From the beginning of 2020, the world is experiencing an unprecedented tragedy, COVID-19 has spread around the global. People are dying every day because of COVID-19. Because of quarantine and other reasons, factories cannot operate, and many companies’ employees have to work from home. Every country’s economy is being affected by this outbreak. Germany and South Korea have also been severely affected by this outbreak. In addition, people sentiment also impacted by COVID-19 in year of 2020. Our group used data from Germany and Korea during the outbreak and used hypothesis testing statistic method to analyze the COVID-19 has positive influence or negative influence on the economies of Germany and South Korea. Also, we use South Korea COVID-19 “infodemic” data to analyze the death rate has positive impact or negative impact with people sentiment.

Hypothesis testing is an inferential statistical process that uses limited information from the sample data as to reach a general conclusion about the population. Researchers usually collect data from a sample and then use the sample data to help answer questions about the population.

For South Korea, we use the COVID-19 data from 01/21/2020 to 06/07/2020 to analyze the death rate has positive impact or negative impact with sentiment. Firstly, we make hypothesis for the problem.

* Our hypothesis is as follows:

We suppose that Total cases and death rate have negative correlation with Market Volatility.

* For this hypothesis, our dependent variable is: sentiment.
* Our independent variables is: total cases and death rate.
* Our control variables is: population density, age, extreme proverty, and education level.

We use 139 sample data to do analysis. After statistical analyzing, the mean of total case in South Korea is 7140.96; the standard deviation is 4625; the minimize value is 1; the maximize values is 11776. The death rate in South Korea is 1.36%; the standard deviation is 0.94%; the minimize value is 0%; the maximize value is 2.36%. the men sentiment in South Korea sample data is: -37.97; the standard deviation is 19.59; the minimize value is: -81.26; the maximize value is: 7.35. In order to test our hypothesis, we use correlation coefficient to do analysis, the correlation analysis for South Korea is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Total cases\_South Korea* | *Total death\_South Korea* | *death rate\_South Korea* | *Sentiment\_South Korea* |
| Total cases\_South Korea | 1 |  |  |  |
| Total death\_South Korea | 0.927642434 | 1 |  |  |
| death rate\_South Korea | 0.939925841 | 0.982853082 | 1 |  |
| Sentiment\_South Korea | -0.302961426 | -0.190338775 | -0.284567135 | 1 |

From this table, we can see total cases and death rate has negative correlation with sentiment. The hypothesis is correct.

For Germany, we make hypothesis as follows:

Total cases and death rate have negative correlation with Market Volatility.

The dependent variable is: market volatility; the independent variable are total cases and death rate; the control variable are population density, age, extreme proverty, and education level. We also use Germany COVID-19 data from 01/21/2020 to 06/07/2020 to do analysis. The number of observation is 139. The mean total case in Germany is 70831; the standard deviation is 76964; the maximize value is 183979. The men of death rate is 1.85%; the standard deviation is 1.95%; the minimize value is 0%; the maximize value is 4.71%. The mean of market volatility in Germany is 0.54; the standard deviation is 0.62; the minimize value is -0.54; the maximize value is 1.51. In order to test our hypothesis, we use correlation coefficient to do analysis, the correlation analysis for South Korea is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *total cases\_Germany* | *total death\_Germany* | *death rate\_Germany* | *Mkt\_Volatility\_Germany* |
| total cases\_Germany | 1 |  |  |  |
| total death\_Germany | 0.959749329 | 1 |  |  |
| death rate\_Germany | 0.988607398 | 0.989994782 | 1 |  |
| Mkt\_Volatility\_Germany | -0.260917667 | -0.101825034 | -0.193939087 | 1 |

From correlation table, we can see total cases and death rate have negative correlation with market volatility. Our hypothesis is correct.