

InflationIQ: Navigating CPI Shifts

This report presents the findings of an analysis conducted on consumer spending patterns, inflation change, and the Consumer Price Index (CPI) across various expenditure categories. The analysis encompasses a comprehensive examination of trends, correlations, and insights drawn from the available data.

Key Findings:

- Strong positive correlation observed between certain expenditure categories.
- Variations in spending patterns identified for categories.
- Inflation rates and CPI trends analyzed, revealing fluctuations over time.

1. Introduction

Consumer spending behavior is a critical indicator of economic health. This report delves into consumer spending trends across different expenditure categories and examines the impact of inflation on purchasing power. The analysis aims to provide valuable insights for decision-makers in finance, marketing, and economics. There are two terms use in this report which are inflation and CPI so the understanding to both of them are most important.

● Inflation

It is a general increase in prices and a decrease in the purchasing power of money. It can have a significant impact on consumer behavior, as people adjust their spending habits in response to rising prices. The impact of inflation on consumer behavior can vary depending on several factors, such as the rate of inflation, the consumer's income, and their spending habits. However, in general, inflation can have a significant impact on consumer spending. if the inflation rate for a particular category is significantly higher than the overall inflation rate, it might indicate that prices in that category are rising rapidly. For calculating the inflation rate we should need to know the market basket value of current and previous year to know the change happen in goods and services.

$$\text{Inflation} = \frac{\text{Year 2} - \text{Year 1}}{\text{Year 1}} \times 100$$

● CPI(consumer Price Index)

The CPI measures changes in the average prices paid by urban consumers for a basket of consumer goods and services. It's a common indicator of inflation. The CPI is used to measure inflation, which is the rate at which the prices of goods and services are rising. Inflation can have a significant impact on the economy, as it can erode the purchasing power of consumers and make it more expensive for businesses to operate. We can calculate CPI as follow:For calculating the CPI we should need to know the base year of market basket value which is the number in which an index number begins to be calculated:

$$\text{CPI} = \frac{\text{Value of current basket value}}{\text{value of market basket in base year}} \times 100$$

- **Scope :**

Data Source: FRED

Time Period: 20 days

Methodology: SQL queries and Power BI visualizations.

Process: Data was extracted(from FRED), transformed(via SQL queries by using SQL management server), and loaded into Power BI. SQL queries were used to calculate correlations, analyze trends, and derive inflation and CPI data.

2. Data Analysis

Analysis of Inflation Change and CPI by Expenditure Category, involved a rigorous examination of consumer spending patterns, inflation trends, and the Consumer Price Index (CPI) across various expenditure categories. This section provides a detailed overview of the key aspects of the data analysis process.

- **Data Sources**

The primary source of data for this analysis was [**FRED**], which provided a rich dataset encompassing a wide range of variables related to consumer spending. The dataset covered a specific time range, allowing for a historical perspective on spending behavior.

- **Data Preparation**

Before commencing the analysis, data underwent a comprehensive preparation phase, which involved data extraction, transformation, and

loading (ETL) into the Power BI platform. The ETL process ensured that the data was in a format suitable for analysis and visualization.

1. **Extraction:** This data is collected from FRED and Data Gov site which provide the data of USA. According to requirement of project this data must have the data by different categories corresponding of year. In this analysis we use data only on time period of 2012-2023. all the files are downloaded into CSV file format and import these files in SQL management server for data cleaning.
2. **Transformation:** all the extracted data imported into SQL server for the cleaning. After cleaning and calculation the results of queries are saved into CSV file format to perform visualization.
3. **Loading:** Data is load into CVS file format into power-bi via get data option of power-bi and again transformed the data such as rename the columns change the data type remove the unrelenting data. And then perform the visualization.

● **Methodology**

SQL queries were employed to extract meaningful insights from the dataset. These queries were designed to address various aspects of consumer spending behavior, inflation calculations, and CPI trends. The SQL queries were executed within the Power BI environment, facilitating seamless integration of the analysis results into interactive visualizations.

● **Analysis Sections**

The data analysis was structured into several distinct sections, each focusing on a specific aspect of the project:

1. **Correlation Analysis:** This section aimed to uncover relationships between different expenditure categories by calculating correlation coefficients. Strong positive correlations were identified between specific pairs of categories, indicating potential market interactions and trends.
2. **Category Analysis:** Consumer behavior was segmented by both year and expenditure category to identify patterns and trends over time. This section revealed insights into changes in spending habits across different categories.

3. **Identifying Trends:** Trends in consumer behavior during periods of high and low spending were explored. This section aimed to highlight shifts in spending patterns and their potential drivers.
4. **Yearly and Monthly Spending Totals by Category:** Analysis in this section provided a breakdown of annual and monthly spending totals for each expenditure category, offering a comprehensive view of expenditure trends.
5. **Category Spending Over Time:** This section delved into the evolution of spending within each category over time. Visualizations were used to illustrate spending trends, emphasizing any significant changes.
6. **Growth Rate:** Analysis of growth rates for each category helped identify periods of rapid growth or decline, aiding in the identification of influential factors.
7. **Category Spending Distribution:** This section provided insights into how spending was distributed within each category. Median, minimum, and maximum spending figures were highlighted.
8. **Inflation & CPI Calculations:** Detailed analysis of inflation rates and CPI trends by expenditure category was conducted. This section aimed to uncover changes in consumer purchasing power over time.

● **Visualizations**

Throughout the analysis, a variety of visualizations, including charts, graphs, slicers, and tables, were employed to present the findings in an engaging and comprehensible manner. These visual aids enhanced the report's ability to convey insights effectively.

3. Conclusion

In conclusion, this analysis sheds light on the intricate dynamics of consumer spending across various expenditure categories. Key findings include strong correlations between certain categories, seasonal spending patterns, and insights into inflation and CPI trends. The data-driven insights derived from this analysis can inform marketing strategies, financial planning, and economic forecasting. It is imperative to adapt to changing consumer behaviors and economic conditions to make informed decisions