

Retrospective look at birth data of various countries after the COVID-19 vaccinations

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1 Introduction

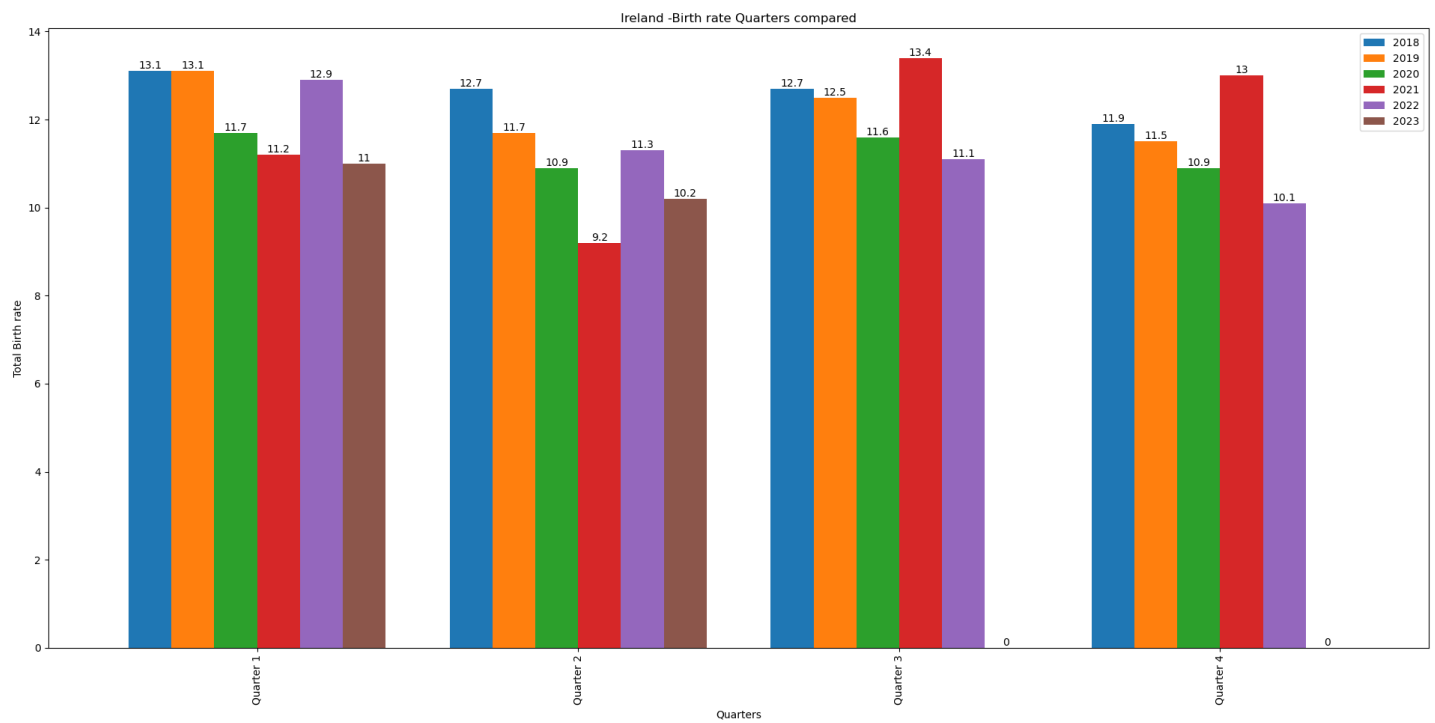
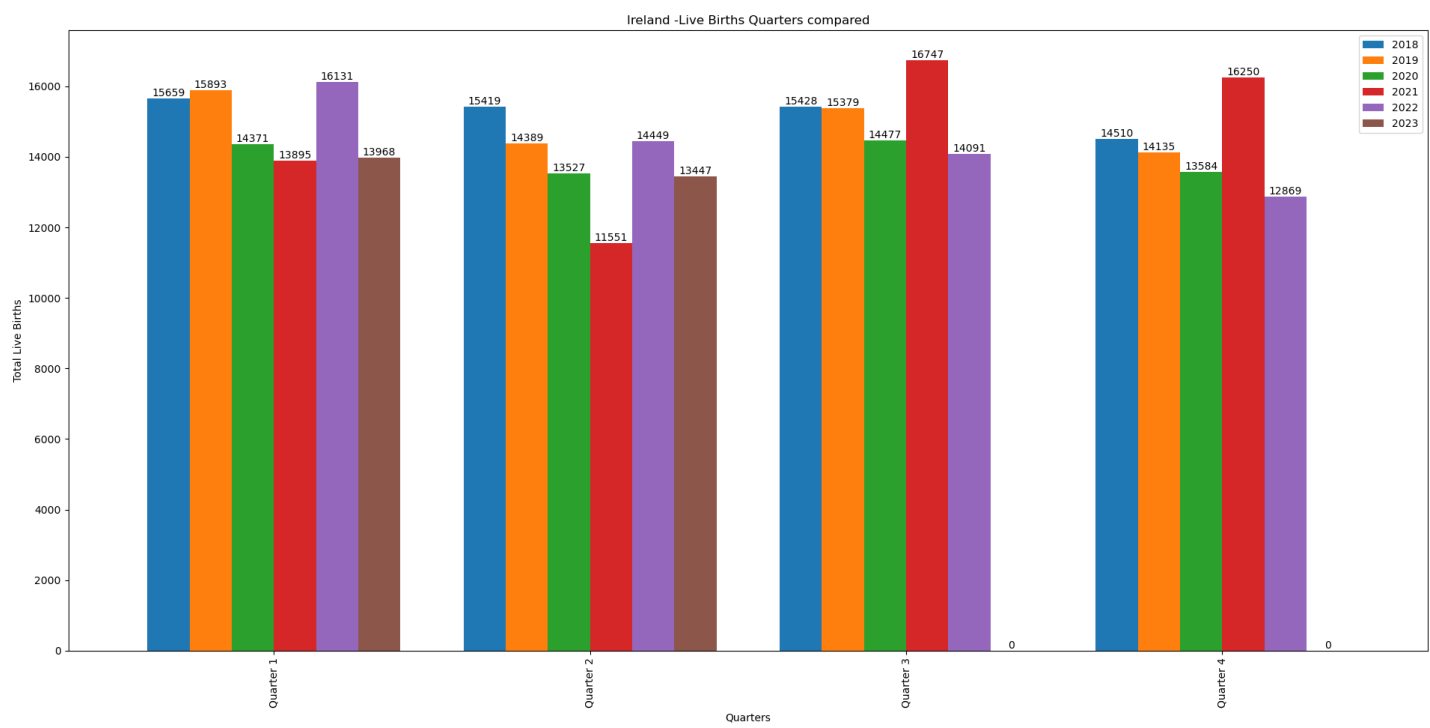
More than 5 billion people worldwide have received a dose of the COVID-19 vaccine, which amounts to about 70.6 % of the World population. With 13.57 billion doses administered till now and at least 4,152 being administered daily, assessing the efficacy and broader impact of the COVID-19 vaccines on society is increasingly imperative. This report aims to analyze the effect of COVID-19 vaccines on the birth rate patterns and whether the COVID-19 vaccines had an effect at all. In this analysis, we will be looking at the data from different countries with different geographical locations to analyze whether an effect of covid 19 vaccines can be seen in the Birth Data of the countries as seen in the case of Germany.

2 Analysis

2.1 Ireland

Ireland's Health Service Executive (HSE) started vaccination for everyone aged 18 to 64 in May 2021 till July 2021. Below are the bar charts for the Live births recorded per quarter and the Birth rate in each quarter plotted to compare each quarter by year.

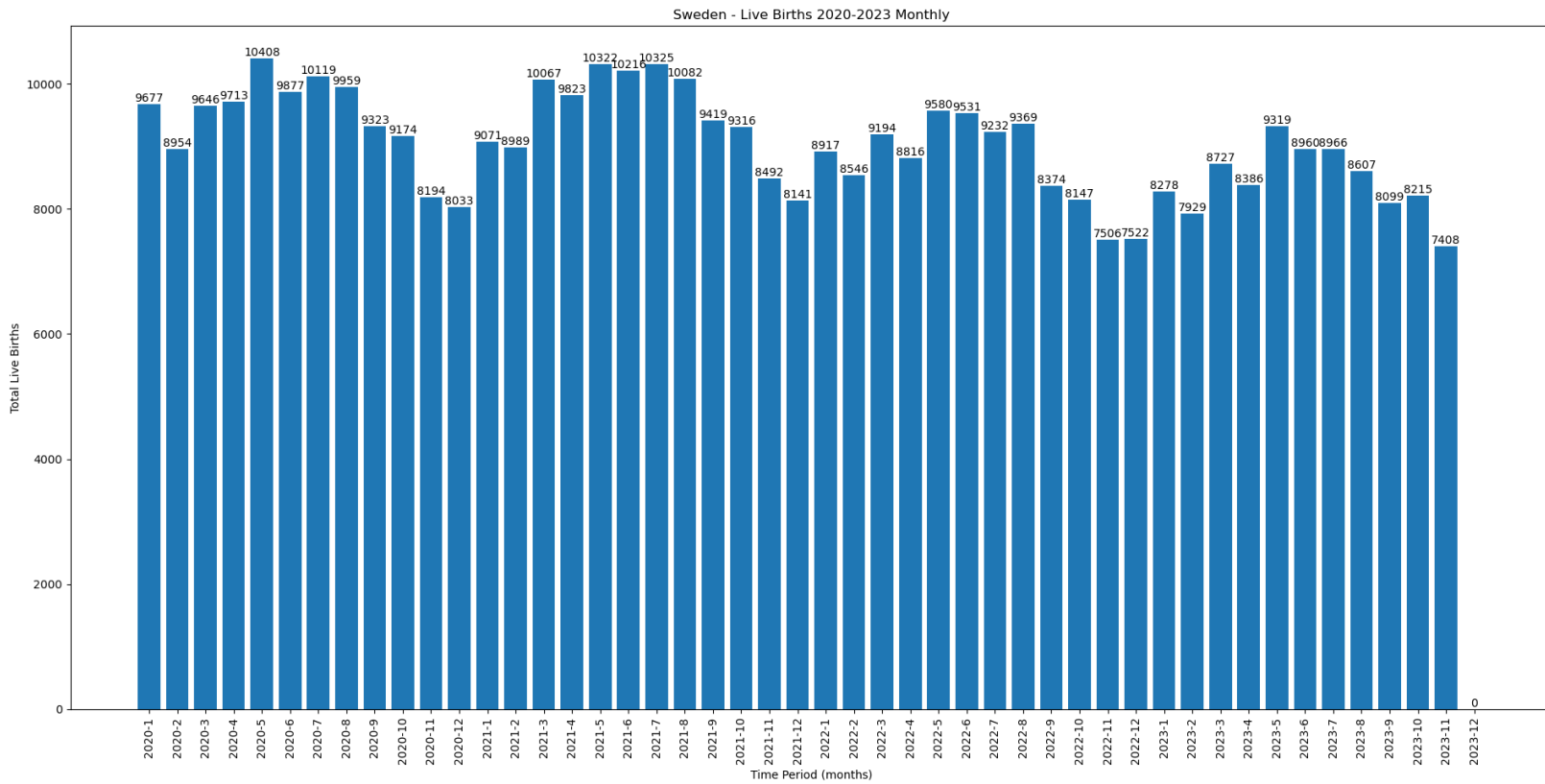
A big dip is observed in the first and second quarters of 2021 at 3.3% and 14.6% respectively, However, in 2022 there is a significant increase in the Birth rate and live births. **In the first quarter of 2022, there is an increase in the live births of 16.0% and 25.08%** in the first and second quarters of 2022 compared to 2021 respectively.

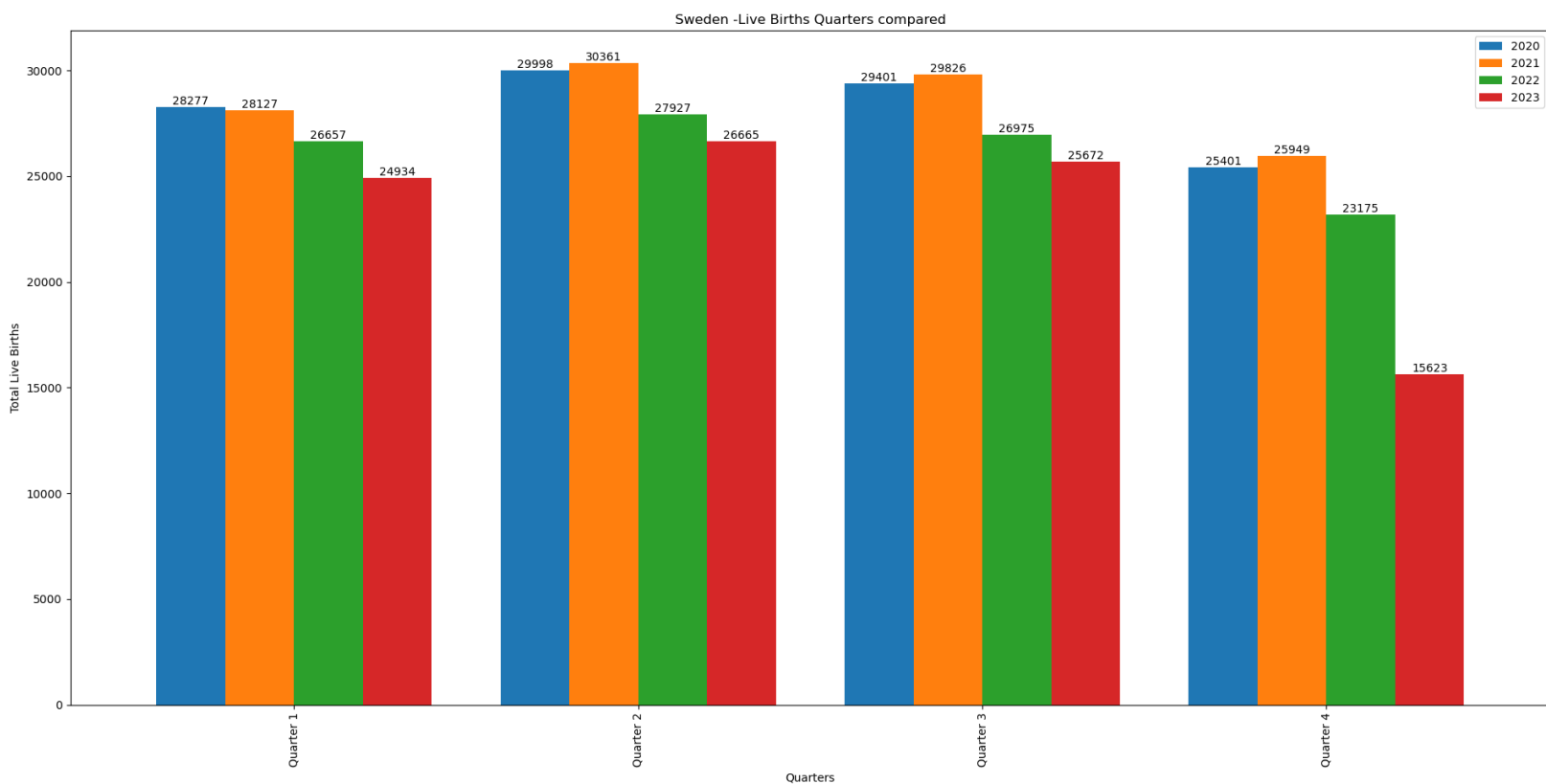


2.2 Sweden

Sweden started vaccination at the end of 2020 in various stages with elderly and frontline workers with high risk getting vaccines in the initial 3 stages, In stage-4 of vaccination all the other age groups that haven't been vaccinated in the previous stages received the vaccines which commenced from May 2021.

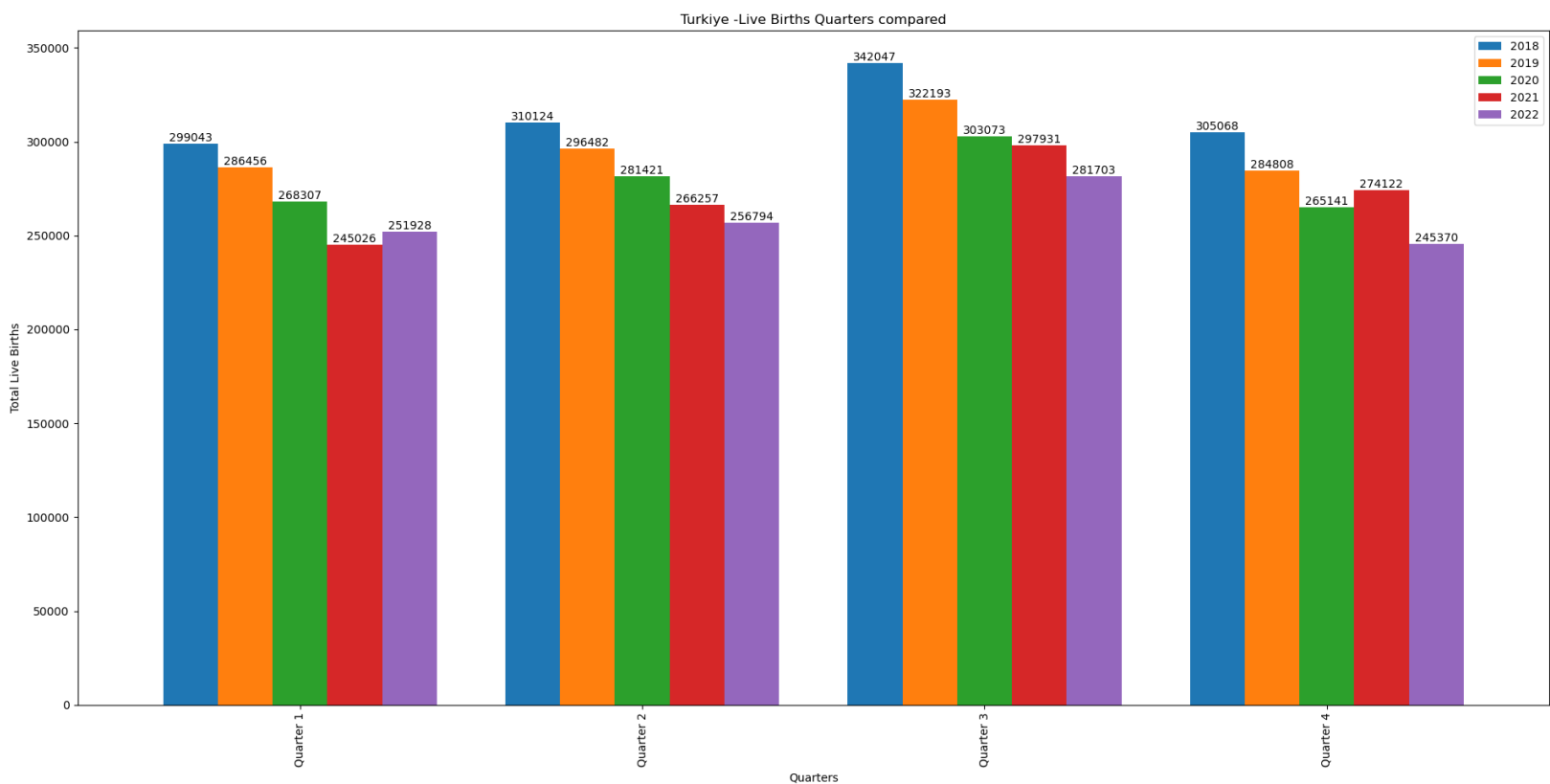
following are the graphs of Live Births recorded in Sweden from January 2020 to November 2023. A notable **decline in Recorded Live Births is observed in the first and second quarters of 2022 at 5.2% and 8.0%** respectively, which is evident in the second graph, however, there is a general downward trend in the live births throughout the quarters in each year recorded in Sweden which can be seen in the first figure.





2.3 Turkiye (Turkey)

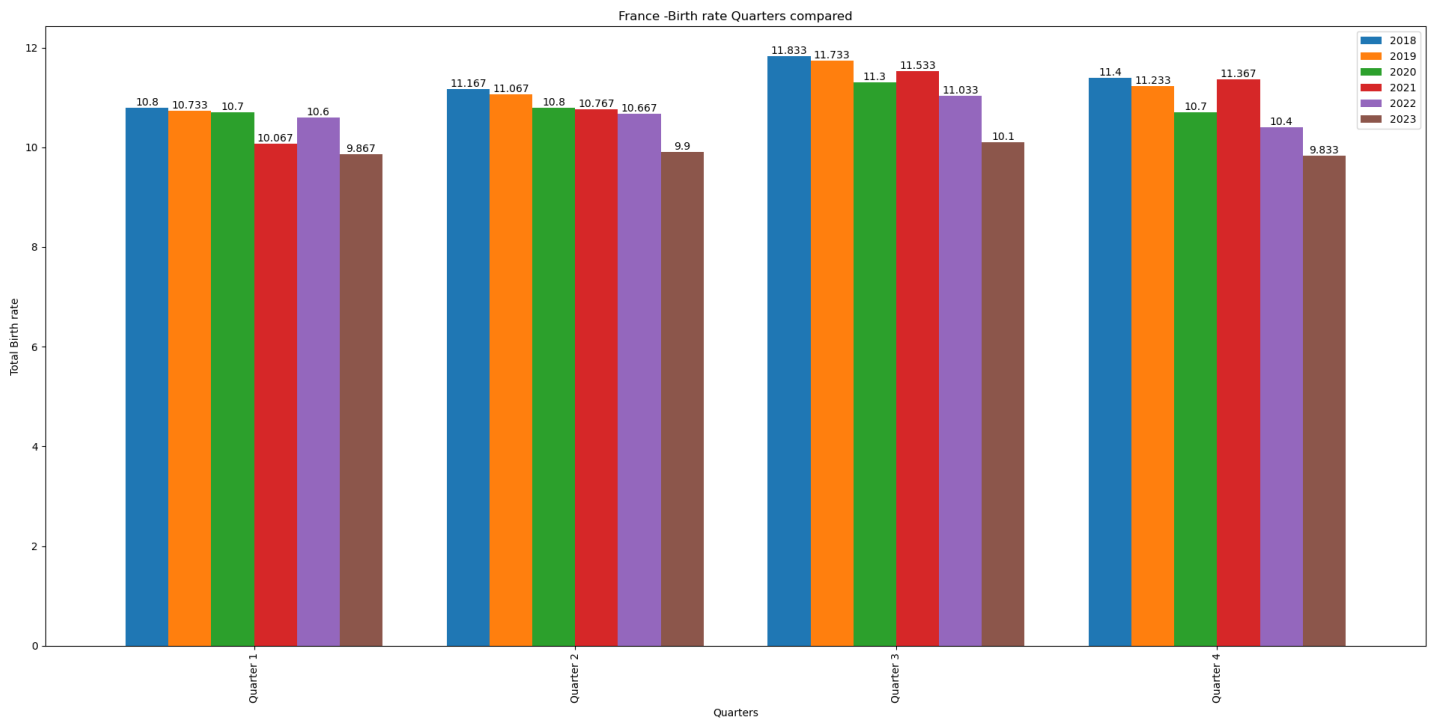
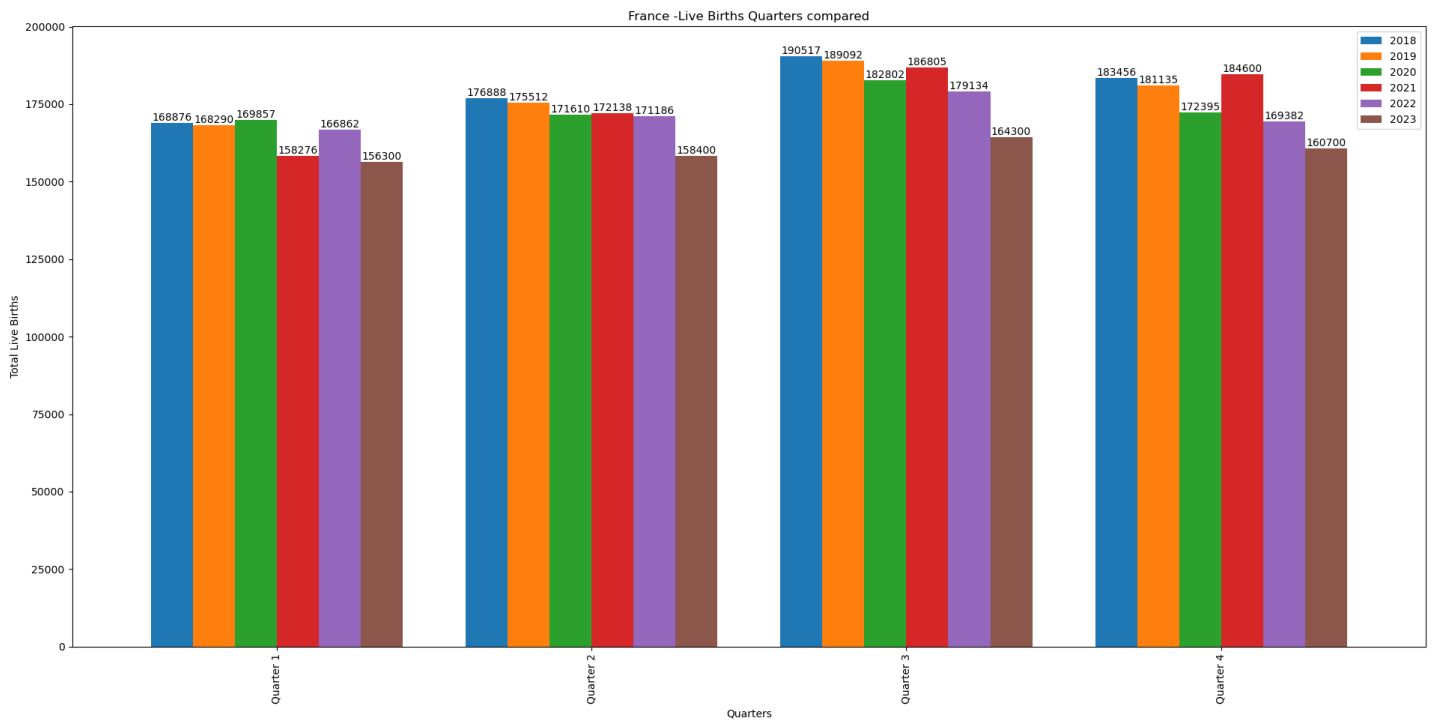
Turkey started COVID-19 vaccination at the end of December 2020. vaccination for all was started in April 2021, In the following bar chart below the recorded live births in Turkey are plotted quarters-wise from 2018 to 2022, A decline in live births can be observed in the first quarter of 2021 of 8.6% and 6.1% in the first quarter of 2022 compared to the first quarter of previous years. However, there is a general downward trend in the births recorded in Turkey. **an increase of 2.8% is also observed in the first quarter of 2022 compared to 2021.**



2.4 France

France started vaccine rollouts in January 2021, with phase 1 starting on 2 January 2021 targeting to vaccinate the highest priority audience, On 30 April 2021 France opened Vaccination to everyone older than 18.

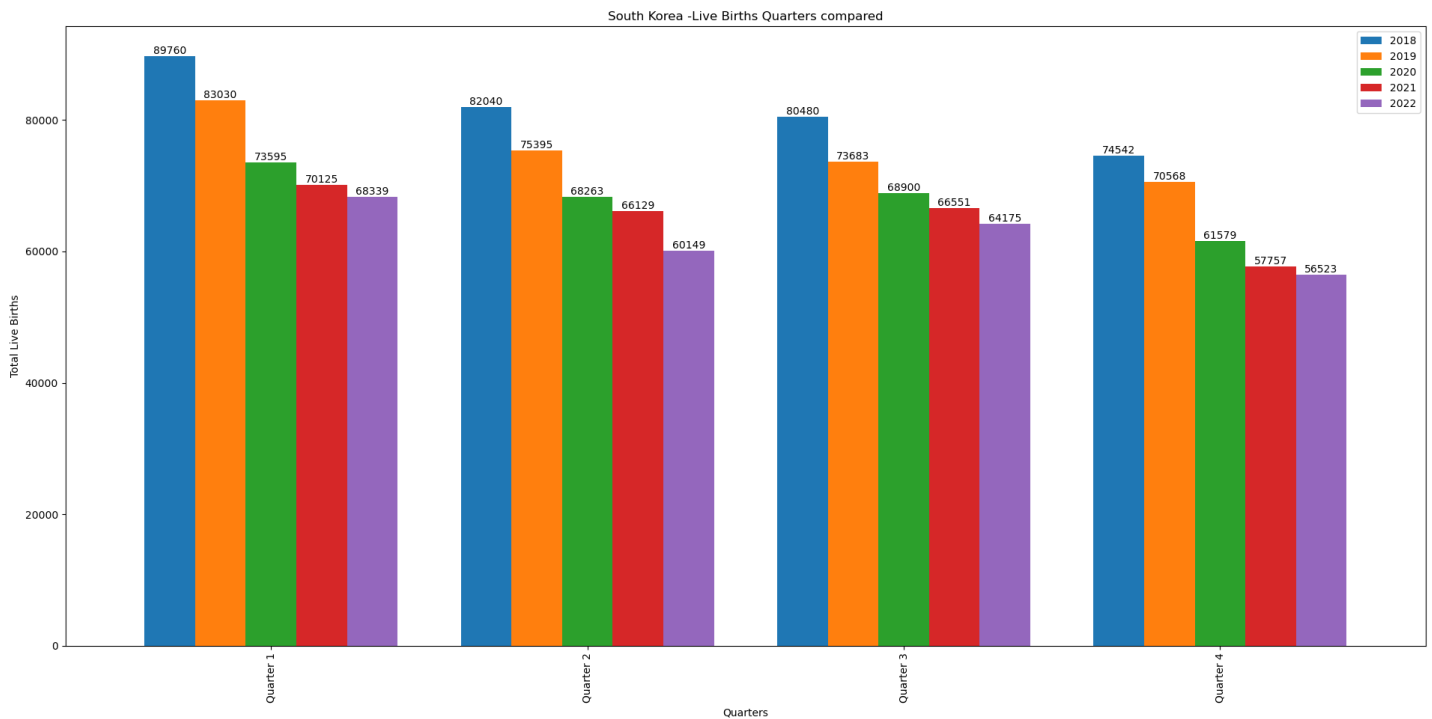
In the following figures of Recorded Live Births and Birth rate in France from 2018 to 2023, A decline in recorded live births of 6.8% compared to the first quarter of the previous year and birth rate is observed in the first quarter of 2021, In the first quarter of 2022 an increase from the previous years first quarter of 5.4% is observed and a slight dip in second quarter of 2022.



2.5 South Korea

South Korea's KDCA (Korean Disease Control Agency) responsible for COVID-19 vaccination started vaccinating in May 2021. The vaccination campaign was slowed down due to Vaccine shortages in July 2021.

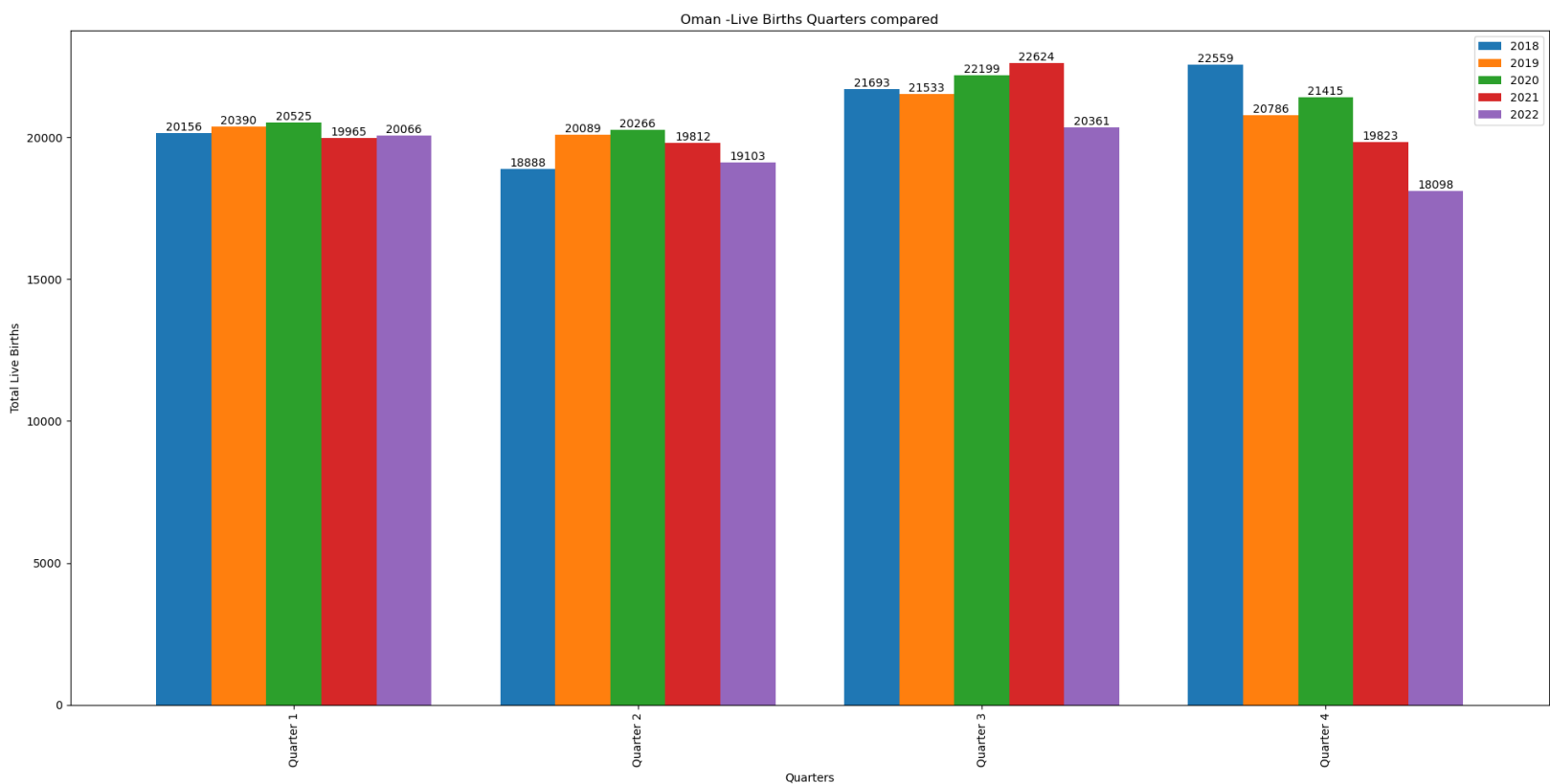
following is the figure for Recorded live births in South Korea. A decline can be observed in the first quarter of 2.54% from the previous year's first quarter and a significant decline of 9.0% in the second quarter of 2022, However, there is a general downward trend observed in the Live births of South Korea.



2.6 Oman

Oman announced its first COVID-19 vaccination program on December 27, 2020. The vaccination was divided in two phases with the first phase targeting to vaccinate high-risk groups first and then rest in the second phase. the second phase was estimated to start in March 2021 and lasted till July 2021. (estimated)

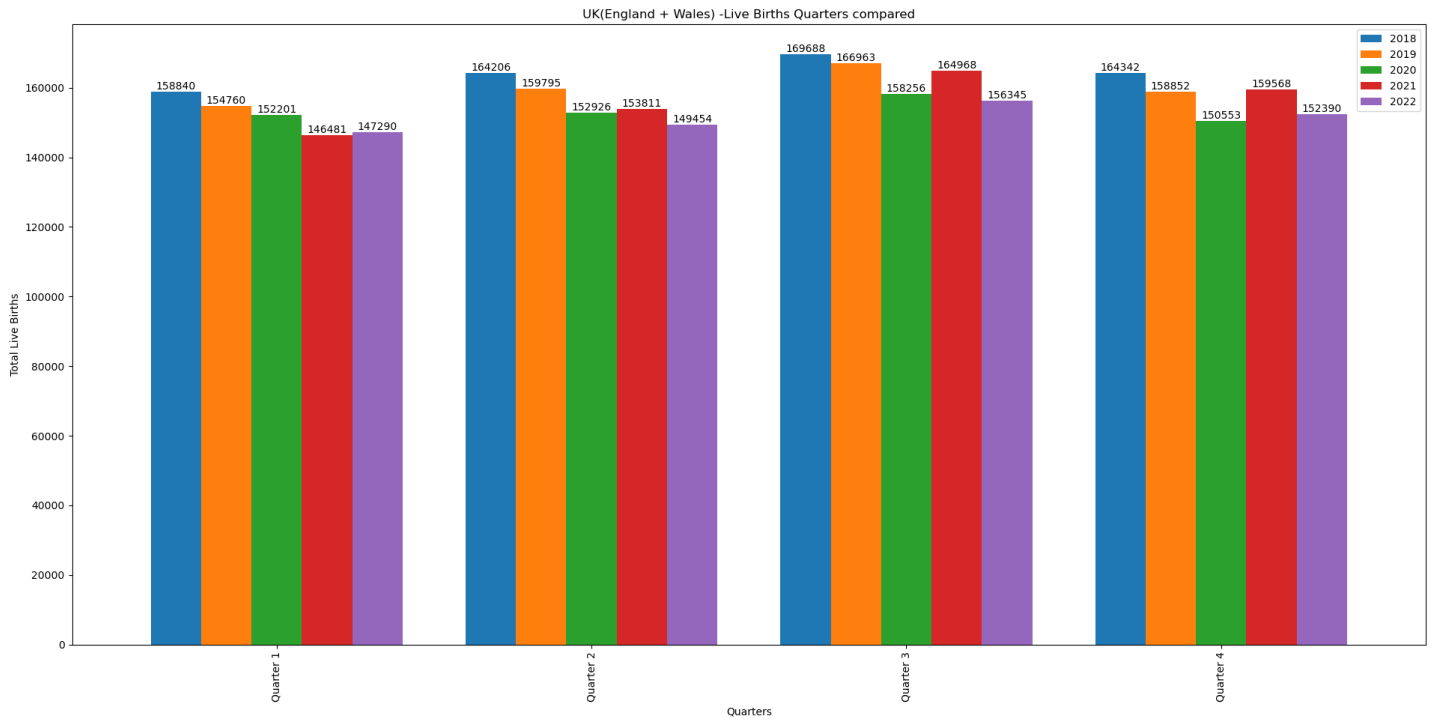
Looking at the live births in the chart below, a slight decline of 2.7% can be observed in the first quarter of 2021 following an increase of 0.5 % in the first quarter of 2022. In the second quarter of 2022, a **decline of 3.5 %** was noted from the previous year's second quarter.



2.7 United Kingdom (England + Wales)

The United Kingdom started covid-19 vaccination program on December 8, 2020. The age group of 18-45 received their COVID-19 vaccine dosage between April 2021 to June 2021. The UK's vaccination uptake was among the highest in the world.

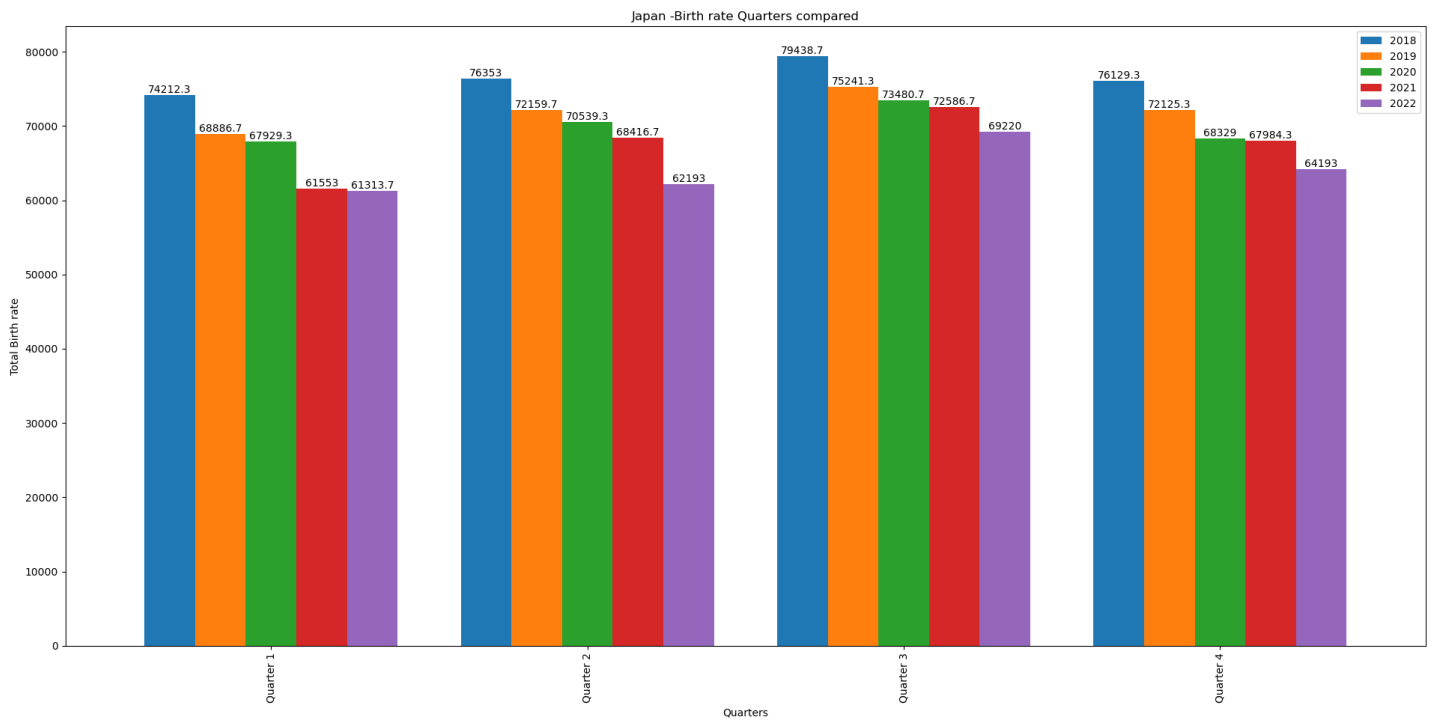
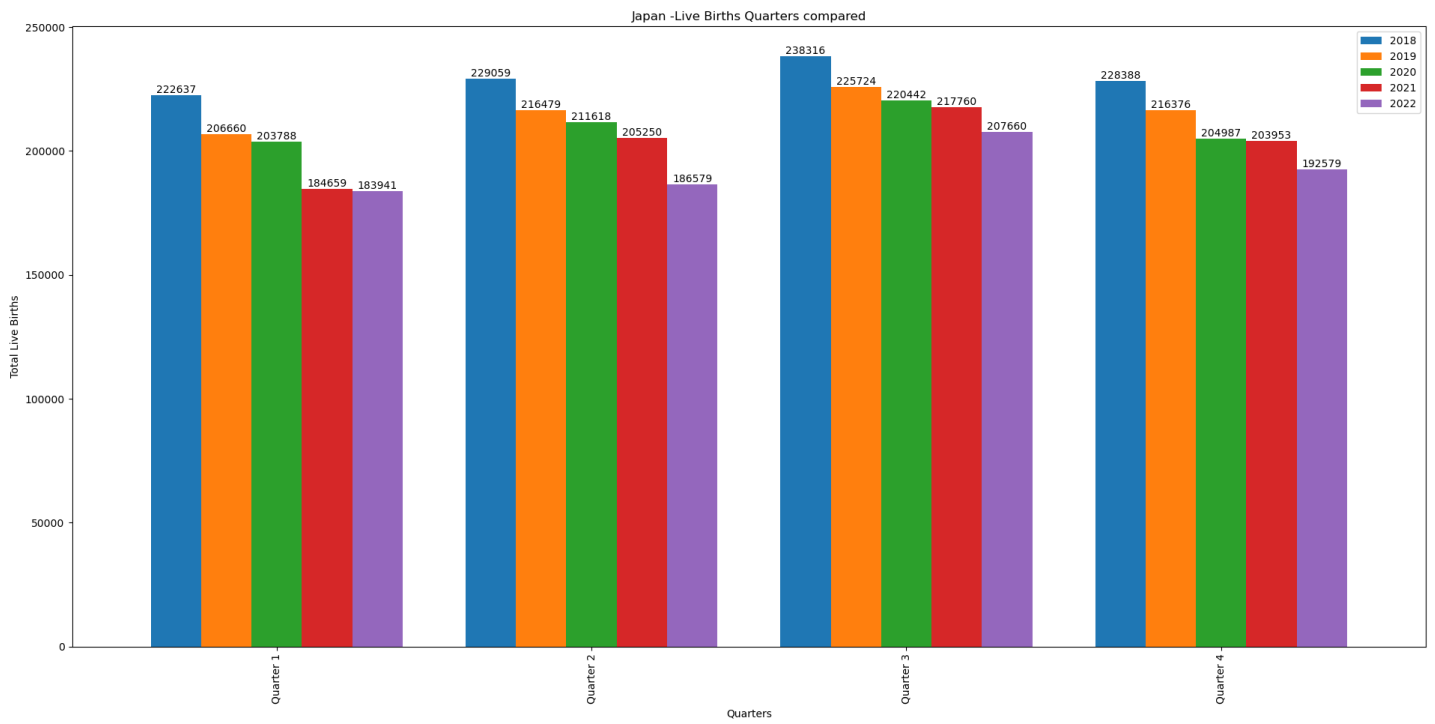
In the following plot of the live births recorded per quarter in each year from 2018-2022, a decline is noted in the first quarter of 2021 and 2022, and in the second quarter of 2022, there is a **decline of 2.8 %** compared to the second quarter of 2021.



2.8 Japan

Japan started the Covid-19 vaccination program from April 12, 2021. Japan was planned to be a host for the 2020 Summer Olympic Games but the spread of COVID-19 resulted in the postponement of the games to July 2021. Japan was among the first countries to approve COVID-19 vaccines for public use. For the general public, the COVID-19 vaccination was started in July 2021.

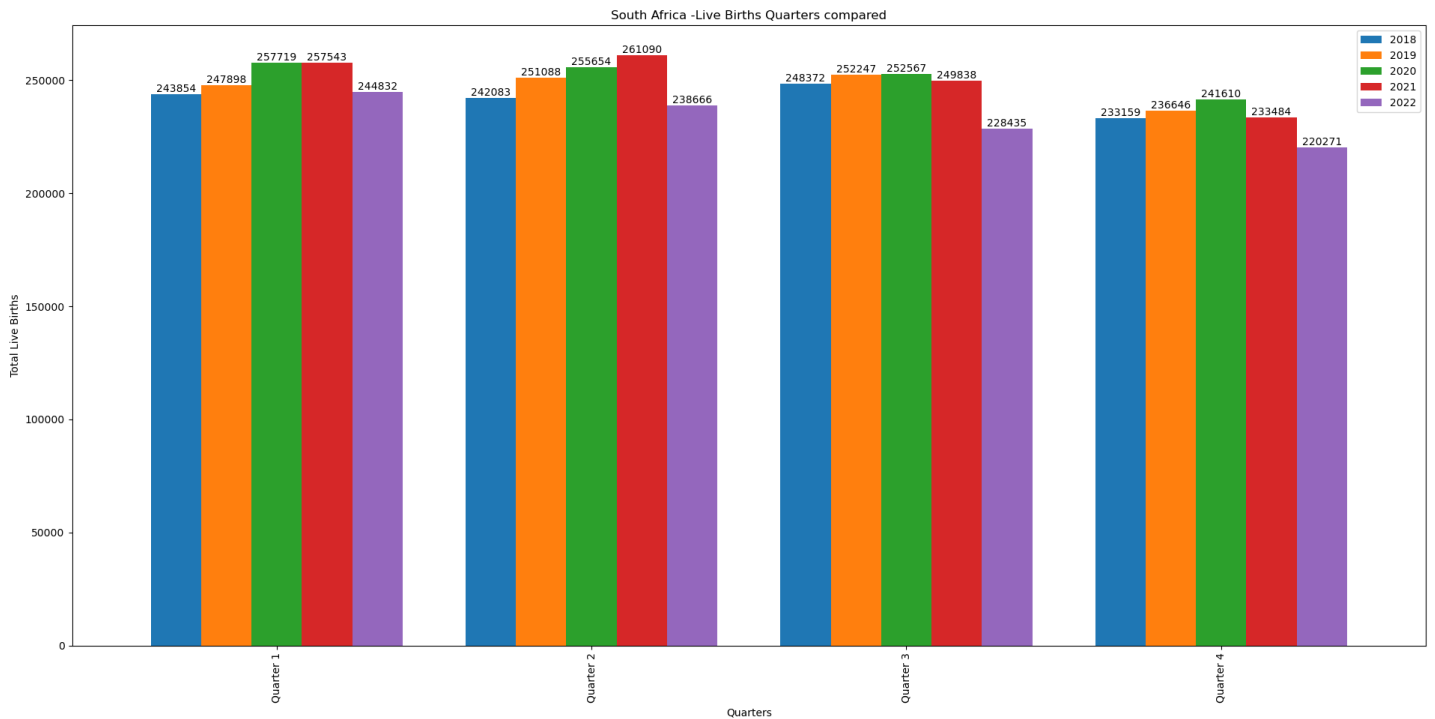
Below are the quarter-wise plots for the Recorded live births and the birth rate for Japan from 2018 to 2022. In the first and second quarter of 2021 and 2022, there was a **decline of 9.3% and 9.7%** respectively compared to the first quarter of 2020. In the second quarter of 2022, there was a **decline of 9.0%** was noted from quarter 2 of 2021.



2.9 South Africa

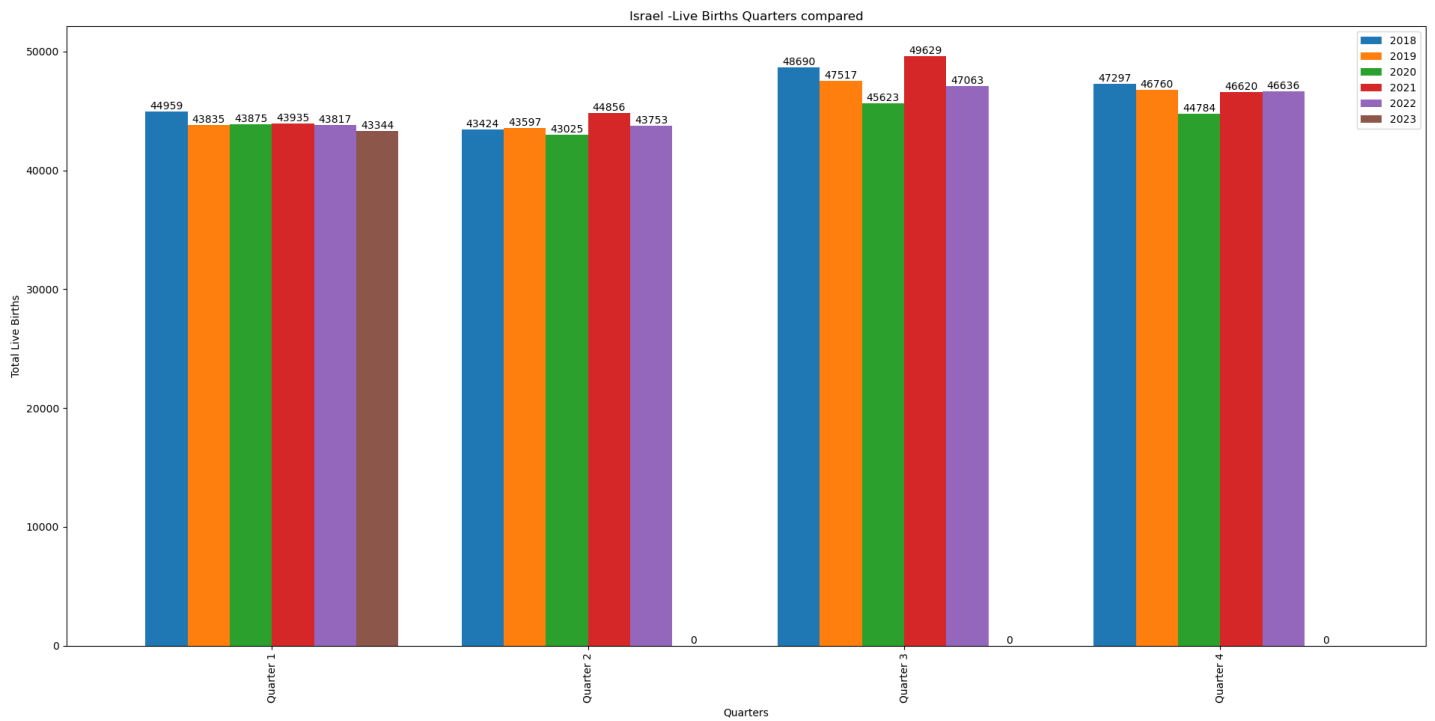
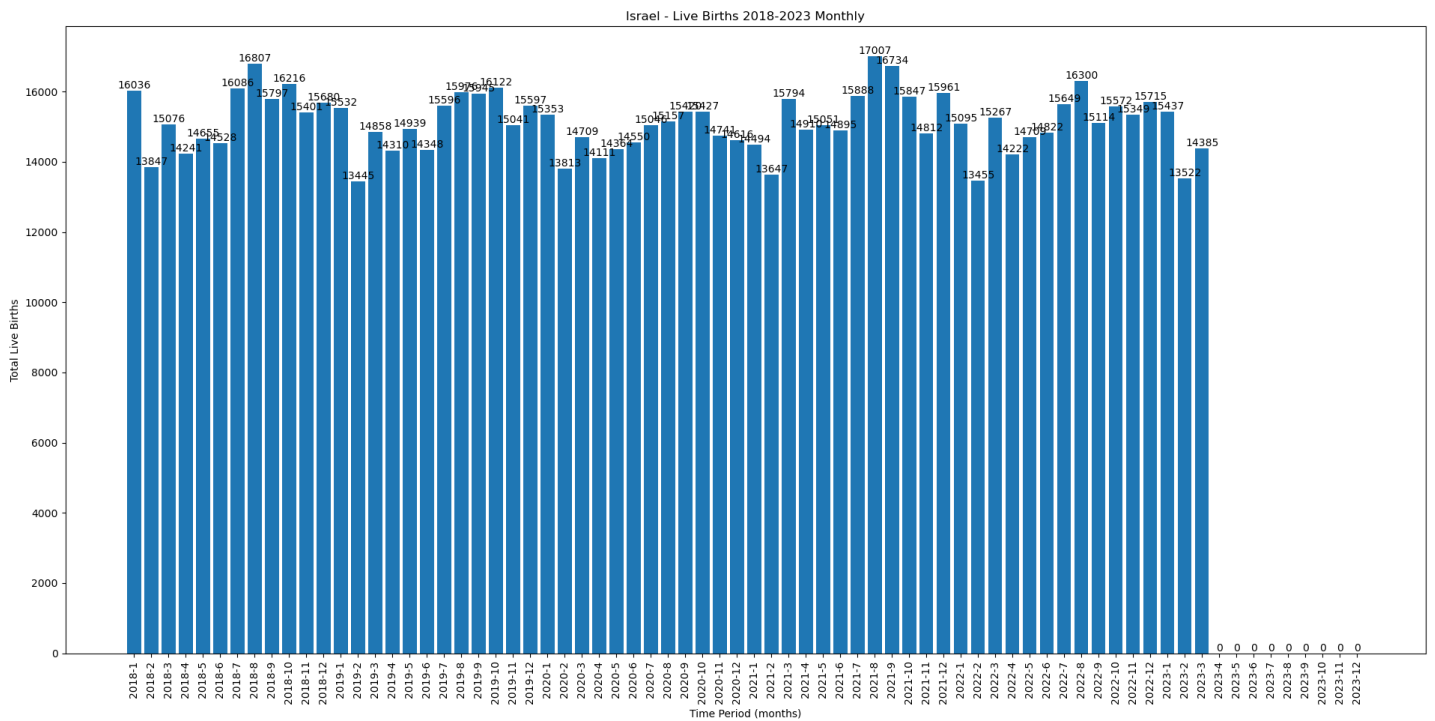
South Africa started its national vaccination program in February 2021. With people aged 18-34 starting from July 2021 and August 2021. following are the Recorded live births in South Africa plotted quarterwise for each year from 2018 to 2022.

A decline of 4.9% is noted in the first quarter of 2022 compared to the first quarter of 2021. there is no significant decline in the first quarter of 2021. In the second quarter of 2022, a **large dip of 8.1%** is recorded compared to last year's first quarter.



2.10 Israel

Israel Started its vaccination program in mid-December 2020. after February 2021 almost 90% of Israel's population had at least received their first dose. Israel has the most doses given by any country per person. In the following graphs of Israel's Live Births, there is no significant change in the last quarter of 2021 or the first quarter of 2022. In the monthly plotted graph a dip can be seen in the month of November 2021 and February 2022.



3 Overview

A significant dip was observed in almost all of the countries analyzed above in the first quarter of 2021 which can be attributed to the Initial Lockdown due to COVID-19, There were some countries that had a decline in the Birth figures recorded that coincided with quarter leading the timing of the Covid-19 Vaccinations.

from the Data in the above section, there are three discernible types of countries can be observed:

1. Countries with an observable decline in the quarter leading off from the COVID-19 vaccinations
 - **2.2 Sweden:** A notable **decline in Recorded Live Births is observed in the first and second quarters of 2022 at 5.2% and 8.0%** respectively, which is evident in the second graph, however, there is a general downward trend in the live births throughout the quarters in each year
 - **2.6 Oman:** A **decline of 3.5 %** was noted from the previous year's second quarter.
 - **2.7 United Kingdom:** In the second quarter of 2022, there is a **decline of 2.8 %** compared to the second quarter of 2021.
 - **2.9 South Africa:** In the second quarter of 2022, a **large dip of 8.1%** is recorded compared to last year's first quarter.
 - **2.8 Japan:** In the second quarter of 2022 there was a **decline of 9.0%** noted from quarter 2 of 2021.
2. Countries with no significant change in birth data from the COVID-19 vaccination :
 - **2.1 Ireland:** **In the first quarter of 2022, there is an increase in the live births of 16.0% and 25.08%** in the first and second quarters of 2022 compared to 2021 respectively.
 - **2.4 France:** In the first quarter of 2022 an increase from the previous year's first quarter of 5.4% is observed and a slight dip in the second quarter of 2022.
3. Countries with a general declining birth rate or An observable general Downward trend:
 - **2.8 Japan**
 - **2.3 Turkey**
 - **2.5 South Korea**