Consumer Price Dynamics in India and the United States, 2017–2024 A Comparative Analysis of Inflation, Volatility, Persistence, and CPI Basket Structure

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ABSTRACT

Purpose

This paper examines inflation in India and the US from 2017 to 2024, with a particular focus on the inflation gap. It also examines how differences in consumption and the structure of the CPI basket may lead to different perceptions of inflation in an emerging economy compared with an advanced economy.

Design/methodology/approach

It's a comparative, descriptive study based on 96 matched monthly observations from Jan 2017 to Dec 2024. The data are secondary and sourced from the Indian MoSPI and the US BLS. The analysis covers monthly YoY inflation rates using annual and sub-period averages, inflation differentials, standard deviations, and lag-one autocorrelation. The differing structures of food and housing expenditure provide context.

Findings

Average inflation over the period was 5.01% in India and 3.43% in the US (a difference of 1.58pp). It varied enormously year on year, with India having much higher inflation in 2020 and the US having higher average inflation in 2022. Quite the opposite of the normal expected scenario, where one would assume that emerging economies would be more volatile in terms of inflation, the US actually had the higher standard deviation over the whole period (2.22pp vs 1.52pp in India). The story of the inflation differential is very much period dependent and headline inflation is not a good enough measure of the range of inflationary pressures you'll see across the different economies.

Originality/value

The paper contributes to the literature on comparative inflation by bringing evidence on inflation trends, cross-country differentials, volatility, and descriptive persistence together in a single monthly framework. It shows that the relative inflation performance of emerging and developed economies can differ across regimes, challenging conclusions drawn from long-term averages. It provides a clear basis for assessing cross-country inflation performance by separating the effect of CPI basket composition from actual inflation differentials, and it points to further work at the component level. This is relevant to policymakers seeking a more refined understanding of inflation and price stability.

Practical implication: The results suggest that policymakers should account for inflation volatility, changing economic circumstances, and expenditure patterns in addition to the CPI. The different inflation profiles between India and the US suggest that assessments of price stability should account for a country's specific consumption patterns and the timing of inflationary pressures. The study provides a descriptive basis for improved inflation monitoring, policy communication, and economic planning, and highlights the need for further component-level analysis before attempting to establish causality.

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Keywords: Consumer Price Index, inflation dynamics, India, United States, comparative economic analysis, inflation volatility, monetary policy, expenditure patterns

1. INTRODUCTION

Inflation isn't really felt as a percentage. We feel it in the prices we pay for our groceries, our rent, our transport and our medical care. The CPI (Consumer Price Index) is a measure of the cost of a 'basket' of goods and services which is representative of what households actually buy. It is not the cost of living of any one household. It is the cost of living of the average household as per a particular system of price collection and aggregation. The annual inflation rate is generally the percentage change in the CPI from the same month of the previous year (MoSPI, n.d.; BLS, n.d.).

Governments and central banks look at the CPI for price stability and wage setting. Benefits, pensions and all sorts of business plans will be based on it. The headline figure, though, is very misleading in that it hides a great deal. A massive spike in food prices will affect a household very differently than a gradual increase in rent, even if the overall inflation rate is the same.

India and the United States make a useful pair for comparison. India publishes separate rural, urban, and combined series that cover a broad household population, whereas the widely reported U.S. CPI-U covers urban consumers only. The two countries also differ in spending patterns, in how they measure housing, and in how commodity prices reach household budgets. India's CPI has since been rebased to 2024=100, which makes continuity and category harmonisation a real concern (MoSPI, 2026). For these reasons, the study compares rates of price change, not raw national index levels, and does not treat unlike components as identical.

The research context draws on a broader historical collection spanning 2013–2025; however, the principal empirical sample—the balanced and auditable sample—covers January 2017 through December 2024. The gaps are more extensive, and the data should not be treated as a complete cross-country panel. Rather, they illustrate how the inflation gap evolves over time and inform the interpretation of descriptive findings on volatility and persistence before the analysis turns to narrower explanations based on food, shelter, and expenditure weights. This provides a foundation for comparing persistence and dispersion.

2. OBJECTIVES OF THE STUDY

The objectives for the study include

(1) To compare the direction and size of headline CPI inflation in India and the US over the 2017-2024 period.

(2) To look at how the inflation gap develops over the pre-pandemic, pandemic and post-pandemic periods.

(3) To compare the volatility and the descriptive persistence of headline inflation (which is precisely what the results below show).

(4) To look at how the differing structures of food and housing spending in the two countries go some way towards explaining the divergence without attempting to quantify it.

3. LITERATURE REVIEW, THEORY AND RESEARCH GAP

3.1 Inflation as an expenditure-weighted experience

Kaplan and Schulhofer-Wohl (2017) show that inflation varies enormously from household to household, mainly because households pay different prices for the same products. Jaravel (2019) points to changes in product availability and product innovation as a key driver of the unequal consumer price experiences. These studies remind us that the national headline CPI is a useful summary statistic rather than a direct measure of any individual household's welfare. Cavallo (2024) shows that changing consumption weights during the

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pandemic can significantly affect measured inflation, again highlighting the importance of looking at expenditure shares and price changes at the category level.

3.2 Food-price transmission and shelter measurement

Anand et al. (2014) examine the link between Indian food inflation and monetary policy transmission. Goel (2024) looks at heterogeneity across food price categories, and Samal and Goyari (2023) look at the real and inflationary impacts on relative food price volatility. All of these papers confirm that food is a relevant channel in the Indian context, but none identifies food's contribution to the India-US inflation differential. For the US CPI, the BLS (n.d.-b) explains rental equivalence in the shelter component; therefore, simply comparing the shelter weight in the US with that in India would not be a like-for-like measure of consumption.

3.3 Research Gap and contribution

Inflation is the result of price movements combined with the structure and aggregation of household spending. Individual prices may be influenced by a range of factors including supply conditions, demand, imported energy prices, exchange rates and monetary policy, but these individual influences are not separately observable in the present panel. The paper is therefore concerned with testing the descriptive cross-country predictions regarding inflation gaps and their variation rather than making any claim to the causal effect of a particular shock.

The actual research contribution is the joint treatment of the average inflation difference, its sensitivity to subperiods, its serial dependence and its instability within the one matched monthly design. It provides an explicit measure of comparison in terms of what basket weights can and cannot establish. That's a contribution to the interpretation of CPIS across countries, not a claim that there hasn't been some bilateral inflation research previously. The formal inflation driver models and the harmonised weight vs price decomposition are entirely separate research exercises which would require additional data.

4. DATA AND METHODOLOGY

4.1 Source, Construction, and Inclusion Rules

For this analysis, the data on the Combined CPI for India come from MOSPI-published data (including historical releases) and the U.S. BLS city average CPI-U all items series. The monthly data set is from 2013 to 2025, though the fully observed bilateral panel is from Jan 2017 to Dec 2024 (96 monthly pairs). There is no interpolation of missing values. The index numbers are not directly comparable across countries as they have different base periods. The inflation rates are calculated using the unadjusted monthly indices, based on the archived input CSV.

The Indian CPI series has been base revised to 2024=100, with MoSPI providing guidance on how the revised series is linked via a common overlapping year. It would be a mistake to assume that the revised classifications are the same as those based on the 2012 base. As the empirical window closes in at 2024, this paper continues to use the original headline series for its main comparisons. The later releases are not simply 'carried forward' into the historical panel (MoSPI, 2026).

4.2 Variables and Estimates

For country c and month t, the year-on-year inflation rate is given by pi(c,t) = 100 x [CPI(c,t)/CPI(c,t-12) - 1]. The bilateral difference is d(t) = pi(India,t) - pi(US,t), in percentage points. The annual figures are the arithmetic average of the 12 monthly year-on-year rates (not December-on-December or annual average price index changes). The sample standard deviation is the standard deviation of the reported inflation rate, not the standard deviation of the inequality in the inflation rate experienced by households.

The unconditional mean gap is estimated as the intercept in the equation $d(t) = \mu + \epsilon(t)$. To account for serial dependence and time-varying variance, we use Newey-West heteroskedasticity- and

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autocorrelation-consistent (HAC) covariance estimates with 12 lags. The analysis uses 95% confidence intervals and reports p-values. The subperiod samples are defined as 2017–2019, 2020–2022, and 2023–2024. A Cumulative Sum test of residuals from a constant-mean model provides an exploratory check of parameter stability. Lag-one autocorrelation is presented descriptively because adjacent year-on-year inflation rates share 11 overlapping months of index information. Exogenous inflation shocks are not identified.

4.3 Comparability and Restrictions

For a like-for-like numerical expenditure weight decomposition we need the matched component inflation series, the appropriate dated expenditure weights and a fully reconciled category mapping to each of the official measures. Given the source panel, the food, energy, fuel, transport, and housing and shelter components are analyzed under different national definitions, so their expenditure shares are contextual rather than estimated as percentage-point contributions. The U.S. CPI-U and India's combined CPI also cover different populations. All inferences are subject to these measurement and sample limitations.

5. DATA AND METHODOLOGY

5.1. Sources and sample

The study uses two official secondary series: the all-India combined CPI from the Ministry of Statistics and Programme Implementation (MoSPI), sourced from its historical CPI archive and releases, and the U.S. CPI for All Urban Consumers (CPI-U), all items, from the U.S. Bureau of Labour Statistics (BLS). The dataset was compiled from the accompanying historical working panel. The wider source set covers parts of 2013 to 2025, but the balanced analytical window is January 2017 to December 2024 (96 months). Both countries entered as unadjusted year-on-year inflation, so we use different seasonally adjusted national series.

5.2. Measures

Inflation in month t is calculated as $100 \times (CPI_t/CPI_{t-12} - 1)$. The inflation gap is Indian inflation minus U.S. inflation, in percentage points. Descriptive statistics are arithmetic means, sample standard deviations, and the minimum and maximum monthly inflation rates. The annual rates reported below are averages of the twelve monthly year-on-year rates. They are not December-to-December rates or annual-average index growth. Lag-one autocorrelation is a descriptive indicator of persistence, not a structural or causal estimate.

5.3. Scope of component analysis

The component section is of course narrower than the headline analysis. The Indian food and consumer food categories, the housing and fuel categories don't exactly map to the US food, shelter, housing and energy series. The current basket weights can't just be applied across the board to every year. A defensible decomposition would require a category mapping, country-specific weights for each period, matched component year-on-year changes and an explicit reconciliation residual. This piece does not purport to be a numerical weight versus price decomposition.

6. DATA PRESENTATION, RESULTS AND INTERPRETATION

6.1. Year-on-year CPI inflation

Table 1. Mean of monthly year-on-year CPI inflation rates, by calendar year.

Year	India (%)	U.S. (%)	Gap (pp)
2017	3.33	2.13	1.2
2018	3.96	2.44	1.52
2019	3.71	1.81	1.9

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2020	6.63	1.24	5.39
2021	5.14	4.69	0.45
2022	6.7	8.01	-1.31
2023	5.66	4.14	1.52
2024	4.95	2.95	2
2017–2024	5.01	3.43	1.58

Source: calculated from the matched 96 month panel.

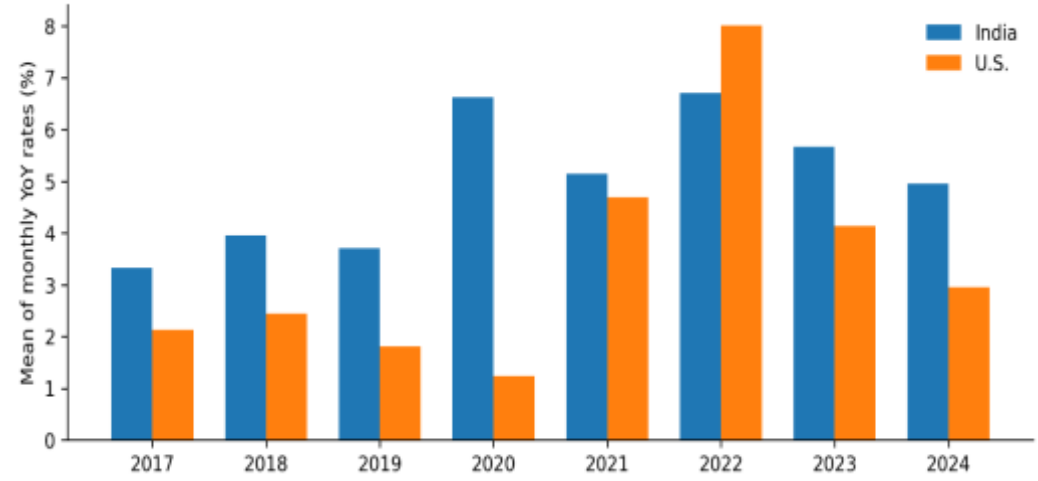


Figure 1. Monthly year on year headline CPI inflation, India and United States, January 2017 to December 2024.

Source: MoSPI and BLS historical CPI data.

Figure 1 shows that inflation didn't move together in the two economies. India started the period with quite variable inflation, whilst U.S. inflation rocketed up during the global price surge of 2021–2022. Neither country can really be described as the more inflation-prone at any given point in time.

Figure 2. Annual mean of monthly year-on-year headline inflation—source: calculated from MoSPI and BLS.



India's average inflation was higher than that of the US in 7 of the 8 years. The only year it wasn't the case was 2022 when U.S. inflation came in at 8.01% and Indian inflation at 6.70%. The biggest annual gap in favour of India was in 2020 (5.39pp). Given that inflation pressures are year on year, the annual series doesn't really lend itself to a fixed ranking.

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6.2. Inflation gap and changes in economic conditions

Table 2. Subperiod means and sample standard deviations of monthly year-on-year inflation.

Period	India mean	U.S. mean	Gap (pp)	India SD	U.S. SD
Pre-pandemic (2017–2019)	3.67	2.13	1.54	1.19	0.39
Pandemic/price-shock era (2020–2022)	6.15	4.65	1.51	1.03	3.05
Later period (2023–2024)	5.3	3.54	1.76	0.91	1.04

Note: the economic period labels refer to the sample and are not formal break-test results.

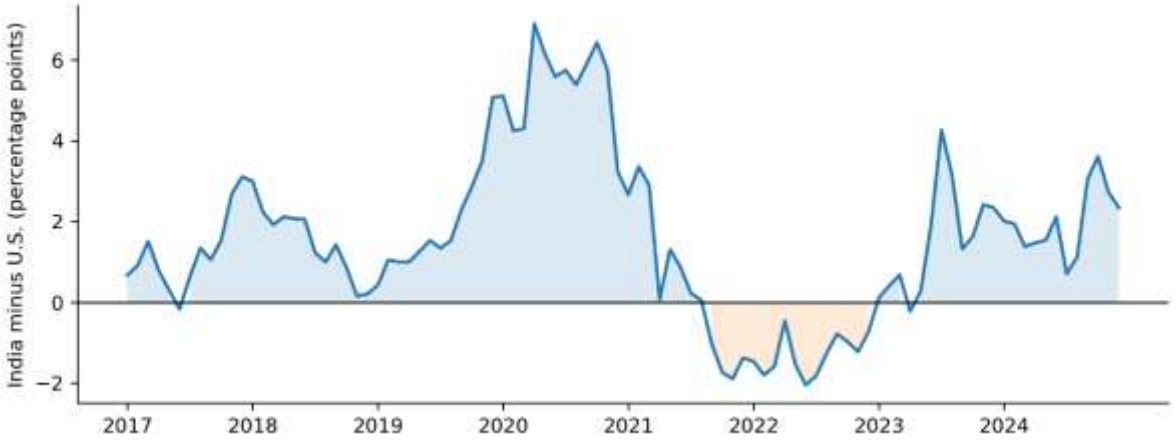

Figure 3. Monthly inflation differential (India minus United States), in percentage points. Negative values indicate that US inflation was higher.

The average gap was broadly the same across the three sub-periods (+1.54, +1.51 and +1.76 pp) but the average masks very different behaviour within each one. The reversals in 2020 and 2022 are a case in point as to why policy interpretation requires knowledge of the timing and composition of the shocks, not just the average gap.

6.2 Gap estimates and stability

Table 2. Inflation gap: HAC-robust mean estimates and robustness checks

Sample	Months	Mean gap (pp)	95% HAC CI (pp)	p-value
Full matched sample	96	1.58	0.37 to 2.80	0.0107
2017–2019	36	1.54	1.01 to 2.07	0
2020–2022	36	1.51	-1.47 to 4.49	0.3209
2023–2024	24	1.76	1.28 to 2.24	0
Exclude 2022	84	2	0.94 to 3.06	0.0002
Exclude 2020–2022	60	1.63	1.29 to 1.96	0

Note: intercept-only mean tests with HAC standard errors; lag=12 or fewer where needed. These comparisons are exploratory and the subperiods were not determined by estimated break dates.

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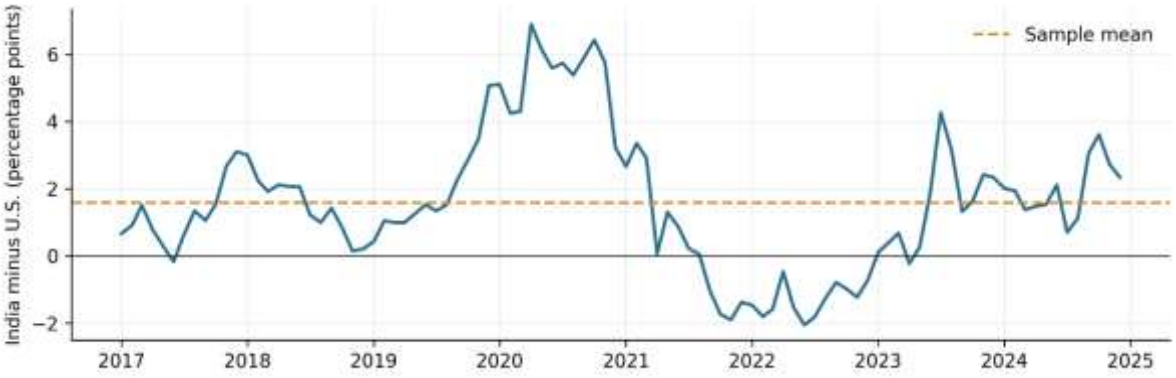

Figure 2: Monthly India–U.S. headline inflation difference (pp). Negative values indicate higher U.S. inflation.

The sample mean gap is 1.583 pp (95% HAC CI 0.367 to 2.798; p=0.0107). The gap is positive across the full sample but the CI for the 2020–2022 period includes zero so a positive full sample result cannot be taken as evidence of a constant gap in every regime. The gap increases if 2022 is removed which again shows the result is sensitive to the U.S. price spike. The CUSUM is 2.368 (approximate p=2.7e-05) and this rejects the null of a stable simple constant mean gap. That's evidence of instability, not an estimated date or cause of a structural break.

6.3 Volatility and persistence

Table 3. Dispersion and serial dependence of headline inflation

Measure	India	United States
2017–2024 SD	1.52	2.22
2017–2019 SD	1.19	0.39
2020–2022 SD	1.03	3.05
2023–2024 SD	0.91	1.04
Lag-one autocorrelation	0.865	0.982
SD of 1-month change in YoY rate	0.79	0.42

SDS are in percentage points. Correlation is unitless. The Yoy rate changes will dampen some of the persistent level effects but are not independent monthly inflation innovations.

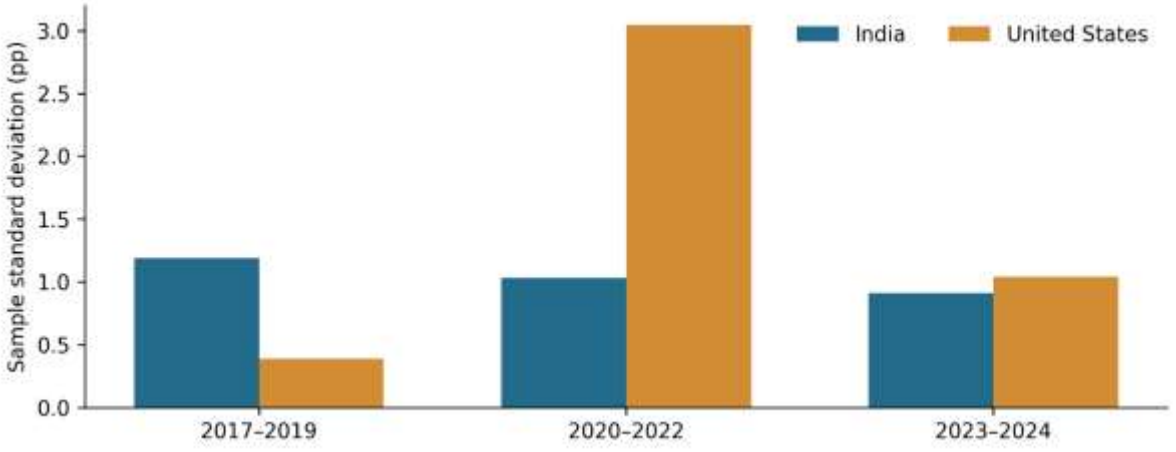

Figure 3. Standard deviation of monthly year-on-year CPI inflation by pre-defined sub-period.

The US has greater dispersion over the full eight years (driven overwhelmingly by the 2020–2022 period). The pre-pandemic comparison is the other way around. So the categorical statement that one economy is always

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more volatile is not borne out. The higher U.S. lag-one correlation is a feature of the overlapping annual rate observations. It should not be interpreted as a structural estimate of greater price-setting persistence (in the face of common shocks, measurement construction and the possibility of regime shifts).

6.4 Published expenditure weights and measurement differences

Table 4. Official illustrative expenditure weights: definitions and dates matter

Category	India combined CPI, 2012-base (%)	U.S. CPI-U, Dec. 2024 (%)
Food and beverages	45.863	14.526
Housing (national category)	10.07	44.201
Shelter (U.S. subcategory)	No direct match	35.483

Sources: MoSPI (2026), CPI 2024 series FAQ reporting 2012 base combined weights; BLS (2025), December 2024 CPI-U relative importance. Indian housing and U.S. housing are not harmonised categories and the reference years are also different. These are not causal contributions.

The food and beverages share is vastly higher in India than in the published U.S. CPI-U structure. The Indian housing category is not in any way comparable to the U.S. housing category (the U.S. one includes owners' equivalent rent as part of shelter). The numbers therefore simply show that the agencies attach different relative weights to their differently defined categories. They don't demonstrate that food or shelter accounted for a particular proportion of the 2017-2024 inflation gap. A claim of that kind would require the monthly component series, historical weight vintages and harmonisation that are beyond the scope of the data available in this piece.

6.4. What the CPI baskets suggest, and what they do not prove

Table 4. Conceptual comparison of CPI component structures; not estimated contribution shares

Dimension	India	United States	Interpretive caution
Population	Combined rural and urban CPI	CPI-U covers urban consumers	Coverage is not identical
Food	Relatively prominent household expenditure category	Smaller relative food share	Definitions and dates of weights differ
Housing	National housing treatment and classifications	Shelter includes rent and owners' equivalent rent	Direct one-to-one comparison is not valid
Energy/transport	Fuel and transport across national CPI categories	Energy and transportation aggregates published by BLS	Category mapping is necessary

Source: MoSPI CPI methodology and BLS CPI definitions.

Food is obviously a larger component of the Indian basket whereas shelter is a much bigger component in the US CPI-U. That would point to plausible channels. The impact of food price changes will be substantial in a country where food is such a large share of the household budget and the impact of rent adjustment and the way housing is measured will be significant in a country where shelter is such a big component. Weight alone doesn't drive inflation though. A component will contribute to the change in inflation via both its weight and the actual movement in its price and the official CPI aggregation is far more complicated than a simple static weighted average.

7. DISCUSSION AND POLICY IMPLICATIONS

Three points are worth noting. First, India did see higher average inflation over the 2017-2024 period, though

not in every year (2022 was a very significant reversal). Second, inflation risk is period dependent: the country with the most variation in one sub-period need not be the country with the most variation over the full period. Third, a food vs shelter story is quite possible given the household expenditure patterns and the existing literature, but it is not the story that has been empirically established. Getting these distinctions right means that policymakers don't end up confusing the headline figures with the statistical basket and the actual drivers of inflation.

For India, inflation monitoring could combine the headline rate with separate rural/urban and food-category movements, with the caveat that any basket revisions and linking decisions would be fully explained when making historical comparisons. For the US the headline release would continue to be interpreted in conjunction with the shelter, energy and core measures, particularly where the various components of the price index are adjusting at different lags. In both cases statistical agencies and applied researchers can do a lot to improve the public's understanding by publishing plain language category crosswalks, time-stamped relative importance tables and the actual contributions. Those are all implications of the evidence and the measurement framework; they are not causal policy effects established by the study.

8. CONCLUSION

For the 96 matched months from 2017 to 2024 the mean headline CPI inflation was 5.01% in India and 3.43% in the US. The robustly estimated average gap of 1.58pp masks a very pronounced U.S. inflation spike in 2022 and a significant shift in the ranking of the countries in terms of price variability. The instability diagnostics suggest that a single constant inflation differential is simply too restrictive a summary of the whole period. The interpretation of cross-country CPIS is enhanced by looking at the level of inflation as well as the timing, dispersion and index coverage. The contribution of the paper is in the transparent measurement and regime aware comparison, not in any unproven attribution of food or housing effects. A follow-up empirical exercise would be to put together the matched national components and vintage consistent weights to quantify the expenditure weight and component price channels.

9. Data Availability, Ethics and Declarations

Data availability: A month level analysis CSV and a reproducibility script are provided with this draft. The primary data sources are the MoSPI/e-Sankhyiki and the BLS CPI databases. The analytical CSV is a reconstructed working panel and should be row by row reconciled against the downloaded official releases prior to the final upload to the journal. No individuals were involved in the study and no personal data were used. Funding, conflicts of interest, author contributions and author identity must be completed by the actual authors in accordance with journal policy. No such declarations are being made.

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