The Impact of COVID-19 Pandemic on the Inflation Dynamics of Bangladesh: Lessons for Future Economic Policy Formulation

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Abstract

The intention of this policy note is to analyze the impact of the COVID-19 on the Inflation dynamics in Bangladesh. General, food, and non-food inflation trends at national, rural, and urban levels over pre-COVID-19 and COVID-19 periods have been investigated in this policy note. The sample period from January 2019 to February 2020 is considered as the pre-pandemic period and March 2020 to April 2021 as the pandemic period. Tables, graphs along with the correlation matrix are used to analyze the stated inflation dynamics. The investigation has resulted in a significant impact of COVID-19 on the inflation rate of Bangladesh in terms of increasing volatility which differs by rural and urban areas. Both food inflation and non-food inflation at national level experienced a considerable volatility in terms of standard deviation, but the fluctuations in food inflation are greater than those of non-food inflation. Another finding of this policy note is the relationship between general inflation with non-food inflation which is changing over time. Besides, the inflation dynamics of disaggregated non-food inflation showed higher inflation in the transport and communication, and medical care and health expenses and lower inflation of clothing and footwear, and gross rent, fuel & lighting. Observing the trends and correlation between inflation rates at aggregated level and disaggregated items of inflation, we found that price level stabilizing regulations relating to crisis-sensitive economic sectors e.g. medical services for COVID-19 is crucial to minimize unexpected inflation volatility during any crisis similar to the current one. In addition, maintaining self-sufficiency in major food items, creating adequate buffer food stocks and sufficient foreign reserves for food imports are also important to subdue the adverse price effects of the pandemic.

**Keywords:** Inflation, COVID-19

JEL Classification: E31

I. Introduction

COVID-19 pandemic is an unprecedented crisis for the modern world. Integration among countries across the globe through globalization has made the crisis unique in its kind. Bangladesh also could not avoid the impact of the pandemic. Bangladesh economy is facing diverse challenges to adapt to the crisis through balancing between life and livelihood. Price level is one of the important indicators that reflect the overall situation of an economy. So, investigating the dynamics of inflation under the COVID-19 situation deems to be important to understand the overall health of the economy. The lesson from this analysis will also be helpful

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[1]The authors of this policy note, *Md. Maidul Islam Chowdhury, Alok Roy, Nazmun Nahar Mily, and Dr. Sayera Younus* are the Joint Directors in the Research Department and Monetary Policy Department, Deputy General Manager, and General Manager respectively in the Research Department of Bangladesh Bank. Views expressed in the policy note are the authors own and do not reflect the views of the institution they work.

to get an insight into the required steps to be taken to face any future crisis similar to the current one.

The role of COVID-19 on inflation seems to be ambiguous theoretically due to the existence of factors pulling inflation in opposite directions. The factors like plummeting commodity prices, stumbling oil prices, and a depressed labor market may pull inflation down when large fiscal deficits and expansionary monetary policy may push inflation up. So, the presence of these factors resulting from COVID-19 with their relative strength may define the final trajectory of inflation in a country.

Graph 1: Fiscal Deficit (excluding foreign grants)
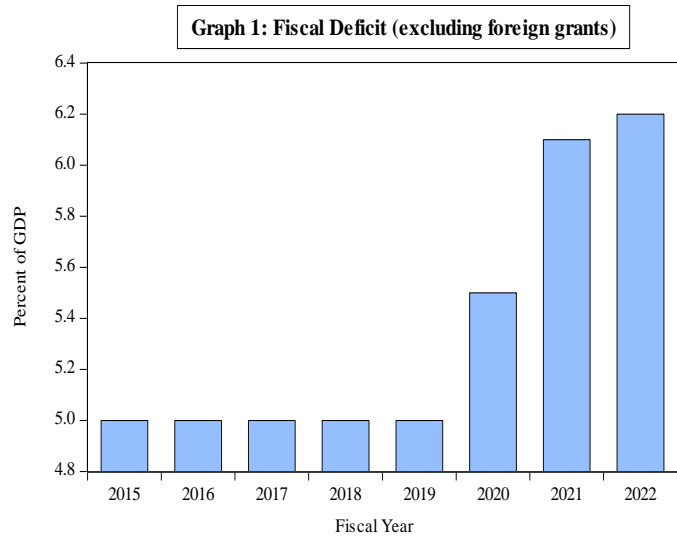
Source: Ministry of Finance, Bangladesh

The Government of Bangladesh with the collaboration of the Bangladesh Bank has announced a series of stimulus packages and refinance schemes equivalent to BDT1284.41 billion which is 4.59 percent of GDP to recover from the COVID-19 related economic losses. Accordingly, the budget deficit reached a record height in FY2021 to 6.1 percent of GDP which has been raised further to 6.2 percent of GDP for FY22.The increased budget deficit is supposed to affect inflation adversely. In addition to the increasing budget deficit, Bangladesh Bank pursued quantitative easing to absorb the shock of COVID-19 on the economy by lowering Cash Reserve Ratio (CRR), Repo Rate, Reverse Repo Rate, Bank Rate as shown in Graph 2 and raising Advance Deposit Ratio (ADR) from 85 percent to 87 percent for conventional banking and Investment

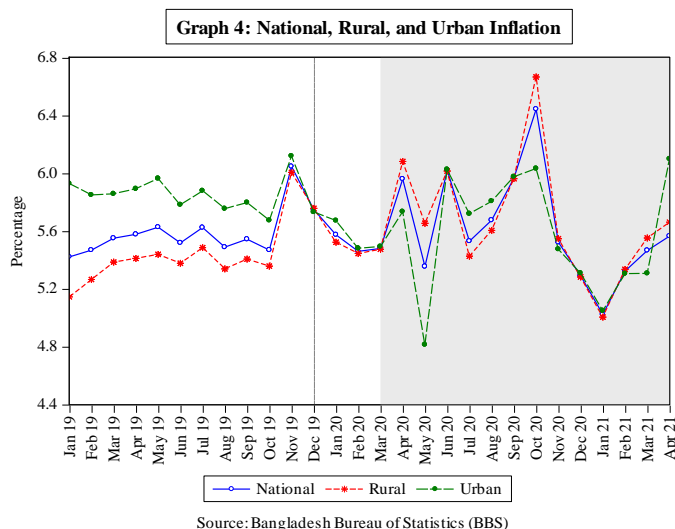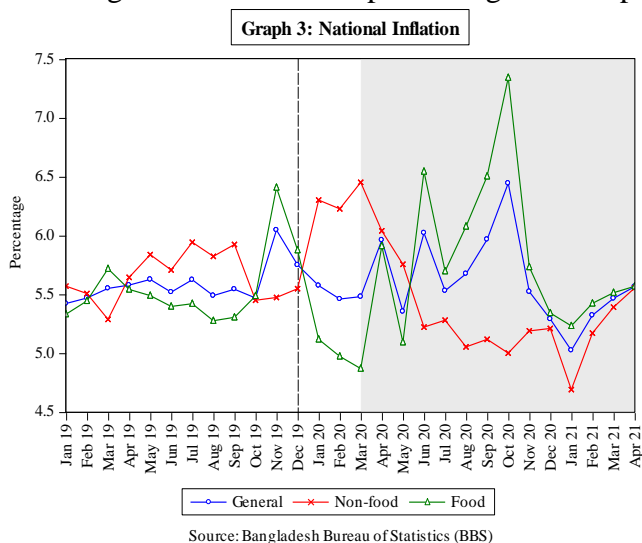**Graph 2: Quantitative Easing (QE) by Bangladesh Bank**
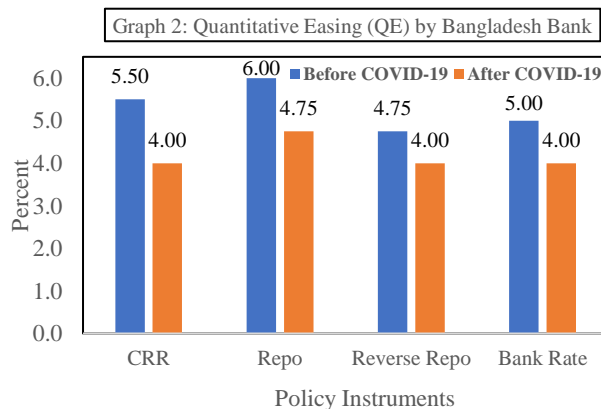
Source: Bangladesh Bank

Deposit Ratio (IDR) from 90 percent to 92 percent for Islamic banking. This may increase inflation further. On the other hand, depressed domestic demand during the pandemic for non-food items with decreasing world food price and oil price supposed to reduce inflation in Bangladesh. For instance, the world food price index continuously decreased from 93.87 in Jan'2020 to 85.43 in May'2020 when the average crude oil price decreased from USD61.63 per barrel in Jan'2020 to USD30.38 per barrel in May'20 (*The Pink Sheet-World Bank*). So, two opposite forces are active to determine inflation dynamics in Bangladesh at the advent of COVID-19.This policy note is an attempt to examine the impact of COVID-19 on inflation under the stated circumstances.

II. Impact of COVID-19 on Overall Inflation

Bangladesh has been experiencing a stable point-to-point or year-on-year (Y-o-Y) inflation rate

Graph 3: National Inflation

Source: Bangladesh Bureau of Statistics (BBS)

Graph 4: National, Rural, and Urban Inflation

Source: Bangladesh Bureau of Statistics (BBS)

of around 5.5 percent before the emergence of COVID-19. Then the first confirmation of COVID-19 in December 2019in China started to affect the whole world as China has a huge contribution to the world economy through its extraordinary manufacturing industry. However, Bangladesh economy started to suffer from COVID-19 since March 2020, the start of countrywide lockdown following the first official identification of the COVID-19 infection in the country. Graph 3 describes the national inflation of Bangladesh for the period from January 2019 to April 2021. The starting point of our sample is January 2019 since the whole year of 2019 was a stable one among the last few years in terms of the inflation rate of Bangladesh before the first emergence of the virus domestically. So, we have defined January 2019 to February 2020 as the *pre-pandemic period* and March 2020 to April 2021 as the *pandemic period*, shown as the shaded region in the Graph. It is easily observable from the graph that the inflation experienced comparative stability before February 2020, but then, the inflation became noticeably volatile implying that, COVID-19 might have a considerable impact on inflation as there was no significant economic shock other than COVID-19 in the stated period. COVID-19 altered the spending patterns of Bangladeshi consumers as people avoided restaurants, shopping malls, public transports, recreational spots, etc. which has the potential to redefine the inflation structure of Bangladesh as the regular typical combination of consumption basket items got changed, at least temporarily. As a result, the standard deviation of national general inflation increased from 0.16 in the pre-pandemic period to 0.37 in the pandemic period as given in Table 1.

Key Descriptive Statistics of Inflation Rate in Pre-pandemic (*Jan'2019 to Feb'2020*) and Pandemic Period (*Mar'2020 to Apr'2021*)

Table 1: National

	Pre-pandemic Period			Pandemic Period		
	General	Food	Non-Food	*General*	*Food*	*Non-Food*
Mean	5.58	5.48	5.73	*5.62*	*5.77*	*5.37*
Std. Dev.	0.16	0.35	0.30	*0.37*	*0.66*	*0.46*

Table 2: Urban

	Pre-pandemic Period			Pandemic Period		
	General	Food	Non-Food	General	Food	Non-Food
Mean	5.81	5.23	6.47	5.58	5.29	5.81
Std. Dev.	0.15	0.33	0.26	0.40	0.84	0.36

Table 3: Rural

	Pre-pandemic Period			Pandemic Period		
	General	Food	Non-Food	General	Food	Non-Food
Mean	5.45	5.60	5.18	5.66	5.99	5.03
Std. Dev.	0.21	0.38	0.47	0.41	0.64	0.59

Source: Authors' calculation based on BBS data.

Graph 4 shows the inflation dynamics of rural and urban areas along with the national level. Here we observe the co-movement of the national, rural, and urban inflation with comparative stability before the identification of the virus in Bangladesh. The inflation of urban areas has been hit harder by COVID-19 compared to the rural area in terms of the volatility associated with their trends. This scenario is also reinforced by the standard deviation of general urban inflation that increased from 0.15 to 0.40 (Table 2), when the standard deviation of general rural inflation increased from 0.21 to 0.41 (Table 3) in the pandemic period. However, the last three months of our sample as shown in Graph 4 indicates the possible return of the inflation rate to its pre-pandemic trend, but the second wave of COVID-19 triggered a new lockdown state in Bangladesh from mid-April 2021 which may affect the future trajectory of inflation in Bangladesh.

Now, let's shed light on the food and non-food inflation in parallel to the overall general inflation at national level. Both food inflation and non-food inflation at national level experienced considerable volatility, but the fluctuations in food inflation are greater than those of non-food inflation (Graph 3). From this token, the COVID-19 seems to have slightly more impact on food inflation compared to non-food inflation at national level. This observation is also supported by the change in the standard deviations of food and non-food inflation over the pre-pandemic and pandemic period as given in Table 1. The Tables (Table 1, 2, and 3) elaborates the key statistics of general, food, and non-food inflation for national, urban and rural levels over pre-pandemic and pandemic periods.

Pair-wise Correlation Coefficients of General, Food, and Non-Food inflation Rate in Pre-pandemic (*Jan'2019 to Feb'2020*) and Pandemic Period (*Mar'2020 to Apr'2021*)

Table 4: National

	Pre-pandemic Period			Pandemic Period		
	General	Food	Non-Food	General	Food	Non-Food
General	1.00	0.85	-0.19	1.00	0.90	0.02
Food		1.00	-0.68		1.00	-0.42
Non-Food			1.00			1.00

Table 5: Urban						
	Pre-pandemic Period			*Pandemic Period*		
	General	*Food*	*Non-Food*	*General*	*Food*	*Non-Food*
General	1.00	0.73	0.20	1.00	0.80	-0.18
Food		1.00	-0.53		1.00	-0.59
Non-Food			1.00			1.00

| Table 6: Rural						
	Pre-pandemic Period			*Pandemic Period*		
	General	*Food*	*Non-Food*	*General*	*Food*	*Non-Food*
General	1.00	0.77	0.11	1.00	0.88	0.19
Food		1.00	-0.54		1.00	-0.29
Non-Food			1.00			1.00

Source: Authors' calculation based on BBS data.

Table 4, 5, and 6 describes the association among general, food, and non-food inflation in terms of coefficient correlation at national, urban and rural levels incorporating pandemic effect. We observe that general inflation is positively correlated with food inflation when negatively correlated with non-food inflation before the pandemic. Besides, an analysis (given in the Appendix) to check the negative association between general and non-food inflation against different sample sizes shows correlation coefficient 0.18, -0.10, -0.27, and -0.39 for the sample Jan'2015–Feb'2020, Jan'2016–Feb'2020, Jan'2017–Feb'2020, and Jan'2018–Feb'2020 respectively which indicates that the association of general inflation with non-food inflation is changing over time. However, the association between general inflation and food inflation became stronger during the pandemic period largely due to consumers' high priority of food consumption during the pandemic.

III. Disaggregated inflation and sources of inflation volatility from COVID-19

The available data from Bangladesh Bureau of Statistics (BBS) disaggregates national inflation into food and non-food inflation when non-food inflation can be broken down into six categories: gross rent, fuel & lighting; clothing & footwear; transport & communications; medical care & health expenses; recreation, entertainment, education & cultural services; and miscellaneous. We have seen in section II that both food inflation and non-food inflation experienced volatile trajectories during the pandemic, but food inflation fluctuated around an average rate when non-food inflation maintained a declining trend. Now, we can analyze the components of non-food inflation to understand its overall trend since the emergence of COVID-19. Graph 5

Graph 5:Component-wise National Inflation
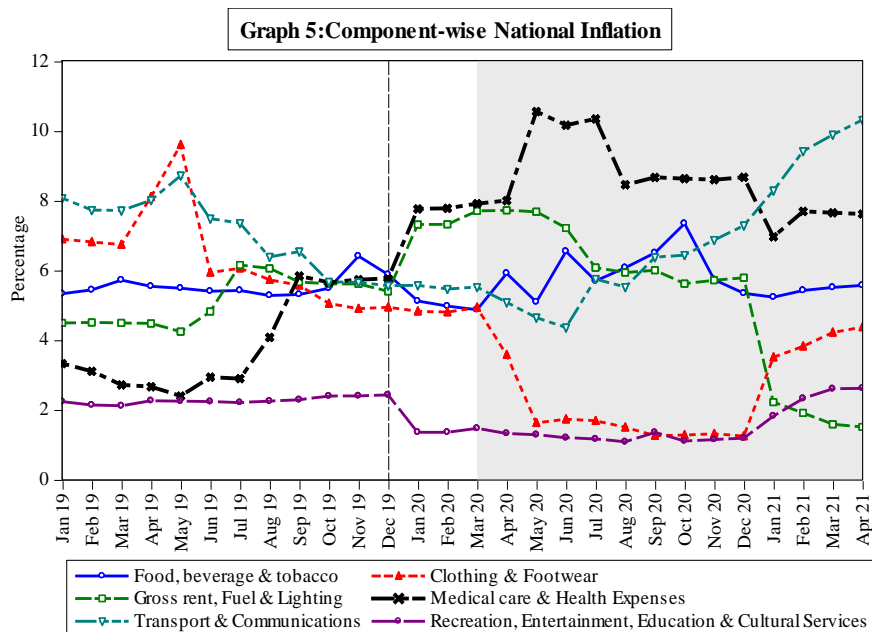
Source: Source: Bangladesh Bureau of Statistics (BBS)

shows that the overall volatility of disaggregated national inflation is higher during the COVID-19 period compared to the virus-free period. Here, we observe that inflation of recreation, entertainment, education & cultural services maintained a stable path. Most of the recreation spots and education institutions remained closed since the countrywide lockdown in response to COVID-19 spread in Bangladesh. On the other hand, online education has been introduced in the country which also didn't affect the contribution of education to the inflation. So, the inflation of recreation, entertainment, education & cultural services remained stable amid the COVID-19 pandemic.

Clothing and footwear experienced decreasing inflation due to a fall in its demand. People across the country prioritized food intake over clothing and footwear like non-food consumption which led to the falling demand for these products. Consequently, the inflation of clothing and footwear plummeted sharply.

Transport and communication inflation was in decreasing trend before the COVID-19 period. This trend sustained for some time in the beginning of the COVID-19 period which later started to rise. This trend can be explained by the policy taken by the government for transport and communication sector. According to the government policy, transports were allowed to take passengers in reduced number but with higher fare in the relaxed lockdown state which increased the overall price of the transport and communication sector. Eventually, the inflation of the sector increased sharply as shown in Graph 5.

Gross rent, fuel & lighting inflation rose slightly after the start of the COVID-19 period amid sharply decreasing world fuel price as the world fuel price was not adjusted domestically in Bangladesh. But from January 2021, the inflation declined sharply mostly contributed by the possible decrease in gross rent as the demand for the rental house in the cities and towns fell due to the people who lost their job because of COVID-19 lockdown started to return to the village.

Finally, medical care and health expenses increased sharply in the COVID-19 period due to an unprecedented increase in the health expenses resulting from the coronavirus infection. Though the inflation of medical care and health expenses was maintaining an increasing trend before the pandemic period, it experienced an upward structure shift due to COVID-19 as evident from Graph 5.

However, increased inflation of transport and communication, and medical care and health expenses failed to outweigh the decreased inflation of clothing and footwear, and Gross rent, fuel & lighting leading to decreased overall non-food inflation.

IV. Impact of COVID-19 on Inflation Compared to Neighboring Countries

We can have a brief observation on the impact of COVID-19 on the inflation in the neighboring countries of Bangladesh to have a comparative understanding of the impact of COVID-19 on the country-wise regional inflation. The impact of COVID-19 on the inflation rates of the stated countries along with Bangladesh is visible in Graph 6. We observe the same kind of picture for


Graph 6: Inflation in Neighboring Countries
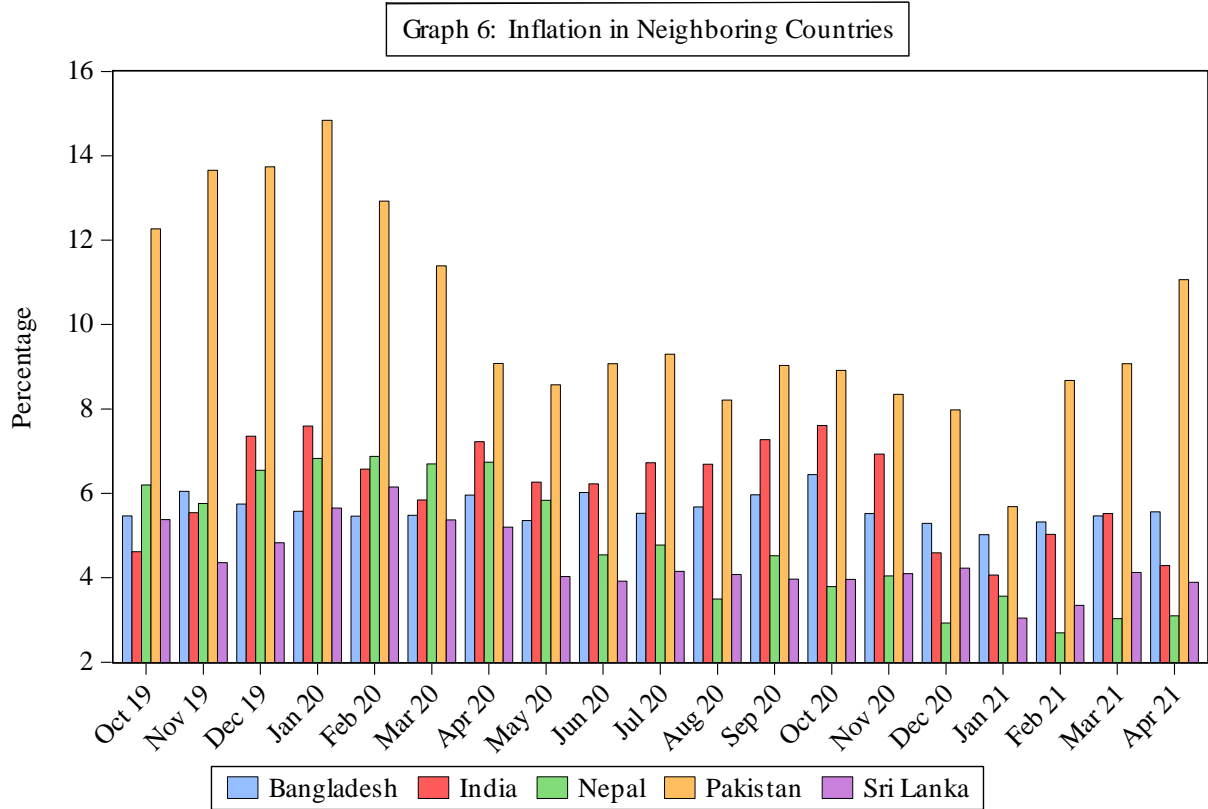
Source: International Financial Statistics (IFS)

Bangladesh, India, Nepal and Sri Lanka but the inflation trends of Pakistan slightly differ from the other countries during the pandemic period. Here, we observe an increasing inflation trend for all the neighboring countries of Bangladesh from the beginning of the pandemic which declined gradually showing similar co movement around the world.

V. Inflation Rate and Wage Rate Change

The relationship between inflation rate and unemployment is a familiar phenomenon in Economics known as the Phillips curve. So, our analysis of inflation rate dynamics amid the COVID-19 pandemic will be incomplete without discovering the possible relationship between inflation rate and unemployment scenario in Bangladesh during the pandemic, but the unavailability of unemployment data in the required frequency makes the analysis challenging for this policy note. So, we tried to use the wage rate index as a proxy of the unemployment rate in Bangladesh as wage rate and the unemployment rate has a close relationship. It can be considered that the unemployment rate to be high when the wage rate decreases and the lower unemployment rate when the wage rate increases (Phillips, 1958). Graph 7 demonstrates the possible relationship between the inflation and Y-o-Y wage rate changes i.e. wage inflation in Bangladesh perspective. Theoretically, we expect the wage inflation to be positively associated with the price inflation. In the Bangladesh case, we observe that wage inflation and price inflation maintained a positive relationship until January 2020. The price inflation started to decline after December 2019 and fell sharply in April 2020 just after the start of strict lockdown

in March 2020. The wage inflation fell to a record low in July 2020 and started to rise afterward. The increasing wage inflation with the rising price inflation in the last few months of our sample indicates possible recovery of Bangladesh economy, but the possible recovery is now threatened by the second wave of the pandemic. However, we can perceive from Graph 7 that price inflation and wage inflation did not maintain a coherent relationship in the pandemic period compared to the pre-

Graph 7: National Price Inflation and Wage Rate Inflation in Bangladesh

r= - 0.36 (Pandemic period)
Opposite movement of the variables
r=0.15 (Pre-Pandemic)

Inflation — Wage Rate Change (%)

Source: Source: Bangladesh Bureau of Statistics (BBS)

pandemic period. This is also shown by the correlation coefficient as shown in the graph. The coefficient of correlation between price inflation and wage inflation was 0.15 in the pre-pandemic period which changed to -0.36 in the pandemic period. So, the COVID-19 pandemic not only has affected the inflation dynamics of Bangladesh but also altered the relationship between the price inflation and the unemployment rate of the country.
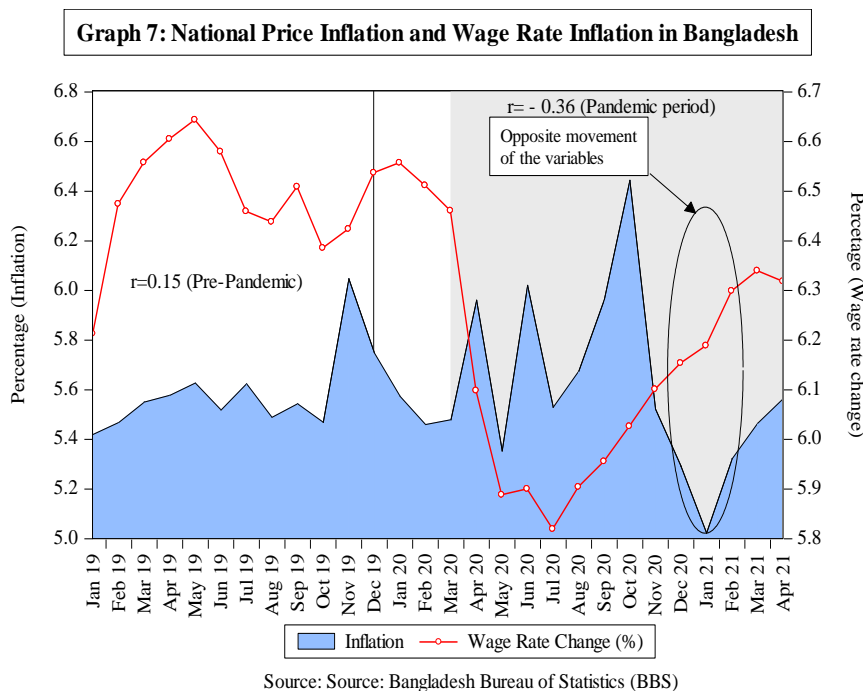
VI. Conclusion

The analysis of this policy note is indicating the multifarious impact of the COVID-19 pandemic on the inflation rate in Bangladesh. The volatility of the overall inflation rate increased when the food inflation rate and urban inflation rate experienced higher volatility compared to the non-food inflation rate and rural inflation rate respectively. The inflation dynamics of disaggregated non-food inflation shows increased inflation of transport and communication, and medical care and health expenses. Besides, the pandemic has increased the association between general inflation and non-food inflation in Bangladesh which underlines the importance of policy formulation focusing on the price level of food and beverage in a crisis like the ongoing one. Price level stabilizing regulations relating to crisis-sensitive economic sectors e.g. medical services for COVID-19 is crucial to minimize unexpected inflation volatility during any crisis similar to the current one. In addition, maintaining self-sufficiency in major food items, creating adequate buffer food stocks and sufficient foreign reserves for food imports are also important to subdue the adverse price effects of the pandemic. Comparing Bangladesh with her neighboring countries, there are noticeable similarities in inflation trends with India, Nepal during pandemic. So, the impact of COVID-19 in inflation dynamics seems to be largely similar in the South Asian region based on the experience of the stated countries. The policy note also sheds light on how COVID-19 has affected the relationship between price inflation and wage inflation in Bangladesh. The findings of the policy note show that both the direction and magnitude of the coefficient correlation between price inflation and wage inflation got altered in the pandemic period.

Correlation Coefficients of General, Food, and Non-Food Inflation at National Level for Different Periods

	Jan'2015-Feb'2020			Jan'2016-Feb'2020			Jan'2017-Feb'2020			Jan'2018-Feb'2020		
	General	Food	Non-Food	General	Food	Non-Food	General	Food	Non-Food	General	Food	Non-Food
General	1.00	0.34	0.18	1.00	0.42	-0.10	1.00	0.62	-0.27	1.00	0.67	-0.39
Food		1.00	0.86		1.00	-0.94		1.00	-0.92		1.00	-0.95
Non-Food			1.00			1.00			1.00			1.00

Source: Authors' calculation based on BBS data