

Covid19 Report

Dimitris Kavroudakis

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

2020-04-04

Contents

1	The <i>CRISTINA</i> project	1
2	Spain	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 “**CoRona vIrus SpaTial aNAlysis**” (*CRISTINA*) which examines the time series progress of COVID-19 events in 177 countries of the world.

2 Spain

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

2.1 Confirmed Cases

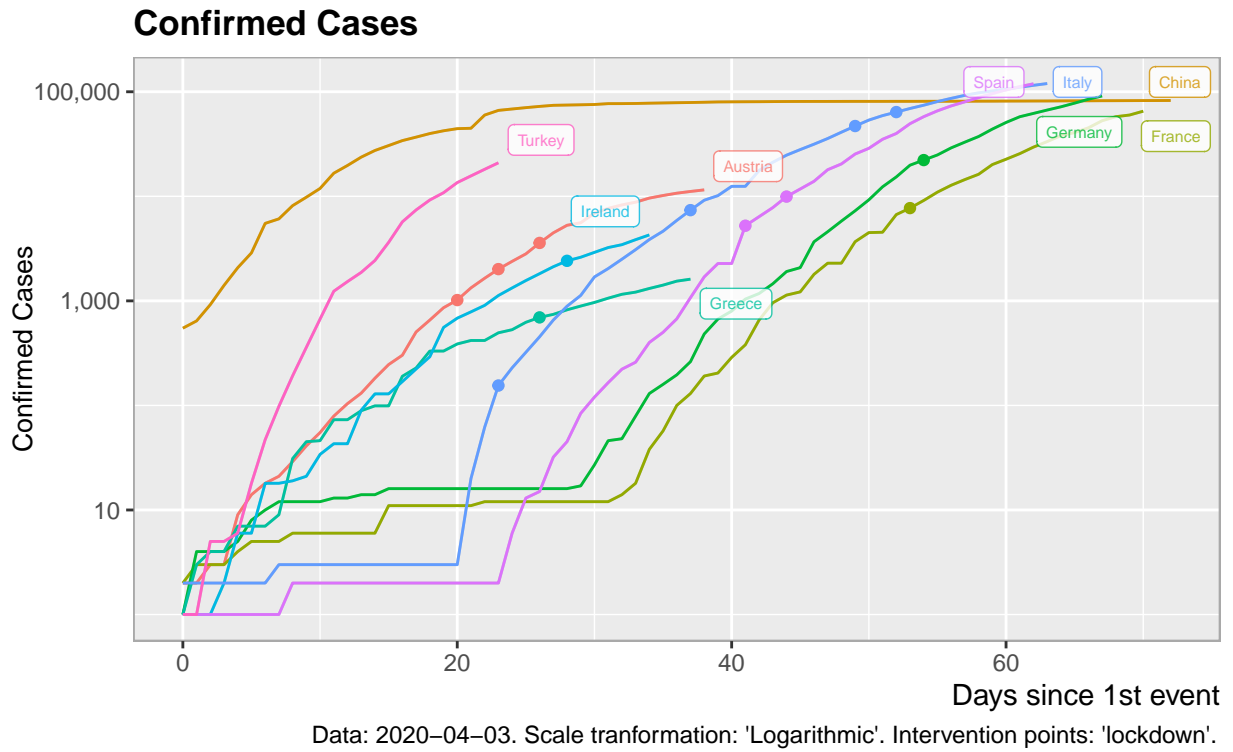


Figure 1: Confirmed Cases

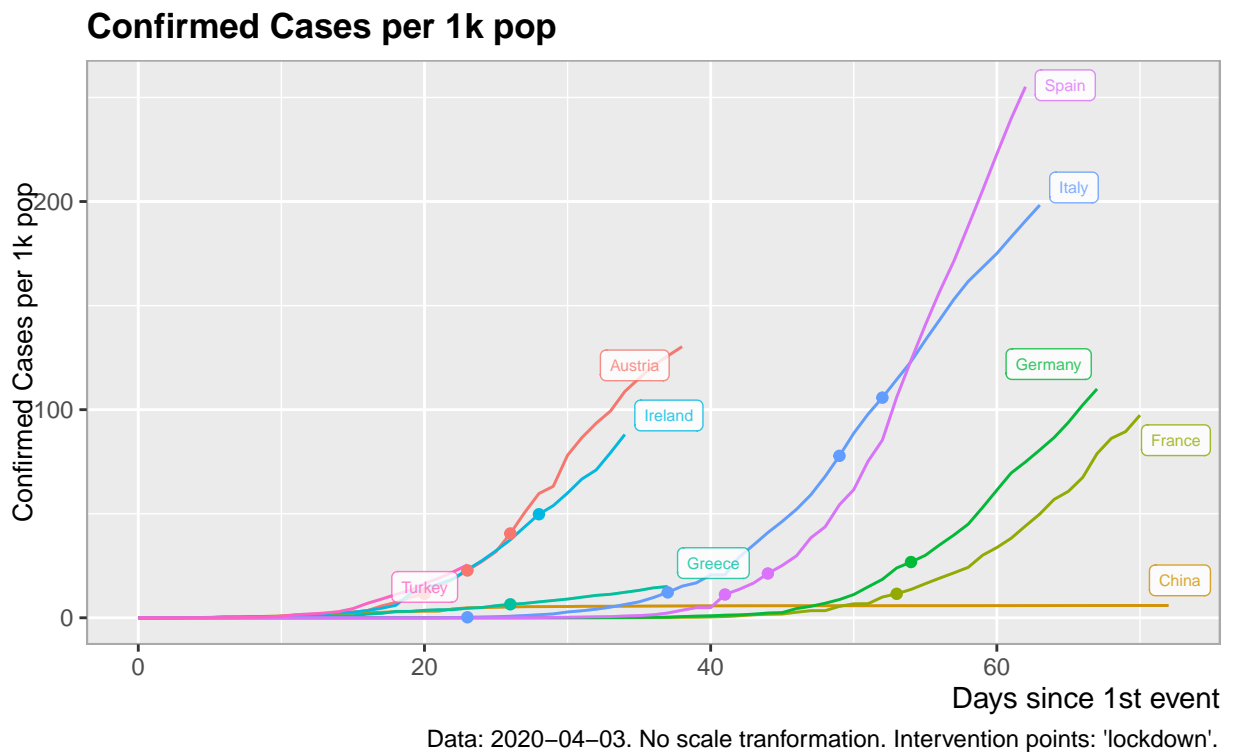


Figure 2: Confirmed Cases by 1000 population

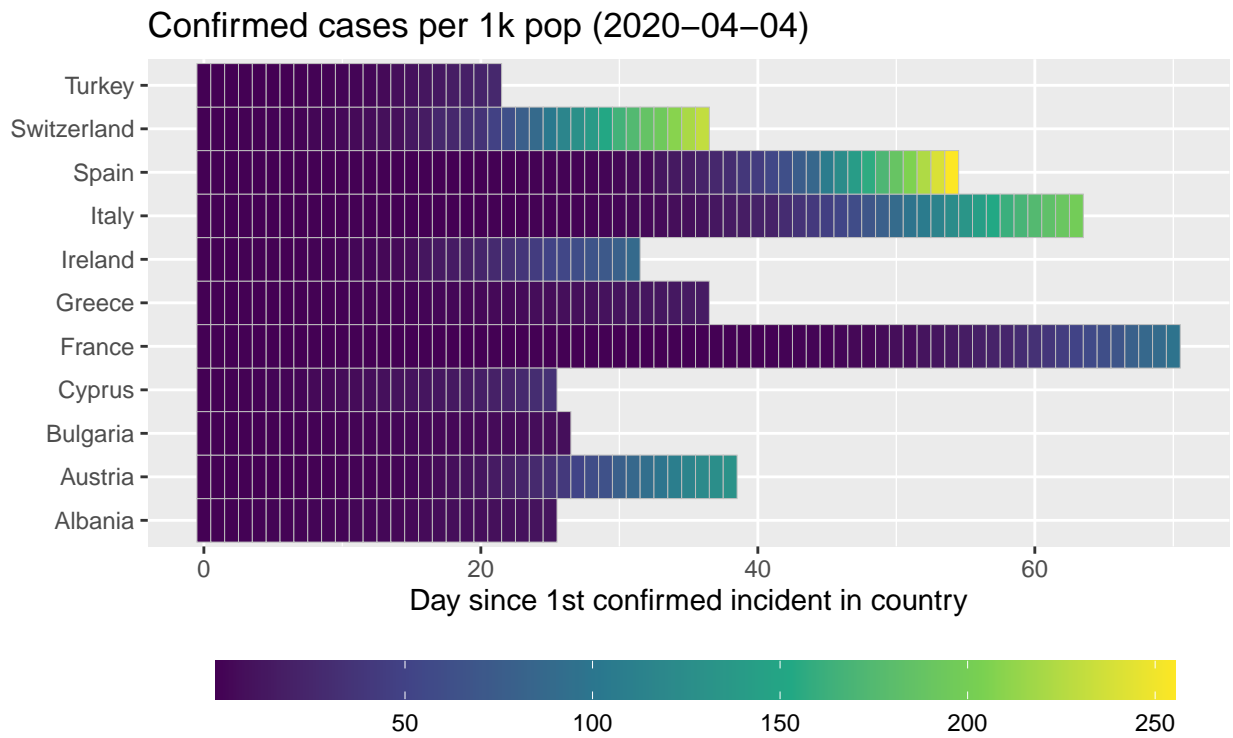


Figure 3: Confirmed Cases by 1000 population

2.2 Deaths

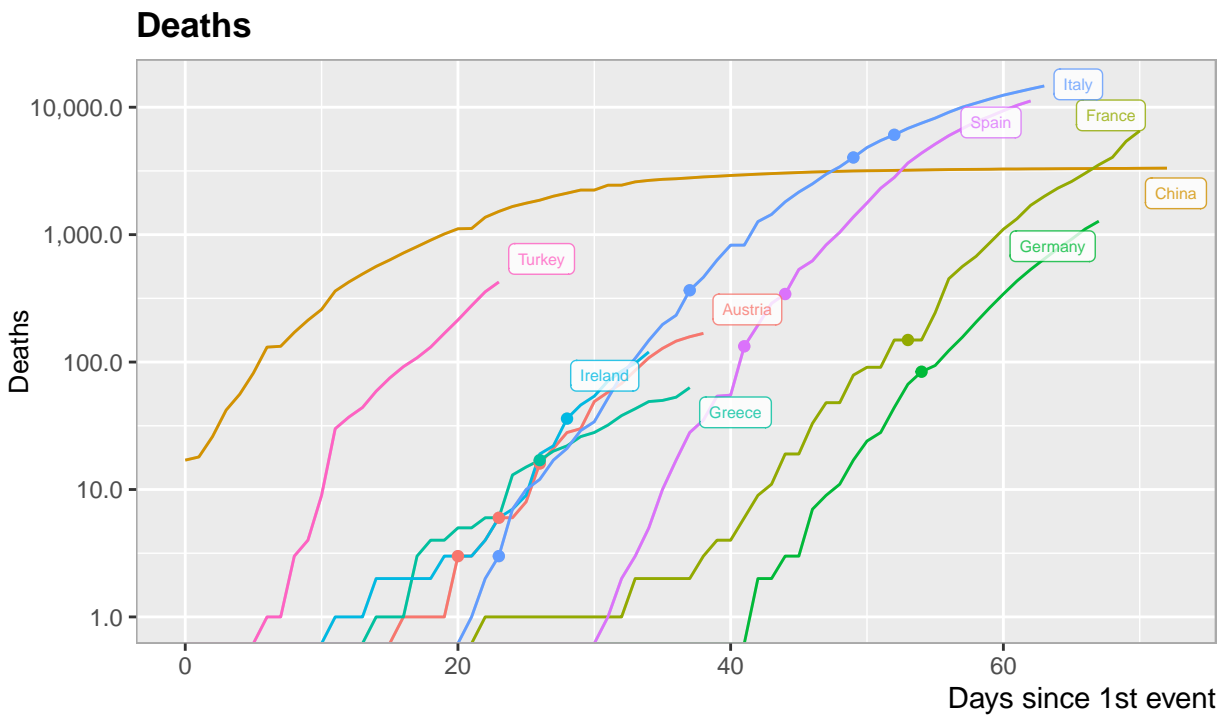


Figure 4: Number of deaths by country

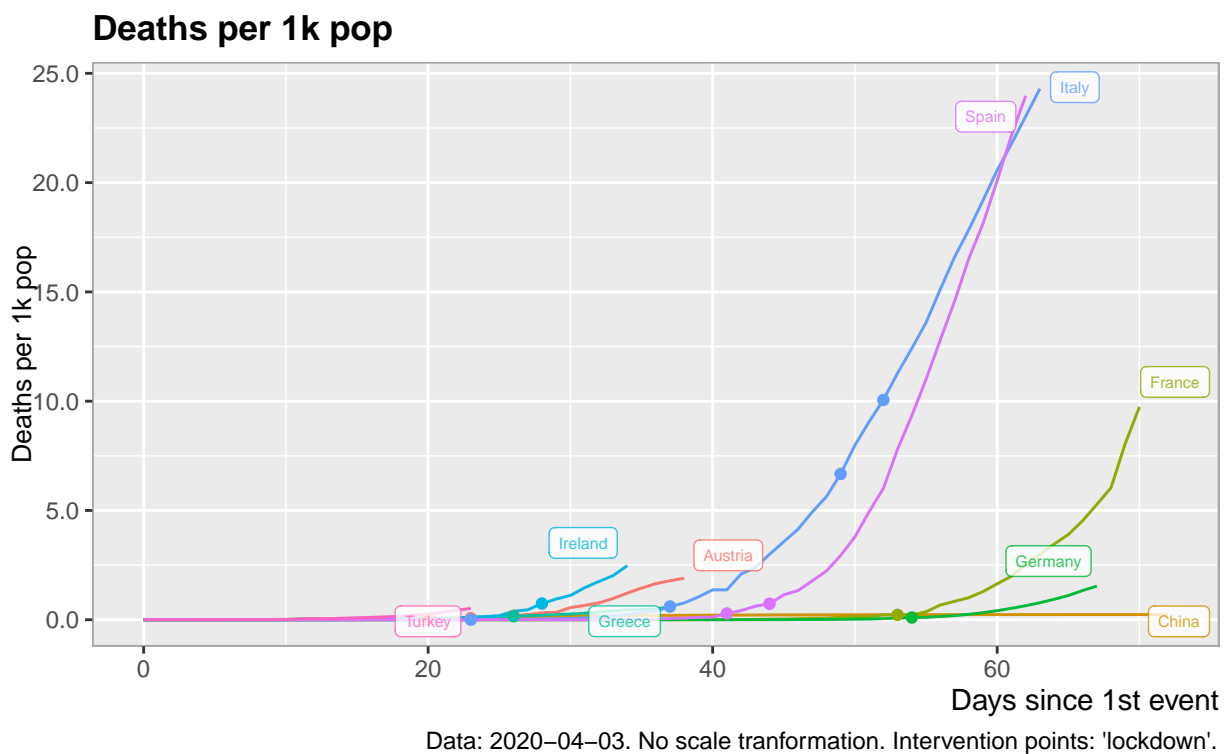


Figure 5: Deaths by 1000 population

3 Rate of change over time

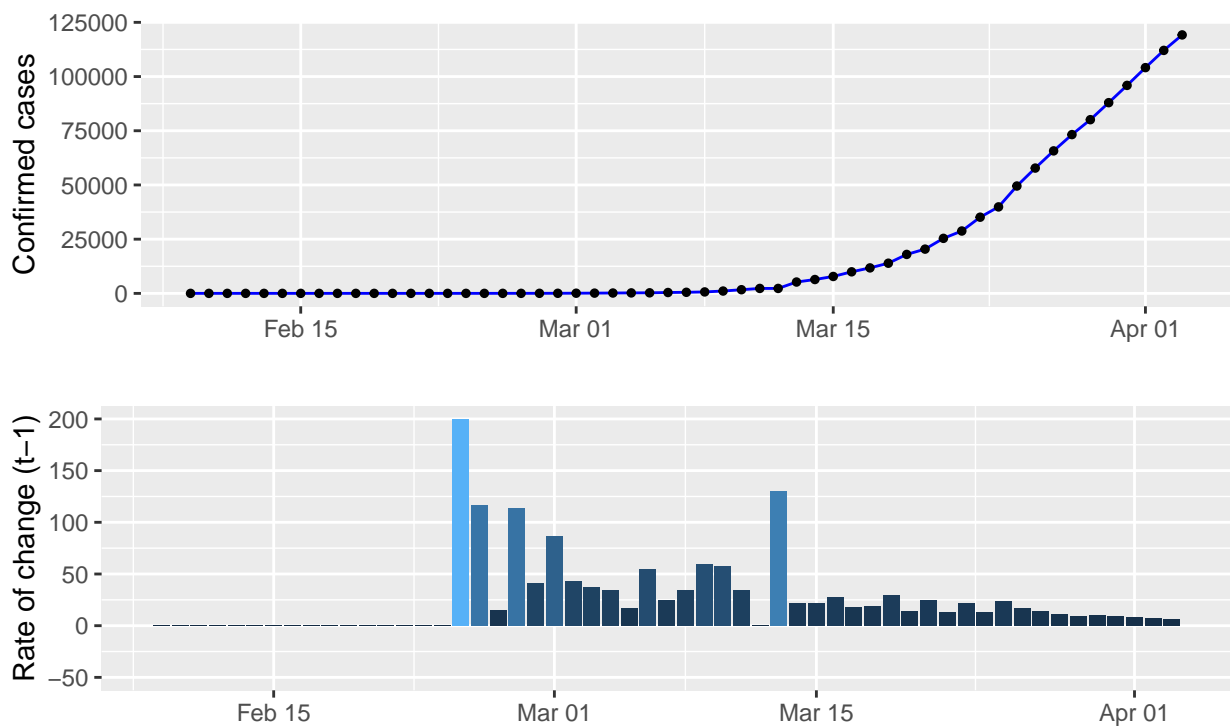


Figure 6: Rate of change of confirmed cases

4 Estimations

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

4.1 ARIMA projection

Projection of 'confirmed' cases for 5 ahead

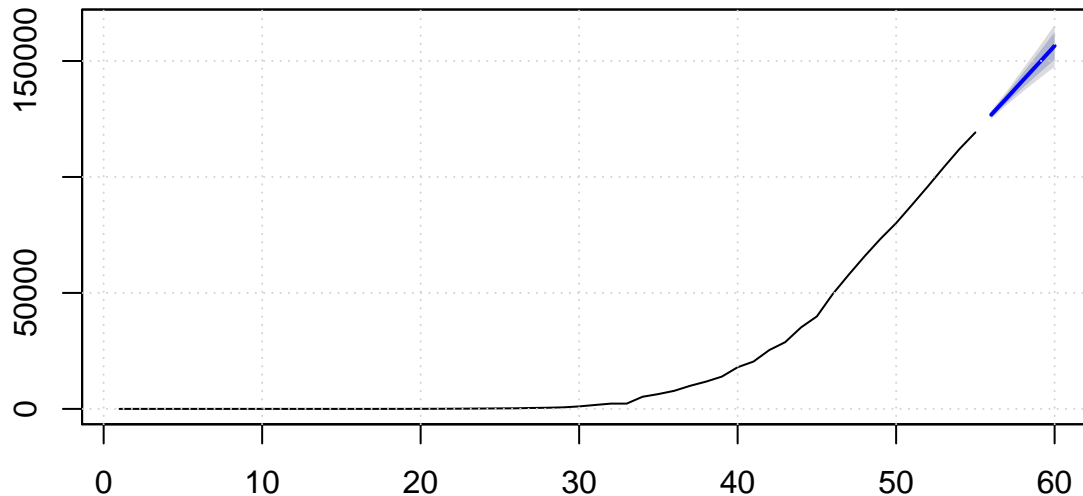


Figure 7: ARIMA projection

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

	Estimation	Confidence 95% (Low)	Confidence 95% (High)
t+1 (2020-04-04)	126826	125059	128592
t+2 (2020-04-05)	134154	131123	137184
t+3 (2020-04-06)	141663	136797	146528
t+4 (2020-04-07)	149062	142256	155868
t+5 (2020-04-08)	156528	147489	165566

- The estimated proportion of cases detected is 1.69%.
- With data up to 2020-04-03 in Spain we have 119199 confirmed cases and 11198 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 9.1 days

4.2 PROPHET projection

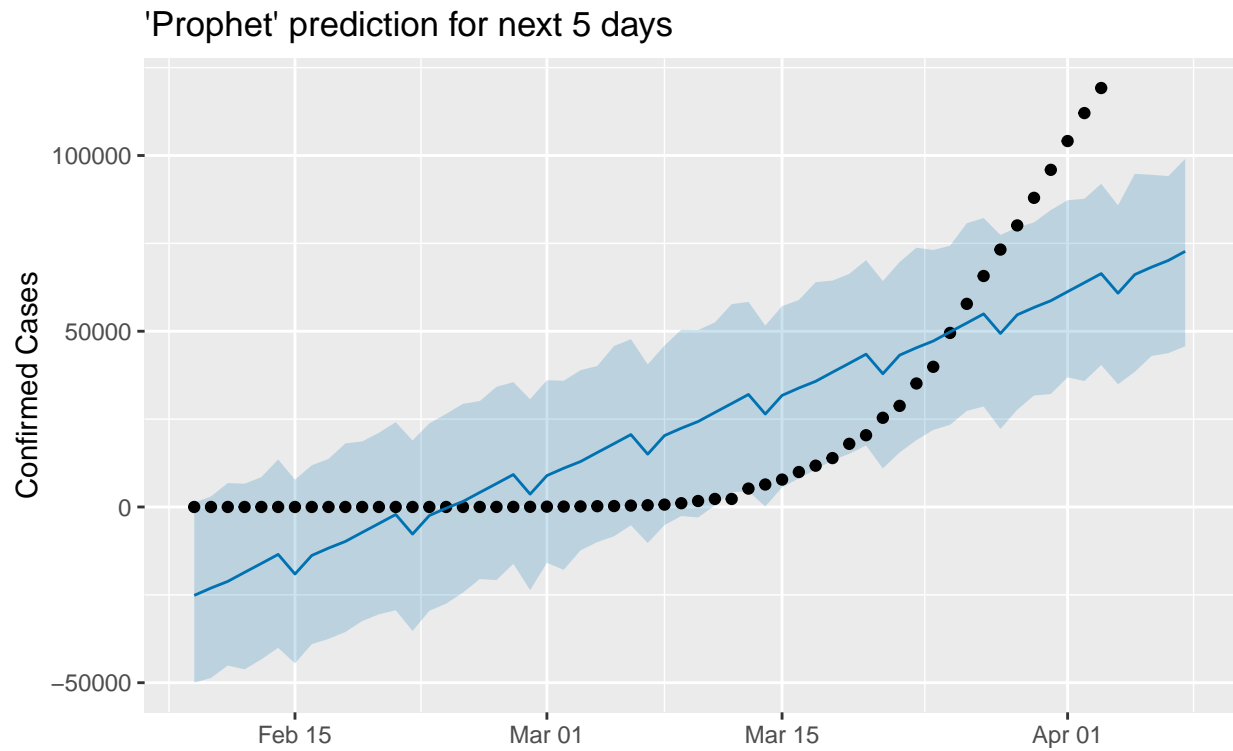


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for Spain

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

	Future_Date	Estimation	Confidence 95% (Low)	Confidence 95% (High)
t+1	2020-04-04	60830	34921	85801
t+2	2020-04-05	66131	38450	94777
t+3	2020-04-06	68239	42957	94517
t+4	2020-04-07	70146	43761	94139
t+5	2020-04-08	72733	45710	99032