

Whither inflation?

Food's feeble bite, the FIT regime
and if-then scenarios

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Executive summary

India's headline inflation, measured by the Consumer Price Index (CPI), has not only trended down for five fiscals now, but also undershot the Reserve Bank of India (RBI)'s medium-term target of 4% for the second straight year in fiscal 2019. This has puzzled analysts and defied the RBI's own projections.

So where does it go from here?

Our base-case scenario is headline inflation rising 60 basis points (bps) to 4% this fiscal from 3.4% in fiscal 2019. This calculus assumes food inflation rising to 3% from an abnormal low of 0.1%.

This is largely a statistical low-base effect at play. However, the rise in food prices may well remain subdued on a sequential basis for two reasons. One, the Indian Meteorological Department has suggested a well-distributed monsoon this year. Two, global food prices are expected to fall in 2019, as projected by the International Monetary Fund and World Bank.

In the context, we foresee two scenarios for fiscal 2020.

The upside scenario: If monsoon plays truant, especially in light of an El Niño event occurring, food inflation could surge. Fuel inflation would follow suit if the current uptick in international crude prices persists. Also, core inflation (headline inflation minus food and fuel inflation) could strengthen further on account of the government's consumption-oriented policies. Together, these could push the print above 5%.

The downside scenario: If food inflation remains low for longer, the headline number could decline to 3.5%, while core inflation would soften because of the lagged impact of economic slack and restrained government spending.

A study of the main components of headline inflation and their trend over the past three decades leave us in no doubt that food has been the main retarding factor. Core inflation, which is supposed to be a better gauge of demand-side pressures in the economy, has been fairly sticky, irrespective of economic cycles. Fuel, on the other hand, has been the most volatile, but given its low weight in the CPI basket, its direct influence on headline inflation is limited.

And this is not the first time the Indian economy is witnessing low inflation. Between fiscals 2000 and 2006, inflation averaged 3.9%, or below the RBI's current medium-term target of 4%. Inflation in the current low phase (fiscals 2015 to 2019) has averaged 4.5%.

Both phases of low headline/food inflation witnessed normal monsoon, except for two sub-par years in each period, a relatively modest increase in minimum support prices, and benign global prices. However, what has been different in recent years, particularly in fiscals 2017 and 2018, is a strong positive supply shock that additionally helped tamp food inflation.

How does all this fit in with India's recently adopted inflation targeting framework?

So far, we note that inflation targeting has coincided with lower inflation and its volatility. Consumer inflation fell to 3.9% per year in three years after implementation of targeting, from an average 7.3% in the four years preceding. Its standard deviation fell to 1.2% from 2.4%. However, it is important to underscore the significant role of a sharp slowdown in food inflation - an idiosyncratic factor - in driving headline inflation lower. If the RBI's medium-term target of 4% has to be met, that must sustain.

Finally, we conclude that while household expectations of inflation have declined after the advent of the inflation targeting framework, their gap from actual inflation has become wider.

That, however, is not the case with the expectations of professional forecasters, who are better-informed. One-year ahead household inflation expectation is currently at 8.3%, compared with 4.2% for professional forecasters.

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Introduction

Inflation has been a regular on the headline circuit - more so since the Reserve Bank of India (RBI) made inflation-targeting a single-minded pursuit.

A quick flashback tells us India's 'headline' inflation, as measured by the CPI, has, by accident or design - or a combination of the two - glissaded from 9% in fiscal 2013 to 3.4% in 2019.

It undershot the RBI's medium-term target of 4% for the second consecutive year in fiscal 2019. In January this year, it nuzzled the lower bound of the target band of 2-6%, flummoxing and consistently shooting short of the projections of analysts as well as the RBI.

That, along with a benign shift in inflation drivers, has led to a consistent lowering of the inflation trajectory in past few Monetary Policy Committee meetings.

What's driving this descent?

To answer this, we broke down headline inflation into its main components and studied their constituent trends over a sufficiently long period. No surprises here, as food inflation turned out to be the major retarding factor. Next, we studied food inflation at an even greater level of disaggregation, pinpointing the sources of slack. Going further, based on three decades of data, we also identified structural breaks and phases in headline, food, and core inflation that helped us accurately predict not only how inflation could turn in the coming fiscal, but also the extent of its volatility.

That gives rise to several questions. How do we read inflation and its trends along with the RBI's flexible inflation targeting (FIT) framework, which has been in place for the past three fiscals? How has that, in turn, impacted inflation, volatility, and its expectations? What is the future of FIT in India?

Based on our assessment, we present our inflation outlook for fiscal 2020, along with alternative inflation scenarios that factor in both upside and downside risks.

The many measures of inflation

While the RBI currently targets CPI inflation, it is worthwhile getting to know other important measures of inflation in the economy and their uses:

- Wholesale price index (WPI) inflation, which indicates the price trends of goods in the wholesale/bulk market. Unlike CPI that covers both goods and services, WPI comprises only goods. There are differences in weights, too. For instance, food has a lower weight in WPI (15.3%) compared with CPI (39.1%).
- Gross domestic product (GDP) deflator, also called the implicit price deflator, is a measure of the level of prices of all domestically produced final goods and services in an economy in a year, making it the broadest measure of economy-wide inflation.
- CPI-IW for industrial workers (base 2001), CPI-AL for agricultural labour (base 1986-87), and CPI-RL for rural labour (base 1986-87) are some other CPI measures that still get reported. While major users of CPI-IW are employers and workers, CPI-AL and RL are used by the governments to notify the minimum wages of agricultural labourers and rural unskilled wage workers, respectively.

In trying to understand inflation dynamics in the economy, we first assess the performance of all three key measures of inflation (CPI, WPI, and GDP deflator).

Inflation through three lenses

Inflation average (% (%, y-o-y)	FY01- FY05	FY06- FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
CPI	4.0	7.7	10.4	8.4	9.9	9.4	5.9	4.9	4.5	3.6	3.4
WPI	5.2	5.5	9.6	8.9	6.9	5.2	1.2	-3.7	1.7	2.9	4.4
GDP deflator	4.0	7.4	10.5	8.7	7.9	6.2	3.3	2.3	3.1	3.8	4.2

Note: For data starting FY13, base is 2012=100 for CPI. Prior to FY13, CPI data pertains to CPI-IW (2001=100). Base for WPI from FY13 is as per 2011-12 base and prior to that, as per 2004-05 base. For GDP deflator, data after FY06 pertains to 2011-12 base and prior to that is 2004-05 base

Source: Central Statistics Office (CSO), Office of the Economic Adviser, Government of India, CRISIL Research

Two important inferences can be drawn from the above table:

- CPI and WPI inflation have diverged. While the former has been trending down since fiscal 2014, the latter moved up since fiscal 2017. This can, in part, be attributed to the difference in coverage and weightage of different components in the two indices
- GDP deflator has moved more in sync with WPI than CPI. This can be explained by the fact that WPI is used to deflate most parts of nominal GDP to arrive at real GDP

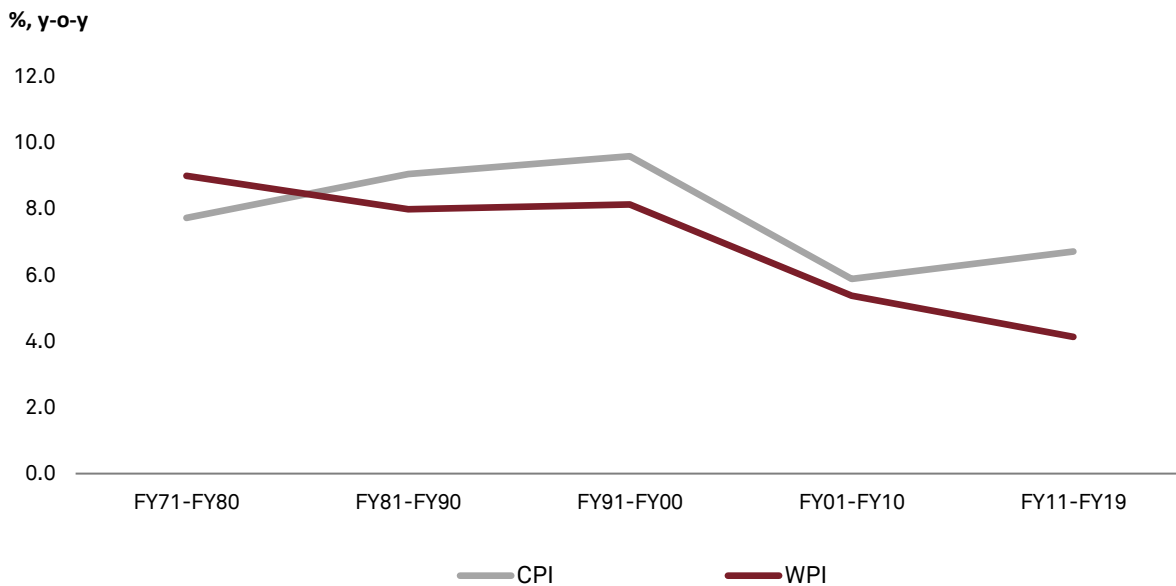
What do long-term trends in CPI and WPI tell us?

We waded through fifty years of historical data to find:

- WPI inflation has mostly stayed below CPI inflation, on average, by 80 basis points (bps) between fiscals 1971 and 2019
- The only period when WPI inflation spiked higher was between fiscals 1971 and 1980, led by oil price shocks
- Both inflation measures treaded lower in the past 20 years, but WPI inflation fell faster, on average, causing the gap between the two to widen:
 - The key element keeping WPI lower than CPI inflation is the larger weight of fuel and manufactured goods and commodities, which, on average, have seen lower inflation than food (the heavyweight in CPI).
 - In the past decade, however, food inflation stayed high between fiscals 2011 and 2014. Even within the WPI, inflation in food was, on average, 250 bps higher than in fuel and 330 bps higher than in manufactured goods. Food explains why CPI inflation lifted higher and diverged from WPI inflation.

- Adoption of a new WPI series further supported lower WPI inflation on average, compared with the past. In the new series with base year 2011-12, inflation rate, in general, was lower than the previous series, mainly due to changes in weighting structure, increase in number of price quotations, exclusion of indirect taxes in computation, and usage of geometric instead of arithmetic mean

The ‘crocodile maw’ shows a growing divergence between WPI and CPI inflation in the past decade



Source: CSO, Office of the Economic Adviser, CRISIL Research

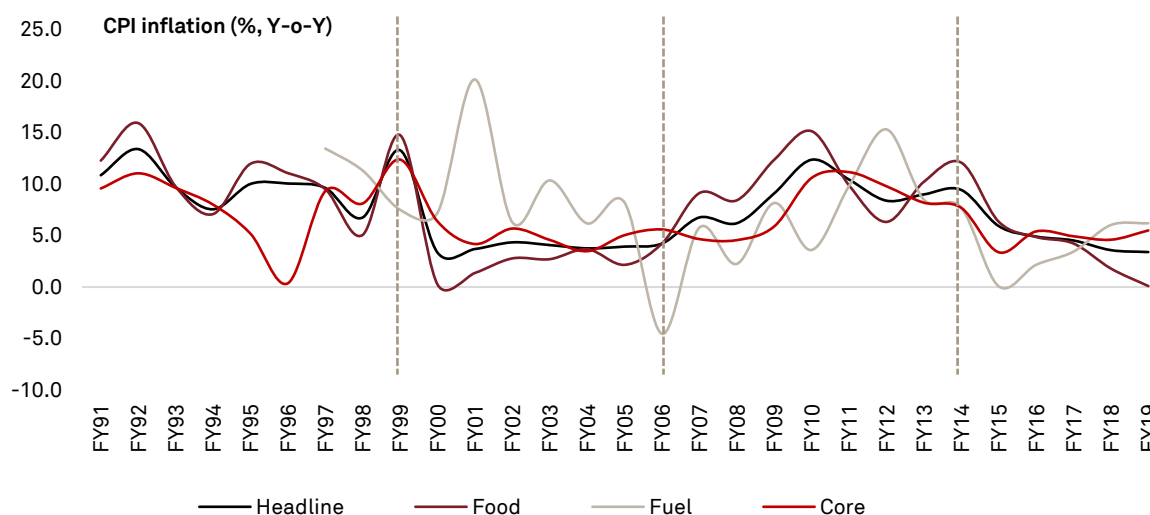
Takeaway 1: WPI inflation has mostly stayed below CPI inflation, on average, by 80 basis points (bps) between fiscals 1971 and 2019. Both inflation measures treaded lower in the past 20 years, but WPI inflation fell faster, on average, causing the gap between the two to widen.

In the sections to follow, we turn the spotlight on CPI inflation, as it is the preferred measure for RBI’s inflation targeting.

Following the CPI inflation trail

CPI (rural and urban combined) with 2011-12 base became the preferred inflation gauge for the RBI after it adopted FIT in 2016. To analyse the long-term trend, we have stitched together the CPI-IW series with the CPI-combined series to construct long-term data from fiscal 1991 onwards¹.

CPI inflation and its threads, FY91 to FY19



Note: Data till FY12 is for CPI-IW (2001 = 100) and post that for CPI (2012=100); Fuel inflation data is not available before FY97; the dotted vertical lines represent structural breaks in inflation

Source: CSO, Labour Bureau, CRISIL Research

The distinct trends in food, fuel, and core - the three significant constituents of headline inflation - are of great interest to us. The key observations from the chart above and tables below are:

- There appears to be three structural breaks² in inflation data between fiscals 1991 and 2019, giving us four distinct phases with different average inflation values
- Movements in headline and food inflation have been almost in sync, showing a high degree of correlation between the two
- Periods of high inflation also saw high core inflation. Nevertheless, the correlation between headline and core is weaker than with food, which suggests that food has remained the key driver of headline inflation, despite having a lower weight than core in CPI basket
- Fuel appears to be the most volatile among all, but given its low weight in the CPI basket, its direct influence on headline inflation is limited

¹ In this context, the RBI's Expert Committee to Revise and Strengthen the Monetary Policy Framework had observed that, "...CPI-Combined has a strong and statistically significant correlation with the CPI-IW, allowing the superimposition of the weighting pattern of the former on the price trends of the latter so as to generate a sufficiently long time series for empirical assessment."

² A structural break is when a time series abruptly changes at a point in time which could involve a change in mean or any other parameters of the process that produce the series. In our analysis we used 'R software' which performs the 'Chow test' to find out structural breaks

Swings in CPI inflation...

Average inflation (%)	Headline	Food	Fuel	Core
Phase I (FY91-FY99)	10.1	10.8	10.8	8.2
Phase II (FY00-FY06)	3.9	2.5	7.7	5.0
Phase III (FY07-FY14)	9.0	10.6	7.6	7.8
Phase IV (FY15-FY19)	4.5	3.5	4.4	5.2

... and contribution of various categories

Contribution (%)	Headline	Food	Fuel	Core
Phase I (FY91-FY99)	100.0	51.4	8.6	39.9
Phase II (FY00-FY06)	100.0	28.4	12.2	59.2
Phase III (FY07-FY14)	100.0	53.5	5.5	41.0
Phase IV (FY15-FY19)	100.0	28.6	8.9	62.5

Note: The phases are divided on the basis of the structural breaks; Data from FY13 to FY19 pertains to CPI (2011-12=100) and from FY91 to FY12 to CPI-IW (2001=100)

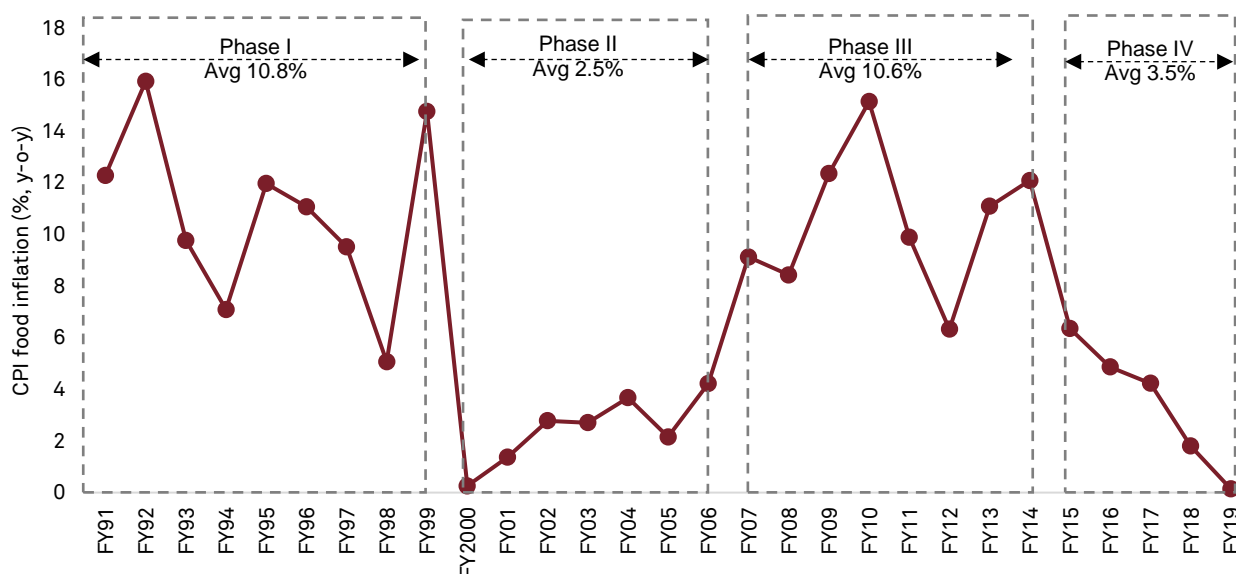
Source: CSO, Labour Bureau, CRISIL Research

All stars aligned to keep inflation low in Phase II (fiscals 2000 to 2006) and Phase IV (fiscals 2015 to 2019). Food played the most prominent role, followed by core and fuel. In this context, it would be interesting to see how long the present phase of low inflation would last. That would largely depend on food inflation, as core has remained sticky at around 5%.

How is low food inflation of today different from the one earlier?

An analysis of food inflation over the past four decades reveals three structural breaks in its trajectory, dividing it into two periods of high (Phases I and III) and two periods of low inflation (Phases II and IV).

High and Low: Three breaks make for four distinct periods in food inflation trajectory



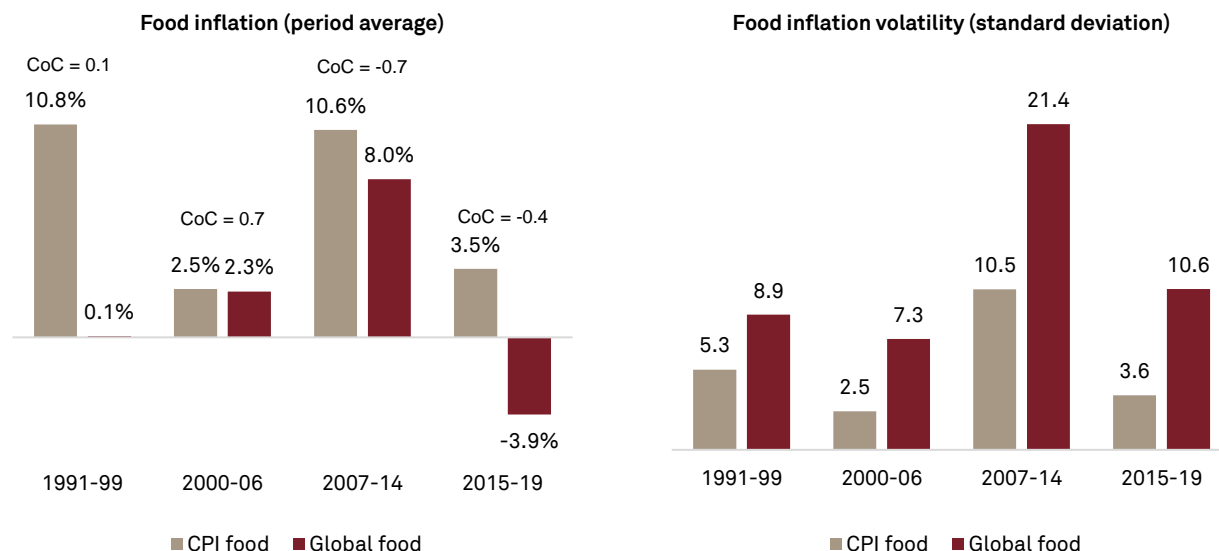
Note: Data prior to FY13 is of CPI-IW

Source: CEIC, CSO, CRISIL

The two periods of low inflation, Phases II and IV, coincidentally witnessed normal monsoon, except for two sub-par years in each period, a relatively modest increase in minimum support prices (MSPs), and softer global prices. Low global food inflation contributed to benign food inflation in India in both periods. The additional factor was a positive supply shock, particularly in fiscals 2017 and 2018, which depressed food inflation in Phase IV. Interestingly, there was a stronger positive correlation of 0.7 between domestic and global food inflation during Phase II compared with -0.4 in Phase IV.

While global inflation continues to be low and weighs down on specific commodities such as sugar and edible oil, domestic supply side factors such as higher agricultural production are also impacting inflation more now than earlier.

Global vs CPI food inflation: Domestic supply-side factors are ringing out louder



Note: CoC: Coefficient of correlation

Source: CEIC, CSO, Food and Agriculture Organisation (FAO), CRISIL Research

Periods of low food inflation also saw lower volatility as measured by standard deviation. However, between the two periods of low inflation, volatility was lower in Phase II than Phase IV.

A similar trend was observed in global food inflation. However, volatility was lower in the case of CPI food inflation.

What led to structural shifts in food inflation?

Phase I (fiscals 1991-99)

Domestic food inflation rose due to sharp 9% average annual increase in MSP. In addition, MSP was extended to seven additional crops (coarse cereals and oil seeds) towards the end of this period, accentuating inflationary pressure. Global food inflation largely stayed benign, except a few intermittent spikes.

Phase II (fiscals 2000-06)

Domestic food inflation was closely linked to global food inflation. Lower global food prices cooled food inflation at home. Relatively higher domestic food grain stocks and tepid increase in MSP (5.4% on average per year) also contributed in keeping it low.

Phase III (fiscals 2007-14)

From fiscals 2007 to 2009, domestic food inflation shadowed the pick-up in global food inflation. Global food inflation was highly volatile and surged to its highest level ever (in fiscal 2008), as droughts, coupled with crop failures in major food producing countries, kept food prices high. Post fiscal 2009, however, domestic factors

dominated movements in CPI inflation, leading to a divergence in the global and domestic inflation trends³. While global inflation remained volatile, CPI food trended up, hit by the drought in fiscal 2010, coupled with low level of domestic food grain stocks.

The other domestic factors that kept inflation high in Phase III and are probably the reasons for the structural break include:

Increase in non-agri rural wages: Following the drought in fiscal 2009, increased government stimulus and a thrust in rural employment generation scheme led to a rise in rural wages. Nominal non-agricultural wages in this period surged 12.2% on average per year, compared with 2.3% per year in Phase II. Improved purchasing power in rural areas pushed up food inflation

Shift in consumption pattern to protein rich food: With improved incomes, consumption patterns have been shifting to more protein-rich food such as pulses. Inadequate domestic supply also contributed to the upward pressure on inflation

Significant rise in MSP: There was a sharp rise in MSP during this period compared with the preceding periods. MSP increased 12.4% on average per year across crops

Phase IV (fiscals 2015-19)

Positive domestic supply shock kept food inflation low. That, and some other key trends were:

Depressed global food inflation: It was in negative territory for most of this period, posting its lowest ever level in fiscal 2016

Record high agriculture production: Agriculture production, especially of cereals and pulses, was at a record high in fiscal 2018. The healthy growth continued in fiscal 2019, along with record output in vegetables. Agriculture GDP averaged 2.3% in Phase II, whereas it was 2.9% in Phase IV. A strong positive supply shock, particularly in fiscals 2017 and 2018, depressed food inflation in the last three fiscals of Phase IV

Slower growth of non-agri rural wages: Nominal non-agricultural rural wages grew at a tepid pace of 4.5% annually, on average. Depressed global and domestic prices, coupled with a record high production, hurt farm profitability. In addition, the non-farm economy suffered from disruptions caused by demonetisation

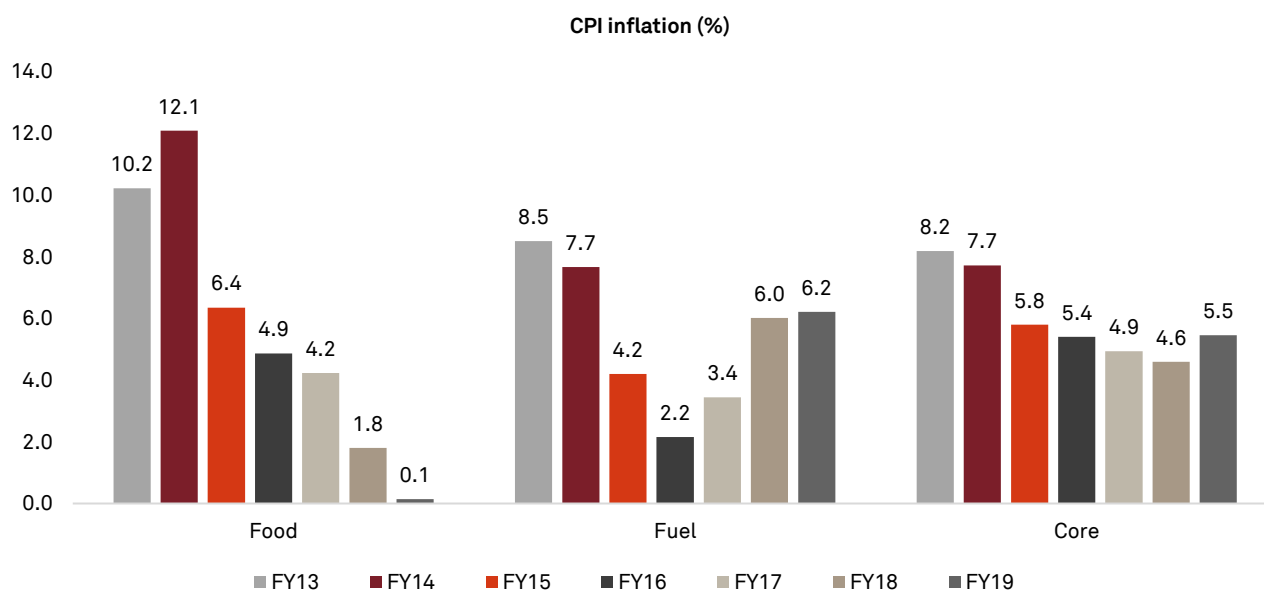
Slower increase in MSP: MSP spurted 7.8% per year, on average, with most of the increase being concentrated towards the end of the period

Why is India's headline inflation vanishing?

Retail inflation based on the new combined CPI series, with 2011-12 base, has declined consistently, from 9.4% in fiscal 2014 to 3.4% in fiscal 2019. It dipped as low as 2% in January 2019, before marginally picking up on base effect to 2.9% in March. A further breakdown by the three key categories, food (39.05% weight), fuel (9.17%), and core (51.78%), reveals the following trends:

³ Kumar, R Vashisht, P Kalita G, Food Inflation: Contingent and Structural Factors, Economic and Political Weekly, Vol XLV No. 10, March 2010

Food inflation lost its bite consistently



Source: CSO, CRISIL Research

The above chart shows:

- Food inflation is the only component of inflation that has seen a secular decline since fiscal 2013 and is the key reason behind falling headline inflation
- Core, which is supposed to indicate the demand-side pressures in the economy, did come down over the years, before rising marginally in fiscal 2019. By and large, it shows downward rigidity at 4.5-5%
- In fiscal 2019, fuel and core pushed up headline inflation, while food pulled it down

What's exhausting food inflation?

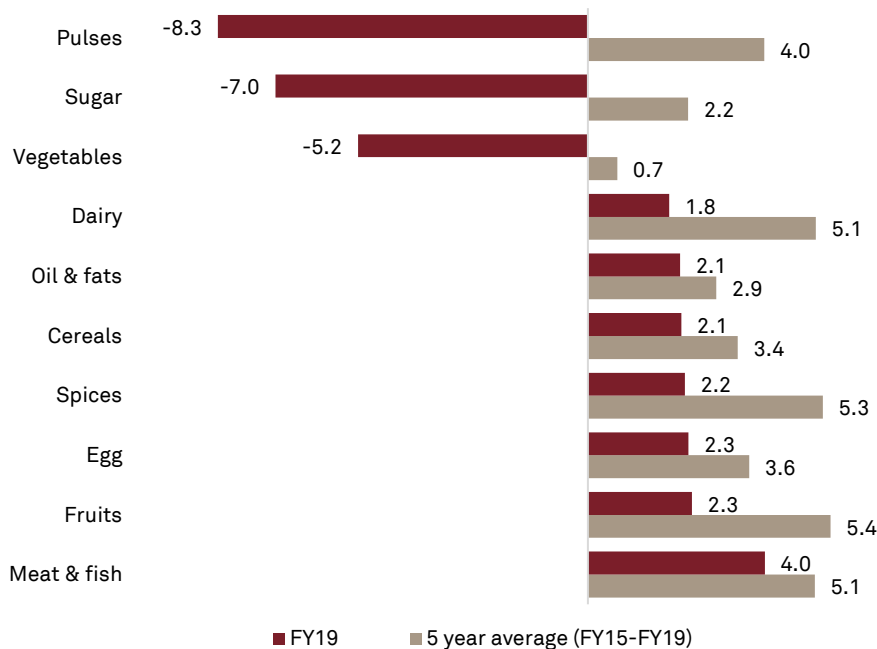
CPI food inflation, at 0.1% in fiscal 2019, was at its lowest at least since fiscal 1991. At a disaggregated level, supply shocks were more prominent in vegetables, pulses, and sugar. Their prices deflated, pulling down food inflation in fiscal 2019.

In the case of vegetables, a record high production⁴ as estimated by the first advance estimate for fiscal 2019, coupled with high base, has been dragging down inflation. Pulses inflation remains negative due to increased domestic production (plus imports) and depressed global prices. Sugar prices, which have a strong positive correlation with global prices, dipped, as global sugar inflation remained in negative territory.

Apart from these three, a decline in inflation in cereals, dairy, fruits, and eggs in fiscal 2019 compared with the previous year also exerted downward pressure on food inflation.

⁴ The Ministry of Agriculture and Farmers Welfare has pegged vegetable production at a record high of 187.5 million metric tonne in fiscal 2019 as per first advance estimate. Record high production is estimated for onion and potato, which has a greater weightage in CPI food (4%).

Vegetables, pulses, and sugar are gnawing at food inflation



Source: CEIC, CSO

Having divined insights into food inflation trends, we now turn to core.

What is behind the stickiness in core inflation?

Core inflation, i.e., inflation sans the volatile food and fuel categories, has the highest weight of 51.8% in overall inflation and therefore, a significant bearing on it. The annual trend in core inflation suggests that unlike food and fuel, it continues to be high and sticky and has never tested sub-4% levels (RBI’s medium-term inflation target) in the 2011-12 CPI series. In fact, it rose to 5.5% in fiscal 2019 from 4.6% in fiscal 2018.

Core inflation refuses to climb down

CPI (% , y-o-y)	Weight (%)	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Core CPI#	51.8	8.2	7.7	5.8	5.4	4.9	4.6	5.5
- Housing	10.1	7.2	7.6	6.9	4.9	5.2	6.5	6.7
- Transport and communication*	6.3	5.5	6.6	2.5	3.3	2.8	1.9	4.3
- Health	5.9	7.2	6.4	5.2	5.4	4.6	4.4	7.1
- Clothing	5.6	11.2	9.6	7.5	6.0	5.1	4.8	4.2
- Prepared meals, snacks, sweets etc.	5.6	11.5	11.2	8.1	7.1	5.7	4.9	4.1
- Education	4.5	8.2	7.8	7.2	6.3	5.3	4.5	6.6
- Personal care and effects	3.9	9.5	3.8	3.5	3.7	6.5	3.6	4.7
- Household goods and services	3.8	8.6	7.6	5.9	5.3	4.4	4.1	5.6
- Pan, Tobacco and Intoxicants	2.4	10.0	9.1	8.1	9.3	6.8	6.9	6.2
- Recreation & amusement	1.7	4.5	6.0	5.1	4.7	4.0	3.9	5.3
- Non-alcoholic beverages	1.3	7.6	8.3	4.7	4.5	3.9	2.2	2.6
- Footwear	1.0	10.5	7.9	6.3	5.1	4.1	3.9	3.7

Note: Red cells indicate inflation > 6%, yellow means inflation between 4% and 6% and green indicate inflation < 4%

excluding petrol and diesel starting FY16, *excluding petrol and diesel starting FY16, therefore its weight before FY16 would be 8.59%,

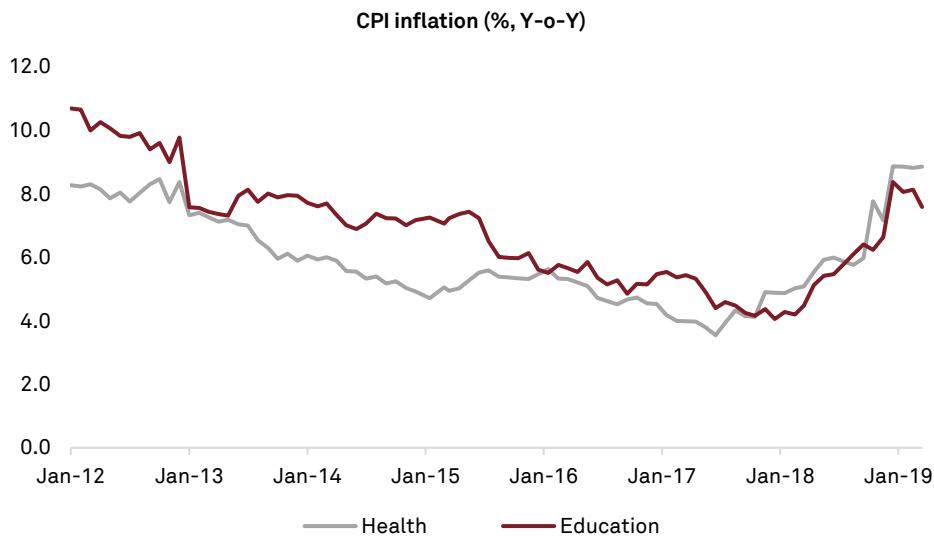
Source: CSO, CRISIL Research

The above table suggests core components such as housing, health, prepared meals, snacks, sweets, etc, education, and pan, tobacco, and intoxicants have seen higher inflation compared with others.

In fact, an analysis of weighted average contribution of different core components suggests that housing, health, education, clothing and prepared meals, snacks, sweets, etc, have almost consistently been the top five contributors to core inflation, totalling a share of ~70%. Interestingly, the share of housing went up from 17.4% in fiscal 2016 to 20.2% in fiscal 2017 and 27% in fiscal 2018, thanks to the house rent allowance revision on account of implementation of Seventh Pay Commission recommendations. That wore off in fiscal 2019 as the statistical impact of the Pay Commission recommendations on inflation started waning.

Moreover, contribution of both health and education to core went up further in fiscal 2019 over 2018: to 14% from 10.6% and to 10.4% from 8.5%, respectively. Supply in these two categories remains inadequate, creating a persistent demand-supply gap and leading to inflationary pressures, which seem to spike every few years.

Health and education inflation perk up



Source: CSO

On the other hand, inflation in pan, tobacco, and intoxicants category continues to get impacted by high tax incidence.

Takeaway 2: In sum, the dissipation in India's headline inflation over the past five fiscals can primarily be attributed to food inflation losing steam. That, in turn, is especially true in the case of vegetables, pulses, and sugar, owing to a combination of domestic supply shocks and softening global prices. Core has drifted down but remains far more stubborn, showing a rising tendency in the past fiscal.

Now, how has the RBI's policy of inflation targeting since 2016 worked on various categories of headline inflation? To know this, we first need a quick understanding of India's inflation-targeting experience.

The FIT regime and its impact on inflation

Inflation targeting refers to publicly declared, explicit medium-term targets of inflation in an economy, and a commitment from monetary authorities to achieve them. Inflation targets can be fixed or flexible. Currently, over 35 countries follow them⁵.

⁵ "The past and future of inflation targeting", Klaus Schmidt-Hebbel and Martín Carrasco, 2016

How India got FIT

India is one of the latest entrants to the FIT club. Inflation targeting did not initially find favour with Indian policy makers for reasons such as weak monetary transmission owing to relatively inefficient financial markets, existence of administered rates, risk of significant inflationary pressures from exogenous supply shocks, and till recently, the unavailability of a pan-India CPI. It was also argued that India did not face the problem of high inflation, unlike some other emerging economies at that time, and hence, did not need to adopt inflation targeting (*Mohan and Ray, 2018*⁶).

However, the 2009 Report of the Committee on Financial Sector Reforms (CFSR)⁷ recommended that India adopt the inflation-targeting framework, a view further endorsed by the Financial Sector Legislative Reforms Commission (FSLRC) in 2013. Later, as the governor of the RBI from 2013, Raghuram Rajan constituted a committee⁸ to suggest ways to revise and strengthen the monetary policy framework. This too, recommended the adoption of inflation targeting, given that India was seeing high inflation of ~10% between 2009 and 2014. It also recommended setting the CPI inflation as the nominal anchor for monetary policy.

Finally, India transited to a FIT regime on June 27, 2016, as part of the move to modernise monetary policy making.

The FIT experience so far...

How has inflation behaved in terms of level and volatility since then? How has targeting anchored inflation expectations?

...in containing inflation and volatility

Prima facie, inflation and its volatility did come down after FIT adoption. Consumer inflation fell to 3.9% per year in three years after implementation, from an average 7.3% in the four years preceding. This phenomenon was visible not only in headline inflation but also in each of its key categories.

However, it is important to note, the sharp slowdown in food inflation - considered an idiosyncratic factor - has played an important role in driving headline inflation lower. Food inflation, with 39% weight in CPI, dived by over 600 bps to 2.1% per year in the post FIT period. Of course, these last three fiscals had a high 'luck' quotient, marked by normal monsoon and soft crude prices.

Core inflation, too, slumped by about 120 bps, despite economic momentum picking up (GDP growth rose to 7.5% annually, from 6.8% in the past three fiscals). Perhaps, fewer adverse supply shocks and their weaker transmission to core were behind the slower fall in core inflation. This needs to be probed further when more data is available.

⁶ "Indian Monetary Policy in the Time of Inflation Targeting and Demonetisation", Rakesh Mohan and Partha Ray, 2018

⁷ Constituted by the Government of India and chaired by Raghuram Rajan, published in 2009

⁸ The Expert Committee to Revise and Strengthen the Monetary Policy Framework, chaired by Urjit Patel

In general, evidence on the impact of inflation targeting on volatility of inflation is not very conclusive in emerging markets (Hebbel, 2016⁹). In this context, decline in volatility in overall inflation, particularly core inflation, is notable.

Pre and post FIT: Inflation and its volatility, category-wise

Weight in CPI	Category	Inflation (%, period average)		Standard deviation (%)	
		Pre inflation targeting	Post inflation targeting	Pre inflation targeting	Post inflation targeting
100.0	Headline	7.3	3.9	2.4	1.2
39.1	Food	8.4	2.1	3.8	2.9
6.8	Fuel & light	6.4	5.2	2.5	2.1
54.1	Core*	6.7	5.0	2.0	0.5
44.9	RBI core^	6.2	5.0	2.0	0.7

Note: Pre-inflation targeting is FY13-FY16; Post inflation targeting is FY17-FY19; * Core excludes food & fuel & light from CPI; ^RBI core excludes food, fuel & light, and intoxicants

Source: CSO, CEIC, RBI, CRISIL

...in anchoring inflation expectations

The key objective of inflation targeting is to anchor inflation expectations. “To anchor” here means to enable inflation expectations to remain relatively insensitive to incoming data. For example, if the public experiences a spell of inflation higher than their long-run expectation, but their long-run expectation of inflation changes little as a result, then one could say inflation expectations are well-anchored.

In this case, the occasional overshooting or undershooting of inflation due to supply shocks need not invite monetary policy action, as this will not alter the expectations of the agents in the economy. For that to happen, the central bank must enjoy a high level of credibility.

Of households

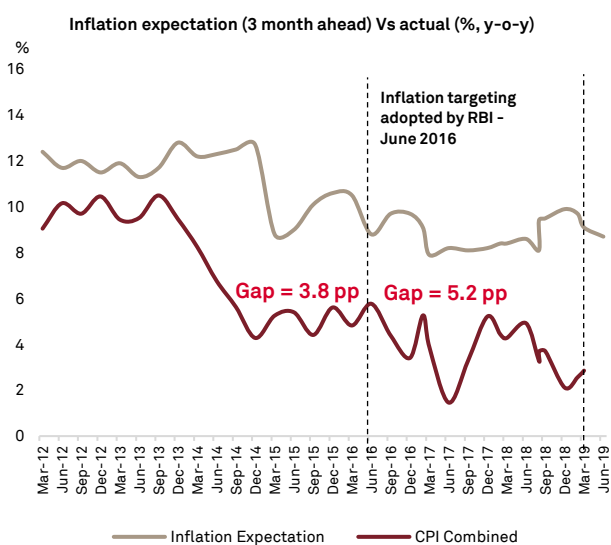
In what follows, we examine the overall inflation expectation of households and professional forecasters’ pre-and post-FIT and the transmission of supply shocks into generalised inflation. A weaker transmission of fuel, food and currency shocks into headline inflation would hint at a decline in inflation persistence, and hence, some degree of success in anchoring of inflation expectations.

⁹ “The past and future of inflation targeting”, Klaus Schmidt-Hebbel and Martín Carrasco, 2016

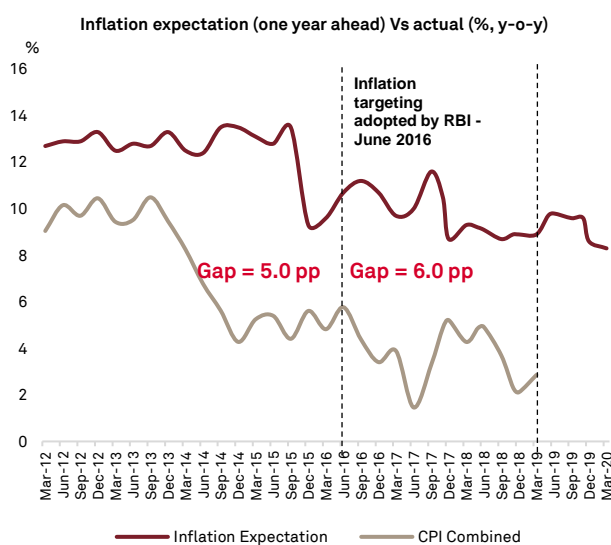
Despite the decline, household expectations of inflation remain significantly above inflation measured through CPI.

Inflation expectations and how they actually panned out

(3 months ahead)



(One year ahead)



Gap = Inflation expectation – actual inflation

Source: RBI, CSO, CRISIL

The charts suggest that inflation expectations of the households, both for three months and one-year ahead, have come down as inflation headed down. This goes to say inflation expectations are adaptive, i.e. they depend on past inflation behaviour. A recent RBI study¹⁰ corroborates this. According to it, “Broadly, expectations could be either forward looking, backward looking or naïve (i.e., inability to judge available information, or lack of seriousness while responding to questions in surveys). While one-year ahead inflation expectations are found to be adaptive, three-months ahead expectations are both adaptive and naïve.”

While inflation expectations have come down, their gap with actual inflation has not only remained high but also increased post-FIT.

Household expectations are generally higher than observed inflation for a variety of reasons such as a) higher perception of current inflation on which households base their future inflation expectations, b) tendency to remember price increases more than price falls, c) lack of information and assigning disproportionate high weights to frequently purchased items such as food or something that gets widely publicised, such as petrol/diesel, and d) limited knowledge about monetary policy actions, etc.

¹⁰ *Inflation Expectations of Households: Do They Influence Wage-Price Dynamics in India?*, Sitikantha Pattanaik, Silu Muduli, and Soumyajit Ray, RBI, 2019

The worry though is, in India, household expectations, despite coming down, remain high vis-à-vis actual inflation, and the gap has, in fact, been widening¹¹.

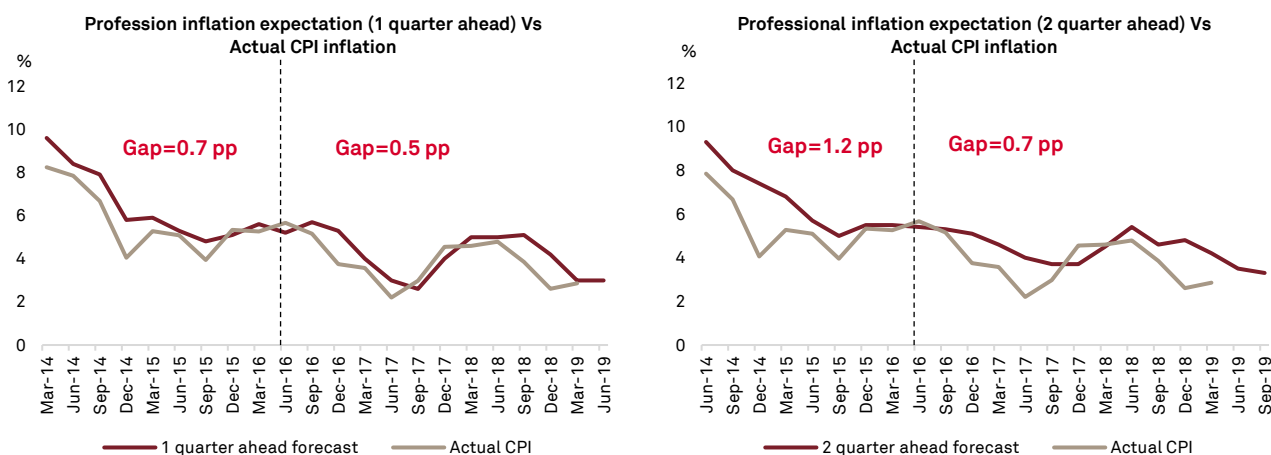
Inflation expectations of households, however, have declined of late and their gap with current perception of inflation has reduced. According to the April 2019 MPC meeting minutes, “...household inflationary expectations 3 months and 12 months ahead continued to decline for the fourth consecutive bi-monthly round sharply and this time by 40 bps each. Moreover, the gap between the household perception and their expectations about inflation is narrowing over recent rounds.”

Of professional forecasters

If we look at the professional forecasters’ expectations, we find that they are better aligned with observed inflation. Not only have expectations come down, but also the gap with actual inflation has also narrowed. This is to be expected, because professional forecasters are mostly better informed and more in sync with monetary policy actions than general households.

We also find that inflation expectation of professional forecasters ‘Granger-cause’¹² household inflation expectation¹³. This finding corroborates with international experience. Carroll (2003) suggested that when households do update their information sets, they update their expectations using those of ‘more-informed’ agents, such as professional forecasters. The channel? Mainly news reports, which reflect the views of the professional forecasters.

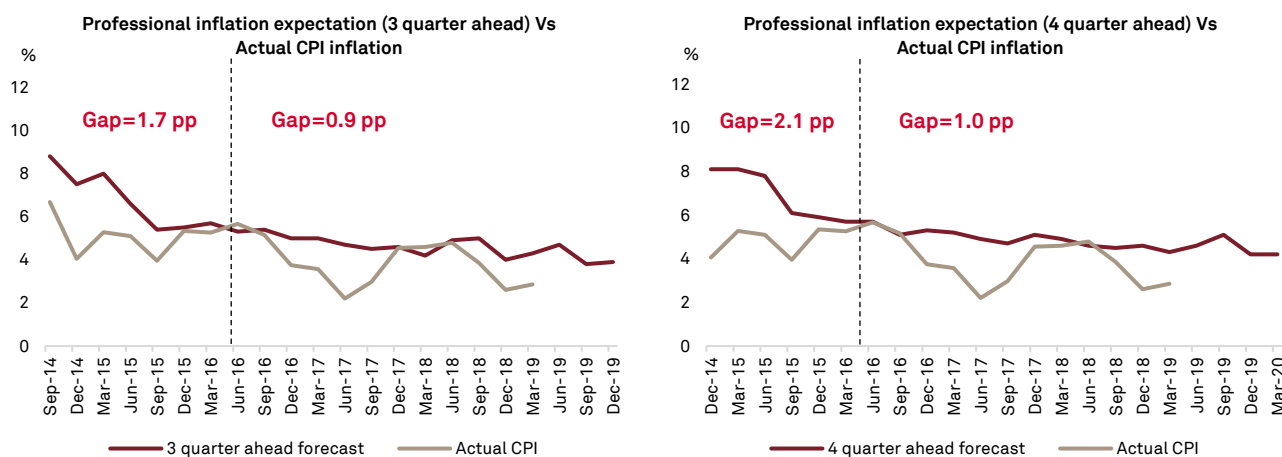
Expectations of professional forecasters were closer to actual inflation



¹¹ One may argue that the reason for the large gap is because household expectations are of urban households whereas overall CPI inflation referred to is for rural-urban combined, but on comparing household expectations with CPI urban inflation too, the relationship doesn't change.

¹² Granger causality is a statistical concept used for testing causality between two variables. If variable 1 is said to Granger cause variable 2, then variable 1 is able to predictor the variable 2, better than the past values of variable 2 itself.

¹³ Since the professional forecasters survey provides quarterly inflation expectation and the household surveys provides monthly inflation expectation, for our analysis we compare the quarterly professional forecast with household forecast for the corresponding quarter end.



Gap = Inflation expectation – actual inflation

Source: RBI, CSO, CRISIL

What about inflation persistence and second-round impact of transitory shocks?

Persistence refers to the tendency of a time series variable to stay away from its mean when perturbed. It is similar to the concept of inertia in physics. The higher the persistence, the longer it would take for the series to revert to its mean, after having been hit with a shock element.

Low inflation persistence, therefore, is a desirable characteristic of any inflation-targeting framework.

Globally, adoption of targeting has resulted in reducing inflation persistence and that is true of India, too (*Dholakia et al, 2018*). Our own finding corroborates this. There is also a weakening of second-round effects, meaning any temporary shock to food/fuel components does not get generalised into headline inflation as easily as it used to earlier. In other words, headline inflation would now tend to revert to core, rather than the other way round.

Challenges in policy implementation

Measurement and communication of unobservable but critical inputs in inflation-targeting framework, such as output gap and equilibrium real rates, poses a significant policy challenge. This is true not only of advanced countries, but also of emerging markets such as India. In fact, it is a bigger challenge for the latter.

The relevance of output gap in explaining inflation in India

Inflation is essentially a reflection of the demand-supply imbalances in the economy. One way to measure the demand-supply mismatch is to gauge how close the current output is to the long-term “potential” output.

Potential output can be interpreted as the level at which all resources in the economy are operating at full capacity. It can usually be determined by the long-term trend in output.

The difference between current and potential output is referred to as the output gap. If the current output is more than what its resources can sustain (i.e. a positive output gap), it will lead to ‘overheating’ of the economy, resulting in higher inflation. Similarly, if output is less than what the economy’s resources could generate (i.e. a negative output gap), it would result in a fall in inflation.

In theory, output gap is an important determinant of inflation and should help explain, even predict, the inflation trajectory. However, in practice, the actual significance of output gap differs across countries, and across time. For example, countries which are not much integrated with the global economy would be more influenced by output gap in their economy, while countries which are more integrated would depend less on domestic output gap, and more on international price movements, etc. In the United States, for instance, recent research has showed that the role of output gap has diminished over time.

How important is the output gap for India’s inflation? To see this, we modelled core CPI inflation on its own past values and of the output gap. We used core inflation as it removes volatile components and is expected to be most responsive to output gap. Its own past values are a proxy for inflation expectations, since it has been found that inflation expectations in India are adaptive¹⁴. For the output gap, we have first estimated potential output by fitting a Hodrick Prescott trend on deseasonalised log GDP series, and taken the difference between actual output and potential output. All the analysis is done on quarterly data from 2005 to present.

In various model specifications, we found both past inflation and output gap to have a statistically significant and positive impact on core inflation with a three-quarter lag. This is similar to the finding of RBI¹⁵ which states that a positive shock to the output gap increases core inflation, and the peak effect occurs with a lag of 3-5 quarters.

However, a note of caution would be in order. Since there is no way to observe potential output, any measure would at best be proxy. Moreover, since output data could be subject to significant revisions, using output gap in real-time analysis could sometimes produce confusing results.

One size doesn’t FIT all

Inflation targeting is still a relatively new framework for the Indian economy. Hence, it may be premature to conclude about its effectiveness just yet. Surely, the initial performance gives reason for optimism as the FIT period coincides with both lower inflation and lowering of inflation expectations.

Globally, many countries have changed their inflation targets as the policy framework evolved. Brazil for instance, gradually reduced its inflation target from 8% in 1999 to 4.5% in 2018 (tolerance margin +/- 1.5%). Thailand initially targeted core inflation (2000-2015), and then switched to headline CPI inflation. The key takeaway here is that inflation targets are not cast in stone.

¹⁴ Pattnaik S, Miduli S and Ray S (2019). *Inflation Expectations of Households: Do They Influence Wage-Price Dynamics in India?* Mint Street Memos, RBI.

¹⁵ Given in RBI’s Monetary Policy Report, April 2019.

For India, the current 4+/-2% target is valid till 2021. If the targeting framework works well for the economy, the band could be narrowed.

Takeaway 3: So far, inflation targeting in India has coincided with lower inflation and its volatility. This is true of both food and core inflation, though the effect on the latter appears crunched. To its credit, inflation persistence has eased since FIT. On the contrary, inflationary expectations, especially of households, have actually strayed away from actual inflation (even though they have fallen). And then, there is the ever-looming question for the future - must we get more flexible with FIT?

Outlook and 'if-then' analysis

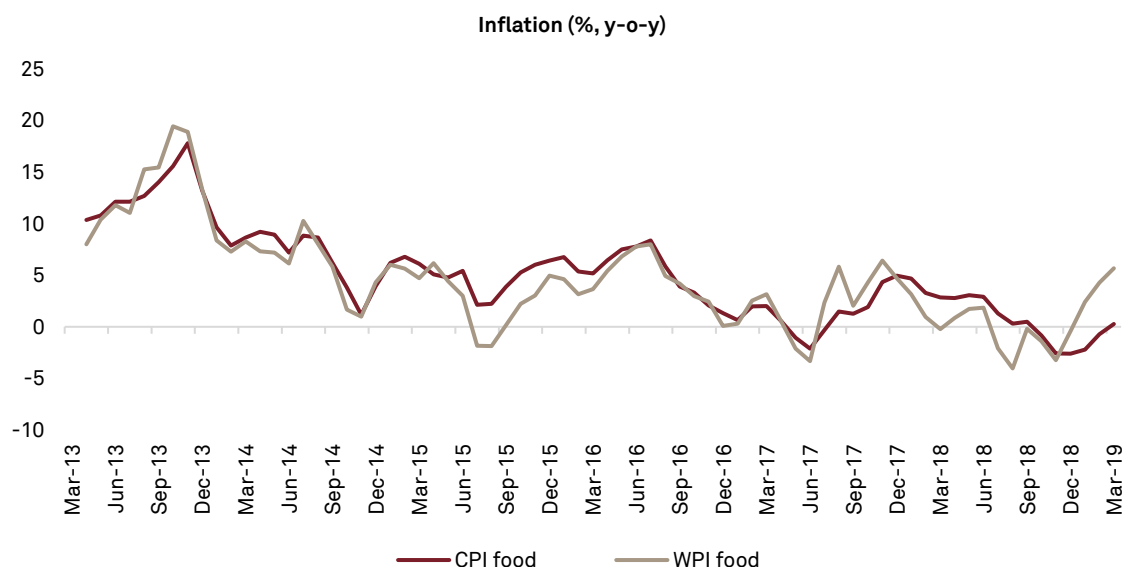
The moot question that remains is, based on our analysis, how do we foretell the inflation outlook? Will we have a repeat of the fiscal 2000–2006 period, when a near 2% annual food inflation caused the headline inflation to hover below 4%? Since food remains the prime mover of headline inflation, the answer to this hinges on the following considerations.

a. Is low food inflation here to stay?

In our *base case scenario*, we project food inflation to pick up and average 3% in fiscal 2020, from 0.1% in fiscal 2019. Inflation is expected to rise due to:

- **Base effect:** Most of the rise in inflation would be led by a weak base effect
 - A low base effect in the case of vegetables, pulses, and sugar, which witnessed negative inflation in fiscal 2019, could weigh on food inflation. These commodities together account for 25% of the weight in food index and 9.8% in the headline index.
 - The base effect has already started playing out in WPI-based food inflation. Past data trends reveal that WPI food inflation Granger causes CPI food inflation. Since WPI food inflation has already started warming up, CPI food inflation is also expected to rise.

Upturn sighted: WPI inflation influences CPI inflation with a lag



Source: CEIC, CSO

- In addition, pulses prices could also rise next year, as they typically do every 2-3 years, as mentioned in our 'Pulses and Rhythms' report¹⁶

¹⁶ Pulses and Rhythms, CRISIL Insight, September 2017

- **Consumption-focused policies:** Policies such as cash transfers to farmers and basic income to rural households, if augmented from current levels, could propel rural demand, and hence, contribute to a pick-up in food inflation
- **Impact of monsoons:** The Indian Meteorological Department (IMD) has forecast a well-distributed normal monsoon in 2019, with rainfall at 96% of the long period average, in its first stage long-range forecast, released in April 2019. The IMD has flagged weak El Niño conditions to prevail, contrary to the expectation of Skymet Weather, a private weather forecasting agency, which sees 60% chance of El Niño, leading to a below-normal monsoon in 2019. El Niño conditions have been unpredictable in the past and can create disturbances even when they are weak. Upside risk to inflation will increase if monsoon plays truant.

b. Will core inflation soften?

There have been indications of economic slack impacting core inflation with a lag in RBI's April monetary policy report. Our own findings corroborate this (see Box: *The relevance of output gap in explaining inflation in India*). While this may play out to some extent, factors such as upside from a consumer-friendly budget, rising expenditure on categories such as health and education, and other populist measures such as farm loan waivers, may **keep the core sticky towards the lower bound of ~5% in our base-case scenario**.

c. Which way is fuel inflation likely to move?

Fuel inflation is expected to stay muted in our base case. Globally, demand pressures are receding, which suggests oil and commodity prices could stay soft. The IMF forecasts only 0.4% average increase in global crude prices over the next five years.

We are working with Brent crude at \$69-74 for fiscal 2020, but the current price rise due to geopolitical tensions presents an upside to this.

In sum, we forecast overall CPI inflation to rise to 4% in fiscal 2020 in our base case scenario, with food, fuel, and core inflation pegged at 3%, 3.5%, and 5%, respectively.

CRISIL's inflation outlook for FY20

Scenario	Headline	Food	Fuel	Core
Base case	4.0	3.0	3.5	5.0
Downside	3.5	2.0	3.5	4.5
Upside	5.0	4.5	4.5	5.5

Source: CRISIL Research

What could alter this math?

Downside risk

In our downside scenario, we expect headline inflation at 3.5%, based on a marginal rise in food inflation to 2% in fiscal 2020, from 0.1% in fiscal 2019. While the low-base effect will still exert pressure on food inflation, a continued decline in global food prices and expected robust domestic supply in a normal monsoon situation would keep the CPI food inflation low. The IMF's World Economic Outlook April 2019 forecasts food prices to decline 2.9% in 2019. If this scenario plays out, CPI food inflation will remain subdued. The World Bank's Commodity Outlook report for April 2019 expects the food index to contract 3.2% in 2019 compared with 0.2% growth in 2018. Most of the decline is on account of oil and meals index, which is partially offset by positive contribution from grain price index.

Restrained economic growth and lagged impact of output gap could drag core inflation down further.

Upside risk

In our upside scenario, we expect headline inflation to surge to 5% in fiscal 2020, led by a pick-up in food and core inflation.

In addition to the triggers mentioned in our base-case scenario, this scenario factors another major upside risk to food inflation, stemming from a truant monsoon. Low food inflation in the previous two fiscals has been supported by normal monsoon, which facilitated record high agricultural production. If El Niño plays out, agricultural output would suffer, considering over 50% of Indian agriculture is monsoon dependent. Also, if El Niño impacts other major agri-commodity exporting economies, then their agricultural output would suffer, too, thus pushing up global food prices.

In addition, while the World Bank expects global food prices to contract in 2019, it has highlighted certain upside risks that may push up global food prices. Higher-than-expected energy costs, a key input in the production of most agricultural commodities, could affect food prices, especially of some crops such as grains and oilseeds. In addition, greater-than-projected growth in biofuel production, for which certain crops are used as inputs, could also lead to higher prices for some food commodities. If these risks materialise, global food prices may rise.

Core could persist at 5.5% (the average for fiscal 2019) if the sticky components, especially health and education, continue to face an upward thrust on account of increased expenditure on these categories.

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