

Covid19 Report

Dimitris Kavroudakis

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

2020-03-05

Contents

1	The <i>CRISTINA</i> project	1
2	Italy	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 **aNA**lysis” (CRISTINA) which examines the time series progress of COVID-19 events in 177 countries of the world.

2 Italy

A series of visualizations for the progress of COVID-19 for **Italy**. 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

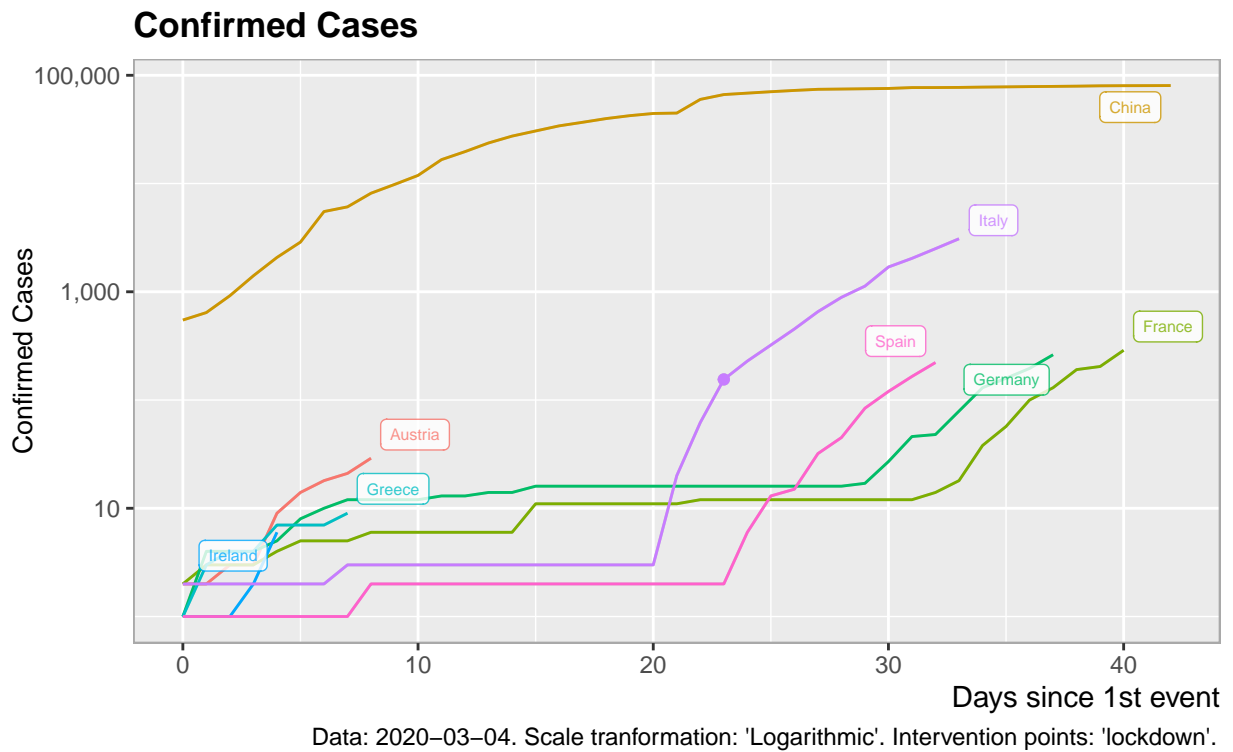


Figure 1: Confirmed Cases

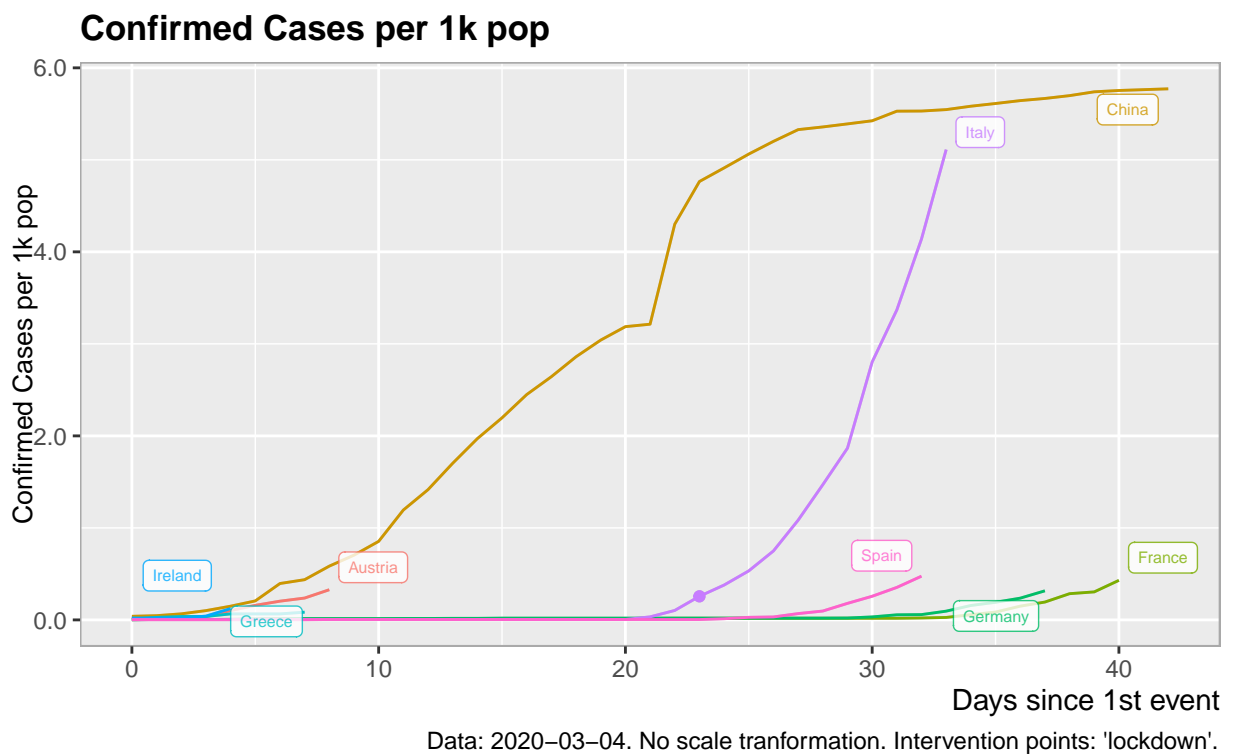


Figure 2: Confirmed Cases by 1000 population

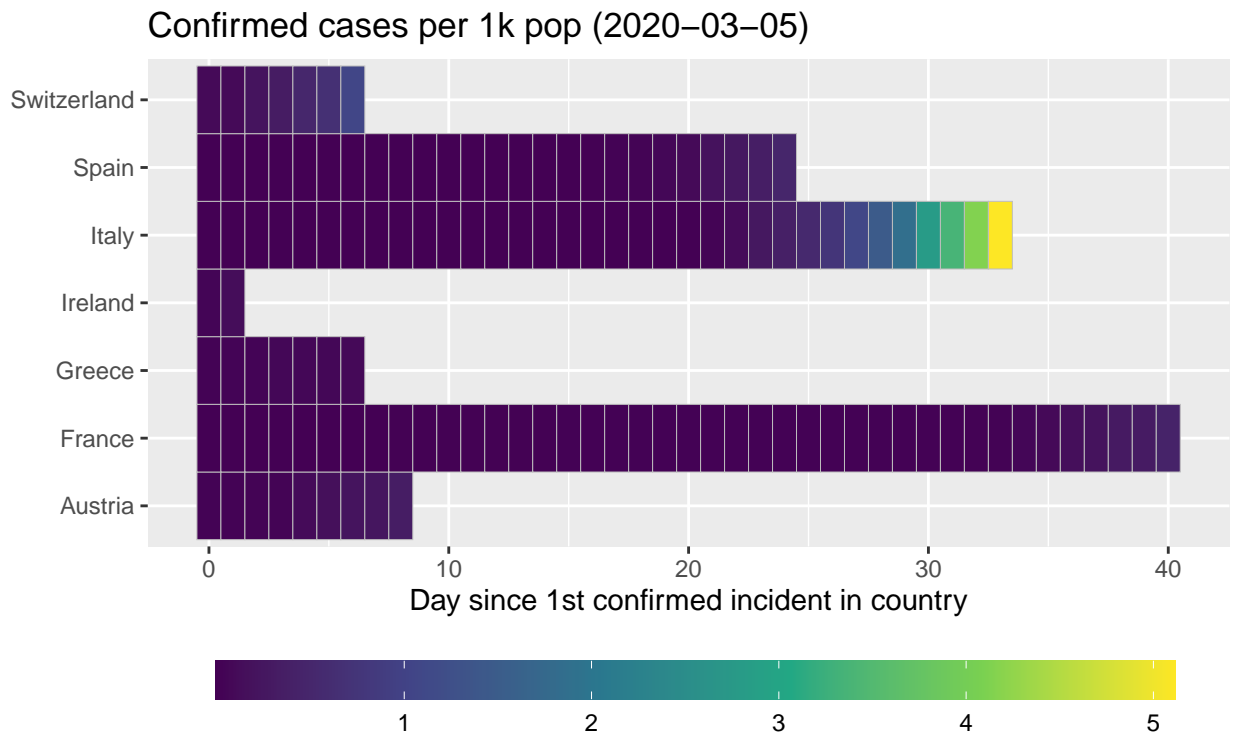
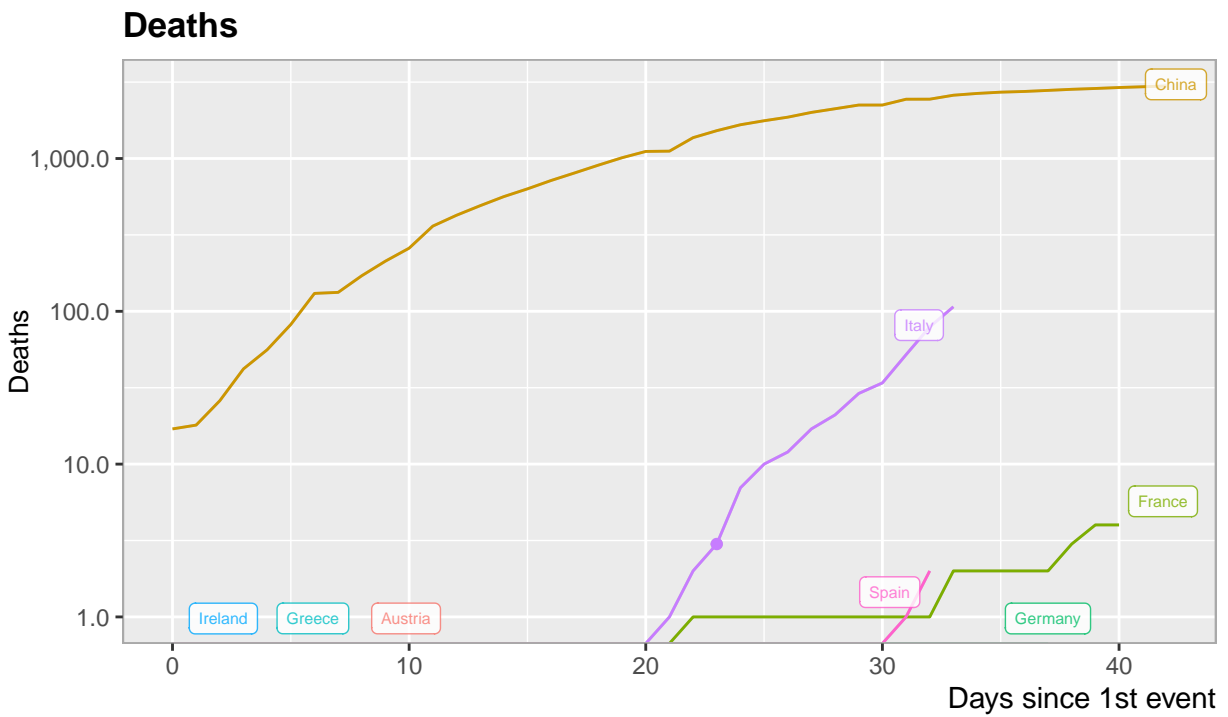


Figure 3: Confirmed Cases by 1000 population

2.2 Deaths



Data: 2020-03-04. Scale tranformation: 'Logarithmic'. Intervention points: 'lockdown'.

Figure 4: Number of deaths by country

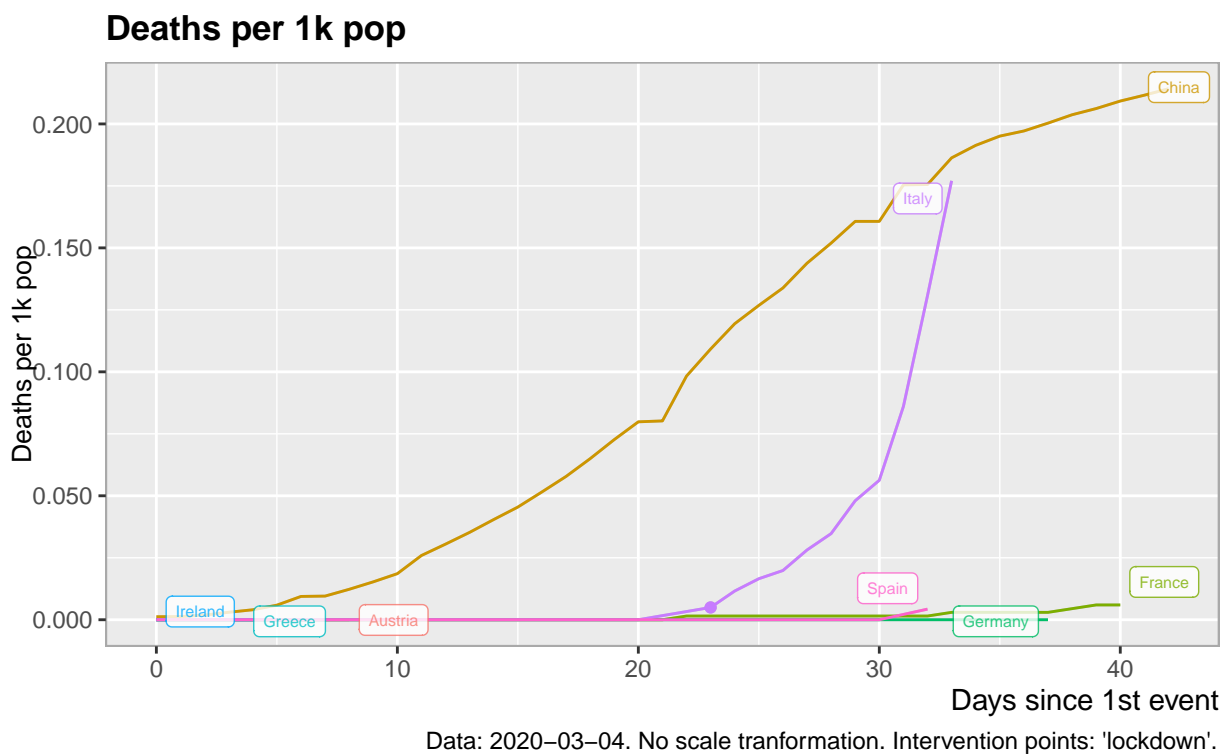


Figure 5: Deaths by 1000 population

3 Rate of change over time

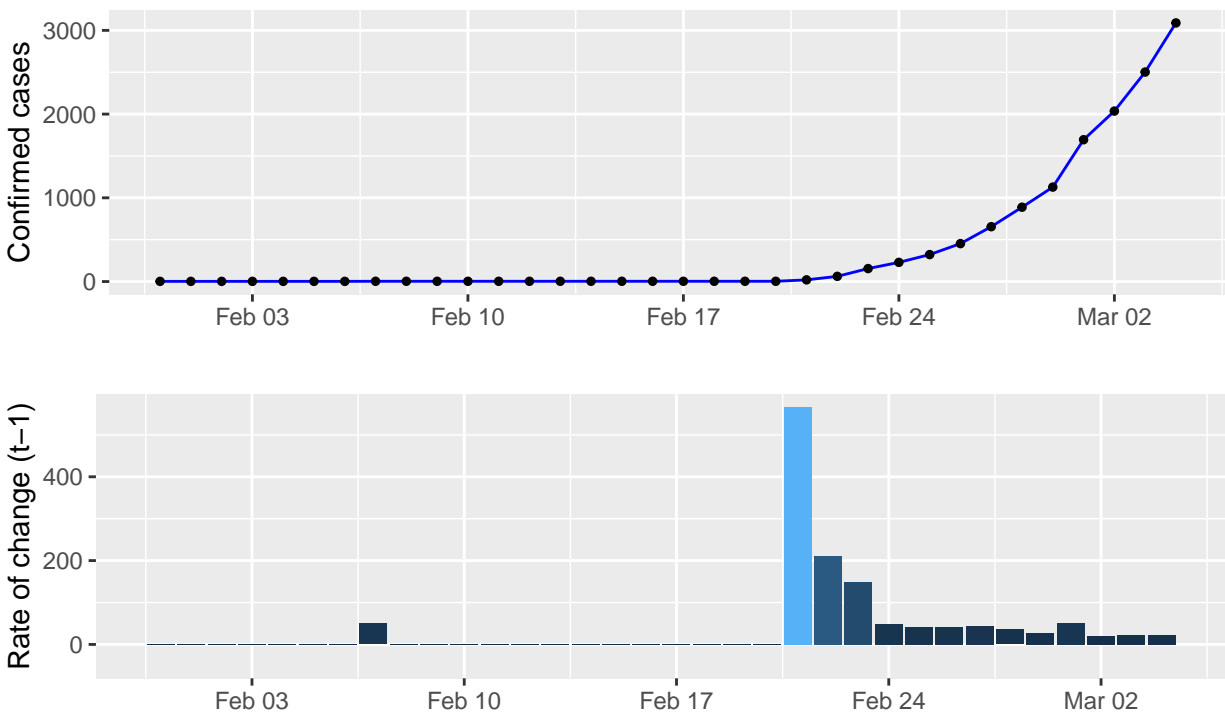


Figure 6: Rate of change of confirmed cases

4 Estimations

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

4.1 ARIMA projection

Projection of 'confirmed' cases for 5 ahead

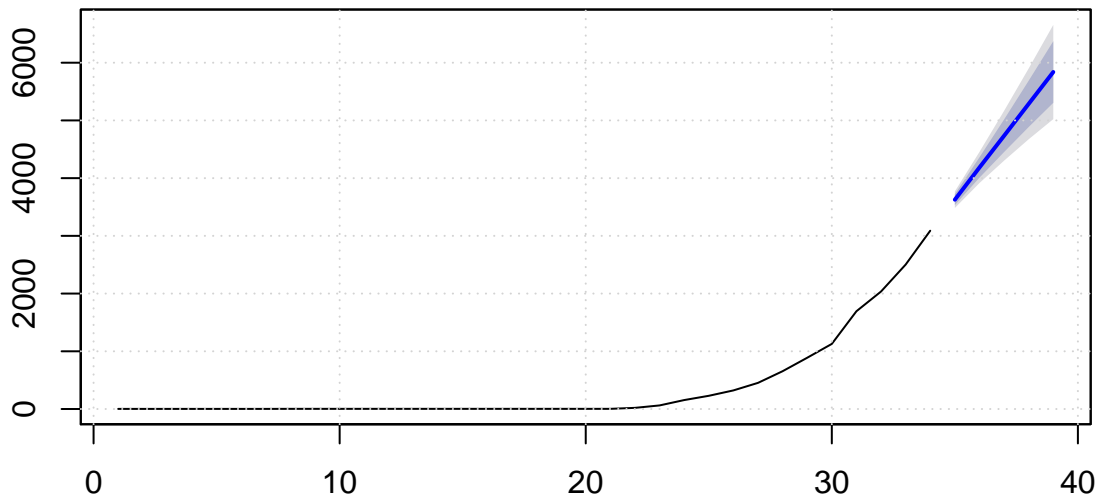


Figure 7: ARIMA projection

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

	Estimation	Confidence 95% (Low)	Confidence 95% (High)
t+1 (2020-03-05)	3627	3483	3770
t+2 (2020-03-06)	4184	3915	4454
t+3 (2020-03-07)	4734	4303	5166
t+4 (2020-03-08)	5287	4674	5900
t+5 (2020-03-09)	5839	5022	6655

- The estimated proportion of cases detected is 0.3%.
- With data up to 2020-03-04 in Italy we have 3089 confirmed cases and 107 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 2.9 days

4.2 PROPHET projection

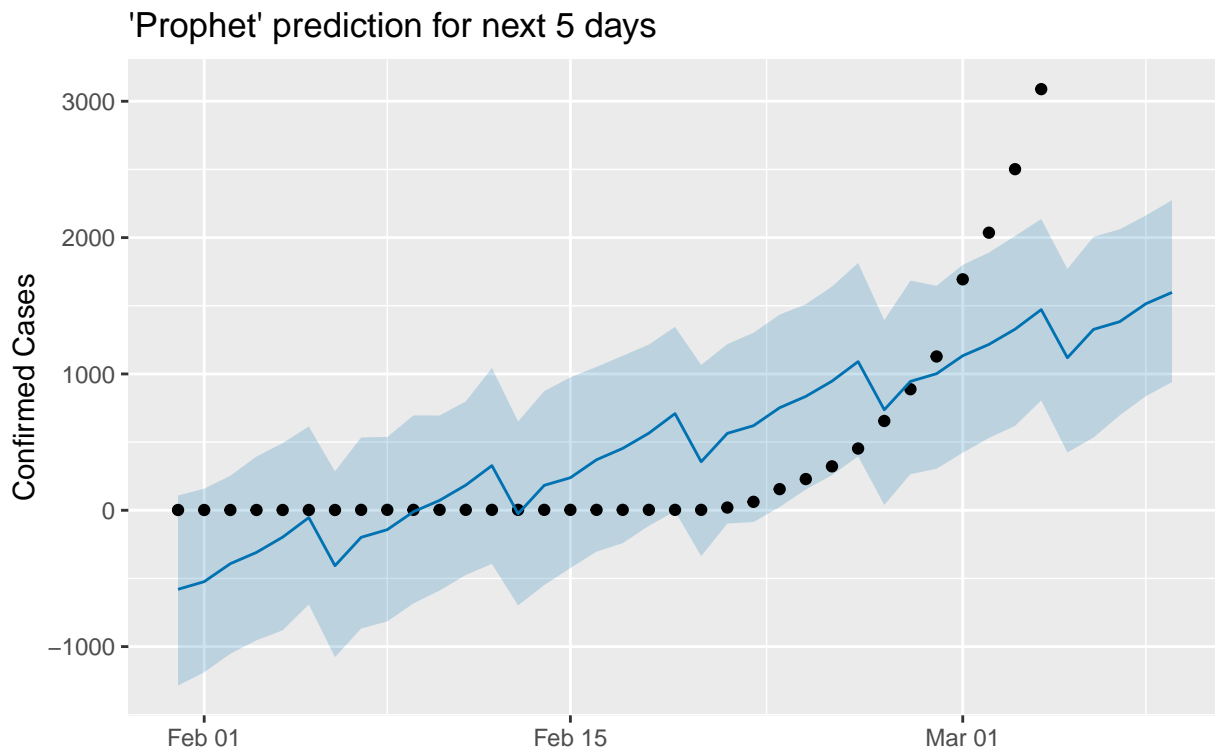


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for Italy

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

	Future_Date	Estimation	Confidence 95% (Low)	Confidence 95% (High)
t+1	2020-03-05	1119	424	1770
t+2	2020-03-06	1327	533.5	2006
t+3	2020-03-07	1383	696.2	2061
t+4	2020-03-08	1515	836.3	2162
t+5	2020-03-09	1598	940.2	2275