PAU

Inflation in Bangladesh: Does the Changing Consumption Pattern Affect Its Measurement?

March 2008

Policy Paper: 0802

Policy Analysis Unit
Bangladesh Bank

Inflation in Bangladesh: Does the Changing Consumption Pattern Affect Its Measurement?[1]

1. Background

For ensuring macroeconomic stability, inflation control is an important objective of monetary policy in Bangladesh. It is maintained that low inflation in general helps to improve resource allocation, fosters market development and private investment, and promotes rapid and stable economic growth. Since ensuring price stability is one of the prime objectives of the country's monetary policy, the latest monetary policy statement of the Bangladesh Bank aims to promote rapid growth with price stability and provide support to the accelerated pace of employment creation and income generation, especially for the poor and the disadvantaged people.[2]

In Bangladesh, price stability is measured by changes in the consumer price index (CPI) inflation. However, as a guide to assessing price stability, CPI inflation has two major implications. *First,* it is likely that there exist some volatile and non-trend components within the CPI as it is measured in Bangladesh. As a result, the sources of short term fluctuations in CPI may lie in components that are transitory and reversible; some of which may be characterized by supply-side shocks or other non-monetary events. It is important, therefore, to exclude the impact of these transitory phenomena in measuring price level changes for the purpose of policy decisions of the monetary authority.[3] *Second,* the CPI in Bangladesh is calculated using Laspeyre's index with base year quantity as fixed weights. These weights are periodically updated using the consumption baskets from the household income and expenditure surveys conducted by the Bangladesh Bureau of Statistics (BBS). The current practice is to use the average weights in rural and urban areas to estimate corresponding CPIs. Obviously, the choice of weights has significant implications for estimating the level of inflation and consequently assessing changes in the welfare of the people due to general price movements in the economy. In particular, decisions regarding specific goods and services to be included in the consumption basket, weight to be assigned to each of these consumption goods, regular monitoring of prices in the market, and timely updating of the base weights to reflect the changing consumption pattern of the people play substantial roles in determining food and non-food inflation as well as inflation rates in rural and urban areas in the country.[4]

---

[1] This Policy Paper has been prepared by Dr. Md. Akhtaruzzaman, Senior Research Economist, Md. Habibour Rahman, Research Economist, and Mohammad Abul Kashem, Assistant Director, Policy Analysis Unit, Bangladesh Bank. The authors are highly grateful to Dr. Mustafa K. Mujeri, Chief Economist, Bangladesh Bank for his valuable comments and constant guidance in preparing this note. His overall intellectual guidance and editing of earlier drafts are deeply appreciated without which the note could not have been published at this stage.

[2] See, *Monetary Policy Statement January-June 2008,* Bangladesh Bank, 10 January 2008.

[3] For separating out these effects, central banks in many countries monitor core inflation as a short term operational guide to monetary policy formulation.

[4] In an agrarian economy like Bangladesh, a large proportion of the people lives in the rural areas and depends on agriculture and informal activities for livelihood. Since a large majority of them are poor (estimated at 28.4

This note examines how changes in the consumption pattern as derived from the household income and expenditure surveys (HIES) of 1995/96 and 2005 affect the average weights of included goods in the CPI and consequently the level of inflation in the economy. For the purpose, the analysis re-calculates inflation rates for recent years using new weights derived from 2005 HIES and compares the results with the inflation rates currently used having weights from 1995/96 HIES. The note also makes a brief assessment of the implications of using the average weights in the consumption basket rather than using specific weights representing different expenditure groups. Finally, some policy implications are provided.

2. Constructing the CPI: Current Approach

The responsibility of constructing the CPI in Bangladesh rests with the BBS. For calculating the CPI, BBS currently uses commodity-wise expenditure shares from 1995/96 HIES as base year weights.[5] Although the 2005 HIES data are available, BBS has not as yet adopted new weights from the latest HIES. As such it is apprehended that there might have taken place important changes in the pattern of household expenditure across different commodities since 1995/96 leading to changes in their relative importance in terms of weights of different commodities across income/expenditure groups and over regions (e.g. rural and urban areas). It is important, therefore, to examine the implications of changing weights on CPI inflation using HIES 2005 data and the potential impact of price developments on household welfare.

Consumption bindle and weights of CPI

The present practice followed by BBS is to compile CPIs for rural and urban areas separately using appropriate price data and relevant weights. The national CPI (CPI-N) is taken as the weighted average of the CPIs for rural and urban areas, with a weight of 70.9 percent for the rural CPI (CPI-R) and 29.1 percent for urban CPI (CPI-U). These weights reflect the population shares in respective areas. The consumption pattern and the weights currently used in the CPI are taken from 1995/96 HIES, and the 1995/96 prices are taken as base year prices.

For each of the above categories, three sub-categories are also distinguished, e.g. food CPI, non-food CPI, and general CPI (which is the weighted average of food and non-food CPIs

---

percent in urban areas and 43.8 percent in rural areas in 2005), their share of expenditure on food items in total expenditure is usually high and they derive a high share of nutrition from a few food items, mostly rice. The price of the staple food (rice) shows significant volatility, especially in recent years, due to fluctuation in supply, seasonal shortages, and supply disruptions caused by natural disasters like floods and cyclones. The weight in food items in the CPI is also high in other South Asian countries like India and Pakistan. In India, for example, food items have a weight of around 57 percent in the CPI for industrial workers and the food weight in the CPI basket is more than 49 percent in Pakistan.

[5] In Bangladesh, the CPI is calculated on the basis of Laspeyre's formula with base year quantity (households' commodity-wise expenditure shares) as fixed weight: $\text{CPI} = \sum \frac{P_1 W_0}{P_0 W_0} X 100$. In the past, the weights used in estimating CPI inflation referred to different years such as 1969/70, 1973/74, and 1985/86.

with respective expenditure shares adopted as weights). The weights are determined on the basis of marginal budget (expenditure) shares of sample households covered in 1995/96 HIES. However, there are variations in number of items in the CPI basket across commodity categories and between rural and urban areas. The consumption bundle underlying CPI-R consists of 215 commodities and services whereas CPI-U has 302 items. The list of items in terms of broad groups along with their corresponding weights is given in Table 1.

From Table 1, the following major characteristics of the consumption bundle may be noted:

- In rural areas, food, beverage, and tobacco group has 106 items with a total weight of 63 percent; whereas this group has 113 items having a weight of nearly 49 percent in urban areas;
- The non-food group has 109 items with a weight of 37 percent in rural areas compared with 189 items having a combined weight of 51 percent in urban areas;
- The weight of food sub-category is nearly 61 percent in rural areas, which is around 45 percent in urban areas;[6]
- In the non-food category, gross rent, fuel, and lighting group has the highest weight, nearly 15 percent and 22 percent in rural and urban areas respectively.

Table 1: Consumption basket and weights in CPI

Items	CPI-rural		CPI-urban	
	No. of items	Weights (%)	No. of items	Weights (%)
I. Food, beverage, and tobacco	**106**	**62.96**	**113**	**48.80**
Food	99	60.48	104	44.53
Beverage	3	0.96	3	2.40
Tobacco and products	4	1.52	6	1.87
II Non-food	**109**	**37.04**	**189**	**51.20**
Clothing and footwear	33	6.88	48	6.79
Gross rent, fuel and lighting	6	14.69	13	22.17
Furniture, household equipment	28	2.70	37	2.58
Medical and health expenses	5	2.79	16	2.97
Transport and communication	11	2.98	22	7.07
Education, recreation, others	11	3.20	19	6.40
Misc. goods and services	15	3.80	34	3.22
Total	**215**	**100**	**302**	**100**

Source: BBS

From the table, it can be seen that the consumption bundles and the weights underlying CPI-R and CPI-U have significant differences in Bangladesh. In urban areas, the number of items included in the consumption bundle is significantly higher (302 in urban areas compared with 215 in rural areas), which can largely be attributed to higher coverage of non-food items in the urban areas (109 in rural areas and 189 in urban areas). In terms of composition of weights, CPI-R has a higher dependency on food category (by nearly 16 percentage points) than CPI-U. Similarly, the weight of rice is more than double at 24

[6] Of this, the weight of cereals is nearly 27 percent (rice 24 percent) in rural areas compared with 14 percent (rice 11 percent) in urban areas.

percent in rural areas compared with 11 percent in urban areas. These factors point to the existence of significant differences in the consumption pattern of the people living in rural and urban areas of Bangladesh and provide justification to measuring separate CPIs for rural and urban areas of the country.[7]

Some important features of the distribution of weights in the 1995/96 CPI basket may be summarized as follows:

- Within the food category, rice alone has the highest weight of 23.8 percent in CPI-R and 11.3 percent in CPI-U. Given such high weights especially in the rural areas, the price of rice is the most powerful contributor and source of volatility in the CPI.
- Most of the other important food items have no significant urban-rural differential in weight distribution. For example, fish (including dry fish) has almost equal weights in both CPI-R and CPI-U, being the second highest (9.8 percent in CPI-R and 8.2 percent in CPI-U) followed by vegetables (6.2 percent in CPI-R and 4.2 percent in CPI-U), eggs and meat (3.2 percent in CPI-R and 5.2 percent in CPI-U), spices (3.0 percent in CPI-R and 2.2 percent in CPI-U) and edible oils and fats (2.4 percent in CPI-R and 2.5 percent in CPI-U).
- Out of seven broad categories of non-food items, 'gross house rent or housing' has the highest weight in CPI-U (17.2 percent) as opposed to its second highest weight in CPI-R (6.0 percent).
- In the non-food group, fuel and lighting has the highest weight in CPI-R (8.7 percent) compared with 5.0 percent in CPI-U.
- Transport and communication has a weight of 7.1 percent in CPI-U and 3.0 percent in CPI-R.
- The weights of clothing and footwear are very similar in rural and urban areas (6.9 percent and 6.8 percent respectively).

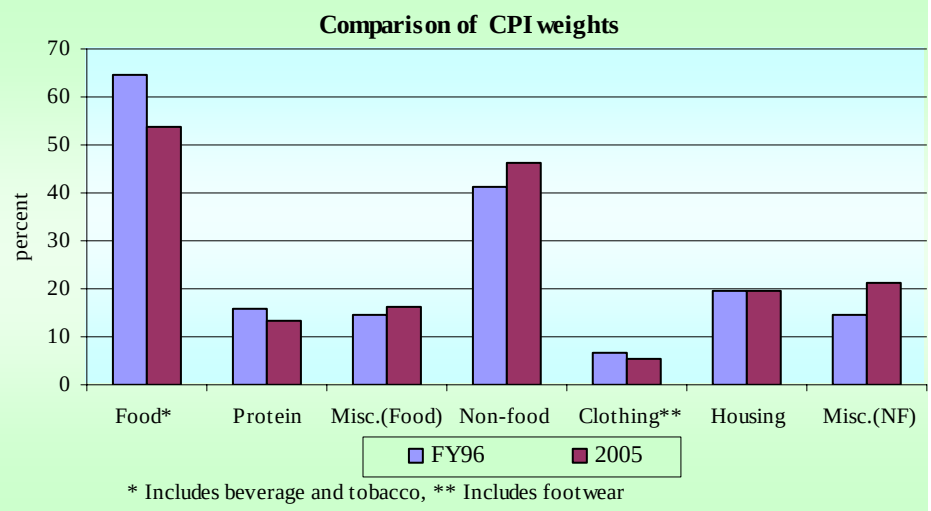
3. Change in CPI Weights between 1995/96 and 2005

The changes in major commodity specific weights in CPI between 1995/96 and 2005, as derived from respective HIES, are given in Table 2. Here we summarize some of the major features of the change over the period:

- The share of expenditure on food items at the national level declined by 5 percentage points from 58.8 percent in 1995/96 to 53.8 percent in 2005.

[7] Another important aspect of CPI which remains neglected in Bangladesh is the need to measure CPI specific to different socio-economic groups. As is well known, the consumption pattern and relative weights of consumption items of different socio-economic groups (e.g. various poor and non-poor groups) differ significantly. This creates group-specific changes indicating the importance of measuring separate CPI for each group to identify differential impact of price changes. This can have important implications for their welfare and can provide important policy implications especially for the poor groups.

- The decline in the share of food expenditure in rural areas was from 63 percent in 1995/96 to 58.5 percent in 2005 while similar change in urban areas was from 48.8 percent to 45.2 percent.
- The share of non-food expenditure, on the other hand, increased from 41.2 percent in 1995/96 to 46.2 percent in 2005 at the national level; with moderate increases from 37.0 percent to 41.5 percent in rural areas and from 51.2 percent to 54.8 percent in urban areas.



- At the national level, the expenditure share of rice declined from 20.2 percent to 19.6 percent between 1995/96 and 2005; the decline was from 23.8 percent to 23.5 percent in the rural areas while, in the urban areas, it increased from 11.3 percent to 12.5 percent. The expenditure share of protein items declined in both rural and urban areas; and the decline was from 15.9 percent to 13.2 percent at the national level. Such declines can have significant welfare implications through impact on the level of protein intake and through further widening the unbalanced nature of the diet for the majority of the country's population.
- In 2005, at the national level, the highest 53.8 percent of total household expenditure is incurred on food and beverage in which rice has the highest expenditure share (19.6 percent) as a single item, followed by housing 18.3 percent (including house rent 12.3 percent, fuel and lighting 6.0 percent), transport and communication (7.8 percent), and clothing and footwear (5.5 percent).
- In the rural areas in 2005, the highest 58.5 percent of the share of total household expenditure is for food and beverage in which rice has 23.5 percent, followed by housing 17.2 percent (including house rent 9.8 percent, fuel and lighting 6.6 percent, and household effects 0.8 percent), clothing and footwear 5.6 percent, transport and communication 6.1 percent, medical care 4.2 percent, and education 2.7 percent.

Table 2: Change in CPI weights between 1996 and 2005

Commodity group	1996			2005		
	Urban	Rural	National	Urban	Rural	National
Food Beverage and tobacco	**48.80**	**62.96**	**58.84**	**45.17**	**58.54**	**53.81**
A. Cereal	13.99	26.73	23.02	13.59	24.19	20.44
Rice	11.28	23.80	20.16	12.54	23.47	19.60
Other cereal	2.71	2.93	2.87	1.05	0.72	0.84
B. Other than cereals	30.54	33.75	32.82	29.85	32.63	31.65
Pulses	1.42	1.61	1.55	1.48	1.39	1.42
Protein items	15.87	15.86	15.86	13.28	13.18	13.22
Miscellaneous food items	12.19	15.48	14.52	14.46	17.07	16.15
C. Beverage & tobacco	4.27	2.48	3.00	1.73	1.72	1.72
Non-food	**51.20**	**37.04**	**41.16**	**54.83**	**41.46**	**46.20**
Clothing and footwear	6.79	6.88	6.85	5.48	5.55	5.53
Housing	24.75	17.39	19.53	24.00	17.16	19.58
Miscellaneous non-food items	19.66	12.77	14.78	25.35	18.75	21.09
Medical care	2.97	2.79	2.84	4.39	4.16	4.24
Trans port and communication	7.07	2.98	4.17	10.14	6.56	7.83
Education	5.23	2.69	3.43	4.41	2.67	3.29
Misc. goods and service	4.39	4.31	4.33	6.41	5.36	5.73

Note: Protein items include fish, vegetables, edible oils and fats, milk and milk products, and eggs and meat
Source: HIES 1995/96 and 2005, BBS

- In the urban area in 2005, 45.2 percent of the total expenditure is incurred on food and beverage, in which rice has 12.5 percent. This is followed by 24.0 percent (including house rent 16.9 percent, fuel and lighting 5.8 percent, and household effects 1.3 percent) for housing, 5.5 percent for clothing and footwear, 10.1 percent for transport and communication, 4.4 percent for medical care, and 4.4 percent for education.

Commodity-specific weights by expenditure groups

While the earlier section highlights significant differences in the commodity-specific weights in rural and urban areas, the pattern of expenditure also varies across different expenditure groups.[8] For the present analysis, three groups have been distinguished using monthly per household expenditure: less than Tk. 4,000 (which roughly corresponds to the poor

[8] In 2005 HIES, it is observed that the average share of expenditure on food items remains at high levels across different deciles groups: the share declines slowly from 68.3 percent for the bottom 5 percent to 61.7 percent for the 8th deciles in rural areas; and from 66.7 percent for the bottom 5 percent to 51.0 percent for the 7th deciles in urban areas. Moreover, the share is high for lower income groups and it is more prominent in the urban areas.

households), between Tk. 4,000 and Tk. 10,000 corresponding to the middle income households, and Tk. 10,000 and above which represents the richer households. The expenditure shares of broad expenditure categories over the three groups are given in Table 3, from which the following may be noted:

- The poor households in the urban areas spend 29.6 percent on rice alone followed by edible oil and fat (3.9 percent) and pulses (1.7 percent). The expenditure share of the rural poor, on the other hand, is 33.1 percent for rice followed by 3.7 percent for edible oil and fat, and 1.3 percent for pulses.
- For the middle income group, the share of rice in urban areas is much less at 16.5 percent followed by edible oil and fat (2.7 percent) and pulses (1.9 percent). For the rural middle income households, the share of rice is 22.8 percent, while the shares are 2.9 percent for edible oil and fat and 1.4 percent for pulses.
- For the richer households, the share of rice in urban areas is only 8.1 percent while the similar share is 14.0 percent in rural areas.

Table 3: Expenditure shares by household expenditure groups, 2005

Expenditure group (Taka)	% of house-holds	Urban				% of house-holds	Rural				% of house-holds	National			
		Food & beve-rage	Rice	Pulses	Edible oil & fat		Food & beve-rage	Rice	Pulses	Edible oil & fat		Food & beve-rage	Rice	Pulses	Edible oil & fat
<4,000	26.57	65.92	29.56	1.73	3.92	47.28	67.24	33.14	1.27	3.65	42.04	67.06	32.66	1.33	3.69
4,000 to 10,000	49.16	54.47	16.45	1.89	2.66	43.88	59.81	22.77	1.38	2.38	45.23	58.13	20.85	1.62	2.46
10,000 and above	24.27	37.62	8.11	1.16	1.62	8.83	45.09	14.01	1.07	1.68	12.75	41.41	11.02	1.12	1.66
All groups	100	45.18	12.54	1.48	2.11	100	58.54	23.47	1.39	2.38	100	53.82	19.61	1.43	2.29

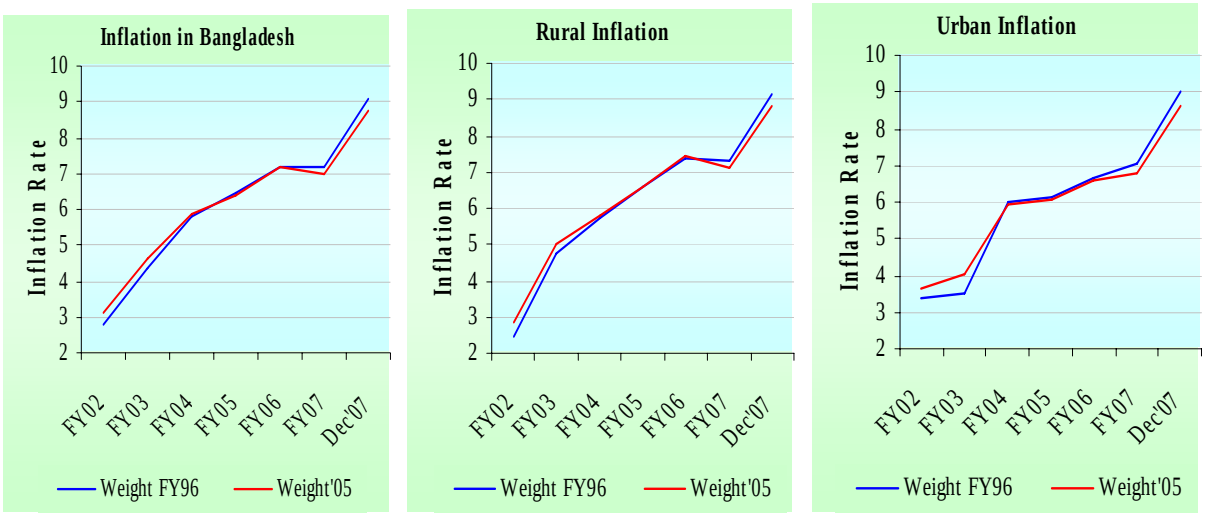
Source: HIES 2005, BBS

The above shows that the poor households in both rural and urban areas spend significantly higher shares of their total expenditure on food items (67.2 percent in rural areas and 65.9 percent in urban areas) compared with the average currently used in constructing CPI based on 1995/96 weights (63.0 percent in rural areas and 48.8 percent in urban areas) and the average share derived from 2005 HIES (58.5 percent in rural areas and 45.2 percent in urban areas). In particular, the expenditure share on rice differs significantly for the poor households: 33.1 percent in rural areas and 29.6 percent in urban areas compared with 23.8 percent in rural areas and 11.3 percent in urban areas used at present in constructing the CPI and the average values of 23.5 percent in rural areas and 12.5 percent in urban areas from 2005 HIES. This indicates that the CPI inflation constructed by using the average weights fails to properly reflect the impact of changes in prices, especially of food items, on the welfare of the poor people. For the poor, the change in the price of rice is especially

critical since the weight of rice in total expenditure is more than 33 percent in the rural areas and 30 percent in the urban areas of the country.

4. Estimates of Inflation using Alternative Weights

For comparing the implications of changing weights, this section provides alternative estimates of inflation using the average weights from 2005 HIES over the period FY02 to FY07 (and for December 2007). The re-calculated CPI inflation rates for the rural and urban areas and at the national level using the new 2005 HIES weights along with the usual estimates provided by BBS using 1995/96 HIES are given in Table 4.



The results show two interesting trends. *First,* the estimates based on 2005 weights provide lower inflation rates for FY02-FY03, higher inflation rates for FY04-FY06 and again lower rates for FY07 and December 2007 compared with the rates calculated on the basis of 1995/96 weights. This is true for CPI inflation in both rural and urban areas and at the national level. *Second,* the general trend for non-food inflation in both rural and urban areas is to generate higher figures with 2005 weights relative to 1995/96 weights.

Table 4: Estimates of 12-month average inflation

Sector	Group	HIES	Weight	FY02	FY03	FY04	FY05	FY06	FY07	Dec. 2007
Rural	General	1995-96	100.00	2.43	4.74	5.77	6.62	7.36	7.28	9.15
	Food		62.96	1.44	4.05	6.55	7.99	7.62	7.93	10.11
	Non- food		37.04	4.57	5.91	4.47	4.27	6.90	6.10	7.40
Urban	General		100.00	3.36	3.52	5.99	6.14	6.68	7.02	9.01
	Food		48.80	2.09	2.09	7.80	7.71	8.09	8.53	11.30
	Non- food		51.20	4.70	5.00	4.14	4.49	5.14	5.34	6.43
National	General		100.00	2.79	4.38	5.83	6.49	7.16	7.20	9.11
	Food		58.84	1.63	3.46	6.93	7.90	7.76	8.11	10.46
	Non- food		41.16	4.61	5.66	4.37	4.33	6.40	5.90	7.13
Rural	General	2005	100.00	2.85	5.02	5.82	6.56	7.43	7.11	8.83
	Food		58.54	1.44	4.05	6.55	7.99	7.62	7.93	10.11
	Non- food		41.46	4.91	6.38	4.81	4.57	7.17	5.91	6.96
Urban	General		100.00	3.61	4.02	5.91	6.04	6.62	6.77	8.61
	Food		45.17	1.88	2.58	7.81	7.71	8.09	8.53	11.30
	Non- food		54.83	5.19	5.31	4.27	4.55	5.26	5.10	6.02
National	General		100.00	3.12	4.60	5.85	6.38	7.15	6.99	8.76
	Food		53.81	1.67	3.34	7.00	7.89	7.79	8.15	10.54
	Non- food		46.19	4.96	6.04	4.62	4.56	6.52	5.64	6.65

Source: BBS and authors' calculation.

5. Conclusions and Policy implications

This note has examined the implications of changing weights on the estimates of CPI inflation in Bangladesh. The analysis shows the existence of significant differentials in weight across different consumption items and among various expenditure groups as well as between rural and urban areas of the country. Such differences have implications on the choice of weights in measuring CPI inflation, which is vital to assessing price stability as a guide to monetary policy and measuring welfare gains/losses of different expenditure groups. In view of the importance of the consumption weights in measuring changes in the price level, it is important for BBS to conduct credible household income and expenditure surveys at regular and more frequent intervals (say every 3 years). Moreover, BBS should make more effective use of the new surveys by updating the CPI weights and the consumption basket through including new consumption items and expenditure shares from the HIES as quickly as possible.

The results further highlight the importance of changing weights in measuring CPI inflation for specific income/expenditure groups especially the poor. The high weight for food items, especially rice, for the poor households relative to other groups makes the poor more

vulnerable to food price inflation. This brings out the importance of measuring group-specific CPI inflation rates (e.g. inflation rates for poor households) for measuring the impact and the burden of inflation on the well-being of specific groups, especially belonging to the poor category. Furthermore, the analysis on core inflation in Bangladesh shows that the most volatile component in CPI is food price which is partly influenced by high weights of a few food items.

The present analysis shows that the non-food CPI is higher with 2005 HIES weights in both rural and urban areas compared with similar estimates with 1995/96 HIES weights. These higher weights also generate higher non-food inflation for both rural and urban areas and for the national level till FY06, with a few exceptions. However, for FY07 and December 2007, the non-food inflation estimates are lower with 2005 HIES weights. This is largely due to the fact that non-food prices were growing at a slower rate than food prices during the period and therefore, the dampening effect of the slow growth of non-food prices outweighed the heightening effect of higher non-food weights in 2005 HIES.

Moreover, higher food inflation results for the period till FY06 using 2005 HIES weights though these weights assign lower values to food CPI in both rural and urban areas. This is largely due to the fact that food prices were growing at a higher rate than non-food prices during the period and the heightening effect of higher increase in food prices outweighed the dampening effect of lower food weights in 2005 HIES.

Nevertheless, the study shows that it is important to capture the changing structure of household consumption and ensure the use of representative weights in constructing CPI inflation. This is necessary to generate a more realistic picture of price changes in the economy and consequent impact on different categories of households in the country. The weight distribution in 2005 HIES across different population groups and regions and over various categories of goods shows the changing realities in the expenditure pattern of the people of Bangladesh. Such changes have significant implications and these should be effectively used to adjust the distribution of CPI weights in measuring inflation so that the estimates of inflation become more accurate and representative with capacity to provide more accurate estimates of inflation in Bangladesh.