

Covid19 Report

Dimitris Kavroudakis

Assistant Professor of *Geographical Analysis*,
Department of Geography, University of the Aegean
dimitrisk@aegean.gr
www.dimitrisk.gr

2020-03-12

Contents

| | | |
|----------|------------------------------------|----------|
| 1 | The <i>CRISTINA</i> project | 1 |
| 2 | France | 1 |
| 2.1 | Confirmed Cases | 2 |
| 2.2 | Deaths | 3 |
| 3 | Rate of change over time | 4 |
| 4 | Estimations | 5 |
| 4.1 | ARIMA projection | 5 |
| 4.2 | PROPHET projection | 6 |

1 The *CRISTINA* project

This report is part of a research project “**Co**Rona vIrus **Spa**Tial **a**NAlysis” (CRISTINA) which examines the time series progress of COVID-19 events in 177 countries of the world.

2 France

A series of visualizations for the progress of COVID-19 for **France**. We use absolute numbering scale and logarithmic scale to visualize the progress of “*confirmed cases*”, “*deaths*” and “*recovered cases*”. We also indicate the goverment interventions as dots on top of each line.

2.1 Confirmed Cases

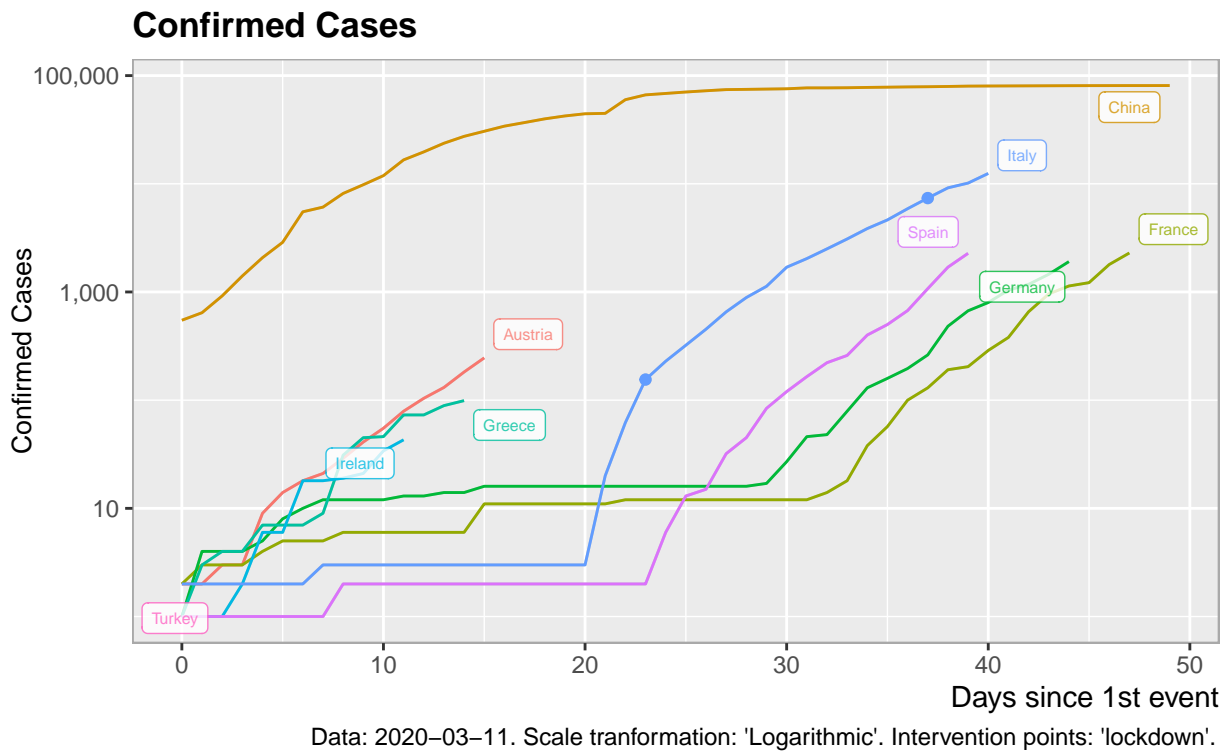


Figure 1: Confirmed Cases

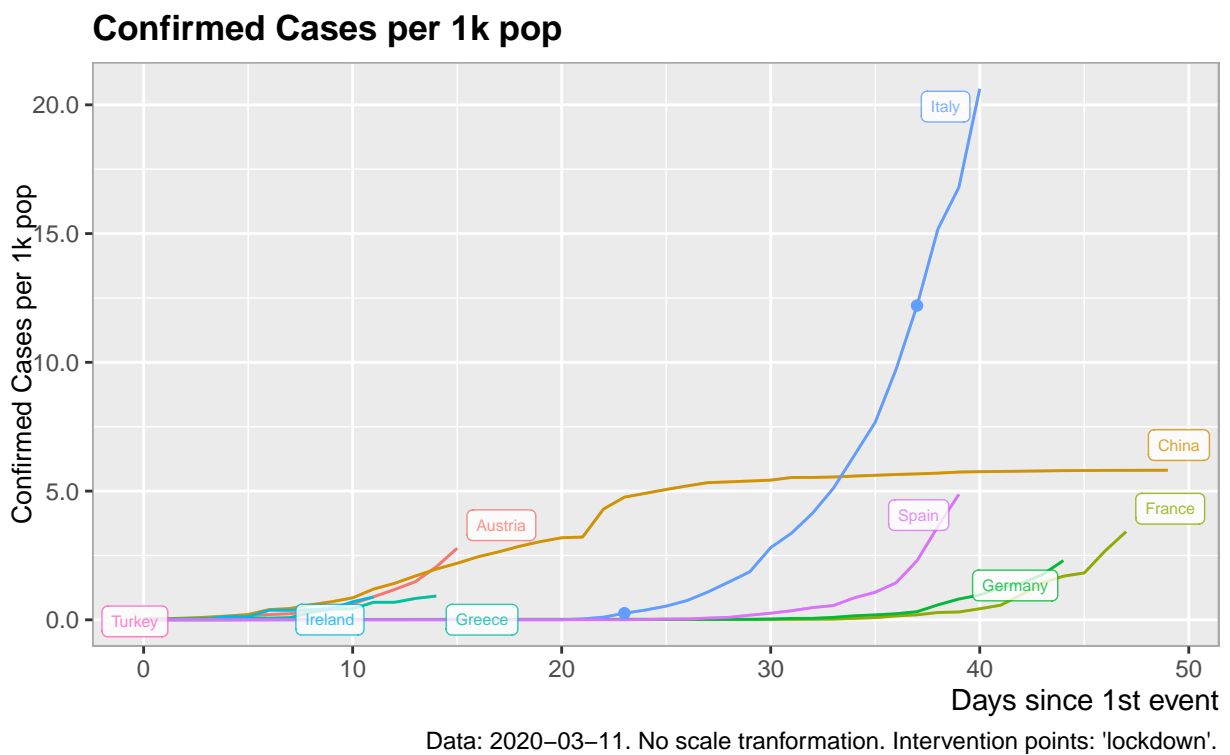


Figure 2: Confirmed Cases by 1000 population

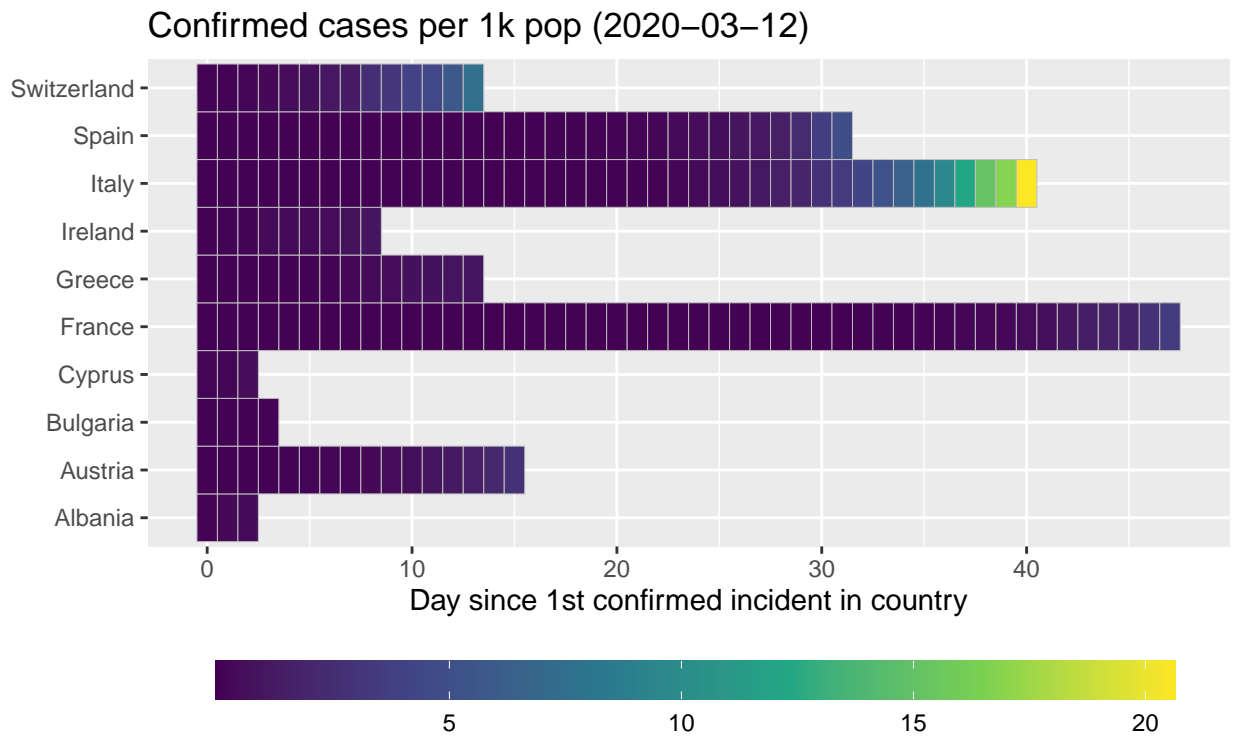
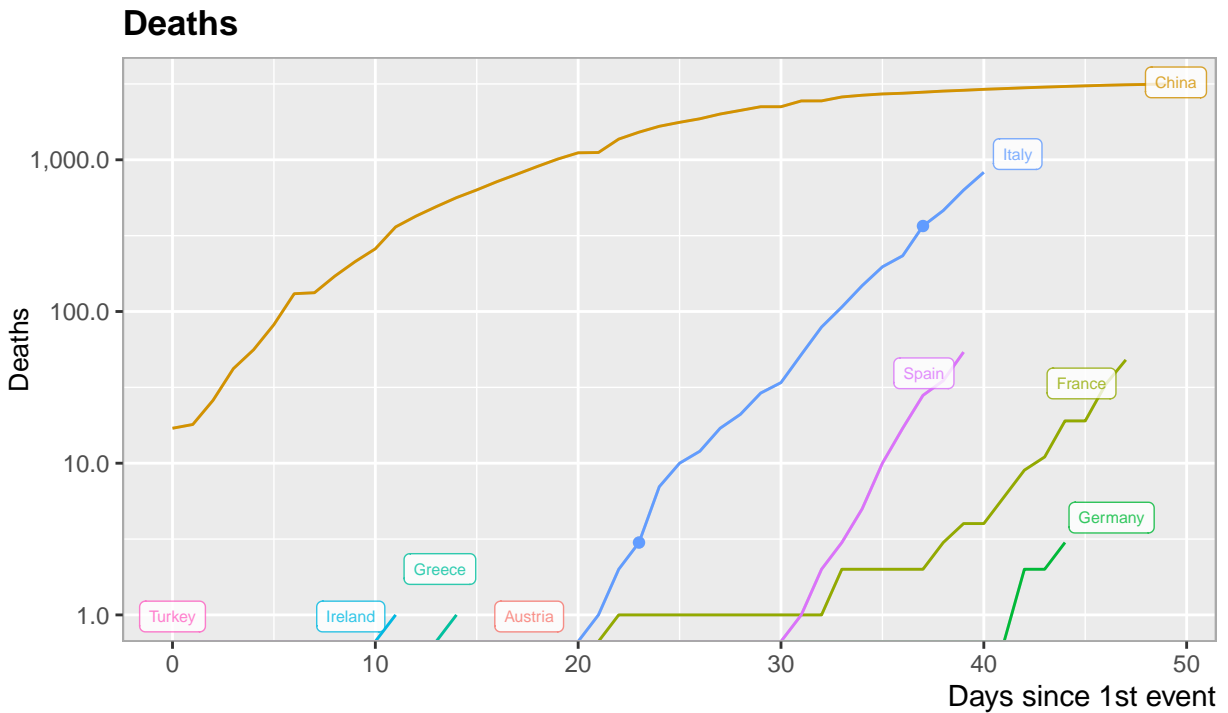


Figure 3: Confirmed Cases by 1000 population

2.2 Deaths



Data: 2020-03-11. Scale tranformation: 'Logarithmic'. Intervention points: 'lockdown'.

Figure 4: Number of deaths by country

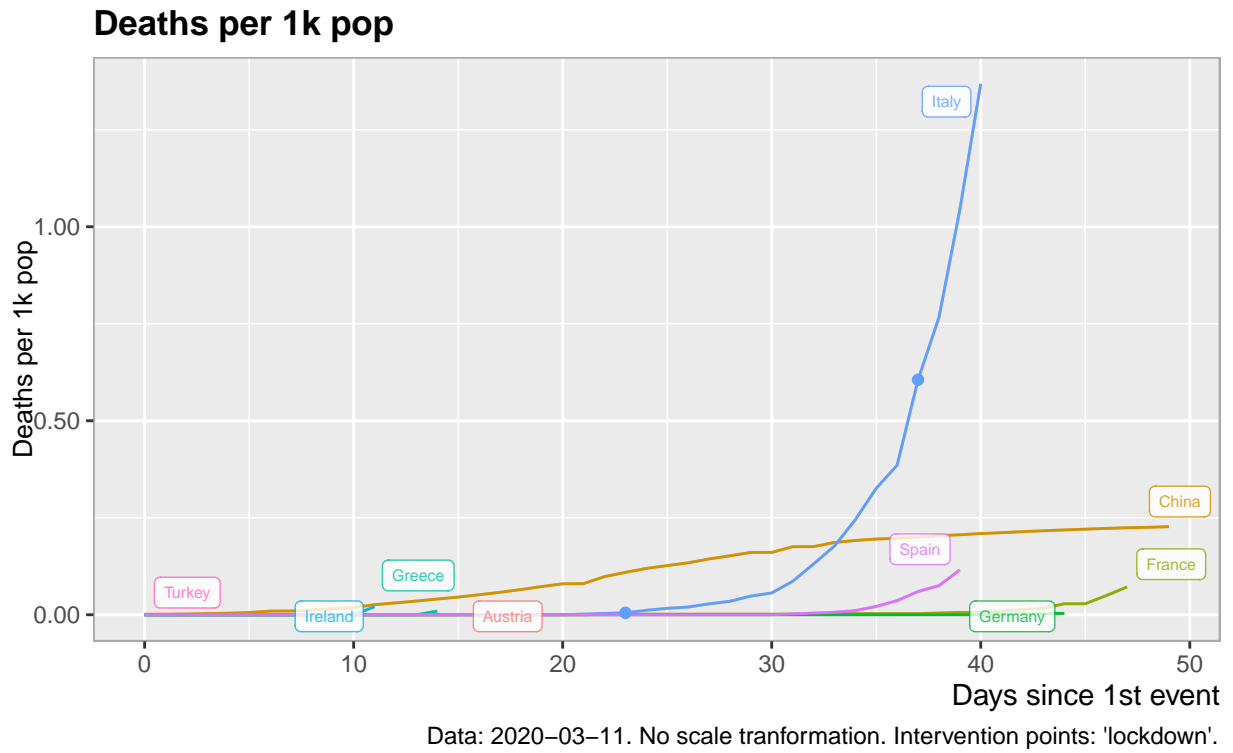


Figure 5: Deaths by 1000 population

3 Rate of change over time

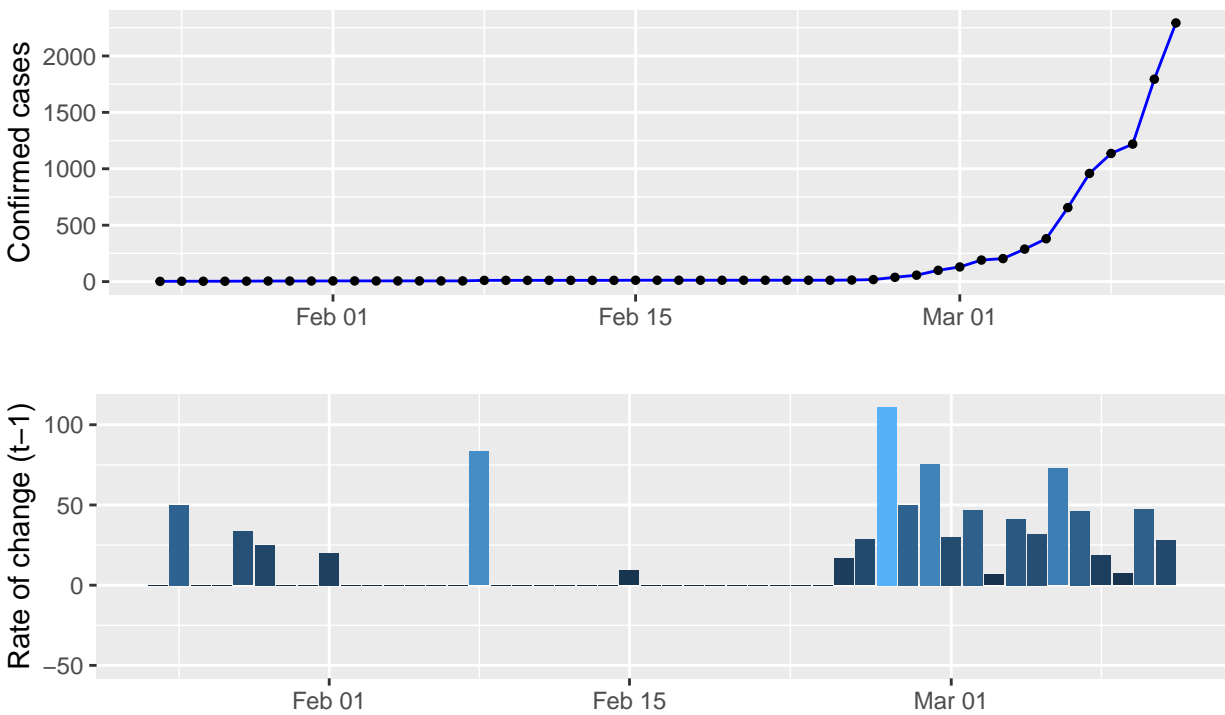


Figure 6: Rate of change of confirmed cases

4 Estimations

We estimate the future projection of *confirmed cases* for the next 5 days in France with two methods.

4.1 ARIMA projection

Projection of 'confirmed' cases for 5 ahead

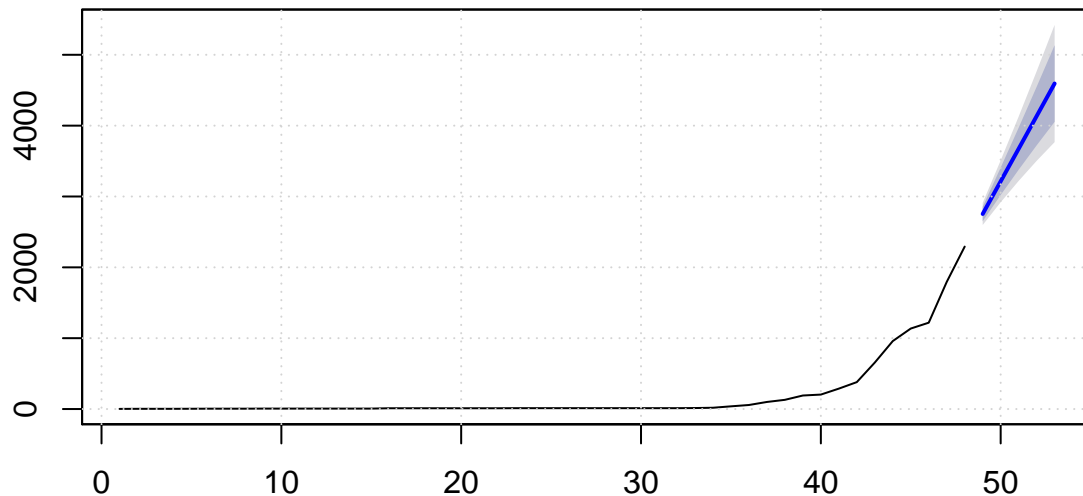


Figure 7: ARIMA projection

Table 1: ARIMA of 'confirmed cases' for 5 days ahead

| | Estimation | Confidence 95% (Low) | Confidence 95% (High) |
|-------------------------|------------|-------------------------|--------------------------|
| t+1 (2020-03-12) | 2753 | 2597 | 2909 |
| t+2 (2020-03-13) | 3214 | 2919 | 3509 |
| t+3 (2020-03-14) | 3674 | 3220 | 4128 |
| t+4 (2020-03-15) | 4134 | 3503 | 4766 |
| t+5 (2020-03-16) | 4595 | 3768 | 5422 |

- The estimated proportion of cases detected is 7.9%.
- With data up to 2020-03-11 in France we have 2293 confirmed cases and 48 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 3.2 days

4.2 PROPHET projection

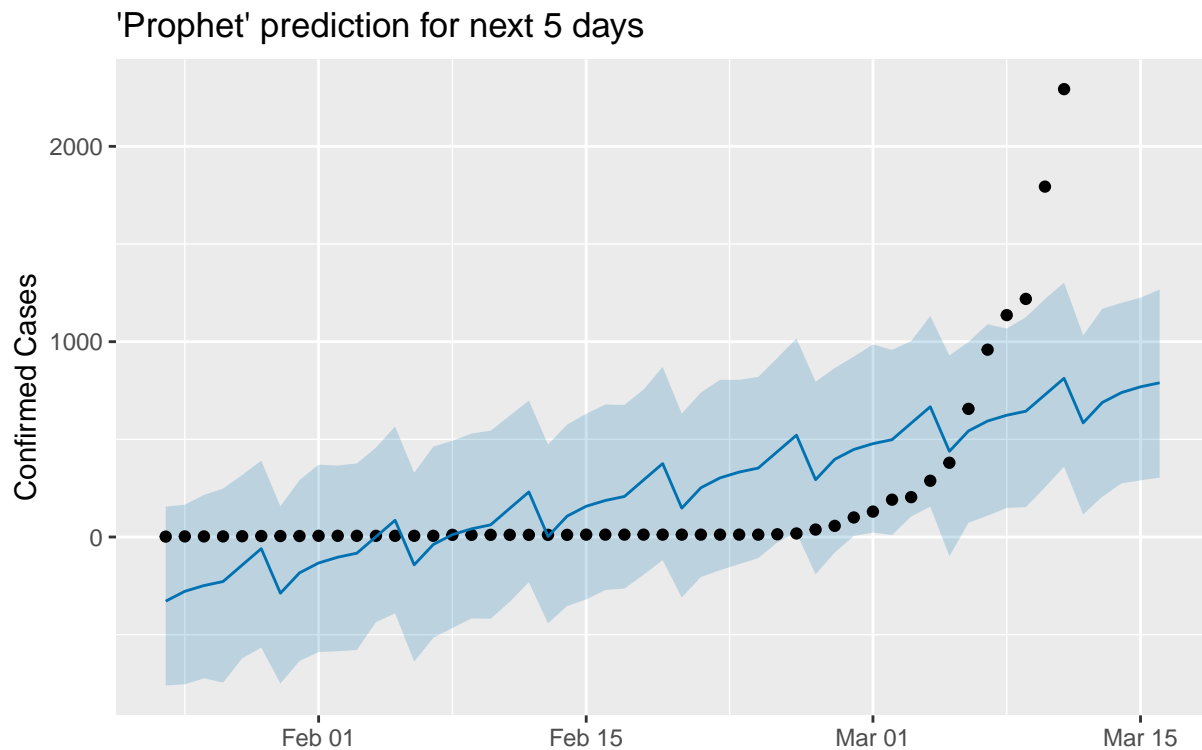


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for France

Table 2: PROPHET of 'confirmed cases' for 5 days ahead for France

| | Future_Date | Estimation | Confidence 95% (Low) | Confidence 95% (High) |
|------------|-------------|------------|-------------------------|--------------------------|
| t+1 | 2020-03-12 | 584.4 | 115.9 | 1032 |
| t+2 | 2020-03-13 | 688.7 | 205.9 | 1168 |
| t+3 | 2020-03-14 | 739.3 | 274.4 | 1199 |
| t+4 | 2020-03-15 | 768.9 | 290.1 | 1225 |
| t+5 | 2020-03-16 | 789.5 | 303.6 | 1267 |