**India CPI Inflation Case Study**



**Overview:**

In India, the Consumer Price Index (CPI) is used to measure inflation, and it involves a fixed basket of goods and services. This basket is comprehensive and includes a wide array of items that an average Indian consumer uses. These items are not limited to just food and clothing but extend to transportation, medical care, electricity, education, and almost every other category that involves expenditure of money**. The CPI is calculated by comparing the general price level in the markets during a particular time period with a base year.** The items in the CPI basket are classified across various categories like food and beverages, clothing, housing, fuel and light, and recreation, among others.

The CPI basket contains categories like food and beverages, housing, apparel, transportation, medical care, and more. The weight of each category in the total index might differ based on its relative importance to the average consumer expenditure but for the purpose of this analysis consider equal weights across all categories.

**Dataset:**

**CPI Inflation Data** - Right-click to download

* The dataset provided is a CPI inflation index extracted from the GOI website.
* Each number represents the index value for that month and category.
* There are missing values in the dataset - use suitable imputation techniques (like moving averages), if required.
* The CPI is an index and not a direct measure of price levels, but rather a relative indicator used to measure inflation or the average change in prices over time. Consumer Price Index (CPI) values cannot be summed across different months to derive meaningful insights or aggregate measures.
* **CPI-U (Urban):** Reflects spending patterns for urban consumers.
* **CPI-R (Rural):** Reflects spending patterns for rural consumers.
  + The General Index gives you the overall inflation for the month for all the categories combined.

**Problem Statement:**

You are working with the National Statistical Office, which is equipped to release inflation numbers in India. As an analyst, you are provided with CPI data and are expected to find out insights from the data. Your senior wants you to find key trends and deep dive into the data to answer the following questions:

1. Based on the **latest** month's data, identify the contribution of different broader categories (food, energy, transportation, education, etc.) towards the CPI basket. Broader categories (buckets) can be created by combining similar categories can be grouped into one bucket; **Example**: Meals, Beverages, and Cereals can be clubbed to create the **"Food"** category, etc.

* Which broader category has the highest contribution towards CPI calculation?



* Contribution is calculated by evaluating the underlying index values for broader categories and should add to **100%** when contributions from different broader categories are added.



1. **A trend of Year-on-Year (Y-o-Y) increase in CPI (rural + urban) inflation starting from 2017** for the entire basket of products combined.

* Create a graph depicting the growth rate Y-o-Y and identify the year with the highest inflation rate.



* Highlight the reason why the year has the highest inflation (based on research).

1. **With India's retail inflation reaching a 3-month high of 5.55% in November 2023**, largely due to a sharp rise in food prices, analyze the following for **12 months ending May 2023**:

* Investigate trends in the prices of the broader food bucket category and evaluate month-on-month changes. Highlight the month with the **highest** and **lowest** food inflation.
* Identify the absolute changes in inflation over the same **12-month period** and determine the **biggest individual category contributor** (only within the broader food category) towards inflation.

1. **Investigate how the onset and progression of the COVID-19 pandemic affected inflation rates in India.**

* Analyze the **impact of key pandemic milestones** (e.g., first lockdown) on the CPI inflation %, specifically focusing on categories like **healthcare, food, and essential services**.

**Hint:** You can consider **March 2020** as the onset of COVID-19 and compare inflation trends before and after **March 2020** to see if there is a change in inflation percentages before and after.

1. **Investigate how major global economic events (such as imported crude oil price fluctuations) have influenced India's inflation.** This can include an analysis of crude oil prices and their **trend**.

* For the purpose of this analysis, focus only on the **imported oil price fluctuations for years 2021 to 2023** (Month-on-month).
* **Identify trends in oil price change with change in inflation prices of all the categories and identify the category whose inflation prices strongly change with fluctuations in imported oil price** (*Hint: you can use the =CORREL function*).

**Submit your answers here:**

*(Participants are requested to submit a single Excel Workbook containing all working sheets with formulas. There is no requirement to submit any additional formats such as PowerPoint presentations for this case study.)*

**Other Information:**

* **Percentage Change:** To understand inflation or deflation trends, calculate the percentage change in CPI between two periods (*e.g., year-over-year or month-over-month*). This shows how much prices have increased or decreased relative to the earlier period.
* **For example, to calculate the monthly inflation rate between two consecutive months:**
  + **Monthly Inflation Rate** = *(CPI in current month – CPI in previous month) / CPI in previous month* × 100
* **Annual Inflation Rate:** For longer periods, such as yearly inflation, use the CPI values at the start and end of the period. This helps in understanding the overall inflation experienced over the year.
  + **Annual Inflation Rate** = *((CPI at end of year – CPI at start of year) / CPI at start of year) × 100*
* **Any month can be considered as the start of the year**; then the end of the year month will be considered **12 months after** the month selected for the start of the year.