# Understanding Nigeria's Inflation Conundrum

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## Introduction

### Background

Inflation and interest rates have a complex relationship that determines the growth and stability of economies. Nigeria, one of Africa's largest economies serves as an interesting reference to explore this complex relationship. As the country has been in constant battle with inflation, as its challenges emanate from supply side factors rather than demand side factors.

Understanding the causes, effects and potential solutions to the inflation problem is crucial for citizens, businesses and policy makers. The article aims to provide an overview of Nigeria's inflation, shedding light on its causes and consequences, as well as providing potential solutions to address this challenge.

### Understanding Inflation and Interest Rates

As a refresher, inflation refers to the constant increase in the price levels of good and services in an economy. It tends to be referred to as either cost-push or demand-pull inflation. Cost-push inflation is as a result of rise in the cost of production, such as higher input prices and wages, resulting in businesses passing the burden to consumers. Alternatively, demand-pull inflation arises due to aggregate demand outpacing aggregate supply.

Interest rates however are determined by monetary authorities, in this case central banks. It is a major influence on investment decisions, borrowing costs and consumer spending. Commonly, central banks use interest rates to control inflation. High interest rates tend to deter spending and borrowing, resulting in reduced aggregated demand and inflation. Conversely, lower interest rates encourage spending and borrowing, stimulating the economy and promoting economic growth.

### Problem Statement

In its battle against Inflation, the Nigerian Central Bank **(CBN)** has constantly increased interest rates, with the aim of slowing inflation. However, this has proved futile with inflation rising to 22.79% as at June.

## Data

### Data Description

For this project, data on inflation, interest and foriegn exchange were gotten from the CBN's data & statistics page.

## Methodology

In this section, all packages that were installed and loaded for this project will be discussed. They are listed below:

- **Tidyverse**: This a collection of several R packages working together for data importation, manipulation, visualization and analysis. The packages that would be useful to this project include;
- **Dplyr**: This package is for data manipulation and provides functions like arrange, filter, mutate and summarize.
- **Readr**: This package is for reading flat files like CSV.
- **Stringr**: This package is for string manipulation, provides functions that allows for manipulation of text data.
- **Ggplot2**: This package allows for all visualizations.
- **Lmtest**: This package was installed to run linear regressions
- **Car**: This packages provides functions for regression analysis
- **Lubridate**: This package was installed to ease working with date and times. Allowing manipulation and formatting of date and time data.

## Data Cleaning

The Tidyverse packages were utilized during data manipulation and wrangling. This section will detail how the data sets were processed prior to analysis.

```
##Getting average data for each Year
Average_data <- Combined_data %>%
  group_by(Year) %>%
  summarize(Average_all_inflation = mean(all_inflation),
            Average_food_inflation = mean(food_inflation),
            Average_interest_rate = mean(Baseline_interest_rate),
            Average_fx_rate = mean(BDC_Dollar_Rate))

str(Average_data)
```

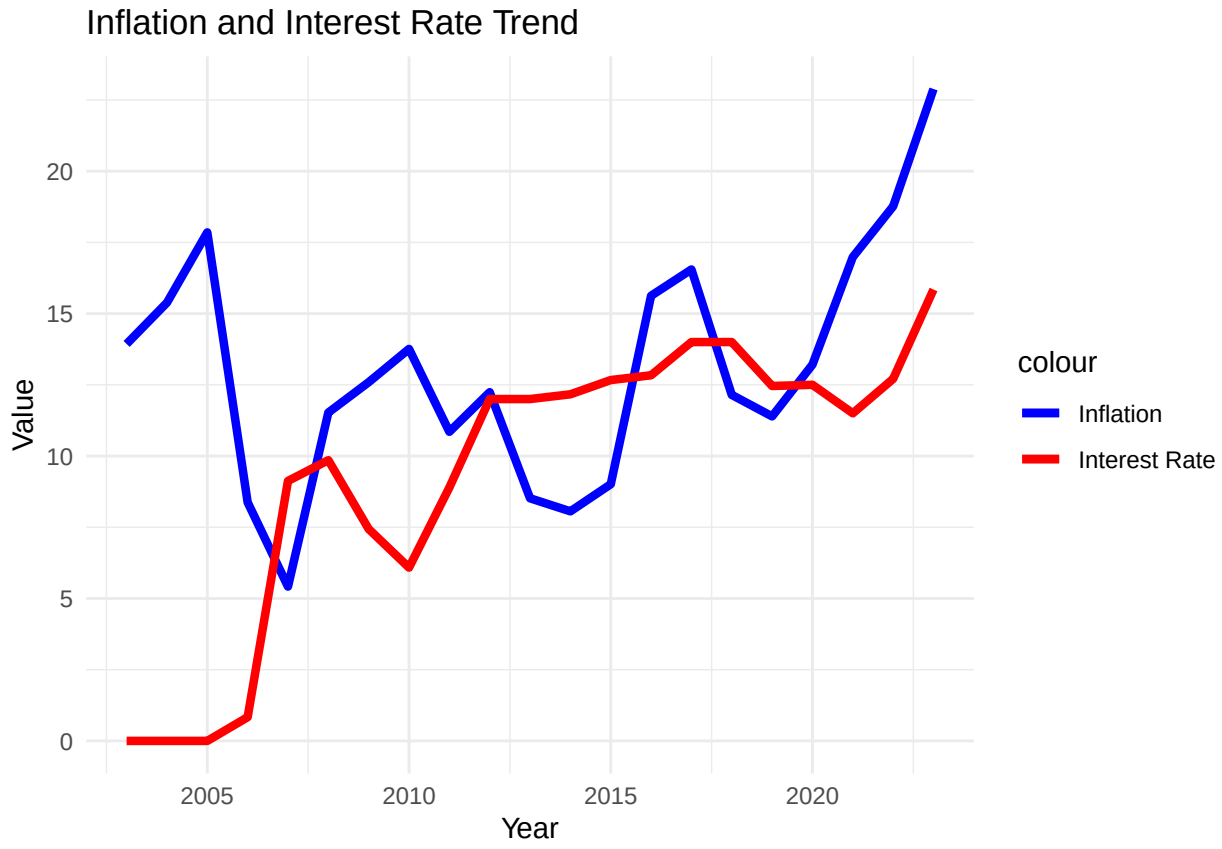
```
## tibble [21 x 5] (S3: tbl_df/tbl/data.frame)
##  $ Year                  : int [1:21] 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 ...
##  $ Average_all_inflation : num [1:21] 13.93 15.38 17.85 8.38 5.42 ...
##  $ Average_food_inflation: num [1:21] 6.01 14.56 23.02 5.93 1.92 ...
##  $ Average_interest_rate : num [1:21] 0 0 0 0.833 9.125 ...
##  $ Average_fx_rate       : num [1:21] 0 141 143 137 127 ...
```

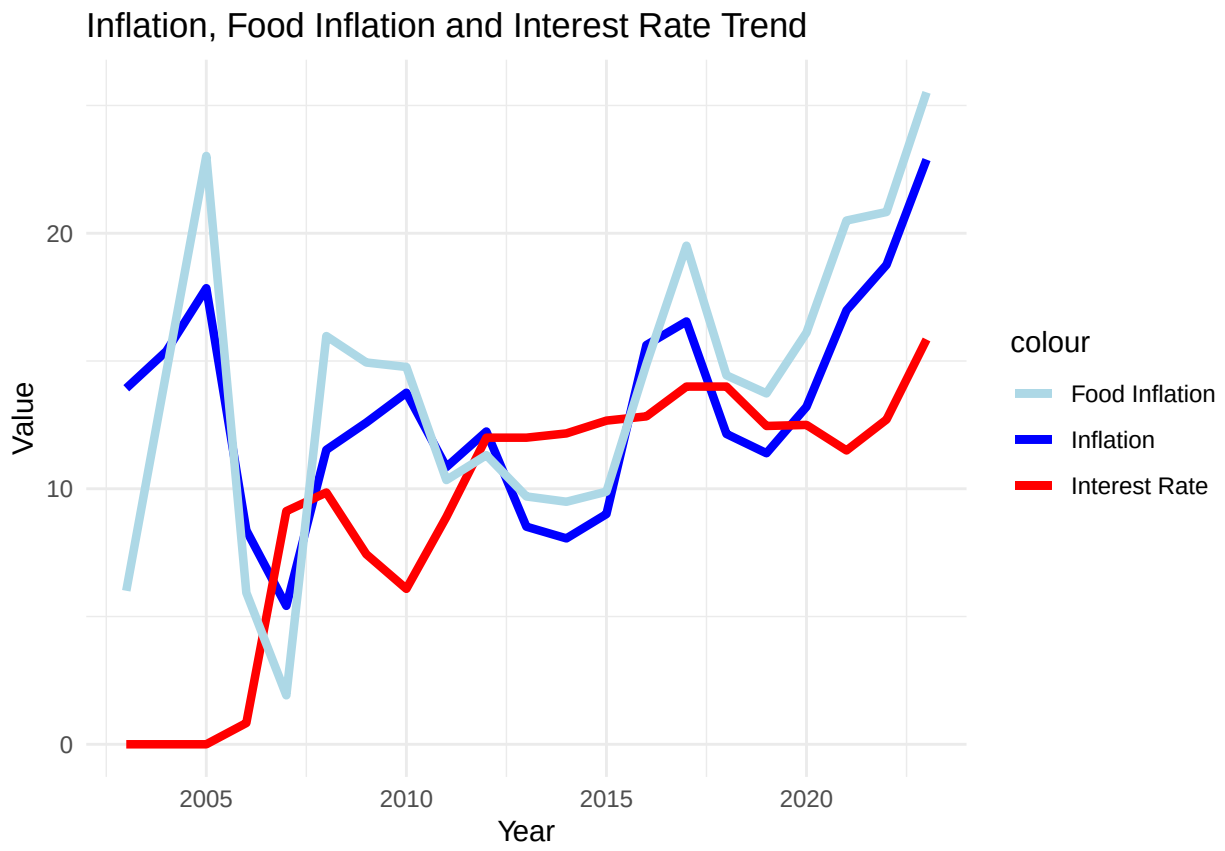
```
print(Average_data)
```

```
## # A tibble: 21 x 5
##     Year Average_all_inflation Average_food_inflation Average_interest_rate
##    <int>                 <dbl>                  <dbl>                 <dbl>
##  1  2003                  13.9                   6.01                 0
##  2  2004                  15.4                  14.6                  0
```

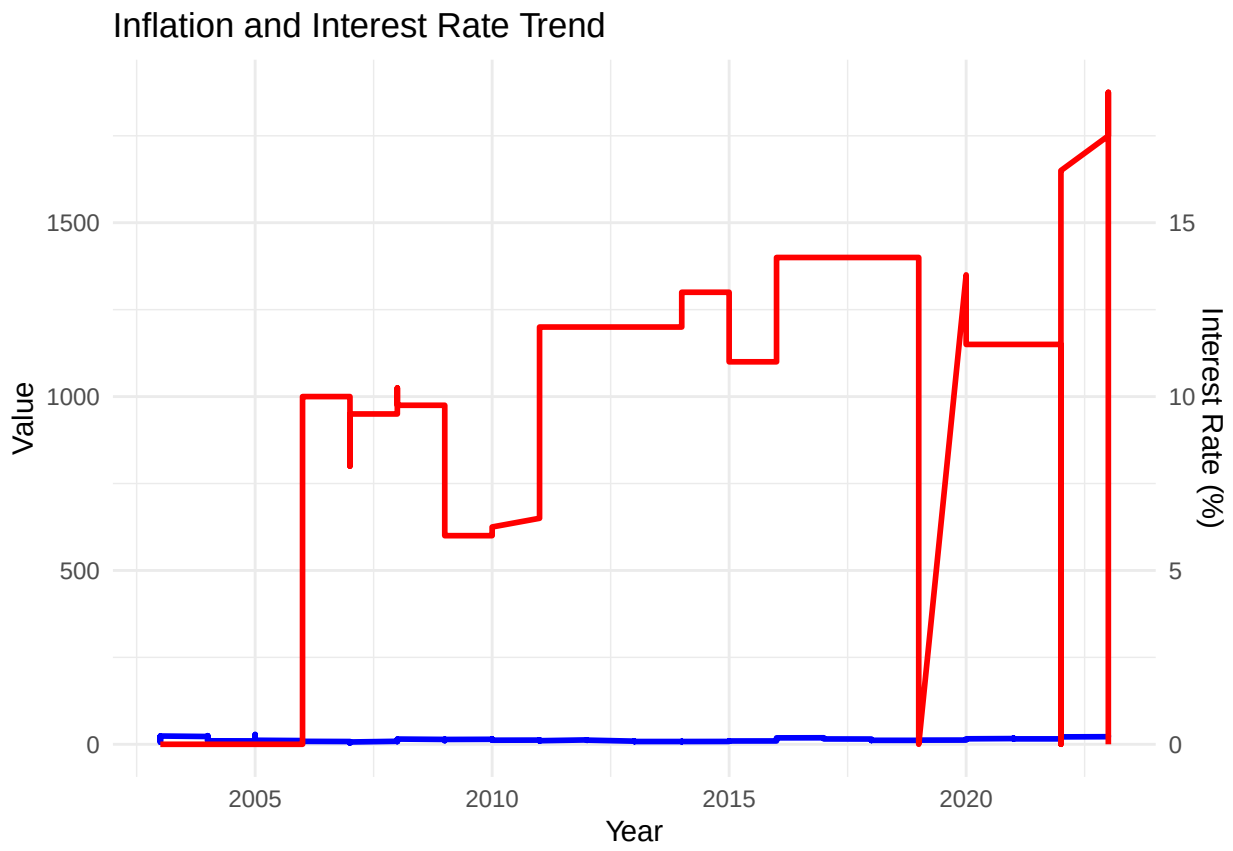
```
##  3  2005                17.8                23.0                0
##  4  2006                 8.38                5.93               0.833
##  5  2007                 5.42                1.92               9.12
##  6  2008                11.5                16.0                9.85
##  7  2009                12.6                14.9                7.44
##  8  2010                13.8                14.8                6.08
##  9  2011                10.8                10.3                8.90
## 10  2012                12.2                11.3               12
## # i 11 more rows
## # i 1 more variable: Average_fx_rate <dbl>
```

```r
ggplot(data = Average_data, aes(x = Year)) +
  geom_line(aes(y = Average_all_inflation, color = "Inflation"), size = 1.5) +
  geom_line(aes(y = Average_interest_rate, color = "Interest Rate"), size = 1.5) +
  labs(title = "Inflation and Interest Rate Trend",
       x = "Year",
       y = "Value") +
  scale_color_manual(values = c("Inflation" = "blue", "Interest Rate" = "red")) +
  theme_minimal()
```



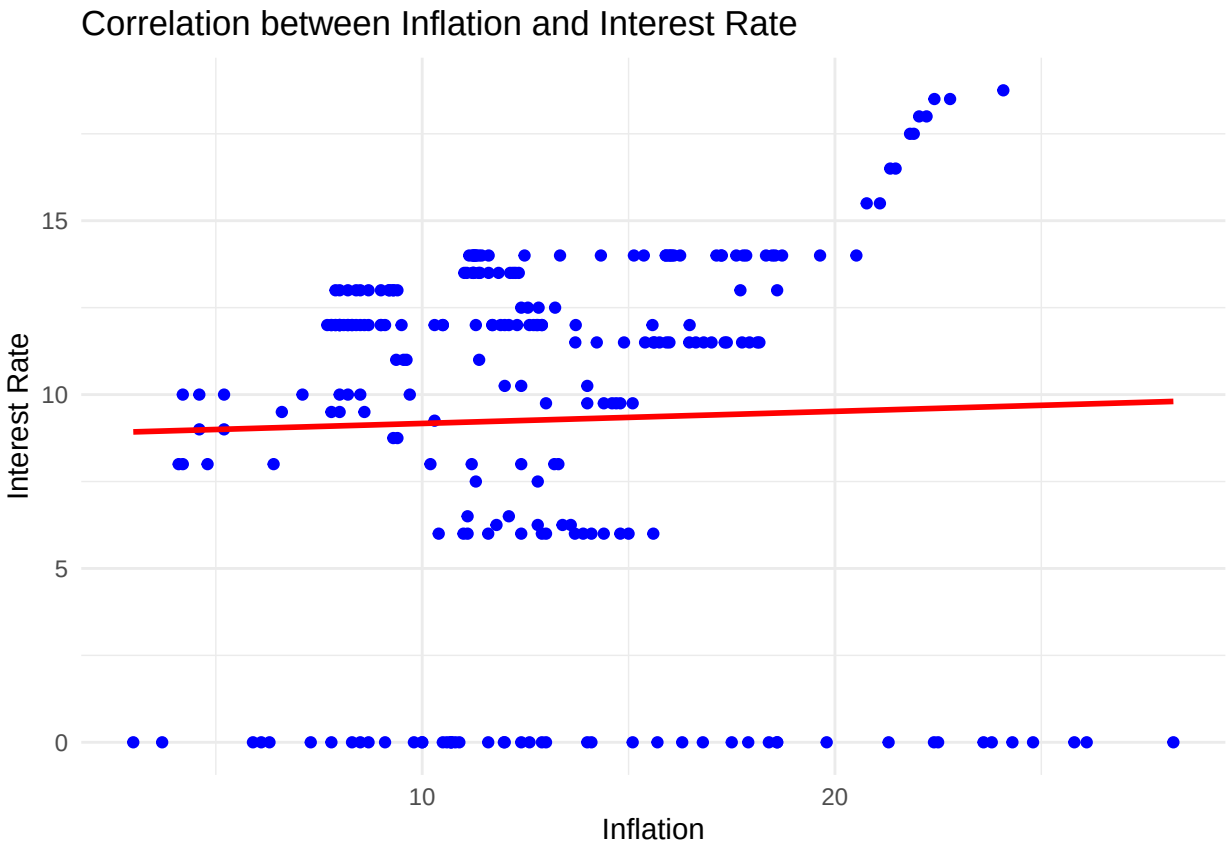



```
ggplot(data = Combined_data, aes(x = Year, y = all_inflation)) +
  geom_line(color = "blue", size = 1) +
  geom_line(aes(y = Baseline_interest_rate * 100), color = "red", size = 1) +
  labs(title = "Inflation and Interest Rate Trend",
       x = "Year",
       y = "Value") +
  scale_y_continuous(sec.axis = sec_axis(~./100, name = "Interest Rate (%)")) +
  theme_minimal()
```

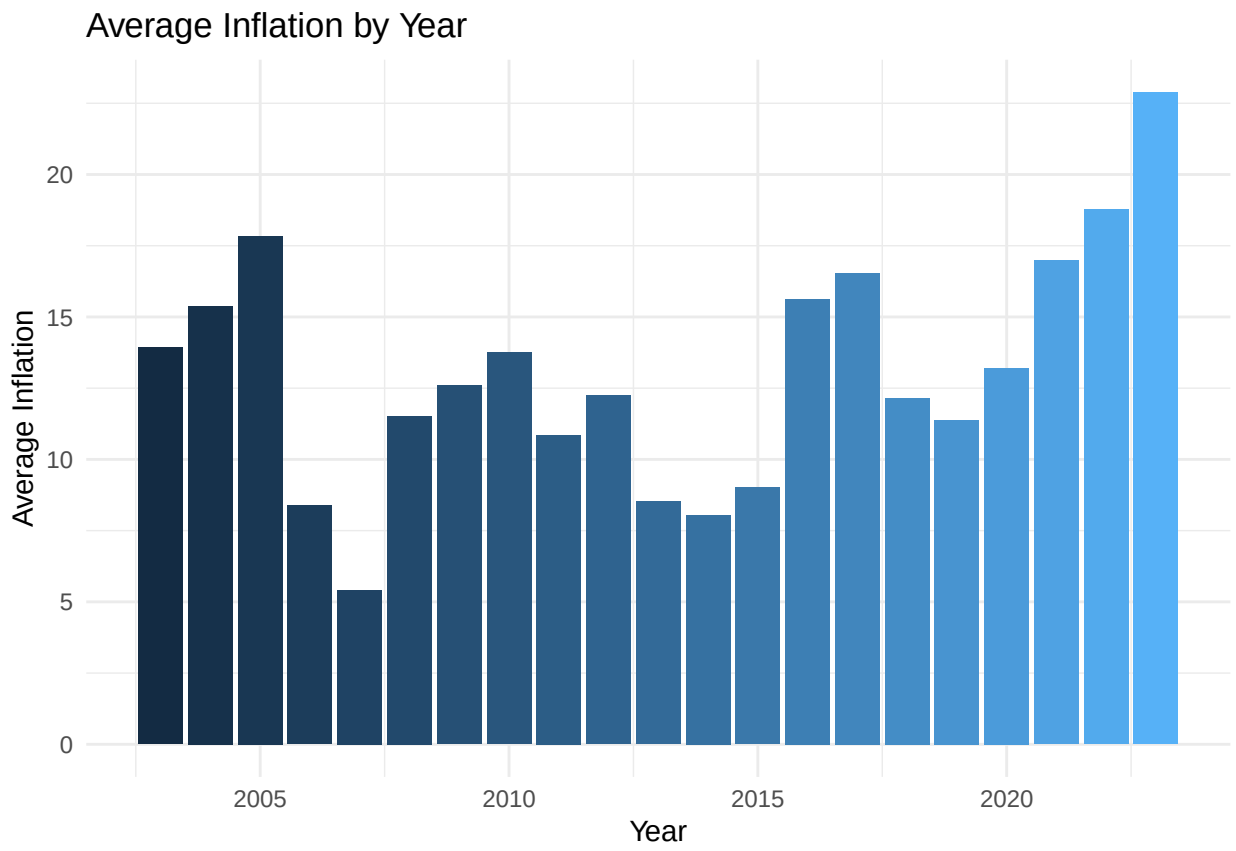



```
ggplot(data = Combined_data, aes(x = all_inflation, y = Baseline_interest_rate)) +
  geom_point(color = "blue") +
  geom_smooth(method = "lm", se = FALSE, color = "red") +
  labs(title = "Correlation between Inflation and Interest Rate",
       x = "Inflation",
       y = "Interest Rate") +
  theme_minimal()
```

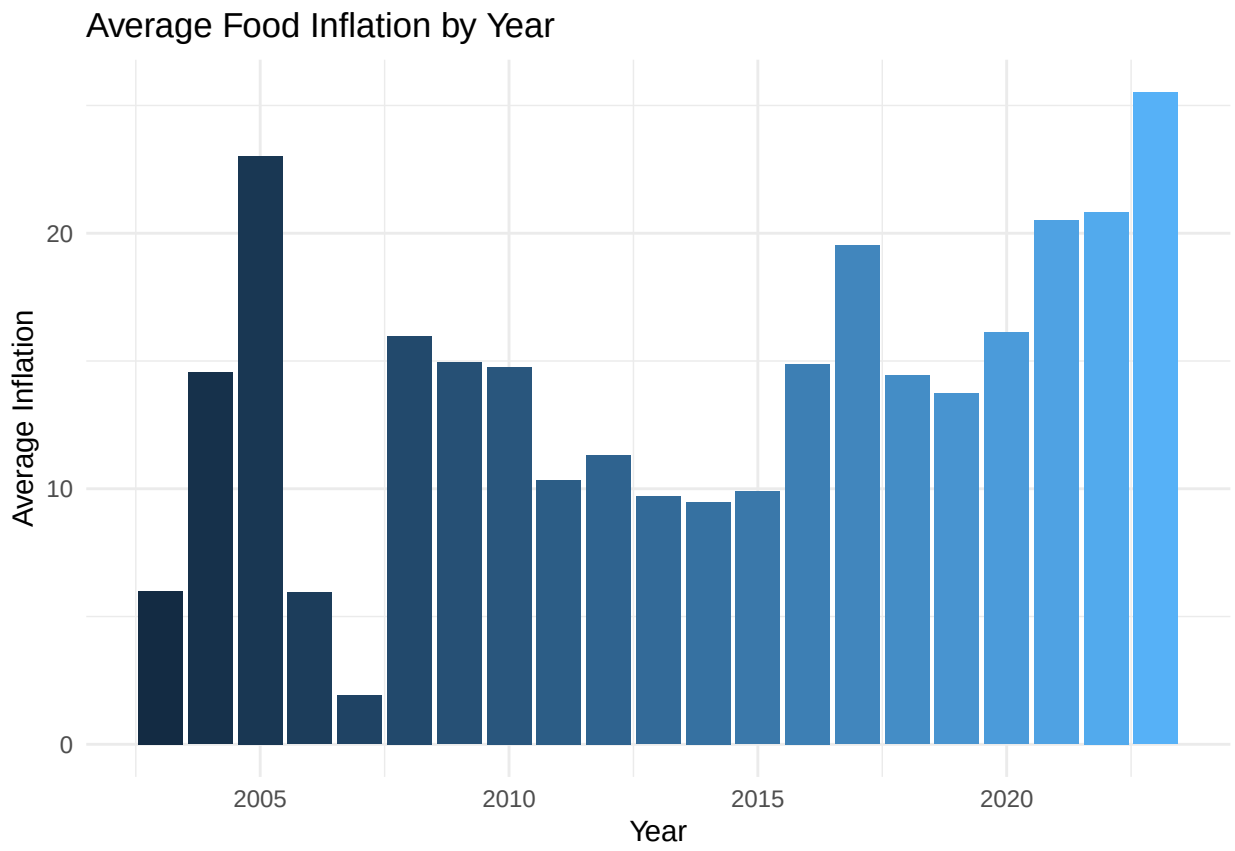
```
## `geom_smooth()` using formula = 'y ~ x'
```



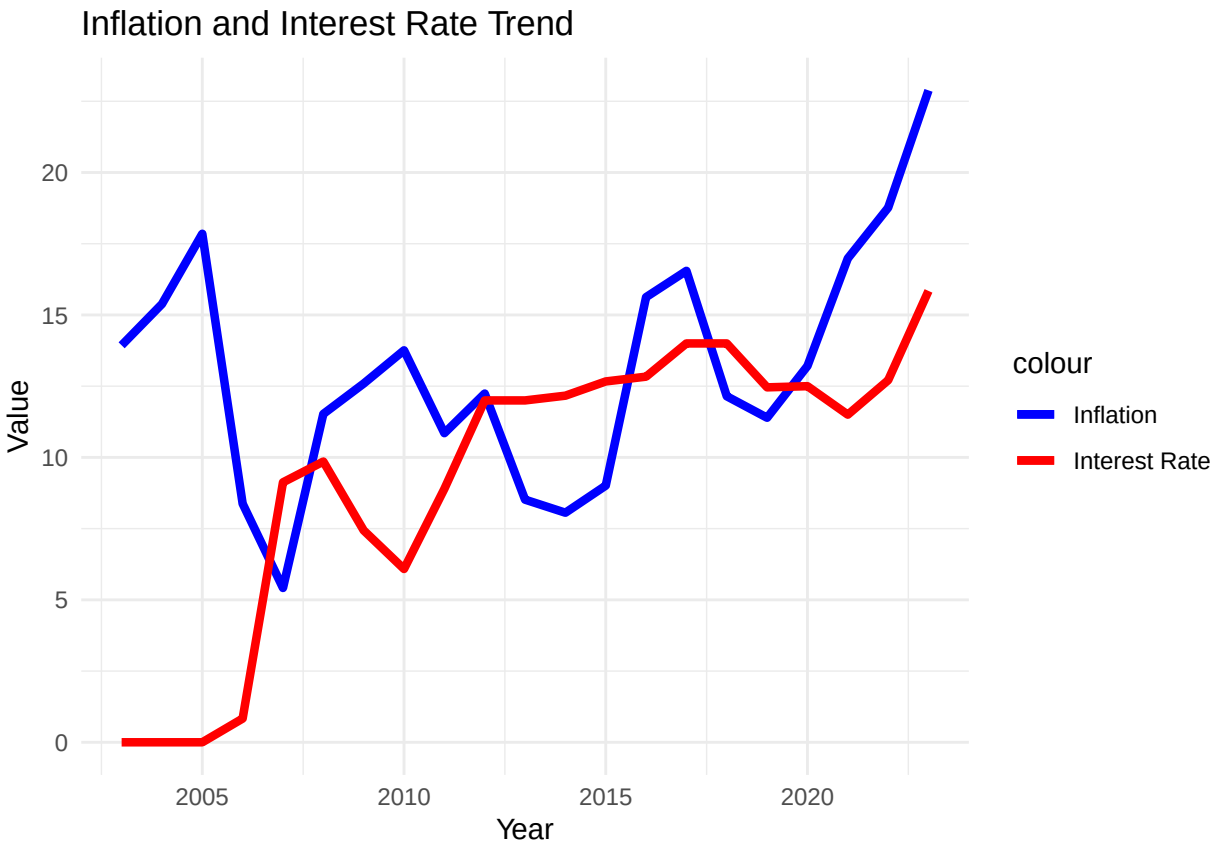

```
ggplot(data = Average_data, aes(x = Year, y = Average_all_inflation, fill = Year)) +
  geom_bar(stat = "identity", position = "dodge") +
  labs(title = "Average Inflation by Year",
       x = "Year",
       y = "Average Inflation") +
  theme_minimal() +
  theme(legend.position = "none")
```




```
ggplot(data = Average_data, aes(x = Year, y = Average_food_inflation, fill = Year)) +
  geom_bar(stat = "identity", position = "dodge") +
  labs(title = "Average Food Inflation by Year",
       x = "Year",
       y = "Average Inflation") +
  theme_minimal() +
  theme(legend.position = "none")
```




```
ggplot(data = Average_data, aes(x = Year)) +
  geom_line(aes(y = Average_all_inflation, color = "Inflation"), size = 1.5) +
  geom_line(aes(y = Average_interest_rate, color = "Interest Rate"), size = 1.5) +
  labs(title = "Inflation and Interest Rate Trend",
       x = "Year",
       y = "Value") +
  scale_color_manual(values = c("Inflation" = "blue", "Interest Rate" = "red")) +
  theme_minimal()
```


Inflation and Interest Rate Trend
Value
20
15
10
5
0
2005
2010
2015
2020
Year
colour
Inflation
Interest Rate