

Fertility rates overview

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1 Datasets and Goal

The goal of our project is to analyze how fertility rates have changed across countries from 1960 to 2023. For that, we aim to identify correlations between fertility rates and several factors, including GDP¹, infant mortality rate, and income inequality as described by the GINI index.

The final dataset, saved as a CSV file, was constructed by joining three distinct sources using SQL. The join operation was based on two common attributes: country name and year. The sources are as follows:

1. *International Database (IDB)* $\xrightarrow{\text{published}}$ *The United States Census Bureau*
2. *Gross domestic product (GDP)* $\xrightarrow{\text{published}}$ *Our World in Data (OWID)*
3. *Income inequality : Gini coefficient* $\xrightarrow{\text{published}}$ *Our World in Data (OWID)*

A detailed overview of the dataset's most significant attributes, along with their descriptions, is provided in the following subsection (Dataset Information).

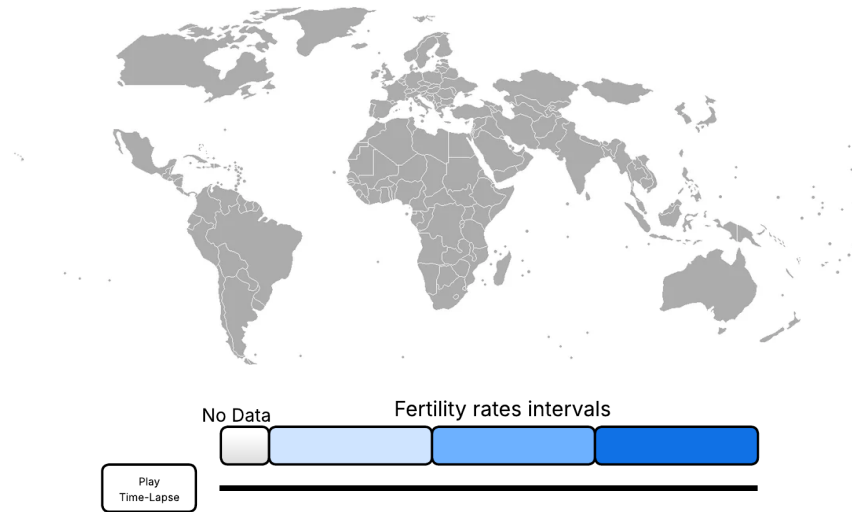
1.1 Dataset Information

The compiled dataset integrates several key aspects for our study.

1. **Gini index** - Measures economic inequality on a scale from 0 to 1 shown in a country during a specific year, per capita. 'Per capita' means that the income of each household is attributed equally to each member of the household (including children). Higher values of the coefficient indicate higher inequality;
2. **Gross Domestic Product (GDP)** — Represents the total monetary value of all goods and services produced within a country's borders in a given year. Expressed in US dollars;
3. **Under-5 Mortality Rate** — Indicates the number of deaths of children under age five per 1,000 live births;
4. **Growth Rate** — Reflects the annual population change, accounting for births, deaths, and net migration, expressed as a percentage of the midyear population;
5. **Fertility Rate** — Represents the average number of children a woman would have by the end of her reproductive years (typically by age 49).

¹Gross Domestic Product

2 Chart 1 specifications

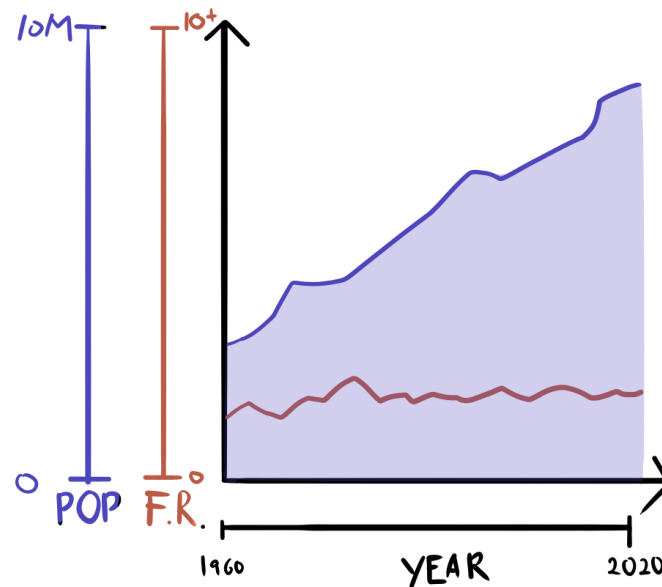


The main chart is an interactive world map where users can directly view the fertility rates of countries, as indicated by the color scheme defined in the legend. Users can click on individual countries to select them, enabling side-by-side comparisons. Multiple countries can be selected simultaneously, and clicking a selected country again will deselect it. See **Chart 3 specifications** and **Chart 4 specifications** for reference.

When hovering over a country, a dialog box will pop up displaying additional information, as described in **Chart 2 specifications**.

In addition to the interactive map, there is a timeline that can be clicked, triggering a time-lapse animation which influences all the other charts as well. This animation allows users to observe how a country's fertility rate have changed over time according to the parameters that are described in the dataset.

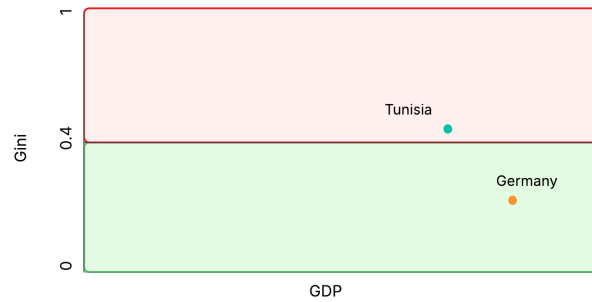
3 Chart 2 specifications



In this line chart, the fertility rate of the country hovered over in **Chart 1** is plotted over time on the primary y-axis, while the population is simultaneously plotted on a secondary y-axis. This approach enables users to observe trends and potential relationships

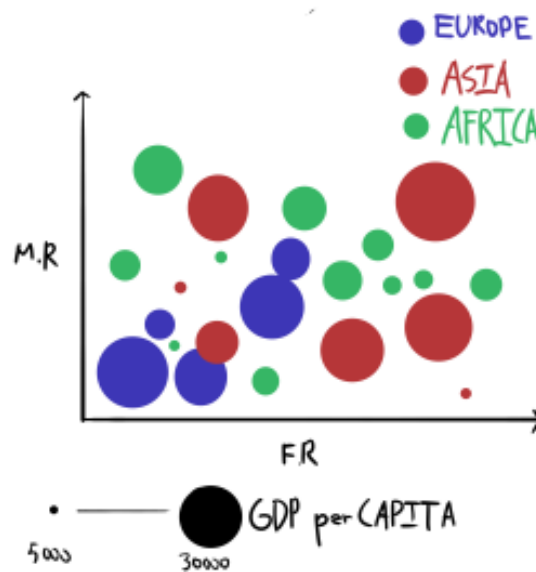
between the two variables across years. Moreover, this chart functions independently of the timeline controller in **Chart 1**.

4 Chart 3 specifications



Once countries are selected on the interactive world map, a scatter plot will dynamically render their data to analyze the relationship between GDP and income inequality (as represented by the Gini index). The purpose is to immediately illustrate how each country's economic landscape may relate to fertility rates.

5 Chart 4 specifications



This chart visualizes the relationship between three factors. One of the factors is represented by the size of the circle within the graph, while another is fixed on the x-axis to track changes in fertility rates, as it is the focus of our study. The third factor is customizable through a set of preset options. One preset, for example, could have the child mortality rate on y-axis, whereas the GDP is represented by the size of the circle. Furthermore, the specific year for the visualization can be set through the timeline controller defined in **Chart 1**.

The chart visualizes all the countries in the world that have the corresponding data for that specific year. A key aspect of this chart is that countries with similar geographic locations are grouped by the same color.