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Understanding Aspects of Inflation in India

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The adoption of Flexible inflation targeting by RBI formally in 2016 has led to a renewed interest in the dynamics of inflation as a macroeconomic variable, and a shift from discretionary policy making to a more rule-based approach. The element of discretion has not been entirely done away with, as the primary objective of RBI is to keep headline CPI inflation at 4 per cent, with a tolerance band of +/-2 per cent around it. This gives the central bank freedom to exercise discretion in times of extreme events like the pandemic and the commodity inflation witnessed during and after the commencement of the Russia-Ukraine conflict. Along with the primary objective of keeping inflation around 4%, the RBI also has to keep inflation expectations of the general public as close to target as possible. If inflation expectations are allowed to be adrift the central bank will lose credibility. Most countries face divergence between the nominal anchor, in India's case the headline retail inflation, and inflation expectations as seen in the various surveys conducted periodically by central banks. India is no exception to this and the same issue of divergence between actual headline inflation and inflation expectations is studied in a recent RBI paper which is summarized below.

The role of expectations was formalized during the 1970s in the rational expectations revolution, which stated that individuals will adjust their expectations of future inflation based on past experiences and policy changes. This was in contrast to the earlier approach of adaptive expectations where it was believed that individuals' expectations are formed by studying historical data. Dr. Robert Lucas Junior, a Nobel laureate, who passed away recently, is considered to be a pioneer in leading the rational expectations revolution in mainstream economic theory. He was also instrumental in formulating the Lucas Critique which posited that expectations are rational and policies could not be formed without considering the responses of the people to the policy, hence establishing the importance of micro-foundations in macroeconomic policy making.

Headline CPI inflation had been above the target of 4 per cent in FY23, and worryingly even above the upper tolerance level of 6 per cent on average for three quarters necessitating the RBI to write a letter to the parliament explaining reasons as to the failure to achieve the inflation target. This trend was caused by the Russia-Ukraine conflict leading to a sudden spike in crude oil prices, and also many items in the commodity complex, in the months of February and March continuing almost till October 2022. Also, a heat wave in the north resulted in destruction of wheat crops leading to a spike in the cereal prices in the food basket. Usually, seasonal movements in vegetables prices cause wide fluctuations in the headline CPI, but in January 2023, cereals which have a weight greater than vegetables at around ~10 per cent in the CPI basket, and remain relatively stable as compared to the vegetables index, spiked up due to a technical reset by the Ministry of Statistics and Programme Implementation (MoSPI), leading to an inflation print of 6.5 per cent. Crude oil prices had peaked to above the USD 110/bbls during the initial days of the war and hence both food and energy prices had been relatively higher during the time which had set the inflation expectations higher than usual. Some of these trends are reviving in FY24 too, and the recent spike in prices of tomatoes has roiled inflation projections and will likely cause headline inflation to be higher than the RBI forecast for Q2FY24. Recent research by RBI points to the fact that this upward reset of the equilibrium level of inflation may be transient and inflation might follow lower trajectories given that macroeconomic conditions stabilize in the near term.

Recently RBI published four studies on various aspects of inflation and inflation expectations, all related to the headline CPI basket, and this research provides a useful insight into the recent shift in the inflation trends, and presents the view that inflation will ultimately converge to the designated inflation target of 4 per cent, albeit in different ways of approach and study:

1. Reading Consumers' Minds: An analysis of Inflation Expectations: reveals the nuances of the divergence between the actual headline CPI inflation and the inflation expectations of households as depicted in the periodic survey of the households conducted by the RBI.
2. Tail Risks of Inflation in India: Tries to assess the tail risks in the spirit of Value-at-Risk (VaR) as understood in financial risk management and concludes that tail risks to inflation have gradually declined in the years after the country adopted Flexible Inflation Targeting.
3. Recent Regime Reversal in Inflation: The Indian Experience, in the monthly RBI bulletin April 2023 co-authored by Dr. M.D.Patra et al also reconfirm the hypothesis that inflation dynamics have turned favorable after the country has adopted Flexible Inflation Targeting and in the short run headline CPI inflation is expected to inch closer to the target level of 4 per cent .
4. India's Steady State Equilibrium Inflation: A revisit, in the monthly RBI bulletin May 2023, authored by R.K. Sinha from the Monetary Policy Department (MPD). This article presents the view that the long run steady state equilibrium inflation could be around 4.3 per cent based on the pre-pandemic data.

Analyzing the divergence in Headline CPI and Inflation expectations of Households: The study by Purnima Shaw[1], simulates various consumption baskets to estimate inflation expectations and determine what the author terms as the inflation sentiment. The inflation sentiment is the estimated mean inflation obtained by sampling the baskets. The inflation sentiment fails to achieve closeness to the actual survey based inflation expectations and hence the study further suggests alternative logical methods for designing basket compositions and identifies the most suited method using which the estimated expectations are found to be close to and well-correlated with the actual survey numbers.

The findings also suggest that a sudden rise in inflation in items of regular use can explain the deviation in households' inflation expectations from the official inflation. The deviation of survey expectations from the headline inflation can thus be explained effectively, apart from the usual factors of media reports and demographic characteristics, which influence the formation of inflation expectations.

Tail Risks of Inflation in India[2]: Tail risk is defined as the chance of loss occurring due to a rare event. Tails refer to the probability of an extreme event happening. Naturally, the probability of such rare events is usually very small under the normal distribution conditions, though distributions with fat tails will have larger probabilities ascribed to rare events. The objectives of the study were as follows:

1. Estimate tail risks of inflation in India corresponding to various domestic and global drivers and test whether inflation risks have stabilized in the IT period;
2. Examine shifting of the conditional distribution of inflation for different domestic and global shocks;
3. Estimate expected tail values of inflation and examine the robustness of the models;
4. Examine the causal relationship between inflation and inflation uncertainty and assess the reaction of the monetary policy to the asymmetric nature of conditional distribution and uncertainty around the central tendency.

The main contribution of the study is to derive the conditional distribution of inflation based on the current macroeconomic situation rather than depending on the past as in

[1] Reading Consumers' Minds: An analysis of Inflation Expectations, Purnima Shaw, RBI WPS (DEPR),05/2023

[2] Tail Risks of Inflation in India,Silu Muduli,Himani Shekhar, RBI WPS (DEPR)03/2023

the case of a fan chart. After analyzing the historical tail risks and shifts in the conditional distribution for various shocks, it concludes that a rise in domestic income and household inflation expectations increase the upside risks and lower the downside risks to inflation. As in the previous study of analyzing the divergence between actual headline inflation and household inflation expectations, inflation expectations of households affect the upside risks to inflation.

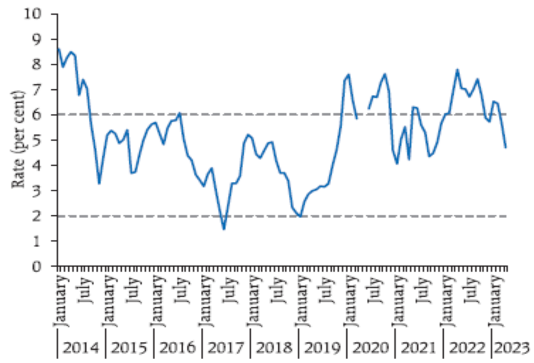
India's steady State Equilibrium Inflation: A Revisit: The paper tracks the stochastic transition of inflation over the period 2014-2022, which also coincides with the de-facto adoption of inflation targeting by the Reserve Bank of India, followed by its formal institution in 2016, and the experience thereafter including the pandemic-induced era. It finds that the long-run steady state equilibrium level of inflation could be around 4.3 per cent based on pre-pandemic data. It may appear to have edged up marginally in the pandemic period, which is likely to be transient and may glide to lower trajectories in due course once there is macroeconomic stability.

In achieving the desired and acceptable level of inflation RBI's monetary policy stance is the most prominent and guiding factor apart from other macroeconomic factors like crude oil prices, which impact the inflation trajectory. A variable like crude oil price can pull or push inflation either way by virtue of an adverse or favorable price movement as the one witnessed during the pandemic and during the Russia Ukraine conflict. A similar effect on the inflation trajectory would be seen by the volatility in food prices. The sharp increase in vegetables and cereal prices lead the headline inflation to a higher level in the short run. Notwithstanding these shocks, RBI's sustained and focused efforts through its policy stance were crucial to bring inflation to a level of 4 per cent during the pre-COVID period.

The pertinent question in the presence of various shocks revolves around the trend inflation in India in the period after India adopted the Flexible Inflation Targeting framework, and where it would hover in the long run under steady state equilibrium. RBI conducted a study[3] of the likely central tendency of the long run inflation and it was observed that the long run steady state equilibrium level of inflation could be steeling to around 4 per cent with an upward bias.

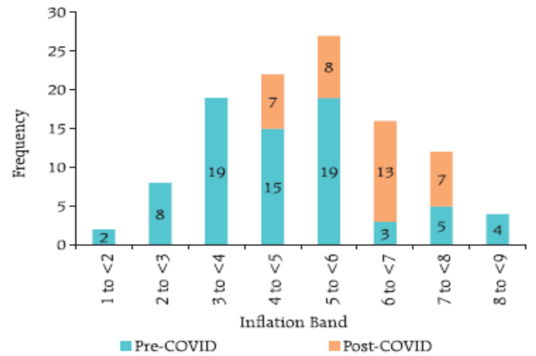
[3] RBI (2017) Distribution of Inflation in India Box 11.3 Annual Report 2016-17 Reserve Bank of India, August.

Chart 1: Time-series of CPI-C Inflation



Note: Inflation prints for April and May 2020 are not included. These were not published routinely by MoSPI due to pandemic-induced economy-wide lockdowns and were imputed subsequently.
Source: Ministry of Statistics and Programme Implementation (MoSPI).

Chart 2: Frequency Distribution of CPI-C Inflation



Note: The Pre-COVID and Post-COVID periods pertain to January 2014 to March 2020 and June 2020 to April 2023, respectively.
Sources: MoSPI; and Author's calculations.

The average inflation over a longer period i.e. 2014-2022 across the components of CPI-C indicates large variations in some product sub-groups, especially in 'food and beverages' i.e. 'meat and fish', 'oils and fats', and 'spices' at a higher side with a Compound Annual Growth Rate (CAGR) of above 6 per cent .The variation in CAGRs of the sub-products are reflective of the relative demand for and supply of these products and their intra-year and inter year variations may represent several generic and specific shocks in the economy.

Inflation in India surged since the emergence of the COVID pandemic and the subsequent Ukraine war and became a major policy concern. With the pandemic impact waning, and the supply chains are easing, however, the long-run steady state level for inflation using stochastic transitions at the micro-level data shows a tendency of inflation to tread slowly towards its central value. This study shows that the inflation long-run steady state equilibrium level could be around 4.3 per cent based on the pre-pandemic datasets. The marginal uptick in steady state inflation observed during the pandemic period is likely to be transient and steady state inflation may revert to lower trajectories going forward. The precise speed of the recovery and normalization of business conditions coupled with evolving situations may dictate how much and how soon the inflation glides onto a lower trajectory.

<u>Recent Regime Reversal in Inflation: The Indian Experience:</u> This paper asserts a similar theory**,** the theory that the adoption of the Flexible Inflation Targeting framework has proved to be beneficial to the Indian economy with much less volatility in headline inflation. Also, the inflation regime had changed due to the supply shocks in 2020-22, i.e.

during the COVID-19 pandemic and the Russia-Ukraine war to a high inflation regime, which has now reversed. There is a rising probability that inflation is transiting away from the high inflation regime with a decline in persistence and trend even as inflation is becoming more sensitive to demand factors.

Conclusion: Over a time cycle inflation undergoes multiple regime shifts, which are also responsive in part to the actions of monetary policy. Recent research by RBI suggests that inflation in India has seen two major regime shifts in the last eight years, one when India adopted inflation targeting; bringing the headline inflation to traverse within the upper and lower tolerance bands of 2-6 per cent. The post COVID and Russia-Ukraine war poly crises environment had led to an increase in the probability of higher inflation, but since those events have settled for now, inflation in India is indicating signs of a downward regime shift.

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