Long-Term Trends in U.S. Grocery Prices (COMP3125 Individual Project)

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***Abstract*— This project looks at how grocery prices in the United States have changed over the past 10–20 years. Using data from the USDA and the BLS, it examines price trends for common foods and compares them to overall food inflation. Basic statistics and linear regression are used to measure how fast prices have risen and which items increased the most. The goal is to give a clear picture of how everyday food costs have shifted and what that means for consumers.**

Keywords— grocery prices, inflation, USDA data, price trends, regression analysis

I. Introduction

Grocery prices have become a major economic concern in recent years, affecting household budgets, food security, and national inflation trends. Rising food costs place pressure on consumers, especially families and students, making it increasingly important to understand how individual grocery items have changed in price over time. While overall inflation data provides a broad picture of economic change, specific food items often increase at different rates due to unique supply-chain pressures, seasonal variability, labor shortages, and global events.

This project examines how the prices of common grocery items have evolved over the past decade, identifying which foods experienced the greatest increases and which remained relatively stable. By analyzing long-term government datasets and applying statistical methods, this study aims to quantify real price movement and highlight underlying patterns. Understanding these trends is valuable for both consumers and policymakers, offering insight into how inflation affects essential goods and how the cost of living has changed.

II. Datasets

A. Source of dataset (Heading 2)

The primary dataset used in this project is the U.S. Bureau of Labor Statistics Average price data database, which provides monthly average prices for commonly purchased grocery items across the United States. This data set is publicly available and a credible source. The dataset includes yearly price values for items such as milk, eggs, bread, beef, chicken, tomatoes, and oranges.

A supplemental dataset from The Economics Daily Consumer Price Index All Urban Consumers – Food Category, published by the U.S Bureau of Labor Statistics, is used to provide inflation context. This dataset contains yearly CPI values for overall food inflation and serves as a reference point for adjusting prices and comparing item-level changes to national inflation trends.

Both datasets span more than 10 years, allowing for a meaningful long-term analysis of food price changes. This time window is sufficient to observe trends before, during, and after periods of unusual economic activity, such as the COVID-19 pandemic, supply-chain disruptions, and labor market shifts.

B. Character of the datasets

Column Name	Description	Units
Year	Calendar year of price measurement	YYYY
Item	Grocery item name	
Price	Average annual retail price	USD per item
Unit	Measurement used (per gallon, per dozen, etc.)	

III. Methodology

This project uses two primary analytical methods: descriptive statistical analysis and linear regression modeling.

A. Descriptive Statistics

Descriptive statistics are used to summarize and compare grocery prices across years. This includes:

- computing year-to-year percentage changes,
- calculating total percent increase from the first year to the last year,
- identifying the highest- and lowest-increasing items.

Advantages**:**

- Simple to implement and interpret
- Clearly shows real price movement

Limitations**:**

- Does not model long-term trends
- Sensitive to outlier years (e.g., pandemic spikes)

B. Linear Regression

A simple linear regression model is used to estimate how each item's price changes over time. For each item, the model takes the form:

$$\text{Price} = a * \text{year} + b \quad (1)$$

Where:

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- *a* represents the rate of yearly price increase (slope), and
- *b* is the intercept.

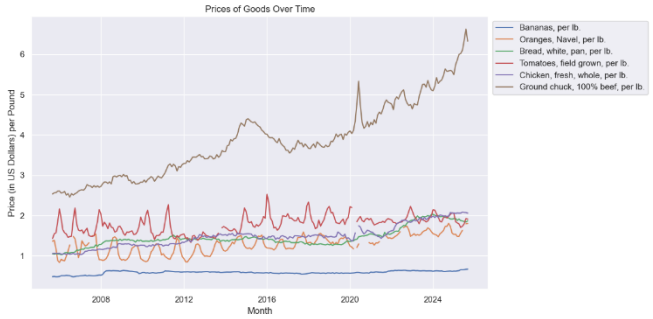
C. Inflation Adjustment

To compare real versus nominal price changes, CPI data is used to adjust all prices to constant-dollar terms. This reveals whether grocery items are rising faster than overall food inflation.

IV. Results

A. What are the most expensive grocery items?

To answer this question, the Average Price Data [1] was interpreted. By filtering the data to only include units that were per pound the data could be prepared directly on price.



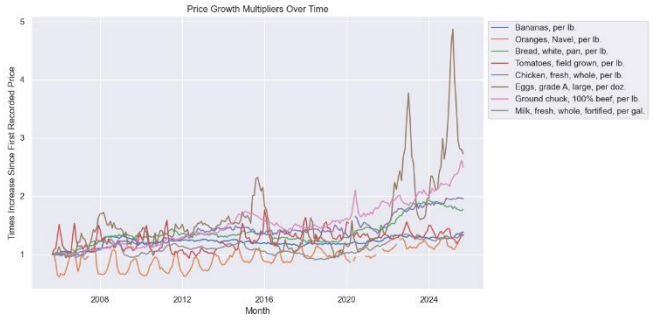
1) Interperitation: The graph shows the Price per Pound in U.S. dollars of several food items: bananas, oranges, bread, tomatoes, chicken, and beef, over the time period 2005 to 2025.

2) Results: Beef remains the highest over the entire time period. While other price increases aren't as noticable, the other food items also gradiaully increase over the period.

a) Interestingly, the price of chicken does not increase nearly as dramatically as the price beef.

B. What grocery items prices have had the most inflation?

To answer this question, the Average Price Data [1] was interpreted further. This time, eggs and milk could be used because the grocery items units of per dozen and per gallon could be used in addition to per pound.



1) Interperitation: The graph shows the times increase in U.S. dollars of several food items: bananas, oranges, bread, tomatoes, chicken, and beef, eggs, and milk over the time period 2005 to 2025.

2) Results: While the price of beef remained higher than most of the other grocery items, the price of eggs is unstable and spikes much higher multiple times: in 2008, 2016, and twice between 2022 and 2025.

a) Comparing chicken and beef in this graph shows chicken as the third highest to eggs and beef, trending similarly to the price increase of beef.

C. Is it more affordable to cook at home or eat out?

To answer this question, the Consumer Price Index [2] was interpreted. This dataset included many non-food related categories, so only the *Food at home* and *Food away from home* categories were used.

1) Interperitation: This graph shows the percentage increase of all home food items and all away from home food items compared to the average of the past 12 months, the price is plotted by year between 2015 and 2025.

2) Results: The price of food at home remains lower than the food away from home price between 2015 and 2020, but the price of food at home spikes two times becomes greater. The price of food away from home seems to reflect the prices of groceries due to the similar nature of the plots.

a) It appears to be more affordable to eat food at home because the CPI (Consumer Price Index) of food at home is generally lower than the CPI of food away from home.

V. Discussion

This project could be furthered by examining more grocery items along with a larger period. This project only focuses on the time of 2005 to present but does not consider older data. Additional improvements could be made to the project by examining trends alongside politics and U.S. economic statistics to discover the meaning of specific spikes and trends in the data.

VI. Conclusion

This project examines the price trends of grocery items in the United States. Specific grocery items: beef, chicken, and eggs, increased more drastically than the other items bread, fruits, e.g. Additionally, cooking meals at home with grocery items has remained generally more affordable than eating away from home, but certain spikes in the economy from inflation can decrease its affordability drastically. The information from this project can be used to inform which grocery items are more affordable in the real world.

Identify applicable funding agency here. If none, delete this text box.

References

[1] "Consumer prices up 3.0 percent from September 2024 to September 2025," *Bureau of Labor Statistics*, Nov. 19, 2025. https://www.bls.gov/opub/ted/2025/consumer-prices-up-3-0-percent-from-september-2024-to-september-2025.htm

[2] U.S. Bureau of Labor Statistics, "Average price data (in U.S. dollars), selected items," *www.bls.gov*, 2025.

https://www.bls.gov/charts/consumer-price-index/consumer-price-index-average-price-data.htm