The Distributional Impact of Inflation in South Asia

An Empirical Approach

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Abstract

This paper provides an empirical estimation of the distributional impact of inflation on households in South Asia. Two main channels are explored—the consumption basket channel and the income channel—for households in different income deciles in selected countries in South Asia. Using recent household expenditure surveys, the paper constructs detailed consumption expenditure shares and the effective "cost-of-living" inflation for households of different income levels. The analysis finds that due to a substantially larger share of food expenditure, households in lower income deciles experience higher effective inflation when food prices are high, despite a diversification in consumption expenditure over time. The analysis also suggests heterogeneous effects of inflation through the household income channel.

The Distributional Impact of Inflation in South Asia: An Empirical Approach

Vanessa Olakemi Dovonou, Zoe *Leiyu Xie*[1]

1. Introduction

The recent surge in inflation worldwide has brought attention to the distributional impact of inflation on households' welfare. While past and recent literature has studied the distributional impact of inflation in the U.S. and Europe, there are fewer works on the impact in developing countries. The impact of inflation can be especially relevant for developing countries because many have seen record high inflation since the start of the COVID-19 pandemic, and because the governments of low-income countries tend to lack the fiscal resources to counter the impact of high inflation.

As a prime example, South Asian countries saw a period of record high inflation. It was first driven by supply constraints during the COVID-19 pandemic, and then by rising commodity prices as global demand recovered and following the start of the war in Ukraine, and more recently due to local supply constraints and weakened local currency exchange rates. As a result, energy prices soared in late 2021, and food prices also increased steadily. In India, the largest country in the region, monthly food inflation reached above 10 percent in 2020, while inflation of fuel and lighting reached 14 percent in late 2021. In Pakistan and Sri Lanka, food price inflation reached 36 percent and 84 percent, respectively, in 2022, while transport and other energy-related price inflation touched highs of 60 percent and over 100 percent, respectively.

On the aggregate, as a net importer of energy, South Asia is especially vulnerable to rising prices of energy. At the same time, the fast-rising energy and food prices affect different groups of people differently, depending on their consumption patterns. The distributional effects of rising prices also stem from the source and nature of households' income. Inflation erodes households' real income, and the effect is heterogeneous. Some incomes respond more to inflation (e.g., wages indexed to inflation) than others (e.g., fixed retirement income), while net sellers of goods that experience high inflation will see a relative gain in real income compared to net purchasers of those goods. As a result, people may win or lose in relative terms when inflation is high.

We start with a framework to decompose the impact of a sudden inflation shock on households' real wealth into the income channel, consumption basket channel, and wealth channel, following

Cardoso et al. (2022) and IMF (2023). We show that the effect of inflation through differences in households' consumption baskets can be captured by the effective cost-of-living inflation for the household. The composition of the household consumption basket is computed across four South Asian countries: Bangladesh, India, Pakistan, and Sri Lanka. This allows us to compute the effective cost-of-living and the associated inflation for different household groups. The study further examines the contributors to inflation for various income groups in the four countries, which allows us to identify which commodity items are driving inflation inequality across household groups.

As most South Asian households have little wealth and data on household assets and liabilities are limited, we abstract from looking at the wealth channel. Because of the large informal sector, data on income in the region are also sparse and less reliable than in developed countries, and so we only provide suggestive evidence on the income channel effect and our quantitative study focuses on the consumption basket channel.

The main findings are three-fold. First, food is the largest share of spending in the region, accounting for 51%-63% of budget share among households in the bottom income decile. This is despite a shift toward better diversification of the consumption basket in South Asian countries, especially among households in the bottom income decile in rural India. Households in the top income decile spend proportionally more on energy-related items. As a result, over the period 2020-2022, the bottom-decile households experienced larger cumulative price increases in Pakistan and Sri Lanka, two countries where food price inflation has been especially high; households in the top decile saw overall larger price increases in India and Bangladesh, where the cumulative price increases have been larger in energy-related goods. Second, we find evidence that when food price inflation is high, the real consumption of other goods and services, particularly those considered durables or non-necessities, fell, and the effect is especially stark among low-income households. Third, the income channel suggests a heterogeneous effect of inflation depending on the source of income, indexation, and bargaining power. When the increase in prices outpaces the rise in income, households experience a reduction in their real income.

Understanding the distributional impact of inflation is important. Macroeconomic policies such as monetary policy often only consider aggregate measures of inflation such as the headline or core inflation, but they miss the driver of inflation and its implication on different households across the income distribution. Policies that target the source of inflation—be it food, energy or others—should be considered and could include measures to relax food supply bottlenecks and shift to more sustainable energy sources.

The rest of the paper is organized as follows. Section 1.1 provides a literature review. Section 2 presents the conceptual framework and the empirical methodology, and Section 3 discusses data sources and considerations. Sections 4 and 5 present the results on the consumption basket channel and a discussion on the income channel, respectively.

1.1. Literature review

Rising inflation can have a significant impact on households' welfare, as higher inflation reduces the purchasing power of households' income and savings, especially when income does not rise as fast as prices of goods and services. The literature documented three channels through which inflation can affect households' welfare.

The consumption basket channel captures heterogeneous change in the price of consumption goods. Hagemann (1982) shows that the relative difference between the price indexes experienced by two groups is driven by (1) the relative price changes across items and (2) the relative differences in the items' weights in the two groups. In line with the Engel's law, many have documented that household spending tends to be more diversified (dispersed across consumption components) among wealthier households (Bernanke and Duflo 2007; Baez et al 2021; Lokshin et al 2023). Because lower-income groups have a higher proportion of their income devoted to basic necessities such as food and housing, which tend to see more rapid and larger price increases during inflationary periods (Blanchflower & Saleheen 2007; Baez et al. 2021; Charalampakis et al. 2022; Lydon 2022; Lokshin et al. 2023; Nasir et al. 2023), inflation tends to disproportionately affect lower-income groups. Further, as the general price level of goods and services increases,

households are forced to spend more money to purchase the same amount of goods and services (Lydon 2022). This reduces the disposable income available for other expenditures.

The second channel is through the impact of inflation on households' incomes. As price inflation increases, wage levels may increase, for example, through inflation-indexed wages, or when workers negotiate contracts to make up for loss of purchasing power. But often wage increase lags price inflation. Studies have shown that inflation reduces the real income—nominal income adjusted by price inflation—of households, particularly those with low or fixed incomes (Baez et al 2021). Moreover, some incomes respond more to inflation (e.g., wages indexed to inflation) than others (e.g., fixed retirement income), and so people may win or lose in relative terms when inflation is high.

The third channel, more prevalent in developed or high-savings economies, is through wealth. The wealth channel (also known as the Fisher channel) captures the balance sheet exposures of households to sudden price changes (Doepke and Schneider 2006; Auclert 2019). Savers on fixed interest rates lose while borrowers on fixed interest rates win in relative terms when inflation is high; but households borrowing on flexible rates (e.g., adjustable-rate mortgages) may need to pay more in interest if the central bank's policy rates increase to curb rising inflation.

Furthermore, inflation can have differential effects on different income groups. According to a study by Olatunji and Olanrewaju (2017), inflation has a regressive effect on the welfare of low-income households in Nigeria. The study shows that low-income households spend a higher proportion of their income on food and other basic necessities, which are more sensitive to price changes. As a result, inflation has a more substantial negative impact on their welfare than on high-income households. Cardoso et al. (2022) find that middle-aged households in Spain benefited through the wealth channel as they are typically large nominal debtors in mortgages.

2. Framework and methodology

2.1. Conceptual framework

Changes in inflation can affect households through the relative change in consumption basket structure, the erosion of real income and a change in the real value of their initial stock of assets and liabilities. The sum of these three effects makes it possible to quantify the impact of the price increase on the wealth level of households.

We follow the approach of Cardoso et al. (2022) and IMF (2023) to assess the impact of price changes on households. Let C_t^h denote the consumption expenditure of household h at time t and Y_t^h their nominal wage income. The household's nominal wealth (W_{t+1}^h) is given by:

$$W_{t+1}^h = Y_{t+1}^h - C_{t+1}^h + W_t^h(1 + i)$$

$$= Y_t^h(1 + \alpha^h) - C_t^h + W_t^h(1 + i)$$

(1)

where α^h and i are the nominal growth rates of wage and wealth that are unrelated to price inflation. In the event of a surprise inflation shock ($\pi = \frac{P_{t+1}}{P_t} > 0$) between t and t+1, the household's nominal wealth becomes:

$$W_{t+1,\pi>0}^h = Y_{t+1,\pi>0}^h - C_{t+1,\pi>0}^h + W_t^h(1 + i_{\pi>0})$$

$$= Y_t^h(1 + \alpha_{\pi>0}^h) - C_t^h(1 + \pi^h) + W_t^h(1 + i_{\pi>0})$$

(2)

where π^h is the household effective inflation rate, which will be explained later. In real terms, the household's wealth is defined in the baseline and with the surprise inflation shock, respectively:

(1) $\pi = 0 : \widetilde{W}_{t+1}^h = Y_{t+1}^h - C_{t+1}^h + W_t^h(1 + i)$

(2) $\pi > 0: \widetilde{W}_{t+1,\pi>0}^h = \frac{Y_t^h(1+\alpha_{\pi>0}^h) - C_t^h(1+\pi^h) + W_t^h(1+i_{\pi>0})}{1+\pi}$

The impact of the surprise inflation shock can be approximated by the difference between the wealth at the baseline value (in the case with no inflation: $\widetilde{W}_{t+1}^h$) and the wealth in the event of inflation ($\widetilde{W}_{t+1,\pi>0}^h$):

$$d\widetilde{W}^h_{t+1} = \widetilde{W}^h_{t+1,\pi>0} - \widetilde{W}^h_{t+1}$$

$$= \underbrace{\frac{\left[Y^h_t\left(\alpha^h_{\pi>0} - \alpha^h - \pi(1+\alpha)\right)\right]}{1+\pi}}_{\text{Income channel}} - \underbrace{\frac{\left[C^h_t(\pi^h - \pi)\right]}{1+\pi}}_{\substack{\text{Consumption} \\ \text{basket channel}}} + \underbrace{\frac{\left[W^h_t(i_{\pi>0} - i - \pi(1+i))\right]}{1+\pi}}_{\text{Wealth (Fisher) channel}}$$

$$(3)$$

where $d\widetilde{W}^h_{t+1}$ denotes the changes in real wealth. The first term captures the income effect and is positive when the economy-wide wage growth rate is higher than the price inflation. The second term captures the consumption basket (relative consumption) effect. It suggests a relative gain in the household's wealth when its effective inflation rate (π^h) is lower than the headline inflation (π). When the consumption basket term is normalized by the household's consumption (C^h_t), the only important factor is the effective inflation rate (π^h) for each household. The last term captures the wealth (Fisher) channel and is positive for net debtors and negative for net creditors.

2.2. Empirical methodology for computing the effective inflation rate

Because consumption data is of better quality than income or wealth data in South Asia, similar to many developing countries, we focus the empirical analysis on the consumption basket channel. As shown earlier, the (normalized) consumption basket channel can be captured by the household effective inflation rate. This sub-section outlines the empirical methodology for constructing this effective inflation rate.

According to Arrow (1958) and Hagemann (1982), the disparity in inflation rates across households can be understood by examining the heterogeneity in households' spending: heterogeneity in the spending across goods, across income levels, and over time. We define households' consumption weights (w^h_l) as the share of spending (C^h_l) on the category l in the household's total consumption expenditure (C^h).

$$w^h_l = \frac{C^h_l}{C^h}$$

Using the consumption expenditures shares, the household effective inflation is:

$$\pi_t^h = \frac{\sum_{l=1}^{K} w_l^h \frac{P_{l,t}}{P_{l,b}}}{\sum_{l=1}^{K} w_l^h \frac{P_{l,t-1}}{P_{l,b}}} - 1$$

where $P_{l,t}$ is the price index of product category l at time t.

This effective inflation rate reflects the inflation experienced by a household because of the composition of its consumption basket. To better capture the cross-section of effective inflation rates, we further compute the average effective inflation rates across deciles of households. Because of known issues with income data in poorer countries (Meyer and Sullivan 2003), we use the household's real consumption expenditure[2] (rC_p^h) to proxy for income, as consumption is more accurately measured in the South Asia context. The real consumption measure adjusts for differences in prices across reporting times and regions in a country. It thus helps avoid mis-classifying a household into a lower decile just because it lives in a region with lower cost-of-living or was surveyed earlier in the year than a comparable household in a more expensive region or surveyed later in the year.

Household size matters. A large household with the same total consumption as a smaller household is less well-off on a per-person level. To adjust for household size, a per-adult equivalent adjustment is applied based on household composition information: a household member above age 18 is counted as one member; a household member below age 18 is counted as 0.8 member; and a member who has migrated does not count since the person's consumption is not reported.

The annual average of this household size-adjusted real consumption measure is then used to group households into deciles.[3] The average expenditure share for a decile is then computed as the weighted average of the nominal expenditure shares across all households in the decile:

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[2] Atkinson (1991), World Bank (2001), Meyer and Sullivan (2003) argued that "total consumption/expenditures" is the most appropriate measure for households' material well-being (economic resources).

[3] All consumption (purchased and self-produced) is included as a welfare measure for the decile ranking.

$$w_l^d = \frac{\sum_{h=1}^{N_d} \lambda_d^h w_l^h}{\sum_{h=1}^{N_d} \lambda_d^h}$$

where l refers to the item category and d denotes the decile group ($d = 1,2,\dots,10$). λ_d^h is the sampling weight for the household in decile d (with $d = 1,2,\dots,10$), and N_d the number of households in the decile. We assume that household consumption behavior is invariant (stable) over time (Kints and Breunig 2021; Bez et al. 2021). Hence, the effective inflation rates are computed using consumption shares in a base year: 2019 for India, 2018-19 for Pakistan, 2016-17 for Bangladesh, and 2016 for Sri Lanka. This approach addresses the consumption data availability issue[4] and allows us to focus on the direct effect of relative price changes. But it ignores households' coping behaviors including consumption substitution and bargain hunting, which we look at in the discussion (Section 4.4). Households' tastes may change over time or the items' quality may deteriorate, leading to changes in consumption patterns. But as we document in Section 4.1 using over-time data for India, the shifts in consumption pattern are relatively small over the short period between the base year and the window we examine.

Using the consumption expenditures shares, the effective inflation of a decile is:

$$\pi_t^d = \frac{\sum_{l=1}^{K} w_l^d \frac{P_{l,t}}{P_{l,b}}}{\sum_{l=1}^{K} w_l^d \frac{P_{l,t-1}}{P_{l,b}}} - 1 = \frac{\sum_{l=1}^{K} w_l^d p_{l,t}}{\sum_{l=1}^{K} w_l^d p_{l,t-1}} - 1$$

(4)

where $P_{l,t}$ is the price index of product category l at time t,[5] and $p_{l,t}$ denotes the relative change in the price of item l between the base period and t. Expenditure shares w_l^d of item l for decile d are computed in the base year, with $w_l^d > 0$ and $\sum_{l=1}^{K} w_l^d = 1$. The weights ($w_l^d, l = 1,2,\dots,K$)

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[4] Consumption patterns are collected from the Household Consumption Survey, which requires significant resources and infrastructure. These surveys are not often conducted, particularly in developing economies or regions with limited statistical infrastructure. For instance, the most recent consumption survey was conducted in Sri Lanka in 2016 and in Bangladesh from 2016 to 2017.

[5] For two of the South Asian countries (Bangladesh and Pakistan), household-level prices for each consumption item can be derived from reported consumption volume and value. For the other two countries (India and Sri Lanka), household-level prices are not available, and so the analysis assumes that households face the same prices, i.e., $P_{l,t}$, is the national/regional prices.

reveal the decile's consumption patterns. $\sum_{l=1}^{K} w_l^d p_{l,t}$ denotes the effective price experienced by each decile. The effective decile-wise inflation reflects the effective change in cost of living for each decile.

3. Data

The analysis focuses on four countries for which detailed consumption expenditure data are available. Consumption patterns are derived from household surveys: Consumer Pyramids Household Surveys (CPHS) dataset for India, Household Income and Expenditure Survey (HIES) 2016-17 for Bangladesh, 2018-19 for Pakistan and 2016 for Sri Lanka (Table 1). The HIES data record detailed information on households' consumption and demographic characteristics.

The CPHS collects repeatedly household consumption expenditure on goods and services from about 160,000 sample households. Data for each wave are collected over a four-month period. The survey is conducted in three waves every year (wave1: December-March, wave2: April-July, wave3: August-November). We retain only households which were interviewed all year round.[6] The data provide information on characteristics of households (members' genders, ages, region, states, caste, nature of occupation, industry of occupation, size of household), income and consumption expenditure, including 153 variables (of which 38 variables on food) of monthly household expenditures on consumables goods.

Households sometimes produce their own consumption, especially in rural areas. The HIES (Bangladesh and Pakistan surveys) distinguish whether a good is purchased, gifted, paid as wage in kind, or self-produced. Households in rural Bangladesh self-produce about 13 percent of their total food consumption (19 percent of their cereals consumption) and 41 percent of fuel and lighting consumption (e.g., firewood, wood-powder). Similarly, households in rural Pakistan produce about 15 percent of their total food consumption and 21 percent of their fuel and lighting

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[6] This leads to changing size and composition of the working sample over the years: our sample covers 70,065 Indian households over the entire country in 2015, 92,128 in 2016, 85,803 in 2017, 107,292 in 2018, 83,626 in 2019, and 46,432 in 2020.

consumption. Rural households that consume self-produced items will not be adversely affected by a rise in the item prices; on the contrary, net-sellers may see a rise in their income when they sell the self-produced goods for higher prices. To capture the effect of higher prices on households' consumption expenditure, consumptions reported as self-produced or gifted are excluded from the calculation for Bangladesh and Pakistan.[7]

The monthly price indexes come from country statistical offices. We match household consumption categories with the disaggregated price data (Table 1). For Pakistan, expenditure shares and prices are matched for the 12 COICOP consumption groups, except fuel and lighting which is separated from housing rent and water to provide a more detailed picture of the impact of higher energy prices on households. Because more detailed price data are available for India and Bangladesh, finer categories are used in the matching process for food (e.g., cereals, meat and fish, edible oils and fats) to provide a more precise picture of the impact of food inflation. For Sri Lanka, we match consumption data with the 11 consumer items available in the price data.

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[7] India's CPHS only reports monthly consumption expense and hence excludes self-produced goods.

Table 1. Consumption expenditure and price data

Country	Survey		Price Index	Matched items
	Source	Coverage	Source	
Bangladesh	Household Expenditure and Income Survey	April 2016 – March 2017	Bangladesh Bureau of Statistics	Food, beverage, and tobacco (cereals/grains, fish, eggs and meat, fruits, vegetables…), clothing and footwear, housing, furniture, household equipment, fuel and lighting, health, transport and communication, recreation and culture, education, personal effects, luxury, laundry and cleaning, miscellaneous.
India	Consumer Pyramids Household Surveys	January 2015 - August 2020	National Statistical Office (NSO)	Food and non-alcoholic beverages (cereals and products, meat and fish, eggs, milk and milk products, oils and fats, vegetables, fruits…), Alcoholic beverages and tobacco, clothing and footwear, housing, fuel and lighting, Households goods and services, health, transport and communication, recreation and amusement, education, personal care and effects.
Pakistan	Household Integrated Economic Survey	2018 - 19	Pakistan Bureau of Statistics	Food and non-alcoholic beverages, alcoholic beverages and tobacco, clothing and footwear, housing, furnishing, fuel and lighting, health, transport, communication, recreation and culture, education, restaurants and hotels, miscellaneous.
Sri Lanka	Household Integrated Economic Survey	2016	Sri Lanka Department of Census and Statistics	Food and non-alcoholic beverages, alcoholic beverages and tobacco, clothing and footwear, furnishing, fuel and lighting, health, transport, communication, recreation and culture, education, miscellaneous.

4. Consumption basket channel

4.1. Changes in consumption patterns

Because the CPHS data of India is a panel, it offers information on how consumption patterns evolved over time. Using the Analysis of Variance (ANOVA) analysis, we can decompose the total variance σ_I^2 of the households' expenditure share (w_l) into two components: variability over time (between-period) and variability cross-household (within-period).

$$\sigma_I^2 = \frac{1}{N} \sum_{t=1}^{12} \sum_{h=1}^{N} \left(w_{l,t}^h - \overline{w}_l \right)^2$$

$$= \frac{1}{N} \sum_{t=1}^{12} \sum_{h=1}^{N} (w_{l,t}^h - \overline{w}_{l,t})^2 + \frac{1}{N} \sum_{t=1}^{12} N * (\overline{w}_{l,t} - \overline{w}_l)^2$$

$$\sigma_I^2 = \text{Within period variance} + \text{Between period variance}$$

$$(5)$$

where $\overline{w}_{l,t} = \frac{1}{N} \sum_{h=1}^{N} w_{l,t}^h$ is the average share in each period, and $\overline{w}_l = \frac{1}{N} \sum_{h=1}^{N} N * \overline{w}_{l,t}$ is the average share. The decomposition shows the average fluctuations of the consumption components over time (within period variance) and across households (between period variance).

Most items showed a low variation in average yearly expenditure shares, indicating a stable pattern with low adjustment over time (Table 2). The consumption expenditure shares of most staple items remained relatively constant. The consumption expenditure shares of two items—"Cereals" and "Fuel"—exhibited strong over-time volatility. "Vegetable" and "Recreation and amusement" also exhibited relatively strong volatility across years. Overall, households' consumption pattern is relatively stable over time, which supports our empirical approach of using the consumption expenditure of a base year (Section 2.2).

Table 2. Analysis of Variance on the consumption expenditure shares, India

Items	Between-period variance	Within-period variance (cross-household variation)
Cereals	**11.90**	145.97
Meat and fish	0.06	78.71
Eggs	0.10	3.67
Milk and milk products	0.96	146.84
Oils and fats	0.34	18.07
Vegetables	**2.45**	76.82
Fruits	0.06	6.10
Pulses	0.85	10.16
Sweeteners	0.05	6.99
Spices	0.25	4.44
Nonalcoholic beverages	0.11	2.77
Prepared meals, snacks	0.16	7.26
Pan, tobacco, and intoxicants	0.11	64.69
Clothing and footwear	1.39	52.13
Housing	0.06	27.90
Fuel	**10.51**	181.58
Electricity	0.14	31.93
Household goods, furniture	0.96	25.00
Household service	0.08	10.07
Health	1.56	34.72
Transport	0.15	22.38
Communication	0.14	14.51
Recreation and amusement	**2.10**	78.18
Education	0.79	110.72
Personal care and effects	0.40	10.25

Source: CPHS 2015-2019 and authors' calculations.

Furthermore, significant variability was observed within periods (across households), indicating differences in consumption patterns, preferences, income levels, and household size or composition. The next section examines the cross-sectional differences in households' consumption patterns.
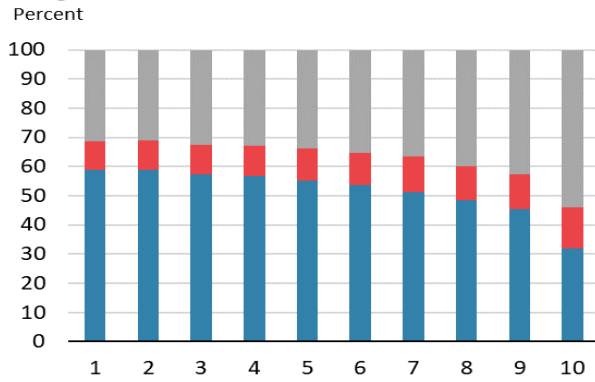
4.2.   Heterogeneity in consumption pattern

Households' expenditures on different items are significantly influenced by their income level. Those in the bottom decile allocate a greater portion of their budget to food, while those in the top decile tend to spend more on energy-related[8] and non-food/non-energy items (Figure 1). Spending on food constitutes about 51-63 percent of consumption expenditures in the bottom-decile across the four South Asian countries studied. For example, in rural India, food takes up over 54 percent of consumption expenditure in the bottom decile and only around 37 percent in the top decile households. Among food items, households in the bottom-decile spend a much larger share on cereal and products than the top-decile households. The category represents 15 percent of households consumption in the bottom-decile versus 7 percent for the top-decile households in rural India. Similarly, the large share of food expenditure (namely cereals products) in the bottom-decile in Bangladesh leaves little room for diversification of consumption on other non-food and non-energy goods and services (Appendix 1). Nonetheless, the dominance of food expenditure is larger in Sri Lanka (63 percent of consumption expenditure) and Bangladesh (61 percent in urban Bangladesh and 59 percent in rural Bangladesh) relative to India, and Pakistan.

Consumption is more diversified in top-decile households, who spend proportionally more on energy-related items such as fuel and lighting and transport—11 percent in the bottom-decile and 21 percent for the richest households in rural Pakistan. As a result, bottom-decile households will be more affected by a 1 percent increase in food prices, especially cereal products. Nonetheless, the impact would be higher in households in the rural area (Figure 1). By contrast, the top-decile is more vulnerable to rising energy prices.
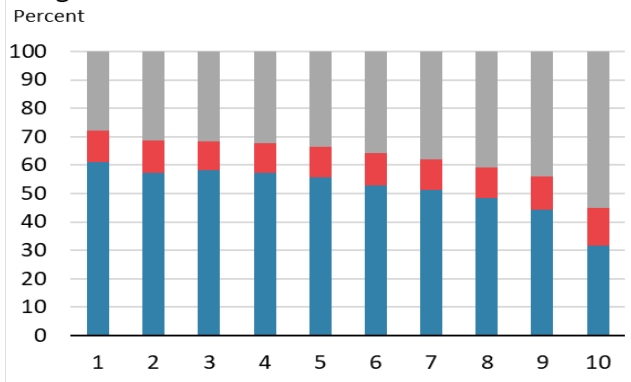
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[8] Energy-related items include fuel, lighting and transport for India, Pakistan and Sri Lanka; fuel, lighting, transport and communication for Bangladesh.

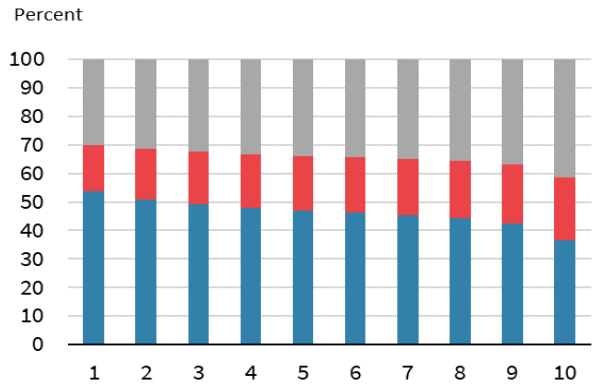# Figure 1. Consumption pattern in South Asia
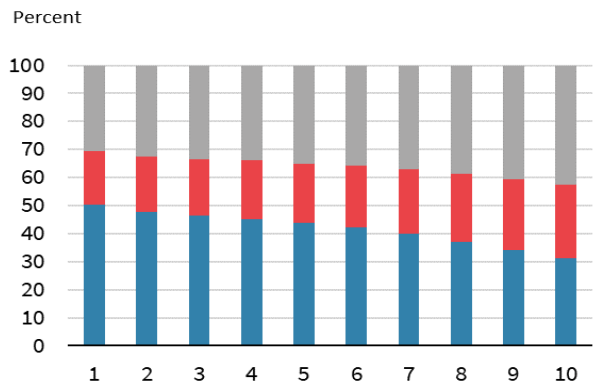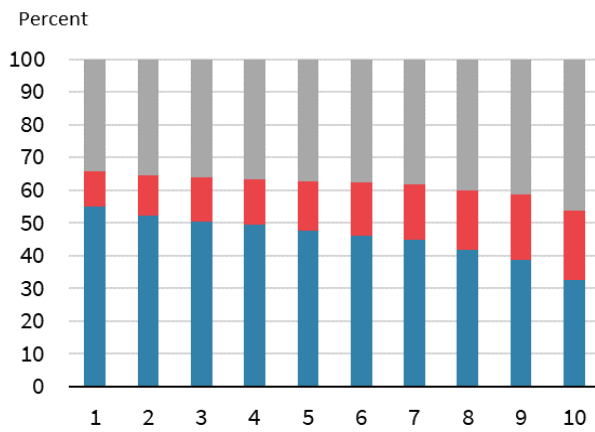
Bangladesh rural
Percent

Bangladesh urban
Percent

India rural
Percent

India urban
Percent

Pakistan rural
Percent

Pakistan urban
Percent

16

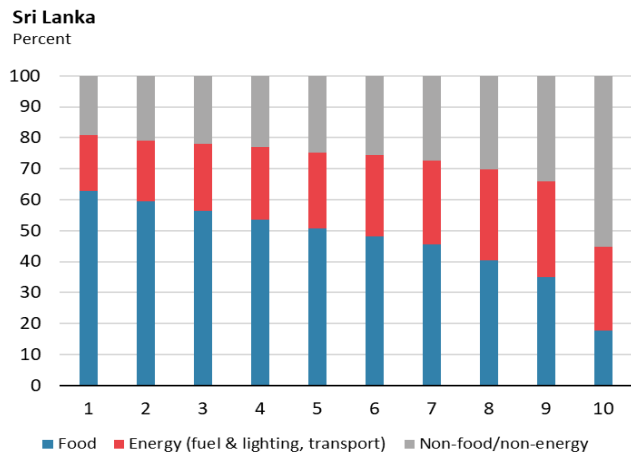**Sri Lanka**
Percent

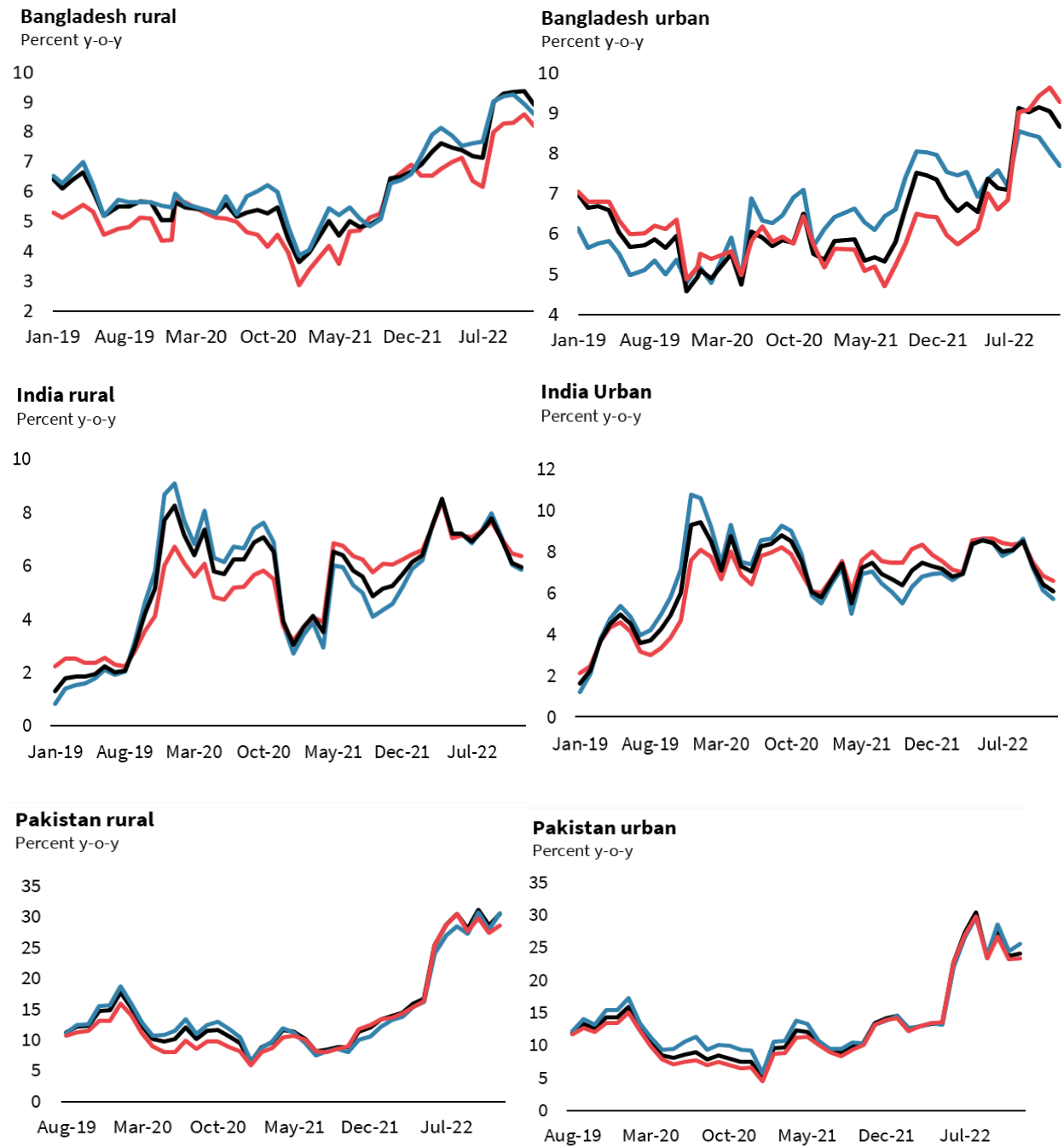Food   Energy (fuel & lighting, transport)   Non-food/non-energy
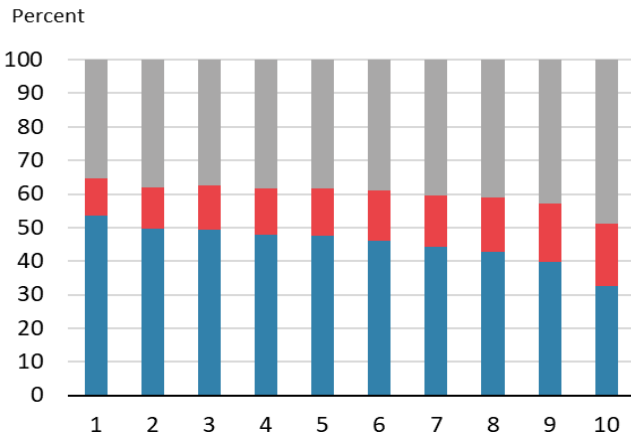
Source: Bangladesh HIES (2016-17), India CPHS (2019), Pakistan HIES (2018-19), Sri Lanka HIES (2016), and authors' calculations.
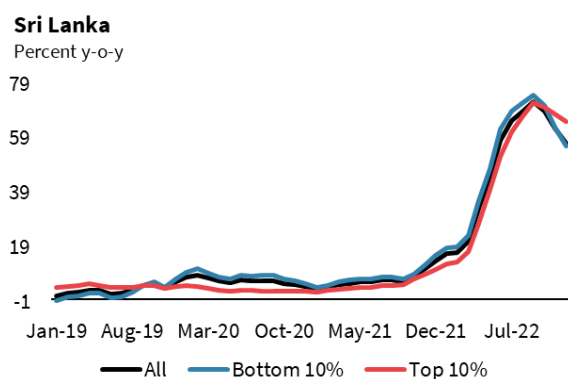**Note**: The energy category in Bangladesh includes fuel, lighting, transport and communication. The food category in Bangladesh includes food, beverage and tobacco. For other countries, energy includes fuel, lighting and transport, and food includes food and non-alcoholic beverages.

4.3.   Heterogeneous effective inflation rates

Over the past two years, South Asia saw a surge in its inflation. Inflation started rising in the region in 2019 driven by increasing food prices (World Bank 2023). As a result, households in the bottom decile were already experiencing higher inflation in December 2019. The COVID-19 pandemic and subsequent lockdowns disrupted supply chains and led to higher food price inflation; the subsequent global demand recovery and the war in Ukraine led to soaring energy inflation. Monthly food inflation reached above 10 percent in 2020 in India, while inflation of fuel and lighting reached 14 percent in late 2021 and stayed high for much of 2022. Currency devaluation in Pakistan and Sri Lanka have exacerbated domestic inflationary pressures. In Pakistan and Sri Lanka, food inflation reached 36 percent and 84 percent, respectively, in 2022, while transport or energy-related price inflation touched highs of 60 percent and over 100 percent, respectively. The surge in energy prices in the region has fueled rising food prices, worsening household purchasing power.

Figure 2. Effective inflation for top and bottom deciles by country and region

Bangladesh rural
Percent y-o-y

Bangladesh urban
Percent y-o-y

India rural
Percent y-o-y

India Urban
Percent y-o-y

Pakistan rural
Percent y-o-y

Pakistan urban
Percent y-o-y

Sri Lanka
Percent y-o-y

—All   —Bottom 10%   —Top 10%

Note: The deciles are defined based on per adult equivalent real consumption on the household level and using data over 201617 for Bangladesh, 2019 for India, 2018–19 for Pakistan, and 2016 for Sri Lanka.

Over the period 2020-2022, the bottom-decile households experienced larger cumulative price increases in Pakistan and in Sri Lanka, whereas the rich saw overall larger price increases in India and Bangladesh (Figure 2). In Pakistan, the larger cumulative bottom-decile inflation is driven by higher overall increases in food prices than in energy prices as energy subsidies dampened domestic energy price increases, while floods in late 2022 pushed up food prices high. By contrast, in India and Bangladesh, the converse is driven by larger cumulative price increases in energy than food prices. The increasing food prices between 2019-20 (Figure 2), raised inflation in both the bottom and top deciles (Appendix 2). Nonetheless, effective inflation in the lowest decile households was significantly higher than the effective inflation in the top-decile households during the first year of the COVID pandemic (Table 3). But as energy prices rose in 2021, the top-decile inflation rose above the lowest decile, in India and Pakistan.

Table 3. Effective inflation higher for the bottom decile when food inflation stayed high, and higher in the top decile when energy inflation stayed high

|		Bangladesh		India		Pakistan		Sri Lanka
Period	Decile	Urban	Rural	Urban	Rural	Urban	Rural	
High food inflation	Bottom	6.9	6.2	9.0	7.6	17.3	18.8	72.2
	Top	5.8	4.2	7.9	5.8	15.0	15.9	67.1
High energy inflation	Bottom	8.5	9.2	6.3	4.4	13.8	10.6	74.8
	Top	9.1	8.3	8.1	6.1	14.0	12.5	72.1

4.4.   Discussion

Our empirical method so far uses the households' consumption expenditure shares in a base year, and examines how changing relative prices of different goods affects different households differently. In particular, higher food price inflation impacts lower-income households more because food takes up a disproportionally large share of their consumption basket. But households' consumption expenditure shares may change over time, either in response to changing inflation or as a result of structural changes. In this subsection, we examine how consumption expenditure shares change focusing on the bottom-decile households.

Shift in consumption pattern in response to inflation

In addition to larger increases in total expenditure due to high food inflation, when food prices remain high households in the lowest decile may also reduce real consumption of food—through substitution and income effects—and reduce real consumption of other goods—through the income effect. This is another way that high food inflation can impact poorer households' welfare disproportionately. Figure 3 shows that when food inflation increases in Bangladesh and Pakistan, real consumption of food—nominal food expenditure deflated by prices of each food category— decreases among the bottom-decile households. Appendix 3 additionally shows that the bottom-decile households also reduce other non-food consumption expenditure when food price inflation is high. Conversely, a decrease in food inflation tends to increase the relative real consumption of food and suggests an increase in their purchasing power.

Figure 3. Relative real food consumption and inflation in the bottom decile
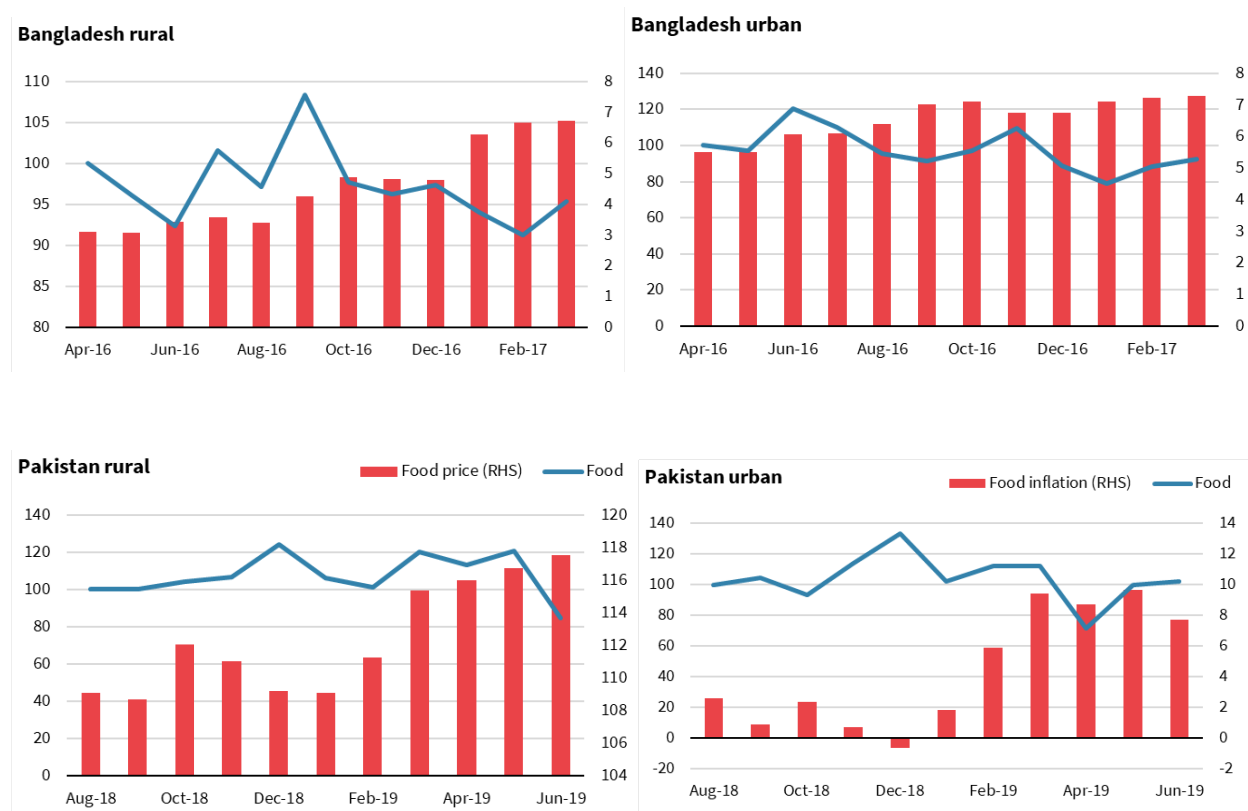
Bangladesh rural

Bangladesh urban

Pakistan rural

Pakistan urban

Source: Bangladesh HIES (2016-17), Pakistan HIES (2018-19), Haver Analytics, Bangladesh Bureau of Statistics, author's calculations.

Note: The deciles are defined based on per adult equivalent real consumption on the household level and using data over 2016–17 for Bangladesh, 2019 for India, 2018–19 for Pakistan, and 2016 for Sri Lanka.

Although the consumption expenditure shares remain relatively stable over the short term, a rise in income over time can lead to shifts in consumption patterns. In addition, large shocks such as COVID can also temporarily alter consumption patterns.

Changes in consumption pattern over time

Figure 4 shows a decreasing trend in the share of food spending in India, suggesting a broad diversification of the consumption basket, namely a shift toward energy and non-food/non-energy consumption items. Studies by Engel (1857), Theil and Finkle (1983), and Chai et al. (2015) document that a rise in household income results in a more balanced distribution of spending across various product categories, through a reduction in the budget share of food spending.

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Notably, in urban India, the proportion of spending on food decreased from about 50 percent in 2015 to 43 percent in 2019, while in rural India, it dropped from 55 percent in 2015 to 47 percent in 2019. The decrease in food share was more pronounced among the bottom-decile households in rural India, falling by 14 percent, compared to the top-decile households which contracted by 10 percent. This same pattern was observed in urban India as well (Appendix 4).

During the period 2015-2019, the share of spending allocated to energy and non-food consumption increased in all regions. In rural India, the share of spending on energy-related items in top decile increased grew on average households in top decile increased the share of their spending on energy-related items by 17.2 percent over this period. Meanwhile, their budget allocation for non-food/non-energy consumption only increased rose by 2.1 percent. Households in the bottom decile increased their budget share for energy by about 19.2 percent, while their budget share for non-food and non-energy consumption items increased rose dramatically by 243.7 percent. In urban areas, the cumulative growth of energy spending share was larger: 23.2 percent for bottom-decile households and 5 percent for top-decile households.

Figure 4. Consumption pattern over time in India
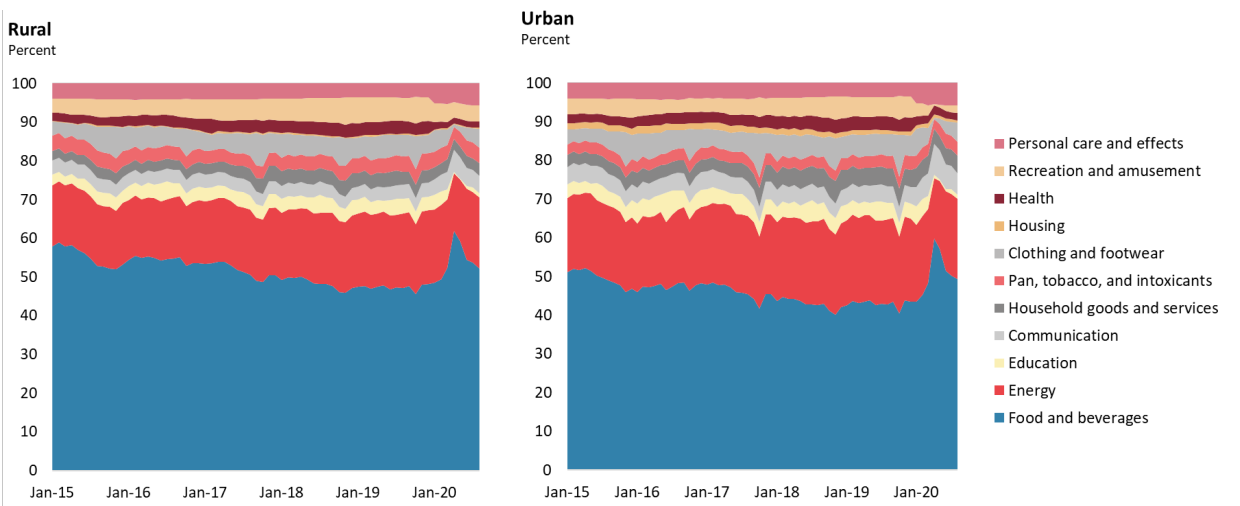
Source: India CPHS (2015-20) and authors' calculations.

During the COVID-19 outbreak, households' consumption patterns shifted towards necessities and away from services and luxury goods, as depicted in Figure 5. Spending on "Clothing and

footwear," "Restaurant and Recreation," and "Household furniture and fixtures" decreased amid activity slowdown, rising food prices, and general lockdown. The largest decline was observed in "Restaurant and Recreation" between 2019 and 2020 (2.4 percentage points), followed by "Clothing and footwear" (2.1 percentage points). The lockdown and school closures also led to a reduction in household spending on "Education" and "Transport." The share of spending on "Food and beverage" rose by 6.8 percentage points in 2020, reflecting the combined effect of the rising food inflation and the lockdown-induced increase in food related item consumption.

Figure 5. Change in consumption pattern in India during COVID-19
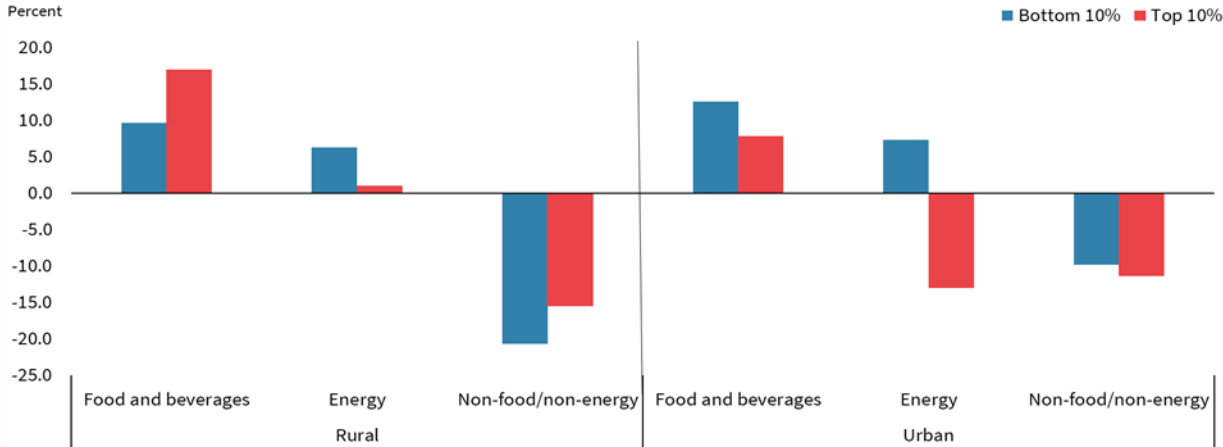
Source: India CPHS (2015-20) and authors' calculations.

These consumption pattern changes may not be uniform across household groups. For example, in rural India, households in the top decile group spent 17 percent more on food-related items in 2020 compared to 2019, while the bottom decile group only spent 9.7 percent more. Conversely, the spending on "Non-food and non-energy" decreased more in the bottom decile group (-20.7 percent) than in the top decile group (-15.5 percent). Both groups spent more on "Energy," mainly due to higher expenditures on "Electricity" in 2020. Such non-uniform changes in consumption pattern, if persist over time, can lead to changes in the distributional impact of the consumption basket channel. For example, the larger increase in food expenditure shares in 2020 by households in the top decile would increase the share of food for those households, and as a result, food price inflation would have less disproportionate impact on the poor compared to before.

5. Income channel

In addition to the consumption basket channel, inflation can have distributional impacts through other channels (Equation 3). Rising prices reduce households' real income available for consumption (inflation income), eroding their purchasing power. As the general price level increases, households can buy fewer goods and services with the same amount of money. It is well known that the poorest households are more vulnerable because they earn little and consume all or most of their income, which leaves them no room for maneuver when prices rise. Moreover, fast-rising prices can impact household income differently depending on its source, whether it is indexed to inflation or fixed or how much bargaining power workers have.

Workers may experience a decrease in purchasing power if their wages do not increase at the same rate as inflation, reducing the actual purchasing power of workers. Retirees, fixed salary contractors, and other fixed income earners are particularly vulnerable as inflation reduces their real income, leads to negative coping strategies, and decreases spending on non-essential items such as education and preventive health care. In contrast, workers in industries or professions where wages are determined through bargaining can consider inflation when negotiating wages, which may help them maintain their consumption. Similarly, households that holds assets (e.g., real estate, stocks) can potentially see an increase in their benefits.

Households that self-produce part of their consumption, such as those in rural areas, already have a mechanism to partially shield themselves from higher inflation. Further, they may experience indirect income when food inflation is high, if they are net sellers in the market. Figure 6 shows the share of total food and energy consumption that is self-produced in rural and urban households in Bangladesh and Pakistan. In both countries, rural households derive more of their consumption from self-produced goods than their urban counterparts.

In rural Bangladesh, 25 percent of food consumption of the lowest-decile households are self-produced, and over 50 percent of the consumption of fuel and lighting are self-produced among this group. Note that the self-produced consumption is not included in the consumption

expenditure share. At the same time, if these households produce enough to sell in the market, then higher food (or fuel) inflation could potentially increase their nominal income. This means that households in rural areas may be less affected by rising food prices and could potentially experience a second order increase in their income. By contrast, in rural Pakistan, households in the upper-middle deciles consume larger shares of self-produced foods, possibly because those are the ones with the land and resources to grow food in scale. As a result, these households are the ones who could experience a positive income effect from higher food inflation, if they are net-sellers of the food they produce. This finding suggests that improving agricultural productivity and providing households in the bottom-decile with access to land could help lessen the impact of inflation on their consumption.

Figure 6. Share of self-produced good in household consumption
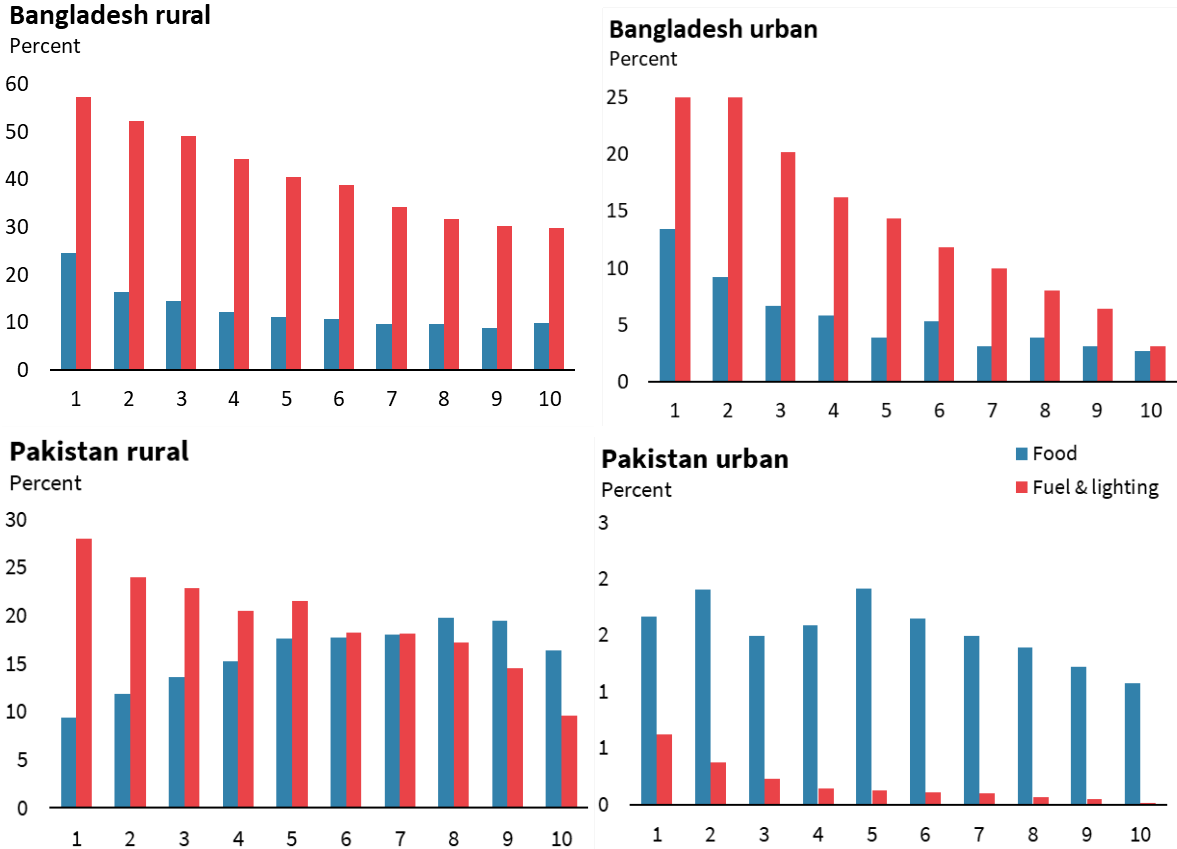
Source: Bangladesh HIES (2016-17), Pakistan HIES (2018-19), author's calculations.

Conclusion

Rising inflation does not affect all households the same way. The magnitude and direction of the effect vary across countries and depend on several factors such as the level of development, economic structure, inflation expectations, and the type of inflation.

Our study sheds light on the distributional impact of inflation in South Asia, highlighting the nuanced effects on different income groups within the region. The findings underscore the importance of considering the diverse characteristics and vulnerabilities of these groups when assessing the consequences of inflation.

We show that inflation tends to disproportionately burden bottom decile (low-income) households due to their limited disposable income and higher reliance on food items. Inflation-driven increases in food prices strain their ability to afford an adequate and nutritious diet, potentially leading to heightened food insecurity and malnutrition. Nonetheless, increases in food prices can raise real income for households that self-produce and sell foods in the market. On the other hand, households in the top-decile (higher-income households) are more vulnerable to energy inflation due to their greater reliance on energy related items (fuel, electricity, and transport). Their consumption patterns are more diversified, with larger non-food/non-energy spending shares, which are relatively less affected by inflation. Nevertheless, it is crucial to recognize that inflation may still affect their discretionary spending and investment decisions, which could have broader economic implications.

To address this, governments need to adopt targeted measures to support and protect vulnerable populations, such as social safety nets, subsidies, and income support programs. Inflation control measures such as price stabilization policies are necessary to improve household welfare. In addition, enhancing productivity and income diversification in rural areas can help alleviate the strain of inflation on agriculture-dependent households. Moreover, central banks and policy makers must balance price stability with inclusive economic growth, taking into account the needs of different socioeconomic groups. Prudent fiscal and monetary policies can help mitigate the adverse consequences of inflation on the most vulnerable segments of society.

Further research and data collection are needed to understand the effects of inflation on household welfare in different contexts and to explore the mechanisms through which inflation affects household welfare. This could involve analyzing the interaction between inflation, income inequality, and other macroeconomic factors, as well as exploring the effectiveness of various policy interventions in different contexts.

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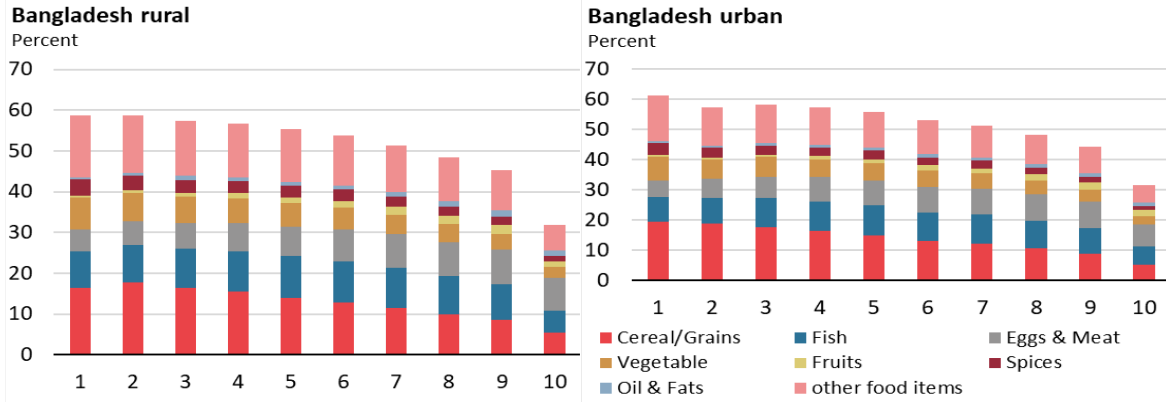
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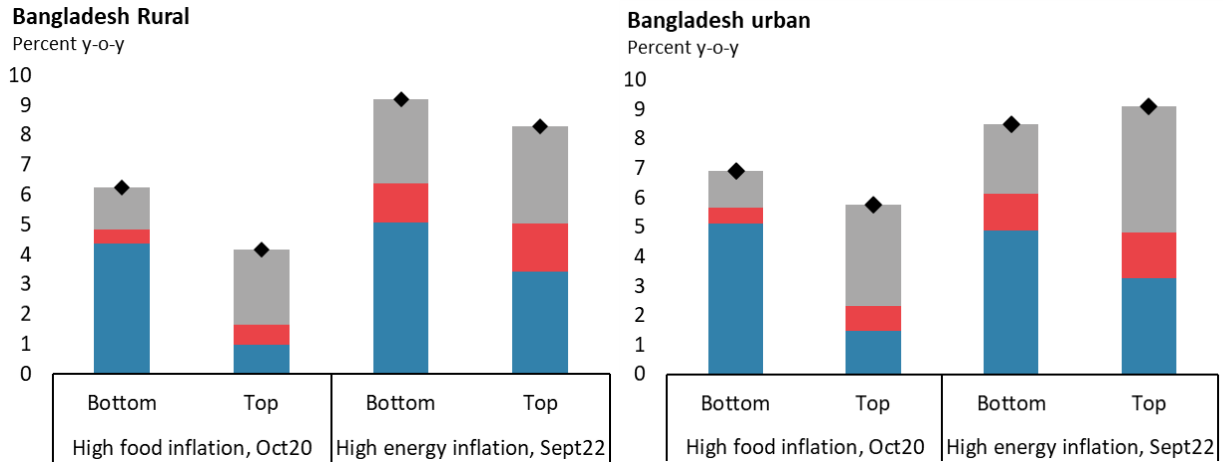
Appendix

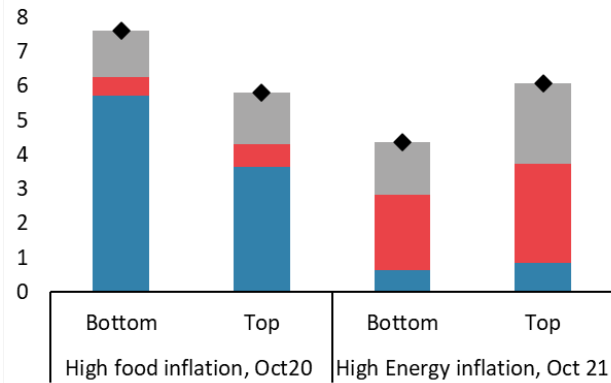## Appendix 1. Food consumption by decile

Bangladesh rural
Percent

Bangladesh urban
Percent

Legend: Cereal/Grains, Fish, Eggs & Meat, Vegetable, Fruits, Spices, Oil & Fats, other food items

Source: Bangladesh HIES (2016-17), author's calculations.

Appendix 2. Inflation in bottom and top deciles

Bangladesh Rural
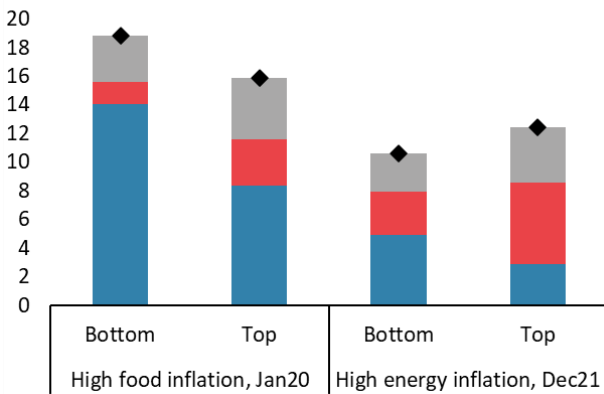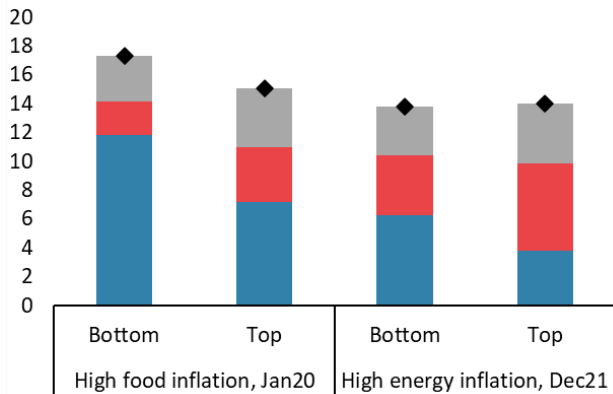Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Oct20 | High energy inflation, Sept22

Bangladesh urban
Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Oct20 | High energy inflation, Sept22

India rural
Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Oct20 | High Energy inflation, Oct 21

India urban
Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Oct20 | High Energy inflation, Oct 21

Pakistan rural
Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Jan20 | High energy inflation, Dec21

Pakistan Urban
Percent y-o-y

Bottom | Top | Bottom | Top
High food inflation, Jan20 | High energy inflation, Dec21

Sri Lanka
Percent y-o-y

Bottom | Top | Bottom | Top
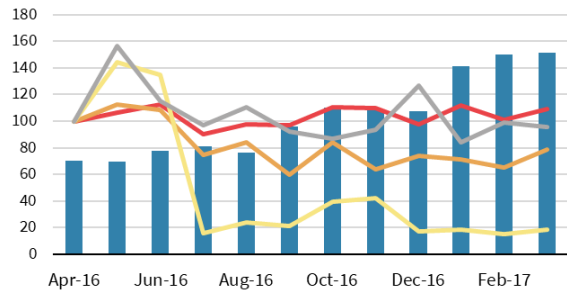High food inflation, Aug22 | High Energy inflation, Sept 22

■ Food and beverages ■ Energy ■ Non-food/non-energy ◆ ALL

Source: Bangladesh HIES (2016-17), India CPHS (2019), Pakistan HIES (2018-19), Sri Lanka HIES (2016), and authors' calculations.
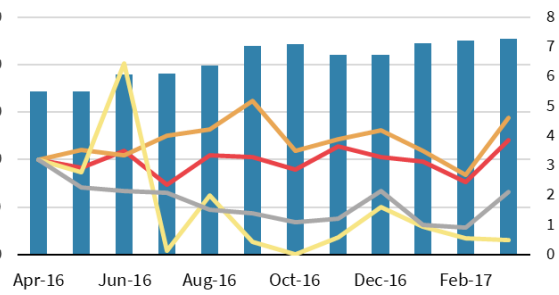
Note: The energy category in Bangladesh and India includes fuel, lighting, transport and communication. The food category in Bangladesh includes food, beverage and tobacco. For other countries, energy includes fuel, lighting and transport, and food includes food and non-alcoholic beverages.

Appendix 3. Select non-food/non-fuel goods relative real consumption vs food inflation in bottom decile households
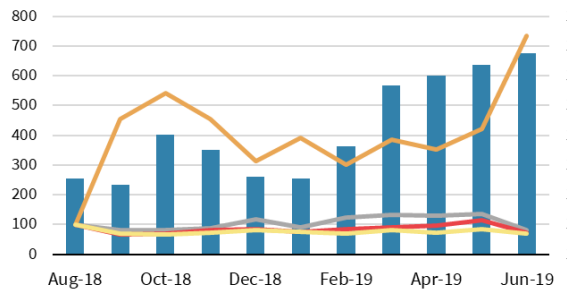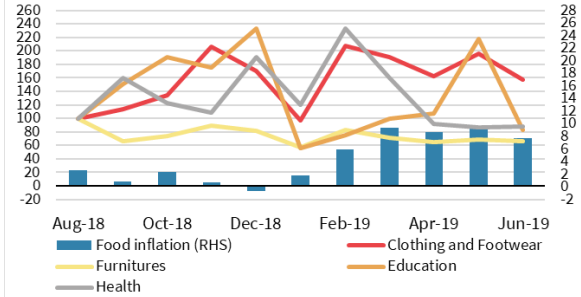
Bangladesh rural

Bangladesh urban

Pakistan rural

Pakistan urban

Legend: Food inflation (RHS) · Clothing and Footwear · Furnitures · Education · Health

Source: Bangladesh HIES (2016-17), Pakistan HIES (2018-19), Haver Analytics, Bangladesh Bureau of Statistics, author's calculations.

Note: The deciles are defined based on per adult equivalent real consumption on the household level and using data over 2016–17 for Bangladesh, 2019 for India, 2018–19 for Pakistan, and 2016 for Sri Lanka.

Appendix 4. Change in consumption patterns in bottom and top deciles, 2015-2019

India: cumulative growth
Percent
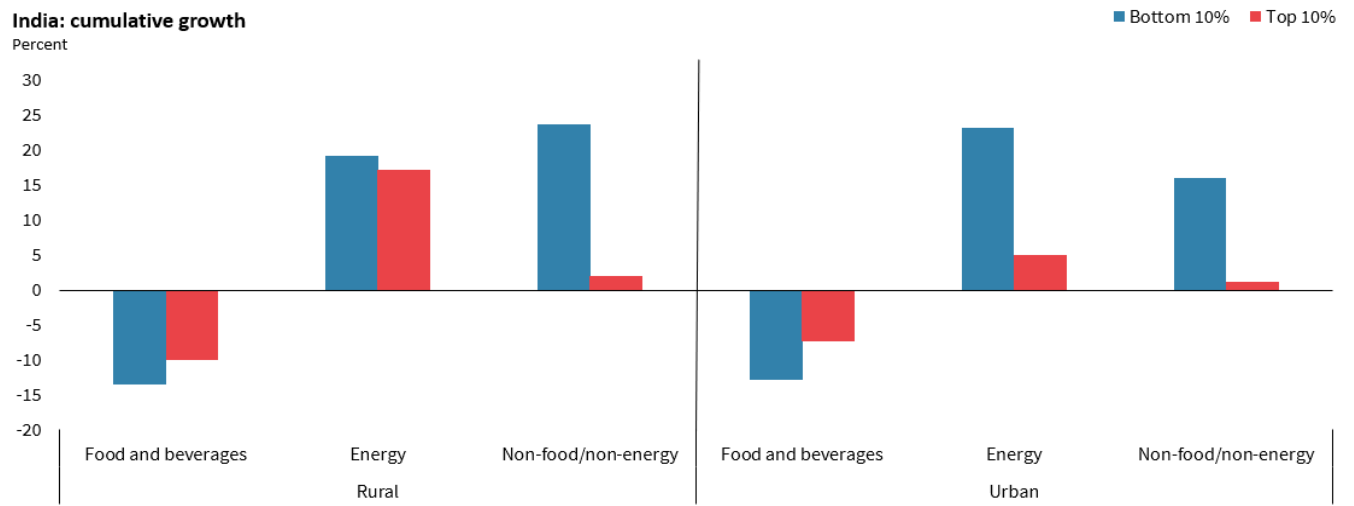
Source: India CPHS (2015-2019), author's calculations.