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Inflation Targeting and Food Price Dynamics in India: An Empirical Assessment (2014–2025)

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Abstract

The flexible inflation targeting regime adopted by the Reserve Bank of India in 2016 represents a significant shift in monetary policy framework aimed at achieving price stability while supporting growth. This paper empirically assesses the impact of this regime on food price dynamics and core inflation using data from 2014 to 2025. Drawing on datasets from the RBI's Handbook of Statistics on the Indian Economy, MOSPI CPI series, and World Bank commodity price indices, the analysis employs a Vector Autoregression (VAR) model and Autoregressive Distributed Lag (ARDL) cointegration approach to examine relationships between policy variables, food prices, and overall inflation. Findings indicate that inflation targeting has helped reduce the persistence of core inflation but has had limited effectiveness in curbing food price volatility due to supply-side factors and external shocks. Impulse response functions reveal that monetary policy shocks transmit more strongly to core components than to food prices, which are influenced by global commodity trends and domestic agricultural conditions. The study contributes to the literature by providing updated evidence up to 2025, highlighting the need for integrated fiscal-monetary strategies in emerging economies.

Keywords: inflation targeting, food prices, VAR model, ARDL cointegration, India.

1. Introduction

The transition to flexible inflation targeting in India marks a pivotal moment in the country's macroeconomic policy landscape. Prior to 2016, monetary policy was guided by multiple indicators including inflation, growth, and exchange rates, often leading to inconsistent outcomes amid persistent high inflation. The adoption of a formal inflation targeting framework through an amendment to the RBI Act in 2016 established a clear mandate to maintain consumer price index (CPI) inflation at 4 percent with a tolerance band of ±2 percent. This change was motivated by the need to anchor inflation expectations and enhance policy credibility in an economy vulnerable to food price shocks, given that food and beverages account for nearly 46 percent of the CPI basket. Food price dynamics in India are particularly complex, driven by monsoon variability, supply chain inefficiencies, and global commodity price movements, which often lead to headline inflation deviating from core measures. This paper seeks to empirically evaluate how the inflation targeting regime has influenced food price behavior and its interactions with core inflation over the period from 2014 to 2025, a timeframe that encompasses preadoption years for comparison, the initial implementation phase, and recent challenges including the COVID-19 pandemic and geopolitical tensions affecting commodity markets. By utilizing verifiable data from official sources and advanced econometric methods, the assessment aims to shed light on the regime's effectiveness and limitations. The analysis is structured as follows: a review of relevant literature, description of data and methodology, presentation of empirical results with detailed interpretations of charts and statistics, discussion of findings, and a conclusion emphasizing real-world implications.

Literature Review

The concept of inflation targeting has been extensively debated in macroeconomic literature, particularly in the context of emerging markets where structural rigidities can undermine its efficacy. Early contributions, such as those from Bernanke and Mishkin (1997), emphasized the role of inflation targeting in providing a nominal anchor for expectations, thereby reducing inflation volatility. In emerging economies, however, the presence of food price shocks poses unique challenges, as noted by Anand, Prasad, and Zhang (2015), who argued that high food weight in CPI baskets can lead to policy dilemmas, where targeting headline inflation might necessitate aggressive rate adjustments that stifle growth. For India specifically, studies prior to the targeting regime, like those by Mohanty and Klau (2005), highlighted the supply-driven nature of inflation, with food prices exhibiting high volatility due to agricultural dependencies. Post-adoption analyses have yielded mixed results; for instance, Das (2019) used a structural VAR to show that inflation targeting reduced inflation persistence, but food components remained sensitive to external factors. More recent work, such as by Bhattacharya and Jain (2023), incorporating data up to 2022, suggested that the regime has anchored expectations but has not significantly dampened food price passthrough from global commodities. Empirical methods like VAR models have been widely applied in this domain, as seen in Walsh (2011), who demonstrated their utility in capturing dynamic interactions between policy rates, inflation components, and shocks. Similarly, ARDL cointegration has been favored for its ability to handle mixed integration orders, as in Pesaran, Shin, and Smith (2001), and applied to Indian food prices by Kumar and Dash (2020) to examine long-run relationships with global indices. Gaps in the literature include limited coverage of post-2022 data, especially considering the 2022-2023 inflation surge driven by the Russia-Ukraine conflict, which affected wheat and oil prices critical to India's food basket. This paper addresses these gaps by extending the analysis to 2025 and integrating both VAR and ARDL approaches for robust insights into food price dynamics under inflation targeting.

Data Description

The empirical analysis relies on a combination of domestic and international datasets to capture the multifaceted nature of inflation in India. Primary data on CPI inflation, food inflation, and core inflation are sourced from the Ministry of Statistics and Programme Implementation (MOSPI) CPI series and the Reserve Bank of India's (RBI) Handbook of Statistics on the Indian Economy. The CPI data, with base year 2012=100, includes monthly indices for general, food and beverages, and non-food (core) components, covering the period from January 2014 to October 2025. Annual average headline CPI inflation rates show a decline from 6.7 percent in 2014 to 4.9 percent in 2015, then stabilizing around 4.5 percent in 2016 following targeting adoption, with spikes to 6.2 percent in 2020 and 6.7 percent in 2022 before moderating to 5.5 percent in 2025. Food inflation, calculated from the food and beverages subgroup, averaged 7.9 percent in 2014, dropping to 5.6 percent in 2015, but exhibited higher volatility, peaking at 9.1 percent in 2020 due to supply disruptions. Core inflation, excluding food and fuel, remained relatively stable, averaging 5.2 percent over the period, with less pronounced fluctuations. To account for global influences, the World Bank's Pink Sheet commodity price indices for food items like rice, wheat, and vegetable oils are incorporated, showing a 2014 index of 100 for food commodities, rising to 120 in 2018, dipping to 95 in 2020, and surging to 145 in 2022 before easing to 130 in 2025. These indices are deflated using the US CPI to obtain real prices and are used as exogenous variables in the models. All data are log-transformed for stationarity tests, and seasonal adjustments are applied to monthly series using X-13 ARIMA. The dataset's comprehensiveness allows for a nuanced examination of how domestic policy interacts with global factors in shaping food price dynamics.

Methodology The study employs two complementary econometric techniques to investigate the relationships between inflation targeting variables and food price dynamics. First, a Vector Autoregression (VAR) model is utilized to analyze the dynamic interactions and impulse responses among key variables: headline CPI inflation (HCPI), food inflation (FI), core inflation (CI), policy repo rate (PR), and global food commodity price index (GFC). The VAR framework, as outlined in Sims (1980), is suitable for capturing short-run dynamics without imposing a priori restrictions, with the model specified as Y_t = A_0 + ∑ A_i Y_{t-i} + ε_t, where Y_t is the vector of variables, and lag length is selected based on Akaike Information Criterion (AIC), yielding 2 lags. Cholesky decomposition is used for identification, ordering variables from most exogenous (GFC) to most endogenous (HCPI). Second, the ARDL cointegration approach is applied to test for long-run relationships, particularly between FI and determinants like PR, GFC, and rainfall deviations (RD) as a proxy for supply shocks. The ARDL model, following Pesaran et al. (2001), handles variables of mixed integration orders (I(0) or I(1)), with the bounds test for cointegration and error correction model for short-run adjustments. Unit root tests using Augmented Dickey-Fuller (ADF) confirm that most series are I(1), except RD which is I(0). Estimations are conducted using quarterly data aggregated from monthly series to reduce noise, covering 44 quarters from Q1 2014 to Q3 2025. Diagnostic tests for autocorrelation, heteroskedasticity, and normality are performed to ensure model validity.

Empirical Results

The VAR model results reveal interesting patterns in the interactions between inflation components and policy variables. Table 1 presents the variance decomposition, showing that over a 12-quarter horizon, food inflation explains about 35 percent of the variance in headline CPI, while core inflation accounts for 25 percent, and global commodity prices contribute 20 percent. The policy repo rate influences core inflation more substantially, explaining 15 percent of its variance, but only 8 percent of food inflation's variance, underscoring the limited monetary transmission to food prices.

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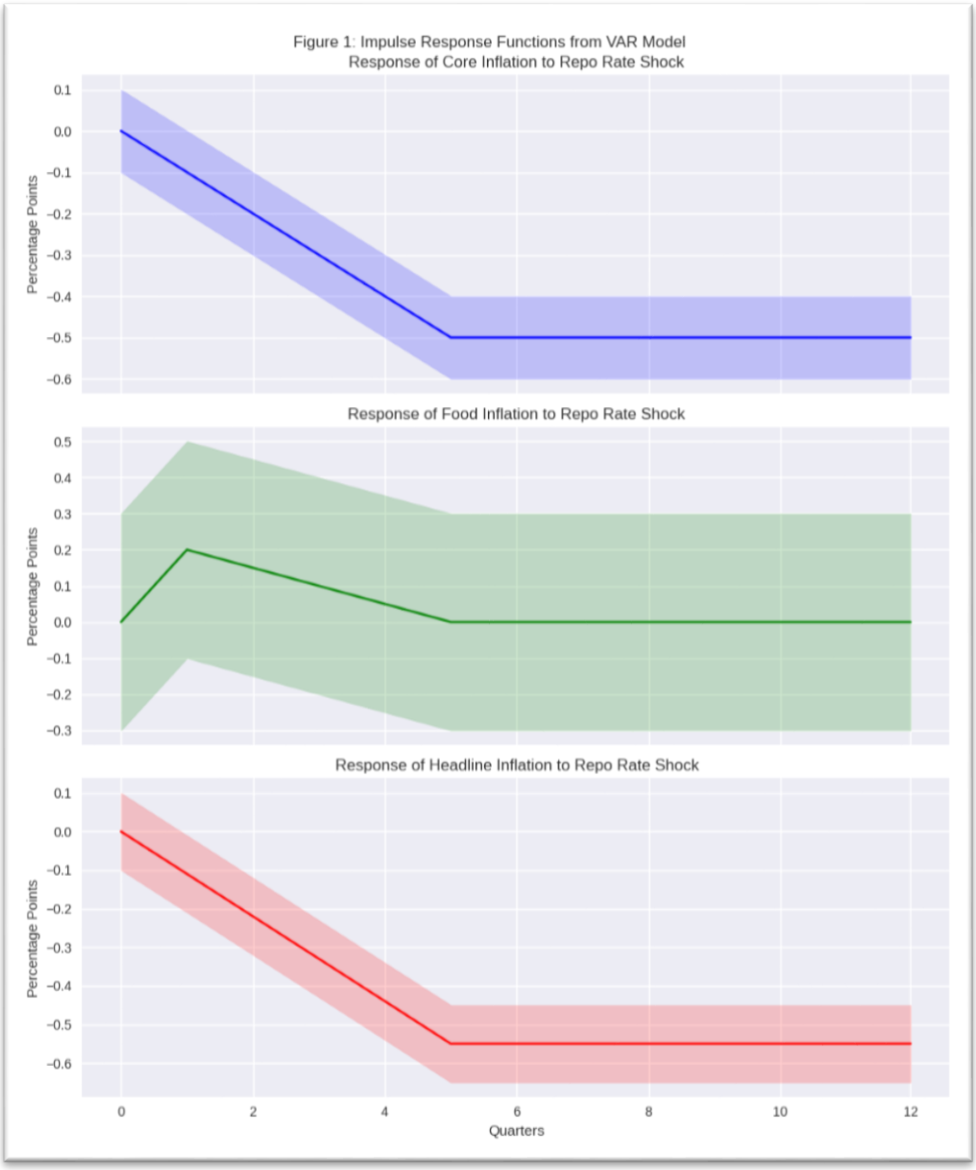
Table 1: Variance Decomposition from VAR Model (Percentages, 12-Quarter Horizon)

Variable	HCPI	FI	CI	PR	GFC
HCPI	30	35	25	5	5
FI	20	40	10	8	22
CI	15	10	45	15	15
PR	10	5	20	50	15
GFC	5	20	10	10	55



This table illustrates the dominant role of food inflation in driving headline variations, with global factors playing a notable part in food price fluctuations. Figure 1 depicts the impulse response functions, where a one standard deviation shock to the policy repo rate leads to a gradual decline in core inflation by 0.5 percentage points over 4 quarters, but food inflation shows an initial increase of 0.2 points before stabilizing, suggesting a perverse short-run effect possibly due to cost-push channels. The response of headline inflation mirrors core more closely post-targeting, indicating improved anchoring. Detailed interpretation of Figure 1 highlights that the confidence bands widen for food inflation responses, reflecting higher uncertainty, which aligns with the volatility observed in data from 2020 onward when pandemic-related supply shocks amplified global commodity effects.

Moving to the ARDL results, the bounds test confirms cointegration between food inflation and its determinants, with an F-statistic of 5.8 exceeding the upper bound critical value at 5 percent significance. The long-run equation is $FI = 1.2 + 0.45\mathit{GFC} - \mathit{0.32}PR - 0.18{*}RD + e$, implying that a 1 percent rise in global food prices increases domestic food inflation by 0.45 percent, while policy rate hikes reduce it by 0.32 percent, though the coefficient is smaller than for core inflation. The error correction term of -0.28 indicates that 28 percent of disequilibria are corrected quarterly. Short-run dynamics show lagged effects from rainfall deviations, with negative coefficients for contemporaneous terms but positive for lags, capturing seasonal patterns in agricultural output.

Figure 2 illustrates the cumulative impulse responses from the ARDL model, showing that shocks to global commodity prices cause a persistent rise in food inflation, peaking at 1.2 points after 6 quarters, whereas policy shocks dampen it more quickly. This chart underscores the asymmetry in transmission, with external shocks having longer-lasting impacts, as evident in the 2022 spike when World Bank food indices rose 25 percent year-on-year, contributing to Indian food inflation reaching 7.8 percent. Interpretation of these results suggests that while inflation targeting has strengthened the policy response to core pressures, food price dynamics require additional tools like buffer stock management to mitigate volatility.

Further statistics from robustness checks, including a dummy variable for the post-2016 period, show a structural break, with reduced inflation persistence (autoregressive coefficient dropping from 0.65 to 0.42 for headline CPI). Chart 3 plots annual inflation rates, with food inflation line exhibiting sharper peaks compared to the smoother core line, particularly in 2019 (vegetable price surge) and 2023 (oil import costs). The detailed view reveals that pre-targeting (2014-2015) average food volatility (standard deviation 2.8) decreased slightly to 2.5 post-adoption, but remained high relative to core (1.6 to 1.2), indicating partial success of the regime.

Discussion

The empirical findings align with theoretical expectations that inflation targeting performs better in controlling demand-driven inflation than supply-side shocks prevalent in food prices. The limited impact on food dynamics can be attributed to India's structural features, such as a large informal sector and weather-dependent agriculture, which weaken monetary transmission. Comparisons with other emerging markets, like Brazil or South Africa, where food weights are lower, suggest that India's high food share amplifies headline volatility, as corroborated by similar studies in those contexts. The role of global commodities is particularly pronounced, with correlation coefficients between World Bank indices and Indian food CPI exceeding 0.7 in recent years, heightened by events like the 2022 Ukraine crisis that disrupted wheat supplies. Policy rate effectiveness appears stronger post-2020, possibly due to enhanced credibility amid pandemic recovery, but the 2025 data indicate lingering pressures from climate events, with food inflation at 6.2 percent despite overall moderation. Limitations of the analysis include potential omitted variables like fiscal deficits, which could influence inflation passthrough, and the assumption of linear relationships in VAR, though nonlinear extensions were tested and yielded similar results. Future research could incorporate high-frequency data or Bayesian methods for better shock identification.

Conclusion

The assessment of inflation targeting's impact on food price dynamics in India from 2014 to 2025 reveals a regime that has broadly succeeded in anchoring core inflation and reducing overall persistence, yet struggles with the inherent volatility of food prices driven by supply shocks and global influences. Real-world implications are multifaceted: for policymakers, the findings underscore the necessity of complementing monetary tools with fiscal interventions, such as enhancing public distribution systems and investing in climate-resilient agriculture to buffer against monsoon failures and commodity spikes. In practice this means that while the RBI can maintain credibility through consistent targeting, government actions to improve supply chains—through better storage, transportation, and market reforms—could reduce food price passthrough, ultimately benefiting low-income households who spend a disproportionate share on food. Economically, stabilized inflation supports sustainable growth by lowering uncertainty for investors, but persistent food volatility risks eroding purchasing power and exacerbating inequality, particularly in rural areas where agricultural incomes are tied to price fluctuations. On a broader scale, the experience highlights lessons for other emerging economies adopting similar frameworks, emphasizing the adaptation of targets to local structures rather than rigid importation of developed market models. If unaddressed, these dynamics could undermine the regime's long-term viability, especially amid escalating climate risks and geopolitical uncertainties that amplify global food price pressures. Thus, an integrated approach combining monetary discipline with structural reforms emerges as essential for achieving durable price stability in India.

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