Four Sectors Model and Bangladesh Economy

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Abstract: *Economic understanding of the real sector, fiscal sector, external sector and monetary sectors are the key to monetary policy and national budget. In brief, through the overall balance of the external sector, the net foreign assets of the monetary sector are linked. The government's national domestic budget deficit is financed from banking sources. Real sector GDP and inflation are related to the fiscal sector and money supply estimation, for example. The government and Bangladesh Bank's (BB) meticulous policy formulation regarding discussed output, inflation, interest rate, and exchange rate consistently impact the four sectors with robust outcomes in the economy, taking care of aggregate demand and supply. Changes in money supply and fiscal policy, for instance, increase or decrease the aggregate demand. While aggregate supply depends on the production of commodities, minerals, energy, and others, it relies on domestic and global price development. As a market maker, to ensure a monetary transmission mechanism, BB needs to play a proactive role in incorporating the right number for fixing lending rates and other rates, for instance, addressing the structural rigidity of the economy. As we are in the process of graduating as a developing country facing an open economy, we need to use real interest rates and real exchange rates, the tools of monetary policy derived from the monetary conditions index, for near (nowcasting) and medium-term forecasting of GDP and inflation in relation to the autoregressive and structural model. Effective money supply and budgetary expenses, along with external and real sectors, taking care of marginal groups of people in the society can ensure the welfare of the economy.*

1. Introduction

In Bangladesh, the four sectors model was first quantified, establishing a relationship in the midterm macroeconomic framework (MTMF) under the IMF poverty reduction and growth facility (PRGF) in the year 2003, combining officials of the Finance Division of the Ministry of Finance, Planning Commission and BB. As we know, our economy comprises agriculture, industry, and service sectors with roughly a share of 12, 37, and 51 percent. In our Gross Domestic Product (GDP), consumption is approximately 76 percent, and savings is 24 percent. On the other hand, our national investment is around 32 percent of GDP

(exceeding US$ 465 billion with per capita income of US$2824) financed from domestic and external sources. Goods and money markets combining IS and LM curves generate Aggregate Demand (AD). The Aggregate Supply (AS) curve derives from factors of production, among others, with the contribution of labor. Central bank's prudential policy rate with the interaction of AD and AS broadly clears the market, taking into account Classical, Keynesian and Neoclassical views. Monetary (Broad Money and Reserve Money), External (Balance of Payments-BOP), Fiscal (National Budget) and Real sectors (for example, GDP and inflation) are the four areas of our economy. In the External frontier, foreign workers' remittances, exports, and imports amounting to roughly monthly over US$ 2,4.5 and 6 billion along with the Financial Account and Overall Balance of BOP impact the foreign exchange reserves as well as Net Foreign Assets (NFA) of BB. In the Monetary sector, Broad Money's (M2) NFA combines Banks and BB's NFA. Private sector and Government sector credits are the important elements of Net Domestic Assets (NDA). Both NFA and NDA of M2 (around US$186) create liability termed Deposits and Currency. In the Fiscal sector or national budget (closely US$71.15 billion), the revenue budget is surplus. VAT, customs duties, and income tax are the main source of income of the National Board of Revenue (NBR). However, in order to implement the Annual Development Program (ADP), the deficit budget norm is followed with a tolerable range. The deficit budget (around 5 percent of GDP) is financed through National Savings Certificates (NSC), banks, and external borrowing.

Finally, in the real sector, the real GDP and inflation are 7.25 and over 5 percent in fiscal year 2022. Sufficient food production (rice and wheat) of nearly 40 million metric tons with marginal import for food security and probable solidification in non-food items contributes for consistency in inflation taking into account prudent monetary and fiscal policy. Furthermore, deficit financing of the national budget is crucial because substantial domestic borrowing from the banking system, especially from the BB, may increase the bank interest rate, impacting the capital market as well. Consequently, maintaining deficit financing of budget around five percent of nominal GDP may balance the interest rate, exchange rate, and capital market. At the same time, private short-term financing with higher interest rates from the external sector may also contribute to the devaluation of domestic currency, fueling inflation and reducing the welfare of the lower-income group (Ahmed et al., 2013; Bukharbayeva et al., 2021; Chowdhury et al., 2019; Hasan et al., 2019; Hossain et al., 2019).

2. Methodology

Different indicative numbers of real, fiscal, monetary, and external sectors are derived based on qualitative and quantitative analysis as underlying elements. Baseline scenarios of the stipulated numbers of the four sectors may be impacted due to alternative scenarios accommodating shocks. The qualitative analysis of this paper depends on secondary data from policy documents to gain insight into the interactions of the four sectors of the economy. Following the research question, rational expectation can be formed by the people with a proper understanding of the four sectors of the economy.

3. Literature Review

Money supply and GDP are cointegrated in India in relation to the study of Biswas and Saunders (1999). Abdullah and Yusop (1996) conducted error correction estimates and established the presence of a cointegration relationship between money and GDP. With particular emphasis on Nigeria, Adepoju et al. (2007) have reviewed the roles of debt management practices for sustainable economic growth and development momentum. The Nigerian Central Bank and National Bureau of Statistics report was generated on the basis of a pragmatic study addressing mass people and a literature survey. Availability of access to external finance strongly influences the economic development process of any nation, according to the analyses of the data collected with descriptive statistics. For sustainable economic growth, debt is a crucial factor, as underlined in this paper. The study found that major impediments to the revitalization of Nigeria's shattered economy as well as the alleviation of debilitating poverty because of huge external debt without servicing in the case of Nigeria before year 2000. Growth and employment were hampered due to the much-needed inflow of foreign resources for investment stimulation. Nigerian importers were required to provide one hundred percent cash cover for all orders and, therefore placed at a competitive disadvantage compared to their counterparts elsewhere in terms of credit cover, which is applicable in the case of Bangladesh, too. Tremendous increases in interest, arrears, and other penalties also undermine the effort to obtain substantive debt relief over the medium term. Both in the long and short runs, this will subsequently depress the economy. In response to changes in the economy and the polity, the best arrangement in debt payment must be put in place from time to time. If it is well managed and if the rate of return is higher than the cost of debt servicing, then debt can only be productive as followed in Bangladesh. Considering market timing in Bangladesh debt management is crucial. To maintain the lower interest cost of the government, the re-issue of government bonds, for example, needs to be conducted considering market sentiment. BB necessitates deciding the prudential cut-off rate of the auction and devolving the amount of government bills and bonds on primary dealers as BB is a market maker (Harun et al., 2018; Iqbal et al., 2019; Islam et al., 2019; Islam et al., 2021; Iqbal et al., 2020).

Nasiruddin (2012) investigates the existence of a long-run money demand function for Bangladesh during the period from 1975 to 1997 using the cointegration and error correction modeling approach for effectual debt management of government bills and bonds and other financial issues. The money demand function also examines the parameter stability. Unique long-run relationship among M2, real GDP, and the exchange rate exists according to the empirical results. Estimating an error correction model in which the error correction term has been found to be correctly signed and statistically significant considering the short-term dynamic behavior of money demand. Taking into account the demand for money in Bangladesh, the real GDP and the real exchange rate have emerged as important determinants. The money supply and money multiplier (BB) of different countries study is pursued by Baghestani and Moot (1997). The degree of controllability over money supply by the monetary authority, stability and predictability of money supply, determinants of money supply and policy implications for governing monetary policy are

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highlighted by them. MM of BB is disaggregated to understand the impact on inflation and other rates of the economy. In reference to Baten (2006) the study of the Bangladesh Capital Asset Pricing Model (CAPM) is strongly supportive in the Bangladesh stock market considering the capital market frontier. It is both logically inconsistent and statistically inefficient to use volatility measures that are based on the assumption of constant volatility over some period of time, as argued by Bera and Higgins (1993). Large and small errors tend to occur in clusters, i.e., large returns are followed by more large returns, and small returns by more small returns in the case of financial data, for example. Using an effective sample of 3,453 observations selected from the Taiwanese stock exchange, (Yu et al., 2008) attempt to reconcile divergent outcomes from the extant literature on debt structure (public, bank, and non-bank private debt). Moreover, operationally analytical foundations that show how financial lubrication is provided via collateral chains identified by Adrian and Shin (2009) in the asset-backed system of money supply addressing capital market for robust GDP growth, taking care of fiscal and external sector.

The long-run pass-through coefficient of the exchange rate is 87 basis points for international price, 126 basis point for US price and 95 basis point for the Indian prices, observed by Bangladesh Development Institute Study (BIDS) jointly prepared by Monzur and Mansur (2009). In the case of domestic price, depending on the certain time lag the price shock tapers off gradually. Following the time interval, the speed of adjustment to the equilibrium rate is 2 percent for international prices, 3 percent for US prices, and 4 percent for Indian prices respectively. Study shows Bangladesh was under persistent inflationary pressure due to the high money supply (Hossain, 1995) after independence in 1971. Bangladesh was under different structural reform programs supported by the IMF and World Bank and as a part of these programs aimed at macroeconomic stability through low and steady inflation until mid-1990. Through the Bangladesh Bank (Amendment) Act 2003, some changes have been brought about in the objectives of monetary policy. However, among the two objectives of price stability and real GDP growth, it seems that price stability got priority, especially to deal with Taylor rule deviation between targeted and actual inflation and output gap, maintaining call money rate within standing deposit (reverse repo) and standing lending facility rate (special repo rate) in order to recent switching from monetary aggregate targeting to interest targeting monetary policy (Zayed, 2018).

4. Concise Interactions of Four Sectors Model of the Economy

Analysis of macroeconomy suggests that our goals are high level and faster growth of output and sufficient employment generation with price-level stability. To achieve these goals, we rely on fiscal policy and monetary policy. We know GDP= C + I+ G + NX. Here, consumption (C) is a weighty variable. Further, C = a + bY. C is autonomous consumption plus marginal propensity of consumption (MPC). The two sectors model is C + I. Where, as mentioned 76 percent is consumption and 24 percent savings. Government expenditure (G) depends on tax (T). In our economy, G is greater than T, resulting in government borrowing from the domestic and external sectors. Government borrowing is not complementary. Rather, the government borrows from the banking sector. This is banking sector investment to government, linking the monetary and fiscal sectors. Real sector GDP and the inflation

rate are considered for calculating broad money expansion in a financial year. GDP's variable export and import is presented in the balance of payment (BOP) of the external frontier (Table 01). A surplus of BOP considering trade balance, current account, and financial account results in the overall balance. The surplus/ deficit of the overall balance of BOP impacts the net foreign attests of reserve money of the monetary sector (Kader et al., 2020).

Table 01 : Four Sectors Model Key Economic Indicators

Indicators/Items	Actual data				Projection data		
	FY2018	FY2019	FY2000	FY01[P]	FY2022	FY2023	FY2024
1	2	3	4	5	6	7	8
Real Sector of the Economy							
Real GDP growth (percent)	7.30	7.90	3.50	6.90	7.20	7.60	8.00
CPI Inflation (percent, 12-month average)$	5.80	5.50	5.70	5.60	5.30	5.20	5.10
Gross Investment (percent of GDP)	31.80	32.20	31.30	31.00	33.10	34.20	36.00
Private sector	24.90	25.30	24.00	23.70	25.00	25.90	26.80
Public sector	6.90	7.00	7.30	7.30	8.10	8.30	9.20
Fiscal Sector of the Economy percent of GDP)							
Total Revenue collection	8.20	8.50	8.40	10.70	11.30	11.30	11.50
Tax Revenue collection	7.40	7.70	7.00	9.00	10.00	10.10	10.30
Of which NBR Tax Revenue collection	7.10	7.40	6.80	8.50	9.50	9.60	9.70
Non-Tax Revenue collection	0.80	0.90	1.40	1.00	1.20	1.20	1.20
Public Expenditure	12.20	13.30	13.30	16.10	17.50	17.00	17.00
Of which ADP (capital)	4.50	5.00	4.90	5.60	6.50	6.50	6.50
Overall balance of budget	-4.00	-4.70	-4.70	-5.30	-6.20	-5.80	-5.50
Financing iteam	4.00	4.70	4.70	5.30	6.20	5.80	5.50
Domestic source financing	3.00	3.60	3.40	3.10	3.30	3.50	3.50
External Financing (net)	1.00	1.10	1.30	2.20	2.90	2.30	2.10
Monetary and Credit Sector of the Economy (Year-on-Year percent change)							
Domestic source Credit	14.70	12.30	14.00	10.10	16.00	16.00	16.00
Credit to the private sector	16.90	11.30	8.60	8.30	15.00	15.00	15.00
Broad money (M2)	9.20	9.90	12.60	13.60	15.10	15.20	15.30
External Sector of the Economy							
Exports received f.o.b (percent change)	6.70	9.10	-17.10	15.10	15.00	13.00	12.00
Imports f.o.b payment (percent change)	25.20	1.80	-8.60	19.70	14.00	13.00	11.00
Remittances earned (percent change)	17.30	9.60	10.90	36.10	20.00	15.00	10.00
Current account balance (percent of GDP)	-3.00	-1.10	-1.00	-1.10	0.010	0.10	0.10
Gross foreign exchange reserves (billion USD)	32.90	32.70	36.00	46.40	51.00	53.70	55.40
Forex. reserve in months of imports	6.00	6.50	6.10	6.90	7.80	7.20	6.60

[P] Provisional, [RB] Revised budget, $base: FY06=100.

Source: (Bank, 2021)

Apart from the mentioned link of the four sectors model, especially forecast of exchange rate variable rather than econometric forecasting depends on fundamentals of the economy. In developed countries, among others three months or six months later, the exchange rate roughly depends on financial or commodity OTC (over the counter) Hedge, Forward, and

Options real rate. Future (exchange house trade) also determines the upcoming exchange rate. Rational absolute and comparative advantage play a crucial role in this regard. In our country, Swap and Forward in the short run along with the trend of the amount of three months later, Letters of Credit opening may indicate the future exchange rate. Moreover, technical analysis deploying ARIMA (autoregressive integrated moving average), for instance, the accounting analysis of receivable and payable of foreign currency in the future date addressing the fundamental outcome of demand and supply, is also an important element in forecasting exchange rate taking into account the short and long positions of foreign exchange position of banks linking external sector with other economic sectors. Interactions of our four sectors model are dealt with addressing endogenous and exogenous issues. The econometric study demonstrates that monetary policy shock positively impacts inflation and GDP (Khan et al., 2020).

5. Balance between Interest Rate and Exchange Rate: The Crucial Element of Monetary Policy

In our country, recent past, banks' lending rate cap was 9 percent for higher output (Figure 3) accommodating single-digit interest rates considering aggregate demand (AD) and supply (AS) Figure 1. AD arrives from the goods (IS curve) and money (LM curve) market. Labor supply influences the AS, addressing classical, neoclassical, and Keynesian norms and unemployment consequences mentioned in the Phillips curve (Figure 2), representing the neutrality of money supply in the long run. In reality, the weighted average lending rate is almost below 200 basis points compared to a 9 percent lending rate. This suggests that the recent 50 basis points increase in the Repo rate has room for a rise in the weighted average lending rate. Increased lending rates due to cost consideration may lower the output with a declining impact on inflation. On the other hand, devaluation of the exchange rate will increase the export and inward foreign remittance with higher income. This is how the monetary conditioning index which is a balance between interest and exchange rate two arms of monetary policy works relying on the overall investment environment of our country subject to rationalization of lending interest rate cap for banks (Kader et al., 2021).

Figure 1: Aggregate Demand and Supply of the Economy
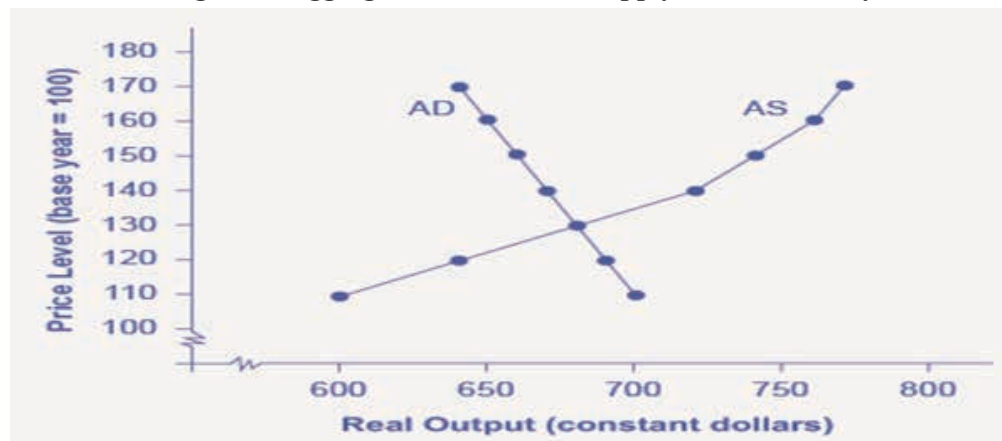
Source: (Zayed et al., 2018)

Figure 2: Long Term Phillips Curve
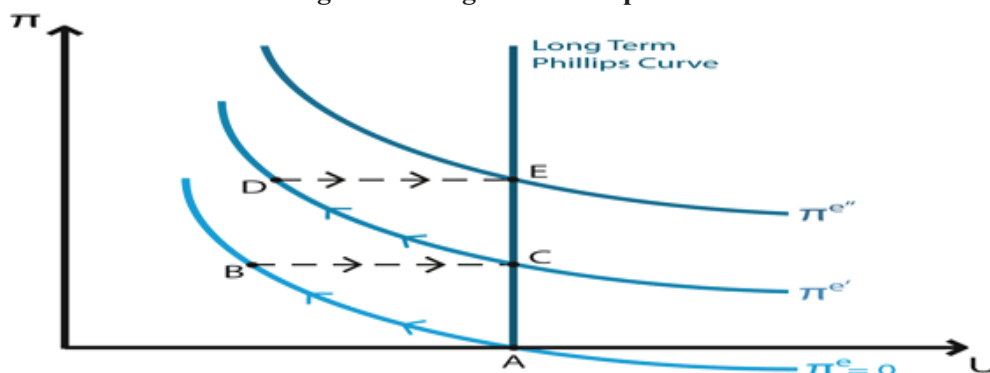
Source: (Zayed et al., 2018)

In the mentioned four sectors model, prudent fiscal and monetary policy creates effective demand balancing the productive manufacturing sector of industry, vibrant service sector, and favorable agricultural sector with rational subsidies and incentives. Net export and foreign currency remittance of the supply side match with the demand derived from consumption and investment, especially in the mega projects related to transport and energy. As we are in the process of graduating as a developing country facing an open economy, we need to use real interest rates and real exchange rates the tools of monetary policy derived from the monetary conditions index (MCI), for near (now casting) and medium term forecasting of GDP and inflation in relation to the autoregressive and structural model. Real exchange rate deviation from the trend and magnitude of real interest are crucial for following MCI in our economy to get more benefits. In this regard, a system of equations, among others related to GDP and inflation for capturing alternative scenarios along with baseline the domestic and global country-specific parameters will provide model-based results for diagnosis the real economic outcome like MCI practicing countries (Mishu et al., 2019).

To reduce the currency growth and lowering inflation, we need to increase the interest rate, which will reduce the devaluation pressure. In reality, only around 1 lac 16 thousand accounts (1 crore and above) control 70 percent of our total deposit. In such cases, higher interest rates will benefit them. However, to impact the above 10 crore bank account (marginal group of 30 percent), including big depositors, we need to raise interest rates in order to provide real return taking into account the loan concentration in large industry and trade sectors compared to the small business sector. In the exchange rate frontier, in the last 10 years, we have devaluated 25 percent. While India devaluated 35 percent. According to MCI, we have to prioritize between the real interest rate and real exchange rate. Our GDP size is more than 460 billion dollars. Export, import, and remittance amounted to around 150 billion dollars. Here, GDP deserves more priority in terms of interest rate stimulation. In the interest rate targeting monetary policy regime, the call money rate is the operating target. M2 and inflation are the intermediate target and ultimate target

respectively. Consequently, apart from balancing interest rate and exchange rate considering MCI, we need to address the inflation (goal) for the greatest good of the country bearing in mind consumer and producer surplus. For ensuring an effective monetary transmission mechanism, for example, a 75 basis points rise in policy rate (repo rate) may not increase the lending rate within the same order for lowering inflation at a higher rate, comparing GDP growth with slowing inflation expectation for increasing real return contributing enhanced purchasing power of the people and attracting foreign currency from abroad in the financial account of balance of payment along with lowering currency outside banks. As a market maker, Bangladesh Bank need to play a proactive role incorporating the right number for fixing lending rate and other rates for instance addressing the structural rigidity of the economy (Mishu et al., 2020a; Mishu et al., 2020b).

6. Keynesian /Classical /Neo-Classical Aggregate Demand and Supply relating to Output and Inflation of the Sectoral Model

In classical economy rise, inflation expectation and the labor wage rate are instantaneously adjusted with a 1 to 1 relation showing Y1 real GDP (Figure 3). Keynesian economy adjustment between price hike and the wage rate is 0 with Y2 output. While in the case of a neoclassical economy adjustment between expected inflation and the labor wage rate is moderate (0 to 1) with the highest real GDP (P3 and Y3). In Bangladesh, wage adjustment with inflation is moderate (Figure 4). Peer countries' point-to-point inflation rate, along with Bangladesh, is shown in Figure 5. In short, this is how output and inflation are related, taking into account sectoral economy (Rakhimova et al., 2021).
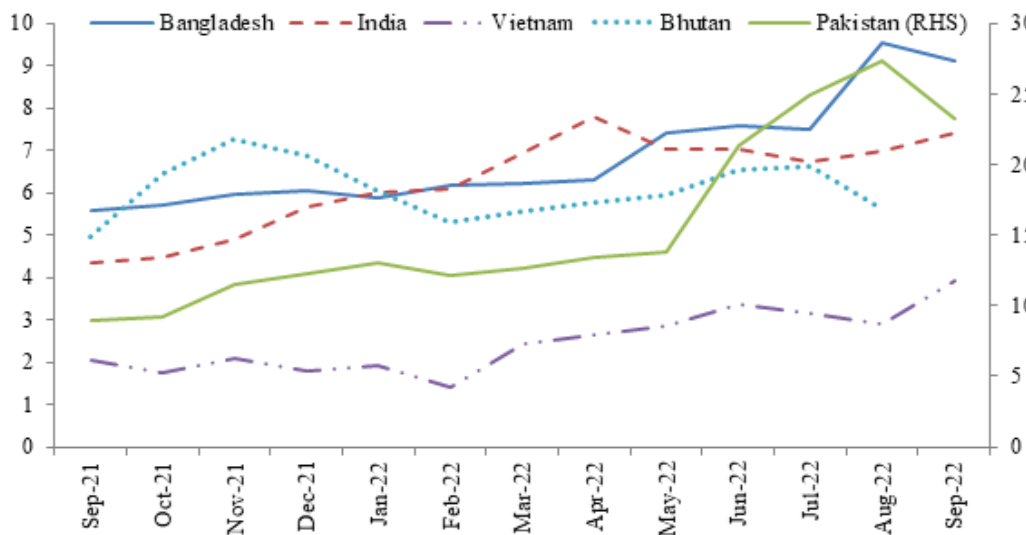
Figure 3: Interactions between Price and GDP
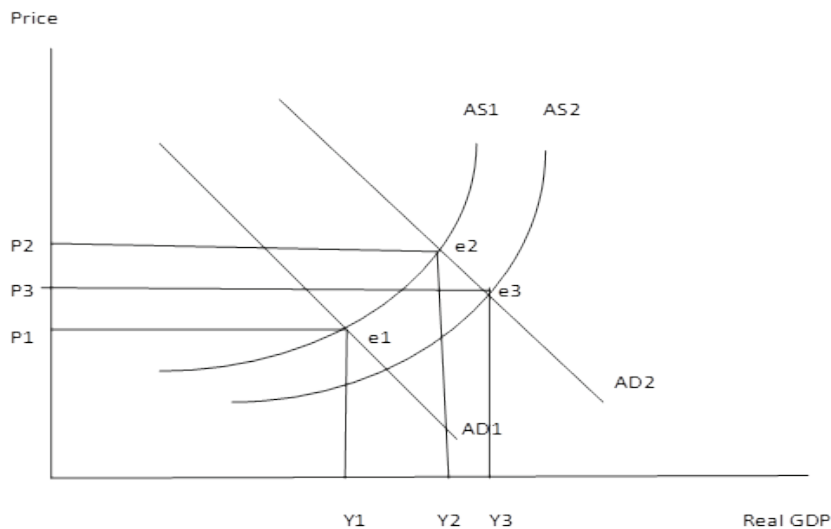
Source: Author's Derivation.

Figure 4: Wage Rate (Percentage Change, Point-to-Point)
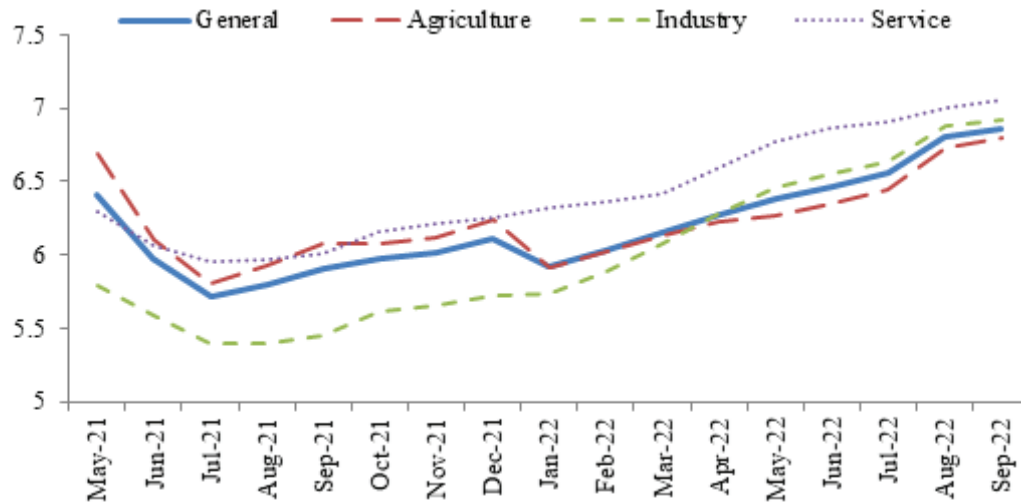
Source: (Statistics, 2023)

Figure 5: Point-to-Point Inflation in Peer Countries (In Percent)

Source: (Statistics, 2023; Bank, 2022).

7. Fundamentals of Microeconomics for Betterment of Sectorial Economic Policy Implications

In a society under perfect competition, we expect normal profit (profit equals revenue minus cost, which equals 0). Here, Total Revenue (TR) is the quantity (Q) times Price (P). The Average Revenue is TR divided by Q and Marginal Revenue (MR) is the

Change in TR dividing Change in Q. In the case of cost: the sum of Fixed Cost (FC) and Variable Cost (VC) is Total Cost (TC). Average Cost (AC) is derived from the sum of average fixed cost (FC dividing Q) and average variable cost (VC dividing Q). Accordingly, marginal cost changes in TC are divided by the change in Q. Economically, in the long run, P, AR, MR, AC, and MC all are equal under perfect competition, monopoly, and monopolistic competition. It may be noted that fixed P (price) results are always the same AR and MR. With all these revenue and cost variables, society assumes normal profit under perfect competition. But we are experiencing abnormal profit for some commodities mainly due to monopoly and monopolistic competition, which need to be addressed for maintaining the fundamental order of economic sectors for instance (Rahman et al., 2021).

8. BB's Proactive Role in Ensuring a Robust Economy

In our banking sector, around seventy percent of branches are in the urban area. Roughly fifty percent of our adults have bank accounts, and of them, only fifteen percent have access to credit. To encourage financial inclusion, we need to include marginal groups of society in the banking system. For poverty alleviation, considering different segment of population income the Gini coefficient disparity need to be addressed. At the same time, desired poverty reduction, optimum employment, zero carbon emissions, climate adaptation and carbon footprint dealing are the challenging issues of our economy, particularly with emphasis on fiscal and monetary policy interactions. Improving the transmission mechanism of monetary policy, which among others depends on cleaning BB's balance sheet off offloading (securitization) the blocked government securities rationalizing of devolvement of government treasury bills and bonds, and strengthening the domestic debt market. The development of policy instruments for Islamic banks is another crucial factor. Faster automation of the banking and financial sector needs to be addressed (Stepnov et al., 2021).

Proper address in the FinTech for crowd funding, peer-to-peer lending, and robo-advisory service for a tech-savvy person will stimulate especially the artificial intelligence and digital financing. In shariah-based Islamic banking prohibiting interest (riba), uncertainty (gharar) and gambling (maysir) and encouraging risk sharing (mudarabah), partnership (musharakah) and leasing (ijarah) will bring momentum in this sector, which share is around thirty percent in the banking system of Bangladesh. Macro-prudential policies, interest rate stress testing, cyclical capital buffers, implementation of Basel III and risk-based supervision rely on the stability of financial sector. Accountability to the government (ministry of finance) through regular Coordination Council meetings can be enhanced. Accountability to the national Parliament can be ensured through answering questions and providing a Governor brief to the Parliamentary Standing Committee. Public accountability can be dealt with through the release of the Monetary Policy Statement, Annual Report, and other research publications of BB taking into account the interactions of four sectors of the economy. For effective performance of four sectors strengthening of government revenue mobilization for investment, export diversification, enhancing foreign direct investment, digitization of the banking system, and ensuring quality and technical education for the young generation in order to exploit the benefit of demographic dividends

are required from economic and BB perspective as well (Shahriar et al., 2021; Zayed, 2015; Goncharenko et al., 2021).

9. Conclusion

Yearly derived economic numbers of the four sectors model is also regarded as a rolling plan in the national five-year plan. A country's economic benefits highly depend on the proper organizing of four sector variables such as GDP, inflation, interest rate, and exchange rate. The orderly composition of the four sectors' financial numbers is technically and fundamentally examined as a pivot element. The real, fiscal, monetary and external sectors understanding will help the policy makers, researchers and other stakeholders understand forming rational expectations for rapid development of the country with proper deploying of budgetary and monetary funds, ensuring accountability and transparency for enhancing welfare and development with special thrust on common people of the country.

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