Policy Note: PN1901

Have Inflation Dynamics Changed in Bangladesh?

July 2019

Chief Economist's Unit
Bangladesh Bank

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Abstract

Monetary policy aiming at price stability crucially depends on clear understanding of inflation dynamics. Unlike other developing and emerging market economies, GDP in Bangladesh has been growing at a faster pace in recent years without stoking inflation. At the same time, food and non-food inflation in Bangladesh have been moving in the opposite direction since the beginning of 2012, although they largely followed the same direction until 2011. These two developments together pose a question whether inflation dynamics have changed in Bangladesh. Given this backdrop, using monthly data we examine if the correlation of food and non-food inflation with their key drivers, such as global commodity price movements, nominal wage growth, and M2 growth, remained broadly in the same line in two periods: July 1995-December 2011 and January 2012- March 2019.We find an unusual large shift in the correlation of food and non-food inflation with M2 growth, nominal wage growth, and global commodity price changes in the latter period. To identify which commodities or commodity groups in CPI contributed to this change in the behavior of food and non-food inflation, we also analyzed commodity-wise CPI data. This analysis suggests that cereals other than rice, vegetable, fruits, and beverage items may have contributed to the change in the behavior of food inflation, while among the non-food items household furniture, transport equipment and maintenance, communication equipment and maintenance, recreation, education, household servants wage, and luxury may be responsible for the changing dynamics of non-food inflation. However, possibility of error arising from selection bias needs also to be looked into before drawing conclusion definitively.

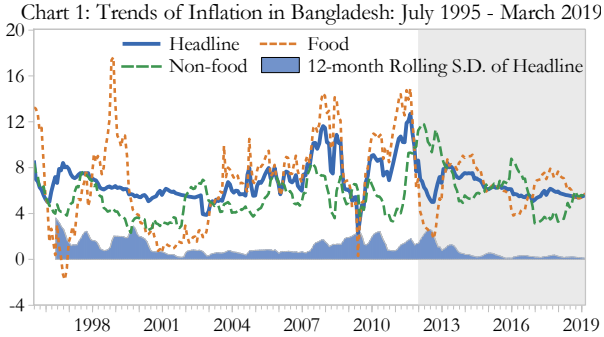
Introduction

Like many developing and emerging market economies, monetary policy in Bangladesh evolves to have two main objectives: price stability and higher inclusive growth. However, price stability is the overriding objective of monetary policy, as low and stable inflation generally helps improve private sector's resource allocation and thereby attaining higher output growth and employment. Monetary policy aiming at price stability crucially depends on the clear understanding of inflation dynamics, along with sound knowledge about monetary transmission mechanism, and nature of external shocks affecting the economy (Anand *et al*, 2014).

Historically Bangladesh often experienced high and volatile inflation, originated mostly from domestic as well as global supply shocks. The level of headline inflation and its volatility were mostly dominated by food inflation because of its large share in the consumption basket. Driven by global commodity price shocks, headline CPI inflation (y/y) picked up to 12.66 percent in September 2011 and then started falling and came down to 5.55 percent in March 2019. This falling trend of inflation is characterized by a significant decline in its volatility (Chart 1). The volatility of headline inflation measured by standard deviation declined from 2.84 percent in July 1995-December 2011 to 0.86 percent in January 2012-March 2019. Moreover, the falling inflation since 2012 coincided with a faster GDP growth in Bangladesh.

[1] The note has been prepared jointly by Khan Md. Saidjada and Syeda Ishrat Jahan. Currently, they are working as Joint Director at the Chief Economist's Unit in Bangladesh Bank. Views expressed in this paper are authors' own. Comments can be sent to: khan.saidjada@bb.org.bd

Chart 1: Trends of Inflation in Bangladesh: July 1995 - March 2019



Source: Bangladesh Bureau of Statistics (BBS) and authors' calculation

Table 1: Key Features of Inflation in Bangladesh

		Jul. 1995-Dec. 2011			Jan. 2012- Mar. 2019		
		Headline	Food	Non-food	Headline	Food	Non-food
	Mean	6.24	6.93	5.16	6.20	6.15	6.37
	Std. Dev.	2.84	4.12	1.57	0.86	1.80	2.30
Correlation	Headline, Food		0.98			0.60	
	Headline, Non-food		0.53			0.24	
	Food, Fon-food		0.36			-0.63	

Source: Authors' calculation based on BBS data
Period1: Jul 1995-Dec2011; Period 2: Jan. 2012-Mar. 2019

Because of their feedback to each other through wage-price relationship, food and non-food inflation generally follow the same direction[2] which had been observed in Bangladesh until 2011. Surprisingly, they started moving in the opposite direction since the beginning of 2012, while comparable countries in South Asia, such as India, Pakistan, and Sri Lanka, continued to show the positive association between food and non-food inflation (Chart A1 in appendix).

The opposite movements of food and non-food inflation have coupled with a decline in mean and volatility of food inflation and a rise in mean and volatility of non-food inflation (Table 1). The mean and standard deviation of food inflation edged down to 6.15 percent and 1.80 percent in January 2012-March 2019 period (henceforth period 2) from 6.93 percent and 4.12 percent in July 1995-December 2011 (henceforth period 1), respectively, whereas mean and variance of non-food inflation inched up to 6.37 percent and 2.30 percent from 5.16 percent and 1.57 percent, respectively. Therefore, the recent fall in headline inflation and its volatility can be attributed partly to a decline in food inflation and its volatility and partly to the opposite movements of food and non-food inflation.

Another notable feature of current inflation process is a weaker relationship of both food and non-food inflation with headline inflation, in the absence of any major change in the weight composition in CPI[3]. The correlation of food and non-food inflation with headline inflation declined to 0.60 and 0.24 in period 2 from 0.98 and 0.53 in period 1, respectively.

A faster GDP growth along with moderate inflation in recent years and the opposite movements of food and non-food inflation pose a question whether inflation dynamics have changed in Bangladesh. Given this backdrop, using monthly data we examine if the correlation of food and non-food inflation with their key drivers, such as global commodity price movements, nominal wage growth, and M2 growth, remained broadly in the same line in two periods: July 1995-December 2011 and January 2012- March 2019. In addition, to identify which commodities or commodity groups in CPI contributed to this change in the

[2] There is a possibility of some lags in the positive association between food and non-food inflation.

[3] Bangladesh Bureau of Statistics (BBS), which is responsible for calculating and publishing inflation numbers, changes its CPI's base year every 10 years. BBS currently uses 2005-06 as the base year for CPI, where the weight of food items declined slightly to 56.18 percent from 58.84 percent in the previous base year 1995-96. The weight of commodities in the CPI basket comes from the Household Income and Expenditure Survey (HIES) conducted by BBS every five years.

behavior of food and non-food inflation, we also compared the association of inflation in various groups of CPI items with food and non-food inflation in two periods.

Global Commodity Price Movements and Inflation in Bangladesh

Chart 2a: Food Inflation and Non-energy Commodity Price growth (%)in Global Market: July 1995 - December 2012

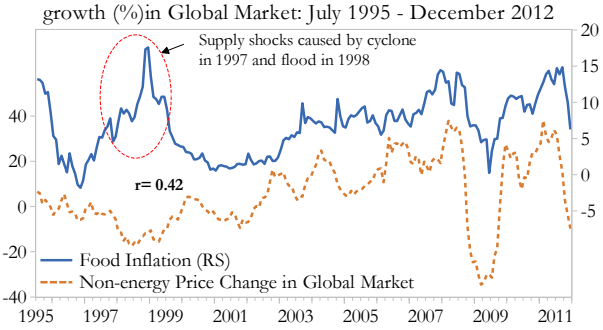


Chart 2b: Food Inflation and Non-energy Commodity Price growth (%) in Global Market: January 2012 -March 2019

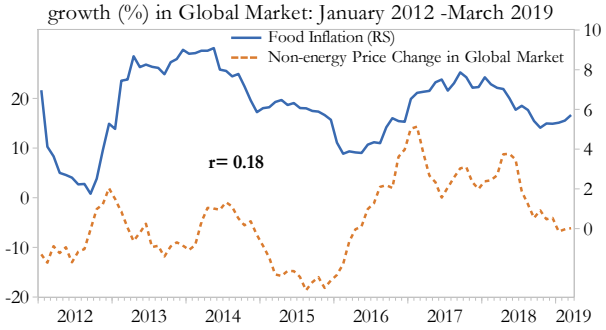
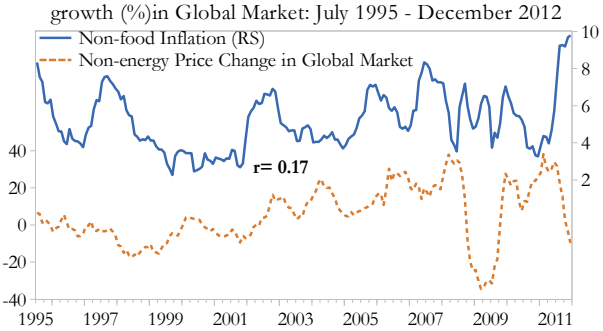
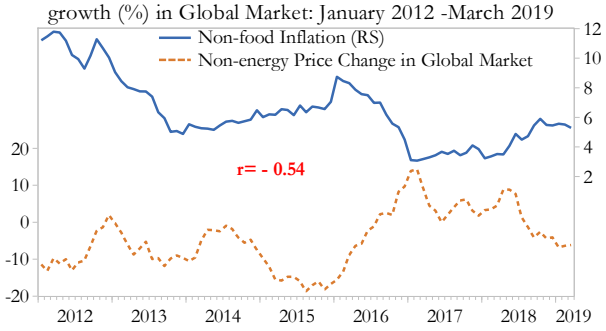


Chart 3a: Non-food Inflation and Non-energy Commodity Price growth (%)in Global Market: July 1995 - December 2012



Sources: BBS; World Bank

Chart 3b: Non-food Inflation and Non-energy Commodity Price growth (%) in Global Market: January 2012 -March 2019



Sources: BBS; World Bank

In a globally integrated economy, domestic prices are often subject to external price shocks, and the degree of influence of such shocks depends on whether the country is a net importer or exporter. Since Bangladesh is a small net importer in the global market and its integration with the global economy is increasing over time, one would anticipate a stronger positive association between global and domestic price movements in period 2 than in period 1. Although both food and non-food inflation were positively associated with global commodity price changes in period 1, their association moved against the anticipation in period 2. The correlation between food inflation and global commodity price changes declined considerably to 0.18 in period 2 from 0.42 in period 1, and the correlation between non-food inflation and global commodity price changes unusually became negative (- 0.54) in period 2 from positive (0.17) in period 1. Although the decline in positive correlation between food inflation and global commodity price changes could partly be attributed to a gradual improvement in food production in Bangladesh in recent years, the underlying reasons of the negative correlation between non-food inflations and global commodity price changes in period 2 is not clearly discernible at this stage. However, this change in correlation of food and non-food inflation with global commodity price changes implies that domestic factors have become more influential in explaining current inflation in Bangladesh.

Nominal Wage Growth and Inflation

In a developing country like Bangladesh, where food items constitute more than half of the consumption basket, high inflation, particularly food inflation, quickly feeds into wage growth and thereby non-food inflation, playing a pivotal role in forming inflation expectation. Therefore, it is reasonable to believe that both food and non-food inflation hold a positive correlation with nominal wage growth, which is observed in period 1. The magnitudes of correlation of food and non-food inflation with nominal wage growth were 0.21 and 0.29 respectively, in period 1 (Chart 4a and 5a). Surprisingly, food inflation and wage growth showed negative correlation (- 0.40) in period 2, while the positive correlation between non-food inflation and wage growth became even stronger (0.82)[4] (Chart 4b and 5b). This stronger positive association between non-food inflation and wage growth in period 2 points to a significant rise of non-food items' share in consumption expenditure, although BBS has kept the weights of food and non-food items in CPI unchanged since 2005-06.

Chart 4a: Food Inflation and Nominal Wage Growth (%): July 1995- December 2011

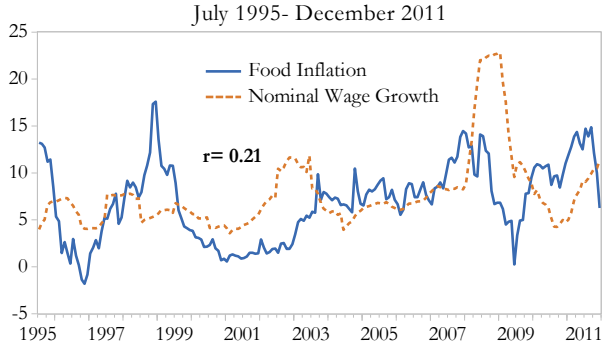


Chart 4b: Food Inflation and Nominal Wage Growth (%): January 2012-March 2019

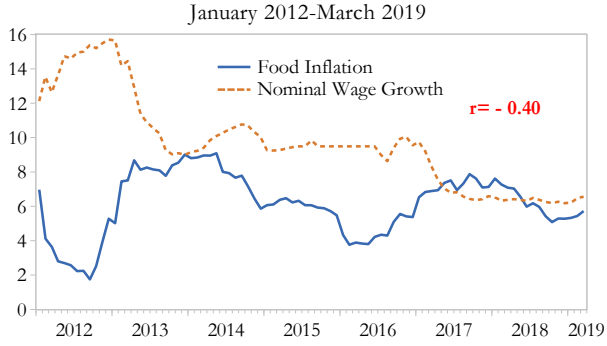
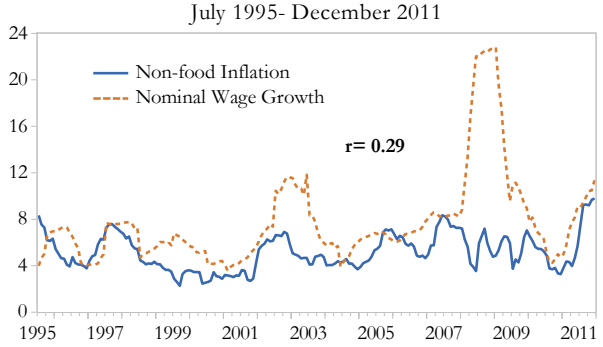
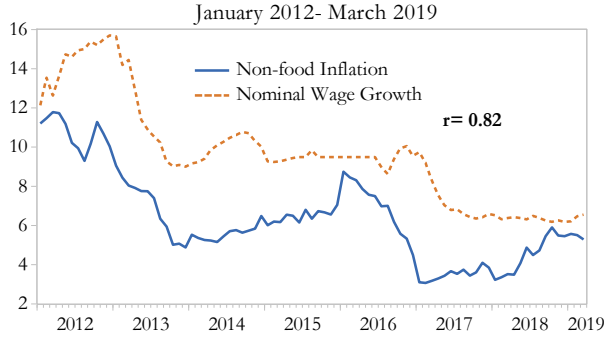


Chart 5a: Non-food Inflation and Nominal Wage Growth (%): July 1995- December 2011



Source: BBS

Chart 5b: Non-food Inflation and Nominal Wage Growth (%): January 2012- March 2019



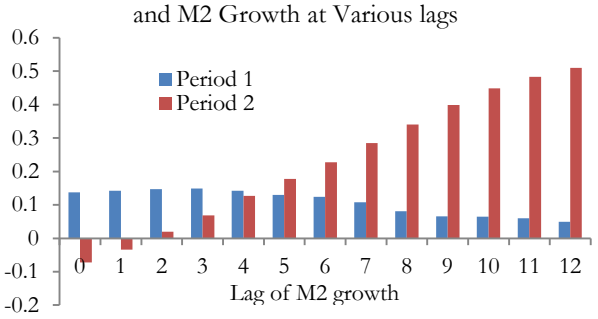
Source: BBS

[4] Because of a strong possibility of a transmission lag in the relationship between inflation and wage growth, we have also examined the correlation of food and non-food inflation with various lags of wage growth. But, our conclusion remained unchanged.

Broad Money (M2) Growth and Inflation

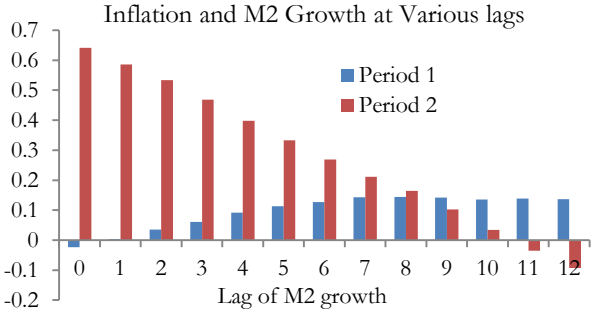
Following the quantity theory of money, Bangladesh Bank conducts its monetary policy within a monetary targeting framework, where broad money (M2) is considered as the intermediate target. The quantity theory of money assumes a positive relationship between money growth and inflation, although there is a transmission lag in this relationship from money to inflation. In this case, we examine whether the relationship between inflation (food and non-food) and M2 growth at various lags remained similar in these two periods. Since monetary policy cannot deal well with inflationary pressure originated from external sources, such as global commodity price shock, we, therefore, remove the impact of global commodity price shocks from domestic inflation before calculating correlation between M2 growth and inflation[5].

Chart 6a: Correlation between Food Inflation and M2 Growth at Various lags



Source: Authors Calculation based on BBS and Bangladesh Bank data

Chart 6b: Correlation between Non-food Inflation and M2 Growth at Various lags



Source: Authors Calculation based on BBS and Bangladesh Bank data

Period-wise correlation of M2 growth with food and non-food inflation appeared in Chart 6a and 6b looks like a mirror image of each other. Chart 6a depicts a moderate positive contemporaneous correlation (0.14) between M2 growth and food inflation in period 1, which increases slightly as the lag of M2 growth increases to 3 (month) and then decays slowly with further increase in lag. In period 2, this correlation becomes positive at the 2nd lag of M2 growth and it increases steadily to 0.51 as the lag increases to 12, suggesting a considerable transmission lag from money growth to food inflation in period 2.

Contrary to food inflation, the correlation between M2 growth and non-food inflation (Chart 6b) becomes positive at the 2nd lag of M2 growth and creeps up slowly to 0.14 as lag rises to 12 in period 1, while, in period 2, this correlation is strongest (0.64) at lag 0 and it becomes weaker as lag increases. In sum, the correlation of money growth with food and non-food inflation experienced a considerable unusual shift between these two periods.

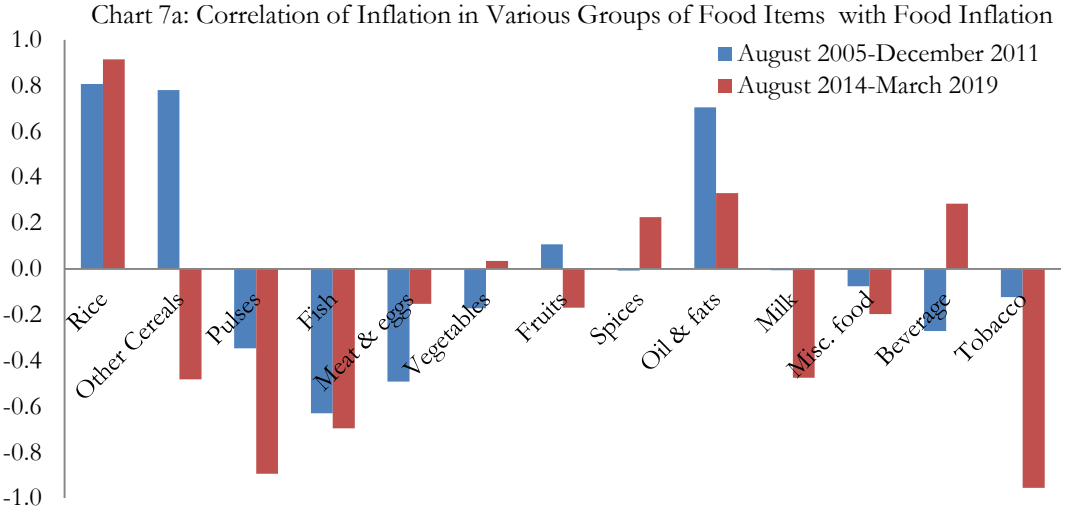
Association of Various Commodity Groups with Food and Non-food Inflation

Given the above findings, it is crucial to understand which commodities or commodity groups in CPI contributed to this change in the behavior of food and non-food inflation. This analysis requires commodity-wise CPI data. Although the sample periods of this study covers the period July 1995 - December 2011 and

[5] To remove the impact of global commodity price shocks on domestic inflation, we regress domestic inflation on global commodity price changes. Then, we calculate the correlation between the residuals of this regression and M2 growth.

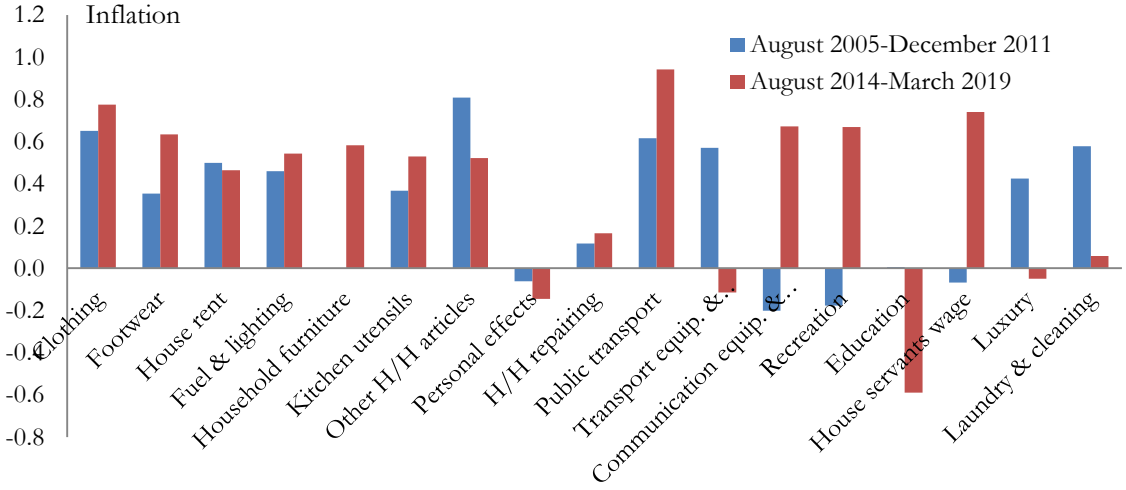
January 2012 - March 2019, we were able to collect commodity-wise CPI inflation data for the period August 2005-December 2011 and August 2014-March 2019. Notwithstanding, we calculate correlation of inflation in various groups of CPI items with food and non-food inflation using this limited data and compare them between these two periods (August 2005-December 2011 and August 2014-March 2019) to indentify the underlying drivers of this change in the behavior of inflation in Bangladesh. In the absence of any major change in inflation process, we expect that these correlations will remain in the same line in the two periods. Period-wise correlations of inflation in various groups of food items with food inflation are presented in Chart 7a. Although the correlation of inflation in most groups of food items with food inflation remained in the same line in the two periods, the correlation of cereals other than rice, vegetable, fruits, and beverage with food inflation went in the opposite direction, implying that they may have contributed to the changing behavior of food inflation.

Chart 7a: Correlation of Inflation in Various Groups of Food Items with Food Inflation



Source: Authors' calculation based on BBS data

Chart 7b: Correlation of Various Non-food Commodity Sub-groups Inflation with Non-food Inflation



Source: Authors' calculation based on BBS data

Similarly, the correlation of inflation in various groups of non-food items, such as household furniture, transport equipment and maintenance, communication equipment and maintenance, recreation, education, household servants wage, and luxury with non-food inflation moved in the opposite direction in two period (Chart 7b), suggesting that these groups of non-food items may have played role behind the changing behavior of non-food inflation.

Conclusion

Monetary policy pursuing price stability requires clear understanding of domestic inflation process. Unlike other developing and emerging market economies, GDP in Bangladesh has been growing at a faster pace in recent years without stoking inflation. At the same time, food and non-food inflation in Bangladesh have been moving in the opposite direction since the beginning of 2012, although they broadly followed the same direction until 2011. Therefore, it is not unreasonable to suspect a change in inflation dynamics in Bangladesh. Given this backdrop, using monthly data we examine if the correlation of food and non-food inflation with their key drivers, such as global commodity price movements, nominal wage growth, and M2 growth, remained broadly in the same line in two periods: July 1995-December 2011 and January 2012-March 2019. We find an unusual large shift in the correlation of food and non-food inflation with M2 growth, nominal wage growth, and global commodity price changes in the latter period.

The dilution of the correlation between inflation and global commodity price movements during January 2012- March 2019 suggests that domestic factors have become more influential in determining recent inflation in Bangladesh. However, the associations of wage and M2 growth with food and non-food inflation implies that factors other than nominal wage and M2 growth are responsible for this changing behavior of recent inflation.

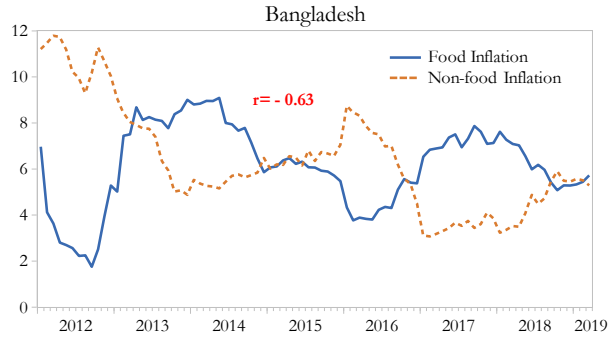
To assess which commodities or commodity groups in CPI contributed to this change in the behavior of food and non-food inflation, we compare the correlation of inflation in various groups of CPI items with food and non-food inflation between the periods (August 2005-December 2011 and August 2014-March 2019).Generally, we expect that these correlations will remain in the same line in the two periods in the absence of any major change in inflation process. We find that although the correlation of inflation in most groups of food items with food inflation remained in the same line in the two periods, the correlation of cereals other than rice, vegetable, fruits, and beverage with food inflation went in the opposite direction. In case of non-food category, the correlation of inflation in various groups of non-food items, such as household furniture, transport equipment and maintenance, communication equipment and maintenance, recreation, education, household servants wage, and luxury with non-food inflation moved in the opposite direction in two period. These results suggest that cereals other than rice, vegetable, fruits, and beverage items may have contributed to the change in the behavior of food inflation, while among the non-food items household furniture, transport equipment and maintenance, communication equipment and maintenance, recreation, education, household servants wage, and luxury may be responsible for the changing dynamics of non-food inflation. However, possibility of error arising from selection bias needs also to be looked into before drawing conclusion definitively.

Reference

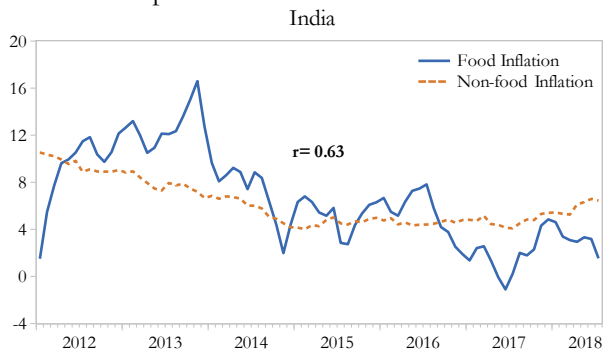
Anand, Rahul, Ding Ding, and Volodymyr Tulin (2014), Food Inflation in India: The Role for Monetary Policy, IMF Working Paper 14/178 (Washington, International Monetary Fund).

Appendix

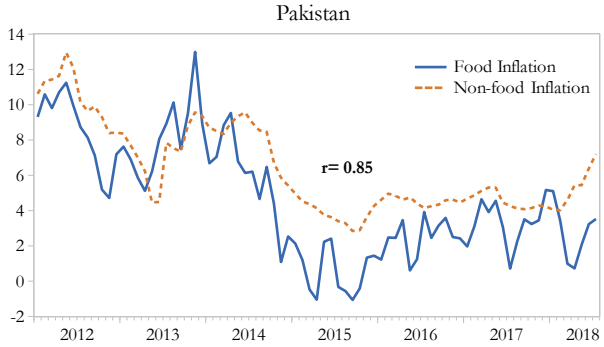
Chart A1: Trends of Food and Non-food Inflation in Comparable South Asian Countries



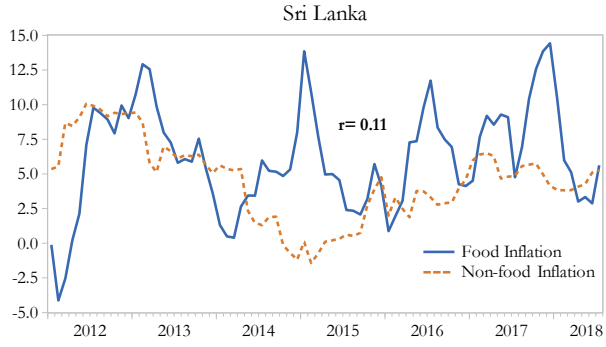
Source: Bangladesh Bureau of Statistics



Source: International Monetary Fund



Source: International Monetary Fund



Source: International Monetary Fund