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Data Visualization on Trends in International Migrant Stock

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Introduction

This document in general reflects the trends in international migrant stock ranging from 1990-2015. It measures the data in different categories including location and gender. It has six excel sheets which contains information including international migrant stock, total population, international migrant stock as a percentage of the total population, female migrants as a percentage of the international migraine stock, annual rate of change of the migrant stock, and estimated refugee stock. The original data set has been cleaned based on tidy data principles. The objective of this project is to conduct data visualization to better understand the information contained in these data sets.

Methods and Results

To understand the international migrant stock, table 2 was first studied as it contains information regarding the total population count. Therefore, it will provide us with the general trend of total population ranging from 1990 to 2015 in 25 years. Of course, Tufte's Principles were followed so that all the charts were labeled properly with titles and descriptions. At the same time, each graph measured a limited quantity of variables within the number of dimensions. For the total population count, box plot was used to understand the population distribution and skewness. The trend of population was also clearly displayed using the box plot as shown in Figure 1.
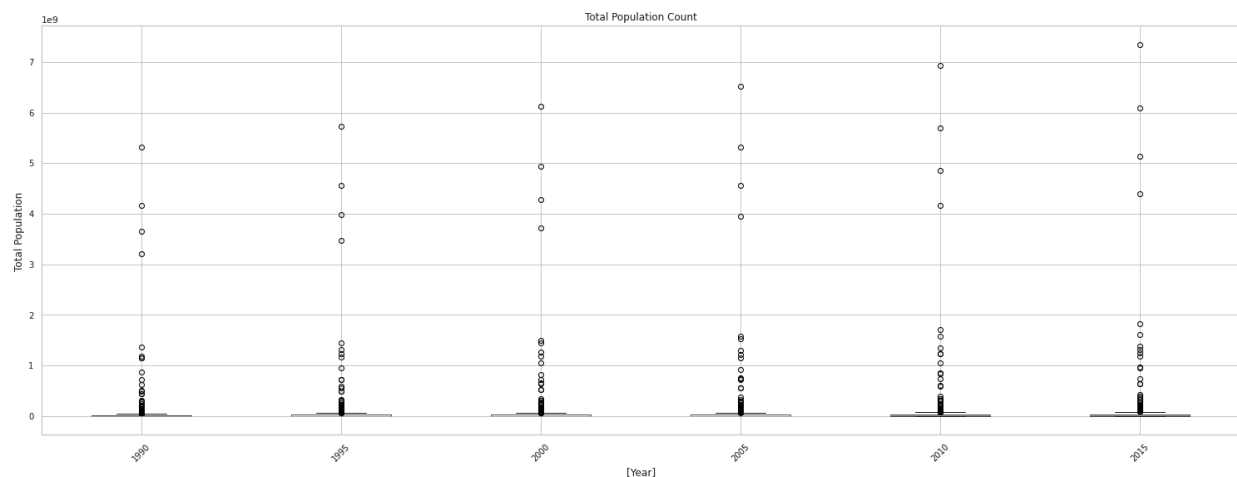

Figure 1. Total Population Count

As shown in Figure 1. The world population has a continuous increasing trend from 1990 to 2015. This increasing trend could be seen in both developed and developing countries. At the same time, from the box plot, we can see that most countries' population is below 1000 million. Another interesting finding is that the difference between each countries' population seems to be getting bigger and bigger through the years.

After understanding the trend of the world's total population, the next question is how is the trend of migrants and how does it compare to the world's total population. To visualize this trend, I had to combine table 1 with table 2. And based on Tufte's Principles, besides stacked bar charts, a line chart was also created to better show the trends of migrants compared to total population.
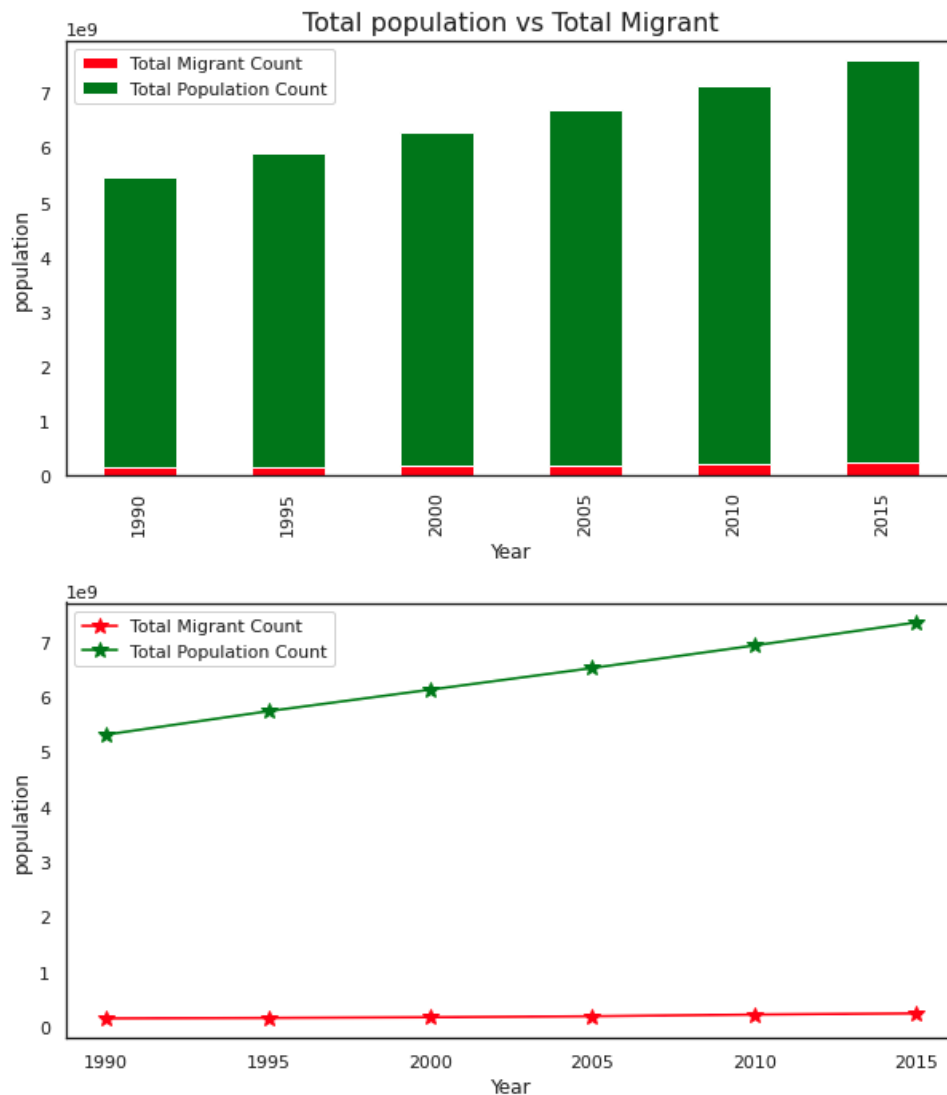

Figure 2. Total Population VS Total Migrant

As shown in Figure 2, it can be seen the increase in the migrant count is far less visible compared to the total population. Despite the fact that we have more population, the percentage of migrants inside the total population is decreasing in 25 years. At the same time, it can be seen that the increase in world population follows a linear distributed line which means the increasement each 5 years are pretty much within a similar range.

Table 2 was also used to study the counts of female and male in the world population and migrants. For this part, a stacked bar chart was also used to have a clear comparison between female and male counts
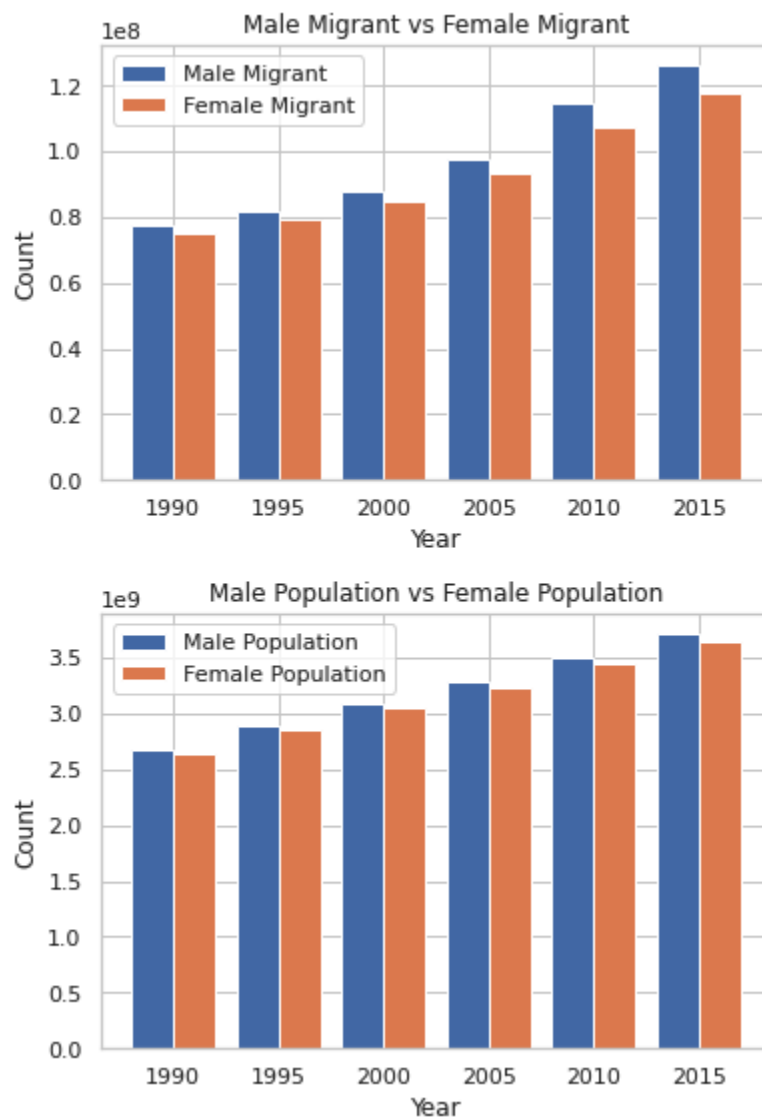

Figure 3. Male vs Female

As shown in Figure 3, both male and female population are growing through the years and there is always more male population than female population in the world. When it comes to the migrant population, there are also more male migrants than female migrants. What is also interesting is that male migrants are growing more rapidly than female migrants.

Moving to table 3, the line chart was used to study the trend of percentage of migrant in developed regions as well as in the developing regions.
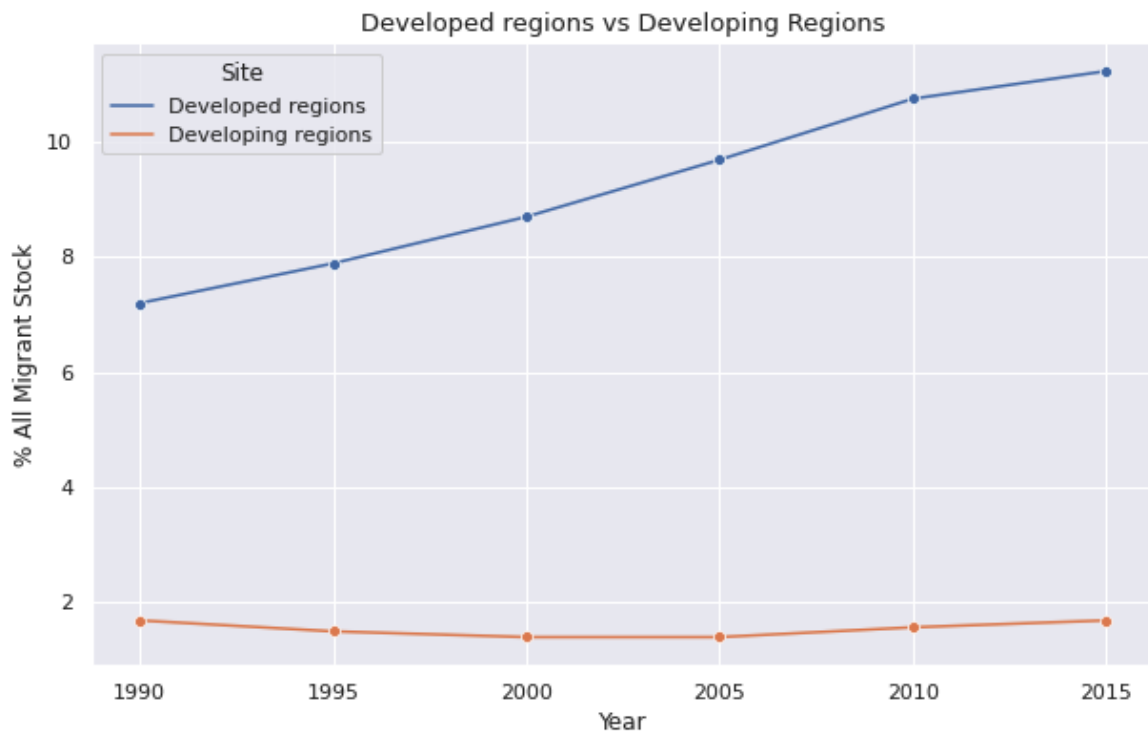

Figure 4. Developed Regions vs Developing Regions

As shown in Figure 4, it is really obvious that there is a higher percentage of migrant stock in developed regions compared to developing regions and this difference is getting bigger and bigger through the years. At the same time, the percentage of migrant stock in developed regions continuously increased through the years while the percentage of migrant stock in developing regions didn't have that much variation.

To dig more information in this table, the trend of percentage of all migrant stock in developing regions, least developed countries and less developed regions excluding least developed countries were studied using a line chart.
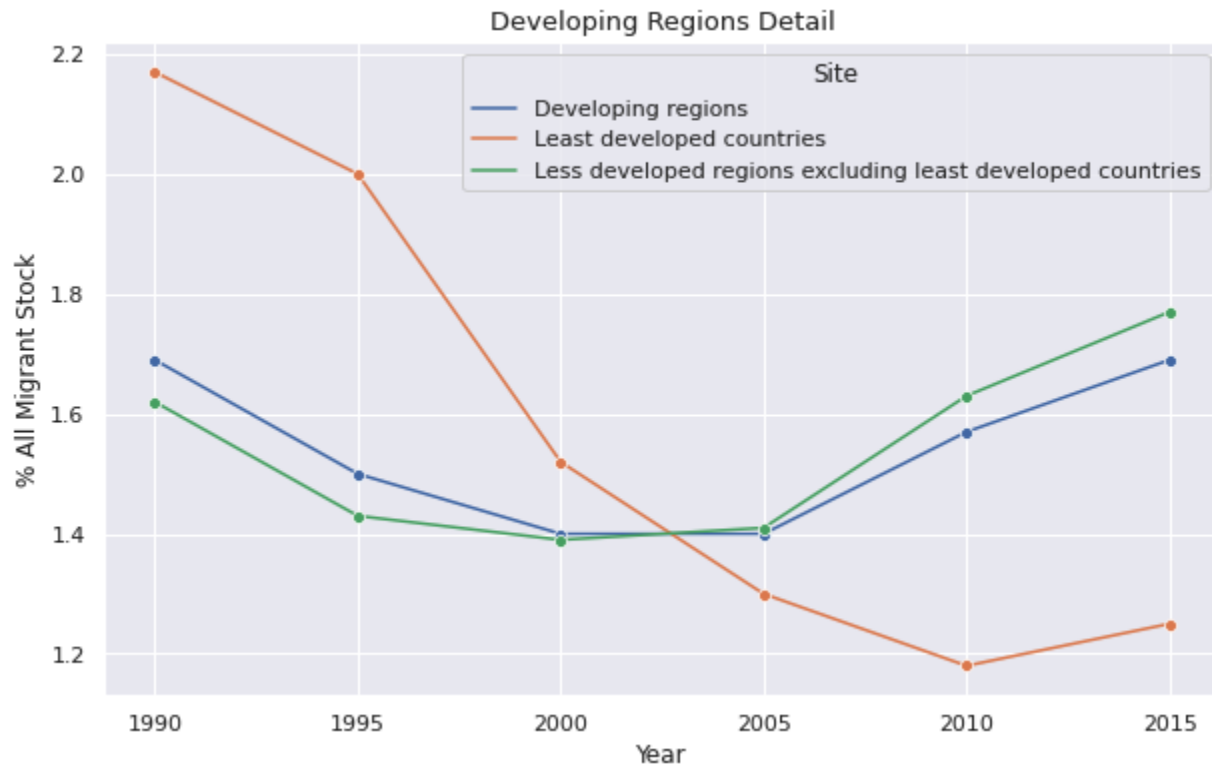

Figure 5. Developing Regions Detail

As shown in Figure 5, from 1990 to 2000, the percentage of all migrant stock in all these places were decreasing. From 2010 to 2015, the percentage of all migrant stock in all these places was increasing. The reason behind it will be an interesting topic to work on.

Also from Figure 5, it can be seen that the trend for least developed countries had a dramatic decrease compared to others. Therefore, a bar chart was plotted to better understand the details of it.
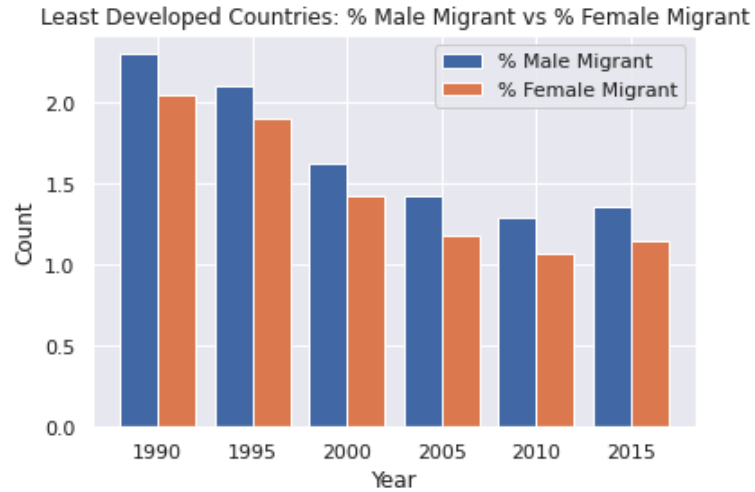
Figure 6. Least Developed Countries: % Male Migrant vs % Female Migrant

As shown in figure 6, there are more male migrants than female migrants and the difference between the two groups didn't show a dramatic change through the years.

Moving to table 4 where only female migrants were studied, the violin chart was used to understand the distribution of it in different regions.
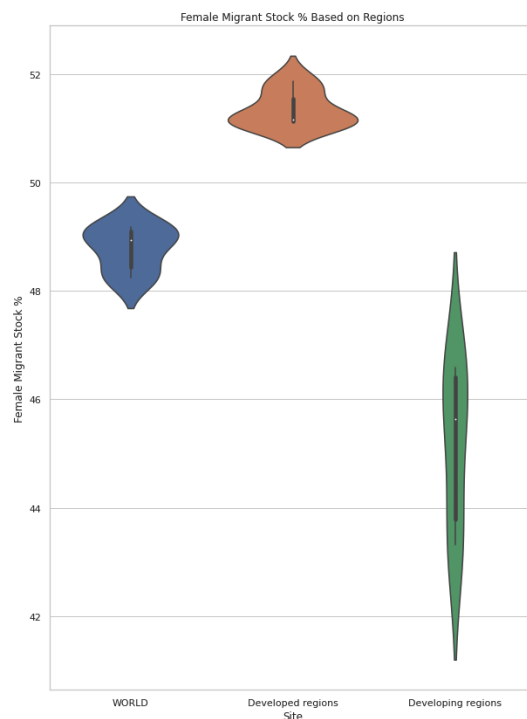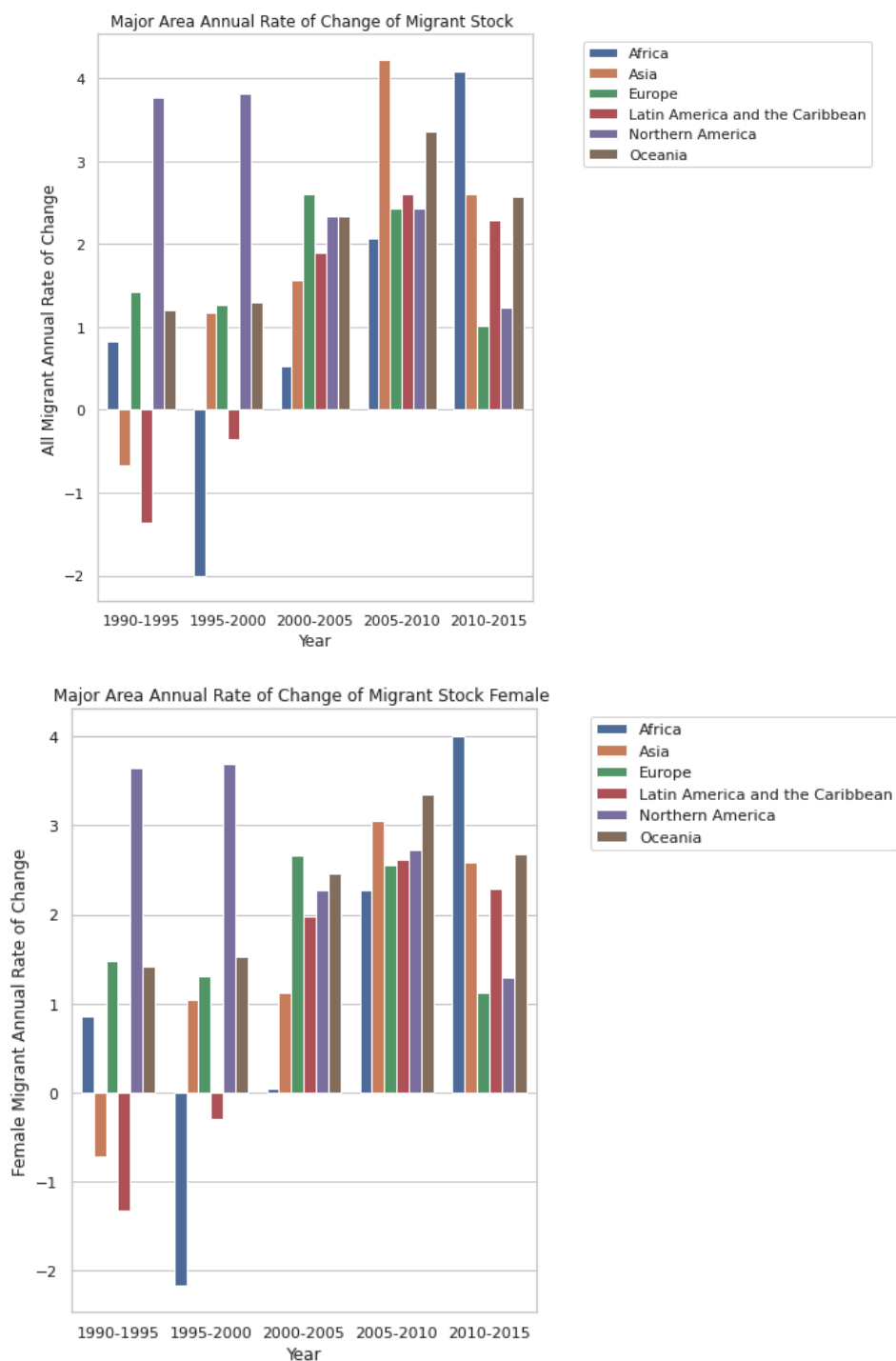

Figure 7. Female Migrant Stock % Based on Regions

As shown in Figure 7. The percentage is the highest in developed regions and the peak is around 51% with most regions ranging from 51% to 52%. For developing regions, the percentage of female migrant stock is lower ranging from 41% to 49% with the peak around 46%.

For table 5, the annual rate of change of migrant stock was studied in major areas in bar charts.
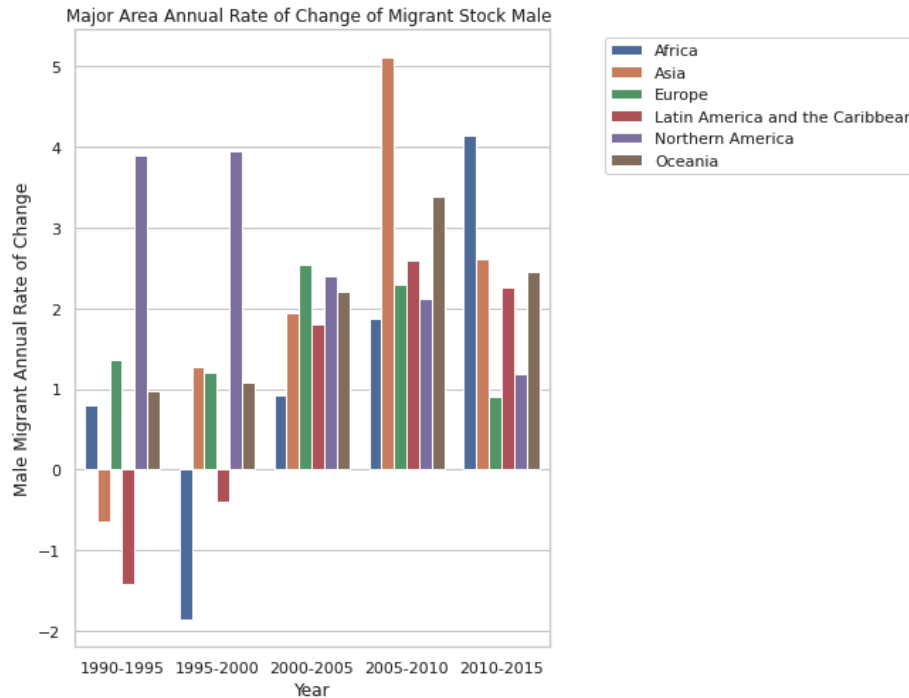
Figure 8. Major Area Annual Rate of Change of Migrant Stock

From Figure 8, the rate of change can be easily seen and compared. Some interesting findings are that Africa experienced the most dramatic decreasing rate from 1995 to 2000. The reason behind it could be a good topic to explore. This might be due to the poor economics at that time.

Table 6 is focusing on refugees. The line chart was firstly used to understand the trend of refugee % of total migrant stock trend.
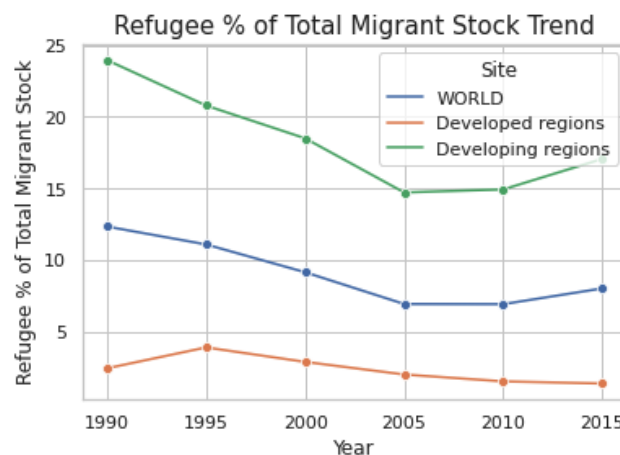

Figure 9. Refugee % of Total Migrant Stock Trend

As shown in Figure 8. The refugee % of total migrant stock in developed regions was decreasing from 1995 to 2015. But for developing regions, the percentage is going up in recent years from 2005 to 2015.

Moving forward, table 6 was combined with table 1 to calculate the numbers of refugees in each area. And the bar chart was used to have a better demonstration of the data
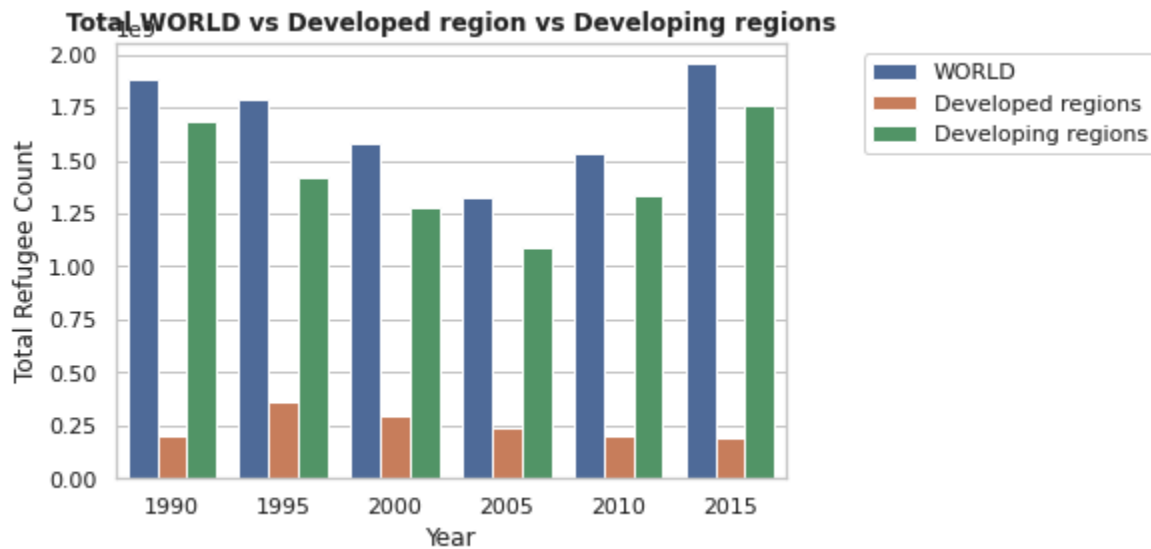

Figure 10. Total World vs Developed region vs Developing regions

From figure 10, it is really sad to find out that the refugee count increased in recent years from 2005 to 2015 and most of them emigrated to developing regions instead of developed regions.
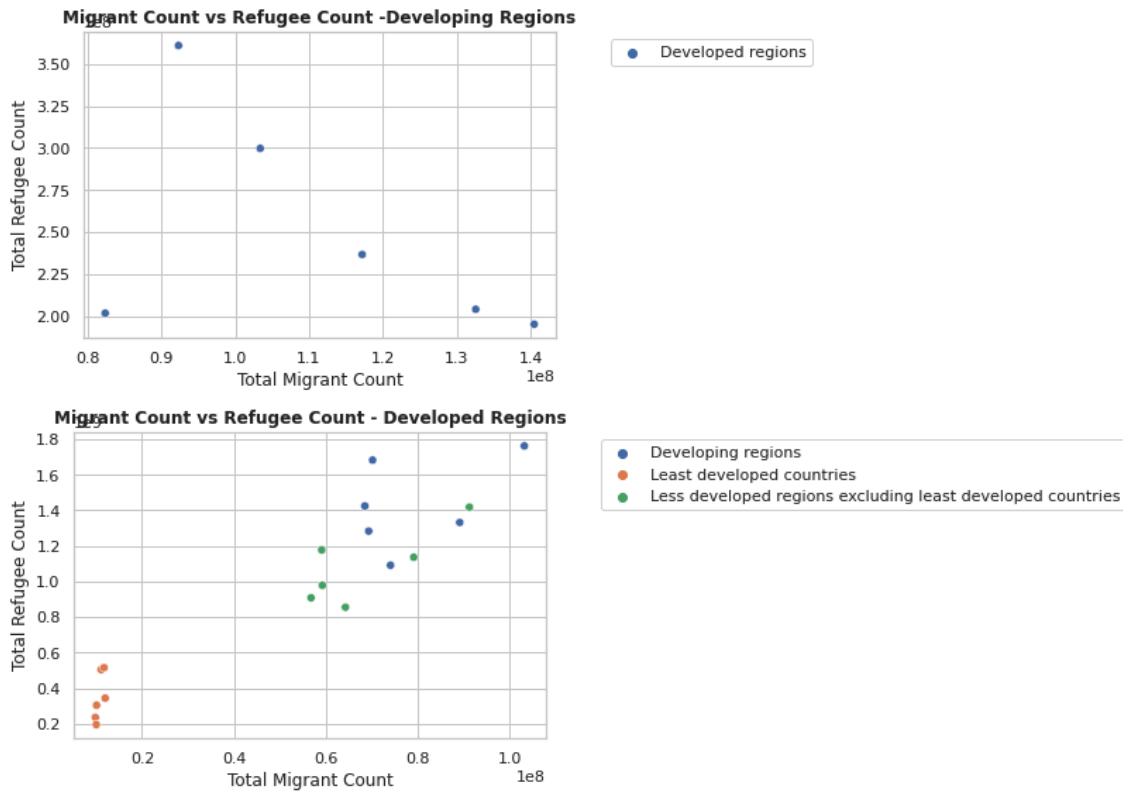
Figure 11. Migrant Count vs Refugee count

From Figure 11, it can be seen that even though the total migrant in developed regions were increasing, there are less and less refugees.
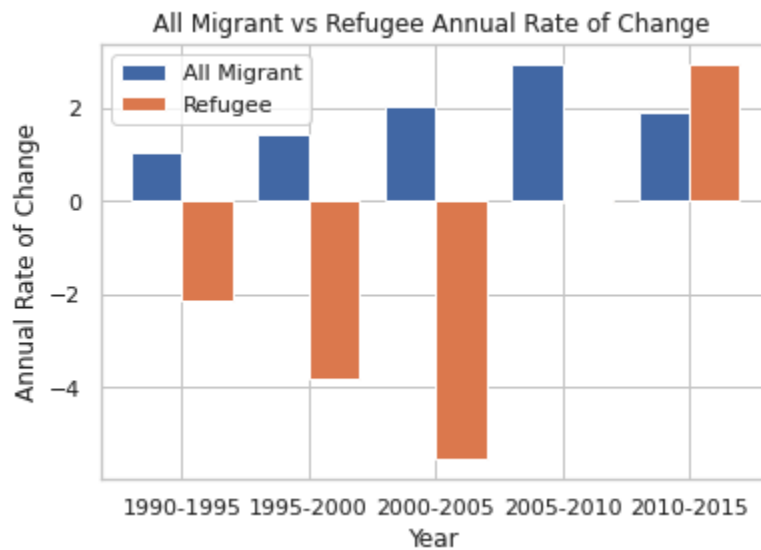

Figure 12. All Migrant vs Refugee Annual Rate of Change

From Figure 12, we can see that starting 2010, the annual rate of change of refugees became positive. There could be some reasons regarding politics, economics or wars.

Discussion

There is a lot of information contained in these data sets. This report however only reflects a portion of the information. But there are still a lot of interesting findings that can be retrieved from the graphs. For example, the number of refugees started increasing after 2010. It will be meaningful to study the reasons behind these trends. The current data visualization of these data sets was conducted without a specific topic or question. It could be more informative if a topic or question is selected before the work. However, I believe the current visualization we have can provide our audience a general feeling of the trend of world population, the world migrant stock, male and female stock, refugees from 1990 to 2015.