
Exploration of Government Measures in Response to Covid-19

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HS 614

Introduction & Background

- Countries: **South Korea & Italy**
 - South Korea never had a full lockdown
 - Italy had full lockdown with many deaths
 - Varied in testing density
- Shelter In Place (**SIP**) Measures Impact
 - Which SIP measures lessened spread? If any
 - Exploring & comparing timeline of measures between countries



Data Sources

- The dataset we used to identify **mitigation measures** is the **ACAPS** dataset:

ISO	MEASURE	COMMENTS	DATE_IMP
ITA	Partial lockdown	General lockdown across component of everyday life; businesses can continue if tl	08/03/2020
ITA	Full lockdown	Extension: of full lock-down until 3rd May	11/04/2020
ITA	Full lockdown	Companies may restart their business, if they have been communicating with the p	10/04/2020
ITA	Partial lockdown	With the phase-out of the full lockdown, a partial lockdown remains with only res	04/05/2020
ITA	Full lockdown	Manufacturing, construction, real estate brokerage and wholesale trade may resta	04/05/2020
KOR	Partial lockdown	Korean government will restrict the operation of some facilities, such as religious	22/03/2020
ITA	International flights suspension	Limited flights to and from China	31/01/2020

- The dataset we used use to identify the **number of confirmed cases and deaths** is the **John Hopkins**:

country	date	confirmed	deaths	new_confirmed	new_deaths
Italy	2/21/20	20	1	17	1
Italy	2/22/20	62	2	42	1
Italy	2/23/20	155	3	93	1
Italy	2/24/20	229	7	74	4
Italy	2/25/20	322	10	93	3

country	date	confirmed	deaths	new_confirmed	new_deaths
Korea, South	2/6/20	23	0	4	0
Korea, South	2/7/20	24	0	1	0
Korea, South	2/8/20	24	0	0	0
Korea, South	2/9/20	25	0	1	0
Korea, South	2/10/20	27	0	2	0

Exploratory Data Analysis

- **Choosing measures:**
 - 1) Partial Lockdown
 - 2) School Closure
 - 3) Restrictions on visa/flights to & from China
- **Representing variables as integers**
 - For tagged day, partial lockdown, school closure & visa/flight restrictions
- **Timeline of events**
 - Italy had later implementation of measures
 - Korea did not have full lockdown
- **Number of deaths & confirmed cases**
 - Italy had much higher percentage of deaths
 - Korea was able to keep deaths low

Integer Variables

tagged_day	partial_lockdown	flights_china	school_closure
1	-16	21	0
2	-15	22	1
3	-14	23	2
4	-13	24	3
5	-12	25	4
6	-11	26	5
7	-10	27	6
8	-9	28	7

Visualizations

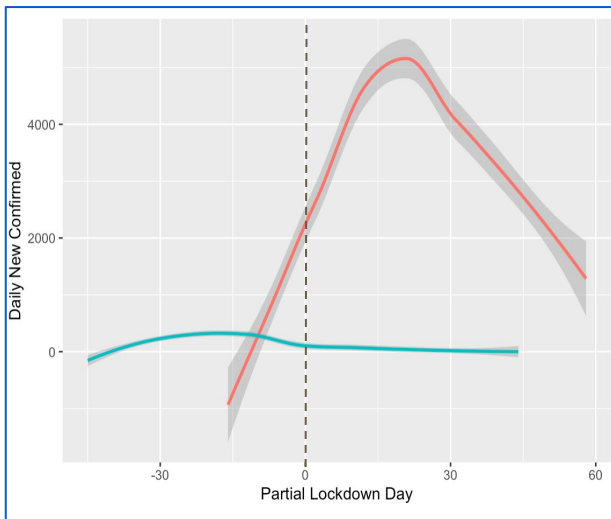
Government measures taken vs. new **daily confirmed** cases :

Country

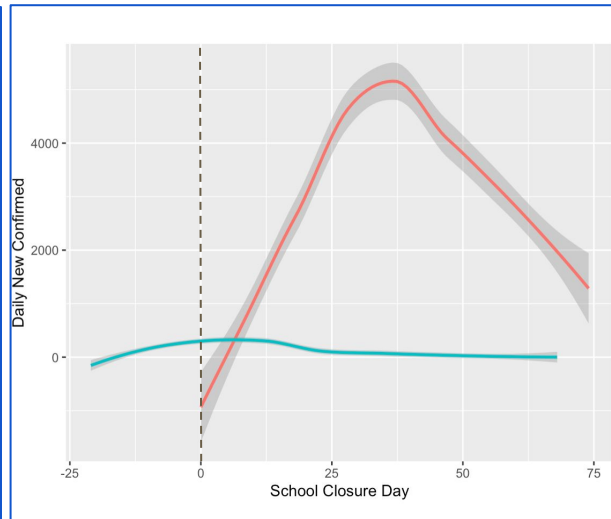
Italy

South Korea

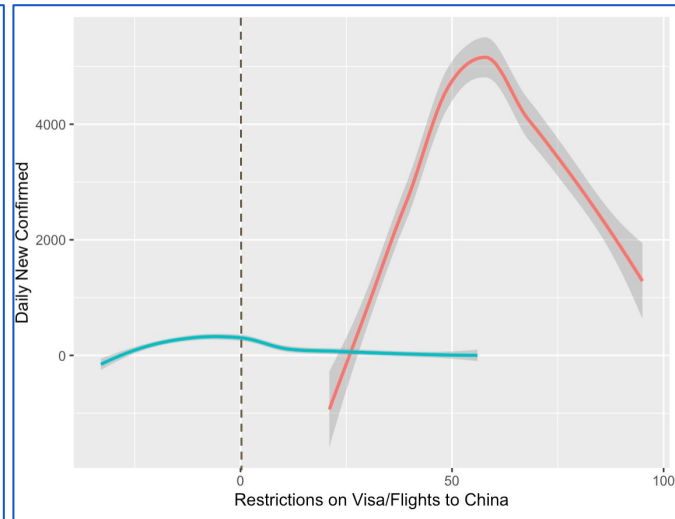
Partial Lockdown



School Closure



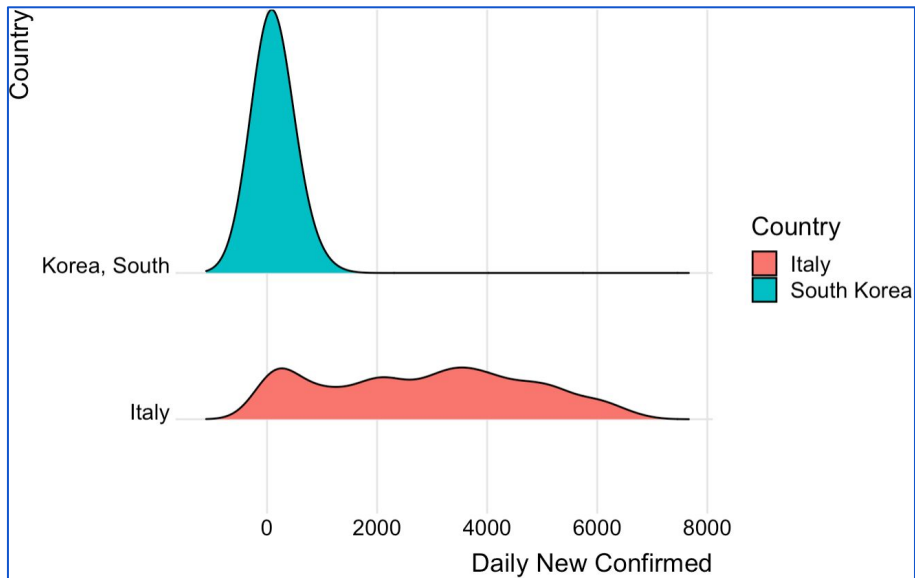
Visa/Flight Restrictions to China



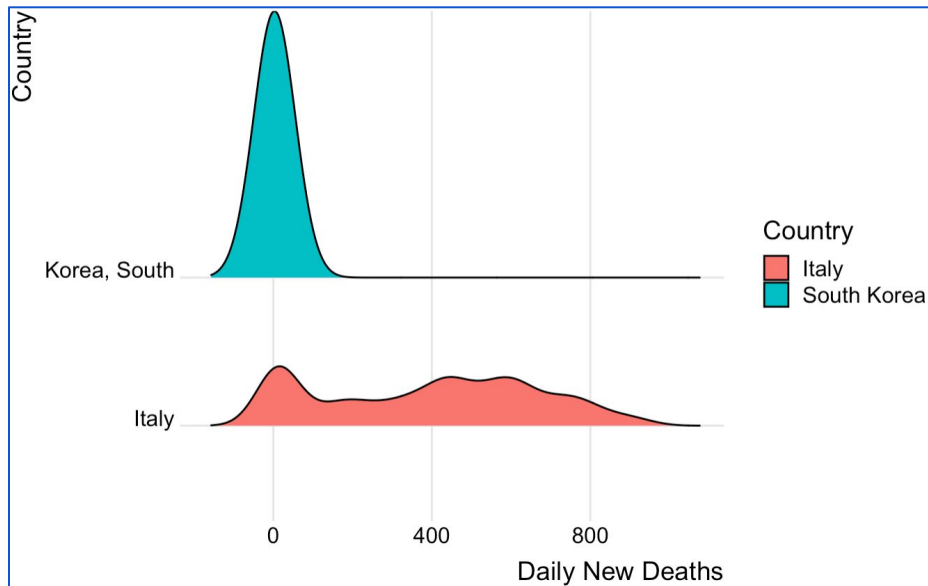
Visualizations cont.

Distributions for New Confirmed & New deaths:

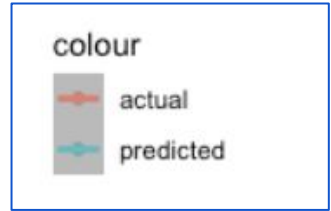
New Confirmed Cases



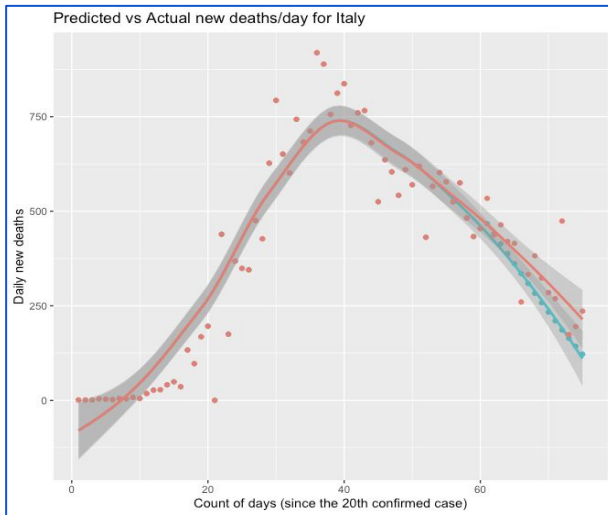
New Deaths



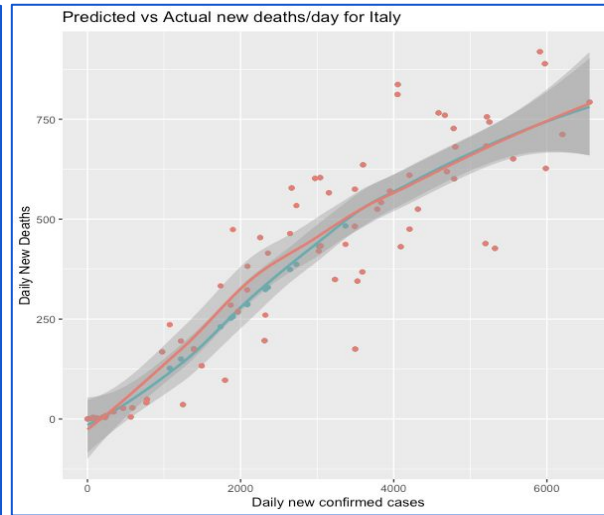
Modeling - Italy



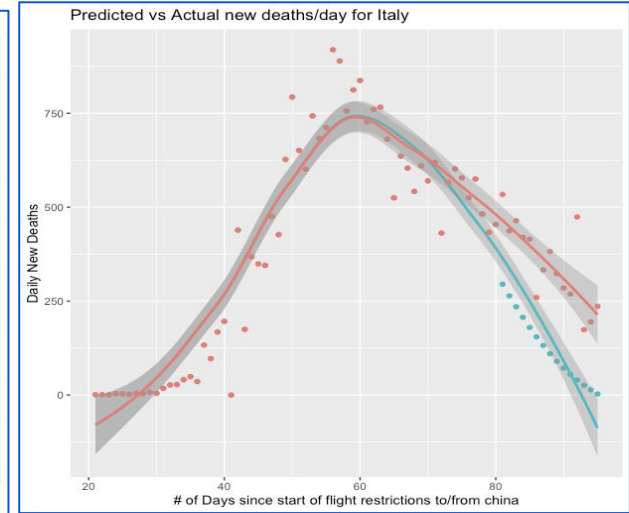
Curve-fitting/extrapolation model : Nonlinear Regression model for Gaussian curve



MAE = 69.66667



MAE = 72.53333

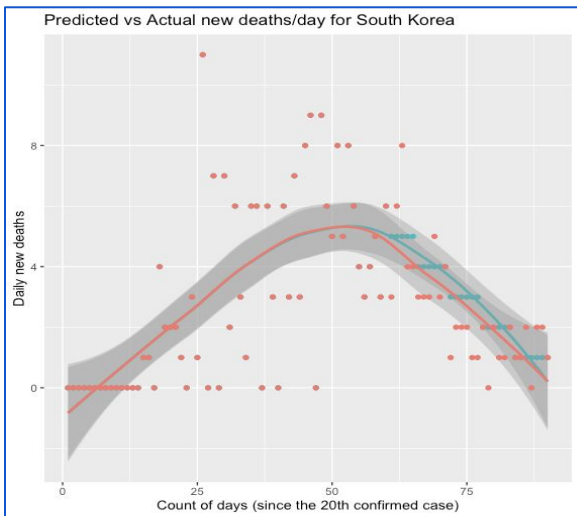


MAE = 221.5333

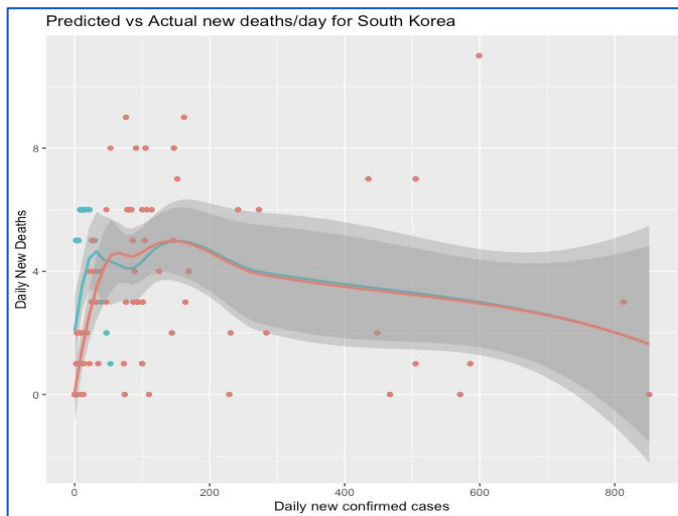
Modeling - South Korea

colour
actual
predicted

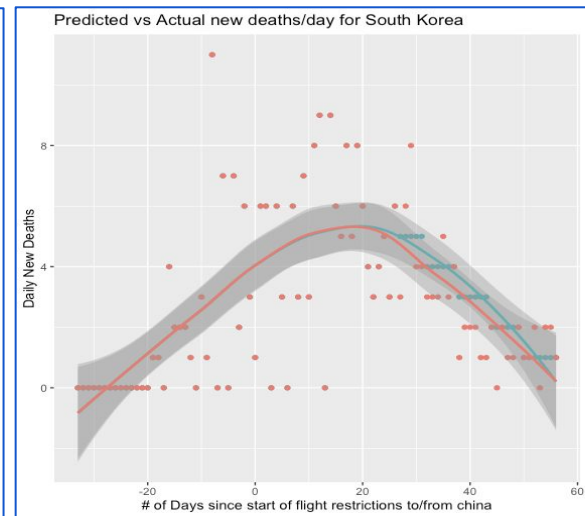
Curve-fitting/extrapolation model : Nonlinear Regression model for Gaussian curve



MAE = 1



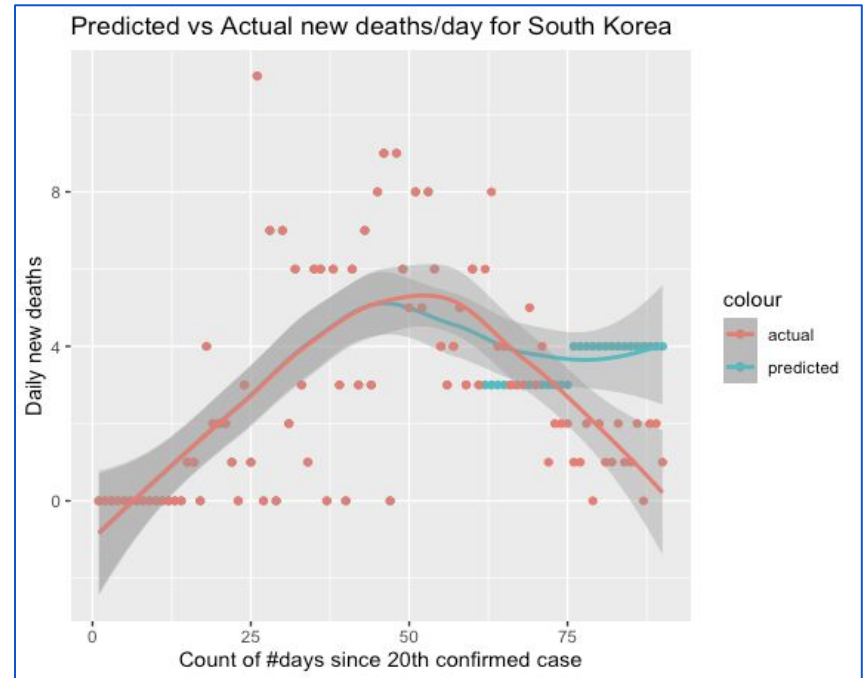
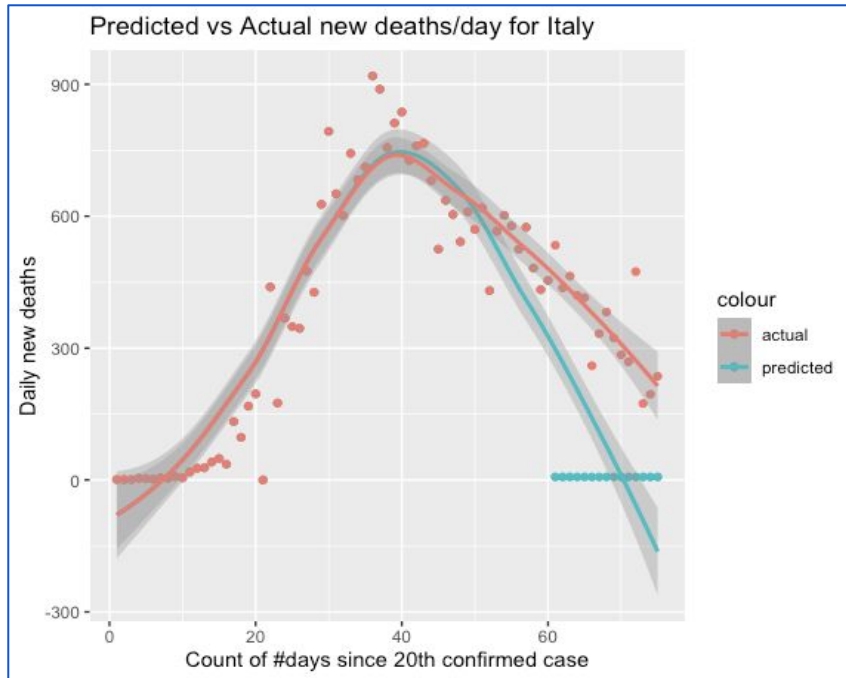
MAE = 3.566667



MAE = 1

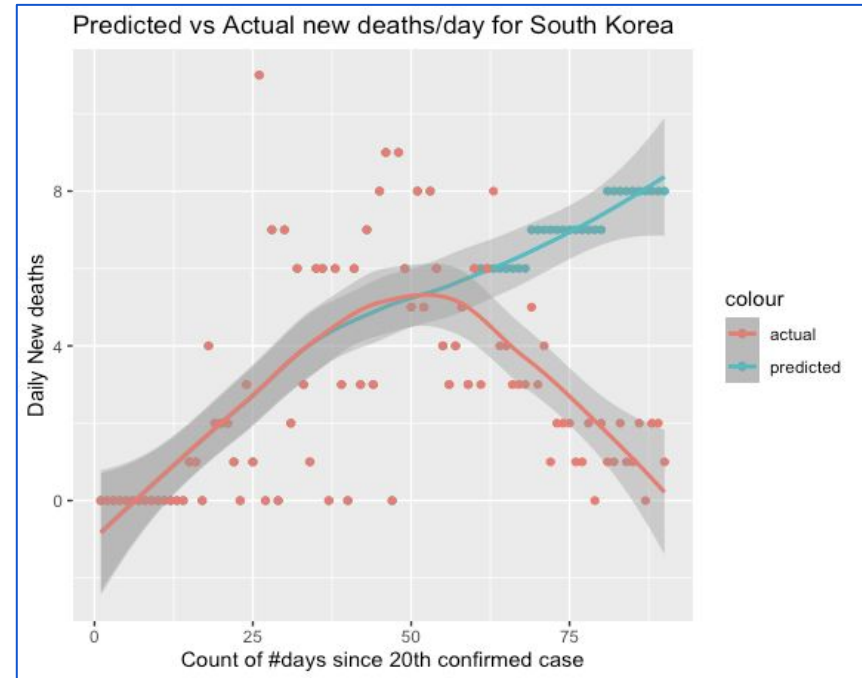
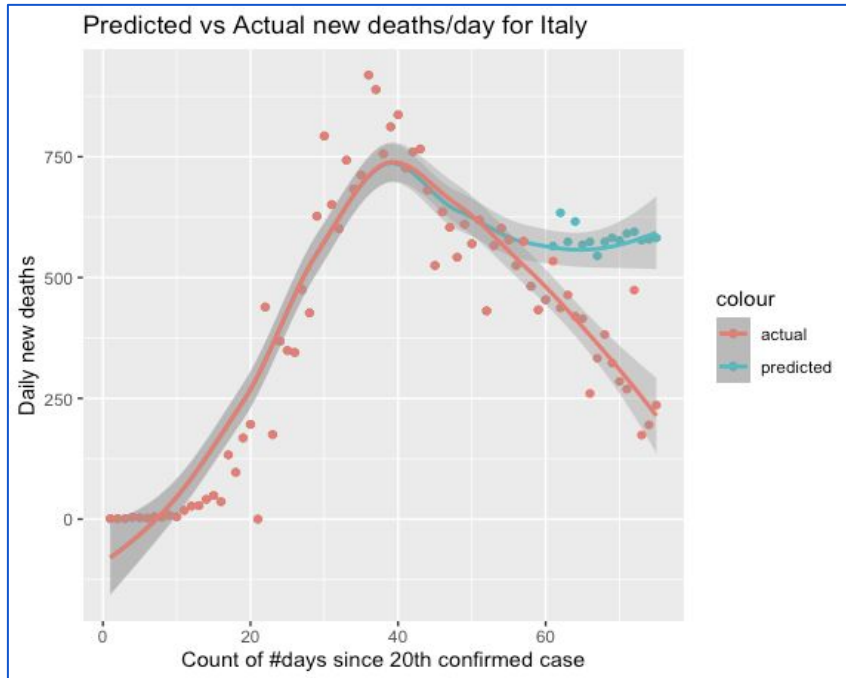
Other modeling approaches we considered

Curve-fitting/extrapolation model : Negative Binomial Regression



Other modeling approaches we considered

Curve-fitting/extrapolation model : Polynomial Linear Regression



Thank you!

Questions?