Group 17

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Code, App, Dataset

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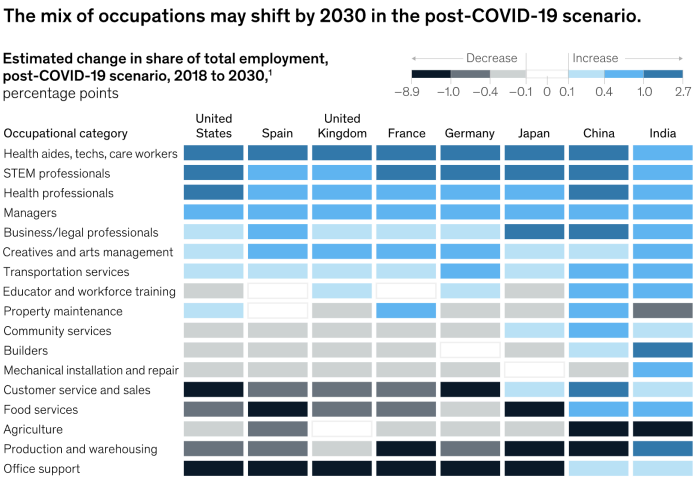
Project Milestone 3: Analyzing Global Unemployment

Introduction

In an era of economic complexities and global interconnectivity, one of the most important markets of today is the labor market. In the aftermath of a global pandemic where unemployment skyrocketed, we seek to visualize its impact by examining what the world looked like before, during, and after. Our multi-faceted exploration of this topic includes analyzing trends across nations, ages, and time periods. Combined, our visualizations facilitate a holistic approach to visualizing unemployment worldwide by offering several visualizations to help put the bigger picture together. The primary objective is to help audiences understand this by designing interactive tools to help them navigate the data. We used a Kaggle dataset tracking global unemployment records from 2014-2024.

Literature Review



An overarching source that we used was McKinsey's *The Future of Work After COVID-19* report (Lund et al., 2019). The reason is that it had many unique visualization techniques that were similar to our topic. The color scheme, presentation format, and heatmap provided a clear and concise representation of complex data. The heatmap displayed the top sectors in the job market with their respective employment rates and we built off that idea by making a heatmap of the top unemployed countries for a better understanding of poorer countries.

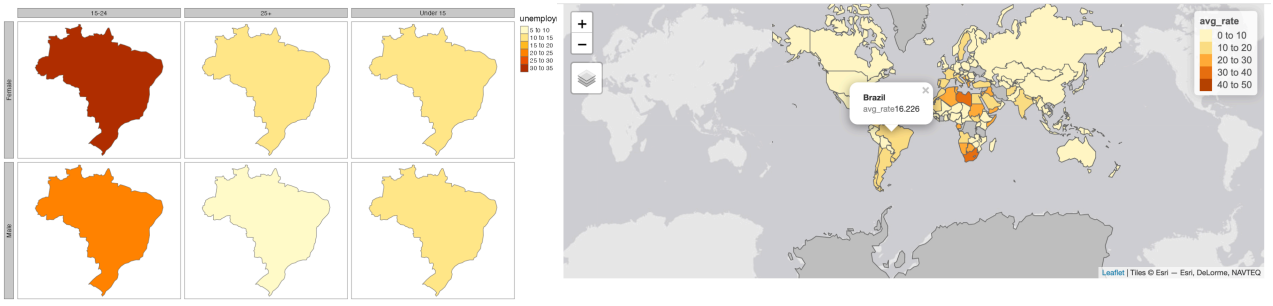
We also drew upon the IMF's World Economic Outlook (April 2024) as one of our major sources of inspiration. One of the key ideas we wanted to understand was the geographical distribution of unemployment trends. They demonstrated this by using a choropleth world map that utilizes color based on the national unemployment rate in each country. Some small touches that we

wanted to incorporate into our design from this visualization included a hover feature that allowed an easy understanding of data beyond the legend. The clear color distinction between different levels leaves little room for misinterpretation. Lastly, updating the year doesn't rerender the graph but updates it instantly. We used this as inspiration because it had a lot of quality-of-life features that can easily be missed when trying to focus on a bigger problem. Its simplicity and interactivity enabled any reader to use it with ease.

Another key research approach was the effectiveness of interaction in creating better learning environments. Our ultimate goal is to help people better understand the factors that affect unemployment and to identify frequently occurring patterns. To do this, all of our graphs are interactive since interactive interfaces have proven to be more powerful and engaging than videos and articles (Cervenec et al., 2022). This tells us the best data visualizations are the ones that are designed to let the audience work and interact at their own pace rather than forcefully slapping data, graphs, and text onto the screen.

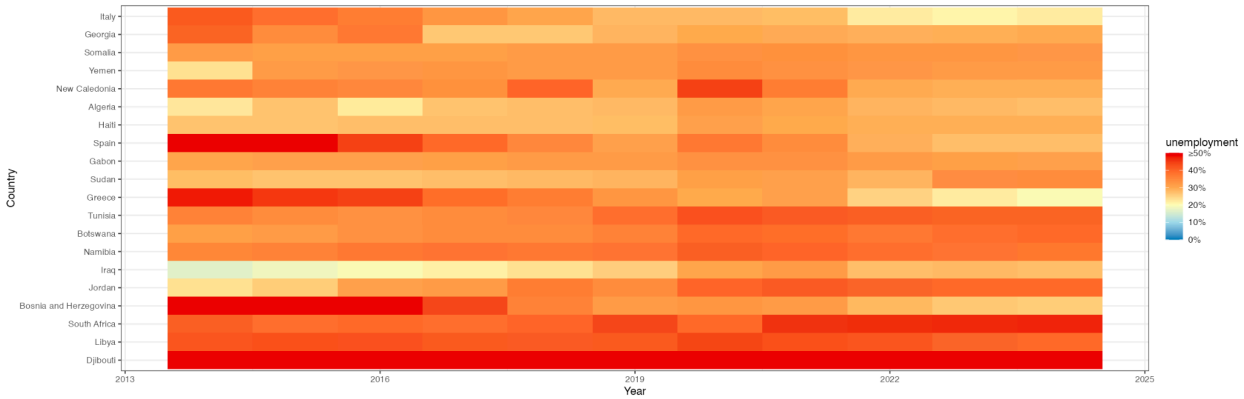
Design

The overall design of the interface is split into three main parts, the world map, the line plot, and the heat map, each giving a different view on the information at hand. The world map does a great job of showing exactly which countries struggle with their unemployment rate, and clicking on one gives the specifics based on age and gender in that country. Going through the years, the visualization shows the difference in the unemployment rate, especially through the year 2020. This design choice was made to help



Seeing the general trend of the unemployment rates over the years is a little difficult just by using the map and scrolling through the years. A line graph is a good way to show this information in a more user-friendly way. Within the line graph, there is an option to switch between regions, and again, it's very obvious that unemployment rates shoot up during the year 2020, no matter which region is selected. It is also easy to see which regions are affected more than others by scrolling through them on this interactive graph.

To dive even further into which countries are at the top of unemployment the implementation of a heatmap made the most sense. The two inputs the user has control over are age group and how many countries are to be implemented into the map. The countries most affected by unemployment start at the bottom and up, which is very obvious by the harsh colors near the bottom of the map. Using the heatmap it is easy to see the trends by country, of how they gave in to high unemployment rates or were able to decrease that value.



Synthesis

When looking at the pandemic and its effects on the labor market it is important to be able to define what a normal, non-pandemic, labor market looks like. In an effort to accomplish this task and accurately display a baseline, one of our first graphs is the average unemployment rate over time for a specific region. This will allow the user to more accurately assess the economic conditions pre and post-pandemic. Furthermore, the pandemic affected the labor market differently in each region and to different degrees. To answer the question of how each region was specifically affected by the pandemic we have a map that colors in the countries based on the average unemployment rate for that year in that country. This will allow the user to look at a chosen region and draw their conclusions about the date. When looking at the labor market it is also important to get a more fine-grained view on the labor market for a specific country. To complete this we created a graph that is faceted by year that displays a specific country. To choose the country all you need to do is click it on the world map. This visualization will allow the user to see the breakdown of a specific country over the years and give context to how their population has dealt with the pandemic. Furthermore, this visualization breaks the unemployment down by gender, this allows the user to look at the socioeconomic view about how the pandemic affected people of a specific gender. Another question that could be asked is which countries have the highest average unemployment. This is the question that the last graph tries to answer. The countries are ordered by unemployment making it easier for the users to view. Also, it

allows the user to select how many of the top countries they would like to view making it easier for the user to view the countries.

Conclusion

Being able to see how a country either bounced back or gave in during tough times can be seen throughout these visualizations. Being able to see the effects on entire countries in just a few graphs really puts the pandemic into perspective. Through the use of effective visualizations, we have been able to show just how the pandemic has affected the labor market. With this holistic approach, we hope that the user can better understand the effects of the pandemic on differing regions as well as socioeconomic groups.

References

[1] Lund, Susan, et al. "The Future of Work after COVID-19." *McKinsey & Company*, McKinsey & Company, 18 Feb. 2021, www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19.

[2] IMF. (2024, April). *World Economic Outlook (April 2024)*. IMF Datamapper. https://www.imf.org/external/datamapper/datasets/WEO

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