

# Flexible Inflation Targeting: Concepts and application in India

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## Abstract

The paper analyses issues important in adapting flexible inflation targeting (FIT) to emerging markets. This sets the context in which the evolution of FIT in India and its performance record are analysed. The dominance of supply shocks implies flexibility and fiscal-monetary coordination are necessary. Coordination can reduce the output sacrifice of disinflation, even as it aids fiscal consolidation. Communication has a major role in guiding expectations towards the inflation target. Strict implementation of inflation targeting imposed a large output sacrifice in the early years, but reversal to flexible implementation, in line with the original agreement, succeeded in keeping inflation largely within announced tolerance bands with a good growth recovery. Forecasting has improved and errors in both directions indicate the absence of bias. While there were supportive events in the initial years, such as the 2014 crash in oil prices and softening of food price inflation, the regime has also survived adverse periods of pandemic related supply-chain snarls and rising oil prices. A long period of disinflation and output sacrifice need not be necessary to anchor inflation expectations when there is complementary supply-side action. Since policy has to respond if inflation persistently exceeds the tolerance band, this also contributes to anchoring inflation expectations.

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## 1. Introduction

The brief period of Indian adoption of inflation targeting (IT) has seen a reversal from a strict to a flexible implementation. Flexibility is more in line with the original agreement between the Reserve Bank of India (RBI) and the government, that was for flexible inflation targeting (FIT)<sup>1</sup>, and with the theoretical evolution of IT that has always emphasized growth as well as inflation (Svensson 2007). It is also more sensitive to and better suited for Indian conditions.

In a period of great global turbulence, India's IT regime did succeed first in reducing inflation and then keeping it largely within announced tolerance bands. In the initial years of FIT there were supportive events, such as the 2014 crash in oil prices and softening of food price inflation, but a large growth sacrifice was imposed. However, the regime has also survived adverse periods of rising oil prices, when flexibility aided good growth recovery.

The paper starts with a discussion of considerations that arise in adapting IT to emerging markets (EMs), including the working of the expectations channel. This sets the context in which the evolution of IT in India and its performance record is then analysed. Some key insights/learnings from this analysis are:

- i. The output sacrifice from disinflation can be very large in an EM, where underemployment is high and it is mainly supply shocks that drive inflation. The pass through of policy interest rates is well established, and the interest rate elasticity of aggregate demand is high. But thin financial markets can create distortions in the term structure of interest rates. A rise in risk premiums can raise longer-term interest rates.
- ii. If fiscal supply-side action moderates inflation, the monetary policy committee (MPC) can keep real interest rates below growth rates ( $r < g$ ) and reduce their volatility, which allows faster job creation, catch-up growth and fiscal consolidation, while risk premiums remain low.
- iii. The expectations channel works well, since more weight is given to official communication when information is thin and inflation is volatile. When uncertainty is high, data-based guidance works better than time-based guidance. Markets value predictability, but even data-based guidance can be adequately forward-looking when the policy reaction function is known. Communication must make the latter clear.
- iv. Money supply is endogenous in an IT regime. Financial deepening also makes it so. But some surplus in durable liquidity is required to absorb the multiple shocks the system experiences.
- v. In the initial years, implementation of IT was stricter than it needed to be and did not respond adequately to data that departed from guidance. As a result, real rates were too high. It has matured since into FIT, that has delivered good growth recoveries while keeping inflation largely within the tolerance band in very difficult times. Deviations of the real rate from equilibrium are lower.

- vi. Since demand affects core inflation, the policy rate impacts this type of inflation. Core inflation is also easier to forecast. But headline consumer inflation, which includes volatile food prices, more directly affects household welfare and expectations. The headline inflation forecast error has also reduced, however, contributing better towards guiding inflation expectations. In the initial years RBI inflation forecasts always exceeded actual inflation, which contributed to real interest rates being too high. In later periods forecast errors were in both directions, which indicates there was now no bias in estimation.
- vii. The choice of headline over core inflation puts more responsibility on fiscal policy, which has relatively more effect on the supply-side. India's choice of headline consumer inflation as the target variable worked because it is dominated by food prices that government can affect. Volatile international commodity shocks, that have a large weight in wholesale prices, are less amenable to domestic policy. Improved monetary-fiscal coordination has contributed to better results.
- viii. In an open economy, capping foreign inflows into debt as a small percentage of the domestic market gives more freedom to keep the interest rate in line with the domestic cycle, while two-way movement of foreign exchange reserves help prevent excess volatility of the exchange rate.

Global supply issues did affect Indian inflation, but FIT succeeded in keeping headline inflation within the tolerance band, even as growth recoveries were good and financial sector parameters improved. In January and in July 2021 there was a just-in-time fall in headline inflation, within the mandated 3 quarters, to the tolerance band.

Normally food is regarded as a volatile component; however, domestic policies affect food, and therefore consumer price index (CPI) headline. The volatility of the wholesale price index (WPI), which rose into double digits, was due to international oil prices. Pass through to CPI is mediated by taxes on fuel. Core inflation was persistent, but the largest component was transport. Core inflation was overall less susceptible to global supply chain distortions since the import share of consumption is low.

The objective of establishing IT and moderating financial market volatility was dominant in the early strict application of FIT, but growth fell as a result, which is also negative for financial markets. Volatility rose as asset quality worsened.

The remainder of the paper is structured as follows: Section 2 adapts key IT concepts to EMs. Section 3 outlines the working of the expectations channel. Section 4 examines the evolution of inflation targeting in India, and its performance record, before Section 5 concludes by contrasting some perceptions with the reality of IT.

## **2. Implementing inflation targeting in emerging markets**

The widely-adopted New Keynesian Economics (NKE) approach to monetary policy<sup>2</sup> is based on simple but forward-looking aggregate demand (AD) and aggregate supply (AS), which are derived

from rigorous optimisation by agents with foresight, but subject to constraints that can capture relevant features of an economy.

The simplest AD curve relates the output gap or excess demand inversely to the real interest rate, positively to expected future demand, and positively to a demand shock; the AS curve relates inflation positively to the output gap, to future expected inflation, and to a cost-push or supply shock. The output gap is defined as the gap between actual and potential output. Thus expectations, aggregate demand, as well as cost-push factors all affect inflation. The instrument that the central bank (CB) uses is the interest rate.

During effective growth transition and catch-up, structural unemployment becomes cyclical. More labour mobility implies output can increase without raising inflation. But inefficiencies and bottlenecks continue to push up costs. Continual supply-side reforms are required to reduce these costs. The AS curve becomes flatter but is subject to cost shocks that push it upwards, making it volatile. In such a structure, output is demand-determined, while supply-shocks predominantly affect inflation. The emerging market demand supply (EMDS) framework, reported below, models such a structure.

AS and AD curves derived in a basic dual-economy dynamic stochastic general equilibrium model, as well as econometric estimations surveyed in Goyal (2015), support an elastic supply subject to shocks. Goyal and Arora (2016) estimate the AS slope to be 0.13. Goyal and Kumar (2018) get a value of 0.1 for the elasticity of inflation to changes in marginal cost. Shifts in AD and AS are negatively correlated, so that a negative supply shock reduces demand. Goyal and Tripathi (2015) find that on estimating supply shocks correctly, the AS slope falls from 0.2 to 0.03. Wage-price expectations are one of the factors.

In such a structure, FIT can contribute to anchoring wage-price expectations. These are one of the factors that shift up the AS. Nominal appreciation, consistent with a competitive exchange rate, as well as fiscal policy actions, can also shift down the AS. Good coordination in such a structure requires policies to work together to shift the AS downwards because of the high output cost of a pro-cyclical demand squeeze. If productivity is rising and fiscal supply-side action is moderating inflation, monetary policy can keep real rates low, stimulating demand.

The NKE literature derives basic rules for monetary policy, which we adapt to our framework. First, consider those relevant under cost-push.

- i. There is a short-run trade-off between inflation and output variability only under cost-push inflation, since an output sacrifice is then required to reduce inflation. Otherwise, if only current and future demand cause inflation, the central bank can adjust interest rates to set excess demand to zero and lower inflation with no cost in terms of output.
- ii. When cost-push inflation is dominant, in order to minimize output sacrifice, optimal policy should aim to achieve an inflation target only over the medium-term. If price shocks are expected to be temporary, they can be seen through. Second-round pass-through of supply shocks reduces as inflation expectations get better anchored.

Since India is subject to frequent supply shocks and to chronic cost-push, its implementation of flexible inflation targeting with a tolerance band of  $\pm 2\%$  around the inflation target of 4%, and time of three quarters given to bring inflation back to the tolerance band after a deviation, is in line with the above principles. Average inflation is targeted. These features allow flexibility in responding to inflation in order to minimize output sacrifice, which is important to retain society's support (Mishkin, 1999).

RBI (2014, II.44) took the view that second-round effects and changes in inflation expectations were likely in response to shocks to food and fuel in view of their 57% share in headline CPI. This presumption called for a quick monetary policy response to the risk itself, in order to demonstrate commitment to the nominal anchor.

If AS is elastic, however, reducing demand will have a large output cost but little effect on inflation, making tightening less effective and therefore less credible. A demand shock is added to a supply shock. Households tend to have a stagflationary view, so they expect inflation to rise when growth falls (Coibon et al., 2022). Higher interest rates raise inflation expectations (Goyal and Parab, 2021a). Second-round effects occur only if supply shocks are high and sustained (Goyal and Parab, 2020). Moreover, in EMs, to the extent that communication has a greater impact and government supply-side action reduces inflation, the need for sharp monetary tightening reduces.

As agents' expectations get anchored, the need to impose output sacrifice reduces, since second round pass-through of supply shocks will not occur, moderating the need to tighten even under persistent or multiple supply shocks. This anchoring of expectations is a major rationale for inflation targeting. There is a gain from credible commitment to an inflation target, which serves to focus expectations when agents are forward-looking. Moreover, communication on a future target and inflation path can increase forward-looking behaviour over time.

- iii. If inflation is within an acceptable zone and supply shocks are expected to be favourable, policy should ensure inflation is below the border of the zone and then let it fall with the supply-side improvements. If negative supply shocks are expected to persistently raise inflation above the upper limit, policy needs to tighten. This is 'inflation zone targeting'.

Under monetary-fiscal policy coordination, if appropriate supply-side action is reducing inflation, once inflation is expected to be within the tolerance band, the MPC can wait for beneficial shocks to bring it down further, thus maximising growth.

Anchoring Indian inflation expectations need not take long if communication is good and supply shocks are favourable, since these impact household inflation expectations. Provided communication makes these issues clear, flexibility to accommodate supply shocks and reduce output sacrifice need not adversely affect inflation anchoring. Transparency and open discussion is a pre-requisite to increase understanding about these issues and to co-opt the private sector.

Coibion et al. (2022) find US households pay little attention to monetary policy. Salient prices, such as that of gasoline, affect household expectations most. But in a hierarchical society with

relatively thin news, official communication has more impact, especially since inflation tends to be high and variable and is therefore the focus of attention (Goyal, 2016).

- iv. Uncertainty requires interest rate smoothing. Many central banks that respond to output and inflation gaps also build in small steps in the policy rate. Forward-looking markets factor in future rise in policy rates. This complements policy as long as markets do not over-react. But small steps have to begin early, when the share of backward-looking behaviour is large, since policy then acts with long lags. Delays in introducing such measures can cause instability (Goyal and Tripathi, 2014).

There is a high degree of uncertainty attached to potential output. Small policy steps give time for the uncertainty to resolve, while reducing output sacrifice<sup>3</sup>. Goyal and Arora (2013) suggest using inflation to measure potential output in the Indian context. An indicator of growth having reached potential is core inflation sustained above some threshold due to second-round effects.

The repo rate has to exceed expected inflation by the equilibrium real interest rate. This is the natural real interest rate (NIR) plus any deviation from its steady state. NIR is defined as the equilibrium real rate, consistent with the target rate of inflation, when prices are fully flexible. The equilibrium real rate falls in a slowdown when the potential output is negative, and rises when it is positive, reflecting the impact of demand or supply shocks on potential output.

- v. In response to excess demand, however, nominal interest rates should respond more than 'one-for-one' to expected inflation, since there is no output sacrifice in this case. A tough and credible policy today will decrease the output cost of lowering inflation tomorrow, but it will be credible only if it works. A tightening will reduce inflation effectively only if there is excess demand. If inflation is partially due to temporary supply shocks and partially due to excess demand, rates need to respond only to the latter part, as in the case of the US Fed exiting from post Covid-19 stimulus.
- vi. Forward-looking policy rules have to be formulated in terms of forecasts of target variables. All central banks work with imperfect information, due to inadequate data. Lags in data availability and quality can be particularly large in an EM. Supply shocks are frequent in agriculture and typically food has a large share in headline consumer inflation. Forecasts of target variables may take time to become more accurate.

The concept of core inflation allows the first-round effects of volatile and difficult-to-forecast supply shocks to be excluded, and therefore may be a better target variable. But headline inflation affects a large part of consumption and therefore impacts household inflation expectations more.

- vii. When forecasts are less reliable, as in many EMs, or in times of great uncertainty, data-based forward-guidance is preferable to time-based guidance. During a severe crisis, however, reassurance may be the dominant consideration.

Inflation targeting is a policy rule, but it allows considerable flexibility. It is actually constrained discretion, since it determines the interest rate as 'a predictable function of a few economic variables' (Allsop and Vines 2000, p.17). All underlying multiple indicators that affect outcomes

are used to derive a more focused signal. This signal gives inflation priority, although IT actually uses all relevant information. It is rule-like only in its predictability, that enforces forward-looking behaviour.

This allows impactful communication that guides markets and moderates overreaction (to which markets are subject). Alternative methods are less effective at this because of the sheer complexity inherent in macroeconomics. Predictability is often complemented by explicit forward guidance.

Based on their expectations of macroeconomic variables, advanced economy central banks often give time-based forward-guidance, e.g. that policy rates will not change for one year. But as long as the policy reaction is a predictable function of variables and of deviation from forecasts, even data-based changes offer forward guidance. When this is the case, private sector fast-moving variables such as asset prices help in policy implementation. If markets tend to over-react and deviate from equilibrium prices, however, it may be necessary to surprise them<sup>4</sup>.

- viii. In an open economy, 'thin' EM markets imply that exchange and interest rates can be too volatile in response to fluctuations in capital flows driven by global shocks. Therefore, market intervention is required in addition to setting policy rates, in order to smooth volatility.

This implies foreign exchange intervention, open market operations (OMOs), and other liquidity operations that sterilize the impact of capital flows on durable liquidity. Reducing the volatility of real interest rates reduces that of growth and helps ensure that growth exceeds these rates. Under these conditions debt ratios come down.

Forward-looking FIT prevents the central bank from taking actions with undesirable long-term consequences. Transparent discussion educates the public about these long-term effects and, therefore, has political benefits. Understanding long-term consequences of choices made helps forego short-term opportunism and populism. Even so, the discretion to adjust to unforeseen circumstances helps avoid politically unacceptable short-term costs.

A medium -term inflation target range gives considerable leeway for short-run stabilization. The floor implies stimulus is required to raise inflation, if demand falls. Keeping a positive inflation target, rather than a price level, allows real wages to adjust even if nominal wages are rigid.

Independent experts in an MPC bring in continuity, shared responsibility, and help in handling complexity. Their different perspectives and areas of expertise aid in communicating, balancing trade-offs, and bringing in some democratic accountability. They represent voters with varied preferences, such as savers and investors; debtors and lenders; and markets, firms, and workers.

This is important as IT requires finding a balance between inflation and growth, short- and long-run considerations. Savers benefit from higher interest rates; borrowers, from lower ones, so equilibrium real rates can be a useful policy guide to avoid benefitting one set at the expense of the other.

Despite the importance of the expectations channel in inflation targeting, it is not well understood. It is worthwhile going into its evolution and structure in some detail.

### 3. The expectations channel

#### 3.1 Evolution of communication

A central banker was earlier expected to be a discreet master of the art of speaking and yet saying nothing, but a major task for the modern central bank is to guide market expectations. Blinder et. al (2008) in a comprehensive survey of the topic starts with two quotes that bring out the move to greater transparency over time.

*'Central Banking ... thrives on a pervasive impression that [it]... is an esoteric art. Access to this art and its proper execution is confined to the initiated elite. The esoteric nature of the art is moreover revealed by an inherent impossibility to articulate its insights in explicit and intelligible words and sentences.'* (Karl Brunner 1981, p. 5)

Communication was not important when the dominant perspective was that expectations are rational, so that only unanticipated money could affect real variables. It was then thought necessary not to give any guidance in order to surprise markets with policy changes.

By the new century, the NKE 'multiple equilibrium view' had come to dominate central bank practice. In this view: *'Successful monetary policy is not so much a matter of effective control of overnight interest rates ... as of affecting ... the evolution of market expectations... [Therefore,] transparency is valuable for the effective conduct of monetary policy... this view has become increasingly widespread among central bankers over the past decade.'* (Michael Woodford 2001, pp. 307 and 312)

The case for obfuscation was based on the theoretical presumption, linked to perfect markets that include all available information, so that only unanticipated money can affect outcomes. But perfect foresight or unique equilibrium necessary for perfect markets are only theoretical constructs. Instead, real world economies have four pervasive features: non-stationarity; learning; absence of unique rationally expected equilibrium; and the presence of asymmetric information<sup>5</sup>.

In this view, central bank communications either create news or reduce noise – that is, give more information or increase predictability. Both are expected to raise the signal-to-noise ratio, reduce financial market volatility, and lead to better monetary policy outcomes. Central bank pronouncements influence market expectations and so move asset prices. They influence household inflation expectations and affect wage-setting.

Supportive empirical tests have shown that central banks are able to move interest rates with fewer sale or purchase interventions, thus improving the cost effectiveness of policy. The yield curve is found to predict policy changes under inflation targeting, implying greater predictability of central bank actions.



### 3.2 Transmission through expectations

The standard New Keynesian Phillips curve or aggregate supply equation below shows that expected inflation influences current inflation,  $\pi_t$ . Other arguments are one period ahead (t+1) expected inflation and the output gap ( $x_t$ ), apart from random shocks ( $u_t$ ).

$$\pi_t = \beta\pi_{t+1}^e + \lambda x_t + u_t$$

Equation 1 (a) shows how the policy rate may work its way through current inflation expectations (perceptions), term structure of interest, and expected wages, to affect expected and current inflation. Market expectations that affect the term structure, and business expectations that also affect wages and prices, differ from household expectations.

A flat AS (or low estimated value of  $\lambda$ ) subject to shocks, will reduce the effectiveness of a repo rate change. The largest impact on inflation is from supply shocks and fiscal action influencing them. As expectations become well-anchored at the inflation target, the impact of supply shocks becomes more transient.

$$r_t \downarrow \rightarrow \pi_{t\dots t+s}^e \uparrow \rightarrow \pi_t, i_{t\dots t+s}, W_{t\dots t+s}^e \uparrow \rightarrow \pi_{t+1}^e \uparrow \quad 1(a)$$

$$\pi_{t\dots t+s}^{e,CB} \uparrow \rightarrow \{\pi_{t\dots t+s}^e\} \uparrow \rightarrow \pi_t, i_{t\dots t+s}, W_{t\dots t+s}^e \uparrow \rightarrow \pi_{t+1}^e \uparrow \quad 1(b)$$

Where  $r_t$  is the policy interest rate (Repo rate for India),  $\pi_{t\dots t+s}^e$  is current inflation perceptions over the time period t...t+s,  $i_{t\dots t+s}$  is interest rates and spreads over time period t...t+s,  $W_{t\dots t+s}^e$  is wage expectations over time period t...t+s,  $\pi_{t+1}^e$  is one period ahead inflation expectations,  $\pi_{t\dots t+s}^{e,CB}$  is CB inflation projections, and  $\pi_t$  is current realized inflation (Goyal, 2016 and Goyal and Parab, 2021b).

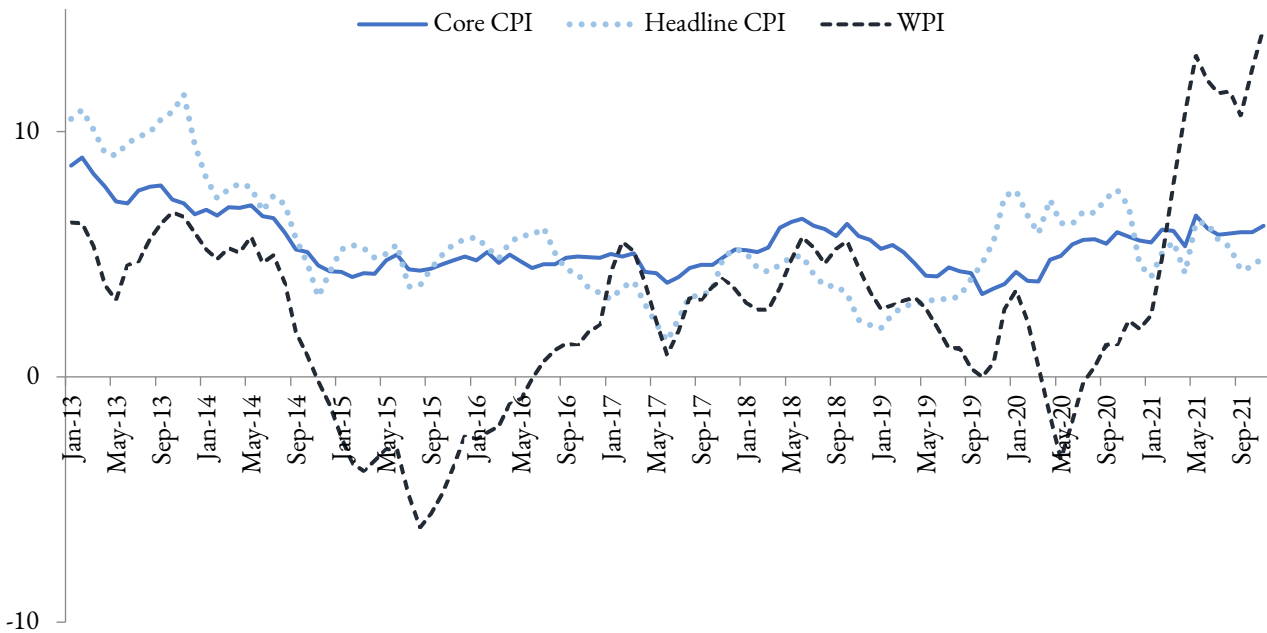
The expectations channel makes tools other than the repo rate available to the central bank. There is the inflation target itself, inflation projections, and various types of guidance. Even though inflation is more volatile and forecasts in EMs are less reliable, there is evidence they have a larger impact (Goyal and Parab 2021a).

Equation 1 (b) shows the effect of the CB communicated inflation path. The policy rate can be changed if actual inflation deviates from the path.

## 4. Evaluating performance of inflation targeting in India

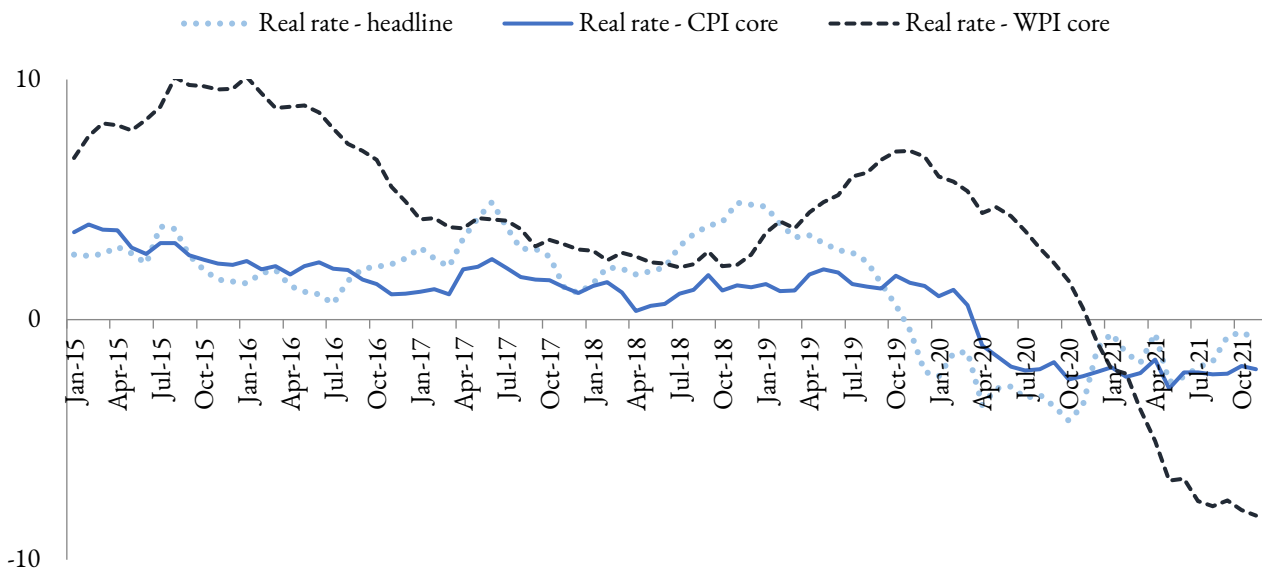
The RBI officially adopted FIT in February 2015<sup>6</sup>, through a transition agreement with the government, although it had begun moving towards it after the RBI (2014) report on FIT. The target inflation rate chosen was CPI headline, at a time when it was the highest inflation rate, in double digits due to sustained high food inflation (Figure 1). A combined CPI had become available only in the early 2010s.

Figure 1: Headline CPI, core CPI, and core WPI inflation



Sources: Calculated from RBI database

Figure 2: Real interest rate: Derived from headline and core CPI and core WPI inflation



Prior to the FIT regime, the inflation rate the RBI used for communication was WPI although under the multiple indicator approach it tracked a number of CPI indices. At this time, WPI inflation was the lowest since food articles have a low share in it<sup>7</sup>. Crude oil prices have a larger share in WPI compared to CPI, making WPI more sensitive to shocks in these prices. With the switch to headline

CPI as the inflation target, the real interest rate swung from negative to sharply positive for all types of inflation.

Figure 2 graphs real interest rates, obtained by subtracting inflation from the one-year Treasury Bill rate<sup>8</sup>, for CPI headline, CPI core, and WPI core<sup>9</sup> respectively. Industry was already in a slowdown and real product interest rates relevant for it, derived from WPI core, touched double digits in 2015-16, aggravating the slowdown.

The RBI had announced a path for gradual reduction of inflation, and – despite WPI inflation coming down sharply in 2014 as oil prices crashed – did not cut interest rates commensurately<sup>10</sup>. CPI inflation also came down gradually with help from falling food price inflation. As policy rates were still not brought down adequately, even with inflation at the target, real interest rates in terms of the target headline CPI reached a peak of 4.85 in November 2018 (Table 1). The equilibrium real rate, because of the continuing industrial slowdown was negative at that time.

Goyal and Arora (2016), who include structural features such as a dual labour market, estimate India's natural interest rate to be negative in slowdowns and positive in booms. The IMF's (2017 pp. 15-16) estimate of India's equilibrium real rate was 1.25 to 1.75%.

**Table 1: Average real rates**

	CPI Headline	CPI core	WPI core
January 2014-December 2018	2.5	2.1	5.6
January 2019-November 2021	-0.6	-0.6	1.2
Annual averages			
2013	-1.7	0.7	5.7
2014	2.2	2.6	5.2
2015	2.7	3.1	8.7
2018	3.0	1.2	2.5
2019	2.2	1.6	5.5
2020	-2.8	-1.2	3.4
2021	-1.4	-2.2	-5.9

Source: Calculated from RBI database.

Another reason for the overshooting was the consistent overestimation of expected inflation in this period. Policymakers themselves were sceptical about the possibility of inflation moderating. Table 2 shows the large positive deviation of expected from realized headline inflation, which was more for the RBI than for professional forecasters (SPF). This meant that while policy rates were kept higher, ex-post real interest rates turned out to be even higher than targeted since actual inflation was below projections. The guidance provided by the projected inflation path was also undercut<sup>11</sup>.

Reassuring financial markets seemed to be a dominant concern for implementing FIT strictly, but markets cannot deliver independent of the real sector. Low, predictable inflation was regarded as a

pre-requisite for the corporate bond market to develop. But corporate investment and borrowing collapsed as growth fell.

Finally, in 2019, in response to the slowdown, and with a new governor, policy rates began to be cut. High-frequency data showed signs of recovery in early 2020, before Covid-19 struck. Real rates became negative in the pandemic period. Even so, despite a rise in inflation driven by global commodity price shocks and supply chain bottlenecks, inflation had not exceeded the tolerance band for more than the 3 quarters at the time of writing. This would have required an explanation from the MPC. Between Covid-19 waves, growth recovery was strong, surprising on the upside.

**Table 2: Deviations of projections from headline CPI**

	SPF 3 month	RBI 3 month	SPF 1 year	RBI 1 Year
<i>Averages</i>				
Mar 2014 – Jan 2019	0.50	0.69	0.81	0.93
Mar 2019-20	-0.08	-0.40	-0.34	-0.49
Nov 2020-21	-0.17	-0.10	-0.29	-0.54
<i>Value For</i>				
Sep-21	0.35	1.25	0.70	1.05
Nov-21	0.62	0.02	0.26	-0.11
Jan-22	-0.44	-0.68	-0.91	-0.61
Mar-22	-1.15	-0.95	-1.46	-1.55

Source: Calculated from RBI database

Despite a once in a hundred years pandemic, the FIT framework held, showing it was possible to restrain inflation yet encourage growth. The framework also showed signs of maturing. Deviations of forecasts from realized headline narrowed, and although the average deviation was now negative, there were periods of positive deviation also, such as September 2021. If there is no bias forecasts should sometimes over-predict and sometimes under-predict actual inflation. Even monthly deviations, however, became negative after the unexpected shocks of the Ukraine war. In November 2021, RBI's deviations were even below the average of professional forecasters. Real rates became less negative in 2021 than they were in 2020, as inflation fell.

This time, oil and supply chain shocks made WPI inflation the highest, such that real product interest rates (using core WPI) were more negative. This benefited firms, while the headline real rates relevant for consumers were less negative, reducing the erosion of real savings. The volatility of the target headline CPI inflation, impacted more by domestic supply factors, was much below that of WPI, which faced more international shocks. WPI volatility created large but transient base effects<sup>12</sup>. It was feasible to moderate the CPI through domestic supply-side policies including tax cuts.

Growth also suffered through the 2010s decade because liquidity was kept in deficit, in the belief that pass-through of interest rates is better under such conditions. This was the practice in major AEs prior to the global financial crisis. But in an EM, it is difficult to predict liquidity requirements because of large shocks due to foreign inflows, changes in currency demand, and in government cash balances. Shortages sometimes became excessive, such as when there was no lender of last resort for a major systemic NBFC in trouble. Moreover, AEs themselves had moved to surplus liquidity conditions under quantitative easing.

Reversal of tight monetary-financial conditions, especially after Covid-19, reduced liquidity hoarding and restarted payments through the economy. Rebalancing of excess liquidity, created in the first year of the pandemic, started early in 2021. In a FIT regime the liquidity adjustment facility (LAF) makes money supply endogenous. Excess durable liquidity is absorbed in the remunerated reverse repo. But only banks can access the LAF in India, and some cooperative banks prefer to access it through commercial banks. This and other market microstructure issues led to short rates falling below reverse repo rates.

Financial deepening also makes money endogenous as it creates near-money substitutes, but this has further to go in India. Even so, broad money<sup>13</sup> and credit growth remained in low single digits through 2020 and 2021, despite surplus durable liquidity, indicating that aggregate demand was low and money creation was not excessive.

Since unemployment and excess capacity was large, and the fiscal stimulus was restrained, it was necessary to sustain demand, not to reduce it. While the policy rate was not at its lower bound of zero, reducing it further was constrained by inflation.

Guidance on policy objectives, on the inflation path — that it was a temporary spike driven mostly by international shocks and that its domestic pass-through could be limited by fiscal supply-side action, including tax cuts — all played a role in restraining inflation expectations before the Ukraine war.

Guidance was time-dependent (stating that it would continue into the next year) only through the first wave, and then became state-dependent as recovery started. In the early years of FIT, an accommodative stance was defined in terms of repo rate changes: the repo could either fall or stay the same. In a neutral stance, it could stay the same or move in either direction. It could rise only under a tight stance.

After the steep pandemic-induced cut in 2020, however, even as rates began to rise, the stance was actually accommodative as the repo rate was below the neutral rate. Liquidity rebalancing was consistent with an accommodative stance. Because of the difficulty in precisely estimating a neutral rate, it was decided to define the stance in terms of the LAF. Stance would be accommodative if liquidity was such that the call money rate was at the reverse repo, neutral if at repo, tight if above the repo.

#### 4.1 Anchoring of expectations

How has the expectations channel worked in this brief period? Markets pay attention to RBI views and guidance and it affects bond spreads. More than the type of inflation, it is the transparency and predictability of an IT regime that is of value to them. The credibility and success of the CB in containing inflation is important for this. Stable inflation lowers country risk premium and cost of borrowing in an open economy. However, analysts and markets tend to be more risk averse and over-react in uncertain times, and this raises spreads and government security yields.

Household and SPF expectations are naïve (backward-looking), but show the influence of RBI communications (Goyal and Parab, 2021a). In most countries, household expectations normally substantially exceed realized inflation (Coibon et. al. 2022, Goyal and Parab 2021a). Goyal and Parab (2021a), however, find evidence that in the long-run as household inflation expectations converge to an equilibrium level, core inflation has the largest effect on them<sup>14</sup>, although as yet household inflation expectations do not affect other variables. There is also evidence that expectations converge faster in an IT regime and for an EM (Goyal and Parab, 2020). In time, this should lead to the long-term inflation target becoming well internalized, affecting wage-price setting, rental contracts and market rates and spreads.

#### 4.2 Issues of measurement

With the focus on inflation under FIT, the measure of inflation should be reliable. It is necessary to update the basket and weights frequently, as well as the number and quality of goods. Combined rural-urban headline CPI, which is used as the inflation target, has not been updated beyond the base of 2012.

In 10 years, the weight and variety of goods in the consumption basket is likely to have changed. The share of food inflation in the consumption basket falls with development. Given measurement issues, in a country of India's spread and diversity, it is better to work with average rather than point inflation. Features such as targeting average inflation, the 3 quarters available to achieve the target, and the tolerance band of plus or minus two around the target contribute to flexibility in the Indian IT regime.

Another issue worth considering is the choice between core and headline CPI as the inflation target. Core inflation is a derived concept. While there are many ways of deriving it, the simplest is an exclusion measure that leaves out volatile commodity price components, so that prices of goods and services are left. Aggregate demand and therefore monetary policy affects these prices.

In the early years of inflation targeting, many countries had core inflation as a target<sup>15</sup>, as it was regarded as better to focus on what a central bank can affect. Now, headline inflation is the target in most countries, as confidence in the ability of the inflation target to impact inflation expectations has increased. It is necessary, however, to suit country context and experience. The target can change as required.

Normally, a volatile headline reverts to a more stable core. In India, early research found persistently high headline above a threshold affects core<sup>16</sup>. Causality reversed in early 2010s as food inflation fell (Goyal and Parab, 2020). Goyal and Parab (2021a) find core inflation dominates household expectations in the long-run.

Correct forecasts contribute to anchoring expectations, and these can be more accurate for core. Stable forecasts may reduce volatility in expectations. Moreover, Goyal and Parab (2021a) find the repo has insignificant or perverse effects on household headline inflation expectations. Repo affects demand for industrial goods and services, which dominate core inflation. This traditional transmission channel may work better under a core inflation target.

But equity and consumer welfare considerations support targeting headline CPI, which is the cost of the average consumption basket. In the Indian context, with a large number of supply shocks and bottlenecks, the selection of headline CPI as the target places more responsibility on government to resolve supply-side issues. Moreover, the food items dominating headline CPI are more amenable to government action, such as the choice of agricultural support prices. Therefore monetary-fiscal coordination is required.

### **4.3 Monetary-fiscal coordination**

After Covid-19 raised their debt levels, AEs began to emphasize monetary-fiscal coordination to help finance government borrowing and spending. In India there were additional justifications for this earlier also, given the structure of AD and AS. Monetary transmission to output is effective, while higher government debt and interest payment burden limit fiscal demand stimulus.

Fiscal deficits cannot expand beyond a point; however, reforms to improve the supply-side and a higher share of public investment are feasible. Monetary-fiscal coordination that suits Indian conditions is for this fiscal supply-side action while monetary policy sustains demand at non-inflationary levels.

If continuing improvement in supply conditions reduces costs of doing business and inflation then monetary policy can keep real interest rates ( $r$ ) below growth rates ( $g$ ). This is the snowball effect that reduces debt ratios automatically over time, as the denominator rises. It was used to justify more government borrowing in AEs for Covid-19 stimulus and protection spending. Using this effect is particularly important for EMs where governments face higher borrowing costs and a large budgetary share of interest payments.

High growth implies this  $r < g$  often holds in EMs, but high volatility in growth and in real interest rates limits its benefits. Therefore, large domestic policy shocks have to be avoided, and countercyclical macroeconomic policy has to smooth shocks. Indian policy has the degrees of freedom to do so.

The above arguments imply, in the Indian context, flexible rules combined with delegation to a conservative fiscal authority and a pro-growth central bank would give the best outcomes (Goyal, 2018). Coordination does not imply loss of central bank autonomy, since keeping policy rates low is

conditional on government supply-side action to reduce inflation. Moreover, the government is itself committed to low inflation since it is important for votes.

Supply-side action requires restraining the quantity but improving the quality of government spending. The Covid-19 period has seen a transition to such spending. Since 2014, the government has aimed to raise agricultural productivity and moderate food prices, which is a major reason for the lower volatility of CPI headline, and for CPI inflation being below WPI unlike in the early 2010s.

CPI headline is more amenable to domestic policy actions. The Centre's cut in fuel taxes on 4<sup>th</sup> November 2022 was followed by many states. It had a large impact on household inflation expectations. These had shot up in early November but fell by the end of the month. While household expectations are backward looking, firms are more forward-looking and their inflation expectations also moderated, enabling the MPC to continue with its accommodative stance.

Another example of post-Covid-19 coordination is the use of credit warranties, which reduced banks' fear of lending, even as lower policy rates raised demand. Using the financial sector to deliver stimulus reduced current public sector borrowing requirement and private sector crowding-out.

RBI (2021, pp. 24) estimated average inflation to be around 4% in the IT period up to 2020. It rose under Covid-19 supply shocks, but these are not likely to last. Estimating equilibrium inflation from the AS gave a value of 5% over 2010s (Goyal and Tripathi, 2015). This should come down, over time, to the inflation target of 4%. Monetary-fiscal coordination, however, makes it feasible to reach the target with minimal output sacrifice through the practice of inflation zone targeting.

## 5. Conclusion

Since the regime is relatively new, there are many misunderstandings about inflation targeting and especially how it works in an EM like India.

Some interpret it as requiring a hawkish focus only on inflation. IT itself evolved, however, with a shift from the monetarist view that markets are perfect and money affects only inflation, to recognizing the possibility of multiple equilibria. Policy has a role to play in coordinating a better outcome with less underutilization of resources. While the communication is more on inflation, it is the outcome of a complex process involving many variables being taken into account. FIT is also concerned about growth and financial stability.

There is a perception that this approach is in response to past inflation, since it was introduced after a high-inflation period. In fact, it is about fighting future inflation, by anchoring inflation expectations. For this, in addition to the target, accurate inflation forecasts are important. IT is intrinsically forward-looking.

A credible regime change implies the future can be different from the past. A long period of disinflation and output sacrifice need not be necessary to anchor inflation expectations with complementary supply-side action. A key difference is the MPC now has to respond if inflation persistently exceeds the tolerance band. This belief can in itself contribute to anchoring inflation



expectations. The major instrument now is the repo rate, but it is not the only instrument. The target, stance and guidance through future growth and inflation paths all play a role.

In an EM with many market imperfections, action on liquidity has to complement changes in the repo rate. Since only banks can borrow short-term liquidity from the RBI, both the informal sector and modern markets are underserved at present. Money markets and the liquidity adjustment facility have to continue to develop, so that the call rate stays within a narrowing corridor.

The dominance of supply shocks and bottlenecks in an EM implies coordination with the government is essential. Good coordination can reduce the output sacrifice of dis-inflation, even as it aids fiscal consolidation.

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## Notes

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<sup>1</sup> The preamble of the RBI Act, 1934, as amended by the Finance Act, 2016, states “AND WHEREAS the primary objective of the monetary policy is to maintain price stability while keeping in mind the objective of growth;” thereby enshrining a flexible inflation targeting framework for India. The initial agreement between the Government of India and the RBI in February 2015 also explicitly mentions flexible inflation targeting (RBI 2021).

<sup>2</sup> Clarida et al (1999) is a comprehensive survey. See also Bernanke and Mishkin (1997). Goyal (2012) is an adaption to an EM, which we develop further here. RBI (2021) examines IT application in India.

<sup>3</sup> A short-term fall in growth below potential can trigger a shift to a lower steady-state growth path, creating persistent losses (Goyal and Kumar, 2018).

<sup>4</sup> Markets had priced in excessive rate hikes after the US Fed began talking of tightening. The steep surprise hike in Indian Repo rates, in an out-of-cycle meeting in May 2022, prevented additional rate hikes being priced in as domestic rate-rising began.

<sup>5</sup> A non-stationary economy can have many possible long-run outcomes. That people have different degrees and types of information makes learning about, foreseeing and arriving at a unique equilibrium more difficult.

<sup>6</sup> The RBI Act, 1934 was amended to provide a constitutional basis for the implementation of the flexible inflation targeting (FIT) framework, and the MPC was set up only in May 2016. RBI Act 45-ZB states: ‘The MPC shall determine the Policy Rate required to achieve the IT.’ It defines the inflation target as the ‘consumer price index’ (RBI 2021).

<sup>7</sup> In the headline WPI (base year 2011-12) basket, Manufactured Products had a weight of 64.2, Oil 13.2, and Primary Articles 22.6. In the headline CPI (base 2012) rural and urban combined, the basket weights are Food & Beverages 45.86, Pan, Tobacco & Intoxicants 2.38, Fuel & Light 6.84, Clothing & Footwear 6.53, Housing 10.07, Miscellaneous, 28.32. The CPI includes services.

<sup>8</sup> The one year Treasury bill rate is used to give the one-year ahead expected inflation. Although the market for this is thin, most short-rates respond well to changes in the policy rate. The latter is inappropriate for comparative purposes because the policy rate switched from the repo to the reverse repo during the Covid-19 period.

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<sup>9</sup> Items constituting CPI core have a weight of 47.3 in the combined CPI index, excluding only the categories Food & Beverages and Fuel & Light. Core WPI, comprising of non-food manufactured products, has a weight of 55.1. Weight of WPI manufactured products is 64.13.

<sup>10</sup> On the glide path, the April 2014 forecast was 8 per cent CPI by January 2015, but CPI fell to 5.2 per cent. The April 2015 CPI prediction for March 2016 was 5.8 per cent by, but it fell to 4.83 per cent. The early 2016 prediction for March 2017 was 5 per cent, but CPI fell to 3.89 per cent.

<sup>11</sup> The bimonthly monetary policy statements from 2014-16 show the one-year-ahead inflation announced was almost always about one percent above realized inflation.

<sup>12</sup> Goyal and Tripathi (2011) show the dominance of food price inflation in second-round inflation effects in India makes CPI inflation cause WPI inflation in statistical tests rather than the reverse, although normally it is producer prices that are expected to affect consumer prices.

<sup>13</sup> Even though the RBI created excess liquidity, broad money and credit growth depends on bank lending, which was low. Banks returned the excess to the RBI who absorbed it in reverse repo balances on which it paid interest to banks.

<sup>14</sup> In their SVAR estimation, the share of a shock to core inflation in one-year-ahead household inflation expectations' variance decomposition rises from 1% in the first quarter to 53% by the 7<sup>th</sup> quarter.

<sup>15</sup> Among EMs, Korea targeted core inflation between 2000 and 2006, Thailand between 2001 and 2014, and Brazil began its adoption of inflation targeting with core inflation as its target (Niedzwiedzinska, 2018).

<sup>16</sup> Anand et al. (2014) showed that Indian headline inflation affects core inflation in the high-inflation period of the late 2010s. Their result did not hold after inflation fell below double digits.