Is the Italian population really in danger of extinction?

Elon Musk recently stated that if Italy continues to have the current birth rate and population decline, it is destined to remain without people.

As an Italian, these statements worried me but also intrigued me: the demographic trend is known to everyone and the news often speak about it, but it pushed me to look for and see with my own eyes the numbers of this decline and how this compares with the numbers of other countries and the rest of the world.

To carry out this analysis I decided to use the following metrics:

- Birth rate

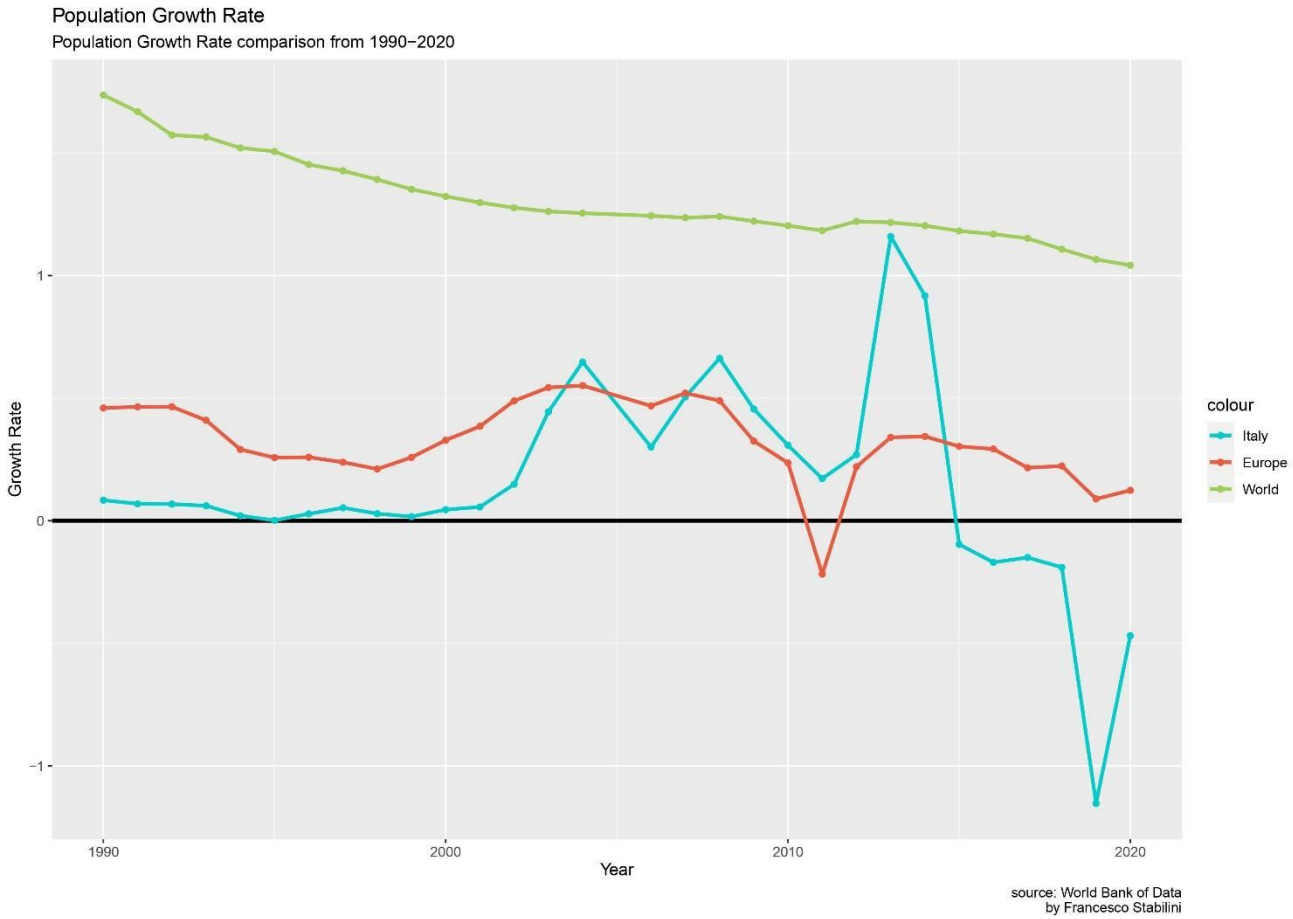
- Death rate

- Percentage growth of the population

- Average age

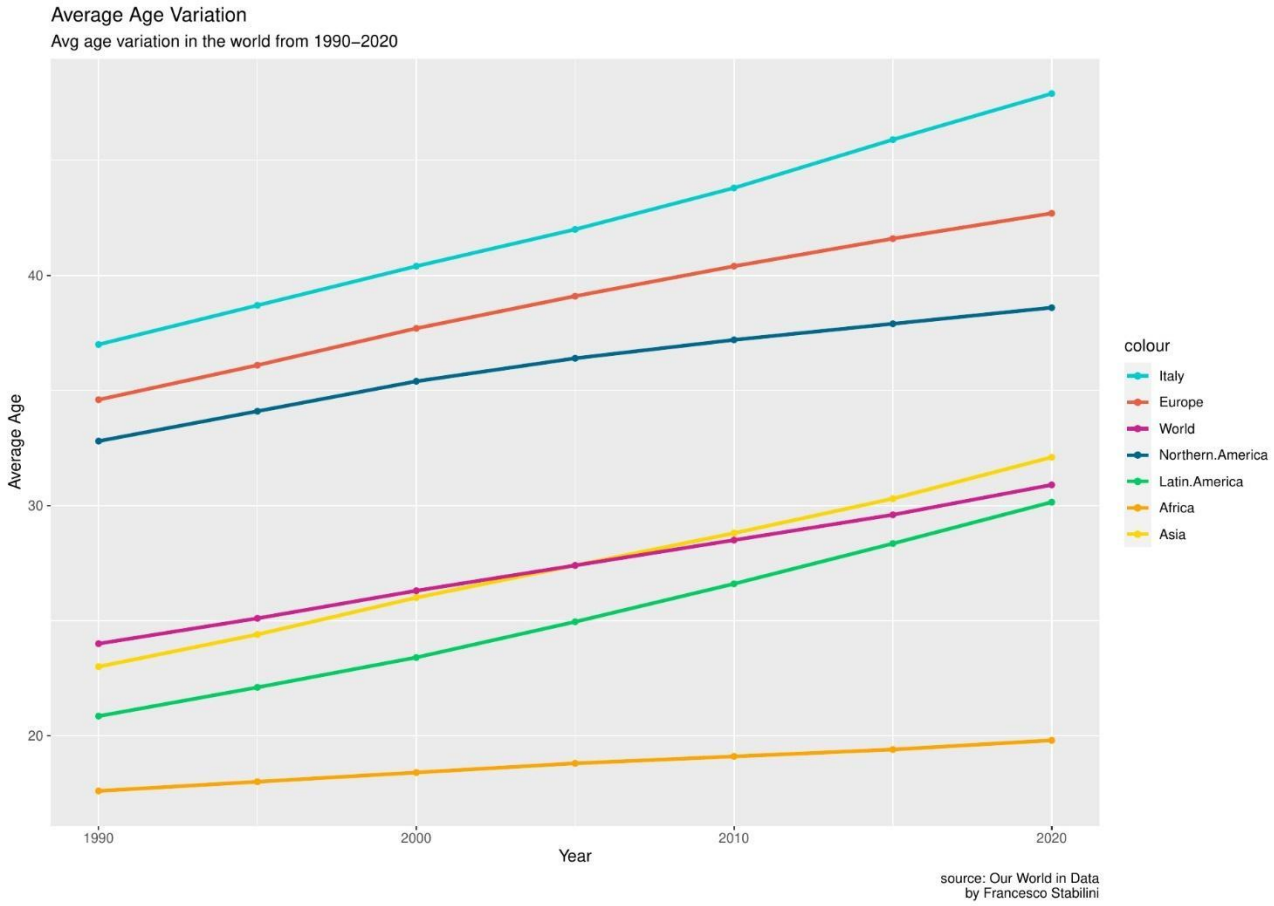
I found the data on the open websites https://data.worldbank.org/ and https://ourworldindata.org/, the sources are cited in the graphs as well. The period that I will analyze is from 1990 to 2020, although I am doing this analysis in June 2022 many data concerning 2021 were missing so I decided to sacrifice contemporaneity in favor of an analysis with complete data and that would allow me to better identify the trend and the information I was looking for. All the charts were made with R and the related codes and datasets can be found in my Git Hub repository https://github.com/Fstabi/ItalyExtinction.

Growth Rate



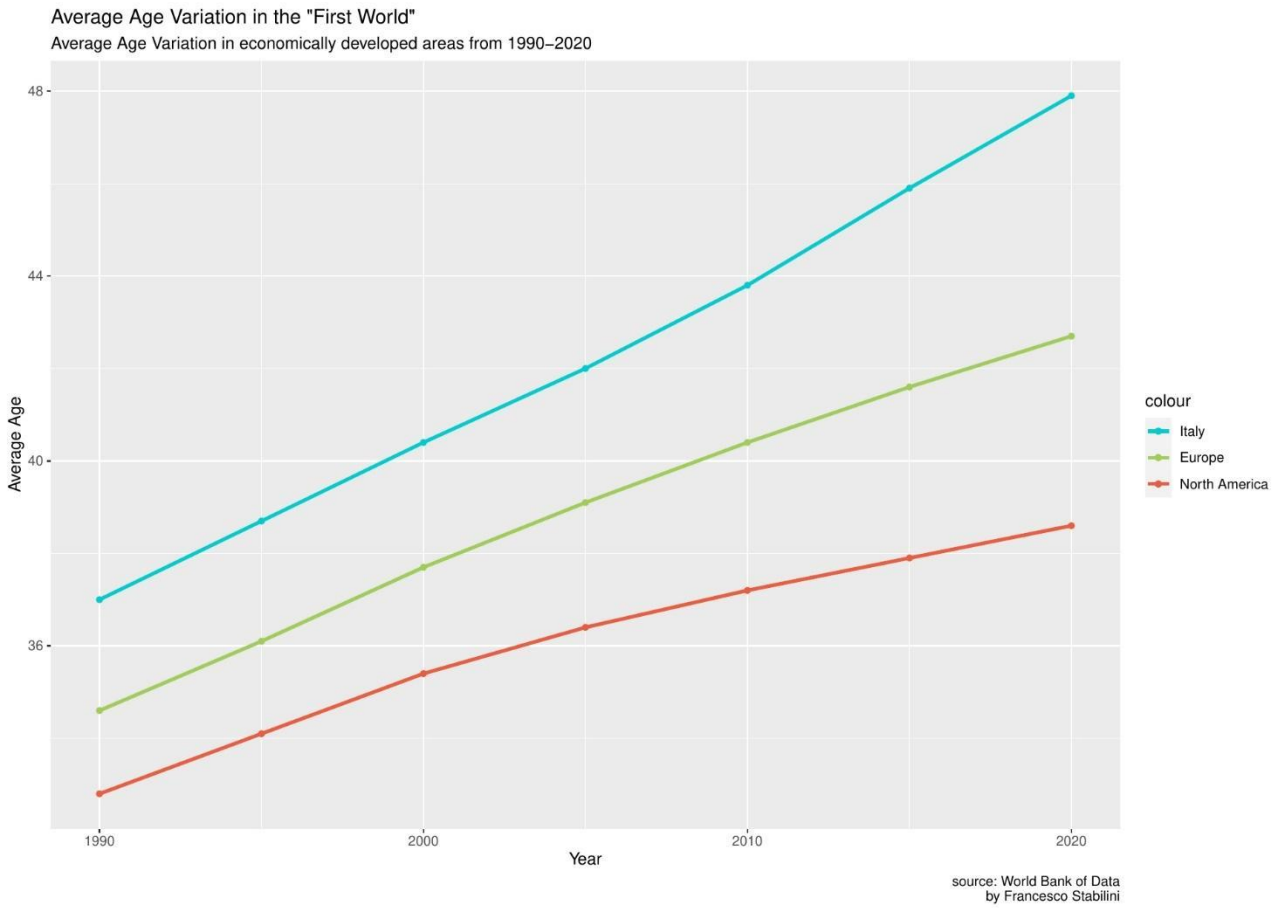
The graph shows how the growth rates of Italy and Europe are quite correlated (except for some years in which Italy had out of the ordinary rates such as 2013 and 2014 where it almost matched the world average), due to similar socio-economic conditions. An important correlation point is the fall that occurred in 2011, due to the economic crisis, which represents the only year of the last thirty where Europe has had a negative growth rate, while the Italian one remained slightly positive. The Italian growth rate begins to deviate from the European one around 2010, where it becomes negative for the first time and, to date, has not yet returned to positive. Another interesting fact that the graph provides is that the world growth rate is also in constant and slow decline, going from 1.7% per year in 1990 to the current 1.04%.

Average Age



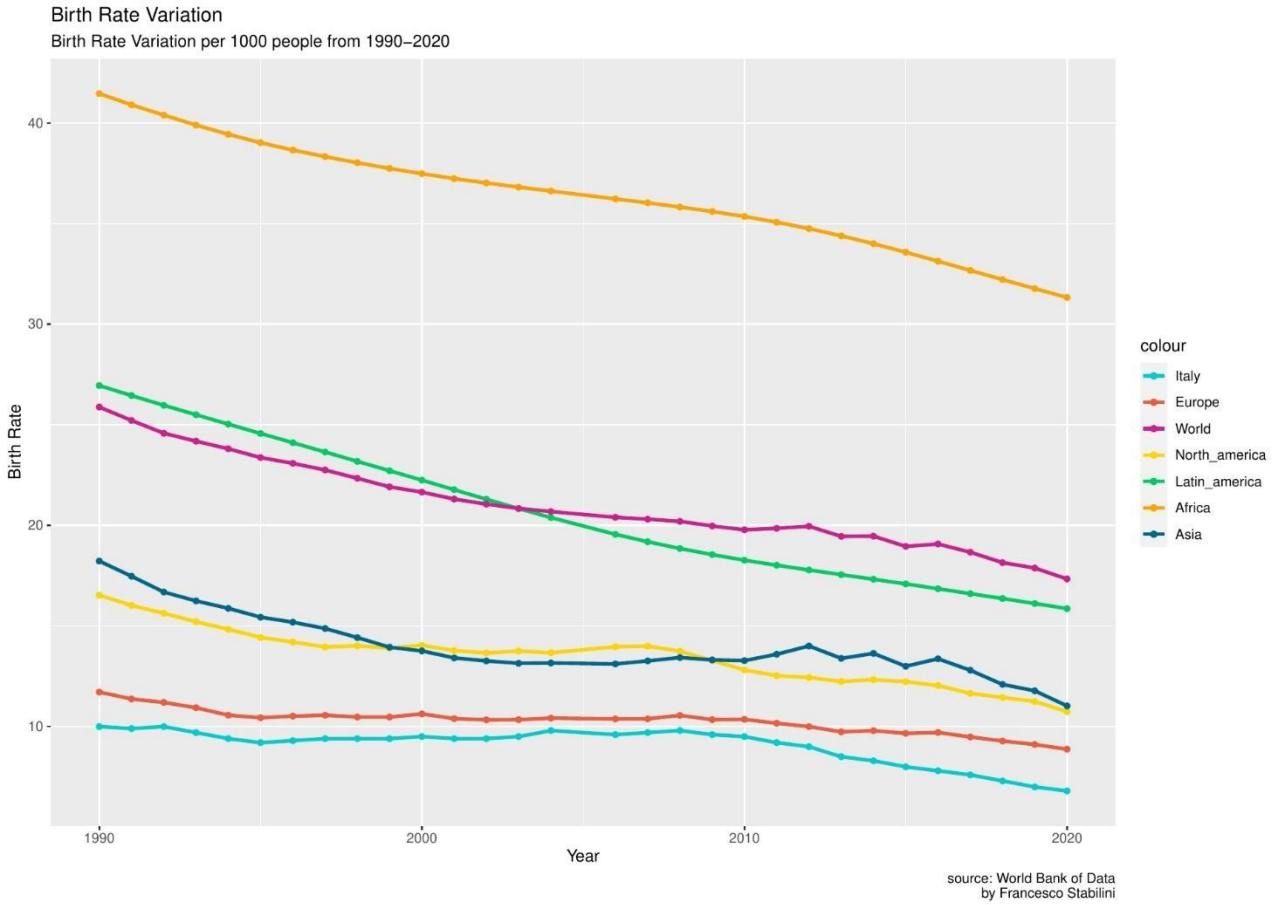
The graph clearly shows how the average age of the population of a given geographical area largely depends on socio-economic well-being, the areas with the highest average age are in fact those defined as "first world". Asia and Latin America in the last 30 years have had important improvements, this is also reflected in a significant increase in the average age, 9 years for Asia and 7 for Latin America. This is not true for Africa, which in 30 years has had an average age increase of only 2 years.

Since this analysis is focused on Italy, I decided to make a second graph regarding only the countries of the so-called "first world".



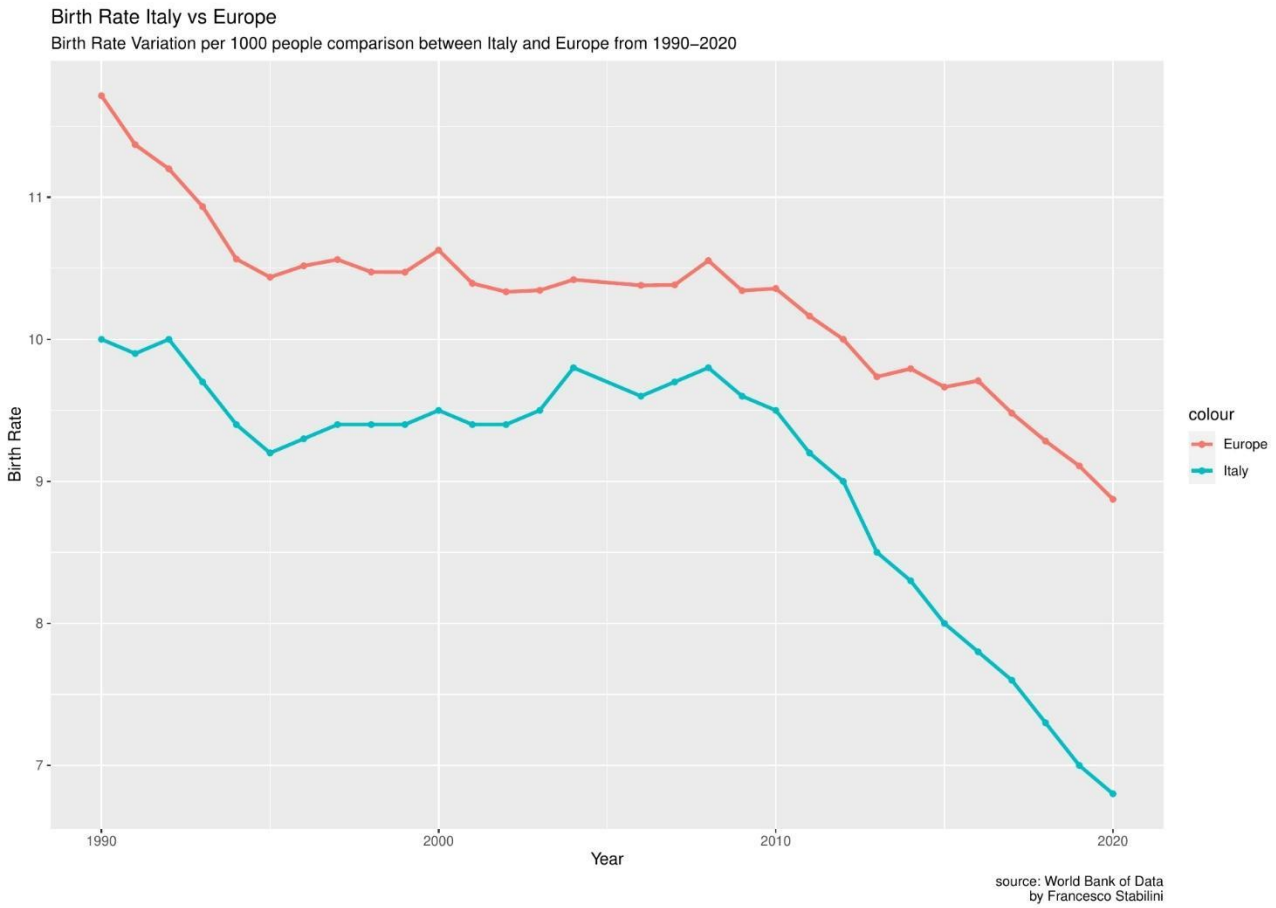
In this zoom of the previous graph, the interesting aspect is that the average age of the three areas analyzed has advanced in parallel for 20 years, until 2010, where the increase has been almost at the same rate. From 2010 onwards Europe and North America are experiencing a slight reduction in the average age increase, which is continuing to increase but at a slower rate. Italy, on the other hand, has even increased the pace of growth, distancing itself more and more clearly from the other countries analyzed.

Birth rate



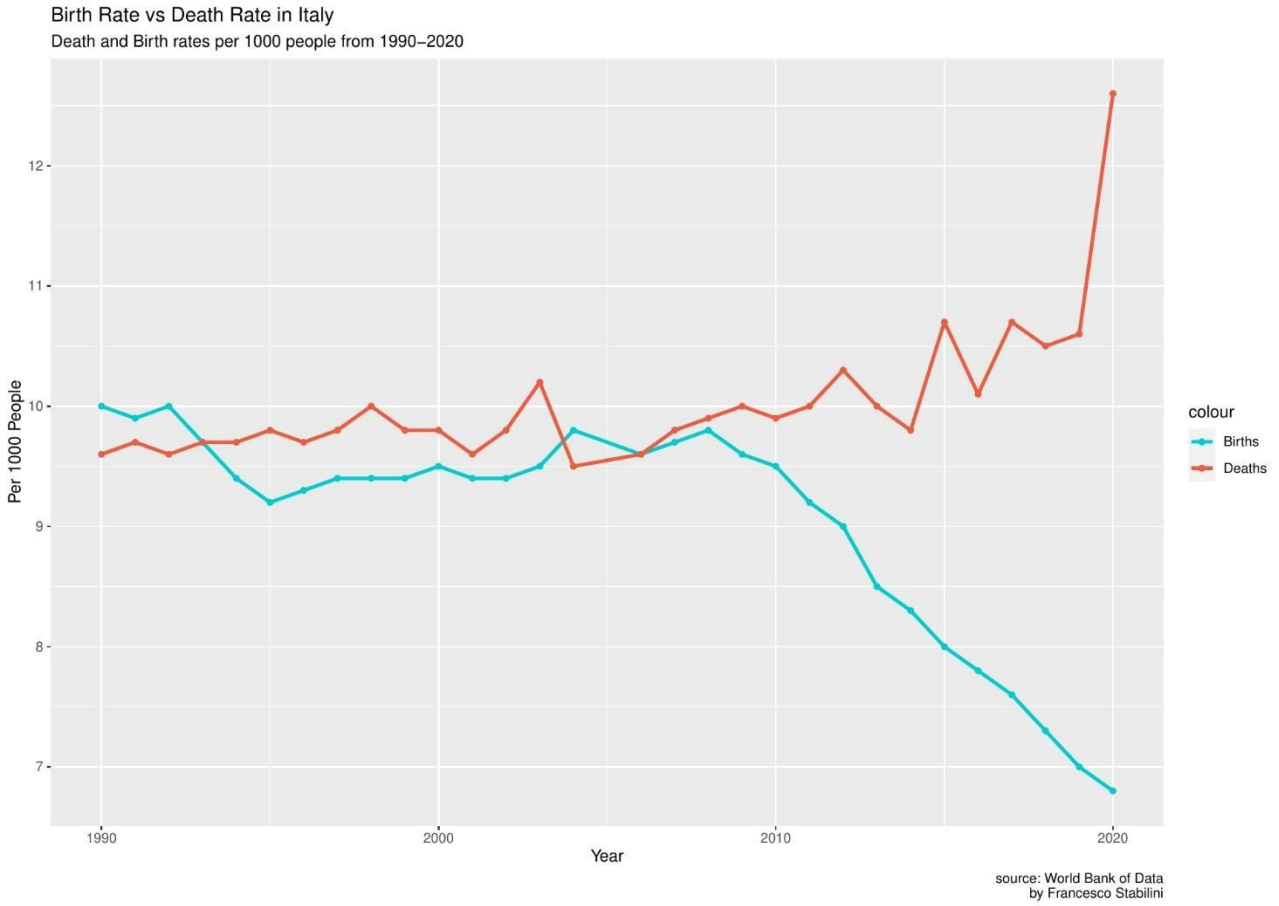
What you notice the first time you look at this graph is that it is almost a mirror image of the average age. It is proven that more developed countries have lower birth rates since women are more integrated into work and social life and are less dedicated to childcare. The main difference is the position occupied by Asia, which ranks very close to Latin America in average age but has almost the same birth rate as North America. This phenomenon is mainly due to the birth rate policies implemented in China in the 1980s which have only recently been relaxed. Italy, as might be expected, has the lowest birth rate in the entire chart.

As I have already done for the average age, I decided to analyze more closely how this rate relates to the European one.



The two lines of the graph are parallel almost all the time, a symptom of the fact that both areas suffer from the same socio-economic phenomena. Intrigued by the almost parallelism of the two lines, I decided to deepen the research and look for the moment in which they were closest and when they were further away. The result is that the smallest gap was in 2004, where Italy had a birth rate that was only 0.6% lower than the European average, while the largest gap was that of 2019, where it stood at 2.1%. A further interesting fact that allows us to perceive the drama of the situation in Italy can be seen when we look for the worst 5 years in terms of the gap with the European rate and we discover that they are exactly the last 5, in the order 2019 (-2, 1%), 2020 (-2.07%), 2018 (-1.98%), 2016 (-1.9%) and 2017 (-1.88). Yikes.

Birth Rate vs Death Rate in Italy



It would be easier for me to say that this chart speaks for itself, but as much as it hurts, I will remain professional until the end of the analysis and comment on it as I did with all the other charts. As we have already seen in other graphs, 2010 represented a watershed year for Italy, which probably failed to recover from the crisis as quickly as the rest of the European countries and began to distance itself negatively from them. Up to that moment the birth and death rates could be said to be equal, the death rate was slightly higher but some years the birth rate still managed to surpass it. From 2010 onwards, the birth rate has undergone a spiraling and above all constant decline which has now continued for a decade. The death rate is also increasing, not at the same rate and consistency as the decline in births though. In 2020 it accelerated rapidly, but it was also influenced by the victims of the coronavirus (it would be interesting to find out how much they affected on the global death rate, but we will leave this for another analysis).