Is Food Inflation in India Driven by Demand or Supply?

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A woman pushes a shopping trolley at a food superstore in Ahmedabad. Credit: Reuters/Amit Dave/File Photo

analysis

Economy

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Inflation has continued to peak at an all-time high in all economies around the world, with food and energy prices skyrocketing to unprecedented levels. Even industrially developed nations like the US, Canada, and the Eurozone, which experienced decades-long of stable price levels have struggles to keep prices under control.

While domestic food price inflation is high globally, consumer food price inflation in India has increased from 0.68% to 8.38% between September 2021 and April 2022. Overall inflation rate was recently reported to be around 7% with most of the price rise stemming from high food and fuel prices.

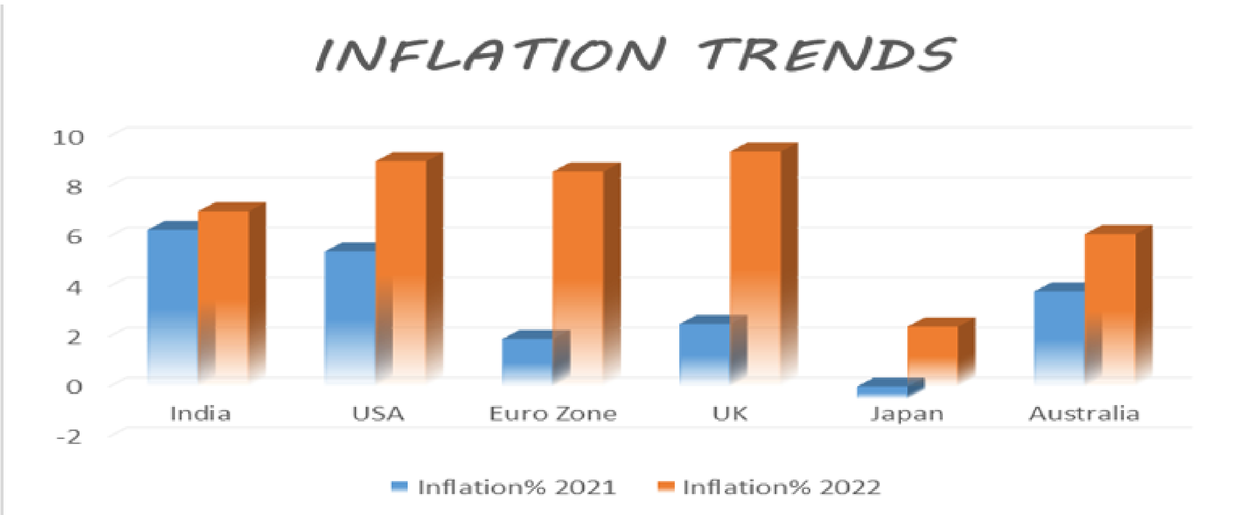
High levels of global food inflation are being driven by multiple reasons such as the COVID-19 pandemic-induced supply chain concerns and the ongoing Russia-Ukraine war.

Multiple lockdowns and subsequent disruptions in the logistics of the supply accounted for a swift rise in food inflation prices. This was further exacerbated during the economic recovery, when demand for food and essentials rose even more.

However, just as demand-driven inflation was declining, a war in Europe caused an increase in input energy costs for commodities, worsening the inflation prices.

This article, involving a critical analysis of inflation trends in India undertaken by Centre for New Economics Studies (CNES) InfoSphere team at Jindal School of Liberal Arts and Humanities, O.P. Jindal Global University, deliberates whether the current inflation trends in India are driven by the supply side or the demand side, with a special focus on studying food inflation patterns.

To better understand India's economic condition, we draw a parallel between India and other (developed) countries where inflation has been high.



Source: CNES InfoSphere Team (Vol IV Edition I)

Supply side

To focus on rising food inflation driven by supply side variables, our team considered climatic factors, specifically the role of 'temperature' and 'rainfall'. These exogenous (or externalised) factors are important since extremes in both categories can adversely affect the production and yield of food grains.

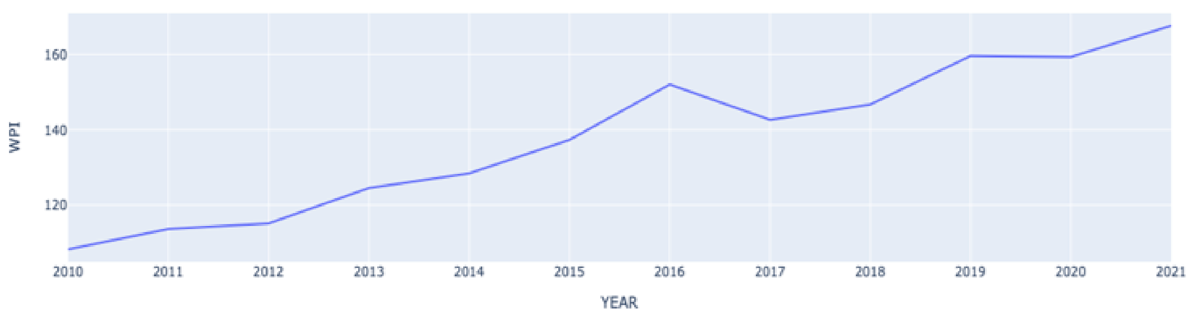
We opted for a multiple-level analytical approach, using three outcome variables: food inflation, the Consumer Food Price Index (CFPI), and the Wholesale Price Index (WPI). This allowed us to analyse the relationship between climatic factors and inflation at multiple levels.

Here, the key relationship to observe closely is the nature of direct correlative relationship between 'food inflation' and 'temperature', which is statistically significant (see here for more details on results). Change in overall temperature significantly predicts patterns of food inflation.

From a modeled understanding of the relationship between change in 'temperature' and food inflation, we need more research to get a sense on how entwined the degree of causation is reflecting one variable's effect on another.

This implies that most models, despite their sophisticated techniques, may not be including a few vital variables which are correlated with temperature and rainfall; and could be a better, predictor of overall food inflation. Our multi-level approach, however, allows us to sidestep this issue by taking a more granular outcome variable and proceeding with a regression analysis (see here for more details).

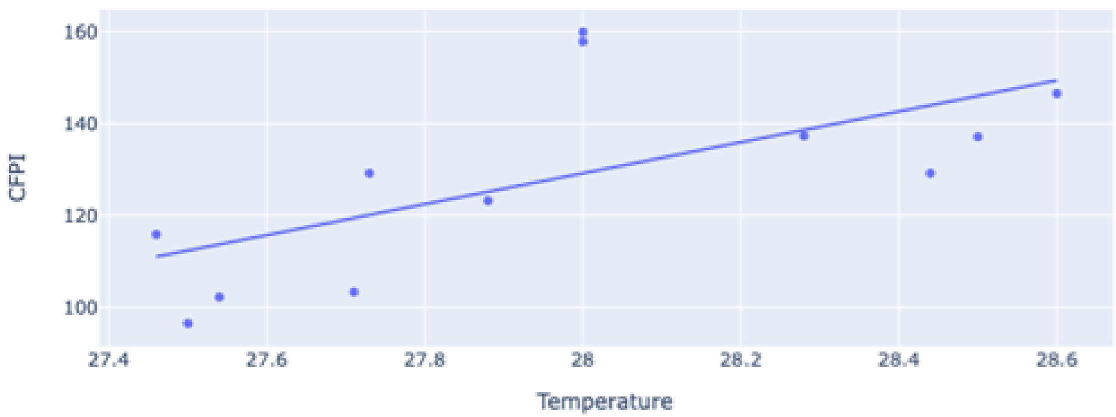
As mentioned earlier, the CFPI and WPI were chosen as the two outcome variables for our analysis. The two graphs below show the movement of WPI over time and the year-to-year inflation values of the WPI over the same time. Evidently, the WPI trendline increases over time, albeit with some fluctuations. The WPI inflation trend seems to be mostly horizontal over the same time-period despite some fluctuations.



The trend of WPI over time.

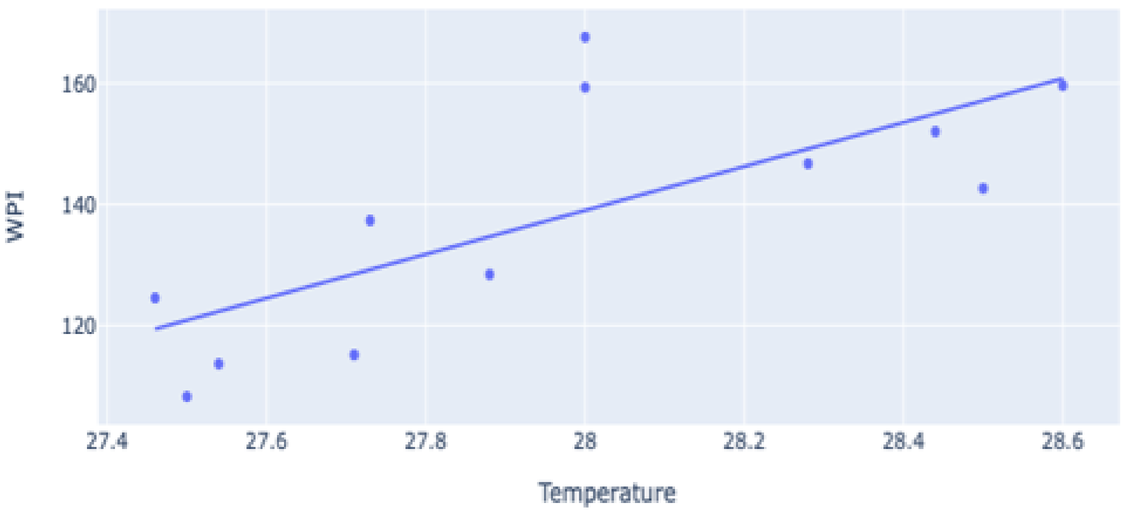
WPI inflation over time

This leads us to suspect that there may be stationarity present in the WPI inflation time series – meaning that the WPI inflation values may not actually be a function of time. This may present problems in our regression analysis, which is why we prefer to use WPI as the outcome variable since it is seemingly a function of time.



A scatter plot of temperature and CFPI (with trendline)

As can be seen above, 'temperature' continues to be significant in its effect on the CFPI. From the analysis shown here, it is statistically significant at the 5% level, and the scatter plot above reveals that there is a positive linear relationship between temperature and CFPI.



A scatter plot of temperature and WPI (with trendline)

Here, too, with the WPI regression, the same positive linear relationship can be seen. We can, therefore, safely say that externalised climatic variables, say, specific temperature, have a perceptible effect on food inflation, primarily through the route of constricting supply.

Also read: The Mother of All Stagflations Could Lie Ahead

Though the current inflation trends are driven by the Russia-Ukraine war, our analysis also helps in establishing the importance of studying externalised supply side factors affecting the supply chains. As climate change continues to be a growing concern, the relationship between temperature and food inflation needs closer scrutiny-particularly by central bankers.

In the recent case, however, given that Russia and Ukraine collectively contribute to 25% of global wheat exports and Russia is the world's third-largest oil producer, the subsequent international sanctions that have been imposed have significantly disrupted the global supply chains, which accentuated inflationary concerns. Just after the Russian invasion of Ukraine, the UN's Food and Agriculture Organisation (FAO) reported an increase of 12.6% in globally traded food commodities.

Additionally, trade sanctions on Russia spiraled up the crude oil prices which further increased the commodity price levels as oil is an integral part of supply chains all over the world. Besides, the container crisis, as well as the port congestion, slow circulatory movement, and high shipping rates, have made the supply chains inefficient.

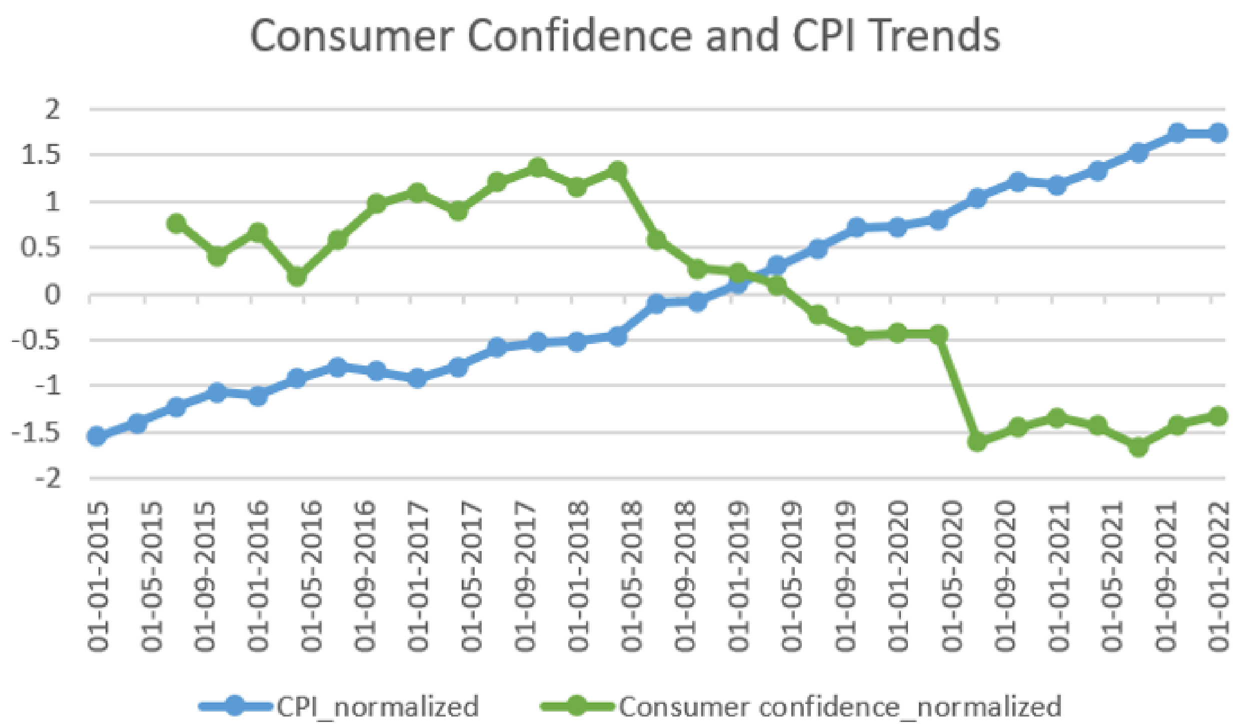
As a result, the cost of production of most essential consumer durables has increased, resulting in Cost-Push (cost-anchored) inflation.

Demand side factors

Given that inflation in 2021 was majorly demand-driven, it was essential to check if demand-side factors also played any role in the recent rise in commodity prices.

Using consumer confidence data as a proxy for consumer demand, we compared it with CPI trends for the last seven years.

From the graph below, it can be observed that CPI had been continuously rising since 2015 while consumer confidence has started to dip since 2018, suggesting a negative relation between the two variables. While the CPI has kept growing, a sudden dip in consumer confidence is also observed in 2020 owning to the onset of the pandemic.

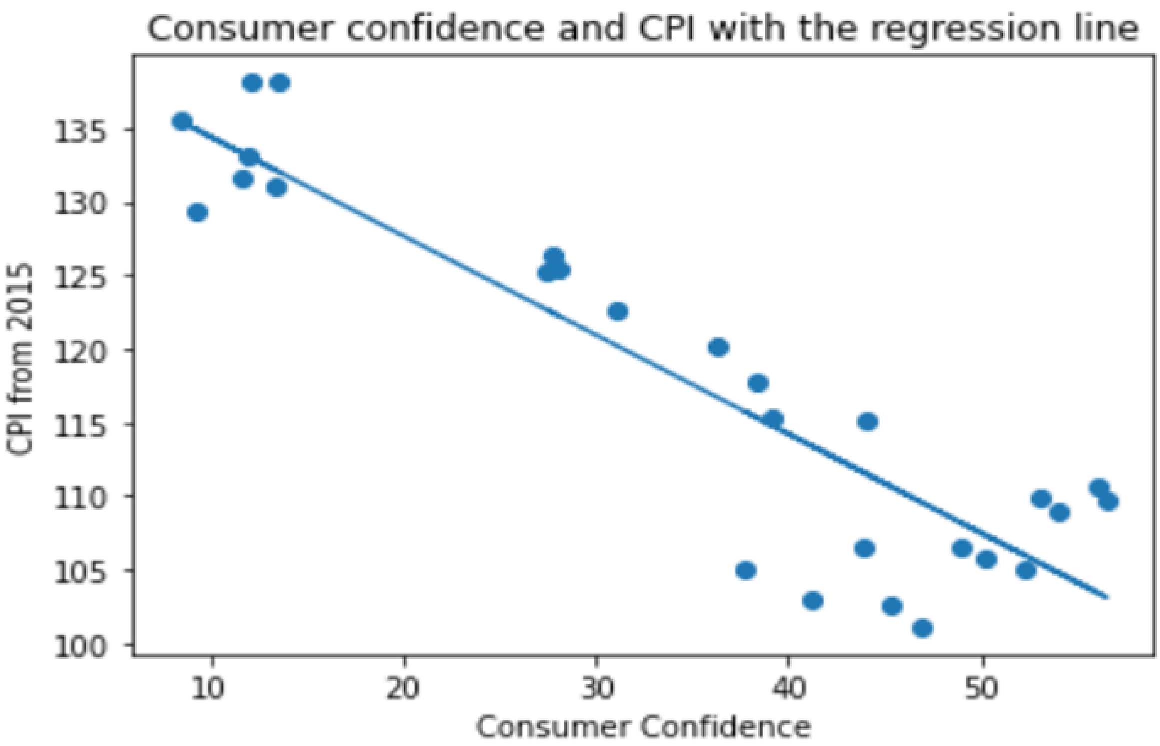


Source: CNES InfoSphere Team

To supplement this analysis, a regression test was used to understand direction, strength, and causal factors (if at all any). Our results suggested a strong negative relationship between consumer confidence and CPI (as the output was statistically significant at a 99% confidence level). See here for more details on our results.

Our analysis here does not show however the direction of this (negative) relationship and the probable cause. More detailed research here may help figure out whether the change in consumer confidence affects CPI or vice versa, particularly in the Indian context.

Also, consumer confidence has been consistently declining since 2015, however, the increase in inflation trends was noted quite recently. This signifies that demand-side variables didn't play a significant role in driving up the recent general price levels.



Source: CNES InfoSphere Team

One of us has previously argued how a formulaic approach to inflation measurement has concerns.

In an informalised space, as in India, if a *chai waala* operating near a construction site in Delhi sees a surge in demand for tea after unlocking, he would immediately need a greater quantity of milk from his regular distributor. If the source of this milk happens to be a dairy operation in a state that still has COVID-19 restrictions in place, then milk supplies could be disrupted or delayed. In such a scenario, the price of tea would go up.

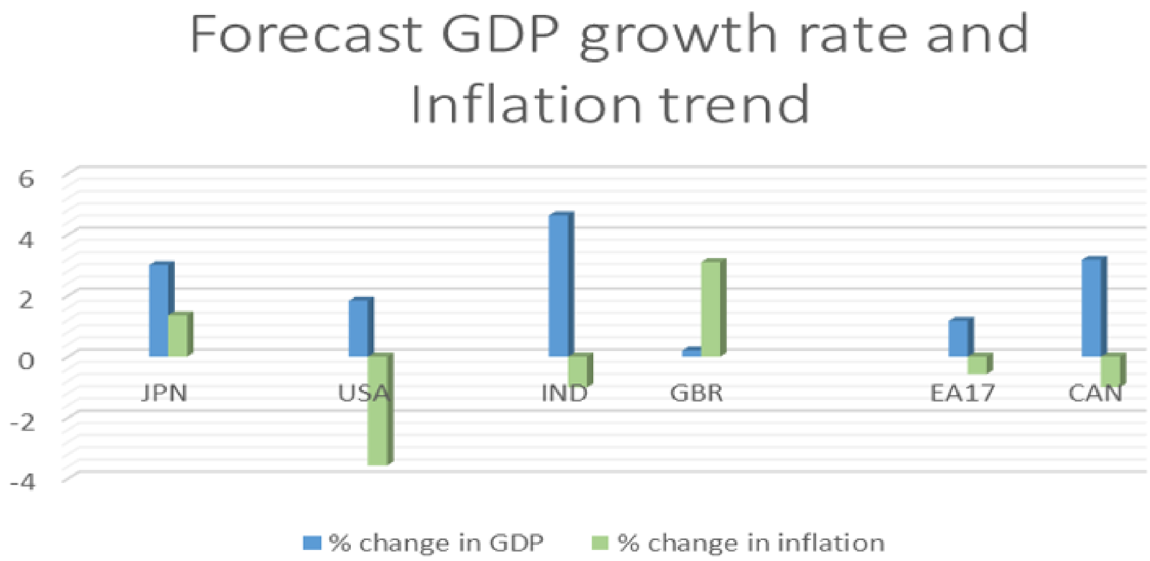
Interpreting such micro-level observations is critical to understanding price behaviour.

An interplay of localised factors – in recent times – has coalesced with a high degree of uncertainty in the lives and livelihoods of various economic agents across India, and this is likely to keep inflation on an incline. It is extremely hard to take a formulaic approach to address such a rise in inflationary expectations. Monetary policy may be ineffective. But, what about other countries.

Also read: How the Rise of Global Inflation Will Play Out in Indian Politics

India versus other countries: a closer assessment

With rates crossing the target range of 2%-6%, inflation has become a heated economic and political issue in the country. Addressing it, India's Union finance minister Nirmala Sitharaman told the parliament in August that the government isn't in denial about inflation in India and made a 'bold statement' about India's inflation position to be "better position than other developed nations".



Source: CNES InfoSphere Team

To have a closer assessment of her statement, we compared India's forecast GDP and inflation change in the next year with other developed nations like Japan, the US, etc.

Though all industrially developed nations expect inflation levels to fall (except Great Britain) by the 2023 first quarter, the forecast increase in their GDP is lower than the growth in India's Forecast GDP. This also needs to be put in perspective. Any comparison made between industrially developed nations and a developing nation with sub-par industrial production capacity requires a close contextual understanding of macroeconomic priorities.

It might seem that the most positive forecast difference between GDP and inflation, India is expected to perform better than most other developed countries. But, each nation's stage of development merits a differed macro-and socio-economic development strategy. India's inflation problem acts as an invisible tax on millions of its poor.

However, acknowledging this void present in the macro realities of the industrialised Global North and developing Global South, the US's own position presents intriguing forecasts. Their increase in forecast GDP is only 2%, yet they claim a significantly large positive gap between their forecast GDP and inflation. Post the inflation surge, the US recently faced, the country expects its inflation rates to fall by nearly 4%, which is the largest among the other developed economies.

Domestically, the challenge for India – right now and in the near future – would be to manage its own inflation rate against all other macroeconomic factors/concerns stemming from: a collapsing rupee; a high current account and trade deficit; an eroding foreign currency reserve scenario; a capital flight in portfolio investment markets etc., all of which, present a clear vulnerability on the side of its balance of payment accounts, also discussed here.

This study was undertaken by the InfoSphere Team of Centre for New Economics Studies (CNES), Jindal School of Liberal Arts and Humanities, O.P. Jindal Global University. To see more of their work, please access their website here along with the most recent edition on inflation.