Final Report
INFO 4310

Topic
Liberation Day: Visualizing US Stock Market Reactions to Trade Policy Changes

Goals and Motivation

The goal of my project is to explore how Trump's tariff announcement on April 2, known as "Liberation Day" has impacted the US stock market. My visualizations and interactivities aim to help users of all backgrounds understand the general nature of how political decisions often have an immediate impact on the economy.

The motivation for my project is to bridge the gap between current political news and its subsequent effects on the financial world. Many news media often separate political events and financial events, making it confusing for users without the necessary background to grasp the relationship between the two. By highlighting the stock market fluctuations during the time of Trump's policy changes, I allow users to engage through the interactivity and gain a sense of the connection between finance and politics. I was inspired largely by The New York Times' Upshot section storytelling, and seek to present intimidating information, especially to financially illiterate people, in an accessible and intuitive manner.

Intended Audience and Use Cases

My project is intended for users who have limited financial literacy or are not up-to-date with political or financial news. It is also useful for students who want to explore the relationship between government policy and financial markets, such as economics or political science majors. Casual investors can also gain insight from my project to understand basic policy impacts. My project may not be well-suited for financial investors or people with financial professions, as it is more simple and basic.

Some of the use cases include:

- Viewing and reading a timeline of the trade-related policy announcements since Trump's inauguration to understand the context. This can be a helpful interactive learning tool for college courses.
- Mapping the countries affected by tariffs to gain an overview of its severity and widespread-ness.
- Selecting specific stocks to view how tariffs affected certain stocks and industries, and gain insights into market sentiment.

Inspiration and Related Materials

I was inspired by The New York Times Upshot, and its approach to data journalism. Their use of article-style story-telling is effective in presenting their idea, as well as maintaining their branding with a newspaper-like aesthetic. I like how they use concise and informative text to support their visualizations, which is what I tried to model in my project. Honestly, I had never known about data journalism before this course and discovering The New York Times Upshot has unlocked a new career potential for me.

Data Sources

I compiled data for my project through various sources. I constructed each dataset from credible online sources and historical stock data. For the timeline of political events, I read articles related to

Trump's trade policies and compiled a basic list of events: Timeline of Events. For the choropleth map visualizing countries affected by the trade policies, I referred to The White House announcements and made a spreadsheet: Tariffs by Country. For the stock market data, I first narrowed my focus to ten total stocks, eight of which are ETFs covering different industries, and two of which are indexes for a benchmark trend. I then used the `STOCKHISTORY` function in Excel to find all ten stocks' data from March 26 to April 8. I chose this data range to get insight into the market reaction a couple weeks before the April 2 announcement, and closed it at April 8 because of Trump's tariff pause on April 9 which I did not want to cover: Stock Market. Since all of my data has been scraped, I included a list of all websites used for data analysis in the footnotes of my webpage.

For more information, the ten stocks of focus for a comprehensive overview are:
Trade-related ETFs:

- XLI: Industrials
- SOXX: Semiconductor
- MOO: Agribusiness
- XLB: Materials

Investor-sensitive ETFs:

- XLK: Technology
- XLF: Financials
- XLP: Consumer Staples
- VCR: Consumer Discretionary

Benchmark Indexes:

- SPY: S&P 500
- DJI: Dow Jones

Design Explorations

In the beginning, I thought I could make a comprehensive overview if I included politician's trading information. This included a line chart of specific politician's trading activities during the same time period as the stock market graph. I thought this was relevant since it was connected to politics, but I found that it was actually introducing a different topic. While it was exciting to introduce how politicians may have insight prior to political announcements (i.e. insider trading), it would have been confusing to my target audience if I tried to tie in too many aspects.

I also initially began with the idea of just "visualizing the stock market," but did not know what to show exactly. I brainstormed showing the AI sectors, but after more research on the political events, I realized AI companies, though I've heard a lot of recent news about them, were not necessarily the main focus. Rather, the tariffs impacted industrial companies that relied heavily on the taxed goods such as steel and aluminum.

I eventually decided to select ETFs and indexes instead of specific companies' stocks to align with my goal of a comprehensive analysis. However, as I looked for stock data on various sources like Yahoo Finance, I didn't realize that a lot of stock market data was only accessible at a cost. Many sources required upwards of $500 to download the data, so I had to rethink how I could get stock market data. After talking with my friend who worked with stocks at Goldman Sachs, she told me about how Excel had a `STOCKHISTORY` function that allowed basic data to be pulled. While tinkering with this function, I came across several limitations. For example, some of the stocks I initially wanted to visualize like XLY

were not available on Excel. So, I researched another representative ETF and found that VCR was a good alternative. Furthermore, Excel only gave daily stock prices, so I could not visualize a more detailed hour-by-hour period as I initially hoped for.

Final Design

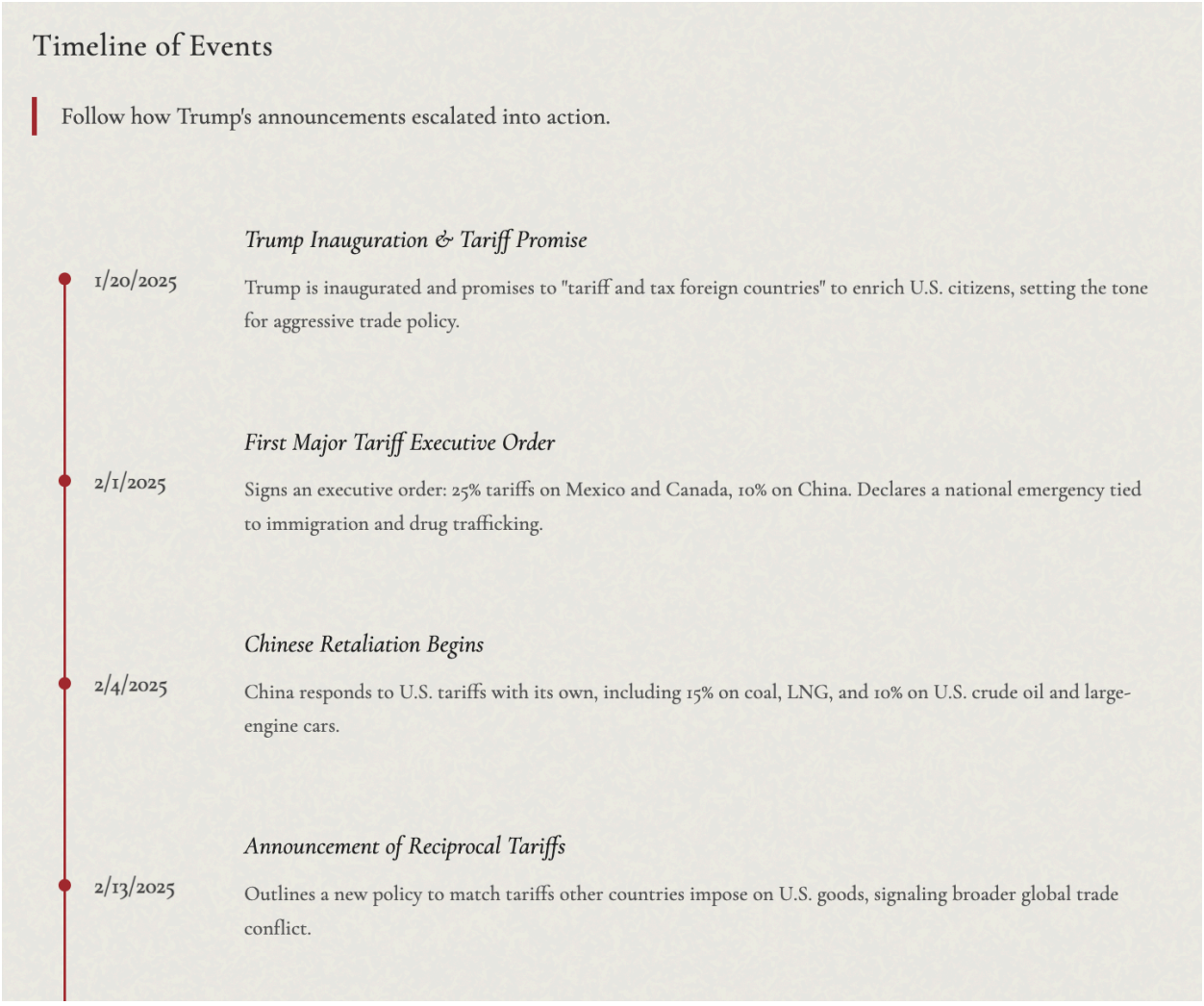
Visualization Flow

The final design is structured intentionally to be viewed on a scroll-basis. This was in an attempt to guide my target audience through a story-telling process of the cause-and-effect relationship between politics and finance. Each section elaborates on the last:

1. Opening Header Image

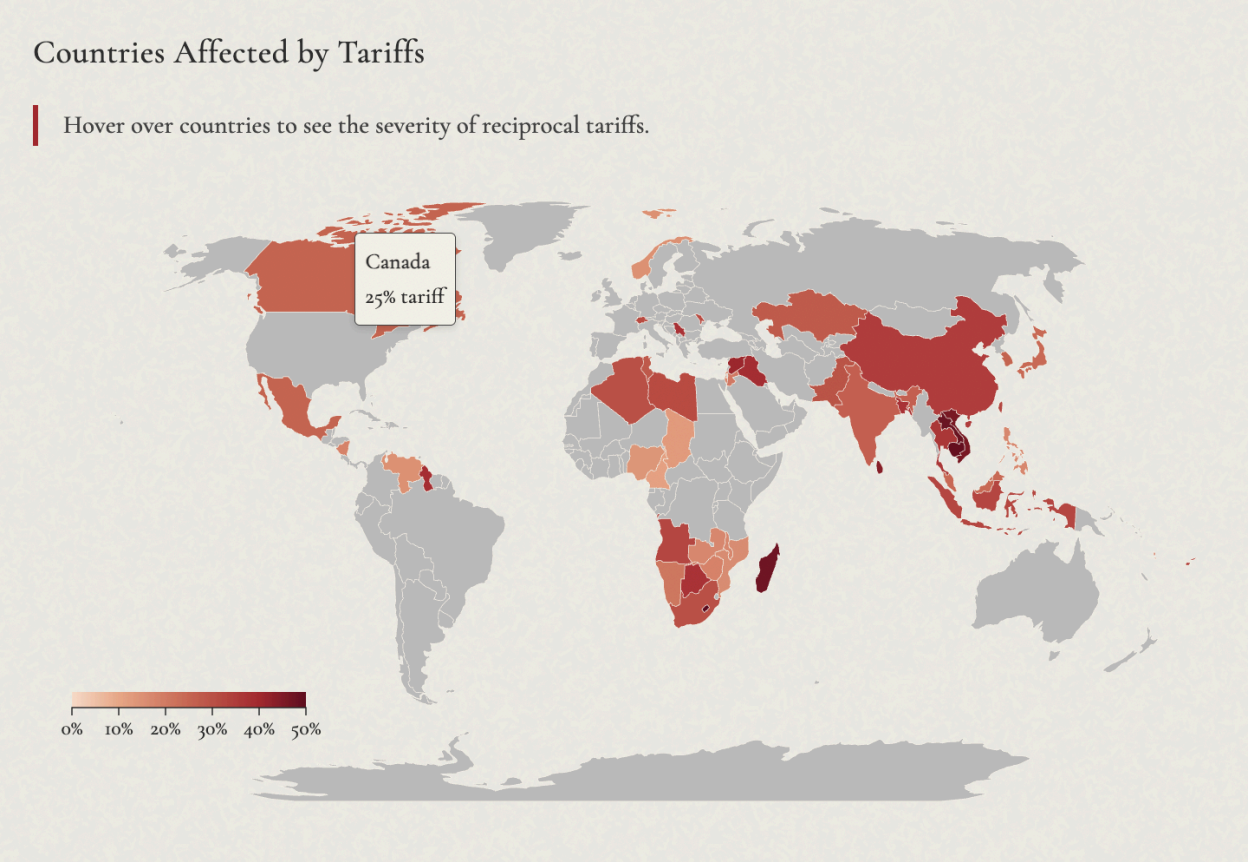
A simple image that symbolizes the topic and minimal text to accompany it. The slide-down animation brings playfulness and entices the user to continue scrolling. My initial drafts lacked a strong opener, and I felt that this image and animation achieved this.

2. Simplified Timeline



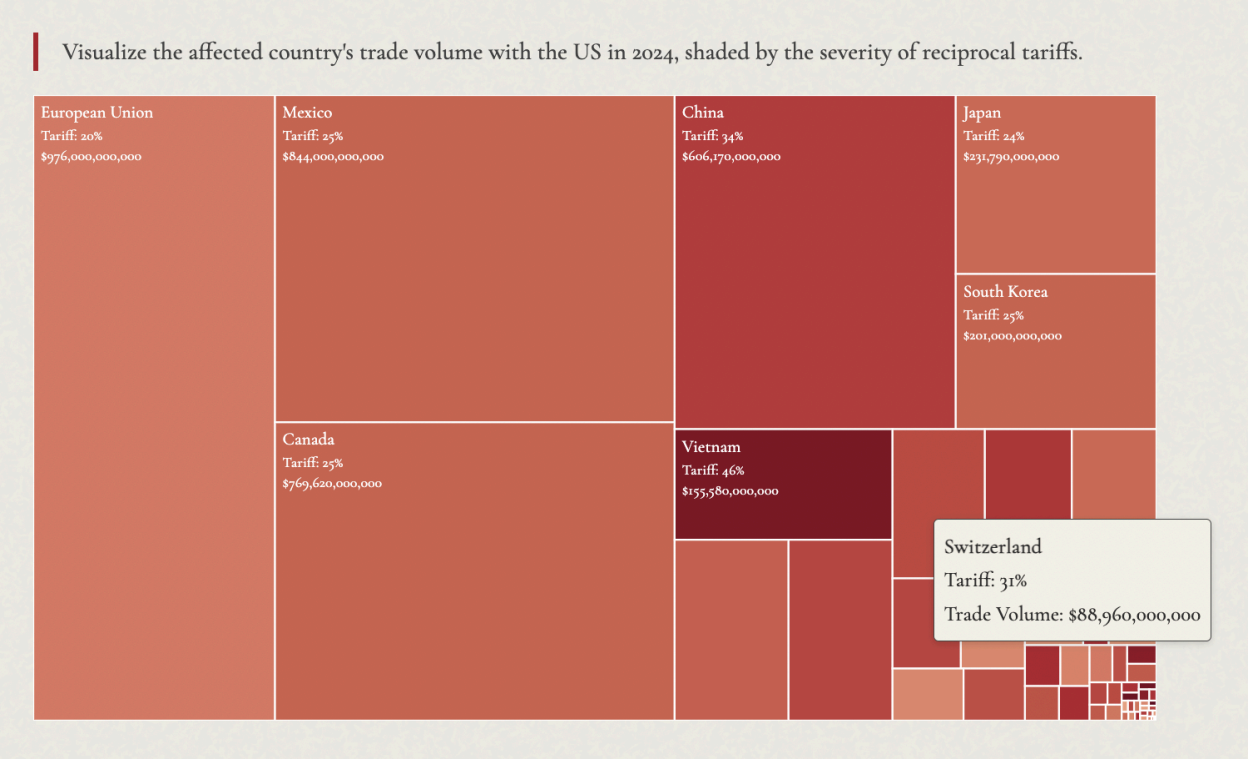
A vertical timeline with left-aligned dots and vertical line to intuitively guide the user. I initially considered a horizontal or scattered timeline for more playfulness, but it felt visually cluttered and off-theme from my vertical story-telling.

3. Choropleth Map with Tooltip



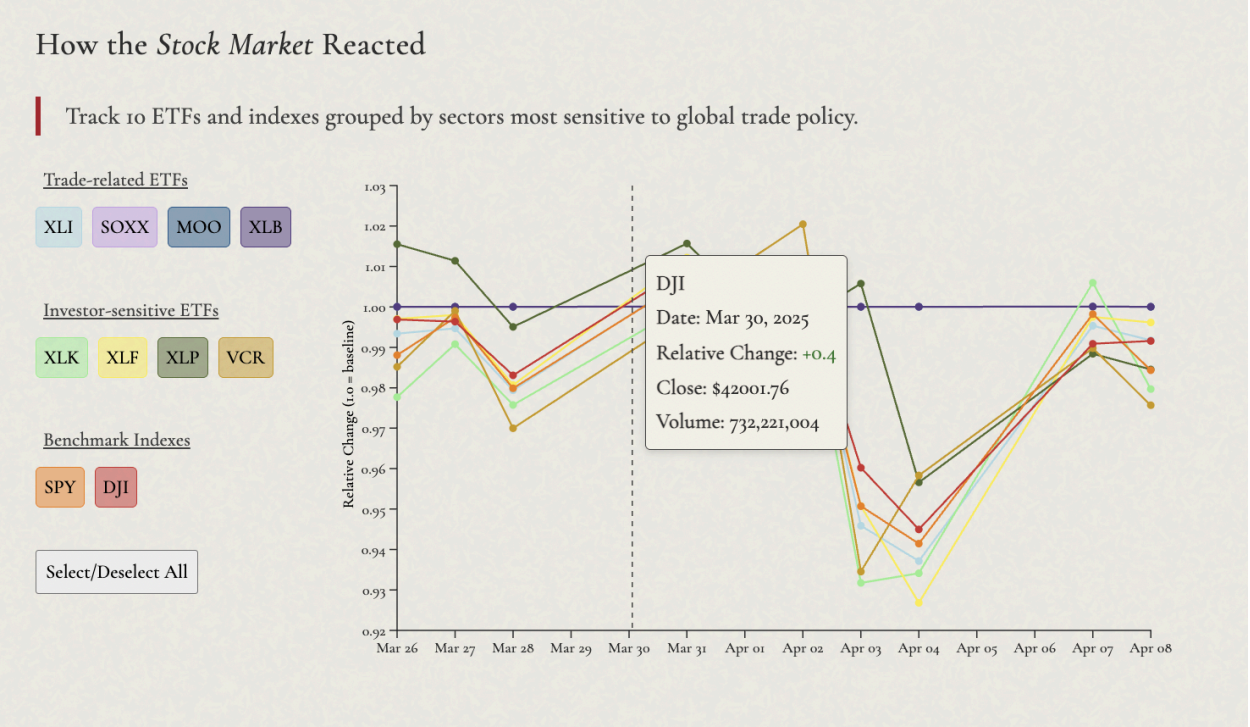
Color scale for tariff severity and a tooltip to further see the exact percentage. I implemented the professor's feedback of increasing the fidelity of the color scale because I originally had four distinct colors to represent buckets of percentages. This simple tooltip also prepares the user to understand the tooltip in the next graphs, which get progressively more informative.

4. Treemap of Trade Volume and Tariffs



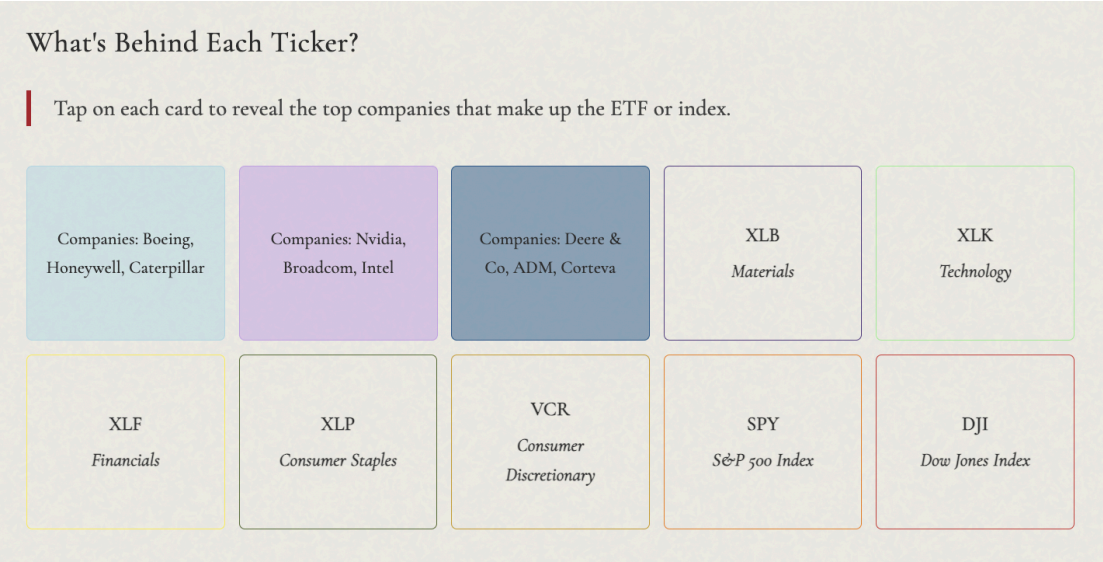
The treemap continues the color scale from the map, but introduces trade volume for a slight variation. It also prompts the user to consider how trade volume may have played a role in the tariff severity. I initially tried to make the treemap “slide in” from a right-side panel, but I wanted to keep in alignment with the vertical transition.

5. Interactive Stock Market Chart



I initially plotted the close price of each stock, but since the stocks had drastically different prices, the y-axis range was too large. I changed this by plotting the relative change, since we are more focused on how stock prices shifted, not its actual value. After the demo day, I also added a vertical dotted line to better track the stock to the dates, since the dates, especially April 2, are significant to my story. The tooltip further provides the closing price and volume, as well as a color-indicated positive or negative change in price (red for decrease, green for increase). The stock buttons provide options for the user to view select stocks rather than all ten.

6. Stock Card Animations



The ten stocks are presented as cards in the final visualization. This serves as supporting context to what each stock represents, in terms of its specific industry category and actual names of some of the top companies represented in the stock. Initially, I contemplated adding company logos for a visual understanding, but with the color-coded stock cards, adding more images seemed more cluttered than helpful.

Implementation Process

I used D3.js for interactive visualizations, HTML/CSS for layout and design, and Excel for data preprocessing. I maintained visual cohesion throughout my project by setting a design standard across all visualizations. I chose Cormorant Garamond for a consistent font, muted colors for all accents, and a consistent dark red line for each section. I applied the same tooltip styling to all visualizations for cohesion. For the treemap layout, I chose the treemapBinary to make the ordering of the nodes look clean like the rest of the styling. While I tried my best to maintain consistent styling, there are definitely areas where different font colors, font sizes, and spacing are not uniform, however, my project maintains readability.

Project Contribution

This was an individual project, so I worked independently to produce the final project. I do not know how much time I spent on this project, but I believe roughly 10-15 hours were spent each week.