INFO 5311

Final Deliverable

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Link to Website: https://the-interplay-between-inflation-and.onrender.com/

Project Goals and Motivation

My primary goal is to visualize and analyze the interplay between CPI (inflation) and unemployment. The motivation behind this project is to provide an accessible and interactive way for users to understand how these two critical economic indicators are related, often illustrated by the Phillips Curve, which suggests an inverse relationship between inflation and unemployment. By leveraging my data visualization, I aim to make a complex economic concept like the Phillips Curve easier to grasp. I also aim to make the factors that influence our economy and macroeconomic policy (such as inflation) more accessible and visible to readers without deep macroeconomic knowledge.

Intended Audience and Use Cases

My intended audience includes people with a grasp of economics, such as students, educators, policymakers. Yet, it has also been designed in a simple fashion to also include anyone interested in the economy, even if they do not have an economics background. Use cases for my project include educational purposes, economic analysis, and policy-making insights. Educators can use my visualizations to demonstrate the relationship between CPI and unemployment, while economists and policymakers can explore historical trends and correlations.

Related Materials and Inspiration

This project is inspired by the need for clear and interactive visualizations in economics. By visualizing the relationship between the inflation and unemployment rates, I aim to make complex economic concepts and policy engaging and easy to understand. Also motivated by explaining historical events like the 1970s stagflation or 2008 crisis, my goal is to provide an intuitive tool for students, educators, and policymakers. With dynamic and interactive visuals, this project brings economic data to life, making learning fun and insightful!

Data Source and Process

I sourced my data from the U.S. Bureau of Labor Statistics (BLS), specifically the CPI and unemployment rate datasets. The data was accessed through the Azure Machine Learning website. Can be found here: https://learn.microsoft.com/en-us/azure/open-datasets/dataset-catalog

Data Cleaning and Manipulation:

1. **Import**: used this statement to import

```
from azureml.opendatasets import UsLaborLAUS
```

2. **Cleaning**: Used PANDAS, I cleaned the data by removing missing values, grouping them by state by year, and ensuring all data points were correctly formatted.
3. **Manipulation**: I calculated additional metrics, such as the year-over-year inflation rate from the raw CPI data.

Design Process

Initial Designs:

1. **Static Graphs**: My first approach involved static line graphs showing unemployment and inflation over time. While informative by themselves, the overlapping of all the state lines made the overall trend legible, but individual states were impossible to discern.
2. **Separate Graphs**: I also tried displaying CPI and unemployment on separate graphs due to their different scales, but this made it hard to see their intertwined relationship.

Dead Ends and Discoveries:

1. **Combined Graphs**: Attempting to overlay multiple datasets on the same graph initially resulted in cluttered and hard-to-read visuals, but I realized boldening is a way to highlight a line and make it 'pop' out from the others.
2. **Interactive Elements**: Introducing interactive elements (e.g., tooltips over the states/boldening lines) significantly enhanced user engagement and understanding of the color scale used for state-by-state unemployment.

Final Design: My final design includes a combined line graph with dual y-axes, one for CPI and the other for unemployment rates. Also, it included a map of the US with states being able to be triggers for tooltips and line boldening. Key features also include:

- **Interactive Filters**: Drop down filter to only display a certain state of interest helps users remove the clutter of all states, if wanted.
- **Tooltips**: Hovering over states also filters in a less aggressive way by boldening the line on the graph for that state, enabling users to pull it out from the rest.
- **Dual Y-Axes**: Separate y-axes for CPI and unemployment rates allows the user to see the concurrent trend by looking for increasing and decreasing trends and not having to move their eyes from graph to graph and match up years (x axis), as the x axis is the same for both.

Feedback and Trade-offs

Feedback from my class presentation highlighted the importance of clarity and interactivity. I chose a design that balances detail and simplicity, ensuring the graph remains readable while still enabling a deep dive. For example, I chose not to segment the CPI by state. Firstly, I felt the

visualizations were already cluttered by all the state lines and adding twice the number of lines for CPI could get out of hand. Second, it would have taken a very long time to code all these new lines in and have them interact with the existing state lines and I feel like the work did not merit the reward. Third, I looked at state by state inflation and it is much more uniform than unemployment, giving the reader even less information. Other trade-offs include the drop down only letting a user select a single state, not multiple. But I thought that the cases when a user would want to select multiple states would be very rare, it is usually just one state.

Implementation

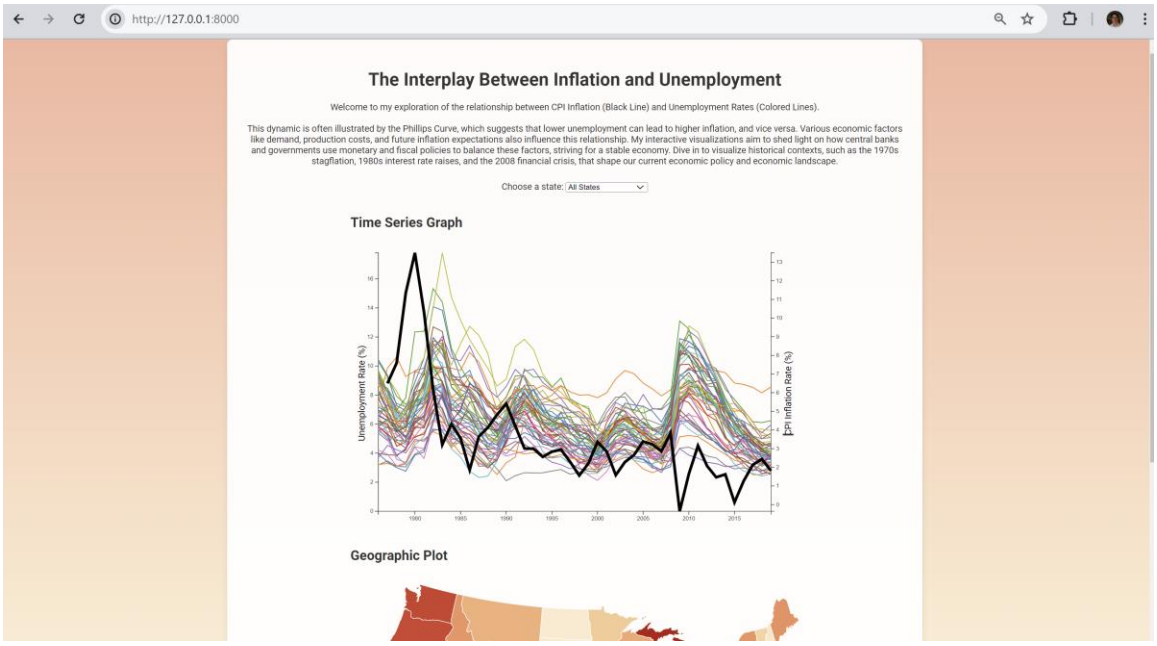
Tools Used:

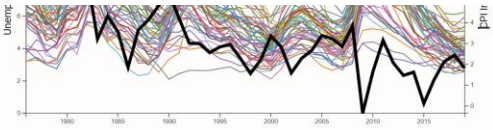
- **D3.js**: For dynamic and interactive visualizations.
- **Python (pandas)**: For data cleaning and manipulation.

Steps:

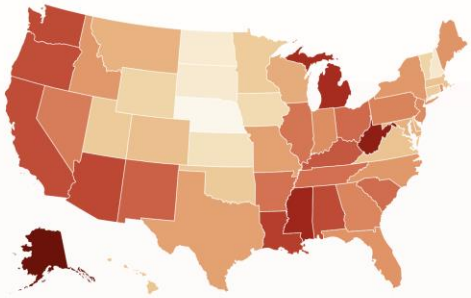
1. **Data Preparation**: Cleaned and manipulated data using Python.
2. **Visualization Setup**: Used D3.js to create the initial SVG canvas and color scales from the imported data.
3. **Interactive Elements**: Added event listeners, tooltips, dropdown filters, and interactivity between graphs.

Images:





Geographic Plot

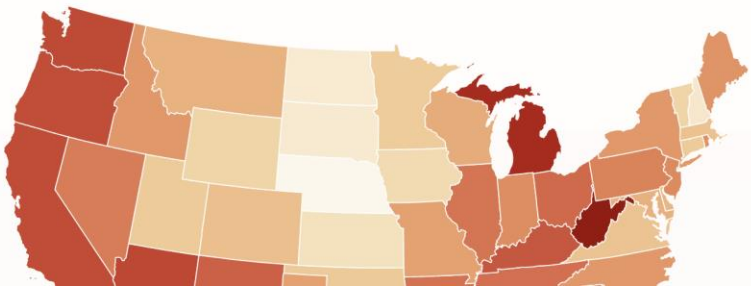


Project by Clayton Seibel

Choose a state: Arizona

Time Series Graph

Geographic Plot



Team Contributions

I worked solo