U.S. Military Budget vs. Social Programs Budget

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FINAL PROJECT CS4802 C TERM 2021

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Initial Project Proposal

Working Title

This is so staff can discuss your project by name

U.S. Military Budget vs. Social Programs Budget

Motivation and Objectives

Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision. Provide the primary questions you are trying to answer with your visualization. What would you like to learn and accomplish?

With COVID-19 being rampant, unemployment going through the roof, we thought it was interesting to look at the different spending that the U.S.A. currently has, including the military budget, and the social programs. The goal of this VIS is to show that the U.S.A. is spending billions of dollars for its military while its civilians are homeless, jobless, and dying.

Data / Data Processing

From where and how are you collecting your data? If appropriate, provide a link to your data sources. Do you expect to do substantial data cleanup and transformation?

https://www.sipri.org/databases/milex

This provides military spending of the U.S. and all other countries. We could use this to make multiple graphs of different countries, and show how different countries balance their social programs vs. their military budget

https://www.oecd.org/social/expenditure.htm

Visualization Design

How will you display your data? Provide some general ideas that you have for the visualization design.

Multi-view graphs. We plan on having one graph show the change in military spending for the U.S.A, and the social programs spending right next to it.

We will then repeat this design for other various countries that we decide to pick.

We will probably use a barchart-vis (or line chart).

Anticipated Challenges + Anything Else

Give us some idea of the challenges you're anticipating with this project. Feel free to describe how you plan to mitigate risk if you have ideas. Also, use this section to communicate anything else you think we might need.

If possible in the time-frame, adding a 3D node VIS showing all the connections of the military budget and how it's distributed between different departments would be a cool VIS add-on. It could help show the improper spending the U.S. has on its military.

Refining Project Proposal

U.S. Military Budget vs. Social Programs Budget

With COVID-19 being rampant, unemployment going through the roof, we thought it was interesting to look at the different spending that the U.S. currently has, including the military budget, and the social programs. The goal of this VIS is to show that the U.S. is spending billions of dollars for its military while its civilians are homeless, jobless, and dying. This can also help show the health downtrend the U.S. has been having, because of bad funding decisions made by governmental bodies.

- https://www.sipri.org/databases/milex
    - This provides military spending of the U.S. and all other countries. We could use this to make multiple graphs of different countries, and show how different countries balance their social programs vs. their military budget
- https://www.oecd.org/social/expenditure.htm
    - This provides the public social spending data from all countries
    - We will definitely have to do a lot of data cleanup, but the database already has some good organizations. These two databases are not set in stone as the ones we want to use.

- Multi-view graphs. We plan on having one graph show the change in military spending for the U.S.A, and the social programs spending right next to it.
- We will then repeat this design for other various countries that we decide to pick.
- We will probably use a barchart-vis (or line chart).
- If possible in the time-frame, adding a 3D node VIS showing all the connections of the military budget and how it's distributed between different departments would be a cool VIS add-on. It could help show the improper spending the U.S. has on its military.

FEEDBACK

- Very cool and impactful idea. What first comes to mind is a need to look at existing US budget visualizations. There should be infographics and interactives out there. I'm sure I've seen treemaps for particular bills before, and node-link + sized node infographics for budgets in others. I would use these for inspiration and to cut down on the time you'd have to spend designing.

MORE RESEARCH / VIS EXAMPLES

- https://ourworldindata.org/military-spending
    - This has a lot of different examples of military spending vis w/ linked views (ish)
- Social programs is a big category - maybe we should considering choosing a subsection, or representing the subcategories within the social program umbrella (low-income housing, public infrastructure, healthcare programs, education, etc)
    - https://ourworldindata.org/government-spending
        - This breaks it down by category & by GDP

- Tree maps for military + social
    - https://www.google.com/search?q=us+military+budget+treemap&rlz=1C1CHBF_enUS774US774&sxsrf=ALeKk02s4ftoiOZowbrSBPNmzXWfNnGALw:1615232327760&source=lnms&tbm=isch&sa=X&ved=2ahUKEwiLqICpuaHvAhUcM1kFHderAowQ_AUoAXoECAkQAw&biw=1920&bih=969#imgrc=gMELGW0mFszxMM
    - Multiple countries
        - Russia, China, USA, Switzerland
    - Compare them to each other
- Line graphs that show change in spending % by year
- Filtering option where we can pick countries we can to compare
    - User doesn't necessarily have to only compare U.S. to other countries
        - Could be like Switzerland vs. Russia
- Datasets of multiple countries that can be dynamically loaded into a tree map
    - Same thing with line graphs
        - Line graphs will only show the net spending increase by year
- If we have time, add another vis of node + lines graph
    - Size of node = amount of spending in billion per year
    - Gravity effects to group certain spending categories together

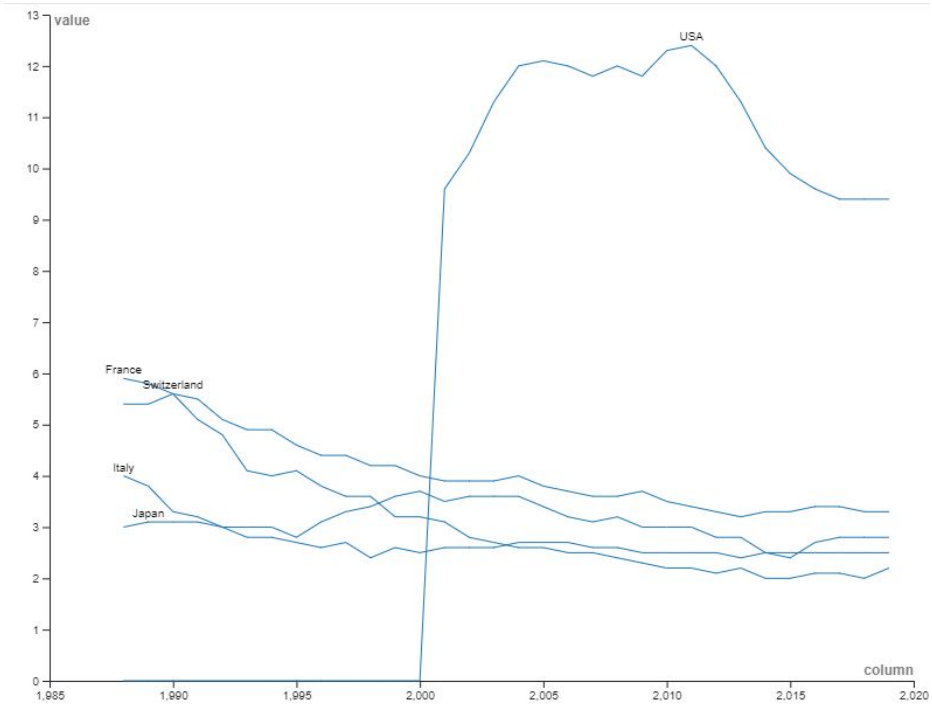
Progress

March 9th 2021

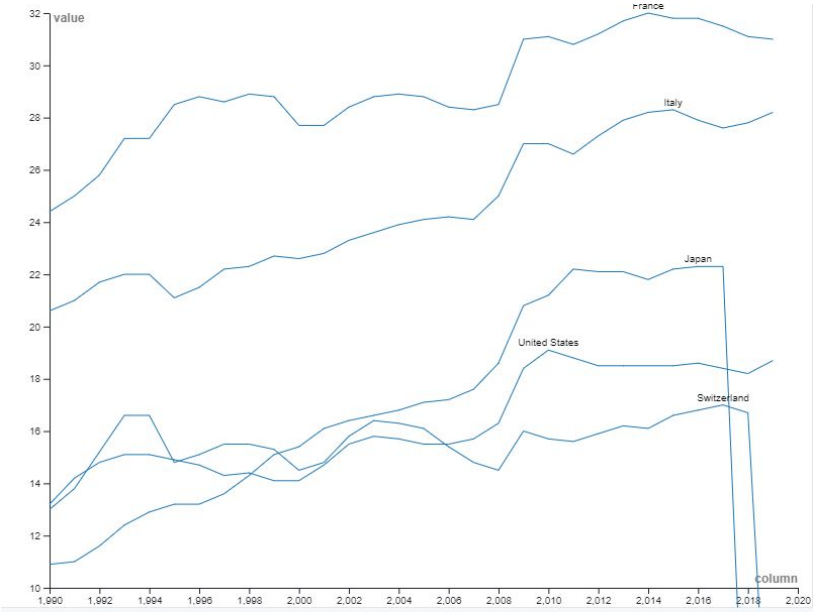
We changed our countries to these: France, Switzerland, Japan, United States, Italy
One of the CSV files contains the % of government spending for the military budget, and another CSV file contains the % of government social spending.

Some of the years are missing data, and are currently filled with NA as the placeholder. We have tried searching online for the missing data, but none of it was successfully found. This will cause a split-line graph.

Using RAWGraphs 2.0 (https://app.rawgraphs.io/), we created a quick line plot for the first CSV file:



And for the second CSV file:



In the future, we will want to ignore the missing values, but this sets a good idea for what the data looks like.

This will be the data for the accompanying graphs of each country's breakdown of their military spending.

March 11th 2021

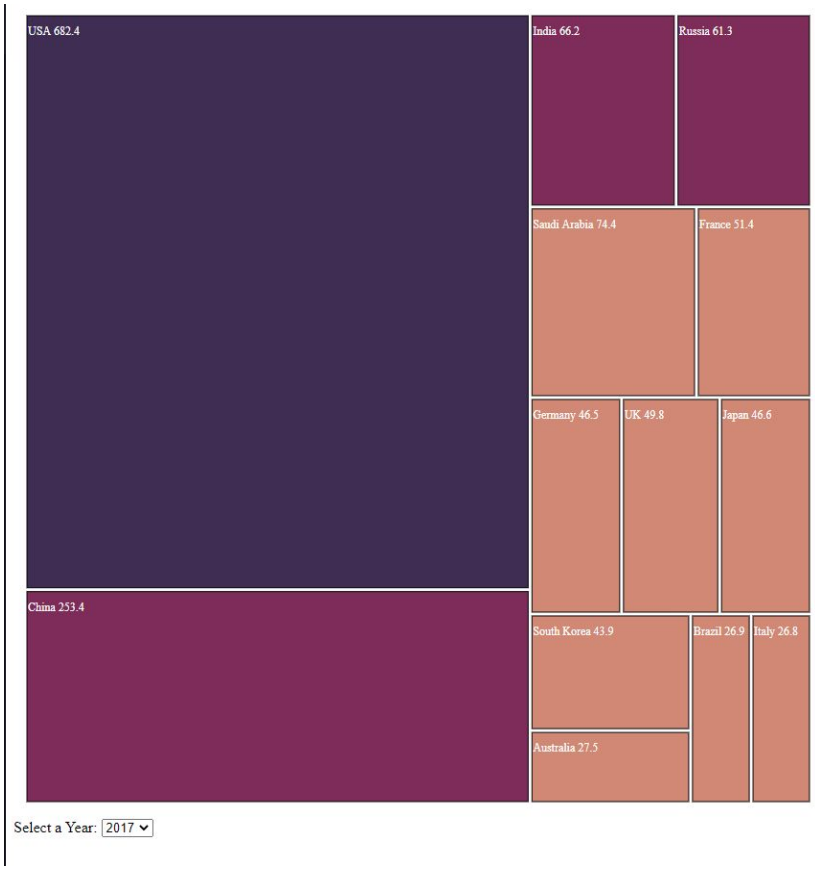
- Switch vis design
- 1 treemap for year 2020 military spending by countries
    - https://www.washingtonpost.com/news/worldviews/wp/2016/02/09/this-remarkable-chart-shows-how-u-s-defense-spending-dwarfs-the-rest-of-the-world/
    - ***IF WE HAVE TIME**
        - Clicking on a country will "zoom" into another treemap
        - Show individual spending
- Bar graph showing trend of USA military spending by year
    - Dates showing correlations with war
    - https://www.thebalance.com/u-s-military-budget-components-challenges-growth-3306320
- Bar Graph showing trend of USA social program spending by year
    - Dates to show correlation
    - https://www.usgovernmentrevenue.com/download
    - https://stats.oecd.org/Index.aspx?datasetcode=SOCX_AGG#
    - Find csv data of USA social program spending by year

    - 2008 market crash
    - 2020 covid
    - svg.append("text")
- No longer limiting to just previous chosen countries
    - Picking a large amount

March 14, 2021

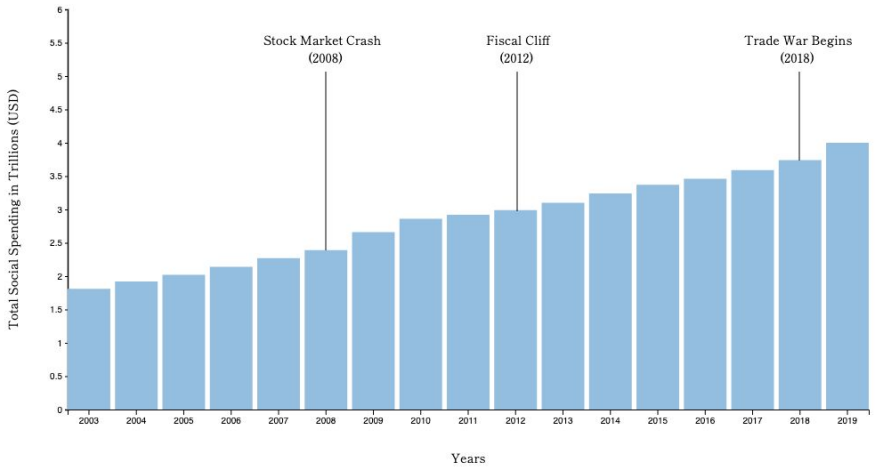
We went our separate ways in coding our individual visualizations, and as of right now, Molly and Danya's code has been merged. We did two bar graphs, which highlight the military spending vs. social spending from years 2003-2020 in the US. When both of our bar graphs are hovered over with a mouse, the bar chart changes color and repeats back the number amount of the dollars spent.

TreeMap:

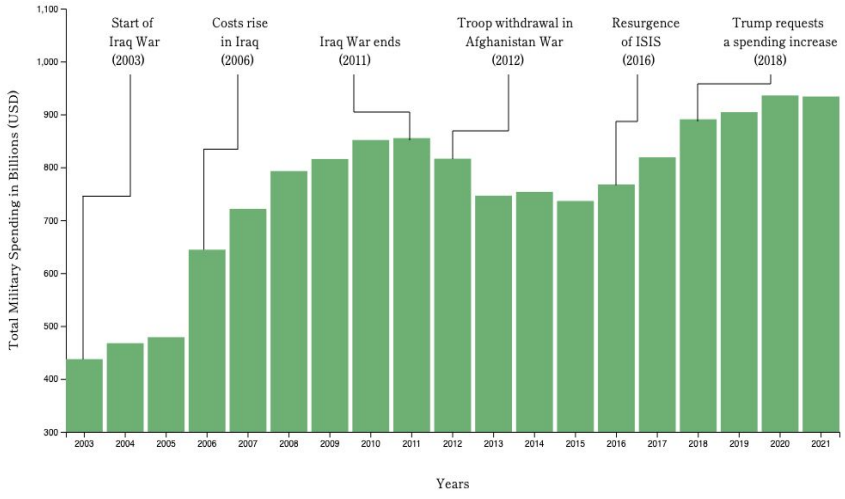


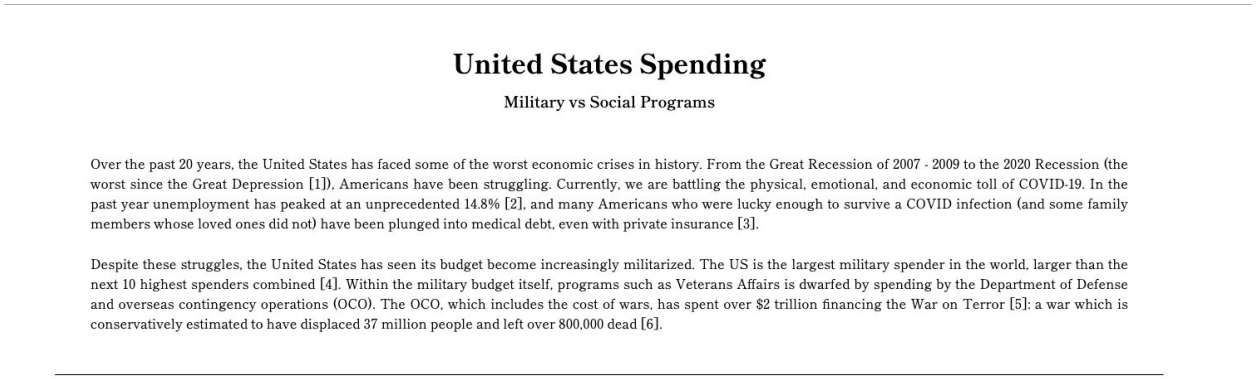
- Can now select a year
- Will reformat CSV data so the treemap can become zoomable

Below you can see the total social spending for the US from the past 17 years.
[Talk abt social security (6.2% of income investopedia.com/retirement/social-security-faqs/)]
(is the majority really just for admisinistrative costs? confused https://www.ssa.gov/budget/)
An important aspect to note is that unlike the military budget, which is reactionary and increases dramatically, the budget for social programs responds only to inflation. This means that despite the multiple finanical crises that have hit the United States in our lifetime, the governement does not offer additional economic support to its citizens.
[Make another point that fits in here - coporate bailouts? banks in 2008 / airplanes in 2020?]



Below, you can see the total military spending for the US from the past 19 years. This visualization shows a distinct upwards trend, despite troop withdrawal from both Afghanistan and Iraq [7], and an announcement by President Obama in 2013 that the War on Terror was over [6]. Also note how the U.S. military budget is reactionary to external events: increasing and decreasing as necessary in response to outside circumstances.





In addition to creating these visualizations, we also had to research a lot of information regarding the US's overall GDP, the financial trends it has, and how military spending grows with social spending and how they affect each other. This was to prove our hypothesis that the U.S. does not match its financial trends in the military with its social programs. Gathering this information was interesting, and it was definitely what we had originally thought, in that the US does not adjust social spending in economic crises.

Some links used: https://howmuch.net/articles/timeline-us-history

March 15th, 2021

Due to the lack of available data from other countries, we decided not to pursue the zoomable treemap, but simply display a single level tree map alongside a pie chart. In addition, we will be adding an animated line graph once again representing total military spending over a period of time.

Screen Recording Script:

Major points to talk about

- Best part of project
    - Interactivity, and text to go along graphs for better explanation for users that are not well informed on governmental spending
    - Learned that although the social spending is technically higher, this is due to social security, and in fact, the U.S. spends much less overall in social programs than they do in the military.
    - Most important thing - the government does not support its citizens during economic crises, and the government loves to spend so much money on the military that it dwarfs the spending budget of the next 10 military powers combined.
    -

Summary of Final Result

Overview and Motivation

Our project goal was to show the relationship between the US military budget, social spending, and economic trends. With COVID-19 being rampant, unemployment going through the roof, we thought it was interesting to look at the different spending that the U.S. currently has, including the military budget, and the social programs. The goal of this visualization is to show that the U.S. is spending billions of dollars for its military while its civilians are homeless, jobless, and dying.

Inspiration

We were inspired by some of the visualizations we came across during class reflections, as well as just a general curiosity of how our country is being run.

Questions

One of the questions we were trying to answer was if in the yearly budget the U.S. adjusts social spending to accommodate current economic trends and crises, such as the Great Recession, COVID-19, etc. This question evolved as we collected data from different sources, and saw that social spending rose with inflation and usually stayed stagnant, whereas military spending always increased.

We chose the military as a point of comparison, as we knew that it was a large expense, but we didn't realize how much of that money was being put into it. Therefore, as the project progressed we generated more questions related to military spending, which manifested in our final three visualizations.

Data

We got our data from multiple sources throughout this project as it evolved, such as the OECD and government sources. All the usable data was eventually converted into JSON format, and can be found in the json folder of our project.

Source for social bar chart:
https://www.compareyourcountry.org/social-expenditure/en/0/547+548/default/2019/USA

Source for military bar chart:

https://www.thebalance.com/u-s-military-budget-components-challenges-growth-3306320

Source for treemap:

- https://www.sipri.org/databases/milex

Source for pie chart:

- https://www.sipri.org/databases/milex

For the social spending, the way the data was laid out was that the data given was a percentage of the US GDP. So say for 2019, the social spending was 18.7% of the total US GDP. We manually calculated the dollar value of this percentage to show in our visualizations. This value translated into the trillions.

For the military bar chart, we copied the given data into an excel sheet to clean the columns we didn't want, and then converted that data directly into our preferred format. We used the total military spending (in billions) from 2003 to 2021 (projected).

Exploratory Data Analysis: Design and Early Visualizations

We initially looked at a lot of bar charts and tree maps. Because this is the majority of what we saw displaying this kind of data, we initially decided to create bar charts showing the trends of spending in both social and military areas. We gained a lot of insight from looking at previous similar visualizations because those had shown us how to best represent the data. Treemaps was a big trend in previous visualizations and was a very effective way of showing how the US compared to other countries in regards to military spending. With treemaps, the drastic spending was very visible.

- Design Evolution: What are the different visualizations you considered? Justify the design decisions you made using the perceptual and design principles you learned in the course. Did you deviate from your proposal?

Design Evolution

Bar Charts: Our initial visualization that we considered was bar charts. Since we saw this in a lot of the visualizations we researched, we felt that it would be best to include at least one or two bar charts to show spending trends. We also felt that as a simple visualization, this would be a good way to ease the user into the data we were displaying before using the more complex and in-depth charts. We concluded that we would try to use bar graphs in our proposal so this was not deviated.

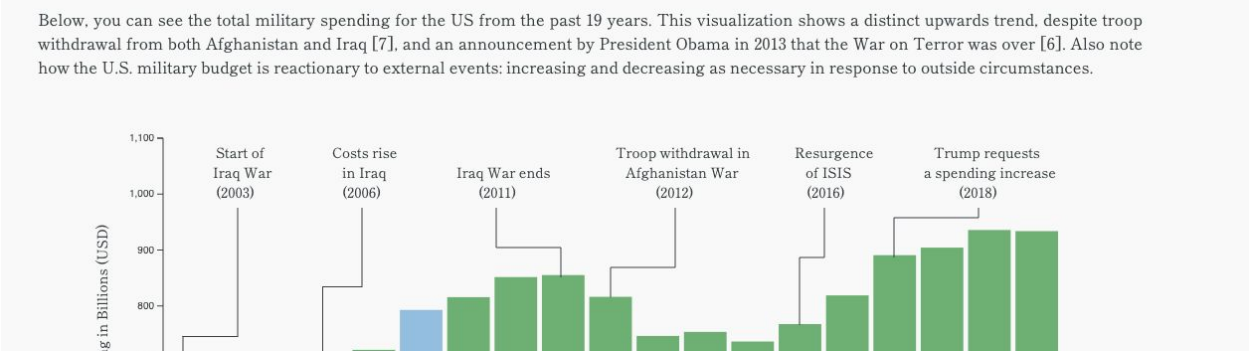
Treemaps: The second visualization that we considered was a treemap since we also saw that during our research. The tree map was really able to show how the USA dominated other countries in military spending. It was very visually effective in getting our point across to users. We did not initially think of this visualization in our proposal.

Pie Chart: Another visualization that we considered was a pie chart. The pie chart was a great visualization that we came across during our research. With the pie chart, it's very easy to effectively visualize the amounts of certain data, and you can really see which data set is highest or lowest.

Line Graph: A line graph is a very useful visualization since it can relate data with fluctuations. We debated using a line graph in place of our bar graphs, but eventually decided against it based on the above listed pros for bar charts. However, we did want to still use a line graph, and were able to use it as our last visualization.

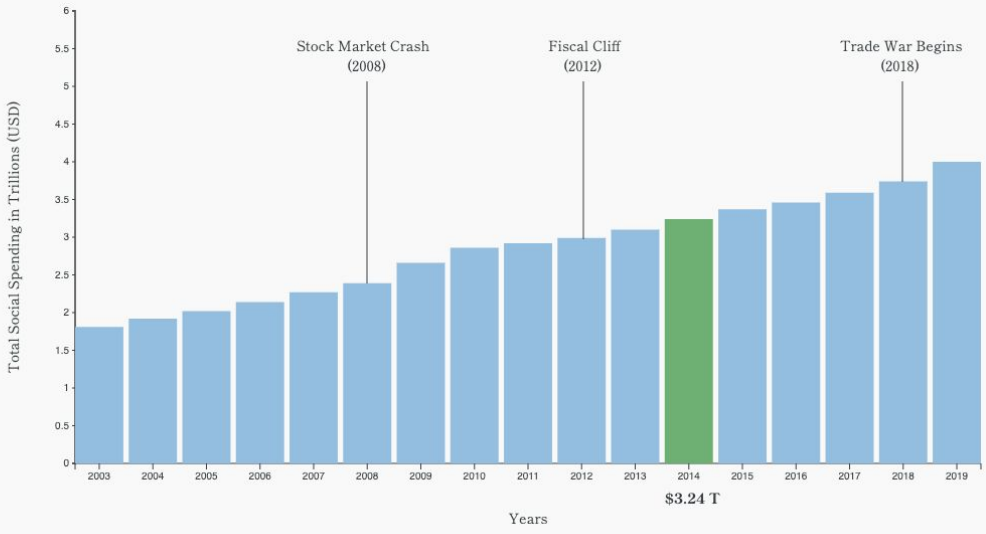
Implementation

For our bar chart visualizations, we wanted these to show overall spending trends. When a mouse is hovered over each individual bar, the bar gets highlighted to a different color and the dollar amount of that bar shows up on the axis. The intent for the interaction was to make it easier for users to see exactly how much money is being translated into the bar graph. With each bar chart, there are labels on some of the years where there were either major economic events, or events with the U.S. military.



This bar chart is the military spending bar chart, where it shows how the military spending fluctuates through the years (2003-2021). The labels are to provide more context to the user in what was going on in the certain time period. When a specific bar is highlighted, it shows the amount of what that bar is showing in the billions. This really helps the user visualize the data and really provides some background on the amount that the military spent in that specific year.

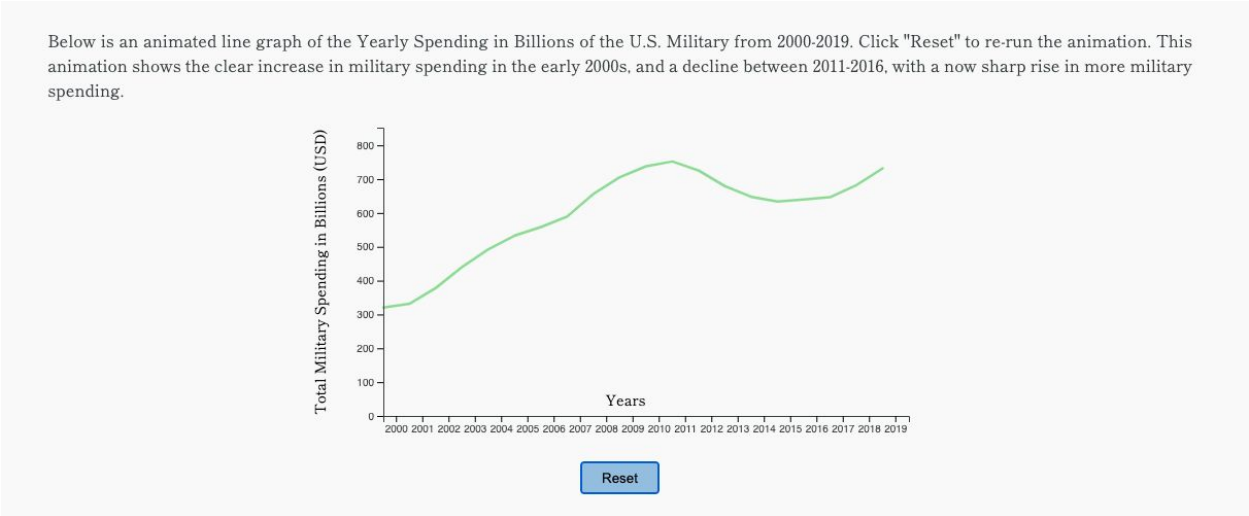
Below you can see the total social spending for the US from the past 17 years. An important aspect to note is that unlike the military budget, which is reactionary and increases dramatically, the budget for social programs responds only to inflation. This means that despite the multiple financial crises that have hit the United States in our lifetime, the government does not offer additional economic support to its citizens. This is in stark contrast to the U.S. government's history of corporate bailouts, which occur in amounts of billions to trillions of dollars, and a luxury only afforded to Americans recently at the height of the pandemic [8].



This bar chart shows how the U.S. spent their money on social issues, such as welfare and health care. We were only able to get this data in the years 2003-2019. As you can see, this bar chart matches the color scheme of the military spending bar chart. When highlighted over, it shows the amount of dollars in the trillions. It was great to have these two bar charts one after another to show the different trends between military spending and social spending.

Above is the treemap and pie chart that show what the U.S. military spends in relation to other countries. Using the dropdown, the user can select 2017, 2018, or 2019, which will update both visualizations accordingly. This is an important section of our project, as it gives the user a point of reference for the military data displayed in the above bar chart by comparing it to other countries, all of which are the next top spenders in the military.

In addition to those bar charts, we also had an animated line graph that shows the U.S. military spending in time. With the animation, it gives a different view than the bar chart, and allows the user to see the data in less specific terms. It just shows how the line has fluctuated throughout the years.



Along with the graph visualizations, our page also has the ability to do light and ‘dark’ mode, where we change the colors of font, and general text, when either of these modes are turned on.

Light/Dark Toggle

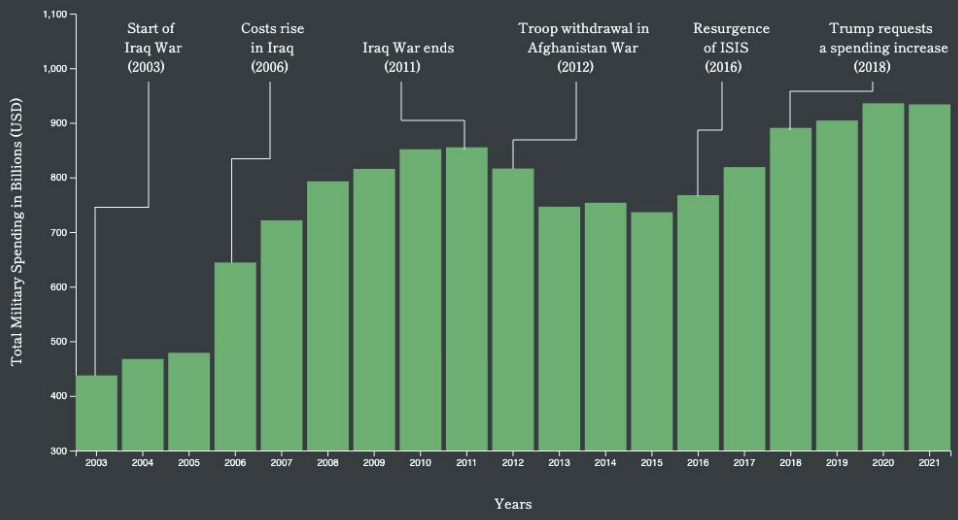
United States Spending

Military vs Social Programs

Over the past 20 years, the United States has faced some of the worst economic crises in history. From the Great Recession of 2007 - 2009 to the 2020 Recession (the worst since the Great Depression [1]), Americans have been struggling. Currently, we are battling the physical, emotional, and economic toll of COVID-19. In the past year unemployment has peaked at an unprecedented 14.8% [2], and many Americans who were lucky enough to survive a COVID infection (and some family members whose loved ones did not) have been plunged into medical debt, even with private insurance [3].

Despite these struggles, the United States has seen its budget become increasingly militarized. The US is the largest military spender in the world, larger than the next 10 highest spenders combined [4]. Within the military budget itself, programs such as Veterans Affairs is dwarfed by spending by the Department of Defense and overseas contingency operations (OCO). The OCO, which includes the cost of wars, has spent over $2 trillion financing the War on Terror [5]: a war which is conservatively estimated to have displaced 37 million people and left over 800,000 dead [6].

Below, you can see the total military spending for the US from the past 19 years. This visualization shows a distinct upwards trend, despite troop withdrawal from both Afghanistan and Iraq [7], and an announcement by President Obama in 2013 that the War on Terror was over [6]. Also note how the U.S. military budget is reactionary to external events: increasing and decreasing as necessary in response to outside circumstances.



Below you can see the total social spending for the US from the past 17 years. An important aspect to note is that unlike the military budget, which is reactionary and increases dramatically, the budget for social programs responds only to inflation. This means that despite the multiple financial crises that have hit the United States in our lifetime, the government does not offer additional economic support to its citizens. This is in stark contrast to the U.S. government's history of corporate bailouts, which occur in amounts of billions to trillions of dollars, and a luxury only afforded to Americans recently at the height of the pandemic [8].

Evaluation

We had a suspicion that the U.S. spends more on the military budget, than social programs for its citizens. In order to confirm our hypothesis, we had to take a look at both military spending as well as social spending in order to gather data to prove this hypothesis. When we finished with our visualizations, we saw the large amount that the U.S. was putting into the military, and how the U.S. government adjusts its spending on the military due to current events. What we saw in the bar graph for military spending was not translated into the bar graph for social spending. In the social spending bar chart, we saw that the amount of spending just rose steadily in regards to inflation. It only increased, but did not have much fluctuation compared to the bar chart for military spending.

While the social spending with the U.S. is in the trillions compared to the billions, the vast majority of that budget goes towards social security, which is only returned to U.S. citizens when they become of age to receive payments. These trillions of dollars are not spent, but rather given back to people after they retire. Because of this, a false perception of fair funding can be made. It is true that social spending is high, but that is mainly due to the aforementioned social security. We wanted to focus less on parts of social spending like social security, and instead look at other ways that the government is spending money. It turned out however, that the United States tries to spend as little money as possible for social spending, with no showing of increased spending during economic crises. Comparing the social spending in this way and the United States military, it is clear that the government has a higher interest in funding its military than funding its social programs.

We also hypothesized that the U.S. military had the most spending compared to other countries' military. With the tree map and pie chart, this hypothesis was proven very obviously as the U.S. completely dominated the countries we compared it with.

Each visualization that we created provides some sort of interactivity for its users. The color scheme of each visualization makes it easy for the users to view and effectively see these data trends. Each visualization provides a basic yet effective way of viewing this data, and we believe that these visualizations really serve to help display the data we found. However, there is always room for improvement. One of the interaction ideas that we had was to make a 'zooming' feature on the tree map visualization, where once hovered over, it would expand into another treemap. This second treemap would have a breakdown of the military budget for that country. Due to time constraints and level of difficulty, we were unable to get this feature working as we couldn't find all of the proper data to do so. In the future, when designing our project, we should try to create an idea with much easier data to find, because a lot of time was spent parsing and formatting data for our visualizations.