

# France and Germany Exceed Italy, South Korea and Japan in Temperature-Adjusted Corona Proliferation A Quick and Dirty Sunday Morning Analysis

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**Abstract:** Measures to contain the Corona virus (COVID-19) may pay off in terms of slowing down proliferation. The proliferation trend in France and Germany now exceeds the one in Italy, South Korea and Japan. At the same time, the containment measures seem more intense in Italy, South Korea and Japan than in France and Germany. Nevertheless, decision makers in France and Germany as in other countries need to compare the costs of containment (such as various forms of shut downs, cancellations of events, school closures, isolation, quarantine) with the costs of a faster proliferation of the virus. This is a “quick and dirty Sunday morning” analysis of confirmed Corona cases as published in CSSEGISandData by the Johns Hopkins Whiting School of Engineering.

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## 1 Summary (Only Section of this Note)

Germany and France are currently (March 8<sup>th</sup>, 2020) experiencing a fast rise in confirmed Corona virus (COVID-19) cases. The proliferation trends in France and Germany exceeds the trends in Italy, South Korea and Japan, countries with similar current temperature.

I use the CSSEGISandData by the Johns Hopkins Whiting School of Engineering generally available through GitHub at

[https://github.com/CSSEGISandData/COVID-19/blob/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_time\\_series/time\\_series\\_19-covid-Confirmed.csv](https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv)

to analyze the time series for France, Germany and Italy in Europe and South Korea, Japan, Malaysia and Thailand in East Asia combined with temperature data retrieved for 9am local time in major cities in these countries (Paris, Frankfurt, Milano, Seoul, Tokyo, Kuala Lumpur and Bangkok), retrieved from the search engine DuckDuckGo. Using ordinary least square regression analysis, I estimate the time trend in the natural logarithm of the confirmed COVID-19 Corona Virus cases on a time trend for 12 days starting February 25<sup>th</sup>, 2020 and ending March 07<sup>th</sup>, 2020. The data starting on February 10<sup>th</sup> are plotted in Figure 1. The trend estimates (for the more recent period February 25<sup>th</sup>, 2020 and ending March 07<sup>th</sup>, 2020) are plotted against the 9am temperature on March 8<sup>th</sup> in Figure 2.

Figure 2 shows that the warmer temperature in Malaysia and Thailand is associated with lower proliferation rates. However, when considering countries with similar early 9am temperatures on March 8<sup>th</sup>, 2020, France and Germany have higher proliferation rates than Italy and Japan and also higher proliferation rates than South Korea.

This simple analysis suggests that measures of containment may pay off in terms of slowing down proliferation. The containment measures seem more intense in Italy, South Korea and Japan than in France and Germany (anecdotal evidence from my reading of the press). Nevertheless, decision makers in France and Germany as in other countries need to compare the costs of containment (such as various forms of shut downs, cancellations of events, school closures, isolation, quarantine) with the costs of a faster proliferation of the Corona virus (COVID-19).

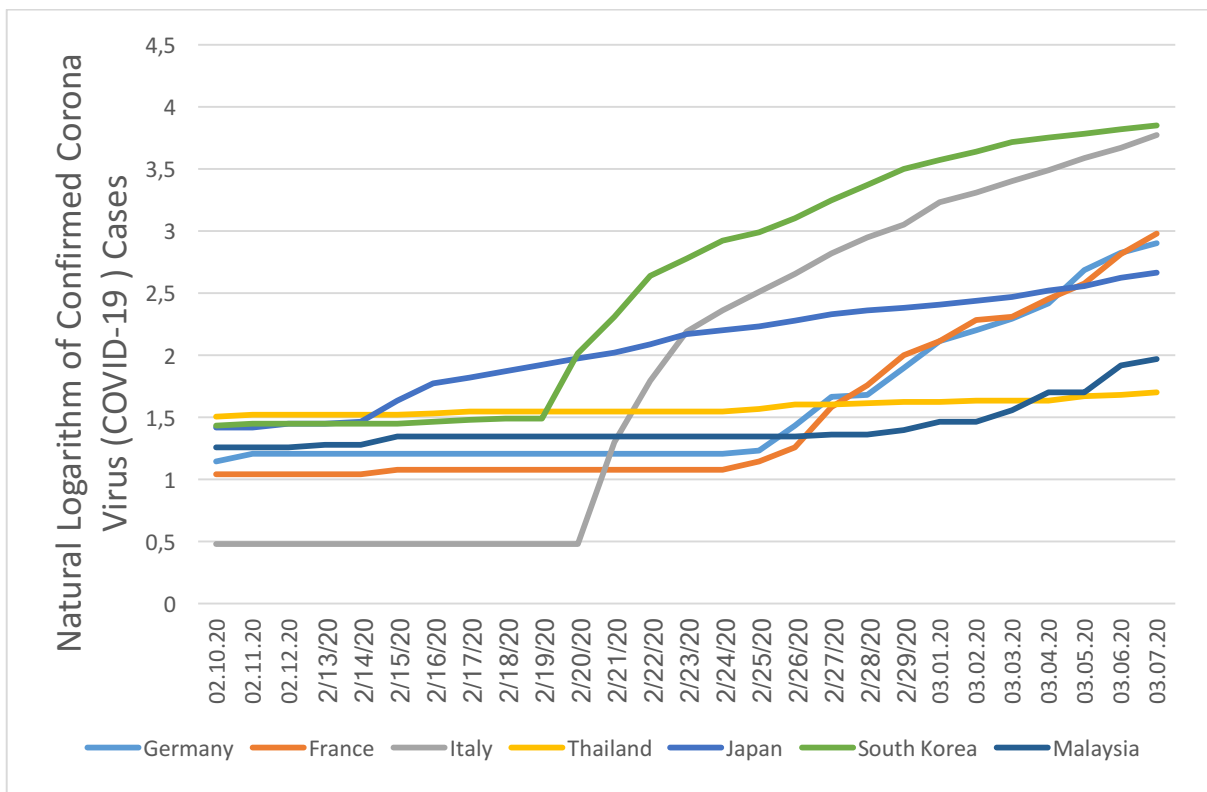


Fig. 1. Natural Logarithm of Confirmed Corona Virus (COVID-19) Cases for Selected Countries from February 10<sup>th</sup> to March 07<sup>th</sup> 2020.

Source: [https://github.com/CSSEGISandData/COVID-19/blob/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_time\\_series/time\\_series\\_19-covid-Confirmed.csv](https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv); retrieved on the morning of March 06<sup>th</sup>, Central European Time.

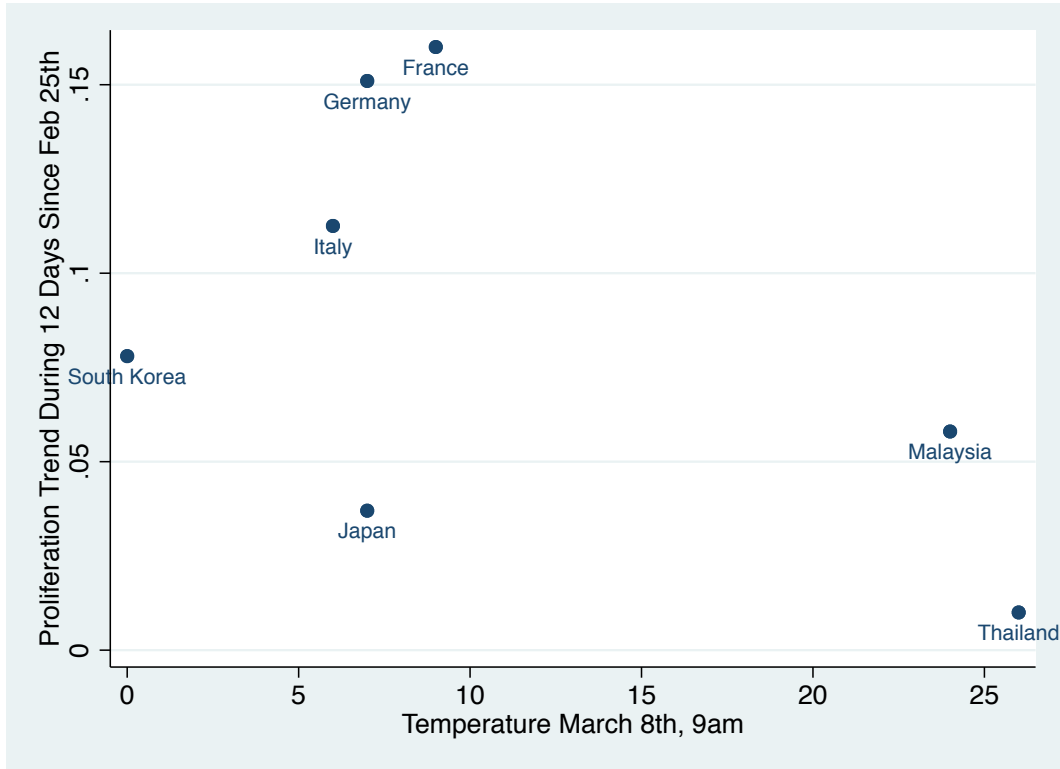


Fig. 2. Proliferation Trend (Regression Trend Slope Using 12 Days Since Feb 25<sup>th</sup> 2020) Plotted Against Temperature

Source: [https://github.com/CSSEGISandData/COVID-19/blob/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_time\\_series/time\\_series\\_19-covid-Confirmed.csv](https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv); retrieved on the morning of March 06<sup>th</sup>, Central European Time. Temperature data have been taken from <https://duckduckgo.com>

## Appendix

Remark: The data are likely to contain significant differences in measurement errors between countries and the analysis is only based on a very crude measure for climate. A more sophisticated analysis would be preferable, but would take considerably more time, when decisions might have to be made quickly.

Trend regressions are carried out using the software Stata 15.1.

**Table A1: Data for Figure 2**

Country	Temperature in Celsius, 9am, March 8 <sup>th</sup> 2020	City for Temperature	Regression slope using 12 days since Feb 25 <sup>th</sup> 2020
Germany	7	Frankfurt	0.151
France	9	Paris	0.160
Italy	6	Milano	0.113
Japan	7	Tokyo	0.037
South Korea	0	Seoul	0.078
Thailand	26	Bangkok	0.010
Malaysia	24	Kuala Lumpur	0.058

Source: [https://github.com/CSSEGISandData/COVID-19/blob/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_time\\_series/time\\_series\\_19-covid-Confirmed.csv](https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv); retrieved on the morning of March 06<sup>th</sup>, Central European Time. Temperature data have been taken from <https://duckduckgo.com>. The temperature for Daegu in South Korea was 1 degree Celsius. The 9am temperature for Milano had to be read off a graph as it was retrieved later when only the digit for 10am instead of 9am appeared in print.