Understanding Inflation in India: A Data focused analysis of Key Economic Indicators

Abstract

This paper aims to analyze three economic indicators: crude oil prices, the food price index and the INR/USD and check if inflation in India can be traced more closely and may lead to partial prediction.The data of monthly trends from 2010 to 2023 were used to predict the future inflation rates. Using basic regression and data visualization tools, the project focuses closely on how each variable behaves and whether any strong patterns emerge. It turns out that food prices seem to have the strongest relationship with inflation while oil has a medium influence and exchange rate is weaker. This isn't a forecasting model, but a structured attempt to think about economic change using real data.

Introduction

Inflation affects everyone, but understanding it and the reason behind it are very complicated. In India, where price changes hit a larger section of the population because of income inequality there is a gap between rich and poor so, it felt important to explore whether we can see any clear signals by looking at some key variables. I picked crude oil prices because they affect transport and energy, food price index because food dominates household spending, and the exchange rate because India imports a lot.

Instead of building a complex machine learning model, I kept it simple: clean the data, plot it and look at trends. Then I tried to connect what I saw with also what's usually discussed in economic reasoning.

Methodology

The dataset I used was inflation rate from 2010 to 2023 to understand the patterns and help me anticipate the trends in the coming years. It included:

- Inflation rate (%)
- Crude oil prices in USD
- Food price index (normalized)
- INR/USD exchange rate

The data was cleaned, aligned by date, and run through basic correlation checks and visual plots using Python. I didn't use advanced forecasting methods here — the goal was to explore basic relationships.

Analysis & Observations

Crude Oil Prices

Oil prices showed a moderate link with inflation. Higher oil generally meant higher inflation, but not

always. Sometimes, rise in oil quantity did not lead to inflation which may be because of subsidies or delay in pricing effects.

Food Price Index
This had the strongest connection. When food prices went up it was followed by inflation sometimes in the same month. It was not clearly stated, but the pattern was there. From a different lens it actually makes sense considering food's role in the CPI.

INR/USD Exchange Rate
This one was less predictable. A falling rupee makes imports more expensive and that should raise inflation. But in this dataset, the trend was not strong. There could be other factors or delayed effects.

Discussion
The project did not lead to a clean formula for predicting inflation, but it did show indicators which are worth watching. Food prices are clearly the most important factor. Oil is secondary but it matters. Exchange rate might matter more in specific cases or over longer periods.

Sometimes, data contradicted expectations. That's probably the best learning here — even with structured data, real-world economics stayed uncertain. But having a few grounded indicators helps reduce the work or uncertainty.

Limitations

- The data may be uncertain though based on realistic trends
- Only three indicators used — many others matter too
- No seasonal adjustments or time-lag modeling
- No policy or qualitative factors included

Conclusion
This paper shows how data even basic can help form a more logical view of inflation. While not a forecasting model, the project made it easier to understand how inflation interacts with everyday economic changes. In practical terms that might help businesses, analysts or even students think more clearly about what's happening and why.

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