impacts balance out each other, and therefore, it can be concluded that the bank rate in Bangladesh may not be an effective tools for boosting economic growth.

**Figure 2: IRF of GDP growth to the bank rate innovations**
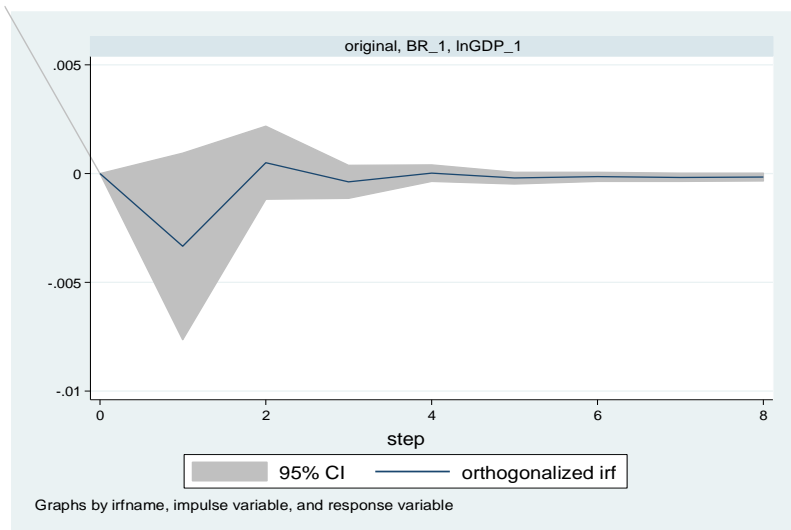


Source: Authors' calculation using STATA

### 5.4.5 The Response of Inflation to the Reserve Requirement Fluctuations

Figure 3 depicts the impact of a reserve requirement shock of one standard deviation on inflation and traces the dynamic responses of price stability over an eight-period time frame.

**Figure 3: IRF of inflation to the reserve requirement fluctuation**
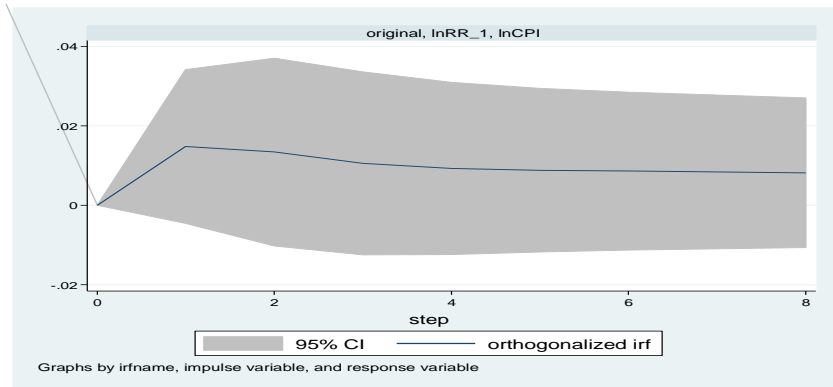
Source: Authors' calculation using STATA

A one standard deviation shock on reserve requirement has a consistent effect on GDP growth. The study reveals that, throughout the period, there has been a positive effect on GDP growth from one standard deviation shock of the reserve requirement, but the effect begins to die out after the third period.

## 5.4.6 The Response of Economic Growth to the Reserve Requirement Fluctuation

Figure 4.6 depicts the impact of a reserve requirement shock of one standard deviation on GDP growth and traces the dynamic responses of GDP growth over an eight-period time frame.

### Figure 4: Impulse response functions of GDP
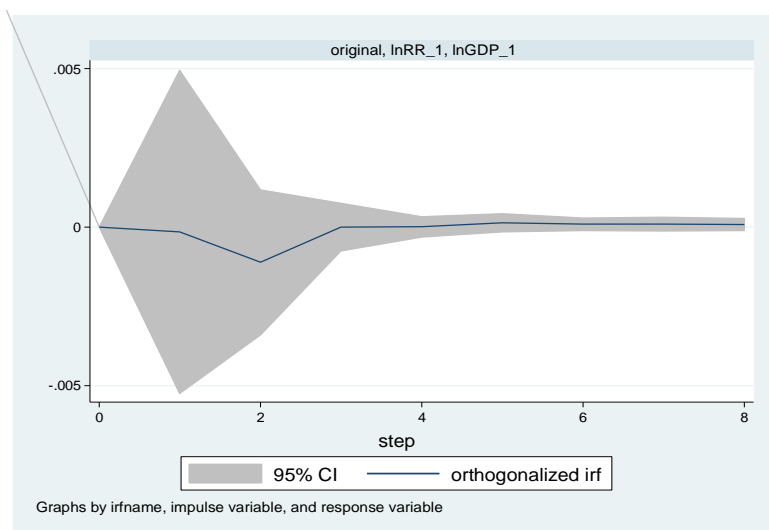
A one standard deviation shock on reserve requirement has some volatile effects on GDP growth. The study shows that a one-standard deviation shock of reserve requirement to GDP growth has an insignificant negative impact in the first three periods before turning positive in the fourth, with a tendency to die out successively.

## 5.5 Granger Causality

To determine if the variables considered in the system have any long-term effects on one another, with the help of our VAR, we can run Granger causality tests; the results are presented in Table 4.

The results of the Granger causality tests suggest that the null hypothesis is rejected in each case of GDP growth and inflation. This means that both variables have Granger effects on one another. However, changes in the bank rate Granger causes neither GDP growth nor inflation while reserve requirement does have a minor significance in Granger-causing GDP growth. We see a strong evidence that lags of 'bank rate' helps predict reserve requirement. However, results indicate that none of the lagged variable Granger-causes bank rate, implying that the rate is arbitrarily set by monetary the authority.

**Table 4: Granger causality with reserve ratio as policy instrument**

| Equation | Excluded (Explanatory variables) | | | |
|---|---|---|---|---|
| | $\ln GDP_{t-1}$ | $\ln CPI_{t-1}$ | $BR_{t-1}$ | $\ln RR_{t-1}$ |
| | $\chi^2\text{-}Statistics$ (Wald test) | | | |
| $\ln GDP_t$ | -- | 6.5728 | 36402 | 4.7659 |
| | | (0.037) | (0.834) | (0.092) |
| $\ln CPI_t$ | 10.188 | -- | 0.73526 | 0.44927 |
| | (0.006) | | (0.692) | (0.799) |
| $BR_t$ | 0.46498 | 1.7574 | -- | 1.7797 |
| | (0.793) | (0.415) | | (0.411) |
| $\ln RR_t$ | 4.0332 | 4.7139 | 6.7158 | -- |
| | (0.133) | (0.095) | (0.035) | |

Source: Authors' calculation using STATA

## 6. Conclusion and Policy Recommendations

Monetary policy is an important element of demand management policy and its effectiveness depends on the appropriate choice of the policy instruments to be used. The goal of this study was to explore the relative effectiveness of two monetary policy tools – the bank rate and the reserve requirement – in transmitting monetary innovations in Bangladesh. The findings of the study suggest that the bank rate as a tool of monetary policy is effective for taming

inflation. Hence, the Bangladesh Bank should use the bank rate policy to curb inflation. However, as a policy bank rate is less effective in stimulating economic growth while the policy of changing reserve requirement is found to negatively affect it. GDP growth is found to have a positive impact on inflation. In order to prevent price hikes, the government should therefore work to control the overheating of the economy.

The research also shows that money supply has a positive impact on GDP growth while the reserve requirements have an unfavorable one. Furthermore, the study comes to the conclusion that while managing the exchange rate is useful for controlling inflation, it has no significant effect on GDP growth. According to the findings of the study, an appreciation of foreign currency further fuels the price hike in Bangladesh. Therefore, the central bank can implement the policy of exchange rate targeting in curbing inflation. The study concludes that GDP growth is related to price stability in the long run. This suggests that when designing policy framework to curb inflation, the central bank of Bangladesh should take into account the effect on GDP over the long term.

The focus of the study is largely on the comparative effectiveness of two monetary policy instruments, namely bank rates and reserve requirements. The paper proposes further investigation into alternative channels for the transmission of monetary policy, such as the asset price channel and the credit channel.

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## Appendix

### Table A1: Definition of variables and sources of data

| Variables | Definition | Sources |
|---|---|---|
| Real GDP | Gross domestic product (constant 2015 US$) | World Development Indicators 2021 |
| CPI | Consumer Price Index (base index, 2005-06=100) | Bangladesh Bank |
| Bank rate | Bangladesh Bank rate (percent) | Bangladesh Bank |
| Reserve requirement | Cash reserve requirement balance with Bangladesh Bank (Taka in crore) | Bangladesh Bank |
| Exchange rate | Taka per US$ | Bangladesh Bank |
| Interest rate | Lending interest rate (percent) | Bangladesh Bank |
| Broad money | Broad money, M2 (Taka in crore) | Bangladesh Bank |

### Table A2: Lagrange-multiplier test

| lag | $\chi^2$ | $df$ | $prob > \chi^2$ |
|---|---|---|---|
| 1 | 23.3408 | 16 | 0.10492 |
| 2 | 23.1375 | 16 | 0.11011 |

H0: no autocorrelation at lag order

### Table A3: Eigenvalue stability condition

| Eigenvalue | Modulus |
|---|---|
| 0.8912003 | 0.8912 |
| 0.4447289 + 0.5627372i | 0.717257 |
| 0.4447289 – 0.5627372i | 0.717257 |
| –0.5623618 + 0.4440227i | 0.716524 |
| –0.5623618 – 0.4440227i | 0.716524 |
| 0.6297531 | 0.629753 |
| –0.5759482 + 0.2361946i | 0.622498 |
| –0.5759482 – 0.2361946i | 0.622498 |
| 0.3043111 + 0.5092639i | 0.593258 |
| 0.3043111 – 0.5092639i | 0.593258 |
| 0.3883525 | 0.388353 |
| –0.1664455 | .166445 |

All the eigenvalues lie inside the unit circle.

VAR satisfies stability condition.