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

Max Aiello
Wentworth Institute of Technology

***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 USDA Retail Food Prices database, which provides annual average prices for commonly purchased grocery items across the United States. The dataset is publicly available through the U.S. Department of Agriculture's Economic Research Service (ERS), a credible and widely used source of national food market statistics. The dataset includes yearly price values for items such as milk, eggs, bread, beef, chicken, fruits, and vegetables.

A supplemental dataset from the U.S. Bureau of Labor Statistics (BLS) Consumer Price Index – Food Category 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:

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

979-8-3315-0993-4/25/$31.00 ©2025 IEEE

Where:

- *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

In this section, present your findings using an appropriate method, such as equations, numerical summaries, or visualizations like charts and graphs. Clearly explain all results and provide guidance on how to interpret them. If any unexpected results arise, discuss possible reasons or contributing factors. To improve clarity and organization, consider using subsections (e.g., A, B) to separate different aspects of your results.

Example: After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper; use the scroll down window on the left of the MS Word Formatting toolbar.

A. Result A

Example: XXX

1) For papers with more than six authors: Add author names horizontally, moving to a third row if needed for more than 8 authors.

2) For papers with less than six authors: To change the default, adjust the template as follows.

a) Selection: Highlight all author and affiliation lines.

b) Change number of columns: Select the Columns icon from the MS Word Standard toolbar and then select the correct number of columns from the selection palette.

c) Deletion: Delete the author and affiliation lines for the extra authors.

B. Results B

Example: Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

C. Results C

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 1", even at the beginning of a sentence.

TABLE I. TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	***Subhead***	***Subhead***
copy	More table copy[a]		

[a] Sample of a Table footnote. (*Table footnote*)

Fig. 1. Example of a figure caption. (*figure caption*)

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

V. Discussion

Every method/project has its shortage or weakness. Please discuss the unsatisfied results in your project. And discuss the feasible suggestions of future work to revise/improve your result.

Example: xxx

VI. Conclusion

In this part, you should summarize your project. What important results did you find for your topic and what's the effect of this result on the real-world?

Example: xxx

Acknowledgment *(Heading 5)*

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

References

Use the IEEE format for the citation. The template will number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first ..." Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [4]. Papers that have been accepted for publication should be cited as "in press" [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

[1] G. Eason, B. Noble, and I. N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. *(references)*

[2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[3] I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[4] K. Elissa, "Title of paper if known," unpublished.

[5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

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

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, “Electron spectroscopy studies on magneto-optical media and plastic substrate interface,” IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[7] M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.

We suggest that you use a text box to insert a graphic (which is ideally a 300 dpi TIFF or EPS file, with all fonts embedded) because, in an MSW document, this method is somewhat more stable than directly inserting a picture.

To have non-visible rules on your frame, use the MSWord “Format” pull-down menu, select Text Box > Colors and Lines to choose No Fill and No Line.

IEEE conference templates contain guidance text for composing and formatting conference papers. Please ensure that all template text is removed from your conference paper prior to submission to the conference. Failure to remove template text from your paper may result in your paper not being published.