

Compiled Graphs on Statistical Data Visualization

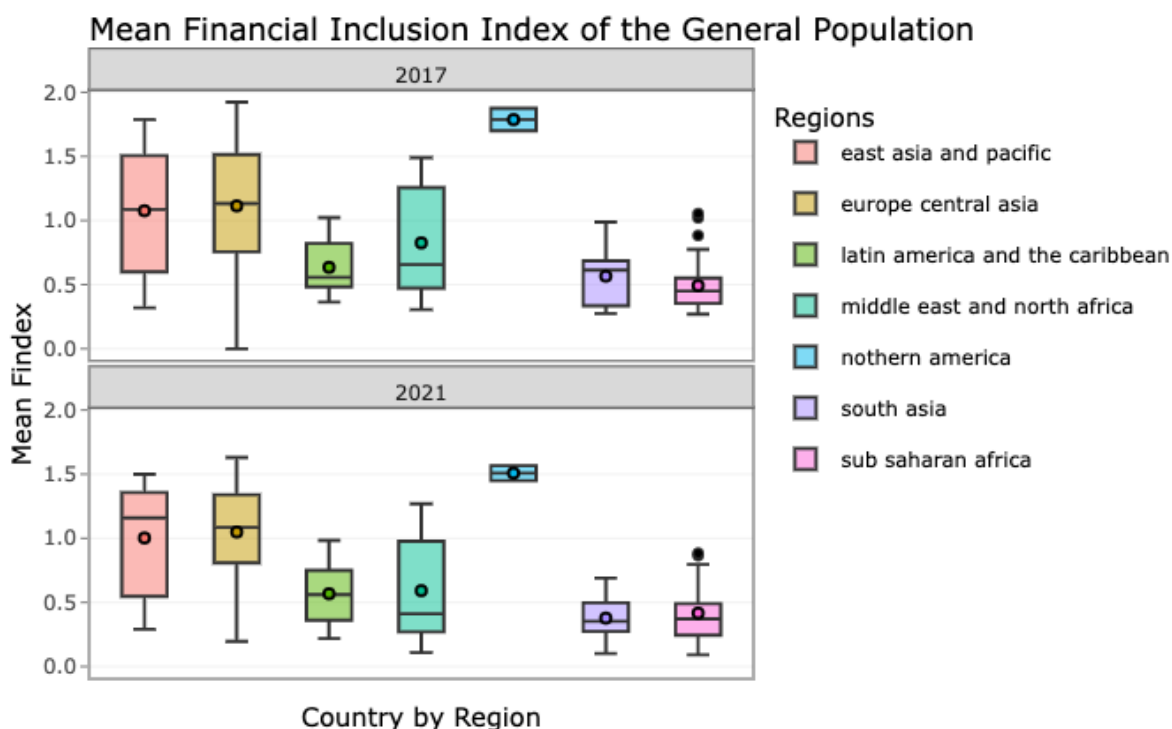
1.1 Region Data Visualization Analysis

We used the New World Bank country classifications by income level for the year 2022-2023 (Hamadeh et al., 2022) to categorize all countries within the General Population, Women, and Low-Income Adults' data frames according to their respective regions. It is important to note that these regional classifications include economies at various income levels.

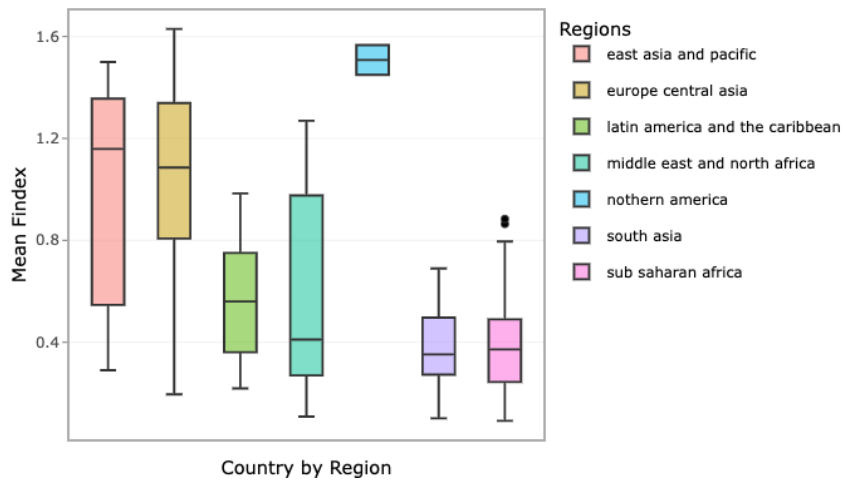
Our objective is to assess the financial inclusion index rates of countries within each region, focusing on distinct target populations such as the general population, women, and low-income adults. This approach facilitates meaningful comparisons among countries sharing the same geographic regions, enabling us to discern best practices and areas requiring improvement.

This section examines the statistical data visualization of countries' financial inclusion (FI) index rates by region. According to the section on country-by-region FI index rates, we observed a decrease in the mean FI across all seven region groups within the GFD for all three focused groups. This suggests that, on average, most countries experienced a decrease in their FI index rate. Consequently, most regional groups exhibited an overall decrease both before and during COVID-19.

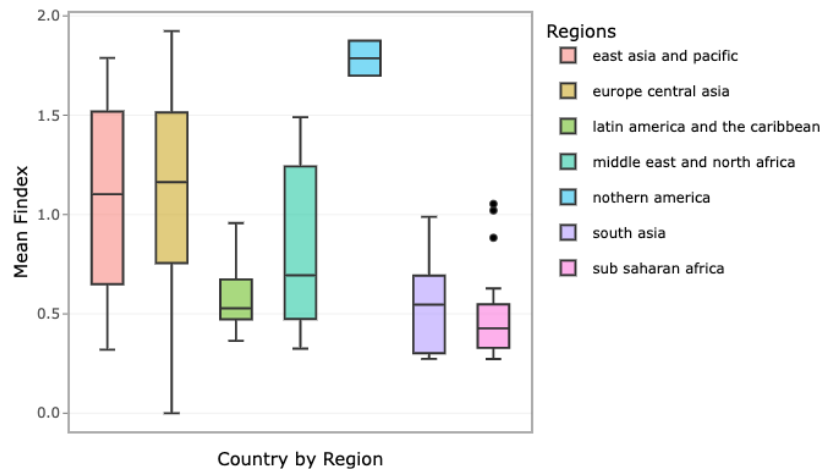
General Population: Financial Inclusion Index Scores by Region



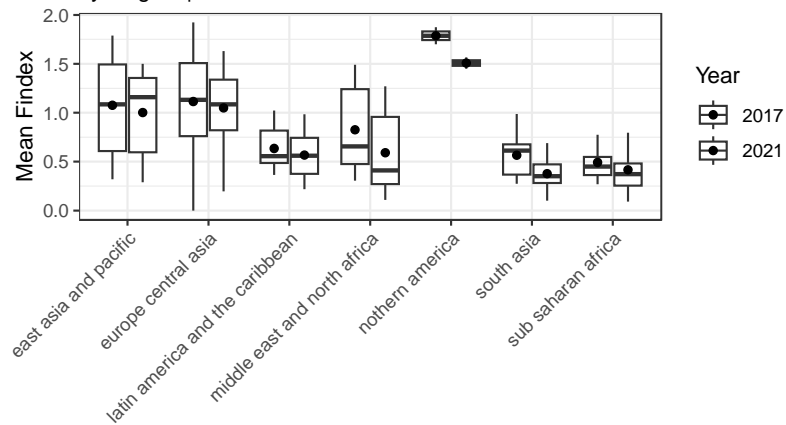
Mean Financial Inclusion Index of the General Population 2021



Mean Financial Inclusion Index of the General Population 2017



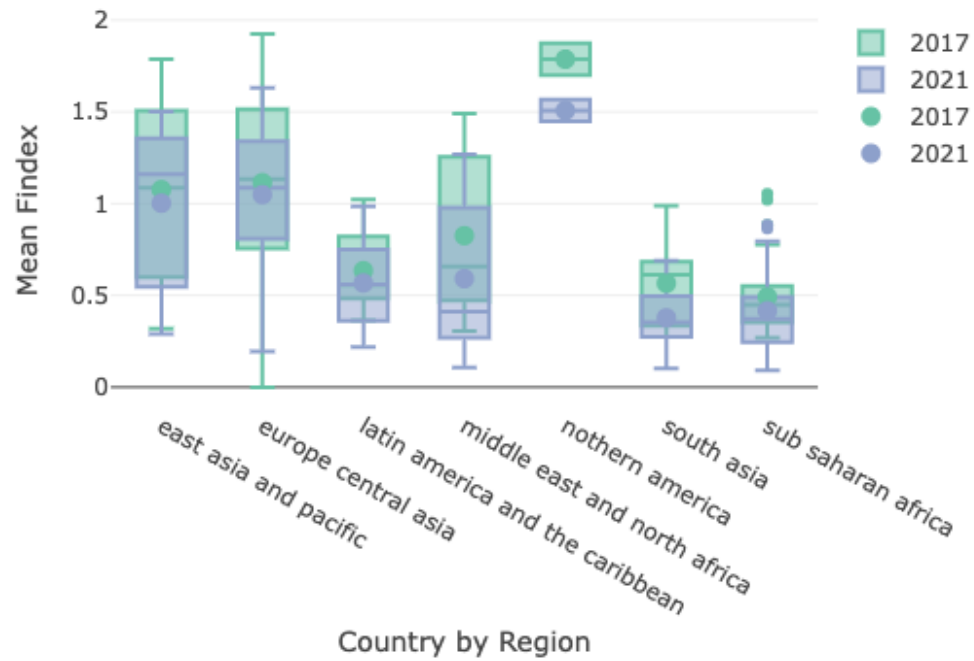
Mean Financial Inclusion Index of the General Population by Region | 2017 & 2021



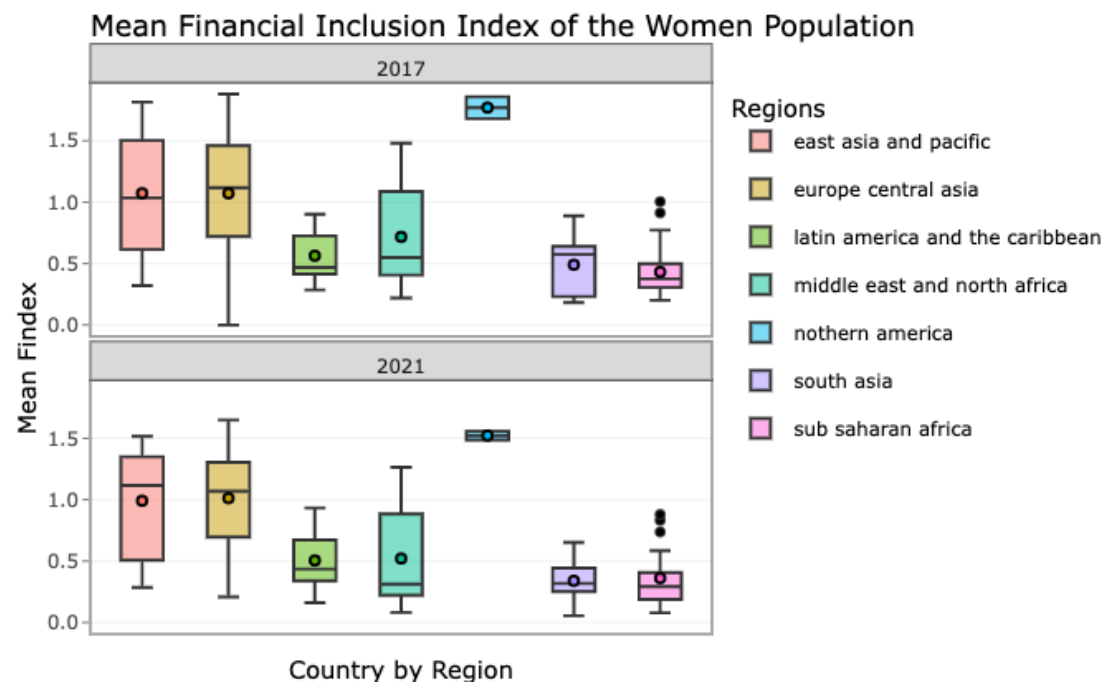
Countries by Region

Data: Global Findex Database, The World Bank 2023

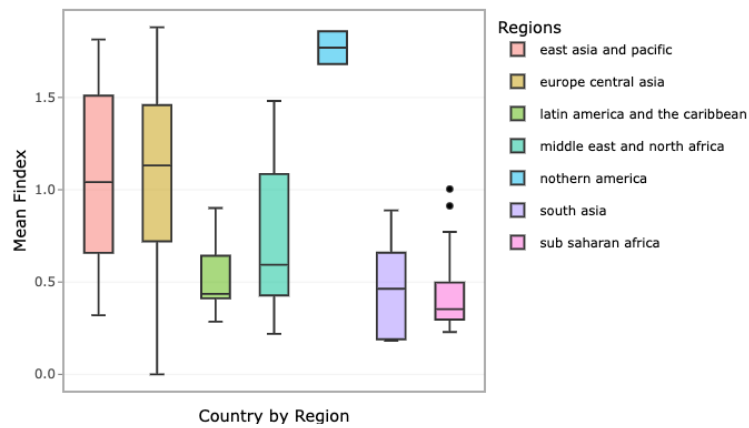
Mean Financial Inclusion Index of the General Population



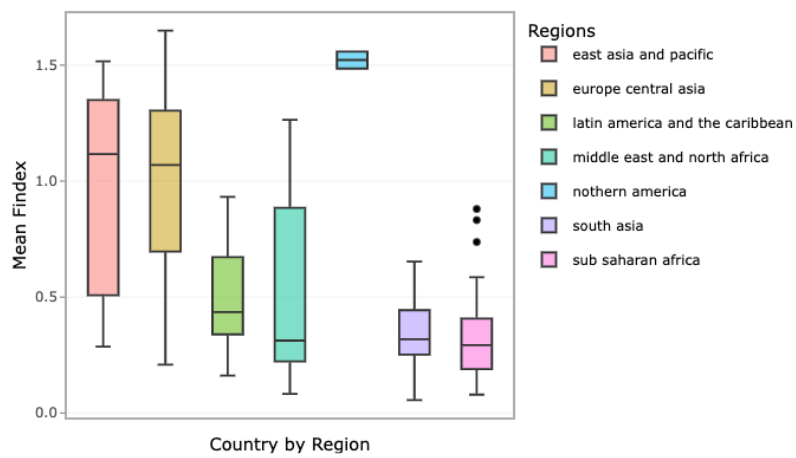
Women Population: Financial Inclusion Index Scores by Region



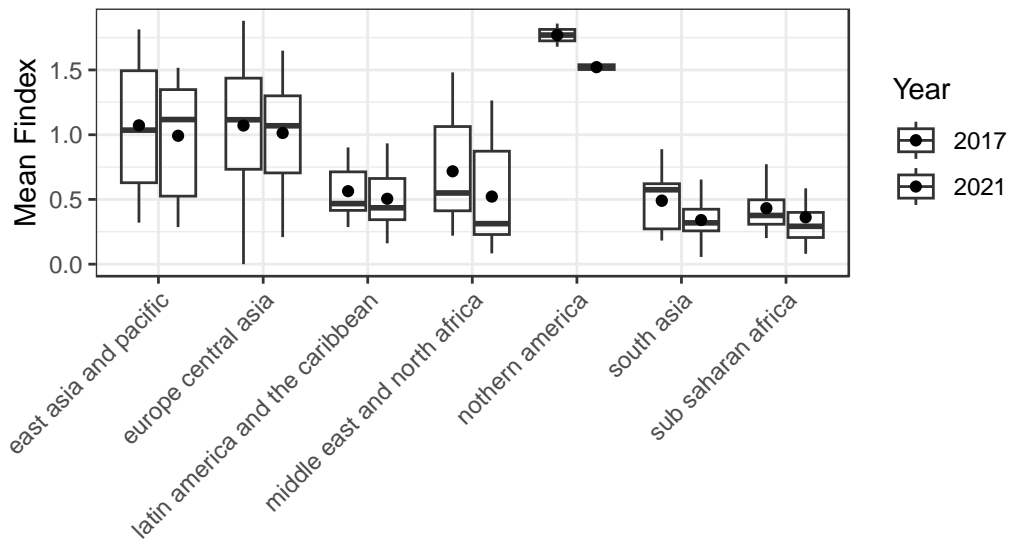
Mean Financial Inclusion Index of the Women Population 2017



Mean Financial Inclusion Index of the Women Population 2021

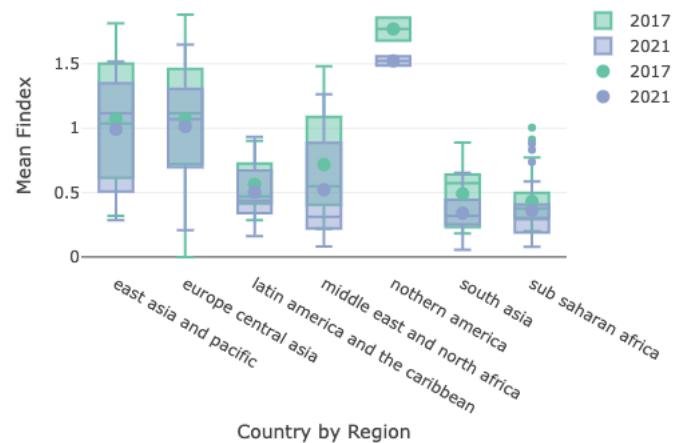


Mean Financial Inclusion Index of the Women Population by Region | 2017 & 2021



Data: Global Findex Database, The World Bank 2023

Mean Financial Inclusion Index of the Women Population

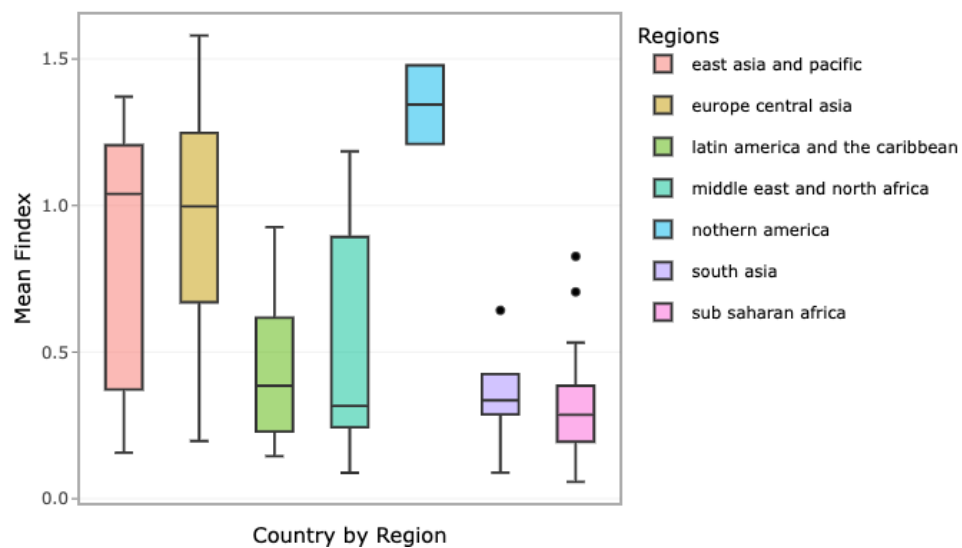


Low-Income Adults Population: Financial Inclusion Index Scores by Region

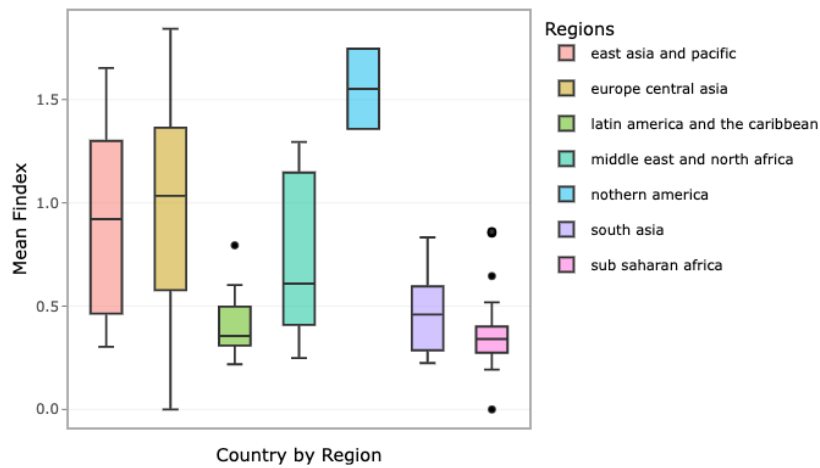
Mean Financial Inclusion Index of the Poorest Population



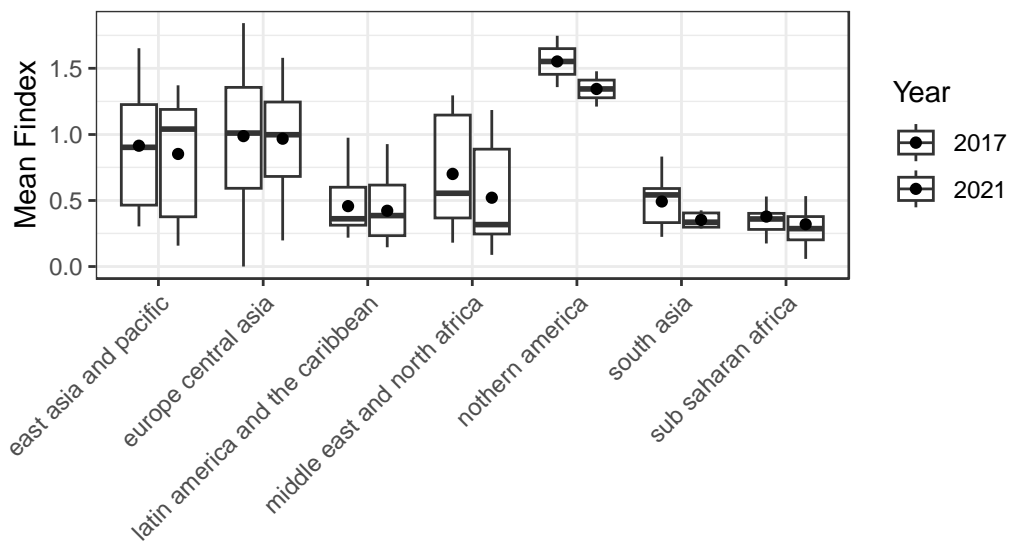
Mean Financial Inclusion Index of the Poorest Population 2021



Mean Financial Inclusion Index of the Poorest Population 2017

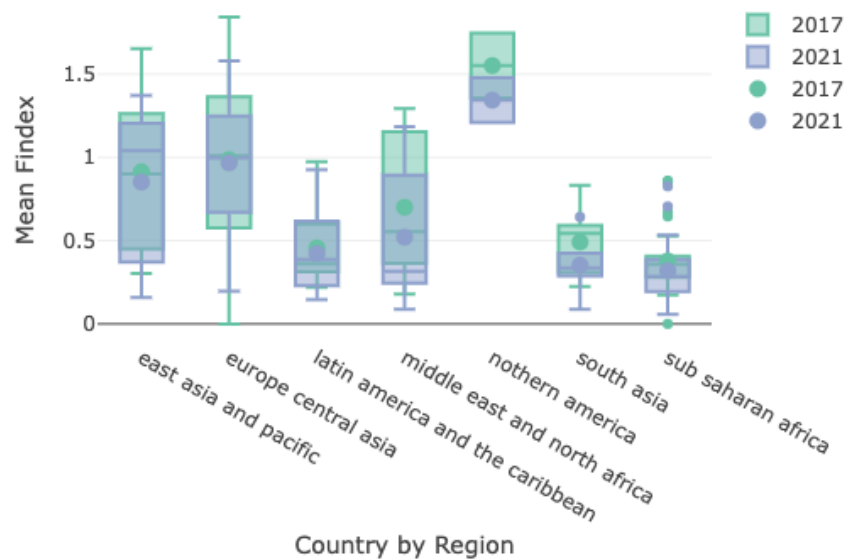


Mean Financial Inclusion Index of the Poorest Population by Region | 2017 & 2021



Data: Global Findex Database, The World Bank 2023

Mean Financial Inclusion Index of the Poorest Population



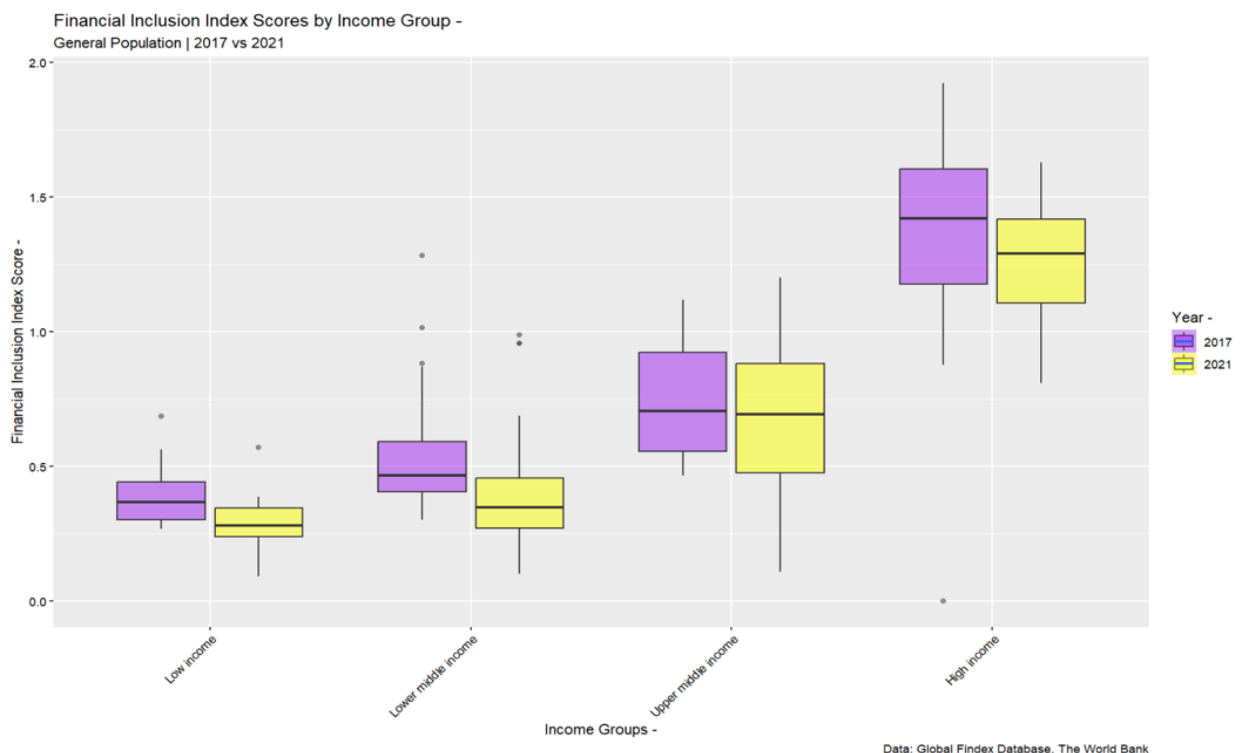
2.1 Income Group Data Visualization Analysis

We used the GFD (Watkins et al, 2023) to categorise all countries within the General Population, Women, and Low-Income Adults' data frames according to their respective income group. The GFD consists of 5 different income groups; Low income, lower middle income, upper middle income, and high income.

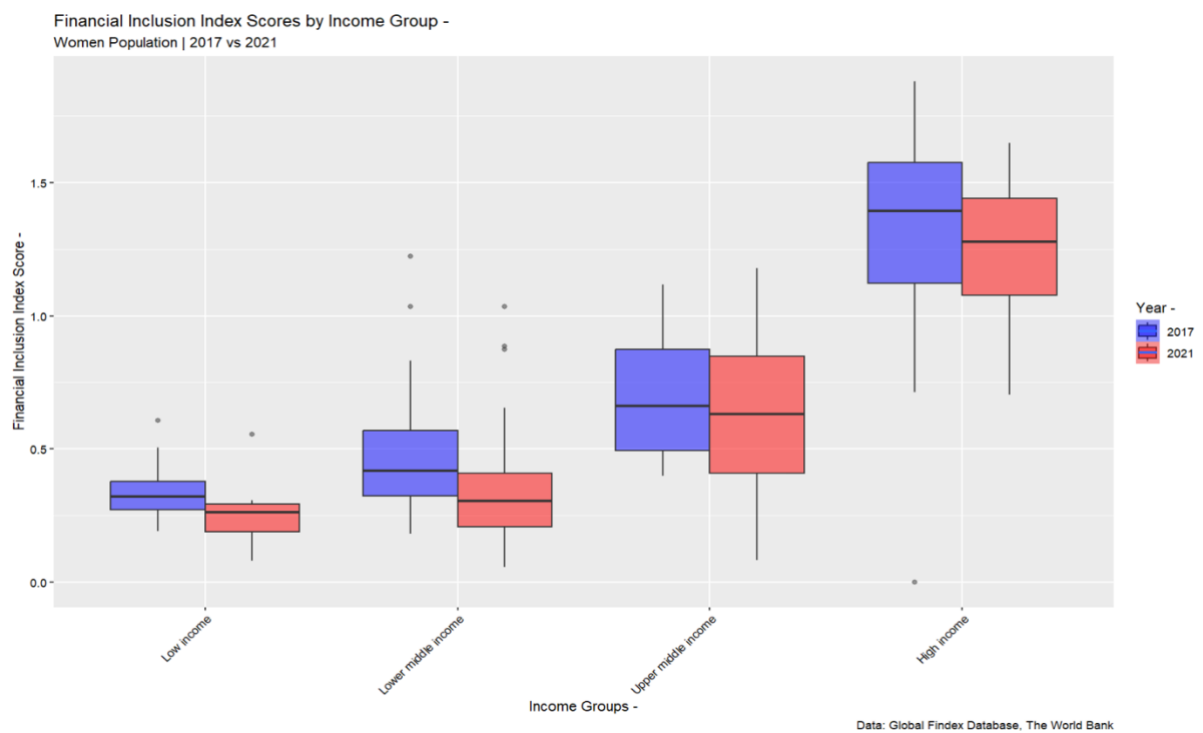
Objective is to assess the financial inclusion index rates of countries by income group, focusing on distinct target populations which include general population, women, and low-income adults. This approach facilitates meaningful comparisons among countries sharing the same income group, potentially revealing whether wealthier countries tend to have higher financial inclusion rates compared to low-income countries.

This section delves into the statistical data visualization of the country by income group financial inclusion rates. As per the country by region financial inclusion rates section, we have seen a decrease in the mean FI for all of the four income groups within the GFD within all three focus groups. This may mean that on average most countries saw a decrease in their financial inclusion state and therefore most regions AND income groups tended to have an overall decrease pre and during COVID-19.

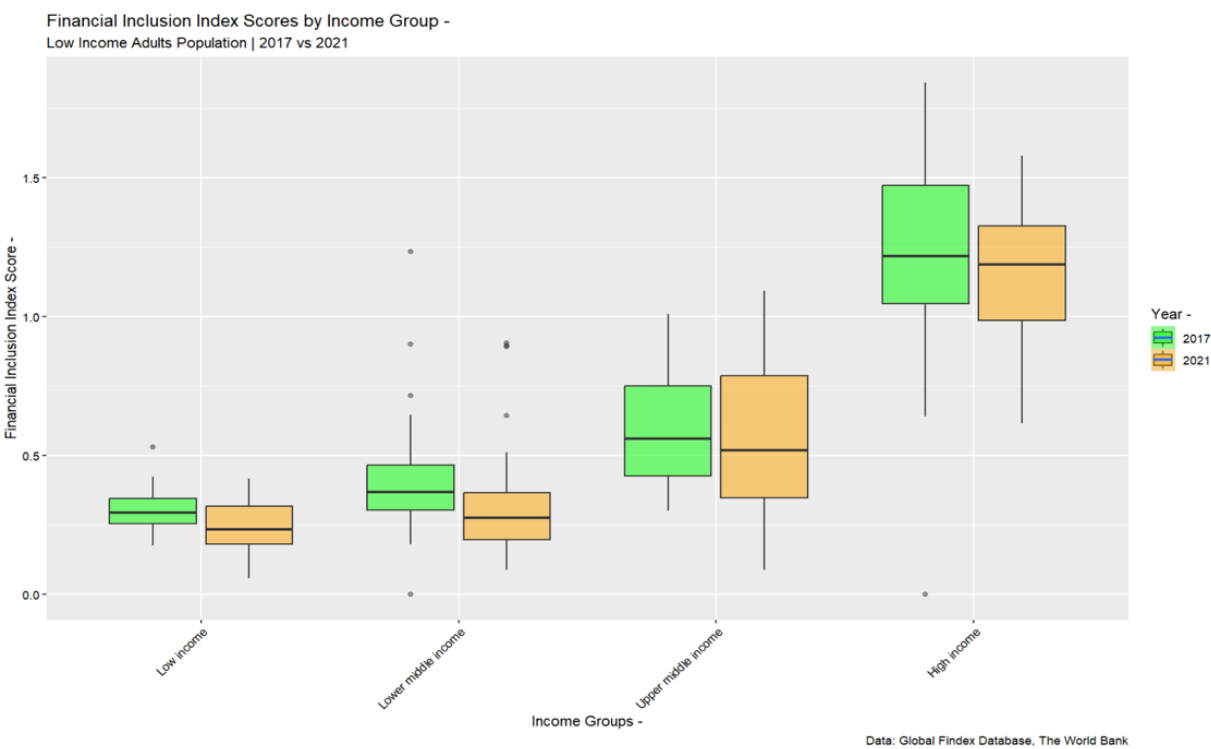
General Population: Financial Inclusion Index Scores by Income Group



Women Population: Financial Inclusion Scores by Income Group



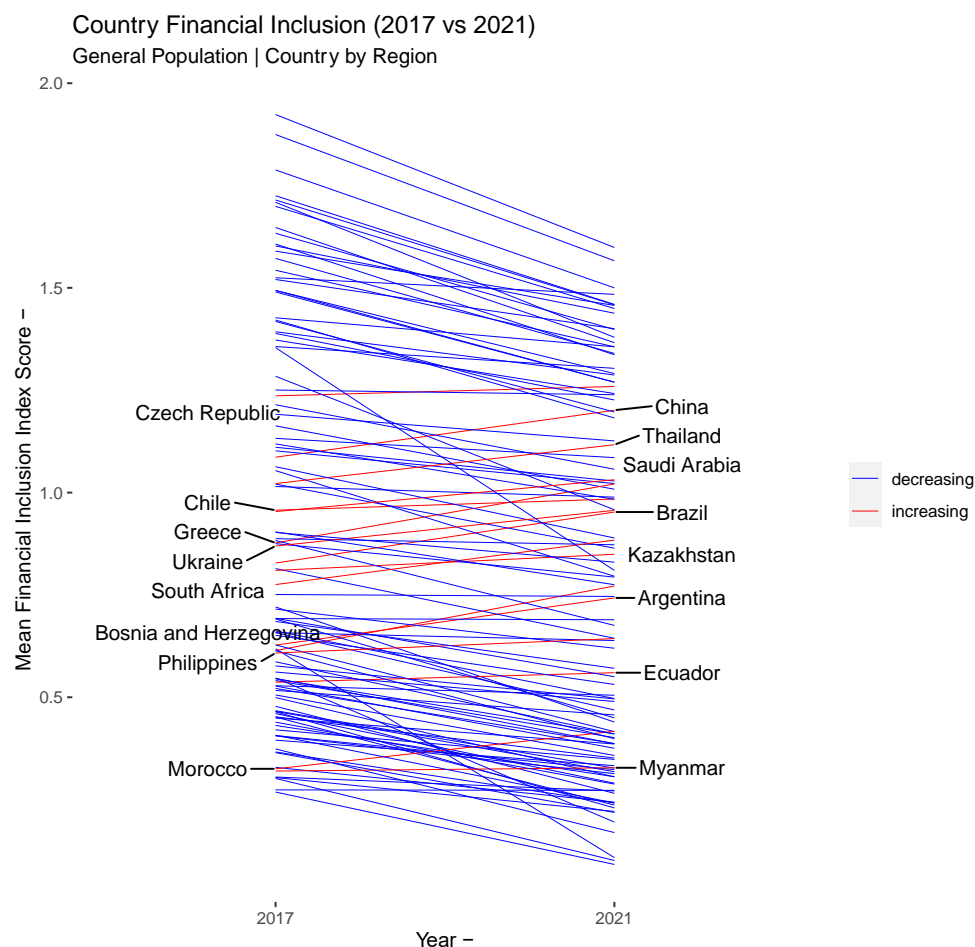
Low-Income Adults Population: Financial Inclusion Index Scores by Income Group



3. Countries by Global Country Classification

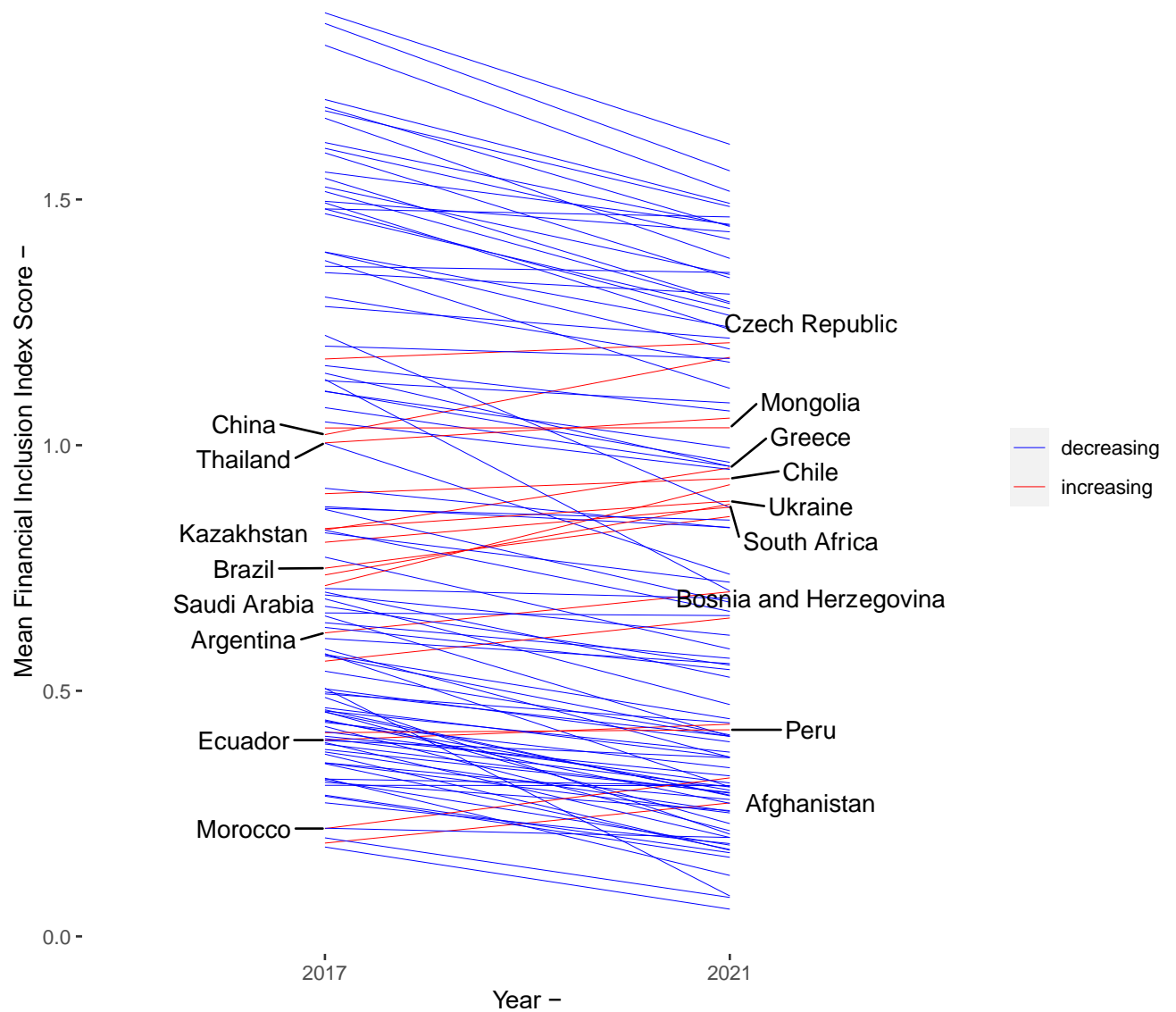
This section primarily focuses on comparing a countries 2017 and 2021 FI score which will then help us to easily identify whether there is a pattern between other various variables and these scores e.g. It may be found that most countries which there is an increase in FI scores, belong to the high income group and the Middle East North African region.

Our objective is to assess the financial inclusion index rates of each country in the FINDEX data base given the country has the appropriate information to analyse and compare FI scores from 2017 and 2021. We will, once again, apply this approach to our three target populations which include general population, women, and low-income adults. This approach facilitates meaningful comparisons among countries with themselves, and fosters in helping to understand whether a country is making financially inclusive improvements. Population-specific analysis can be made when looking at the FI scores of, not only the general population but also women and adults with low income. This section has more of a focus on qualitative data.



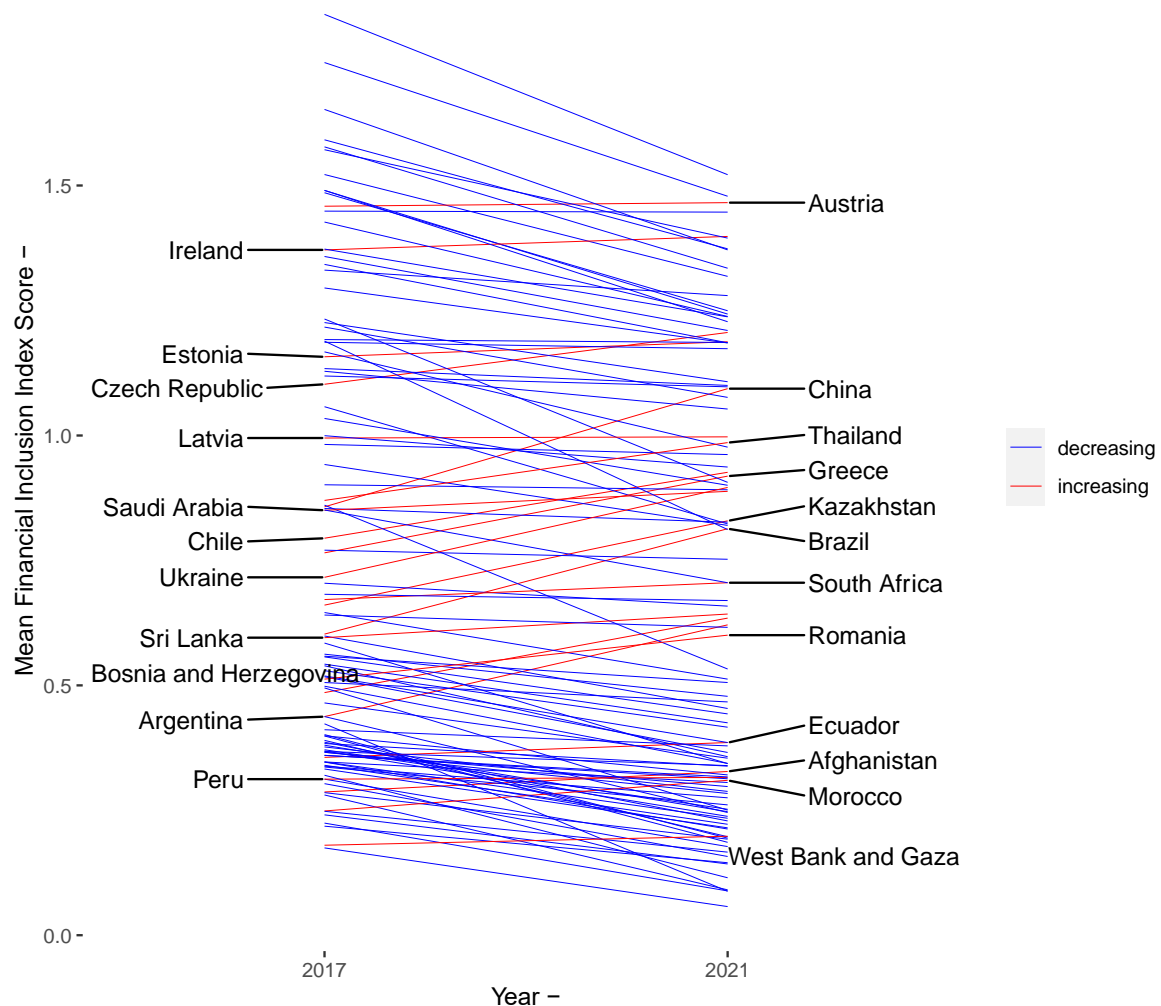
Country Financial Inclusion (2017 vs 2021)

Womens Population | Country by Region



Country Financial Inclusion (2017 vs 2021)

Low-Income Adults Population | Country by Year

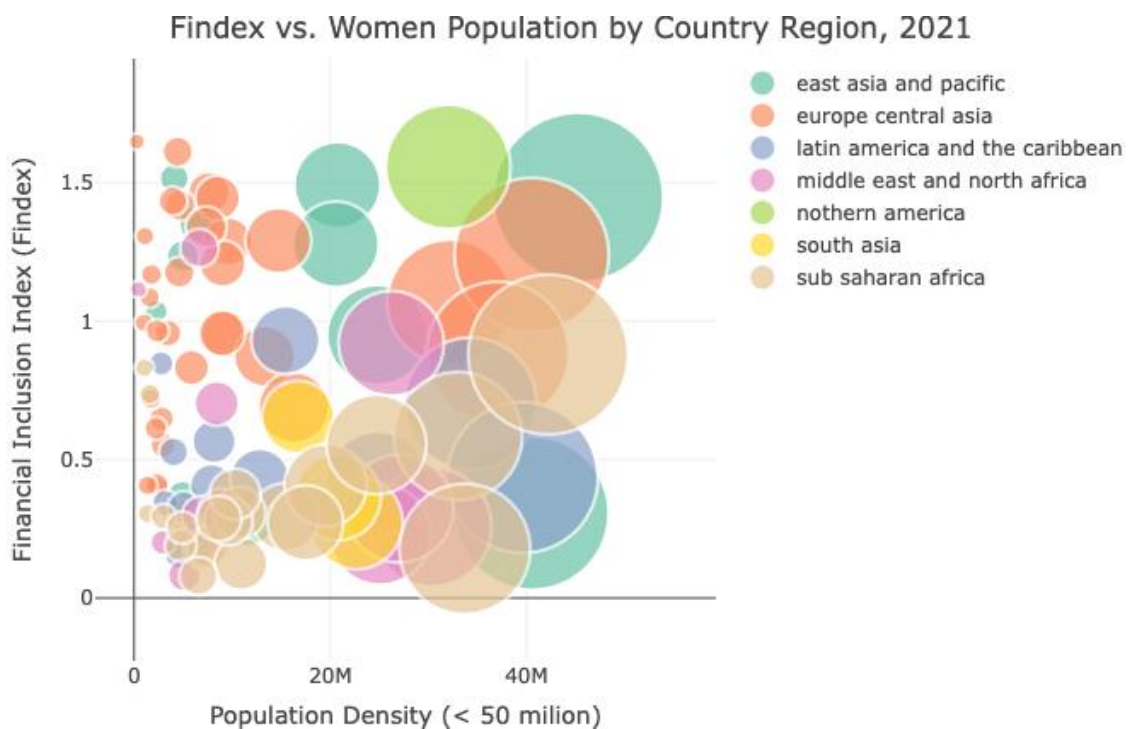
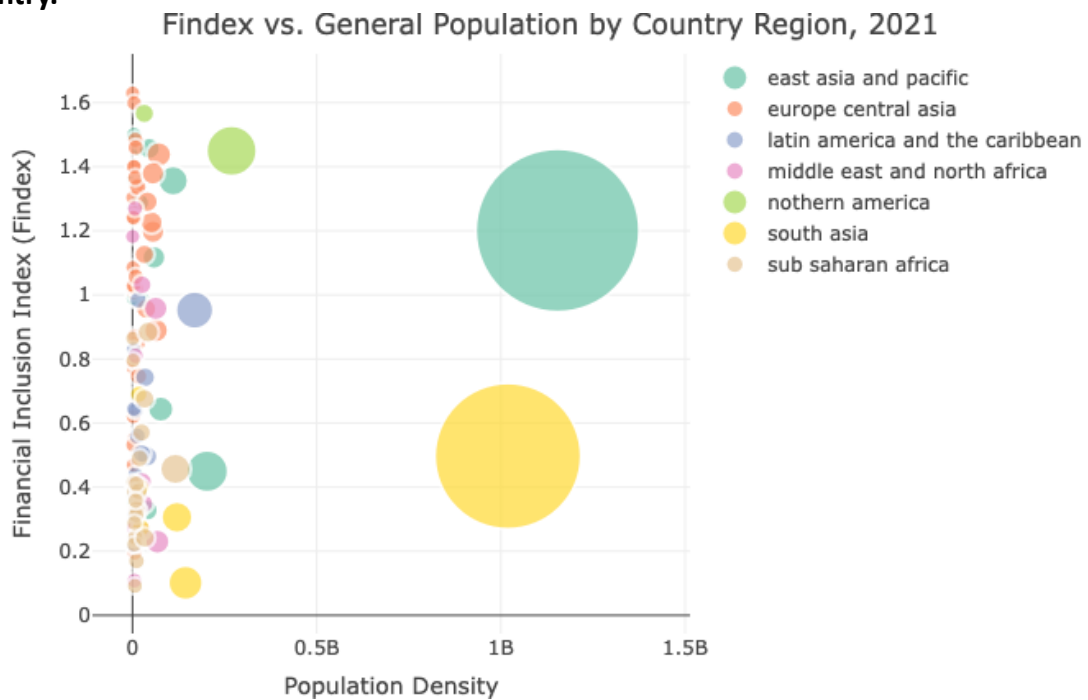


4. Financial Inclusion Index Score per Countries

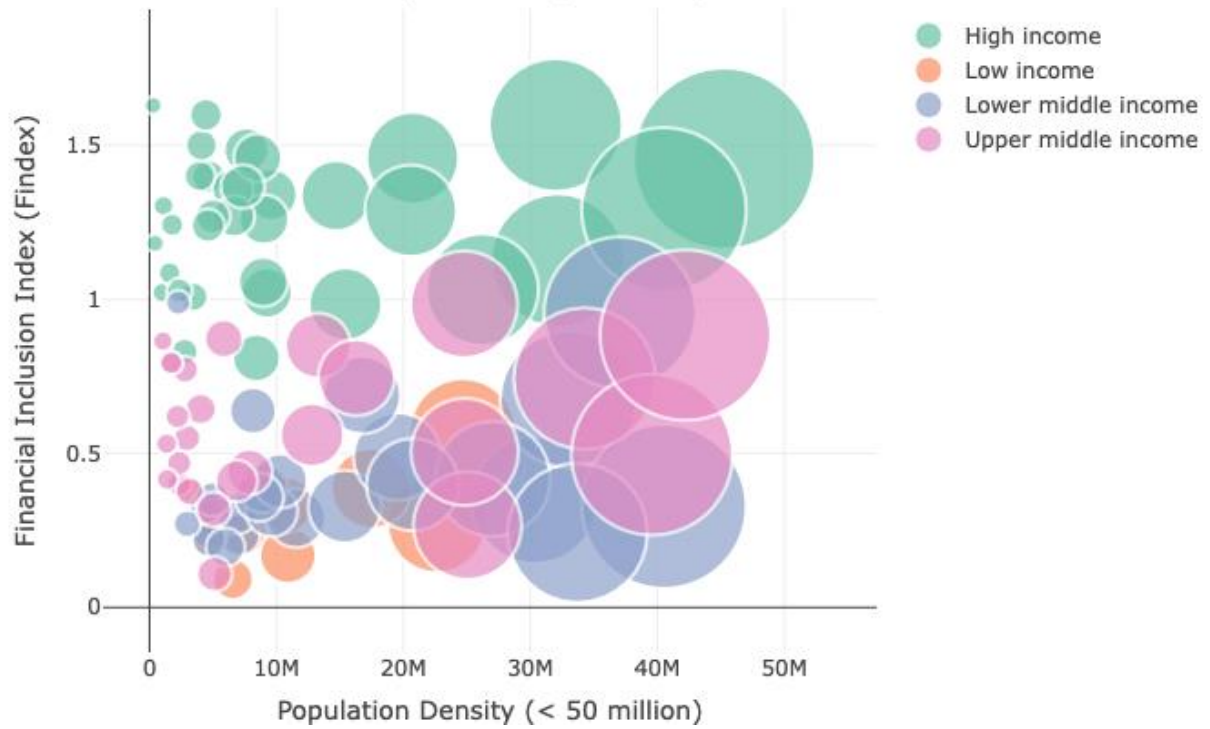
In the following code blocks, each focusing on a specific target population, we processed our data by creating a new data frame containing information about countries, population density, income group categories, the FI index of countries in 2021, and the regions to which each country belongs. Beforehand, we extracted a few variables from the original dataset from the World Bank called 'DatabankWide' and merged this data with the dataset we created in the earlier data processing steps using the 'inner_join' function. We then cleaned the data frame by removing any unwanted variables and columns. Subsequently, we merged it once again with another data frame created in a previous step.

Our primary focus was to examine the effects of population density (x-axis) on the FI Index score in 2021 (y-axis), visualizing it using Plotly. Plotly is a tool that enables effective data visualization by allowing us to color-code the countries by regions and each country's income level. Additionally, it provides interactivity, offering more information about specific data points. Finally, these data processing steps were repeated for all target population groups.

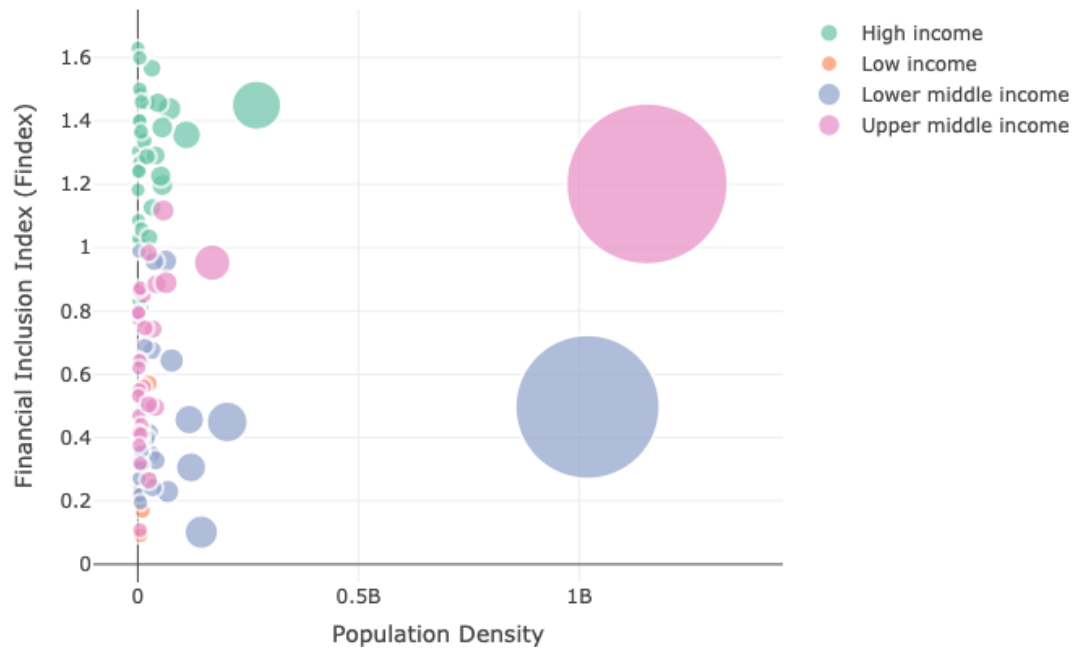
General Population: Comparing FI Score by population density and income group of each country.



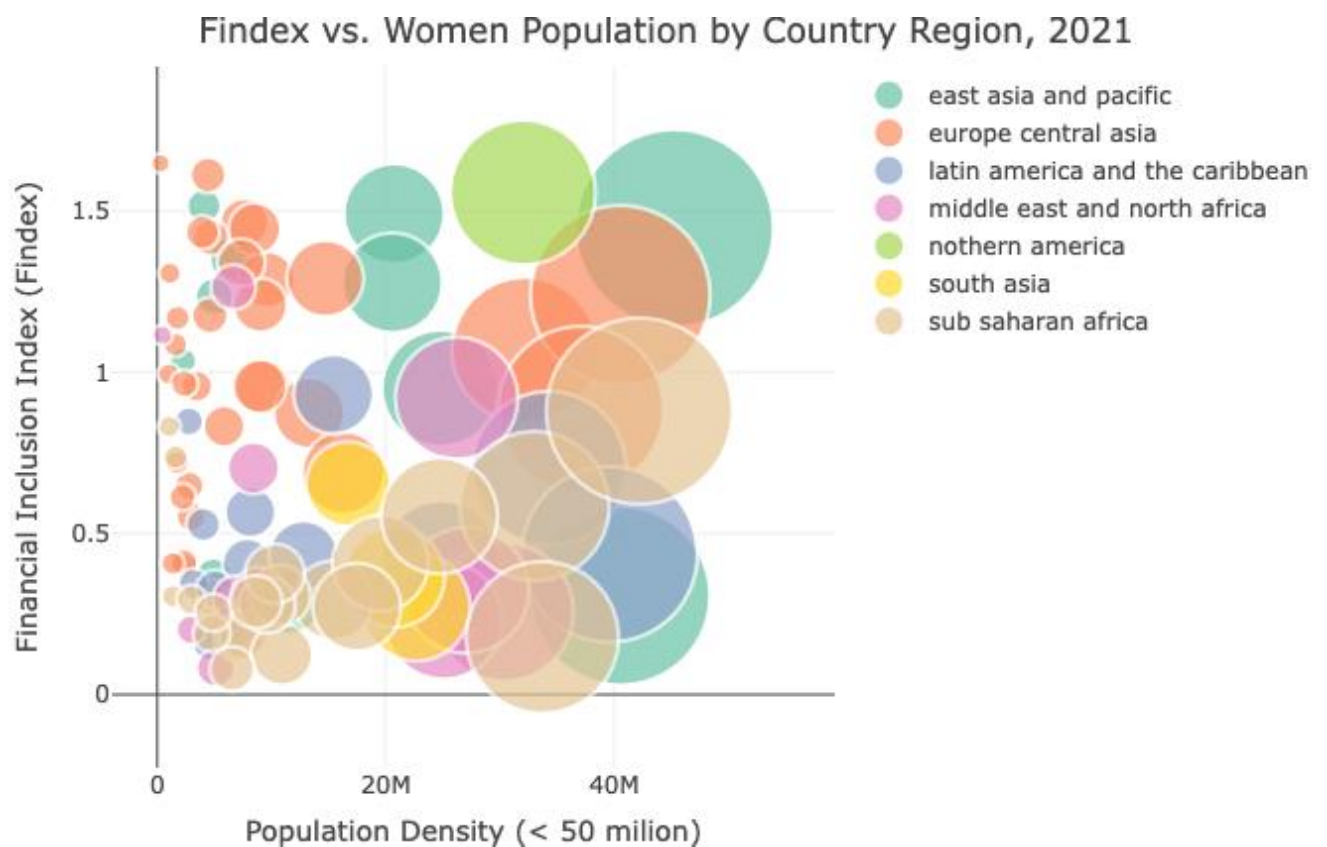
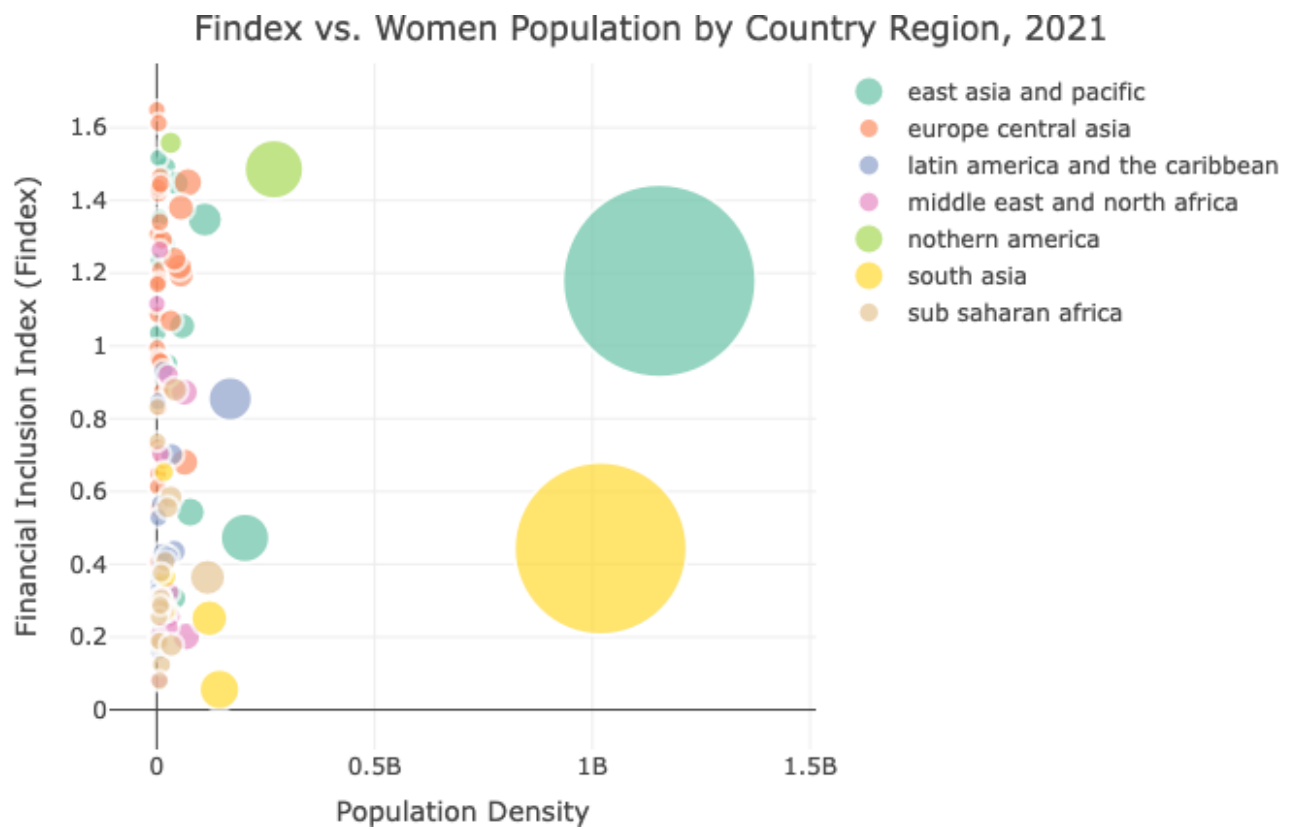
Index vs. Population by Country Income Level, 2021



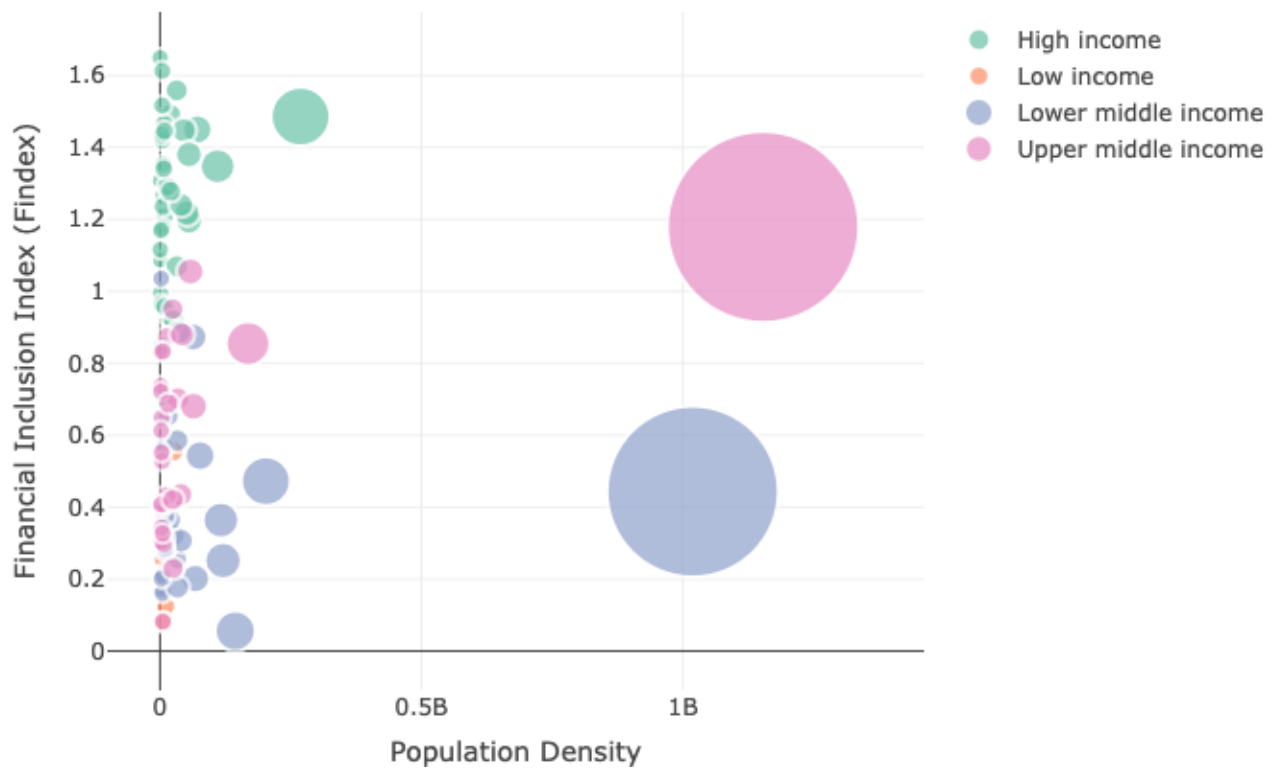
Index vs. Population by Country Income Level, 2021



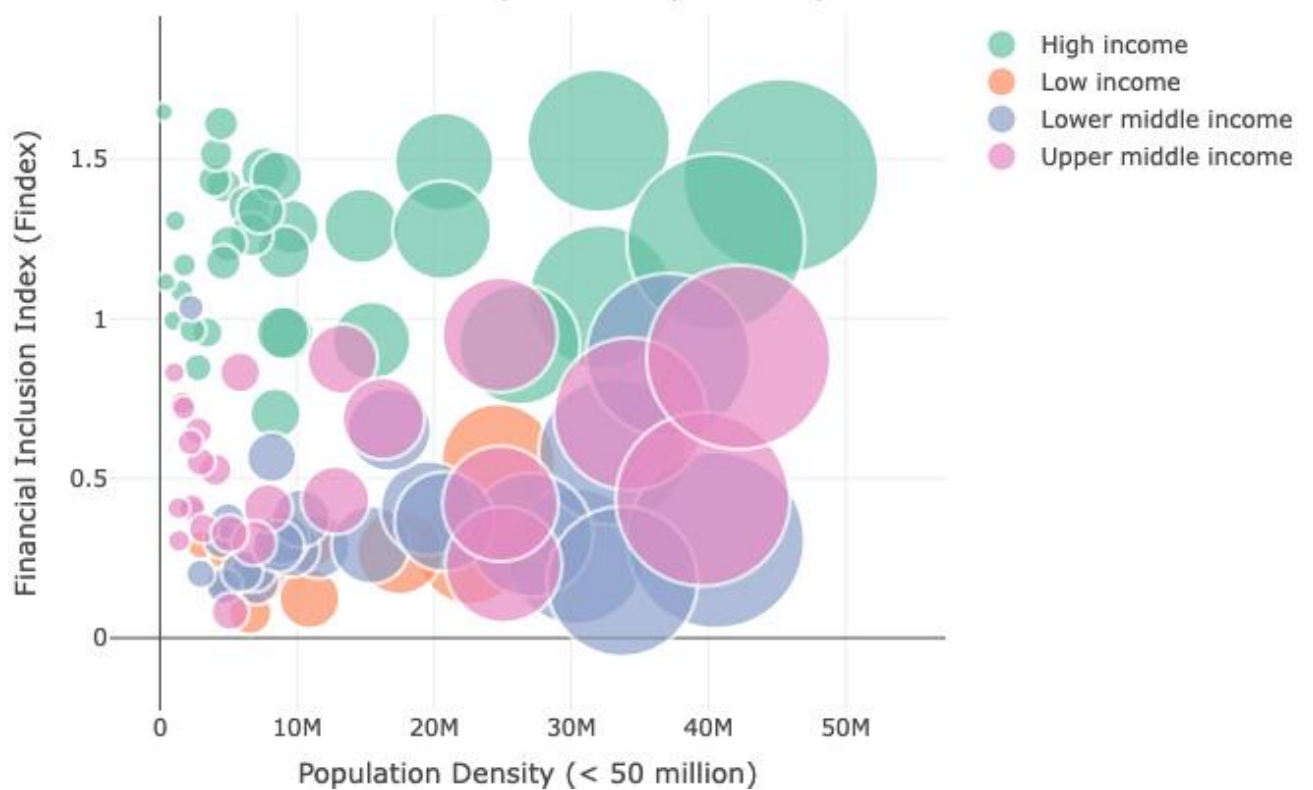
Women Population: Comparing FI Score by population density and income group of each country.



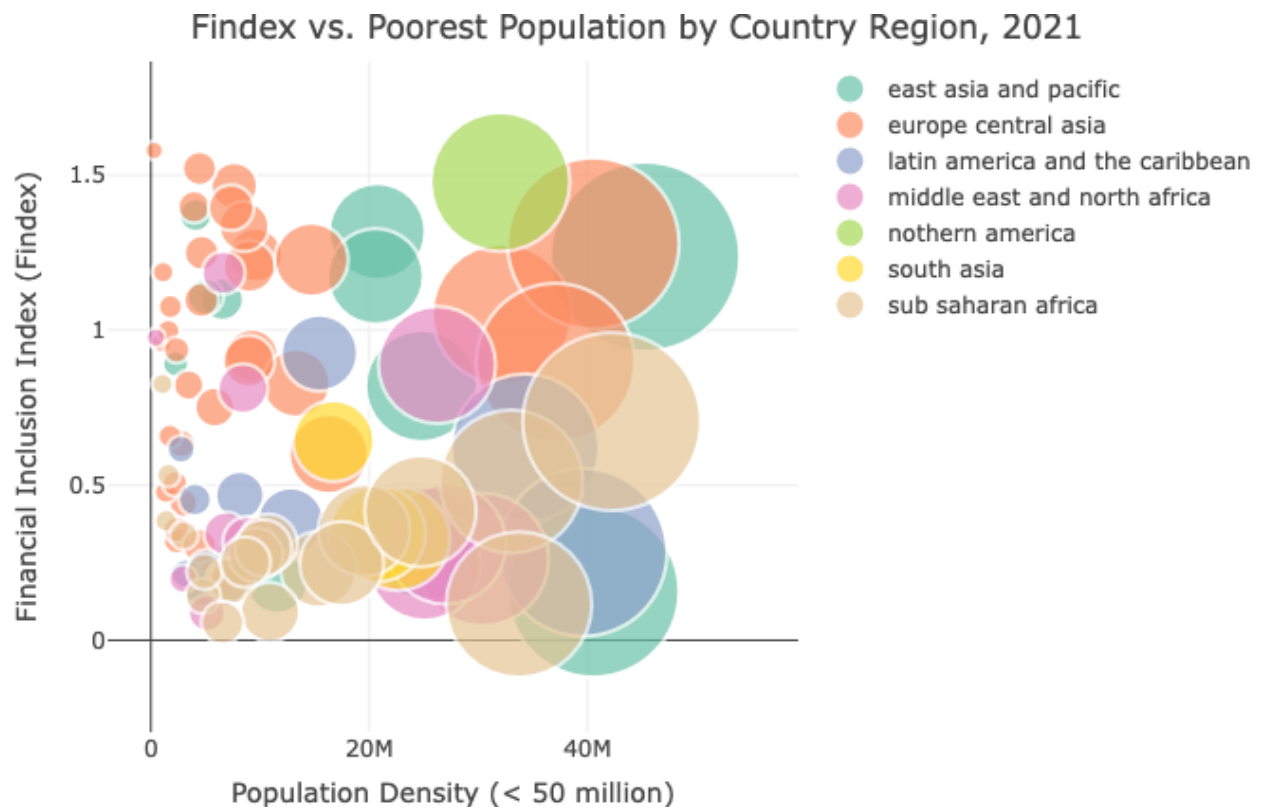
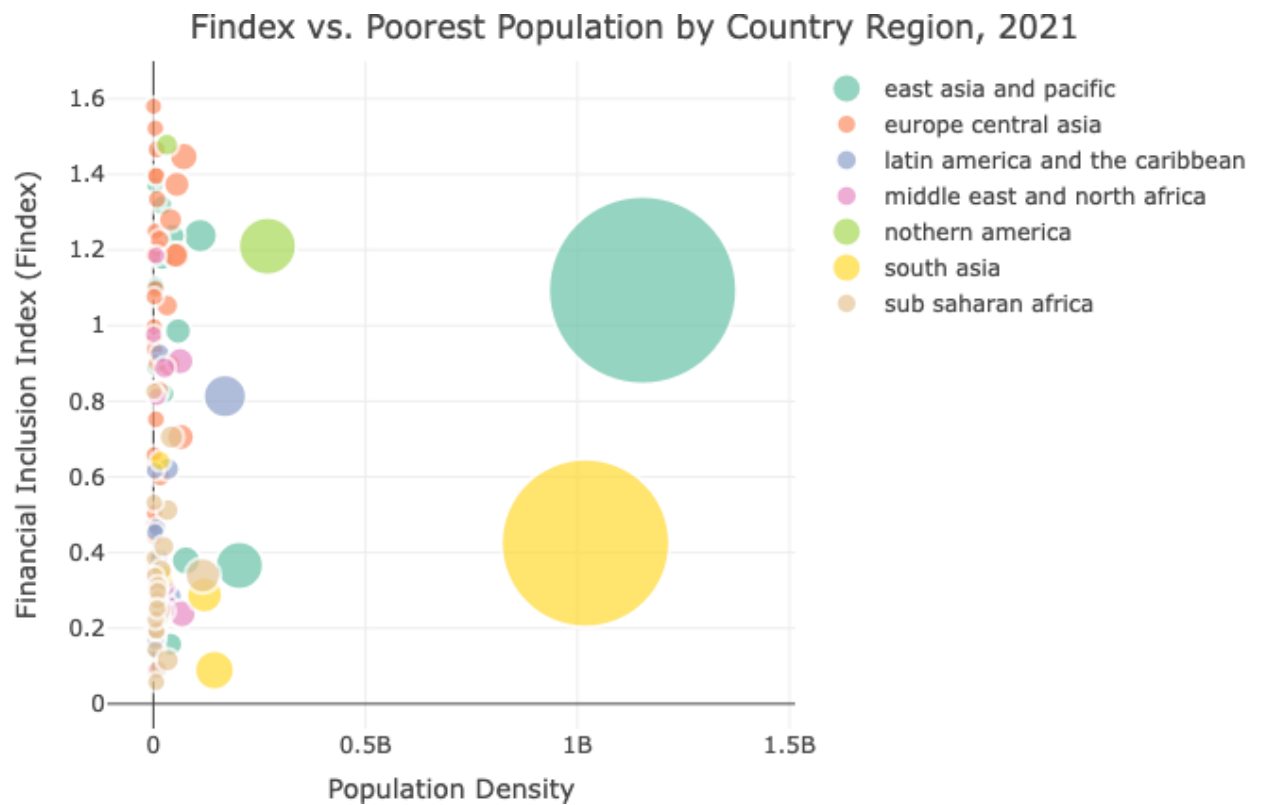
Index vs. Women Population by Country Income Level, 2021



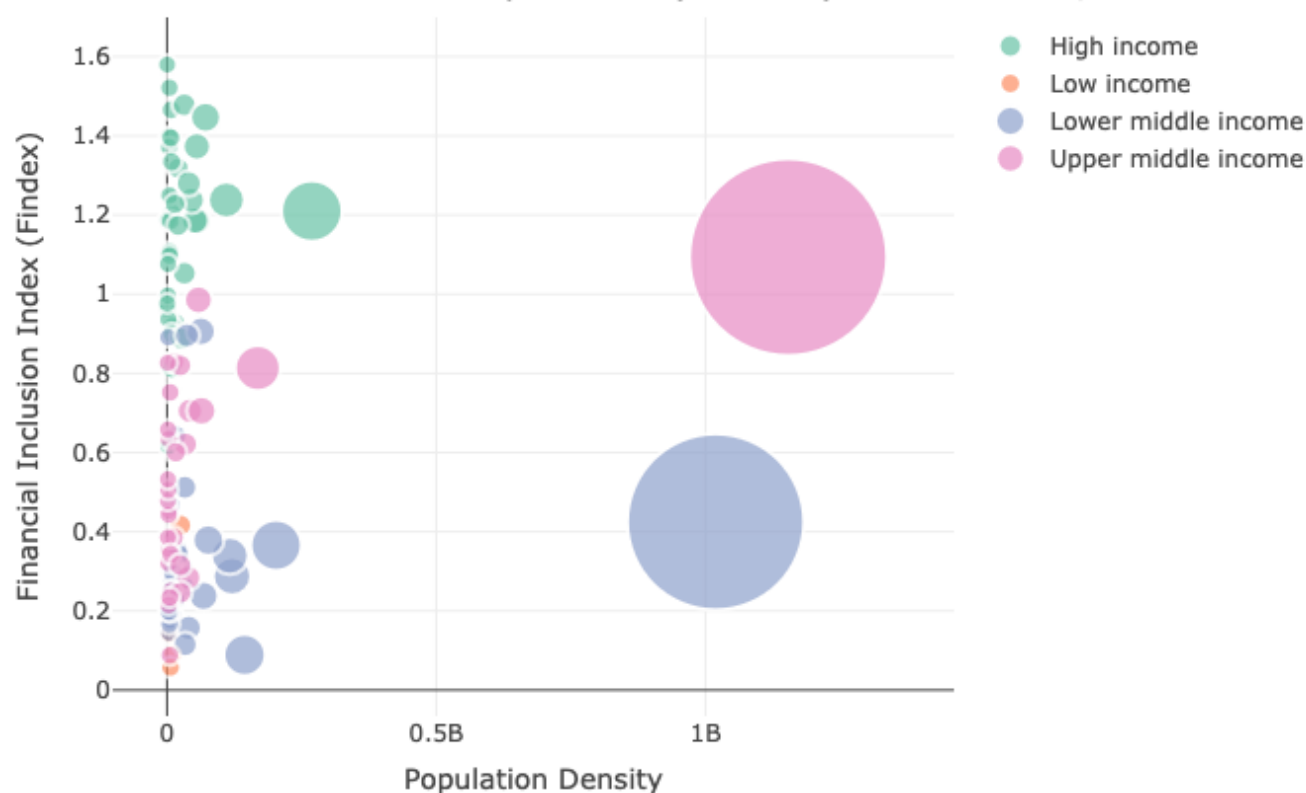
Index vs. Women Population by Country Income Level, 2021



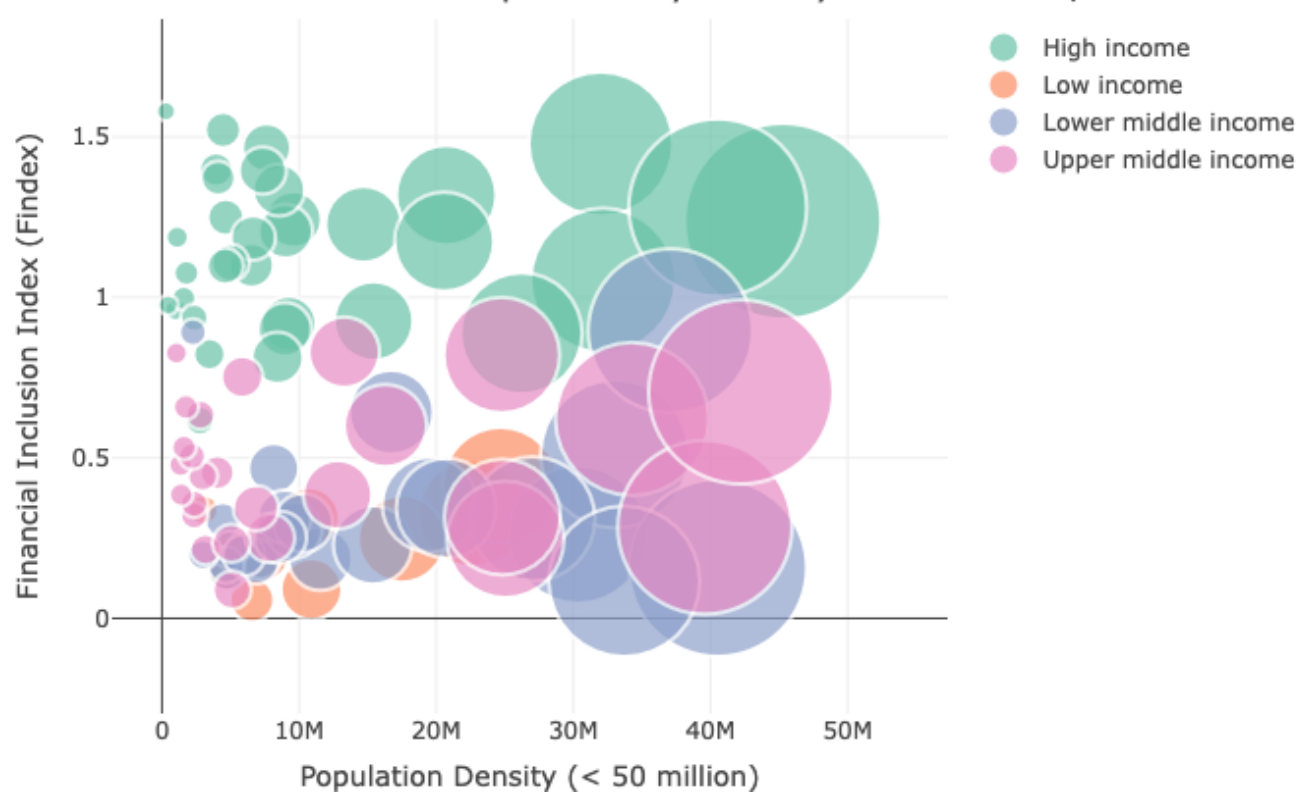
Women Population: Comparing FI Score by population density and income group of each country.



Index vs. Poorest Population by Country Income Level, 2021

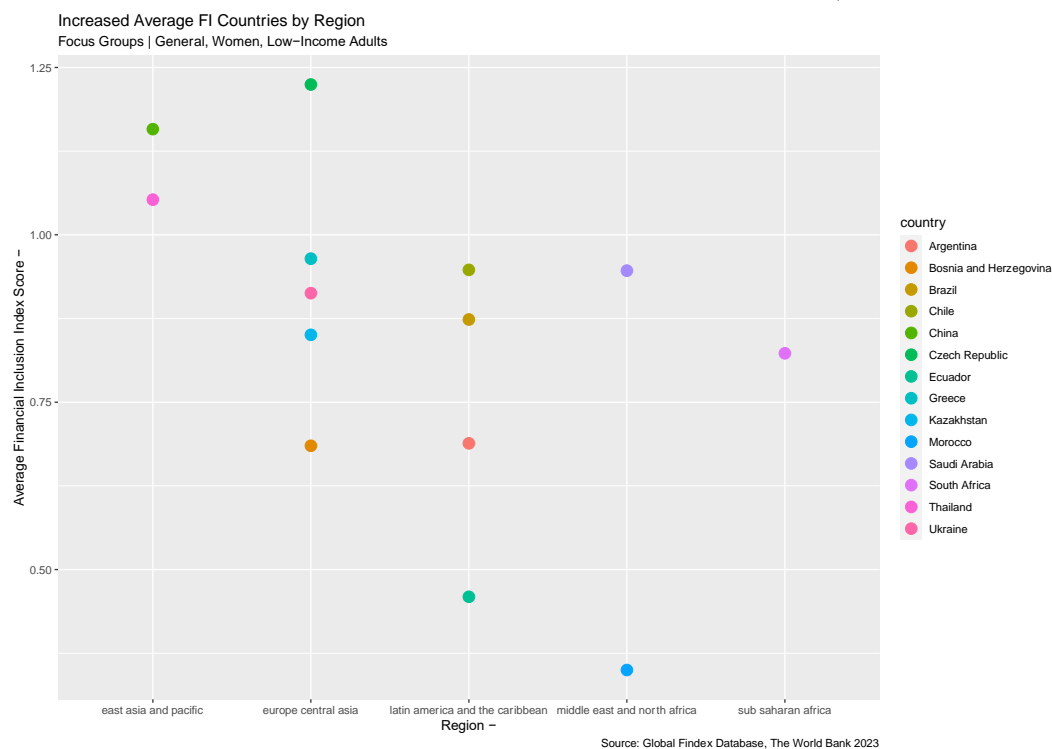
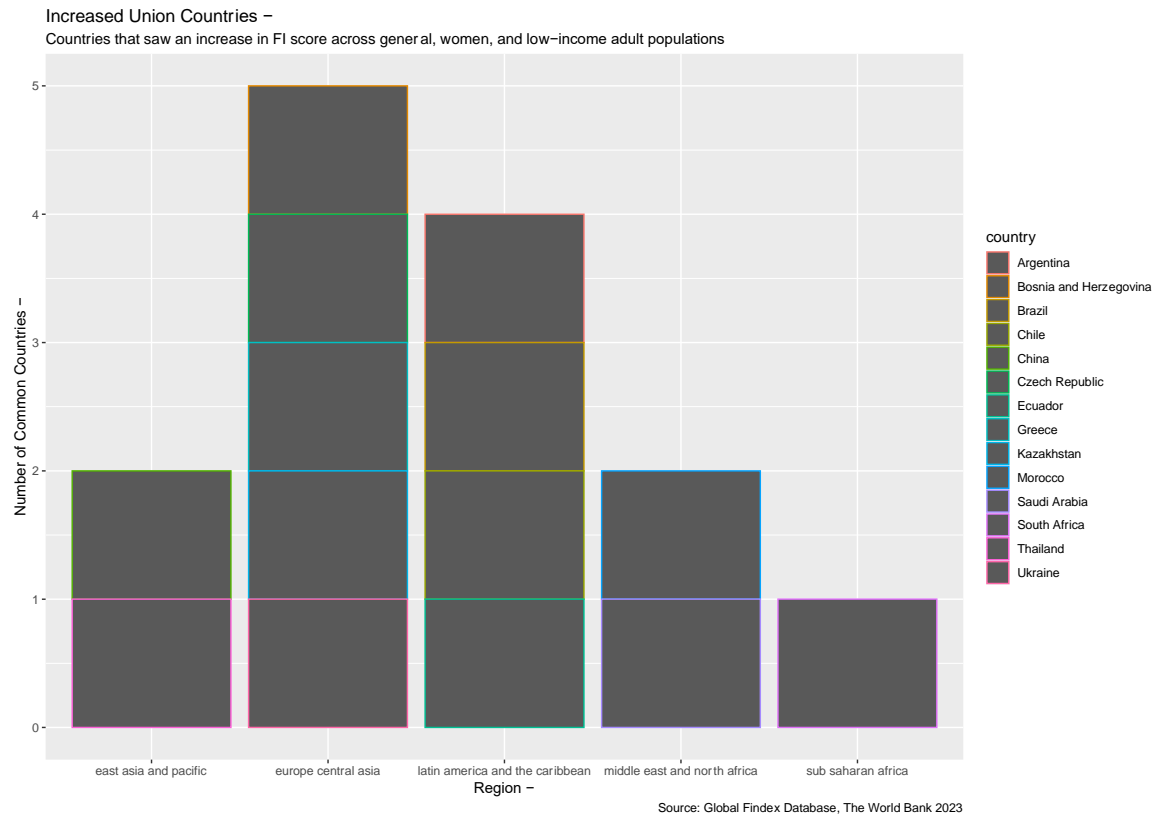


Index vs. Poorest Population by Country Income Level, 2021

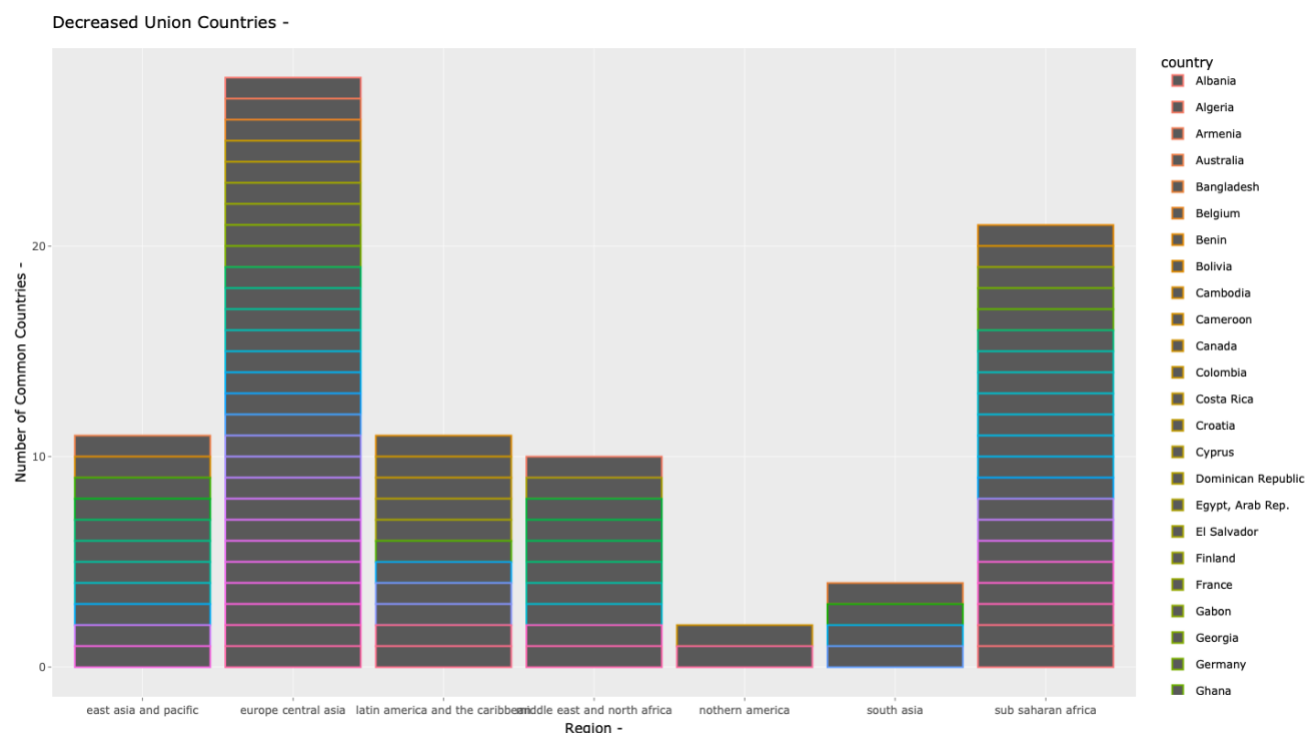


5. Union of Countries that have increased for all focus groups:

Here we are doing basic exploratory data analysis only on the countries that appeared to have an increase in their financial inclusion index score and appeared in all three focus groups. From this we gain insight into which countries had an overall better average score of FI in comparison to other countries.



5.1 Union countries that have decreased for all focus groups:



Decreased Average FI Countries by Region

