

Analyzing Inflation Trends Using FRED Data



Project 1
UofM Data Analytics
Bootcamp



Agenda

The aim of our project is to search for patterns in the CPI for three food categories: Dairy, Meat, and Fruits and Vegetables.

We want to get a general understanding of the data over the last five years and see if any patterns emerge

Questions to explore:

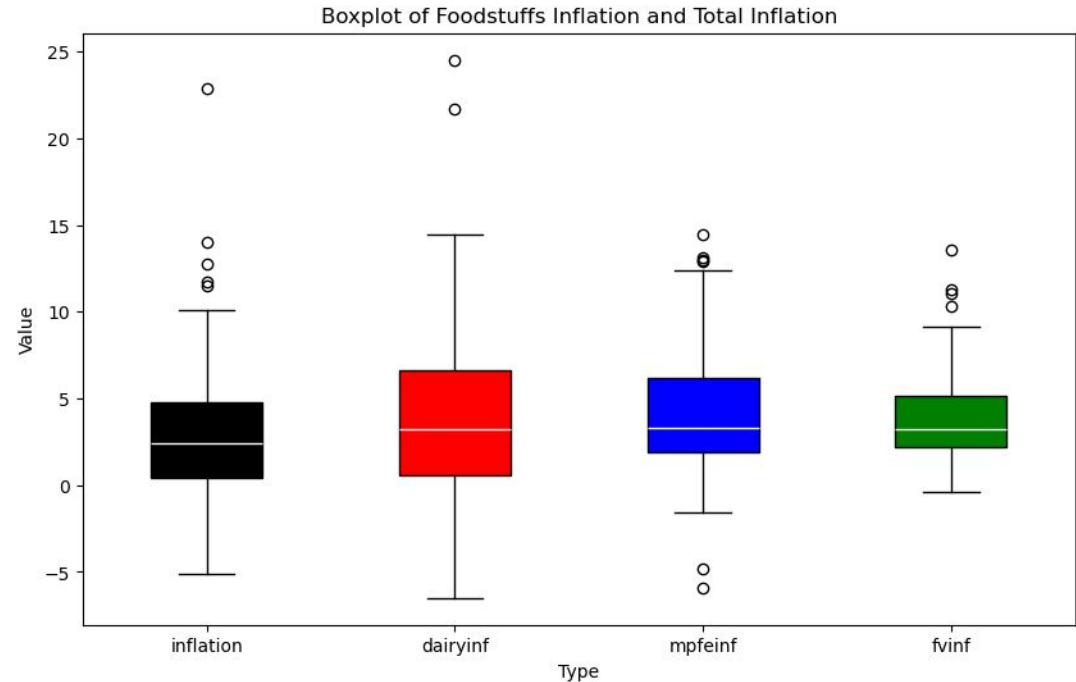
1. Which (if any) of these groups have been subject to higher inflation and which groups may be avoiding it?
2. Compare the inflation trends over the past 5 years to other time periods and explore for differences
3. What patterns are prevalent among each food category?
4. What are the factors that possibly influenced trends in the data during the five year timeframe?

General Understanding of Data

Anova Test

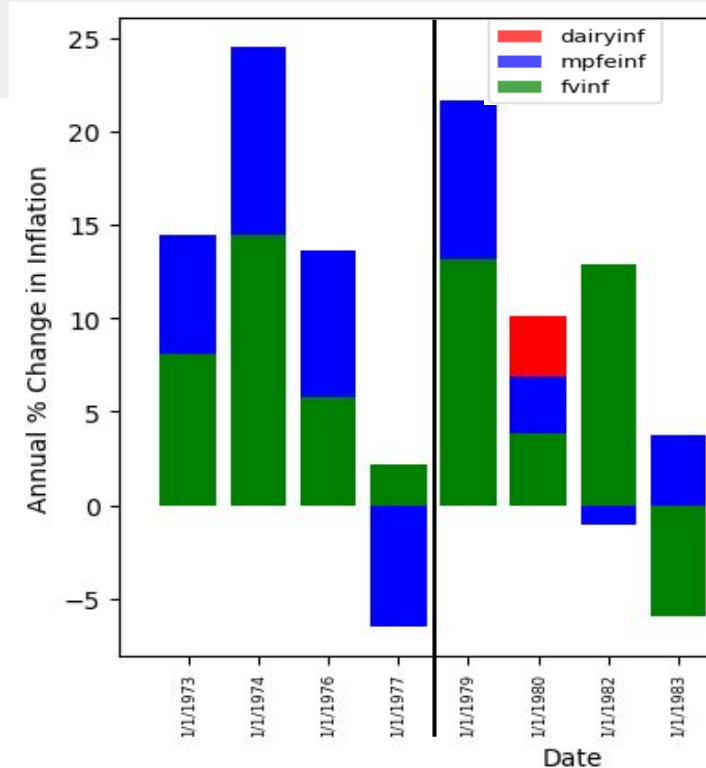
F Statistic: 0.2323683837802475
P Statistic: 0.8737706100451332
No Significant Differences in Data

- CPI -> Annual % Change CPI
 - Inflation*
- Any Market will work!
- Total (All Categories)
- Sub Categories:
 - Dairy
 - Meat
 - Fruits/Vegetables



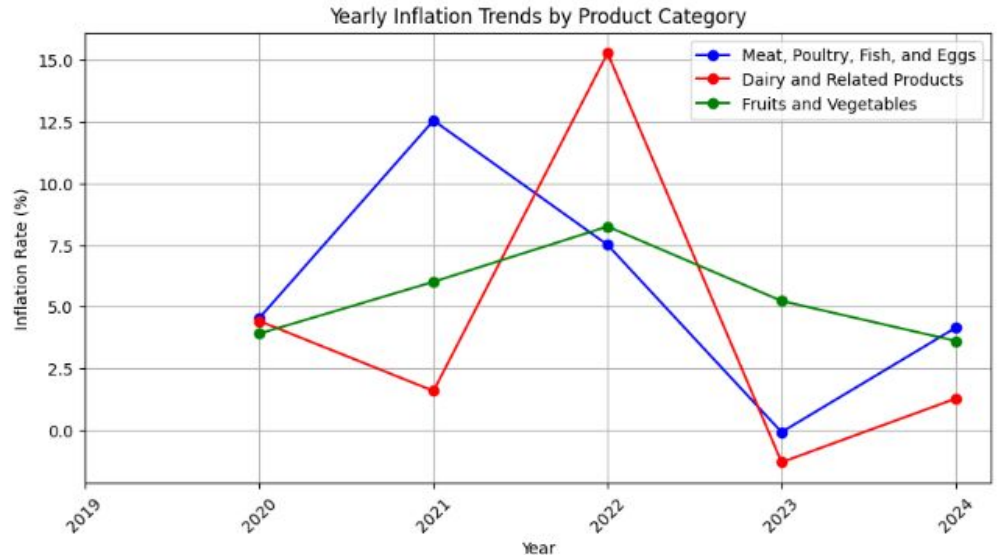
Market Failures

- Outliers important
 - Indicators of market failure
- Inflation: Very important indicator
- Detects crisis and return to stability
- Large swings at the end of recessions
 - Economic policy in response to recession



Inflation Trends

- Meat, Poultry, Fish, and Eggs Show High Volatility
- Dairy and Related Products Peak in 2022
- Fruits and Vegetables Maintain Steady Inflation



Inflation Trends

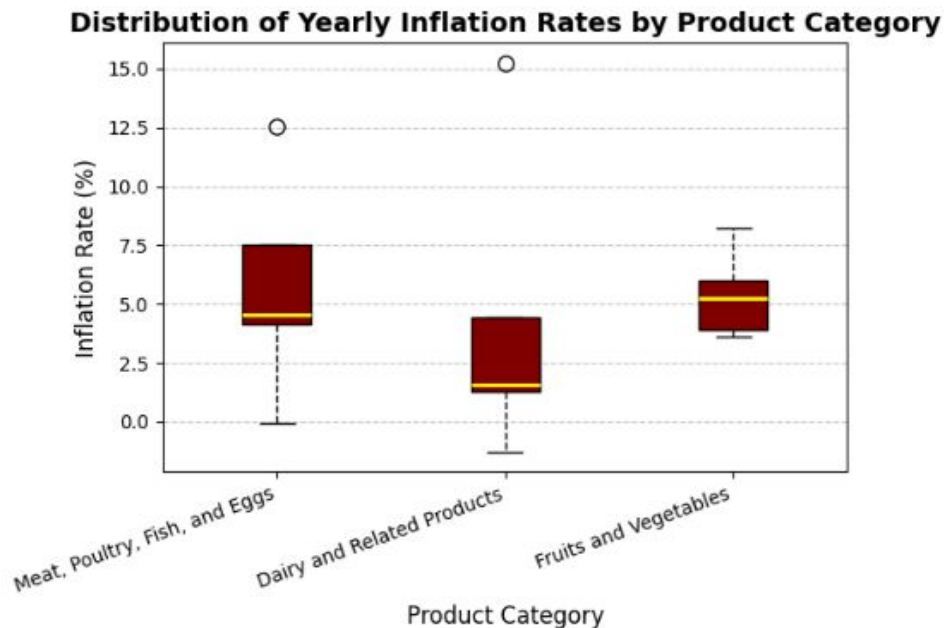
- Meat, Poultry, Fish, and Eggs Have the Widest Inflation Spread
- Dairy Shows Extreme Outlier in 2022
- Fruits and Vegetables Display Stable Inflation Rates

Standard Deviation of Yearly Inflation Rates:

Meat, Poultry, Fish, and Eggs 4.662514

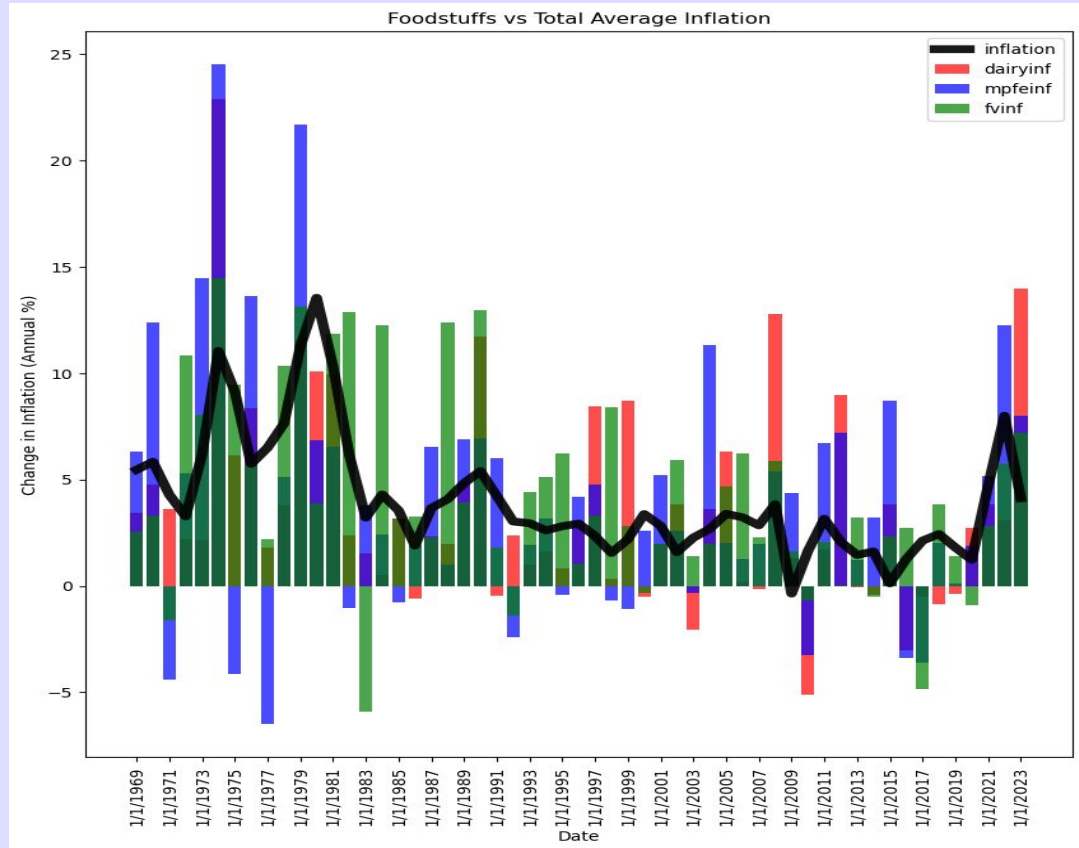
Dairy and Related Products 6.475055

Fruits and Vegetables 1.864129



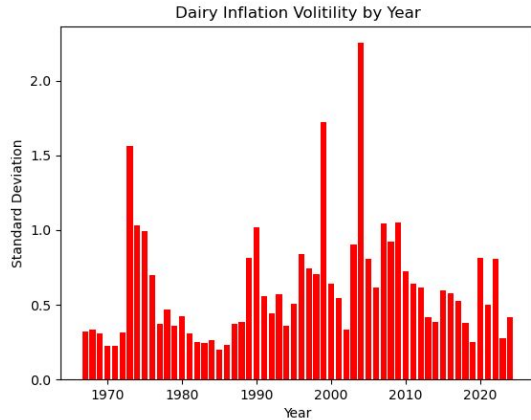
Comparison to Historical Trends

- Recent inflation was less severe than inflation crisis of the 1970's
- Food inflation remained high despite overall inflation reducing in 2022

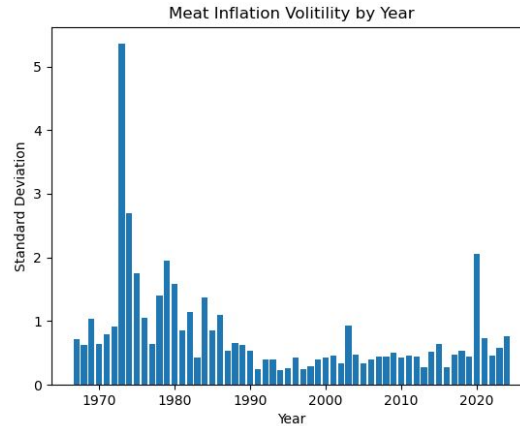


Comparison to Historical Trends

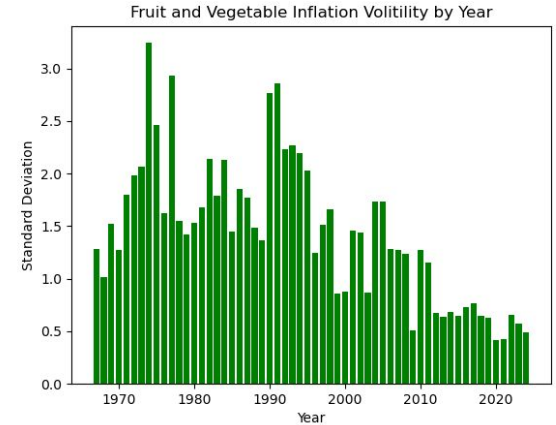
- Overall, recent inflation volatility followed historic patterns



Consistent with historical trends

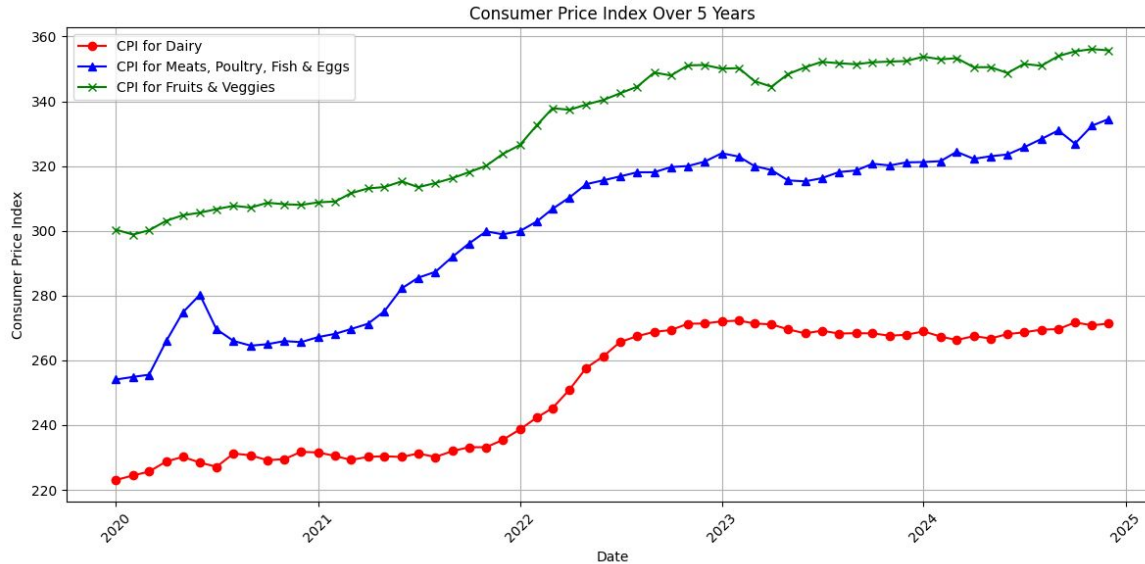


2020 outlier, otherwise consistent



Reduced volatility compared to prior years

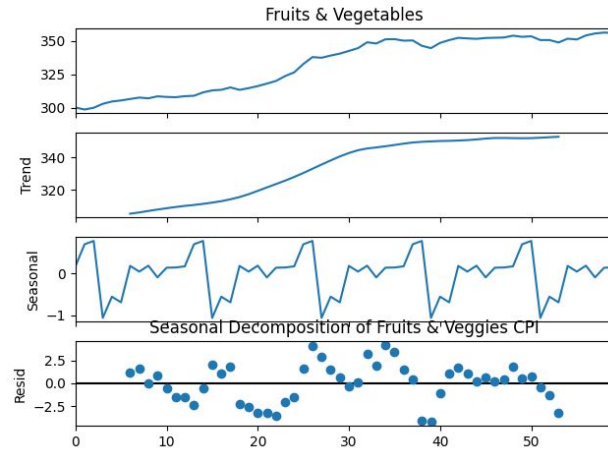
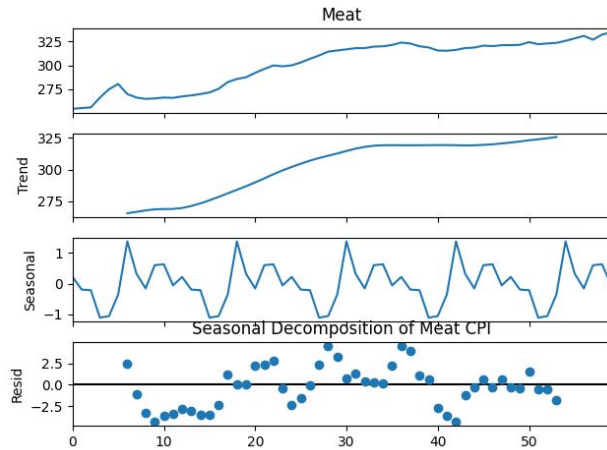
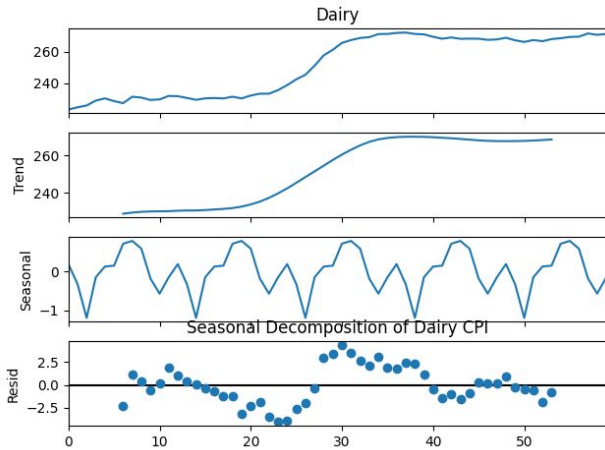
Patterns Among Food Categories



- Increase of CPI over time
- Pearson correlation coefficient (r-values) show a positive linear relationship between all three food categories

	Dairy	Meat	Fruits & Vegetables
Dairy	1.000000	0.940457	0.977279
Meat	0.940457	1.000000	0.973690
Fruits & Vegetables	0.977279	0.973690	1.000000

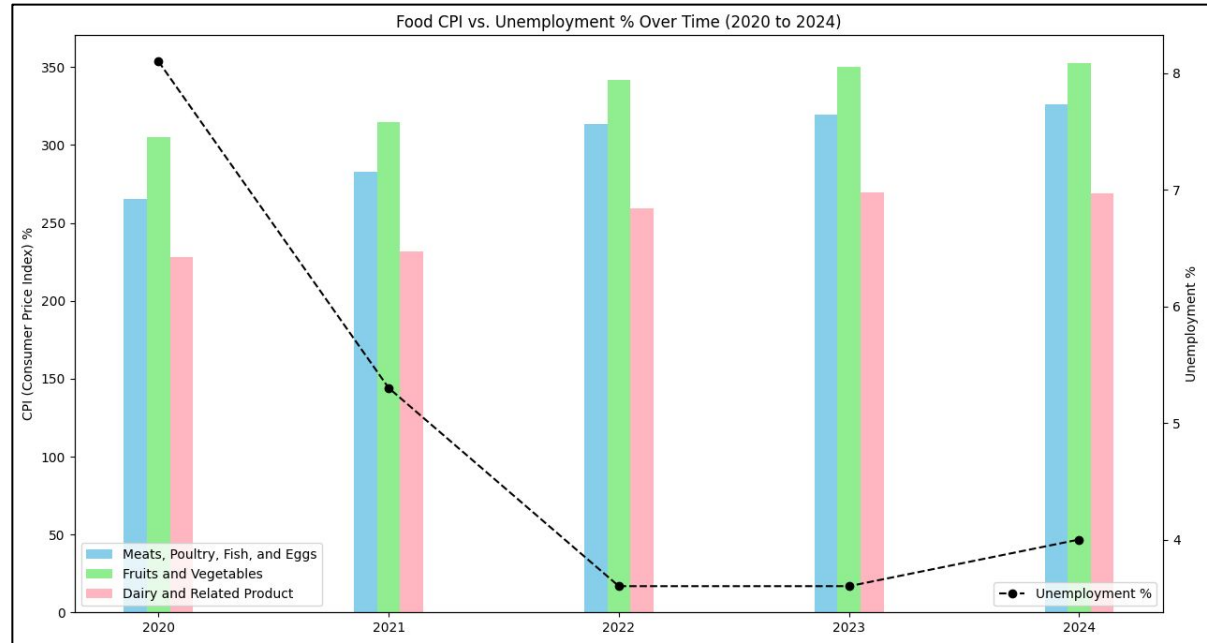
Patterns Among Food Categories



Factors That Possibly Influenced Trends

Unemployment Rates

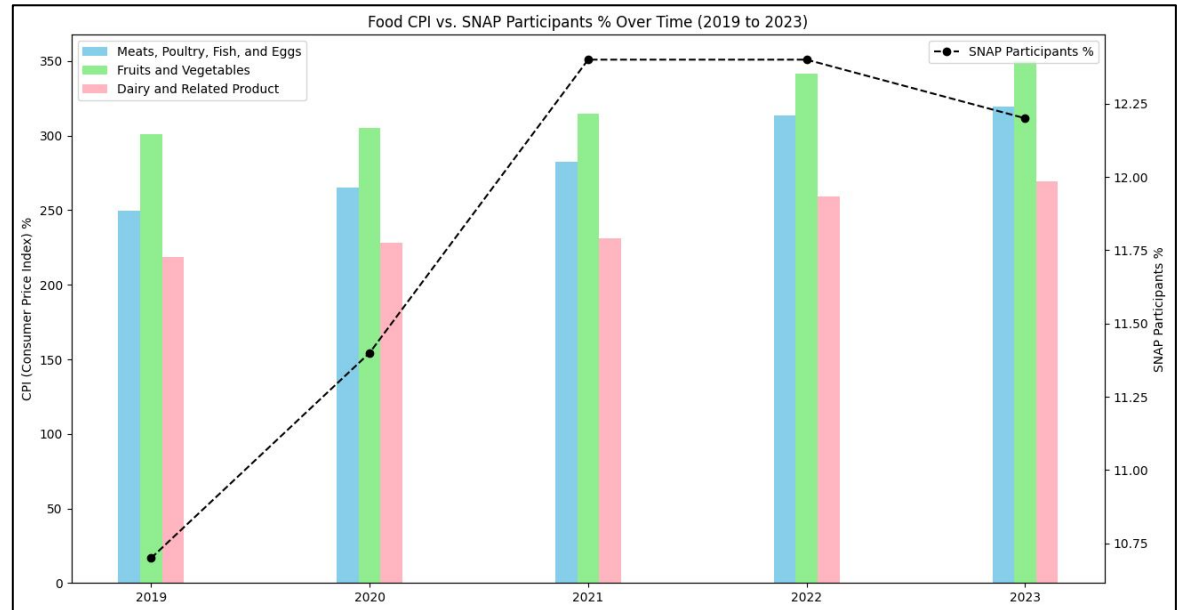
- 2020 was a major year that caused economic fluctuations that we are still recovering from.
- It left an impact on unemployment rates, which spiked that same year and have slowly decreased over the years.
- **As unemployment rates decrease, food CPI rises.**



Factors That Possibly Influenced Trends

SNAP (Supplemental Nutrition Assistance Program) Participation

- Participation in governmental assistance benefits such as the SNAP Program began to increase in 2020.
- Throughout the last 5-6 years, SNAP participation has continued to increase.
- **As the percentage of SNAP participants increases, CPI increases as well.**



Key Findings

Learnings from our data analysis

- **#1:** Points of abnormally high inflation are good indicators of market failure, and points of abnormally low inflation are good indicators of a recovery from a market failure.
- **#2:** We saw a spike in food inflation over the last five years which was higher than the prior 40, however, this was less severe than periods in the 70s and 80s.

Key Findings

Learnings from our data analysis

- **#3:** CPI for all three food categories have increased over the last five years. The seasonal trends show that the prices of food categories have not changed throughout a year, so inflation could be a factor in the rise of food CPI.
- **#4:** During the last 5 years, fluctuations in unemployment rates and participation in SNAP Programs have been major factors influencing the rise of food CPI.

**Thank
You**