Nigeria Inflation Analysis Report: Trends, Drivers, and Economic Correlations (2015-2023)

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Executive Summary

This report analyzes Nigeria's inflation trends from 2015 to 2023, identifying key drivers, seasonal patterns, and economic relationships.

Key Findings:

- **High Volatility and Recent Spike:** Inflation has been highly volatile, with an initial peak in 2017 and a sharp surge to its highest levels in **2022 and 2023** ***(see Visual 1: Average Yearly Inflation Rate)***, with a peak monthly rate of nearly **29%**. ***(see Visual 3: Inflation Heatmap by Year and Month)***
- **Primary Drivers:** The two biggest contributors to overall inflation are **Food (22.0%)** and **Energy (18.2%)**, which together account for over 40% of the average CPI basket. ***(see Visual 7: CPI Components Composition)***.
- **Strong Economic Links:** Inflation has a **strong negative correlation (-0.78)** with **Domestic Production**.***(see Visual 6: Correlation Between Inflation and***

Economic Variables) This means that when the country produces more, inflation tends to drop significantly. There is also a positive link to global Crude Oil Price. ***(see Visual 5: Inflation vs. Crude Oil Price*** and ***Visual 6***).

- **Seasonal Pattern:** On average, inflation consistently increases throughout the year, with the highest average rates recorded in **December**. ***(see Visual 4: Average Inflation by Month)***

Recommendations:

To effectively manage inflation, policy efforts should prioritize **increasing domestic production** and implementing specific strategies to stabilize the costs of **food and energy**.

INTRODUCTION

This project was initiated to explore Nigeria's inflation trends using publicly available economic data spanning the period of **2015 to 2023**. The main goal was to analyze how inflation behaves over time and understand its relationship with key economic factors, specifically focusing on the influence of crude oil prices and domestic production. The insights gathered provide a data-driven foundation for understanding the country's inflationary environment.

PROJECT SCOPE

Data Source and Preparation

The primary dataset was sourced from Kaggle's Nigeria Inflation Dataset and verified against official Central Bank of Nigeria (CBN) statistics. The data was cleaned.

- Missing values for April 2023 (Crude Oil Price, Production, and Crude Oil Export) were filled using official CBN data to maintain the integrity of the time

series.

- Year and Month columns were combined to form valid date objects.
- New variables, such as **Inflation_Change** and **Trend**, were created for deeper analysis.

Analysis Approach

Analysis involved statistical measures (maximum, minimum, standard deviation) and time-series comparisons. Eight key visualizations were generated to highlight:

1. Annual and monthly trends.
2. Year-over-year rate changes.
3. The breakdown of the Consumer Price Index (CPI) components.
4. The correlation between the inflation rate and external economic factor

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FINDINGS AND DETAILED ANALYSIS

Overall Inflation Trend and Volatility

The average annual inflation rate shows a pattern of sharp rises and dips, confirming high volatility:

- **Initial Peak:** The rate rose from approximately **9.0% in 2015** to a high of **16.8% in 2017**. ***(see Visual 1: Average Yearly Inflation Rate)***
- **The Dip:** It then fell off in 2018 and 2019, settling near **11.4%**. ***(see Visual 1)***
- **Recent Surge:** Since 2020, inflation has accelerated sharply, reaching a high of approximately **18.4% in 2022**.***(see Visual 1)***
- The **Year-over-Year Inflation Change (%)** shows the dramatic acceleration. The most significant single-year increase was over **70% in 2016**, indicating that inflation did not just rise, but did so at a rapidly increasing pace in that period. ***(see Visual 2: Year-over-Year Inflation Change (%))***

Seasonal and Monthly Patterns

The data reveals a consistent pattern in how prices change throughout a calendar year:

- **Consistent Monthly Rise:** The **Average Inflation by Month** shows a steady, almost linear increase from January to December. The average inflation rate is lowest in January and highest in **December** (peaking around **16.5%** on average). This suggests that the cost of goods and services is consistently rising through the year, regardless of the annual trend. ***(see Visual 4: Average Inflation by Month).***
- **Intensity Over Time:** The **Inflation Heatmap** clearly shows that the **highest intensity** of inflation occurred in **2023**. Rates were consistently above 20% from May onward, hitting a peak of **28.9%** in December 2023. ***(see Visual 3: Inflation Heatmap by Year and Month).***

Frequency and Variability of Inflation (Distribution)

The Distribution of Inflation Rate Over Time histogram reveals the frequency and variability of the inflation rate over the analysis period ***(see Visual 8: Distribution of Inflation Rate Over Time).***

- Most Common Rates: The inflation rate is not normally distributed, but rather shows a tendency to cluster in two main ranges: 10%–12.5% and 15%–17.5%. This reflects the two distinct periods of high inflation volatility observed in the time series analysis.
- Outlier Rates: The highest rates (above 25%) are the least frequent, occurring only a few times over the entire period (referencing Visual 8). This confirms that rates above 25% are statistical outliers, emphasizing the extreme nature of the 2023 spike.

Key Components Driving Inflation

The **Composition of CPI Components** pie chart identifies the cost areas that contribute most heavily to the overall inflation experienced by consumers:

1. **CPI_Food** is the single largest contributor at **22.0%**.
2. **CPI_Energy** is the second largest at **18.2%**.
3. **CPI_Transport** follows closely at **17.8%**.
4. **Crucial Insight:** Food and Energy alone account for over 40% of the average inflation basket, making policies focused on these two areas critical for reducing the overall rate. ***(see Visual 7: CPI Components Composition)***

CORRELATION WITH ECONOMIC VARIABLES

(see Visual 6: Correlation Between Inflation and Economic Variables):

Variable	Correlation with Inflation Rate	Interpretation
Production	-0.78 (Strong Negative)	This is the most important relationship: increasing domestic production is strongly associated with *lowering* the inflation rate. (referencing **Visual 6**).
Crude Oil Price	0.47 (Moderate Positive)	When global crude oil prices rise, Nigeria's inflation rate tends to increase, reflecting the Energy and Transport components.
CPI Components	0.76 to 0.81 (Strong Positive)	All individual cost categories (Food, Energy, Health, etc.) are highly correlated with the overall inflation rate, confirming they move together.

CONCLUSION

The analysis confirms that Nigeria has faced a period of extreme inflation volatility from 2015 to 2023, climaxing in the highest rates of the period in 2023.

The key drivers are clear:

1. **Structural Dependence:** Inflation is structurally dependent on the costs of **Food, Energy, and Transport**.
2. **Oil Price Exposure:** The rate is moderately exposed to global **Crude Oil Price** shocks.
3. **Production Leverage:** The **strongest lever** available to counter inflation is **increasing domestic Production**. Policies that successfully boost the national output are the most likely to result in a substantial, long-term reduction in the inflation rate.

RECOMMENDATIONS

Based on the strong correlations and identified drivers, the following action-oriented recommendations are proposed to address inflationary pressures:

1. **Prioritize Production Incentives:** Focus on aggressive policies and investment that directly boost **Domestic Production**. Given the **-0.78** correlation, this represents the highest-impact strategy for structurally tackling inflation.
2. **Stabilize Critical Cost Channels:** Develop targeted strategies to stabilize the costs of the two biggest inflation drivers:
    - **Food:** Invest in agricultural infrastructure and supply chain logistics to reduce waste and transport costs.
    - **Energy:** Accelerate investment in reliable, non-oil domestic energy sources to insulate the CPI_Energy component from global oil price volatility.

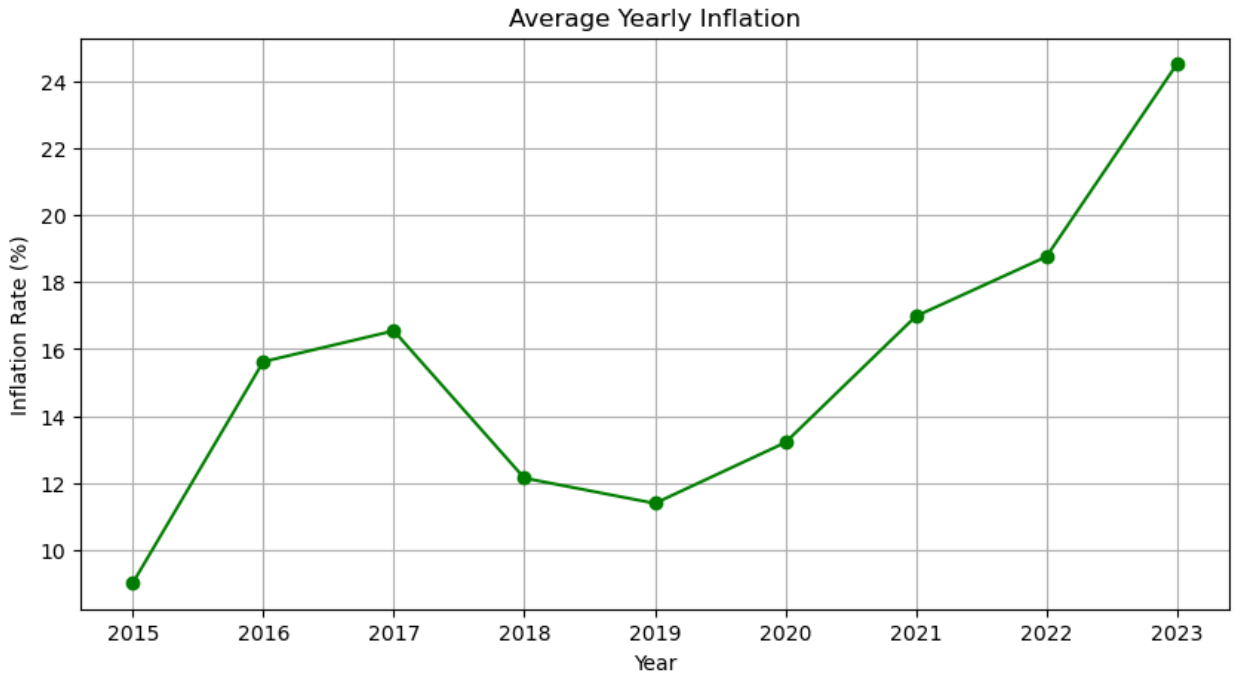
APPENDIX

Visualizations

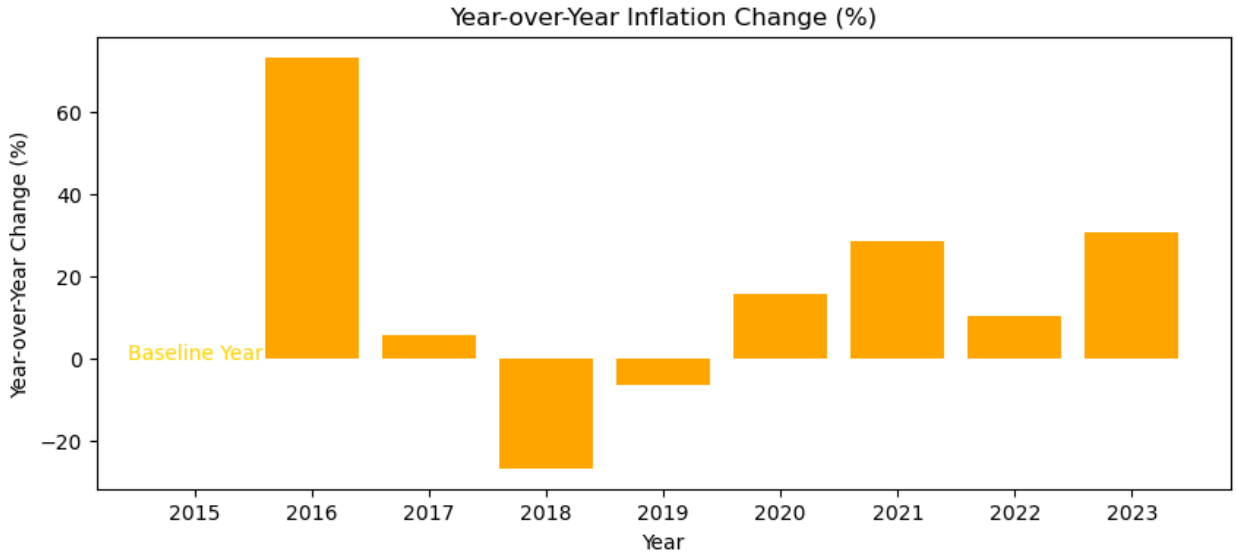
The following charts were generated during the exploratory data analysis to illustrate trends and relationships in Nigeria's inflation data (2015–2023):

> *Note: All visuals were produced in Python using Matplotlib and Seaborn, and exported from Jupyter Notebook.*

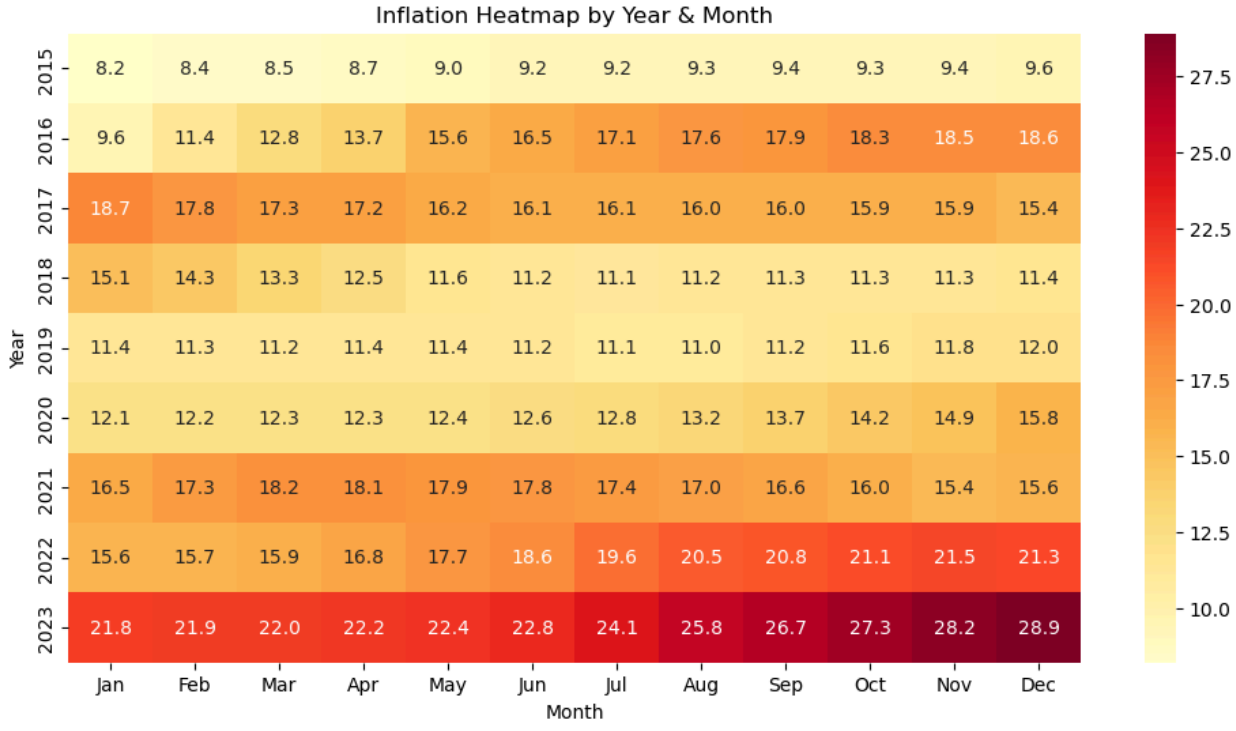
Visual 1: Average Yearly Inflation Rate (2015–2023)



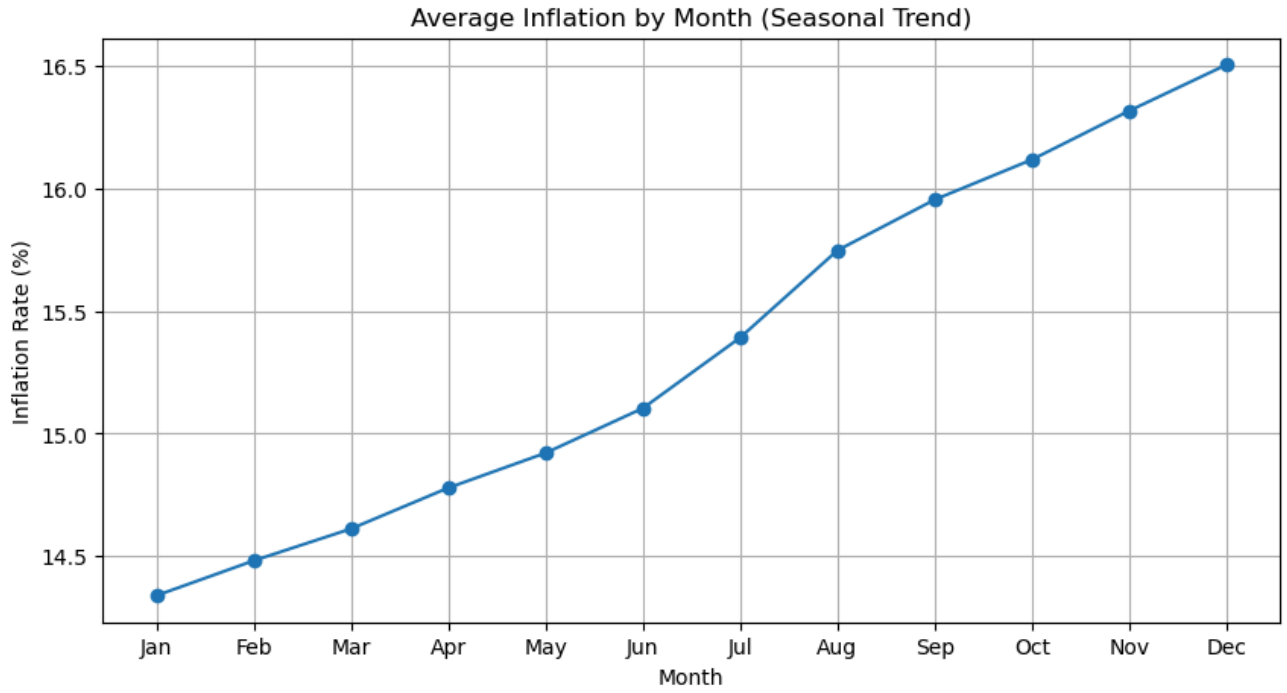
Visual 2: Year-over-Year Inflation Change (%)



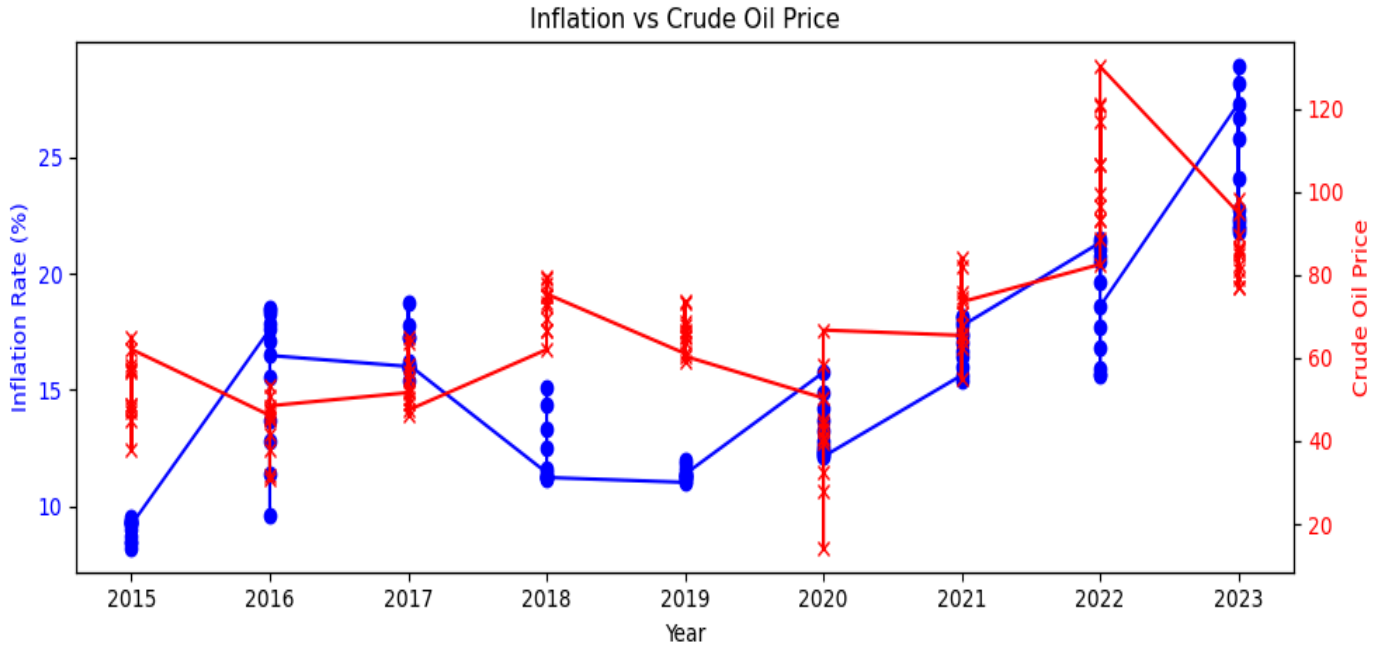
Visual 3: Inflation Heatmap by Year and Month



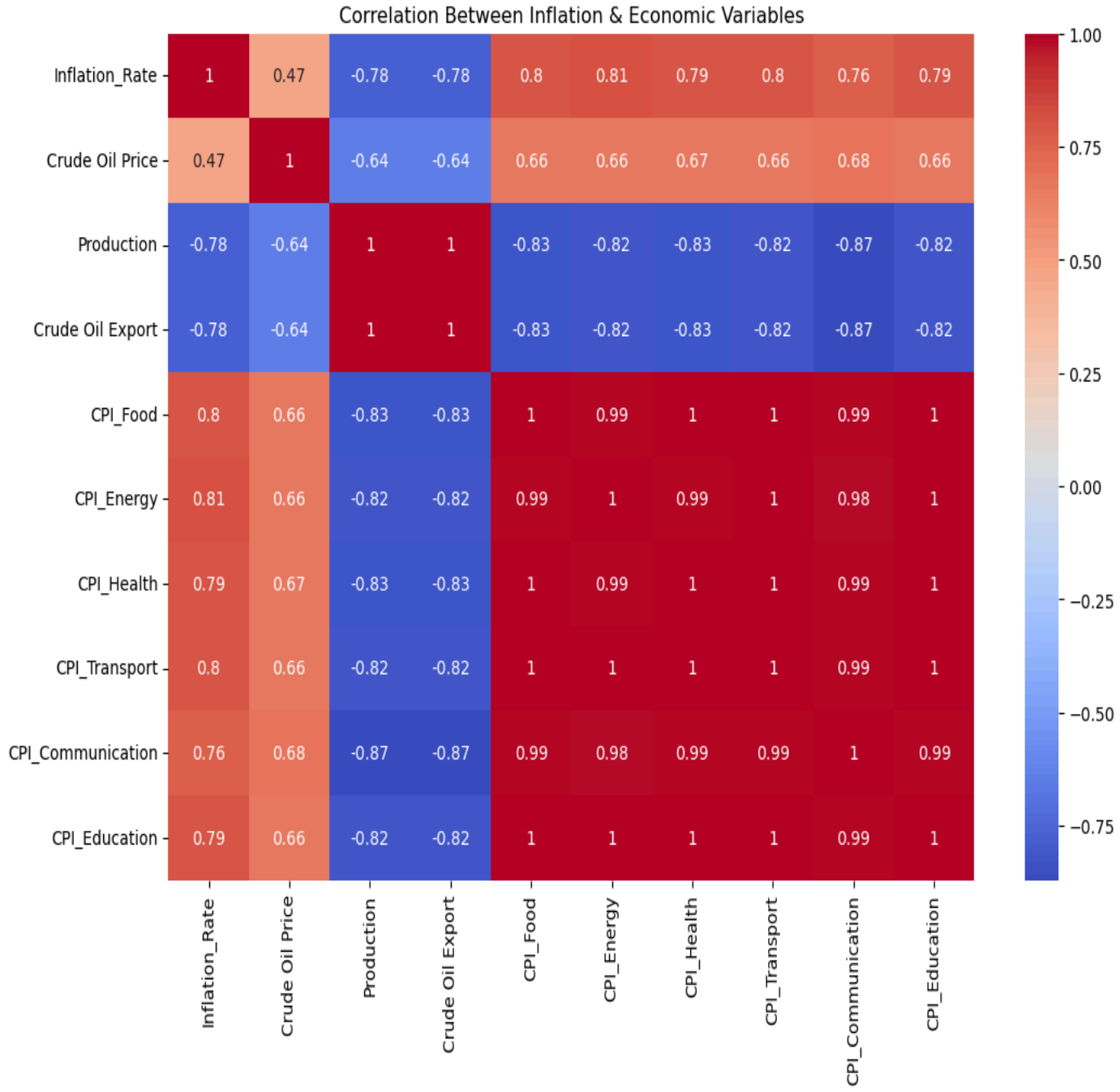
Visual 4: Average Inflation by Month (Seasonal Trend)



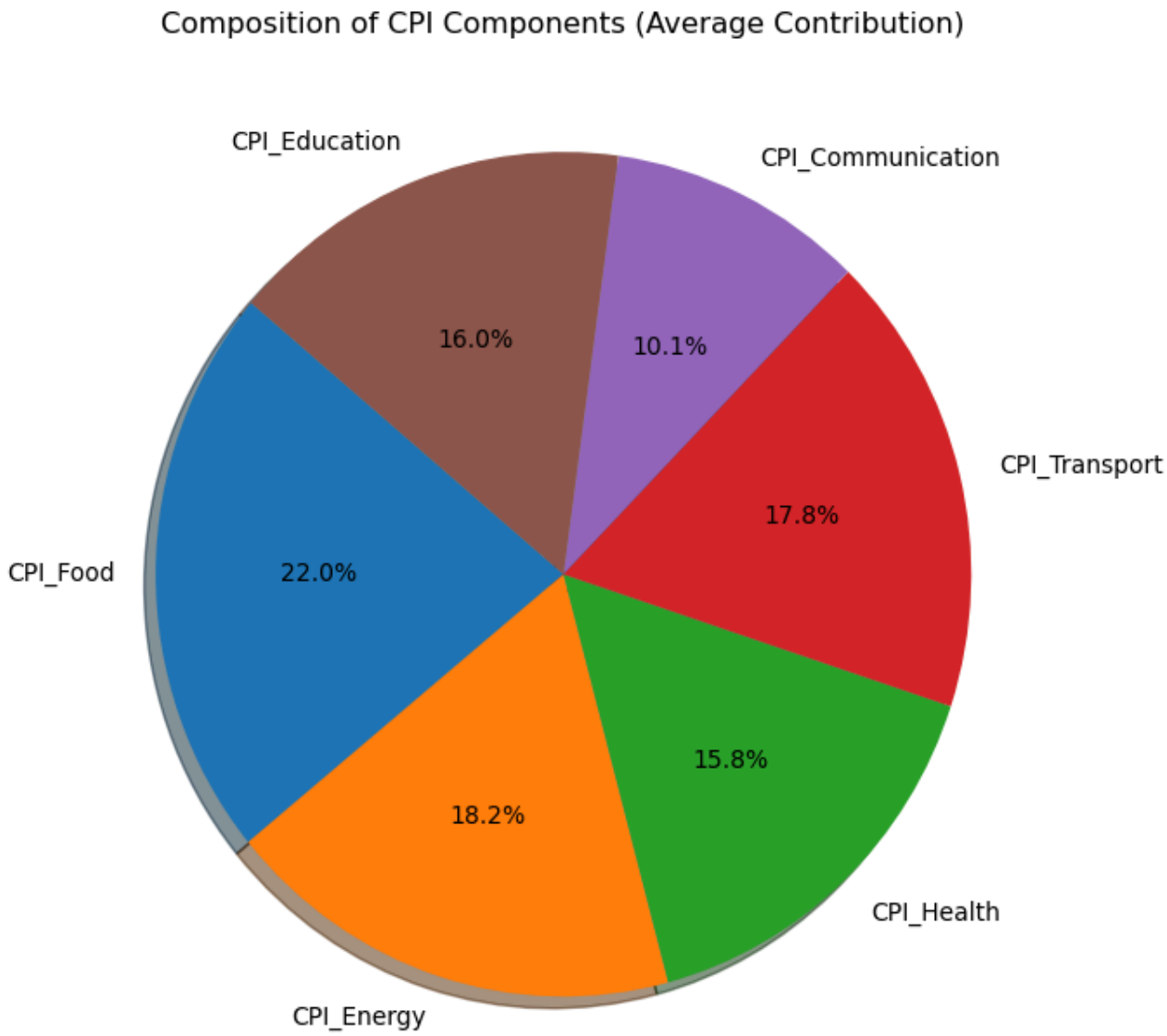
Visual 5: Inflation vs. Crude Oil Price



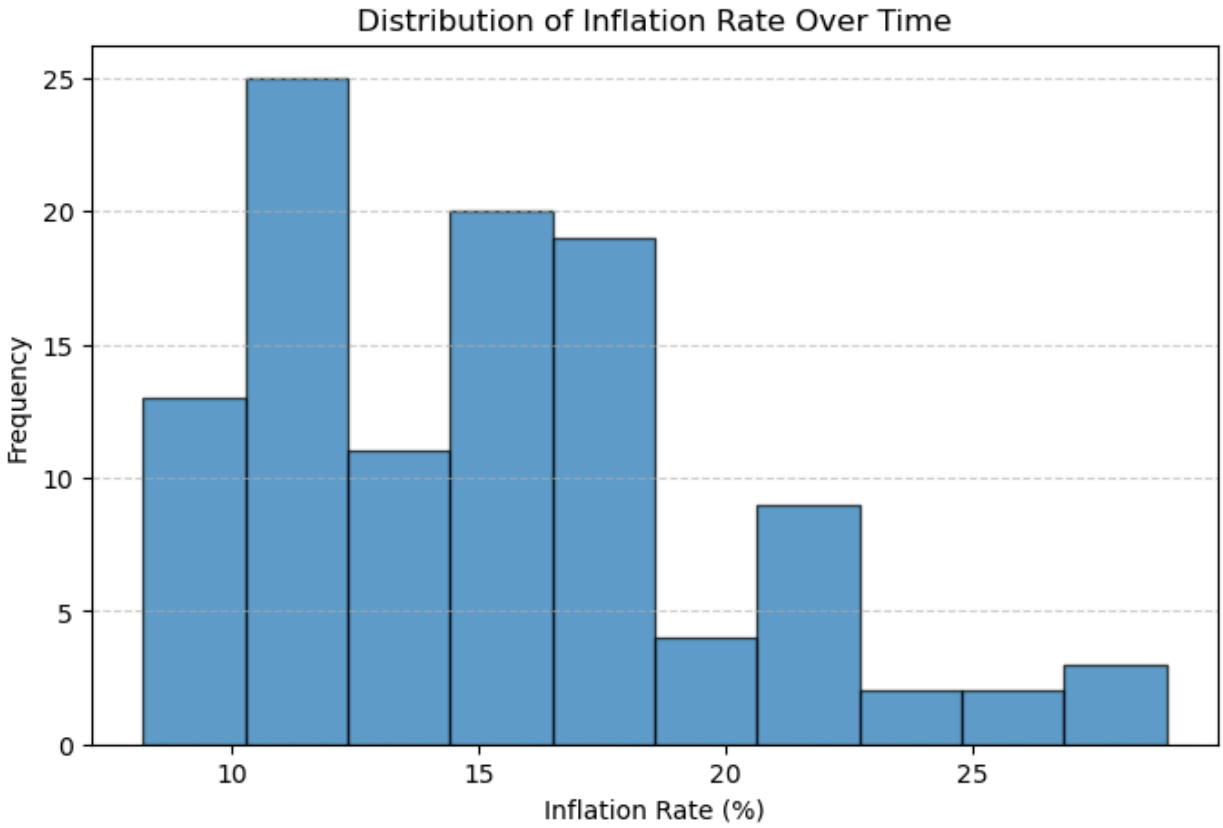
Visual 6: Correlation Between Inflation and Economic Variables



Visual 7: CPI Components Composition



Visual 8: Distribution of Inflation Rate Over Time



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1. **Nigeria Inflation Dataset.** Kaggle. Retrieved from ***https://www.kaggle.com/datasets/iamhardy/nigeria-inflation-rates***

2. **Central Bank of Nigeria (CBN).** Official Statistics Portal. Retrieved from ***https://www.cbn.gov.ng/rates/***