



**Policy Note: PN 2023-01**

**Impact of Reserve Money and Money Supply on Inflation in Bangladesh**

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Monetary Policy Department  
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## Impact of Reserve Money and Money Supply on Inflation in Bangladesh<sup>1</sup>

**Abstract:** This article investigates the intricate relationship between reserve money (high-powered money), money supply, and inflation in the context of Bangladesh's economic landscape. The central tenet of the study is the examination of how changes in high-powered money influence money supply and subsequently impact inflation dynamics. The analysis is conducted within the framework of the transition from a Monetary Targeting Framework (MTF) to an interest rate targeting approach, which prompts an evaluation of the stability of the money multiplier. The primary objectives of the study are threefold: firstly, to explore the influence of high-powered money on money supply during the period spanning July 2017 to June 2023; secondly, to assess the role of money supply as a potential driver of inflation in Bangladesh over the same period; and thirdly, to identify recent factors contributing to the inflation trends in the country.

The findings of the research underline several key insights. The stability of the money multiplier emerges as a pivotal factor in the effective regulation of money supply through reserve money adjustments. However, the study reveals that the money multiplier in Bangladesh is volatile, rendering the money supply unpredictable when manipulated through reserve money changes. This unpredictability could be attributed to fluctuations in consumer behavior, the banking system's strength, inflation, and monetary policy stance. Furthermore, the analysis demonstrates that recent government borrowing from the central bank has not led to proportional growth in money supply due to the central bank's absorption of local currency liquidity. This divergence underscores the limited inflationary impact of increased borrowing.

The study identifies a multifaceted set of drivers behind recent inflation trends in Bangladesh. Supply chain disruptions arisen from the Covid-19 pandemic, triggered by the Russia-Ukraine conflict, currency depreciation, and energy price adjustments emerge as significant contributors. The study emphasizes the complex interplay of both global and domestic factors in shaping inflationary pressures.

In conclusion, this article sheds light on the intricate interrelationships between high-powered money, money supply, and inflation in the context of Bangladesh. The findings emphasize the importance of considering a broad range of economic factors beyond money supply when analyzing inflation trends. As the country transitions its monetary policy approach, understanding these dynamics becomes crucial for effective policy formulation and response.

**Keywords:** Reserve money (high-powered money), money supply, inflation, money multiplier, monetary policy, Bangladesh.

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<sup>1</sup> This note has been prepared jointly by Dr. Md. Habibur Rahman, Chief Economist, Md. Abdul Kayum, and Dr. Md. Omor Faruq, Director and Additional Director respectively of Monetary Policy Department in the Bangladesh Bank. The authors are grateful to Mr. Abdur Rouf Talukder, Honourable Governor of Bangladesh Bank, for his kind instruction, guidance, and valuable suggestions for conducting the study. However, the views expressed in this note are the authors' own and do not necessarily reflect those of the Bangladesh Bank. Comments are welcome and can be sent to: Dr. Md. Omor Faruq, email: omar.faruq@bb.org.bd.

# **Impact of Reserve Money and Money Supply on Inflation in Bangladesh**

## **1. Introduction**

The interaction between two fundamental elements, namely the money multiplier and reserve money (RM), significantly influences the money supply (M2), a concept central to economic discourse. This fundamental assertion rests on the premise of a stable money multiplier and the central bank's adeptness at overseeing reserve money. The complex interplay among central banks, financial institutions, including banks and non-banks, and the general public molds the money supply. Guided by this understanding, the central bank's role extends to the governance of reserve money, thereby shaping the broader money supply (M2). This dual objective encompasses the pursuit of inflation control alongside fostering employment opportunities and overall economic expansion.

As the transition to an interest rate targeting framework in July 2023 approaches, Bangladesh Bank (BB) has historically adhered to the Monetary Targeting Framework (MTF) as its cornerstone for molding monetary policy. The effectiveness of this framework hinges on the central bank's control over the money supply. Lately, a surge in Government borrowing from BB has been witnessed, prompted by substantial borrowing requirements. Factors contributing to this include revenue collection falling short of targets, a slowdown in National Saving Certificates (NSCs) sales, and below-anticipated foreign financing. Coincidentally, the banking sector faces liquidity challenges due to sluggish deposit growth coupled with persistent forex selling by BB, to meet foreign currency obligations, has absorbed considerable local currency liquidity. The influx of high-powered money, or reserve money, into the financial system has the potential to expand the money supply and incite inflation.

Thus, this policy note endeavors to scrutinize the implications of introducing high-powered money into the economic framework and its cascading effects on the money supply, subsequently influencing inflation. The exploration spans: (i) The impact of high-powered money on the money supply from July 2017 to June 2023; (ii) The role of money supply in driving inflation in Bangladesh during this period; (iii) An analysis of the contemporary drivers influencing inflation trends in the Bangladeshi context.

## **2. Relationship between Reserve Money (RM) and Money Supply (M2)**

The interrelation between Money Supply (M2) and Reserve Money (RM) is succinctly expressed by the equation:

$$M2 = mm * RM \dots\dots\dots (1)$$

In this equation, M2 signifies the total money supply, mm represents the money multiplier, and RM denotes reserve money. The money multiplier encapsulates the potential of reserve money to catalyze money supply expansion. Consequently, any change in money supply ( $\Delta M2$ ) originating from changes in reserve money ( $\Delta RM$ ) fundamentally pivots on the stability of the money multiplier (mm). The central bank's ability to govern the money supply (M2) via RM adjustments relies on the steadiness of the money multiplier (mm). This constancy is influenced by a spectrum of factors, including consumer behaviors, the resilience of the banking system (exemplified by the transmission mechanism), prevailing inflation dynamics, and the stance adopted by the central bank concerning monetary policy.

## **3. Factors Influencing the Money Multiplier**

The extent of the money multiplier can be directly impacted by several variables, such as alterations in the currency deposit ratio (C/D), changes in the excess reserve deposit ratio (ER/D), and fluctuations in the required reserve ratio (RRR). A surge in any of these ratios will attenuate the money multiplier's magnitude, and conversely, a decline in these ratios will enhance the multiplier's efficacy. In essence, these three ratios share an inverse relationship with the money multiplier, collectively shaping its dimensions through their interactions.

### **a. Changes in the Currency Deposit Ratio (C/D)**

Consider a scenario where the C/D ratio grows due to changes in depositor behavior, with other variables remaining constant. This change signifies that a portion of checkable deposits is being converted into physical currency by depositors. Consequently, the scope for checkable deposits to undergo multiple rounds of expansion diminishes, culminating in a decrease in the aggregate extent of such expansion, and subsequently curbing the multiplier's impact. Moreover, variables like inflation, heightened uncertainty, and diminished deposit interest rates can all contribute to a reduction in the C/D ratio.

### b. Changes in the Excess Reserves Deposit Ratio (ER/D)

When banks sit with a larger proportion of excess reserves relative to checkable deposits due to limited lending activities, it may result in a contraction of checkable deposits. Consequently, the money multiplier experiences a decline. Such circumstances could arise when the investment climate is unfavorable or risky, prompting banks to adopt a cautious stance toward lending.

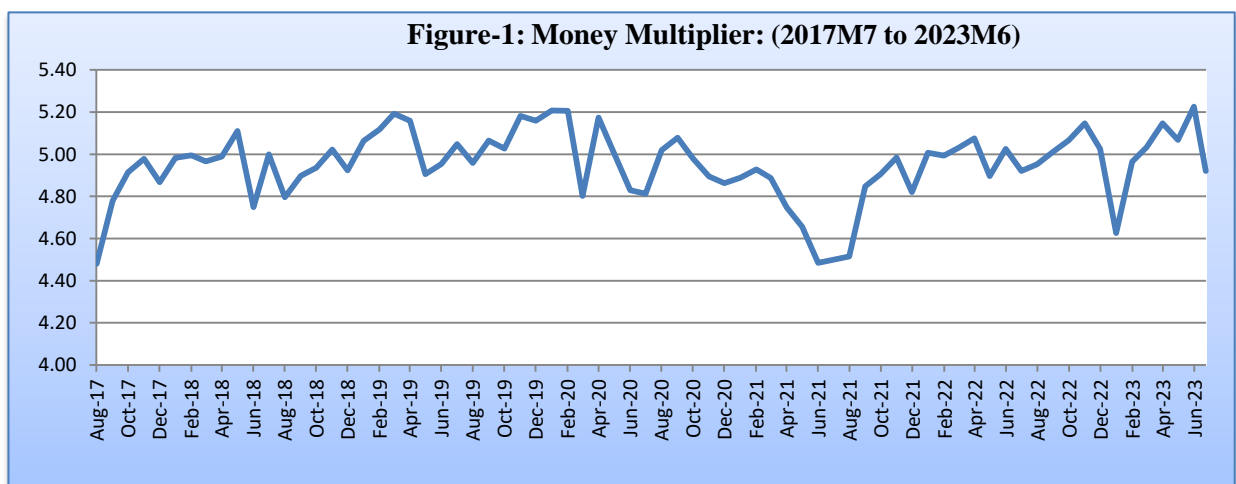
### c. Changes in the Required Reserve Ratio (RRR)

At times, the central bank may choose to elevate the required reserve levels as part of a contractionary monetary policy. This essentially decreases in banks' available loanable funds, contributing to a reduction in the money multiplier through the deposit creation process. This mechanism, in turn, allows the central bank to control the growth of money supply, aligning with the objectives of the Monetary Targeting Framework (MTF) to manage inflation.

## 4. Stability of the Money Multiplier in Bangladesh

The stability of the money multiplier is a pivotal factor in facilitating the precise control of reserve money by the monetary authority, ultimately influencing the broader money supply (M2). However, the extent to which altering reserve money induces money supply growth relies heavily on the stability of the money multiplier.

If the money multiplier remains stable, the central bank can effectively regulate the money supply by manipulating reserve money. Conversely, the money supply becomes unpredictable if the money multiplier exhibits high volatility. The behavioral dynamics of



Source: Authors' calculation based on monthly *Schedule Bank Statistics*, Statistics Department, Bangladesh Bank.

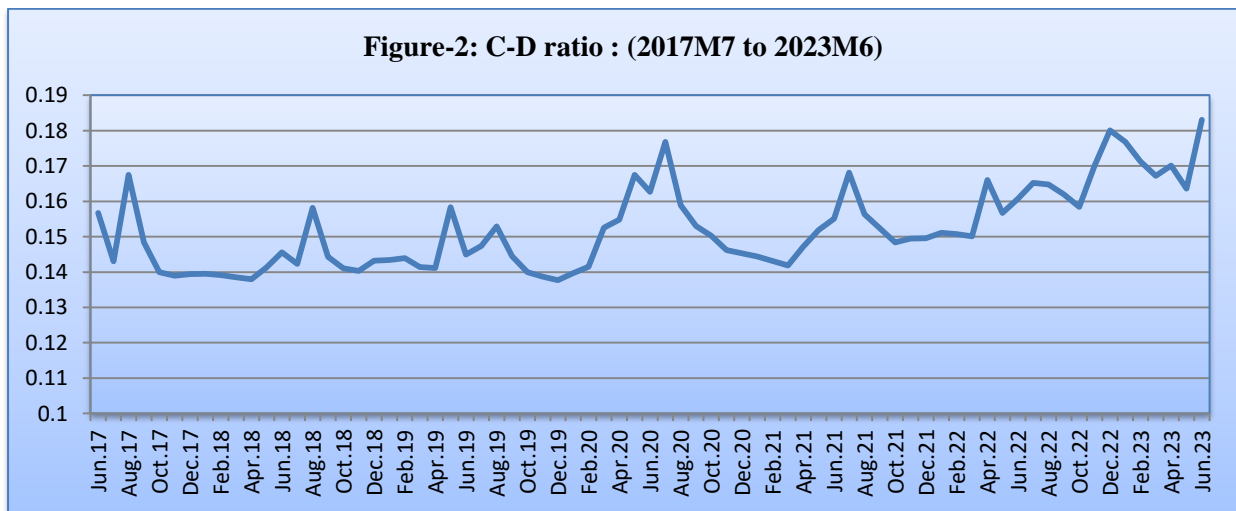
individuals, banks, and the central bank influence the value of the money multiplier.

A closer look at the movement of the money multiplier from July 2017 to June 2023 shows that it displays a fluctuating trend (Figure-1). Bangladesh experiences volatility in the C/D and ER/D ratios, contributing to the instability of the money multiplier during this period. Notably, the onset of the Covid-19 pandemic in the first quarter of 2020 led to stagnant investment and increased cash holdings due to uncertainty, causing a spike in the ER/D ratio. Similarly, the C/D ratio increased during times of high inflation, rising uncertainty, and declining deposit interest rates. The trend highlights the complex interplay of variables shaping the money multiplier.

Let us now look into the contribution of the major components of the money multiplier, specifically the Currency Deposit Ratio (C/D) and the Excess Reserve Deposit Ratio (ER/D), to the process of money supply.

#### 4.1 Behavior of Currency Deposit Ratio:

Consider the implications when the Currency Deposit Ratio (C/D) increases. This scenario signifies that individuals are opting to hold a larger proportion of their income in the form of cash rather than as deposits. This shift towards increased currency holdings introduces the concept of currency leakage, which leads to a reduction in the value of the money multiplier.



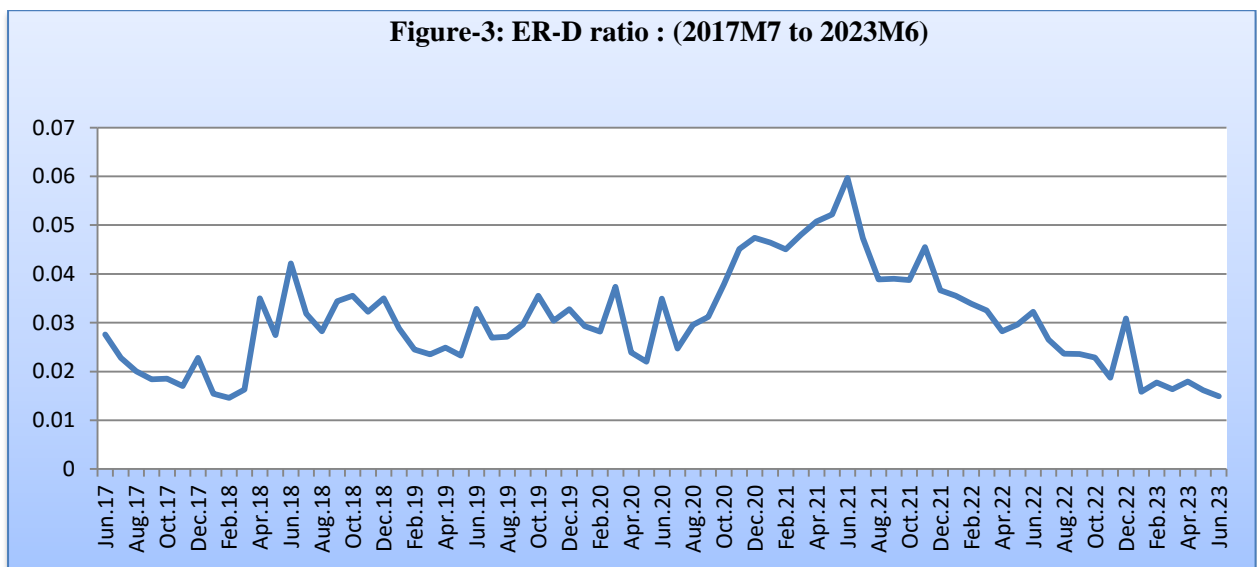
Source: Authors' calculation based on monthly *Schedule Bank Statistics*, Statistics Department, Bangladesh Bank.

Consequently, as the demand for cash holdings grows, the value of the money multiplier (mm) tends to decrease and the overall process of money supply experiences a slowdown trend. Notably, Figure-2 illustrates a recurring seasonality in the C/D ratio within Bangladesh.

During events such as Eid-ul-Fitre and Eid-ul-Azha, there is an elevated demand for currency holdings among the public, causing the C/D ratio to rise. Additionally, times of economic uncertainty and heightened inflation can prompt individuals to hold relatively larger cash reserves. The Covid-19 pandemic exemplified this behavior, as people withdrew and held more cash (from March'20 to September'20) in response to pandemic-related uncertainties. This, in turn, led to a decrease in the value of mm and a deceleration in the money creation process. The C/D ratio also exhibited an increase during November'22 to February'2022, influenced by rumors circulating about the banking sector in Bangladesh. Furthermore, the efficiency of the payment system influences the C/D ratio; a well-developed system diminishes the need for holding excess cash, as quick deposit encashment becomes feasible, causing the C/D ratio to decline.

#### 4.2 Behavior of Excess Reserve Deposit Ratio:

Similarly, an escalation in the Excess Reserve Deposit Ratio (ER/D) also impacts the money multiplier and the money creation process. The underlying notion is that as the excess reserve ratio rises, banks choose to allocate their loanable funds sub-optimally, effectively parking funds with the central bank and limiting the extent of money creation.



Source: Authors' calculation based on monthly *Schedule Bank Statistics*, Statistics Department, Bangladesh Bank.

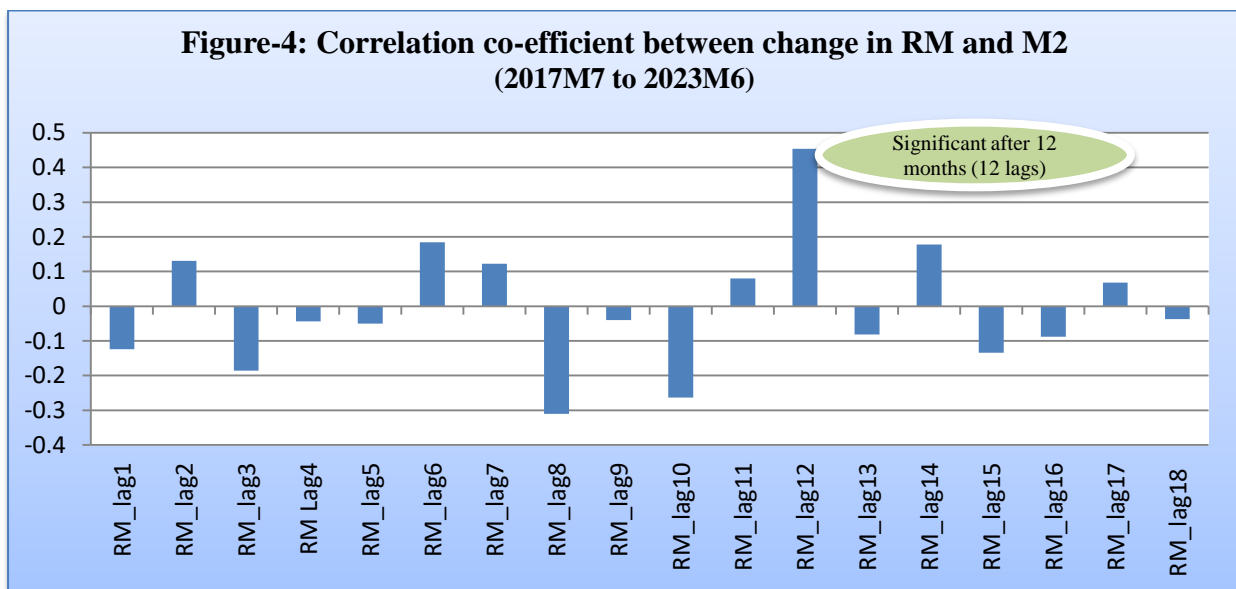
In other words, when viable and profitable investment sectors are scarce, banks may resort to holding their funds with the central bank, indicative of a lack of enthusiasm for investing.

As depicted in Figure-3, the ER/D ratio exhibits a fluctuating pattern, reflecting instability during the observed period. From March'20 to December'21, the ER/D ratio experienced a

heightened value, driven by diminished investment demand, resulting in a lower mm value and a consequent slowdown in money creation. With the decline of the Covid-19 impact in late 2021, economic activities gained momentum due to external sector growth and larger-scale import settlements, leading to a substantial sale of foreign assets (USD). Consequently, local currency liquidity was absorbed, leading to a decline in reserves with the central bank.

### 5. Correlation between $\Delta RM$ and $\Delta M2$

To discern the relationship between reserve money and money supply, we analyzed the Pearson correlation between the changes in RM and M2. The correlation coefficient, displayed in Figure-4, shows that there is a significant and positive impact of changes in reserve money ( $\Delta RM$ ) on money supply (M2), albeit with a lag of twelve periods. Notably, this impact takes a long time to materialize due to the prevailing cultural practices and habits around banking efficiency.



Source: Authors' calculation.

For an extended duration, the Bangladesh Bank (BB) had been following a monetary targeting-based policy approach. Nonetheless, the efficacy of BB's monetary targeting framework, wherein Reserve Money (RM) was the operating target and money supply (M2) served as an intermediate target, appears to be diminishing. Given this scenario, BB's recent decision to transition towards an interest rate targeting framework appears well-suited and timely.



## 6. Underlying Factors for RM and M2 Changes

This section delves into the factors influencing both reserve money and money supply. Beginning with reserve money, two main components are at play: net foreign assets (NFA) and net domestic assets (NDA). NFA encompasses foreign currency, gold, and reserves, while NDA comprises claims on Government, public entities, and deposit money banks (DMBs) in the form of securities, discount loans, and more. Changes in these elements directly impact reserve money and the balance sheet of BB. For example, inflows of foreign currencies, gold, or SDRs augment reserve money, while holding more government securities or disbursing loans through discount windows augments NDA, consequently expanding RM. These shifts ripple through the money supply via the money multiplier ( $M2 = mm \times RM$ ). Table-1 demonstrates how reserve money enhances money supply through money multiplier in FY2023.

**Table-1: Scenario of RM and M<sub>2</sub>**

Period	RM (Crore taka)	M2 (Crore taka)	M2/RM
30/06/2022	3,47,162.1 (-0.26)	17,08,122.0 (9.43)	4.92
30/06/2023	3,83,585.2 (10.49)	18,87,174.0 (10.48)	4.92
	$\Delta RM$ (Crore taka)	$\Delta M2$ (Crore taka)	
30/06/2023	36,423.1	1,79,051.7	4.92
$\Delta RM \times mm = \Delta M2 \rightarrow 36,423.1 \times 5 = 1,82,115.5$			

Source: Authors' calculation based on monthly *Schedule Bank Statistics*, Statistics Department, Bangladesh Bank.

### 6.1 Factors Affecting Changes in RM

Analysis reveals a decrease of Taka 60,260 crore in NFA, primarily attributed to BB's net sale of foreign currency amounting to USD 13,385 million (approximately Taka 1,32,500 crore) during FY2023, adjusted for foreign asset accumulation. Conversely, NDA increased by Taka 96,683 crore, with claims on the Government (net) expanding by Taka 1,02,482 crore and claims on DMBs rising by Taka 45,583 crore. This rise in claims on DMBs resulted from an increase in refinancing by Taka 18,219 crore. Consequently, RM saw a modest increase of Taka 36,423 crore during FY2023, despite significant government borrowing.

Notably, the rise in borrowing from BB was not met with an equivalent increase in reserve money, partially offset by draw-downs in foreign and other domestic assets.

Hence, it is evident that despite the substantial increase in Government borrowing from BB, the corresponding expansion of reserve money remained relatively modest. This effect can be attributed to the counterbalancing impact of drawing down foreign assets and adjusting other domestic assets (net).

## **6.2 Factors Affecting Changes in M2**

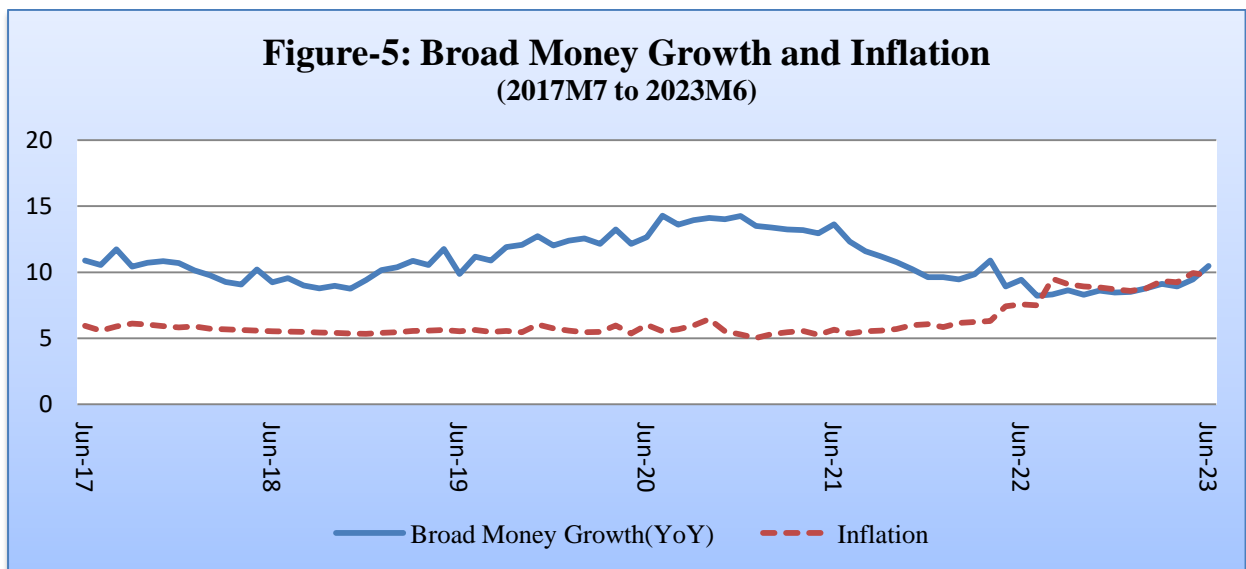
Examination of changes in money supply highlights a decrease of Taka 47,571 crore in NFA, largely due to the repayment of short-term foreign loans and a significant decline in trade credit in the financial account of the Balance of Payments (BoP). In contrast, NDA increased by Taka 2,26,622 crore, with claims on the Government (net) rising by Taka 1,03,845 crore and private sector credit expanding by Taka 1,42,864 crore. Consequently, the money supply increased by Taka 1,79,052 crore during FY2023.

It is important to highlight that there is a lack of substantial impact from reserve money on the money supply. This observation can be attributed to the prevailing challenges within the country's banking sector, characterized by liquidity strain resulting from sluggish deposit growth in contrast to sustained lending expansion. Furthermore, there was a surge in the purchase of dollars from BB to fulfill foreign currency obligations, leading to a significant absorption of local currency within commercial banks. This absorption by BB contributed to the reduced influence of reserve money on the money supply.

## **7. Factors Driving Recent Inflation in Bangladesh**

In the wake of the COVID-19 pandemic, inflation has taken on a global dimension, primarily attributed to disruptions in supply chains. The Russia-Ukraine conflict further exacerbated these disruptions, contributing to an inflationary environment not only in Bangladesh but also across numerous countries worldwide. Responding to elevated prices in commodities, both fuel and non-fuel, nations—especially developed ones such as the USA and UK—adopted a hawkish contractionary monetary policy stance. This collective approach applied substantial depreciation pressure on the Bangladeshi Taka (BDT), resulting in a sustained increase in inflation within Bangladesh. While global commodity prices and inflation began to subside from late 2022, inflation continued to rise within the nation.

Let us examine the central drivers underpinning recent inflation. Firstly, we examine the trajectory of money supply growth in Bangladesh. Broad Money growth was rising during FY19 to FY21, reaching its peak at approximately 14.0 percent in June 2021, coinciding with Bangladesh's monetary stimulus measures. Concurrently, the Bangladesh economy experienced relatively stable and low inflation in those respective years. However, following this stimulus, money supply growth subsided to a range between 8-10 percent, while the economy is seeing spiraling inflationary pressure, significantly reconfirming the argument that the recent inflation in Bangladesh is not due to demand-side factors but rather the consequences of the external supply-side phenomenon. This data, illustrated in Figure-5, dispels the notion that recent inflation solely results from money supply expansion.



Source: Monthly *Schedule Bank Statistics*, Statistics Department, Bangladesh Bank and Bangladesh Bureau of Statistics.

A comprehensive assessment of inflation-contributing factors reveals additional dynamics at play in Bangladesh. Firstly, the initial surge in inflation stemmed from supply chain disturbances caused by the COVID-19 pandemic and the Russia-Ukraine conflict. Secondly, in the latter part of 2022, while global commodity prices began to recede, the Bangladeshi Taka began depreciating due to significant deficits in both the current account balance and overall balance of payments. This depreciation, in turn, catalyzed a rise in import prices, thus contributing to inflationary pressures. Furthermore, the upward adjustment of energy and fuel prices emerged as a substantial factor amplifying inflation within the nation. Lastly, imperfect market conditions also appear to play a role in fueling inflation.

## 8. Conclusion

The analysis above yields several noteworthy observations. Firstly, it becomes evident that both the Currency Deposit Ratio (C/D) and Excess Reserve Deposit Ratio (ER/D) exhibit high volatility during the examined period. This volatility consequently renders the money multiplier in Bangladesh unstable. With an unstable money multiplier, the manipulation of reserve money by the central bank (BB) becomes less effective in predicting money supply outcomes. This realization casts a shadow on the efficacy of the monetary targeting framework employed by BB, wherein Reserve Money (RM) is utilized as the operating target, and money supply serves as the intermediate target. In this respect, BB's decision to switch to an interest rate targeting framework is time-befitting.

Moreover, despite the noticeable escalation in Government borrowing from BB during FY2023, the resulting impact on the money supply has not been as significant as one might anticipate through the lens of reserve money and the money multiplier. The underlying rationale stems from BB's substantial absorption of local currency from commercial banks in exchange for foreign currency (USD) sales. Consequently, this absorption counterbalances the effects of increased government borrowing. While borrowing from BB naturally entails inflationary implications if it leads to an excess of reserve money and a stable money multiplier, recent developments reveal a different trajectory. The surge in Government borrowing has not translated into a substantial elevation of reserve money, nullifying the potential for a significant impact on further inflation.

In this context, the prevailing inflation in Bangladesh can be attributed to a confluence of factors. Elevated global commodity prices resulting from supply disruptions, coupled with adjustments in energy and fuel prices, contribute to the current inflationary climate. Moreover, the pass-through effects of domestic energy prices, the depreciation of the domestic currency, the presence of a culture of downward price rigidity within the nation, and the existence of market imperfections all play pivotal roles in exacerbating the inflationary pressures experienced.

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