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Introduction

In 2015, the European refugee crisis brought the world's attention to the controversy of migrant and refugee issues. The most prominent root causes of this wave of refugees entering Europe were several wars including the most famous ones, the Libyan civil war, and the Syrian civil war. Research showed that in 2015, the estimates of refugees applied for asylum in European countries was up to a record of 1.3 million, which marked the largest annual flow of asylum seekers to Europe since 1985 (Connor, 2010). This huge wave of refugees presented challenges to the European governments in terms of social, cultural, economic and political aspects. Hence, the issue of migrant and refugee is a topic that is worth to discuss. In this report, I will look into a dataset related to migrants and refugees published by the United Nations. To clarify the difference between migrants and refugees, according to the United Nations, an international migrant is defined as an individual "who changes his or her country of usual residence, irrespective of the reason for migration or legal status." On the other hand, refugees are those "who are outside their country of origin for reasons of feared persecution, conflict, generalized violence, or other circumstances that have seriously disturbed public order and, as a result, require international protection(United Nations, n.d.)." In other words, migrants voluntarily move to other countries possibly for career choices or better living conditions whereas refugees are forced to leave their countries due to various negative factors that have impacts on their lives.

The dataset is the same as the one used for the midterm project. I will explore the issue using the statistics provided, including international migrant stock at mid-year, total population, international migrant stock as a percentage of the total population, annual rate of change of the migrant stock, estimated refugee stock at mid-year, refugees as a percentage of the international migrant stock, and annual rate of change of the refugee stock. They are all aggregated by major area, region, country or area of destination, and year.

Methods

This project was conducted using Tufte's data visualization principles. In this project, I used bar graphs, line graphs, small multiple bar graphs and boxplot to explain the dataset. First of all, I made sure that the representation of the numbers are proportional to the numerical quantities presented. To better illustrate the numerical differences, I sorted the data and presented the numbers in order. Additionally, I used the least ink possible to keep the graph clean and easy to read. For the visuals created, I used lighter colour for the background and gridlines, and darker colour for the bars and lines. To distinguish variable differences such as sex, I used blue for male and red for female for better reading experience. Furthermore, I labelled the y-axis, x-axis and important values on some of the graphs to better explain my points. I also kept in mind that the graphs should only demonstrate data variation and avoid unnecessary design variation and graphical effects described by Tufte as chartjunk, so I made sure the design was simple and straightforward. For some graphs, I incorporated multiple characteristics for comparison such as small multiples graph. Lastly, all the data was derived from the dataset and graphs were not quoted out of the context. Following are the graphs I generated to explore the dataset:

1. 2015 International Migrant Stock (Both Sexes)
2. 2015 International Migrant Stock by Sex
3. 1990 - 2015 International Migrant Stock by Major Area (Both Sexes)
4. 1990 - 2015 International Migrant Stock by Major Area and Sex
5. 2015 Europe Population (Both Sexes)
6. 2015 Europe Migrant Stock (Both Sexes)
7. 2015 Europe Migrant Stock Box Plot (Both Sexes)
8. 2015 Germany Migrant Stock by Sex
9. 1990 - 2015 Germany Migrant Percentage
10. Germany Annual Rate of Change of The Migrant Stock by Sex
11. 2015 Europe Estimated Refugee Stock (Both Sexes)
12. 1990 – 2015 Germany Refugee Stock (Both Sexes)
13. 1990 – 2015 Germany Refugee Percentage/Migrant Stock (Both Sexes)
14. Germany Refugee Annual Rate of Change (Both Sexes)

Results

To start out, I looked into international migrant stock of both sexes in 2015. As illustrated in *Figure 1*, I found out that among all the major areas in the world, Europe had the highest number of international migrants with approximately 76.15 millions, followed by Asia with 75.08 millions and North America with 54.49 millions. Furthermore, there were more male migrants than female migrants in Asia whereas the situation was the opposite in Europe and North America as shown in *Figure 2*.

Figure 1

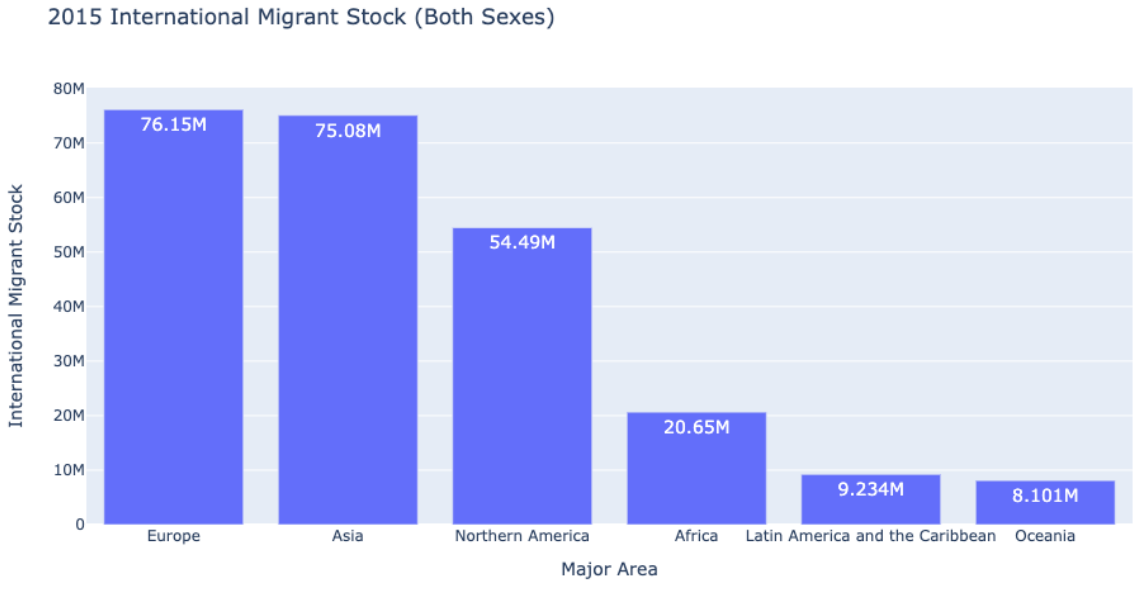
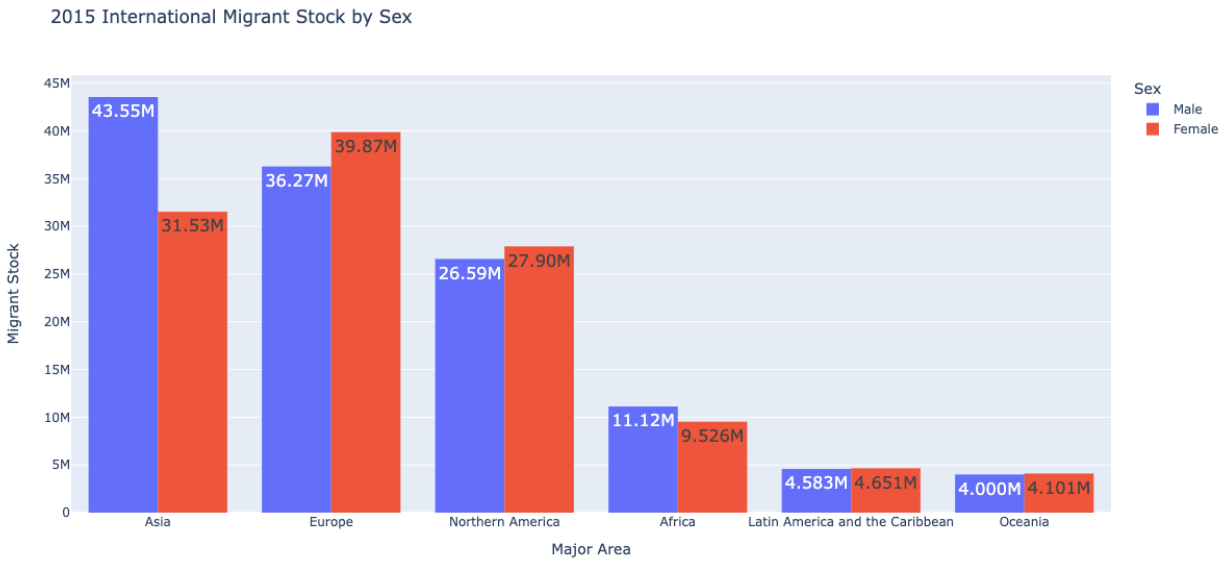


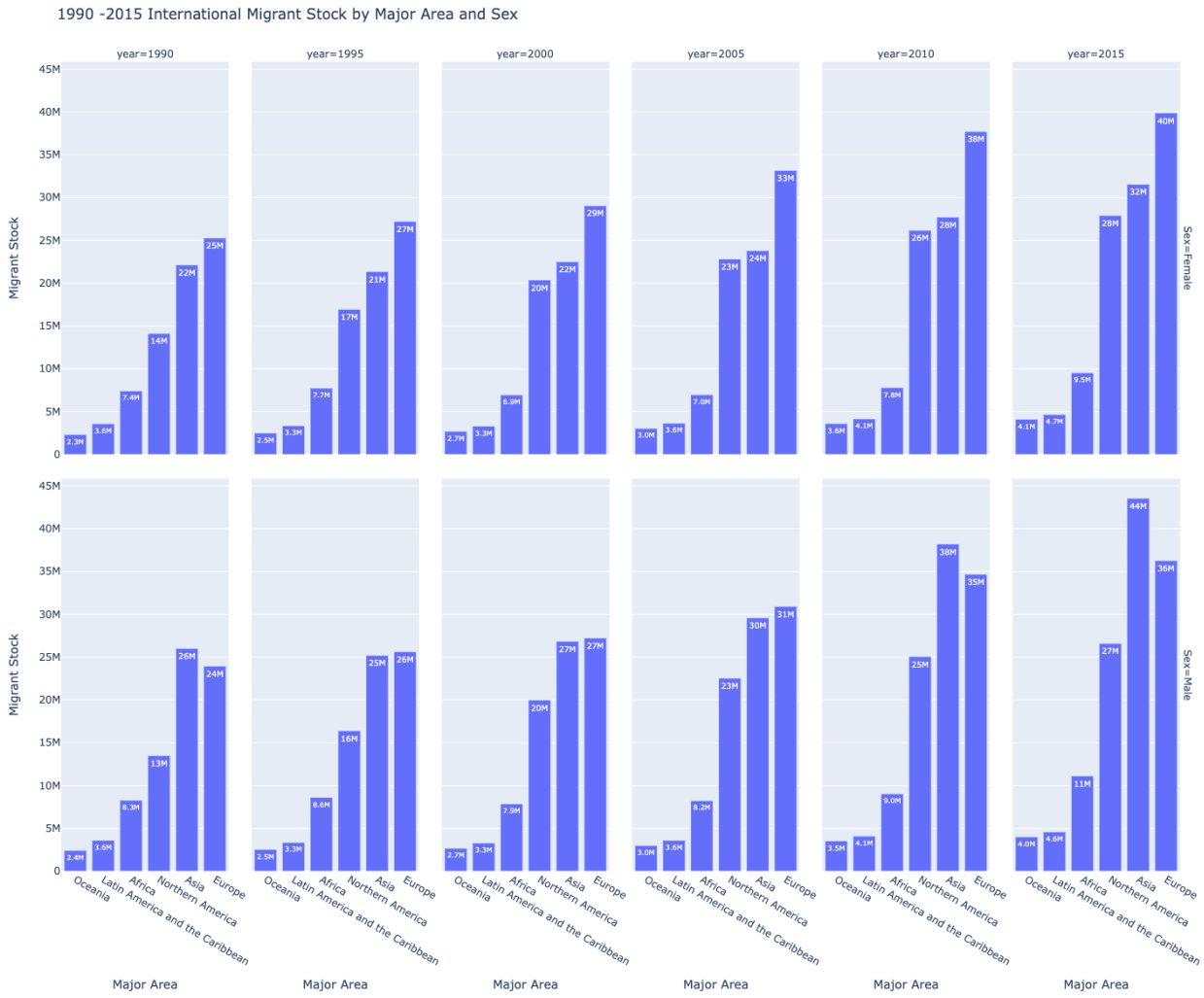
Figure 2



To explore further, I looked into the migrant trend since 1990 using small multiple bar graphs. As illustrated in *Figure 3*, since 1990, Europe, Asia and North America had already become the top three migration destinations and the number had been increasing ever since. In addition, the migrant population of both male and female in these three continents had also increased since 1990 (*Figure 4*). From these overview graphs, I discovered that Europe was the most popular migration destination so I decided to look into Europe.

Figure 3

Figure 4



First, I looked into the European population of respective countries in 2015. I found out that Russian Federation had the highest population with over 140 millions. The second country was Germany with around 81 millions, a significant population difference from Russia Federation (*Figure 5*). Since Russia Federation was the most populated, I assumed they might have the highest number of international migrants. To test out whether my assumption was accurate, I generated a new graph about European migrant population by country in 2015. As illustrated in *Figure 6*, surprisingly, even though Russia Federation still had a great amount of international migrant population, Germany exceeded Russia to be the first on the list of over 12 millions of international migrants in that year.

Figure 5

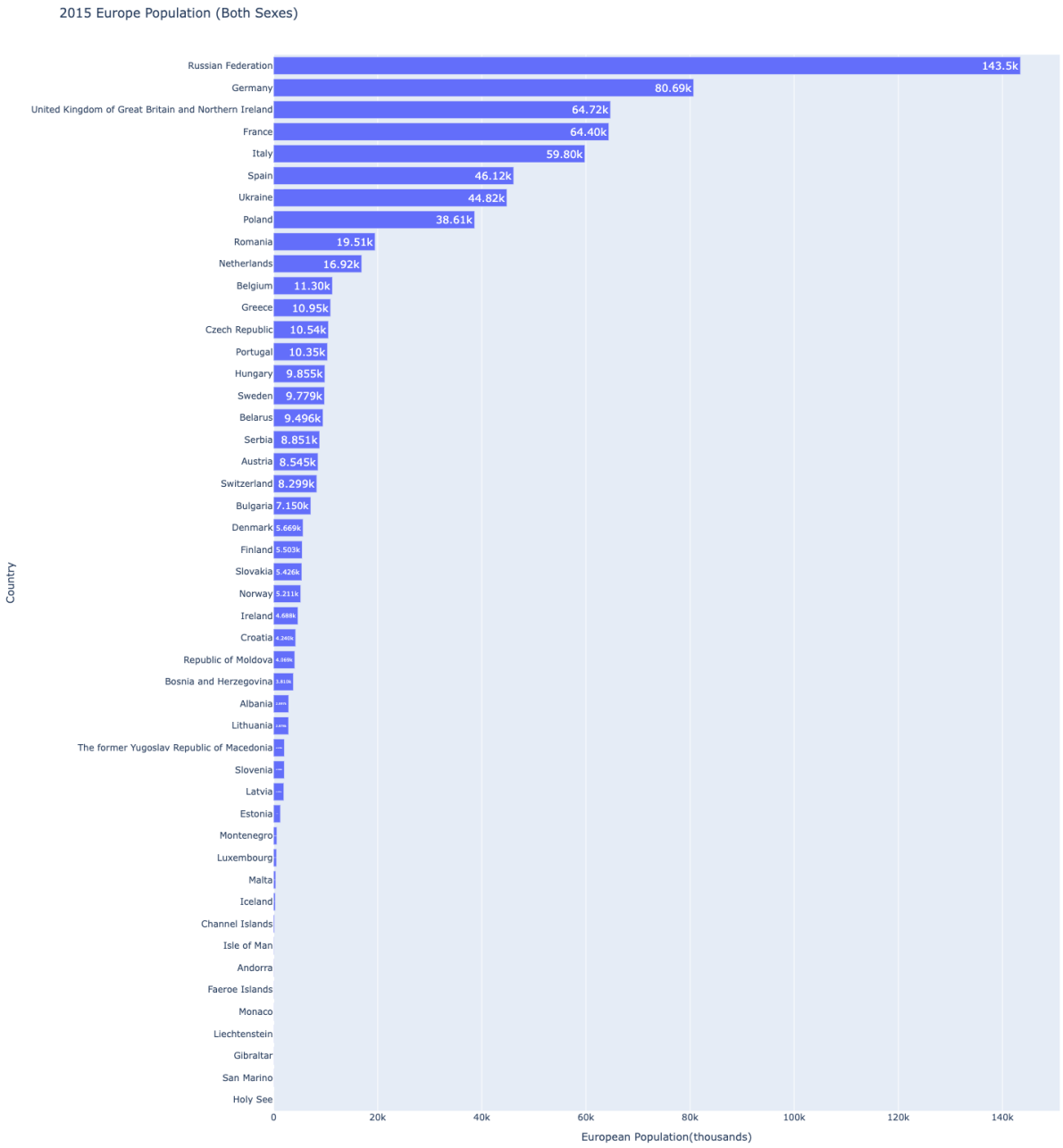
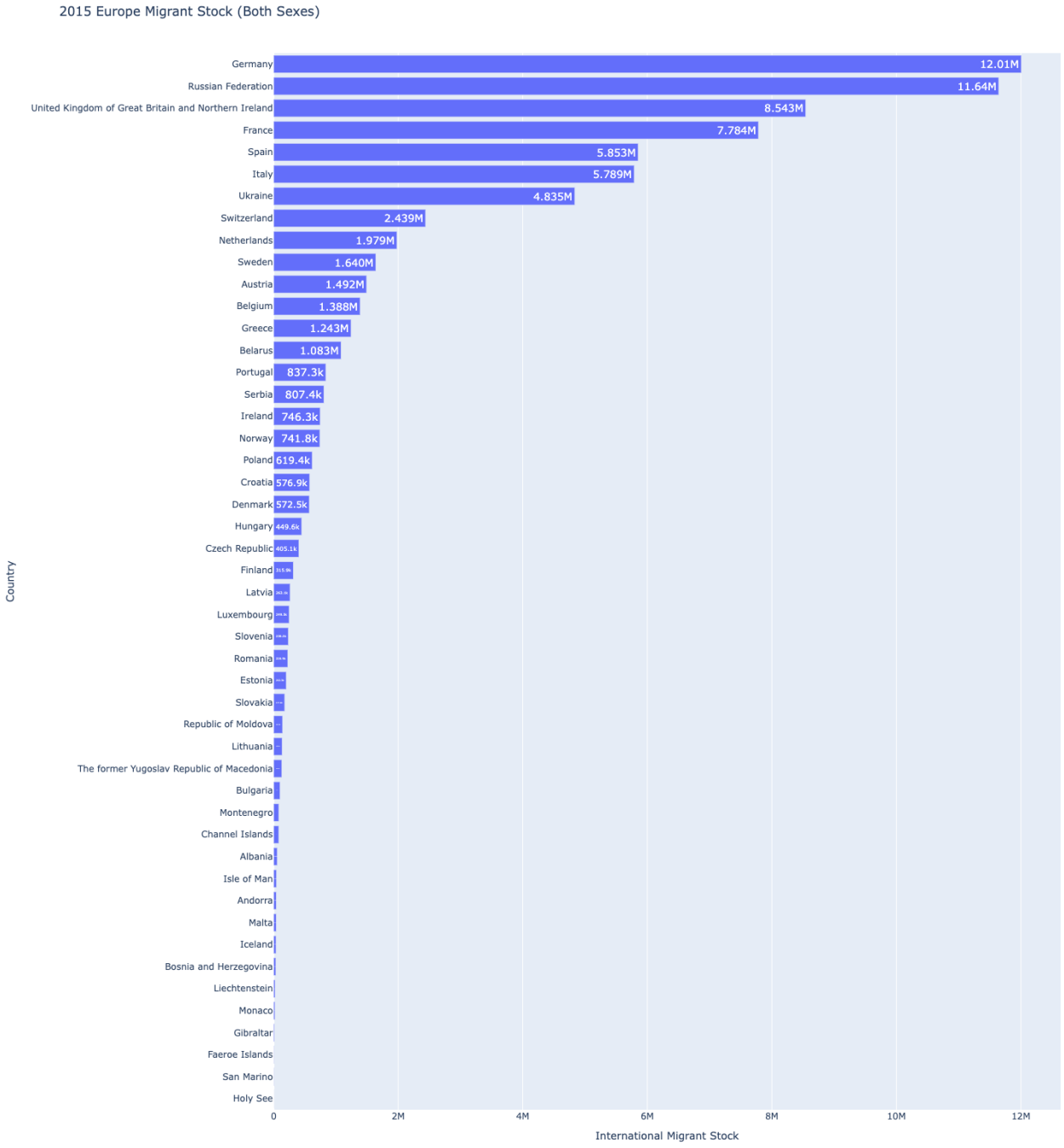

2015 Europe Population (Both Sexes)
Russian Federation 143.5k
Germany 80.69k
United Kingdom of Great Britain and Northern Ireland 64.72k
France 64.40k
Italy 59.80k
Spain 46.12k
Ukraine 44.82k
Poland 38.61k
Romania 19.51k
Netherlands 16.92k
Belgium 11.30k
Greece 10.95k
Czech Republic 10.54k
Portugal 10.35k
Hungary 9.855k
Sweden 9.779k
Belarus 9.496k
Serbia 8.851k
Austria 8.545k
Switzerland 8.299k
Bulgaria 7.150k
Denmark 5.669k
Finland 5.503k
Slovakia 5.426k
Norway 5.211k
Ireland 4.688k
Croatia 4.240k
Republic of Moldova 4.069k
Bosnia and Herzegovina 3.819k
Albania
Lithuania
The former Yugoslav Republic of Macedonia
Slovenia
Latvia
Estonia
Montenegro
Luxembourg
Malta
Iceland
Channel Islands
Isle of Man
Andorra
Faeroe Islands
Monaco
Liechtenstein
Gibraltar
San Marino
Holy See
Country
0
20k
40k
60k
80k
100k
120k
140k
European Population(thousands)

Figure 6



To provide a more descriptive insight into European migrant stock, I created a boxplot. In *Figure 7*, the boxplot has the Max of roughly 2.44 millions, the Q3 of roughly 1.32 million, the Median of roughly 0.29 million, the Q1 of 69,962, and the Min of 800. The boxplot is positive skewed and the median is closer to the bottom quartile. It means that the countries with less migrant population were closer together than the countries with more migrant population. What stands out here is the seven outliers that had a significant amount of international migrant population, which was Germany, Russia, the UK & Northern Ireland, France, Spain, Italy and Ukraine.

Figure 7

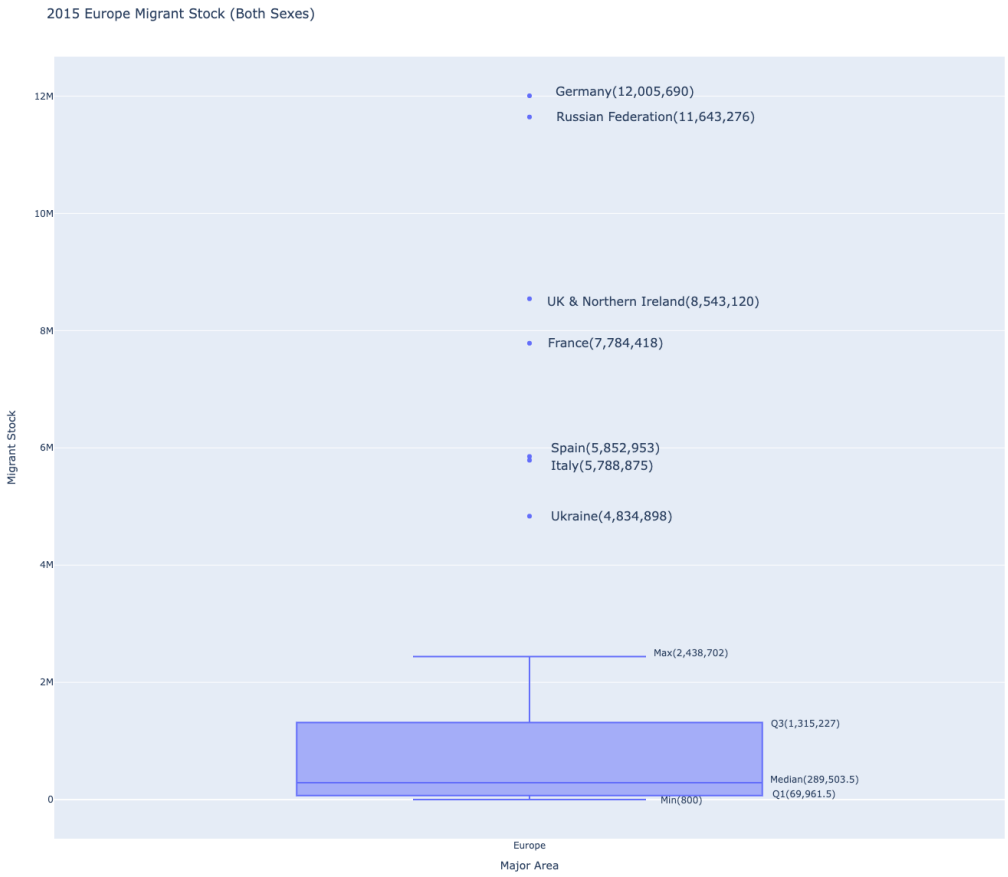
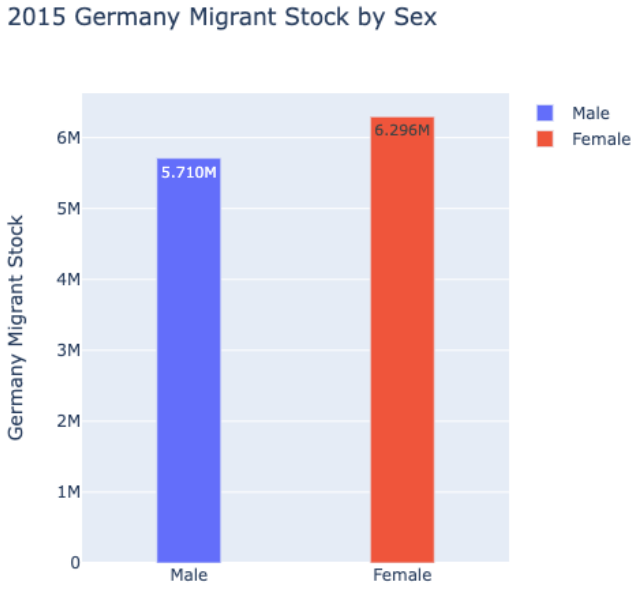


Figure 8



Germany's surprisingly high number of international migrant population piqued my interest so I decided to look into this country specifically. I broke down its migrant population by sex in 2015 and found out that female migrants exceeded male migrants by approximately 0.5 million (Figure 8) . In addition, as shown in *Figure 9*, the proportion of international migrants in terms of the total Germany population had increased from 1990 to 2015. However, we do see a more smooth increase from 2010 to 2015. This trend further confirms in *Figure 10*, which demonstrates that male, female and their aggregated annual rate of change in migrant population had been decreasing over the years, with the biggest drop in 2010 to 2015.

Figure 9

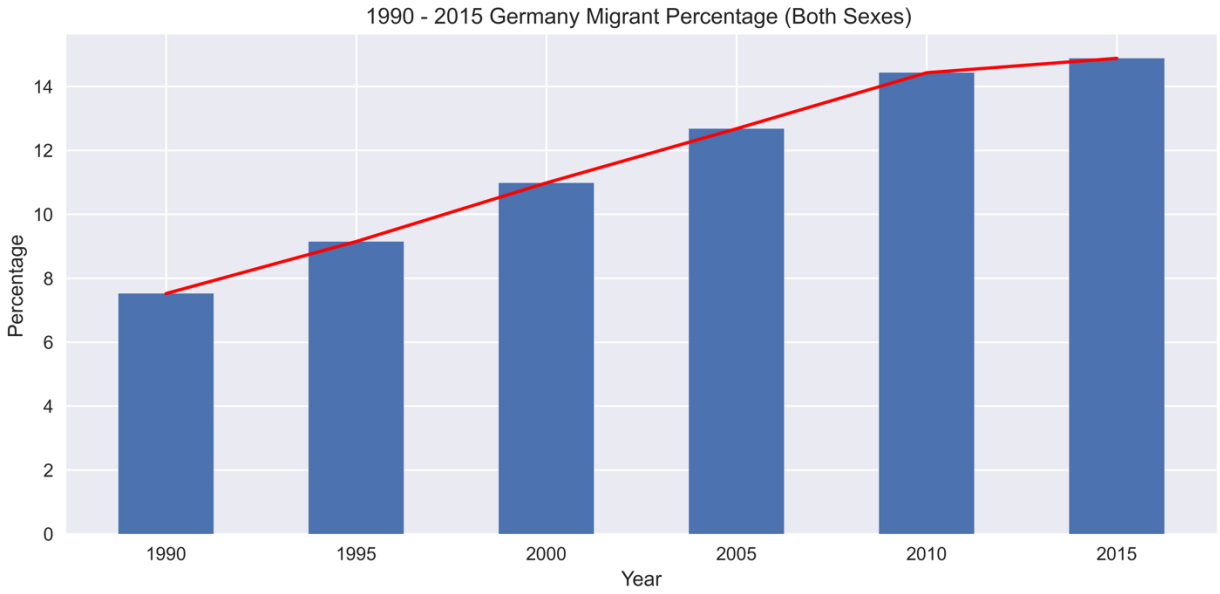
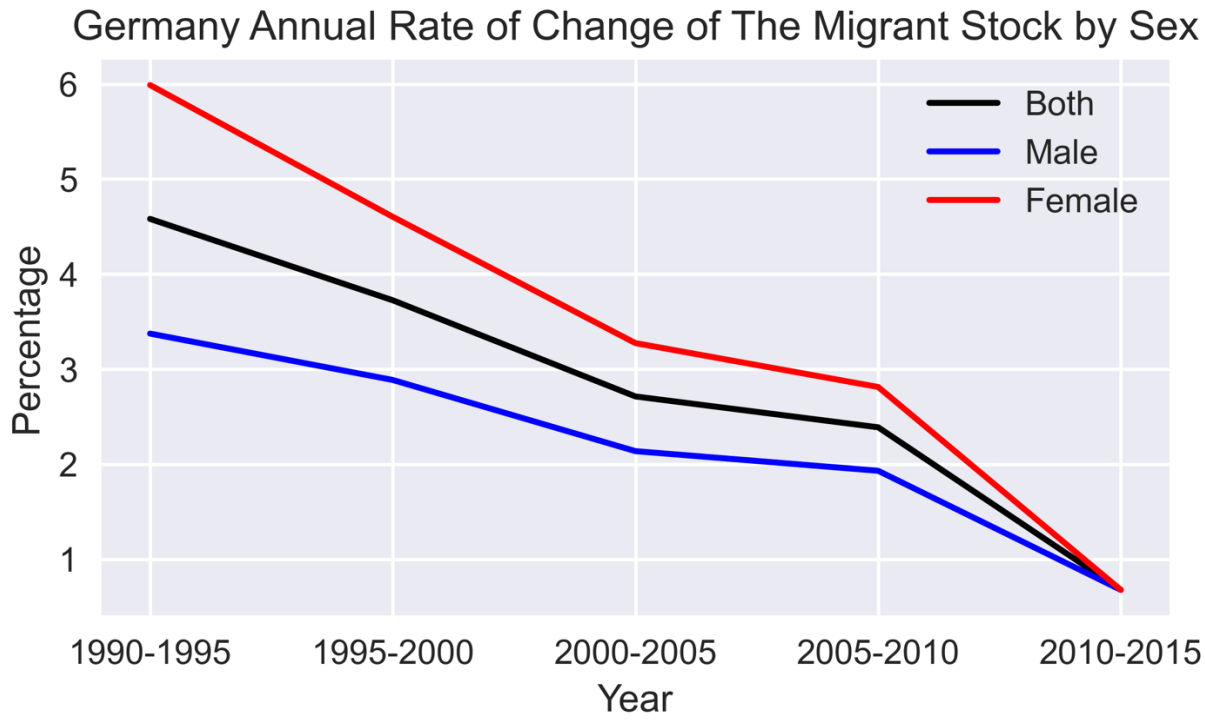


Figure 10



Additionally, Germany was also a popular destination for refugees as shown in *Figure 11*. In 2015, Germany was the third European country in terms of estimated refugee population, following France and Russia Federation. However, in *Figure 12*, we see that Germany's refugee stock increased at a large scale in 1995 but decreased over the years. Such influx of refugees was caused by the Yugoslav War that started in 1990 and pushed lots of refugees to seek asylums in

Germany. However, with the burgeoning refugee movement to Germany, mainstream politicians rushed to tighten asylum rules, which later successfully stopped the influx. As a result, the refugee population had been decreasing ever since. This decrease also reflected on the refugee population percentage in terms of the Germany total international migrant population as illustrated in *Figure 13*. Although there was a slight increase in Refugee Annual Rate of Change from 2000 to 2010 shown in *Figure 14*, the Annual Rate of Change dropped to more than -20% in 2015, indicating less refugees were entering Germany.

Figure 11

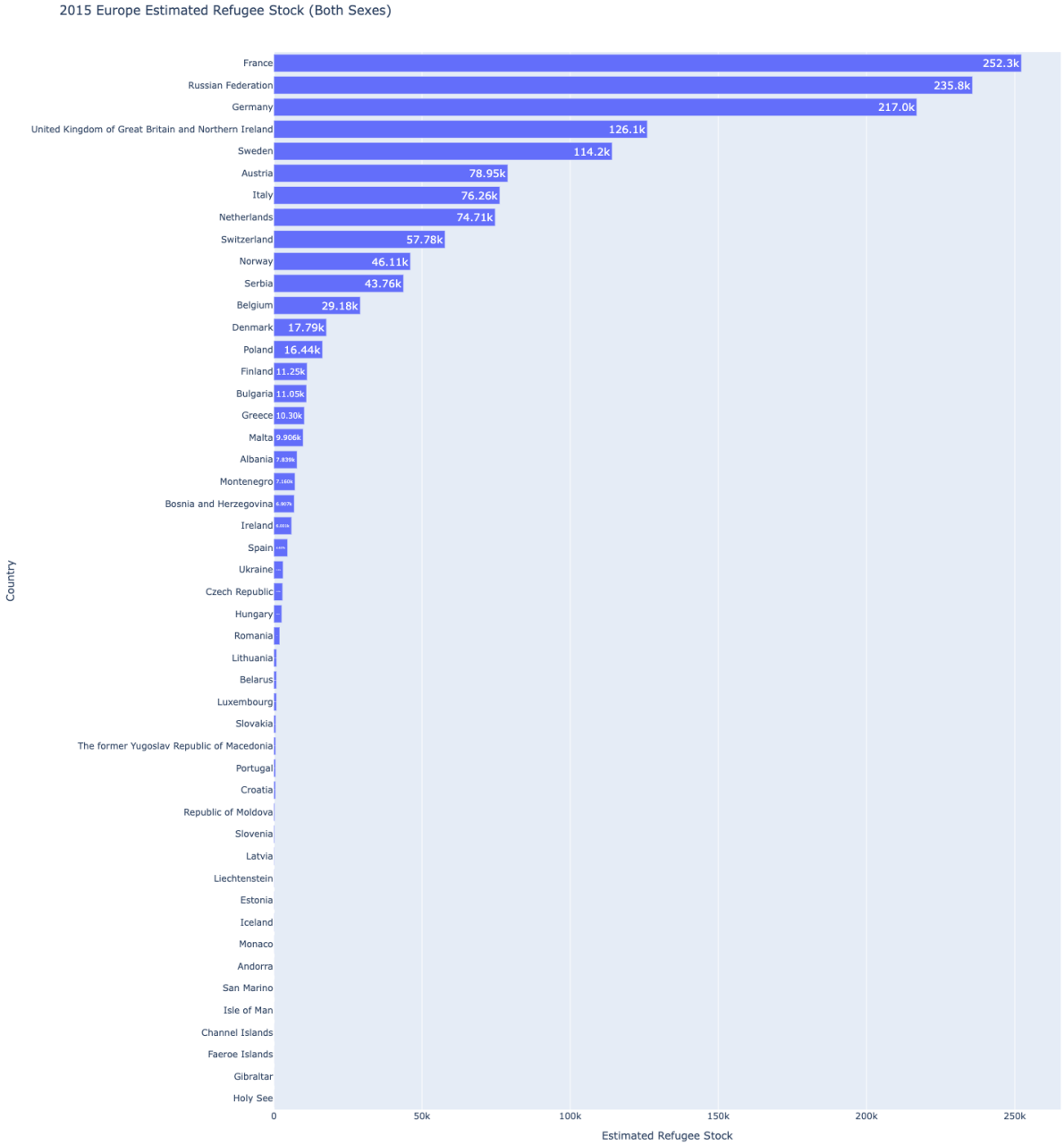


Figure 12

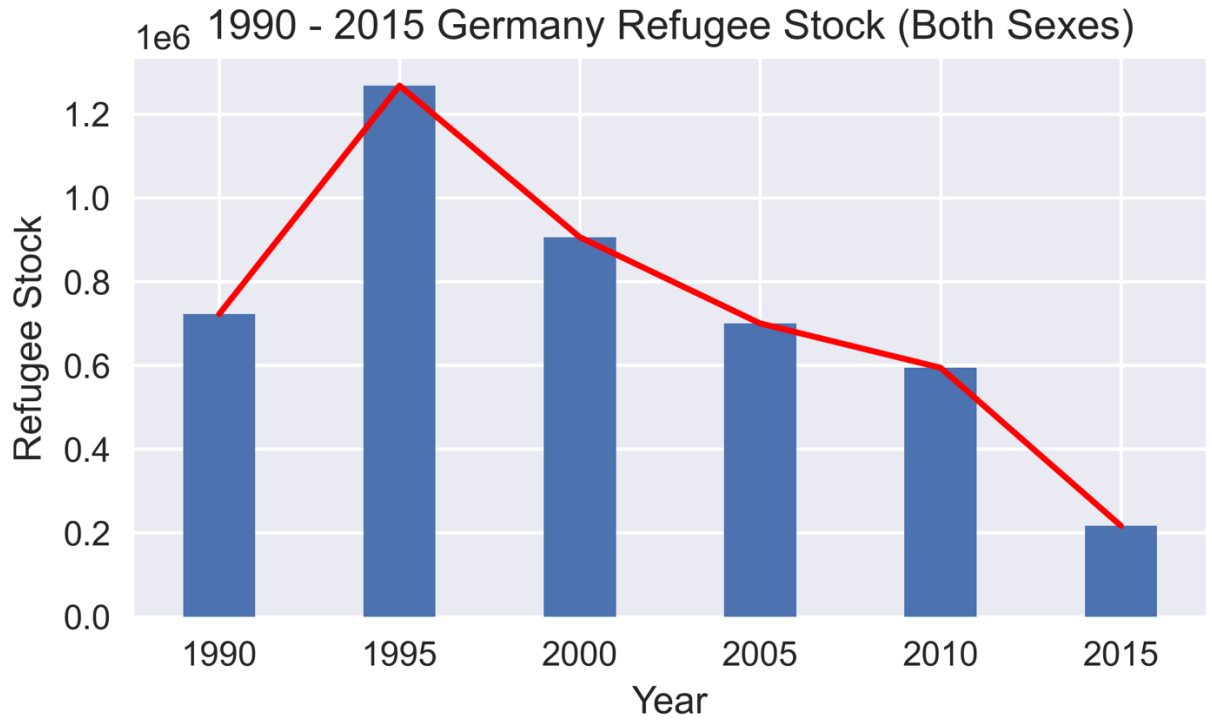


Figure 13

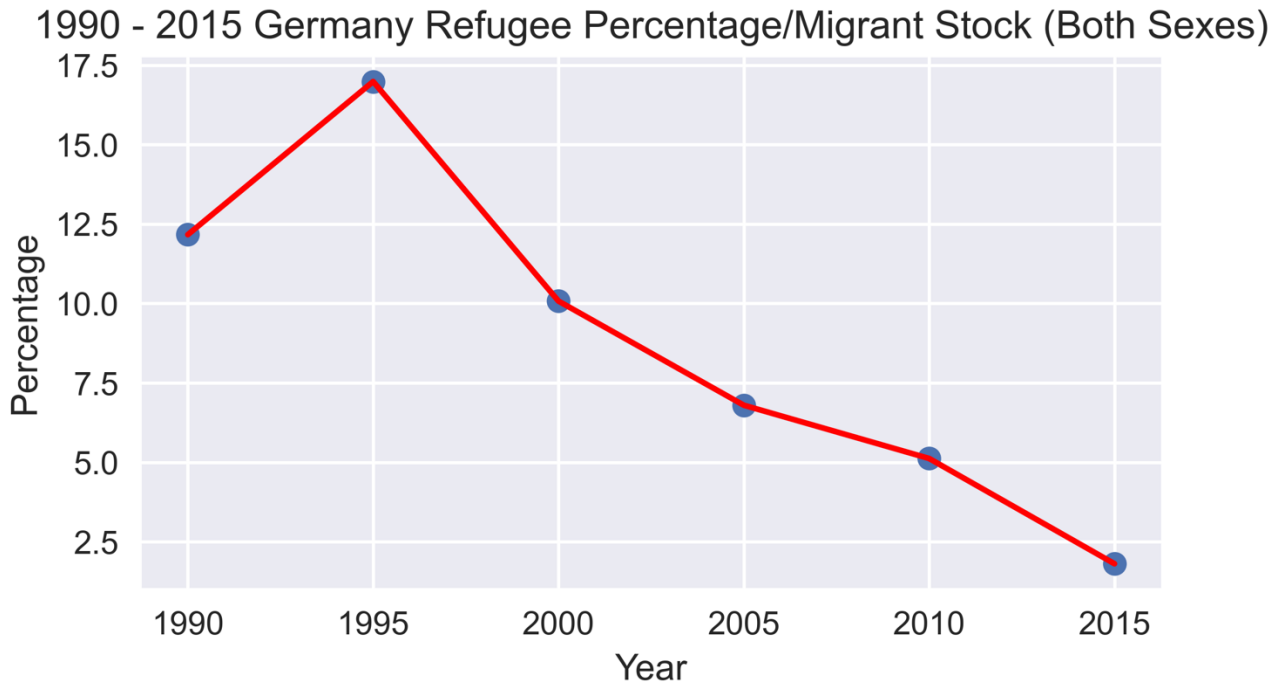
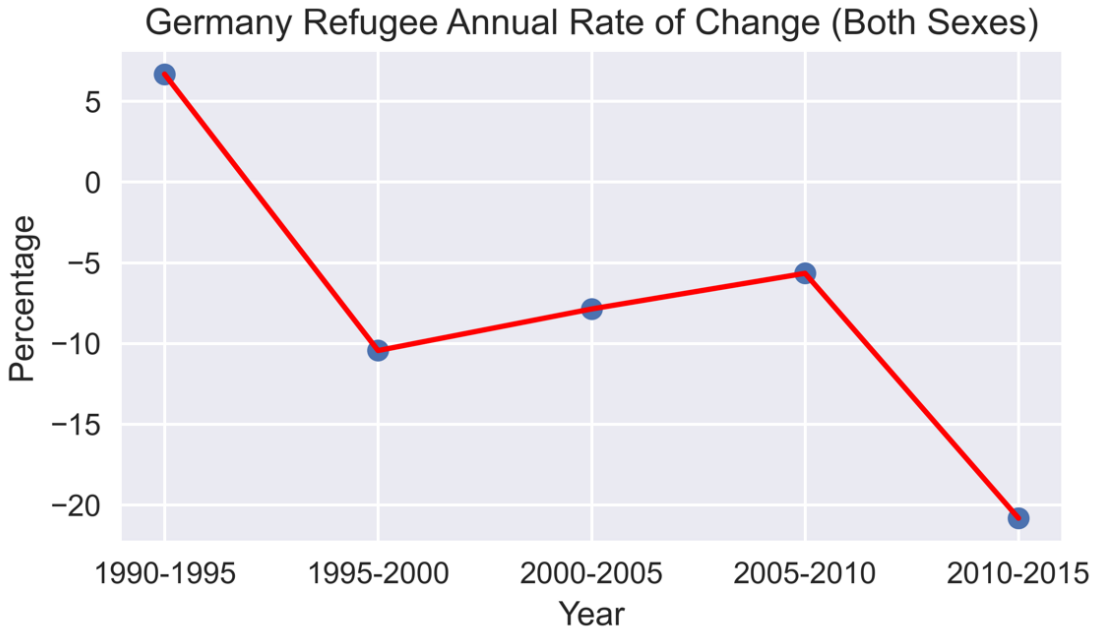


Figure 14



Discussion

There are a few takeaways from this report. First, although the factors associated with migration is multifaceted and complex, we can see that areas with higher migration population are more likely to be economically developed regions such as Europe, North America and Asia. However, it is also apparent that not all the countries are favoured by the migrants who tend to be selective in term of their destinations. This uneven distribution of international migrants might impose challenges to the selected countries in various aspects such as socially and politically. Next, German studies had found that female refugees/immigrants faced more obstacles to joining the job market than their male counterparts (Wallis, 2021) (Salikutluk, 2020). Although differences exist between refugee, immigrants and migrants, other shared factors related to intersectionality such as gender, education and ethnicity can also act as an obstacle to prevent female migrants to succeed in the labour market, which requires German government to address. Lastly, as I mentioned in the introduction that an influx of refugee entered Germany in 2015, although the dataset does not contain information after 2015, future research can look into this refugee crisis and provide some useful insights in addressing refugee/migrant issues.

Overall, I think this project is helpful and interesting. This project was helpful in the way that it helped me familiarize what I had learned in class and applied the knowledge to a real-world dataset. I learned to how clean a dataset and generate visual aids to understand a demographical situation, which could help me land a potential Co-op position. However, it is obvious I still need to keep enhancing my coding skills in the future. Again, same as the midterm project, the challenging part was that there was no specific way of completing, which required me to brainstorm how to tell a story with the dataset and results I generated. However, brainstorming was also the interesting part as I could freely decide what I wanted to analyze.

References

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