The impact of average temperature and relative humidity degrees on the number of (COVID-19) confirmed cases in China and Italy.

Goal:

Studying the impact of the average temperature and relative humidity degrees on the number of confirmed cases in China and Italy. The interval that has been analyzed differs from each country, based on the arrival date of COVID-19 and its propogation in each country. The reason behind choosing studying China and Italy specifically, is due to the rapid increase in their number of confirmed cases.

China

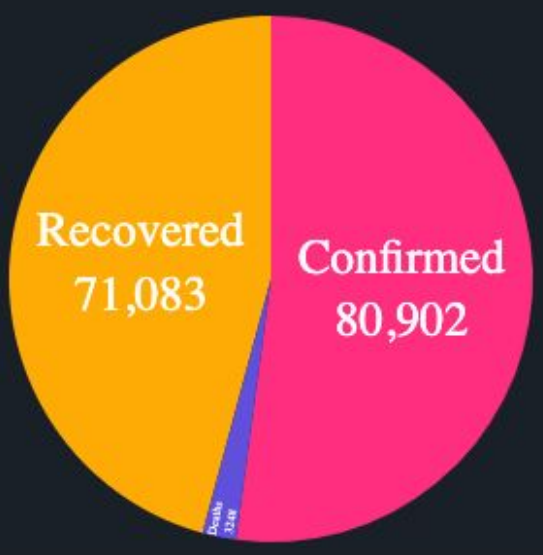

Figure 1.a: China's number of cases

Italy

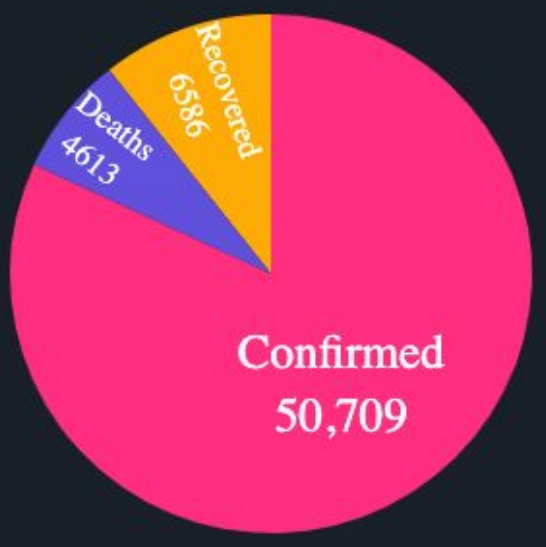

Figure 1.b: Italy's number of cases

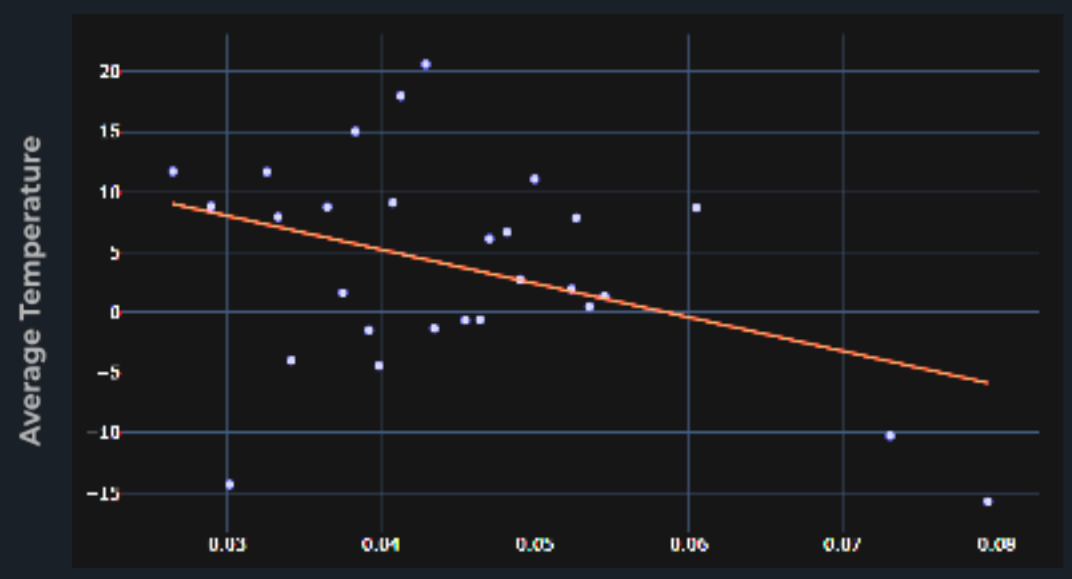

Figure 2.a: The average temperatures of China's provinces along with the average of growth rate in each province.

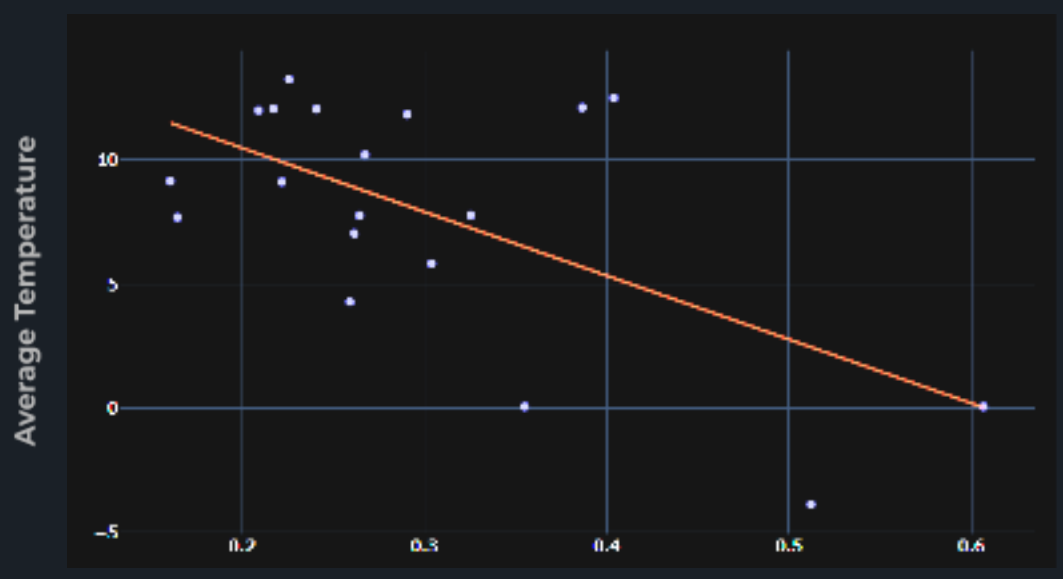

Figure 2.b: The average temperatures of Italy's provinces along with the average of growth rate in each province.

According to figure 2.a, we chose to analyze the data of China's provinces from (1st of Feb - 29th of Feb), and by studying the relationship between the average temperatures of each province with the growth rate (with the aid of Regression Analysis Method), we have concluded that a high average temperature has a significant impact on the number of confirmed cases (decline in the growth rate). However, in figure 2.b, we chose to analyze the data of Italy's provinces from (24th of Feb - 22th of Mar), and we have concluded that a high average temperature in Italy also has an impact in decreasing the number of confirmed cases, but not a strong impact as in China, since China has been affected by external factors such as the large-scale intervention of China, while Italy still have not done a strong intervention.

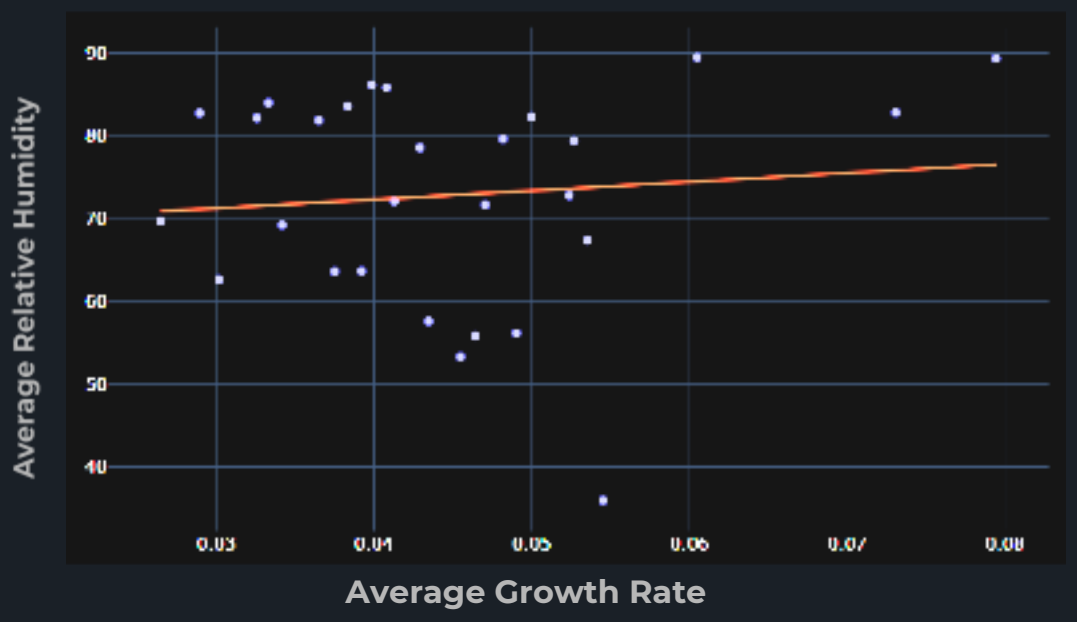

Figure 3.a: The average of relative humidity degrees of China's provinces along with the average of growth rate in each province.

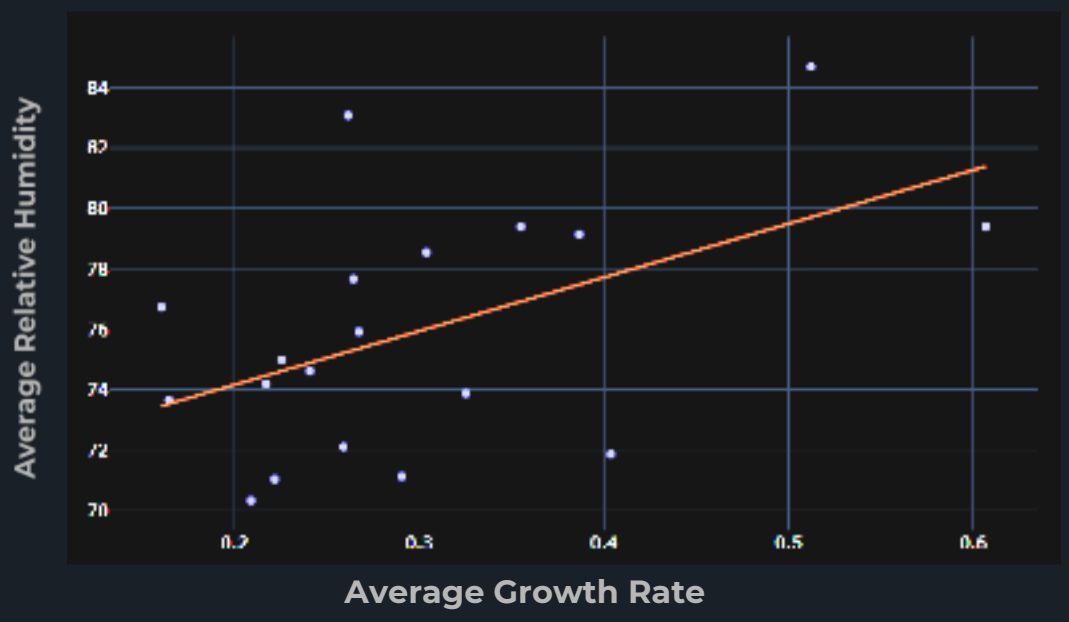

Figure 3.b: The average of relative humidity degrees of Italy's provinces along with the average of growth rate in each province.

According to figure 3.a and 3.b, they show that there is an impact on the growth rate of the confirmed cases by the average of relative humidity of each province, but it is not a strong impact as the impact of the average temperature, due to the fact that the impact of the average temperature is stronger than the impact of relative humidity, and that is proved by the studies in paper [High Temperature and High Humidity Reduce the Transmission of COVID-19] and [Temperature Significantly Change COVID-19 Transmission in 429 cities].

Conclusion:

In conclusion, we can notice the impact of average temperature and relative humidity on the average growth rate of the confirmed cases in China and Italy, which prove that COVID-19 is highly sensitive to high temperature and relative humidity which would be a factor in reducing its propogation. An example to show the impact of the average temperature on the average growth rate, two provinces in Italy, Campania and P.A. Bolzano were chosen, the average temperature of each province was 12 and 0 respectively, and according to their average temperature, the average growth rate of each one of them was 0.2 and 0.6 respectively. From this example, we can see when the temperature reaches (12℃) the number of confirmed cases would only increase by almost (0.2), on the other hand, if the temperature reaches (0℃) the number of confirmed cases would increase by almost (0.6), and that shows the gap between the average growth rate.

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References:

- Italy's Data - By Region
- POWER Data Access Viewer
- China's Data - By Region
- COVID-19 Novel Coronavirus
- High Temperature and High Humidity Reduce the Transmission of COVID-19
- Temperature Significantly Change COVID-19 Transmission in 429 cities