COVID-19 Confirmed Cases Prediction as of April 4, 2020

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Summary of the situation:

- Europe records a 7.7% growth rate of confirmed infections today, with outbreak progress in positive scenario rising from 64.3% to 66.7%. The inflection point of Europe is still unclear, but we can expect the final number of total confirmed cases to fall in the range of 1000-2000 per million population (i.e. 0.1 to 0.2%). It is important to understand that confirmed infections undershoot actual infections by a very large margin.

The situation in the US continues to be uncertain and we do not expect a quick convergence because the epidemic in the USA is both geographically diverse and at a very early stage. Readers can refer to Supplements to COVID-19 Confirmed Cases Prediction (April 1st, 2020)[1] for our analysis on the US test numbers and the confirmed numbers.

- It is relatively clear that Austria has passed its inflection point[2] (see the detailed plots of Austria at page 20 of the set of figures showing the time dynamics for each country), with its daily growth rate of confirmed cases reaching 3.5% today from 10% a week ago. The ensemble distribution of its final confirmed cases per million has also converged to a narrowed unimodal distribution with a median value of 1490.

- The daily confirmed cases in Spain, Italy, Belgium, Netherlands are still floating around the previous peak, with relatively dispersed distributions of the final confirmed cases. It is possible that they may depart from the previous trajectory following the potential inflection point detected earlier and resume their previous exponential growth. However, daily growth rate of hospital bed use, ICU use and death continue decreasing linearly in Belgium, supporting a positive sign there.

- Switzerland, France and Germany go back to their previous exponential growth and have highly uncertain future scenarios, as shown by their the ensemble distributions of final confirmed cases (Figure 1), showing that Switzerland and France are not yet converged, and Germany has a long tail.

- UK, Turkey and Japan continue their previous exponential growth, while Japan records a 12.2% growth in confirmed cases today, which is missed by our yesterday's prediction (Figure 2). Given a linear growing death number, there is not yet a large epidemic in Japan. This could indicate variance in reporting standards of the outbreak worldwide, or different climate, cultural or genetic controls.

-The irregular dips and spikes in the data most likely reflect data aggregation and reporting delays where numbers not included one day are included in the following day.

[1] https://ethz.ch/content/dam/ethz/special-interest/mtec/chair-of-entrepreneurial-risks-dam/documents/Covid-19/Covid_Supplements_1April2020.pdf

[2] On a logistic curve, the inflection point indicates where the curvature changes its sign. As we model the total number of confirmed cases, it is equal to the peak of the daily increase curve, after which the daily number of cases is decreasing. If the inflection point has been passed, the worst of the outbreak is over.

Method:

This report updates predictions for the number of COVID-19 confirmed cases at four time horizons (1-day, 5-day, 10-day and end of the outbreak) and for various countries/regions, based on a phenomenological approach detailed in [1]. We employ 3 versions of the generalized logistic growth equation to model the total number of confirmed cases, resulting in a positive, medium and negative scenario for the final expected number of cases. Note that, for countries/regions at early growth stages, the predictions for long-term horizon (10-day and end of the outbreak) are highly uncertain and will vary a lot as the situation changes. The predicted ranges overlap and, as time passes, we anticipate our methodology to zero in on more reliable numbers.

Data source: European Centre for Disease Prevention and Control (ECDC) [2] updated every day at 1pm CET, reflecting data collected up to 6:00 and 10:00 CET. Thus the daily data in some countries is one day delayed compared to other online live sources.

Key Figures & Tables:

-In Table 1, we report the latest confirmed cases per million population and the estimated outbreak progress in the positive and medium scenario (today's confirmed cases divided by the estimated total final confirmed case in positive and now additionally in medium scenarios).

-In Table 2, we report the prediction results in each selected country/region at four time horizons (1-day, 5-day, 10-day and end of the outbreak) in three scenarios. The detailed fitting results for each country/region are plotted in the figures at the end of this report.-

-In Figure 1, we present a distribution of the estimated final total confirmed numbers per million population based on the positive and medium scenario.

-In Figure 2, we show the 1-day prediction error of yesterday's report.

Comment: We need to emphasize that reported confirmed cases are a leading indicator that is subject to a large number of extraneous variables such as sampling rate[3], sample targeting and reliability of testing. See note at end of this report. The real number of cases in the population is likely to be many multiples higher than those computed from confirmed tests. We strongly recommend that national governments should publish the number of daily tests and implement random testing (polling) in the population, to facilitate all modeling work and therefore better understanding of the epidemic to help guide appropriate policy responses.

[3] For instance, The UK is experiencing issues with raising the testing rate linked to a global shortage of certain key reagents and swabs. From since April 1st, all testing is to be targeted at health sector staff and this will obviously bias future data compared with past data.

Table 1. Current confirmed cases per million population and estimated outbreak progress in positive and medium scenarios (today's confirmed cases divided by the estimated total final confirmed cases in positive and medium scenario). Numbers in brackets are 80% confidence intervals. As positive scenarios predict a smaller final number of total infected cases, the outbreak progress is thus larger in the positive scenario. Note that the estimated final confirmed numbers tend to underestimate the final results, thus the estimated outbreak progress serves both as a lower bound for future developments and as a guide of the dynamics of the evolution of the epidemics[4]. The number of tests per million population and confirmed cases per test are presented in the last two columns based on the information from Wikipedia [3].

	Confirmed per Million Population (Apr-04)	Outbreak Progress in Positive Scenario	Outbreak Progress in Medium Scenario	Tests per Million Population (update date in brackets)	Confirmed Cases per Test (update date in brackets)
Spain	2519	83.4% (77.6%, 89.7%)	67.1% (60.2%, 73.2%)	7596 (Mar 21)	5.6% (Mar 21)
Switzerland	2314	78.0% (67.6%, 88.4%)	60.9% (43.8%, 73.7%)	17904 (Apr 04)	12.8% (Apr 04)
Italy	1983	95.3% (89.8%, 100.5%)	76.7% (72.1%, 80.9%)	10276 (Apr 03)	18.6% (Apr 03)
Belgium	1468	71.9% (60.4%, 82.9%)	71.7% (57.0%, 81.0%)	1594 (Mar 18)	6.8% (Mar 18)
Austria	1303	87.6% (81.7%, 94.0%)	87.2% (80.6%, 93.9%)	11697 (Apr 04)	11.1% (Apr 04)
Germany	1034	68.3% (59.9%, 75.6%)	56.4% (44.0%, 65.4%)	11046 (Mar 29)	5.7% (Mar 29)
France	960	64.8% (49.2%, 76.7%)	57.7% (37.0%, 73.4%)	3346 (Apr 02)	25.4% (Apr 02)
Netherlands	912	80.3% (74.8%, 85.7%)	65.4% (56.2%, 75.2%)	2686 (Mar 26)	13.7% (Mar 26)
United States	850	44.9% (17.8%, 61.6%)	32.9% (7.1%, 50.8%)	4572 (Apr 03)	16.4% (Apr 03)
Europe	764	66.7% (60.2%, 72.3%)	56.9% (49.6%, 62.6%)	NA	NA
Iran	617	Not reliable	Not reliable	962 (Mar 22)	25.8% (Mar 22)
United Kingdom	574	33.0% (12.8%, 48.5%)	23.4% (0.0%, 42.3%)	2573 (Apr 03)	19.4% (Apr 03)
Turkey	254	60.9% (45.4%, 73.8%)	52.7% (23.8%, 68.1%)	1704 (Apr 03)	12.8% (Apr 03)
South Korea	197	Not reliable	Not reliable	8800 (Apr 04)	2.2% (Apr 04)
Japan	23	6.6% (0.0%, 44.2%)	0.0% (0.0%, 18.0%)	340 (Apr 04)	6.8% (Apr 04)

[4]One uncertainty with Italy (and other countries) is whether the main outbreak that is focused on the North may spread through other parts of the country. In other words, does the dynamics aggregated over a whole country represent correctly the dynamics in different parts?

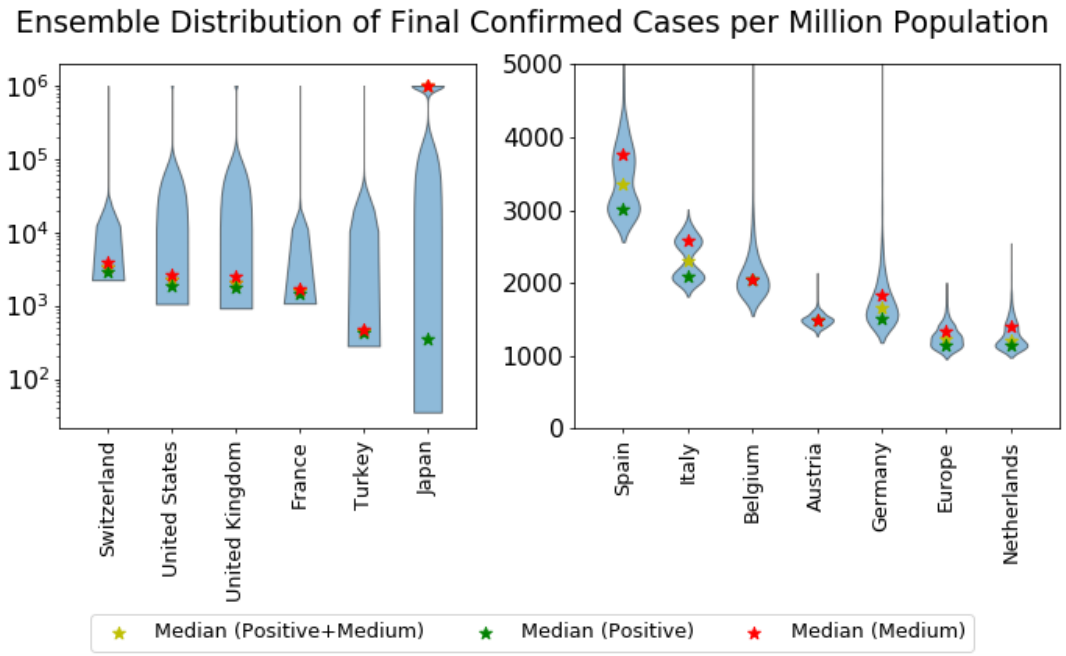


Figure 1. Violin plot of the distributions of the final total number of confirmed cases per million derived by combining the distributions of the positive and medium scenarios. The model setup in the negative scenario does not incorporate a maximum saturation number and thus cannot be used. The yellow star indicates the median prediction for the combined distribution, while the green and red stars indicate the median of the positive and of the medium scenarios respectively. Note that, where we have >1 million infections per 1 million of population, the results are deemed to be unreliable (Table 2).

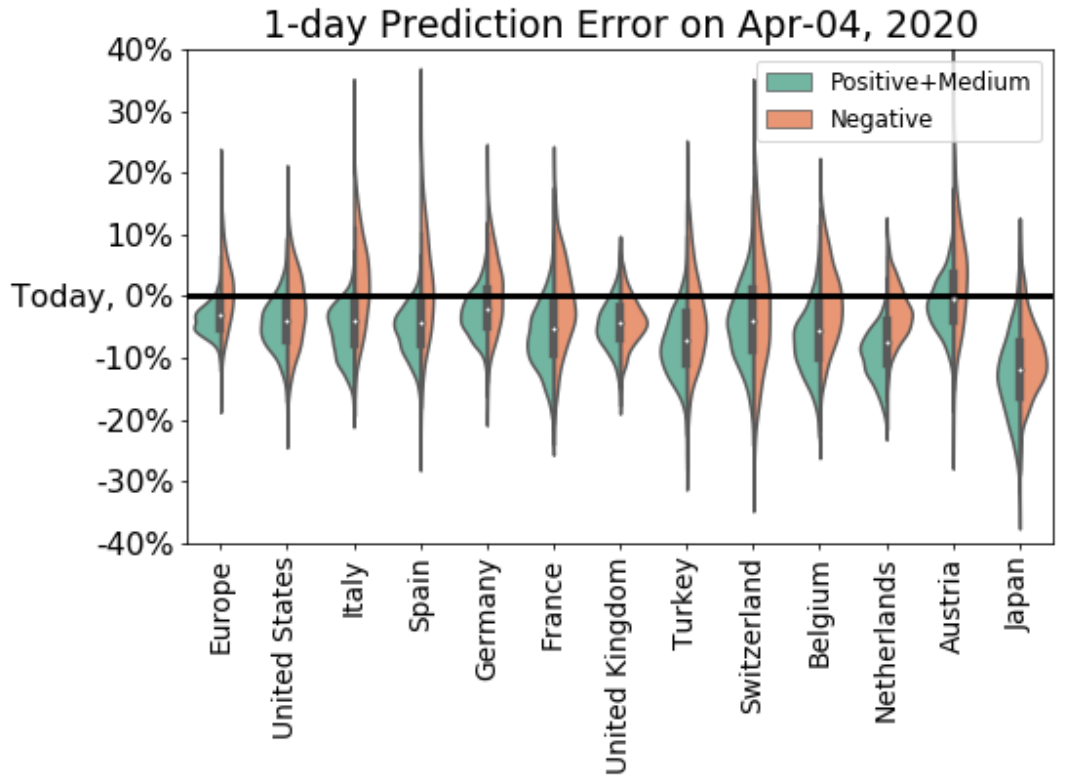


Figure 2. One-day prediction error of the 13 countries/regions. The horizontal line corresponds to today's empirical data. We show the full distribution of errors for each of the two scenarios.

Table 2. Predictions for the number of confirmed cases at four time horizons (1-day, 5-day, 10-day and end of the outbreak) and for various countries/regions. The values in parentheses are 80% prediction intervals based on 500 simulations using a negative binomial error structure. In Today's validation column, today's empirical data is presented below yesterday's 1-day predictive interval. "Not reliable" is declared if more than 10% of the simulations produce extreme numbers (larger than total population). All numbers are in thousands.

Country	Scenario*	Today's validation	5-Apr	9-Apr	14-Apr	Final Total Confirmed
Europe	Positive	(533, 570) 570	588 (568, 609)	699 (669, 731)	784 (737, 834)	855 (789, 947)
	Medium	(531, 560) 570	590 (575, 607)	720 (694, 747)	840 (795, 890)	1000 (910, 1150)
	Negative	(534, 613) 570	614 (573, 660)	823 (765, 886)	1150 (1050, 1250)	Not Reliable
United States	Positive	(249, 283) 278	301 (278, 324)	420 (370, 505)	526 (422, 789)	619 (452, 1560)
	Medium	(252, 279) 278	300 (284, 315)	434 (393, 480)	588 (479, 780)	845 (547, 3890)
	Negative	(251, 294) 278	306 (285, 333)	484 (445, 528)	813 (711, 934)	Not Reliable
Italy	Positive	(104, 114) 120	112 (107, 118)	119 (114, 125)	123 (117, 130)	126 (119, 133)
	Medium	(113, 120) 120	121 (117, 125)	134 (129, 138)	144 (138, 150)	156 (148, 166)
	Negative	(111, 134) 120	127 (115, 139)	155 (140, 170)	192 (172, 214)	Not Reliable
Spain	Positive	(103, 114) 118	114 (110, 120)	130 (123, 137)	138 (129, 147)	141 (131, 152)
	Medium	(109, 118) 118	121 (116, 125)	144 (137, 151)	160 (151, 172)	176 (161, 196)
	Negative	(108, 133) 118	128 (114, 143)	175 (154, 197)	247 (210, 291)	Not Reliable
Germany	Positive	(79.2, 88.2) 85.8	88.4 (84.2, 93.1)	105 (98.8, 112)	116 (108, 127)	126 (114, 143)
	Medium	(79.5, 86.9) 85.8	89.5 (85.5, 93.8)	109 (103, 116)	127 (117, 142)	152 (131, 195)
	Negative	(79.8, 93.1) 85.8	92.8 (85.9, 99.9)	125 (115, 136)	175 (158, 197)	Not Reliable
France	Positive	(56.6, 64.8) 64.3	65.9 (61.1, 71.2)	80.2 (72.6, 89.8)	90.7 (79.7, 107)	99.3 (83.9, 131)
	Medium	(54.6, 64) 64.3	65.2 (60.5, 70.1)	81.4 (73, 89.7)	95 (81.8, 114)	112 (87.6, 174)
	Negative	(57.7, 69.4) 64.3	69.1 (63.4, 74.9)	94.5 (86.5, 103)	135 (122, 152)	Not Reliable
United Kingdom	Positive	(34.4, 38.8) 38.2	40.9 (38.8, 43.4)	61.5 (55.1, 69.2)	84.6 (68.5, 115)	115 (78.6, 297)
	Medium	(34.6, 37.8) 38.2	40.8 (39.2, 42.5)	62.6 (57.3, 68.5)	92.7 (74.5, 119)	Not Reliable
	Negative	(34.8, 38.6) 38.2	41.5 (39.4, 43.5)	67.5 (63.2, 71.5)	118 (108, 131)	Not Reliable
Turkey	Positive	(18, 20.7) 20.9	22.4 (20.9, 24.2)	29.4 (26.1, 34.3)	32.9 (28, 41.8)	34.4 (28.3, 46.1)
	Medium	(17.9, 20.6) 20.9	22.2 (20.8, 23.7)	30.5 (27, 36.2)	36 (29.8, 51.6)	39.7 (30.7, 88)

	Negative	(18.3, 22.4) 20.9	23 (20.9, 25.1)	38.4 (34.4, 43.2)	65.7 (55.8, 79.8)	Not Reliable
Switzerland	Positive	(17.8, 21) 19.7	20.1 (18.6, 21.7)	22.6 (20.7, 24.6)	24.2 (21.7, 26.8)	25.3 (22.3, 29.1)
	Medium	(18.7, 22.1) 19.7	21.1 (19.6, 22.7)	24.5 (22.5, 27)	27.6 (24.7, 31.7)	32.4 (26.7, 45)
	Negative	(18.1, 23.5) 19.7	21.7 (18.9, 24.8)	27.9 (24.3, 31.9)	36.7 (31.5, 43.3)	Not Reliable
Belgium	Positive	(14.2, 16.5) 16.8	17.2 (16, 18.4)	20.4 (18.6, 22.6)	22.4 (19.8, 25.6)	23.3 (20.2, 27.8)
	Medium	(14.5, 16.9) 16.8	17 (15.9, 18.2)	20.5 (18.7, 22.6)	22.4 (20.2, 26.1)	23.4 (20.7, 29.4)
	Negative	(15.2, 18.1) 16.8	18 (16.5, 19.6)	25.8 (23.5, 28)	38.2 (34.1, 43.3)	Not Reliable
Netherlands	Positive	(14.8, 16) 15.7	16.2 (15.5, 16.8)	18.1 (17.2, 18.9)	19.1 (18, 20.3)	19.6 (18.4, 21)
	Medium	(14, 15.6) 15.7	15.9 (15.2, 16.6)	19 (17.8, 20.2)	21.5 (19.7, 23.5)	24 (20.9, 28)
	Negative	(15.7, 17.6) 15.7	17.7 (16.7, 18.9)	23.8 (22.2, 25.3)	32.9 (30.2, 35.6)	Not Reliable
Austria	Positive	(10.8, 12.1) 11.5	11.8 (11.1, 12.4)	12.6 (11.8, 13.4)	13 (12.2, 13.9)	13.2 (12.3, 14.1)
	Medium	(10.7, 11.9) 11.5	11.7 (11.1, 12.3)	12.6 (11.8, 13.3)	13 (12.1, 13.9)	13.2 (12.3, 14.3)
	Negative	(10.7, 13.1) 11.5	12.1 (10.7, 13.7)	15.2 (13.3, 17.3)	19.4 (16.9, 22.3)	Not Reliable
Japan	Positive	(2.23, 2.68) 2.94	2.68 (2.46, 2.93)	4.06 (3.56, 4.65)	6.65 (4.78, 8.55)	Not Reliable
	Medium	(2.44, 2.87) 2.94	3.06 (2.82, 3.32)	4.29 (3.87, 4.72)	6.53 (5.47, 7.4)	Not Reliable
	Negative	(2.44, 2.87) 2.94	3.08 (2.82, 3.37)	4.33 (3.94, 4.79)	6.64 (5.89, 7.53)	Not Reliable
Iran	Positive	(41.5, 49.8) 50.5	45.5 (41.5, 49.8)	54.5 (48.8, 62.8)	61.4 (52.7, 76.8)	Not Reliable
	Medium	(49.6, 55.5) 50.5	52.6 (49.6, 55.5)	66.5 (61.9, 71)	86.6 (77.2, 94.7)	Not Reliable
	Negative	(49.9, 55.6) 50.5	52.8 (49.9, 55.6)	67.5 (63.4, 71.4)	89.2 (83.1, 95.3)	Not Reliable

* Note:

-The scenarios are based on the final total confirmed numbers. The positive and medium scenarios are derived from the Generalized Logistic Model and the Logistic Model. The model with the lower mean predicted final total confirmed number K is classified as the positive scenario, and the other one is classified as the medium scenario. The negative scenario is based on the Generalized Growth model, which should only describe the early stage of the epidemic outbreak and is therefore least reliable for countries in the more mature stage.

-Trajectories from Iran have largely deviated from a typical logistic type growth (S curve), and can't be properly described by our models. Although we still report its calibration results in Table 1, they

should not be taken as reliable in all scenarios and time horizons. This is probably a result of unreliable reported data from Iran.

Limitations of using the statistics of reported confirmed number

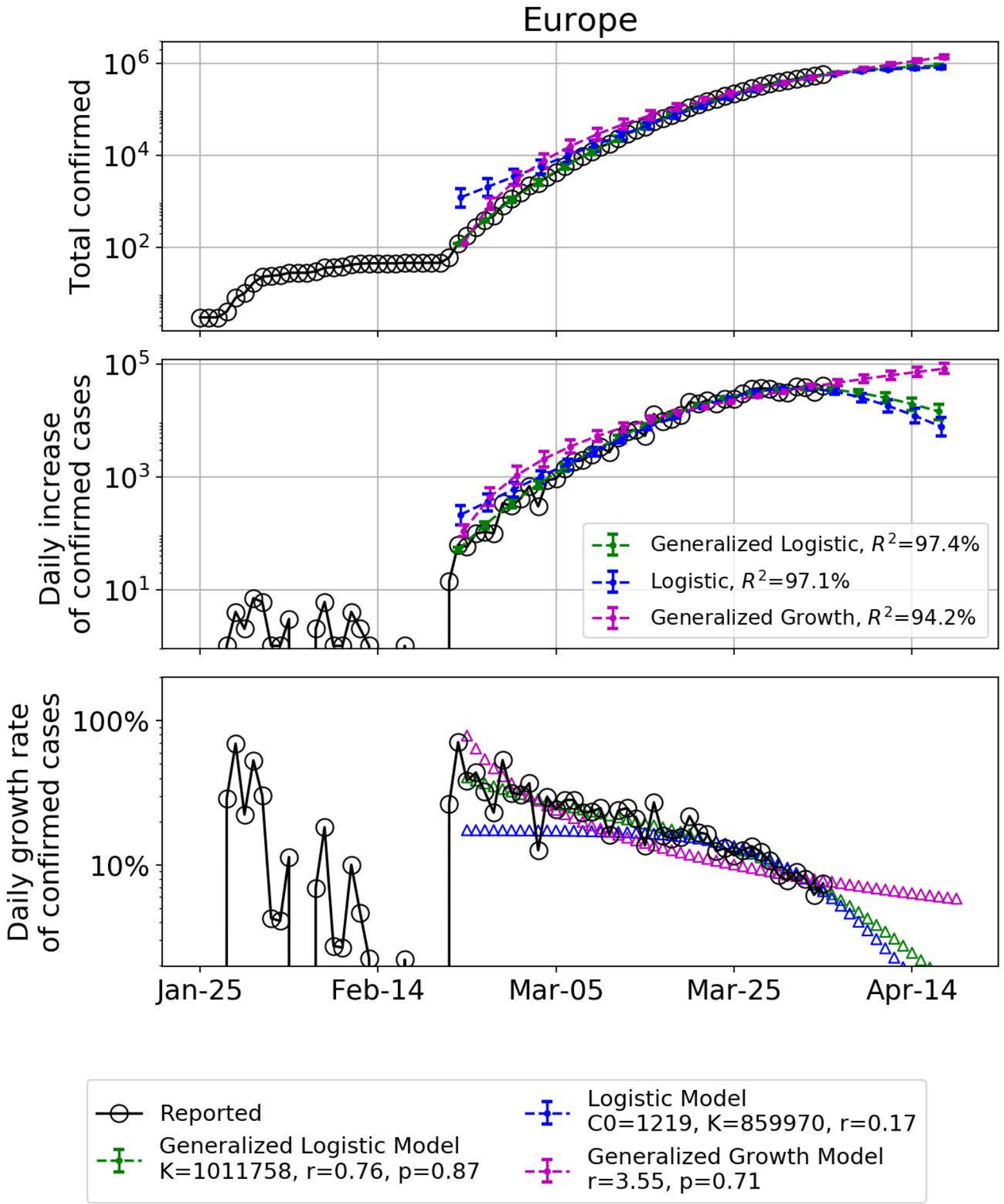
It is important to understand what our prediction models show. The predictions are based on cases identified on the basis of testing and they therefore predict the numbers of future positive tests. Relating positive test results to real levels of infection is subject to a large number of biases. It is a fact that the real number of infections is far higher than those recorded in positive tests since only a tiny fraction of any population has been tested. It is also the case that, in most countries, testing is biased towards those who think they are infected. The first bias, therefore, will underestimate the real number of infections while the second bias will tend to overestimate since it is biased towards those who think they are ill.

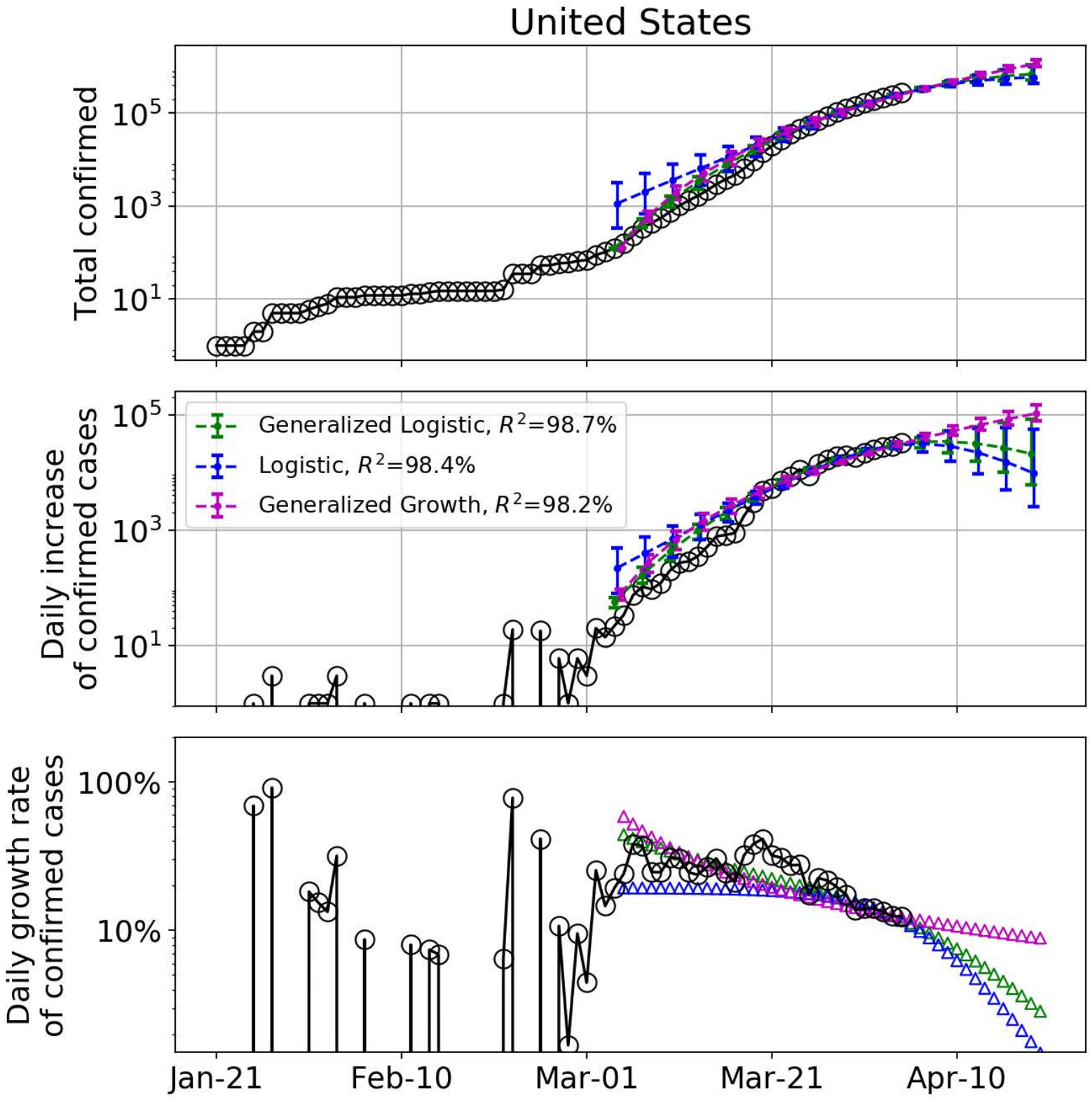
There are further complications. Depending on the testing protocols used, in some instances false positive results have been obtained. In other words, someone without the disease tested positive, probably because they were infected with some other coronavirus. And in other cases, false negative results were obtained, as was the case with the early testing deployed in the USA.
One final complication is the fact that tests are conducted sequentially over time. They do not represent a snapshot of a day in time. Many of those tested early, giving a negative result, may today get a positive result. And many, who tested positive early on, may today be cured.
We anticipate that, over time, our methodology will improve and will provide a more accurate picture of the true levels of infection and where they are headed.

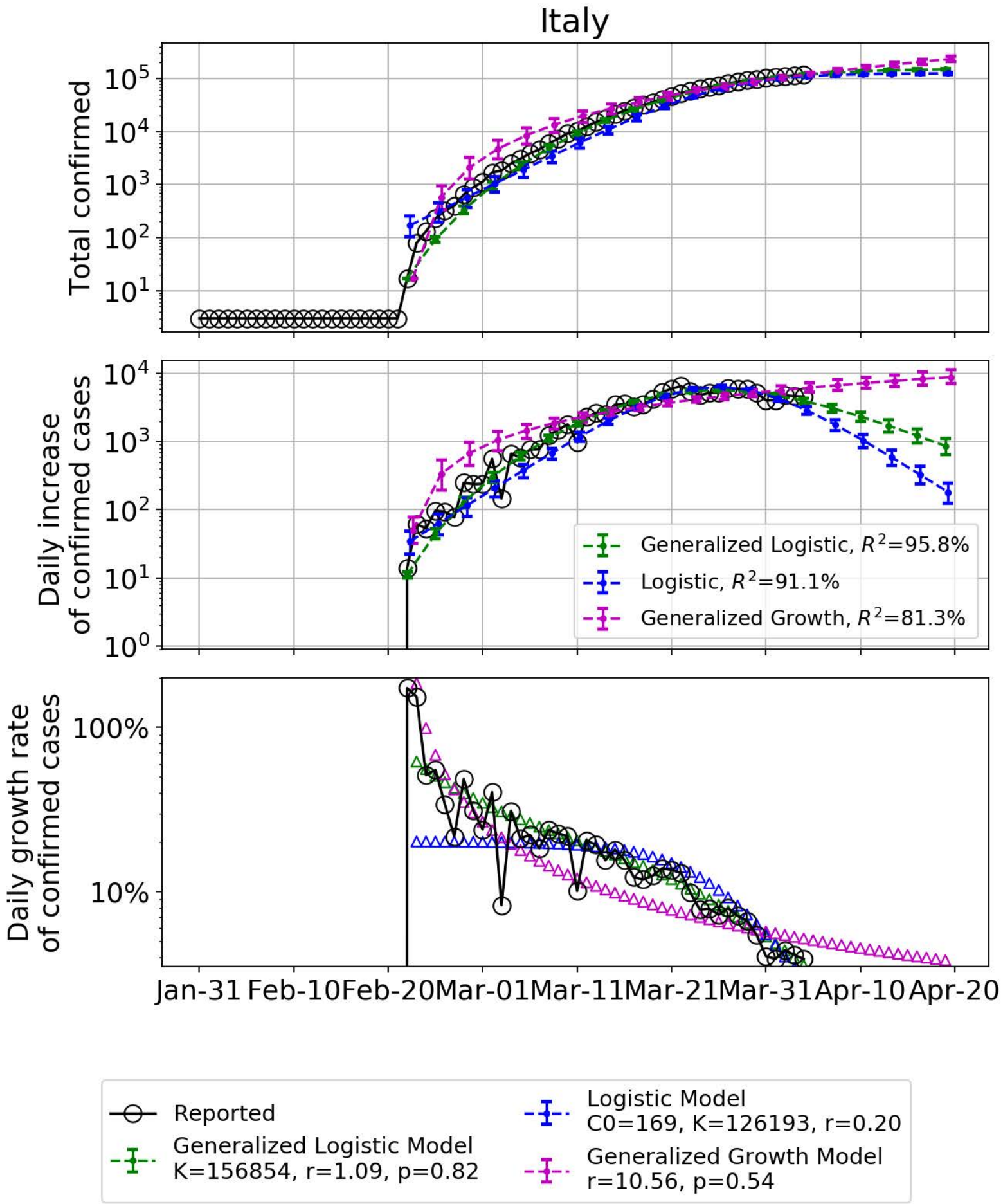
[1] Ke Wu, Didier Darcet, Qian Wang and Didier Sornette, Generalized logistic growth modeling of the COVID-19 outbreak in 29 provinces in China and in the rest of the world, preprint at http://arxiv.org/abs/2003.05681 and
medRxiv: https://medrxiv.org/cgi/content/short/2020.03.11.20034363v1

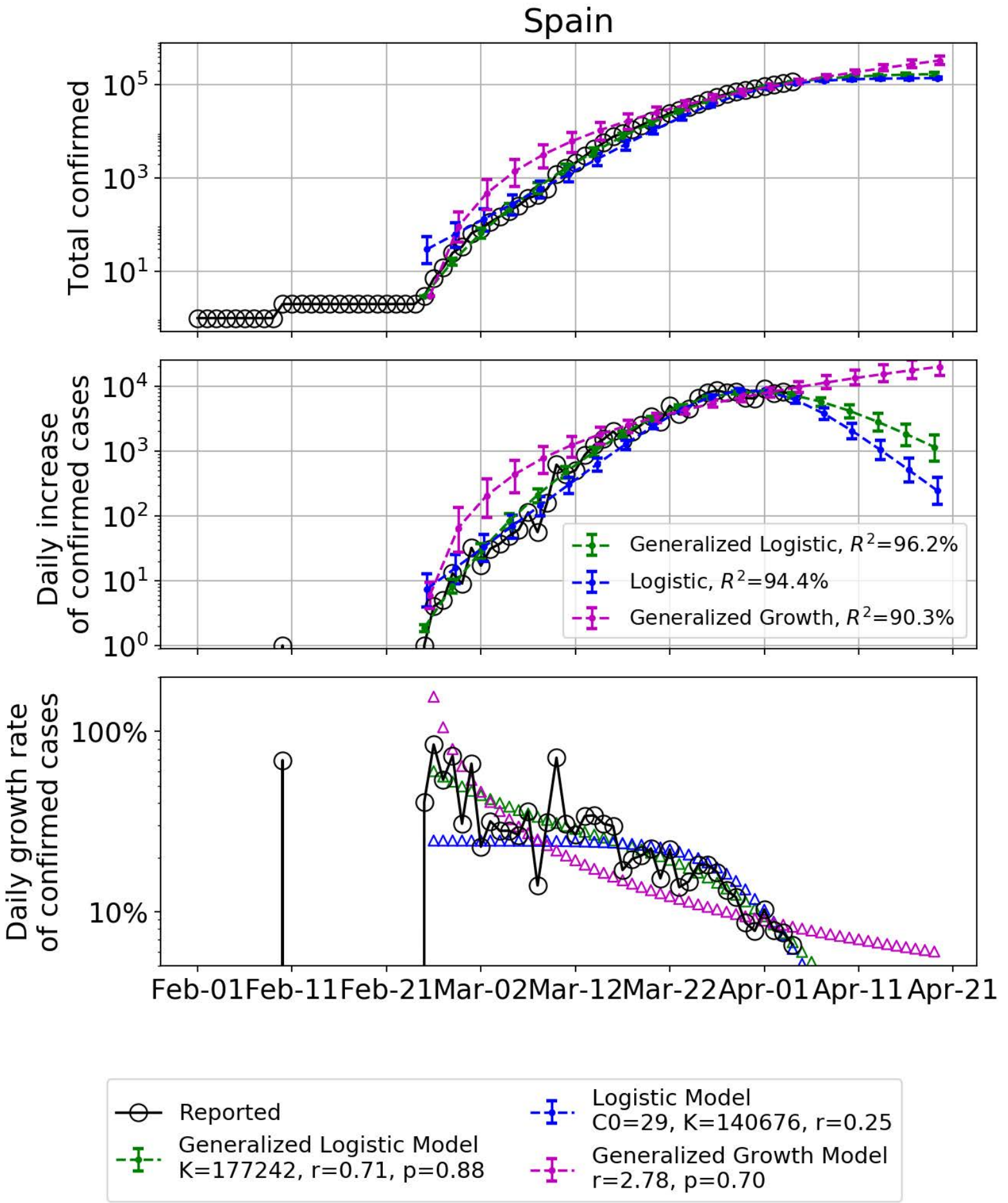
[2] https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases

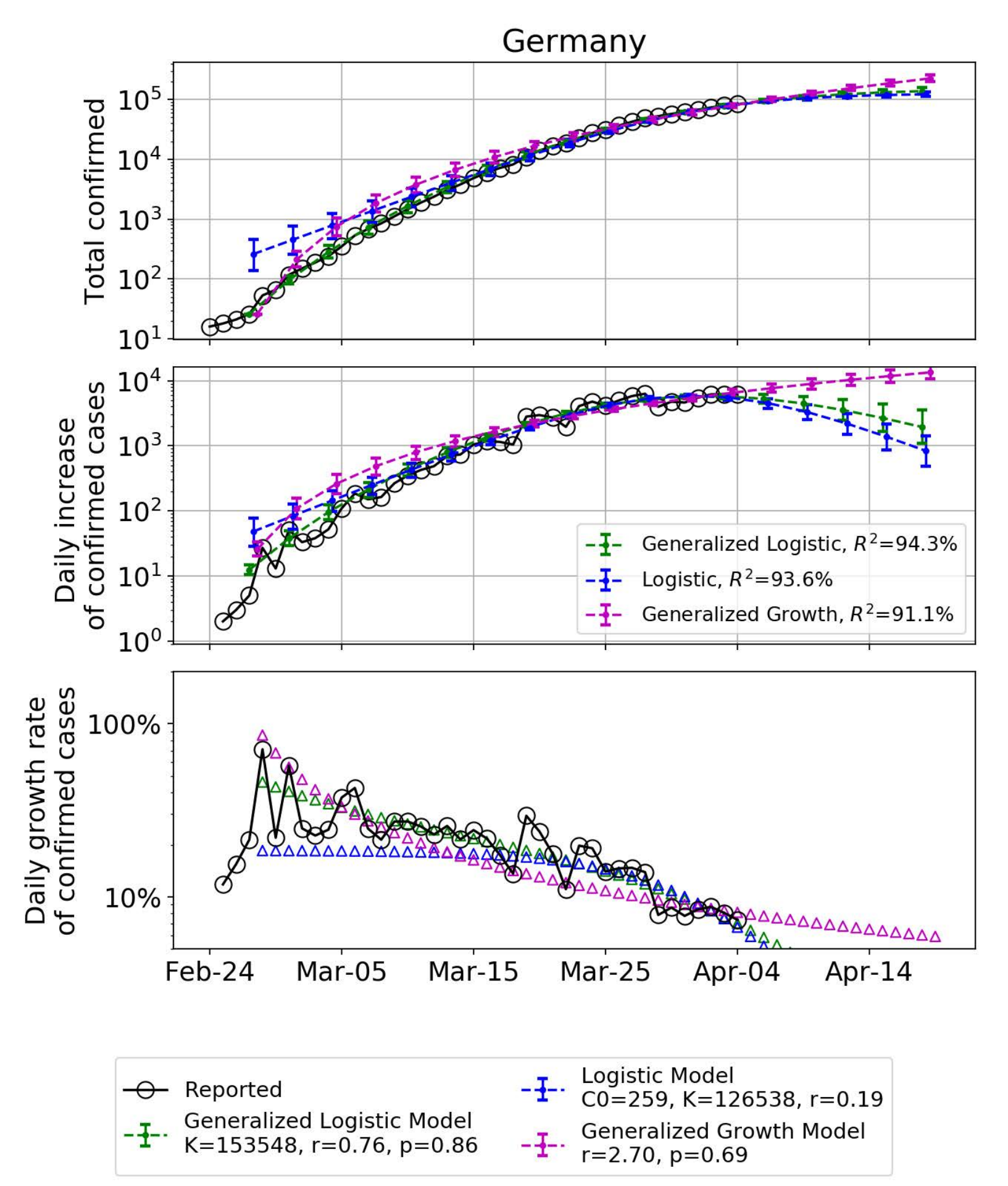
[3] https://en.wikipedia.org/wiki/COVID-19_testing

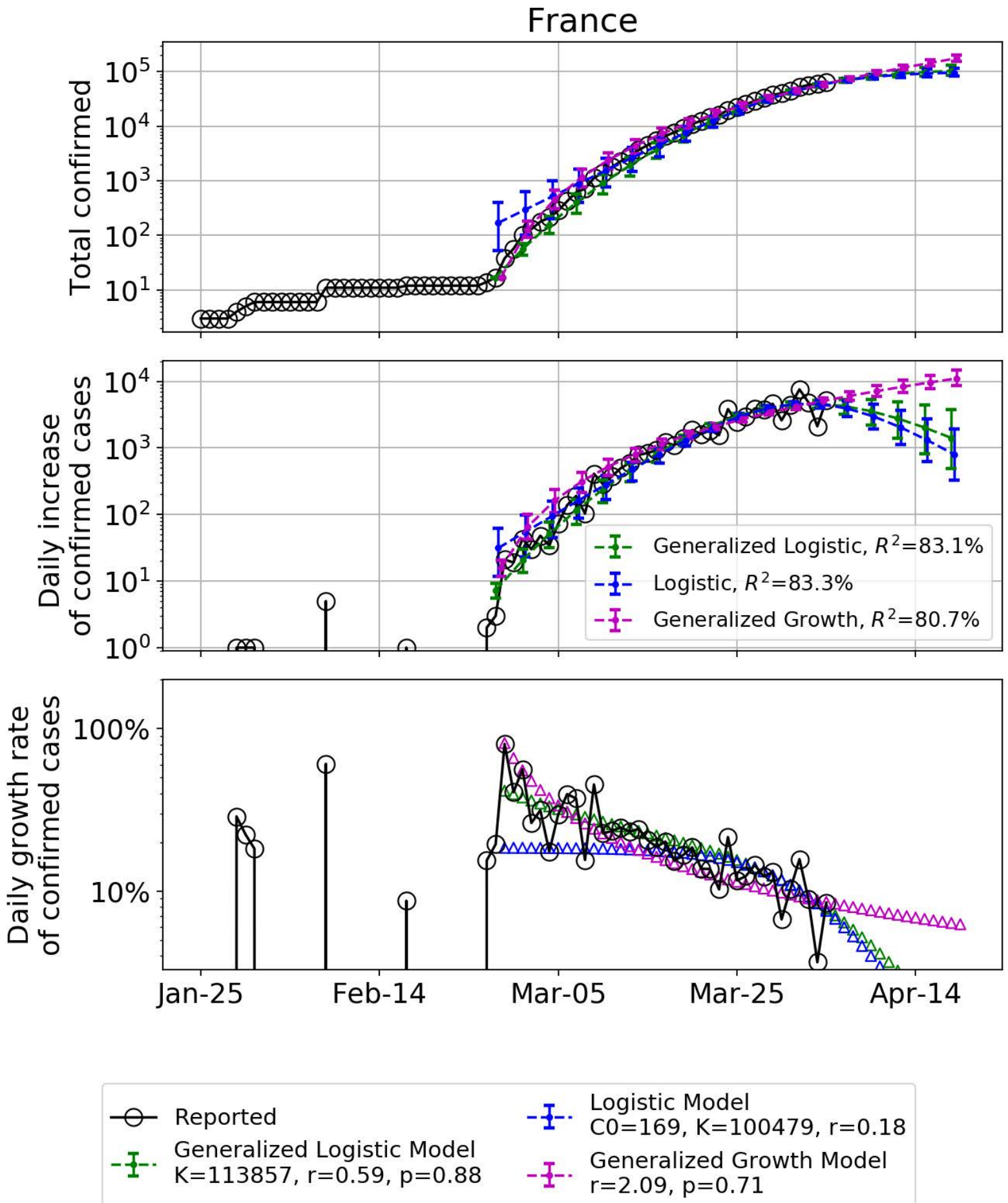

Europe
Total confirmed
10^6
10^4
10^2
Daily increase of confirmed cases
10^5
10^3
10^1
Generalized Logistic, R^2=97.4%
Logistic, R^2=97.1%
Generalized Growth, R^2=94.2%
Daily growth rate of confirmed cases
100%
10%
Jan-25
Feb-14
Mar-05
Mar-25
Apr-14
Reported
Generalized Logistic Model
K=1011758, r=0.76, p=0.87
Logistic Model
C0=1219, K=859970, r=0.17
Generalized Growth Model
r=3.55, p=0.71

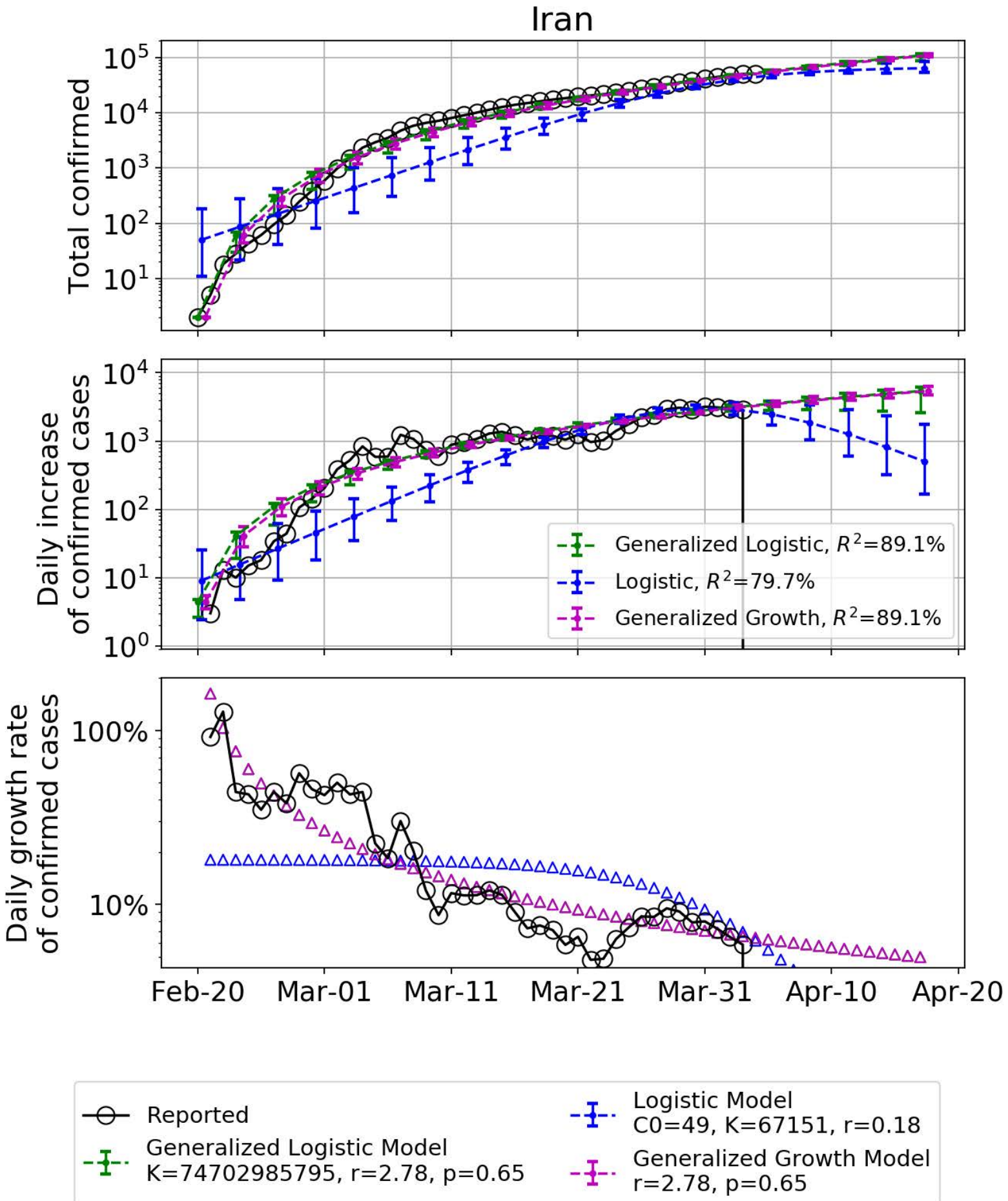

United States
Total confirmed
10^5
10^3
10^1
Daily increase of confirmed cases
Generalized Logistic, R^2=98.7%
Logistic, R^2=98.4%
Generalized Growth, R^2=98.2%
Daily growth rate of confirmed cases
100%
10%
Jan-21
Feb-10
Mar-01
Mar-21
Apr-10
Reported
Generalized Logistic Model
K=874409, r=0.86, p=0.87
Logistic Model
C0=1145, K=646509, r=0.19
Generalized Growth Model
r=1.74, p=0.79

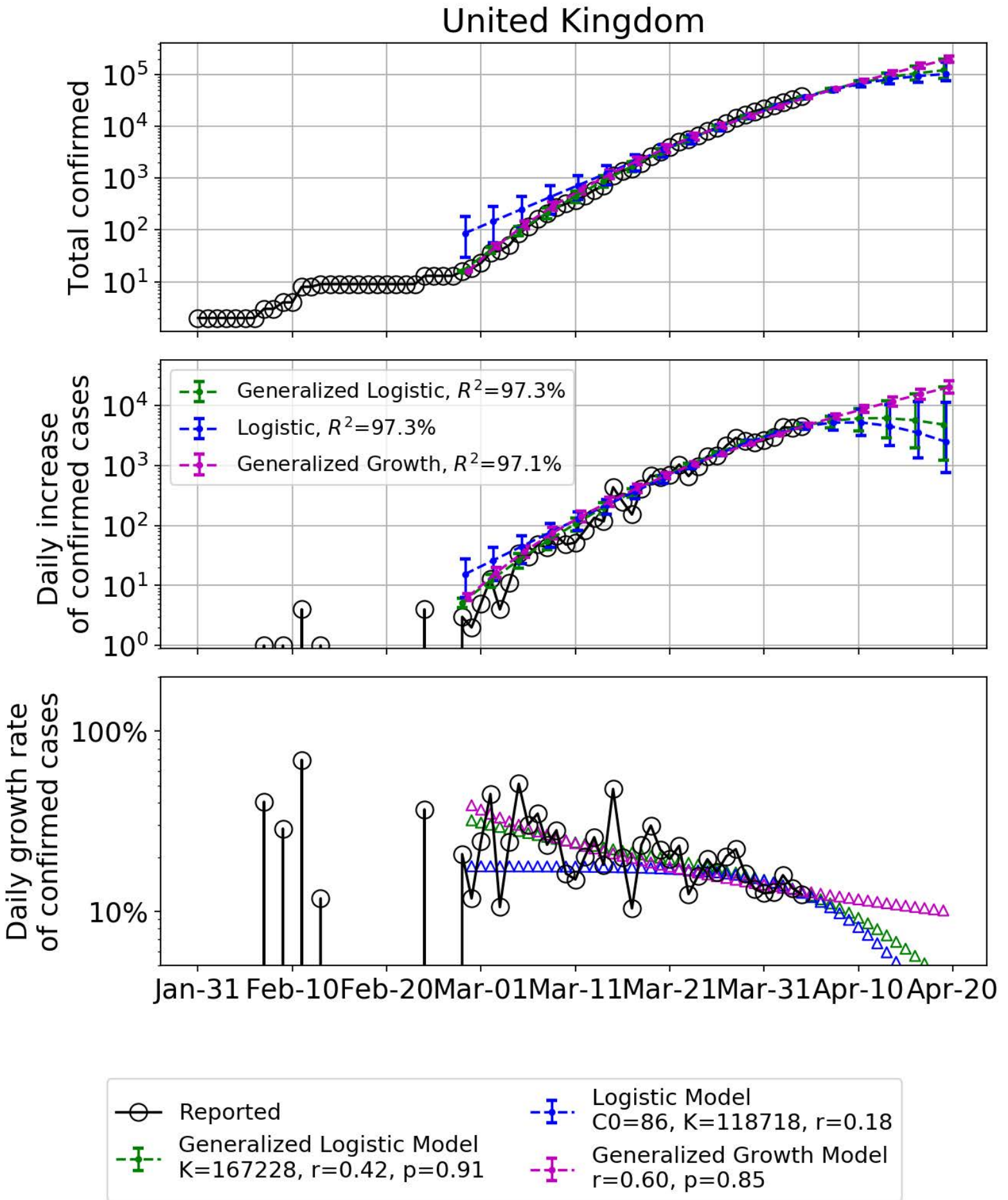

Italy
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=95.8%
Logistic, R^2=91.1%
Generalized Growth, R^2=81.3%
Jan-31
Feb-10
Feb-20
Mar-01
Mar-11
Mar-21
Mar-31
Apr-10
Apr-20
Reported
Generalized Logistic Model
K=156854, r=1.09, p=0.82
Logistic Model
C0=169, K=126193, r=0.20
Generalized Growth Model
r=10.56, p=0.54

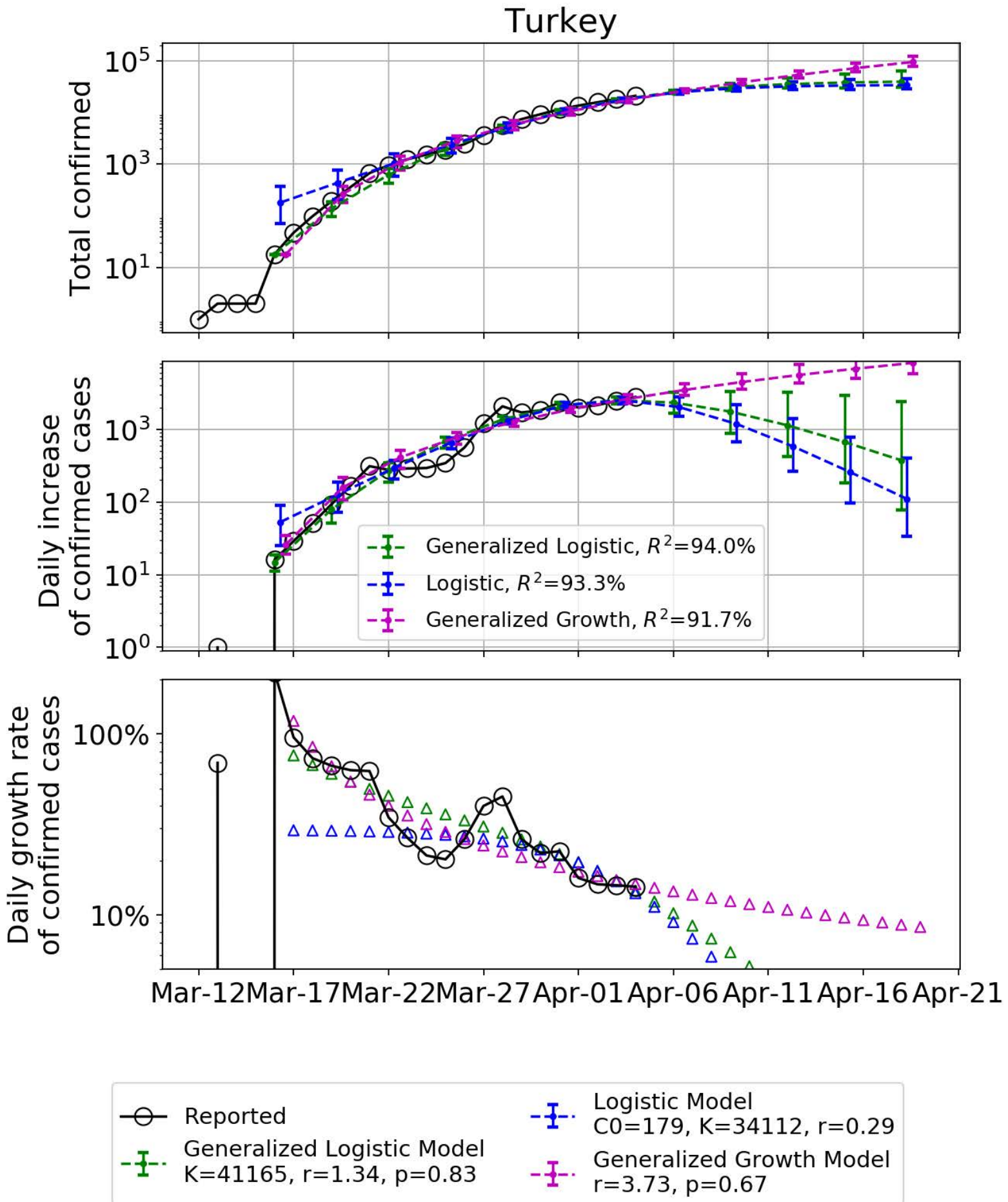

Spain
Total confirmed
10^5
10^3
10^1
Daily increase of confirmed cases
10^4
10^3
10^2
10^1
10^0
Generalized Logistic, R^2=96.2%
Logistic, R^2=94.4%
Generalized Growth, R^2=90.3%
Daily growth rate of confirmed cases
100%
10%
Feb-01
Feb-11
Feb-21
Mar-02
Mar-12
Mar-22
Apr-01
Apr-11
Apr-21
Reported
Generalized Logistic Model
K=177242, r=0.71, p=0.88
Logistic Model
C0=29, K=140676, r=0.25
Generalized Growth Model
r=2.78, p=0.70

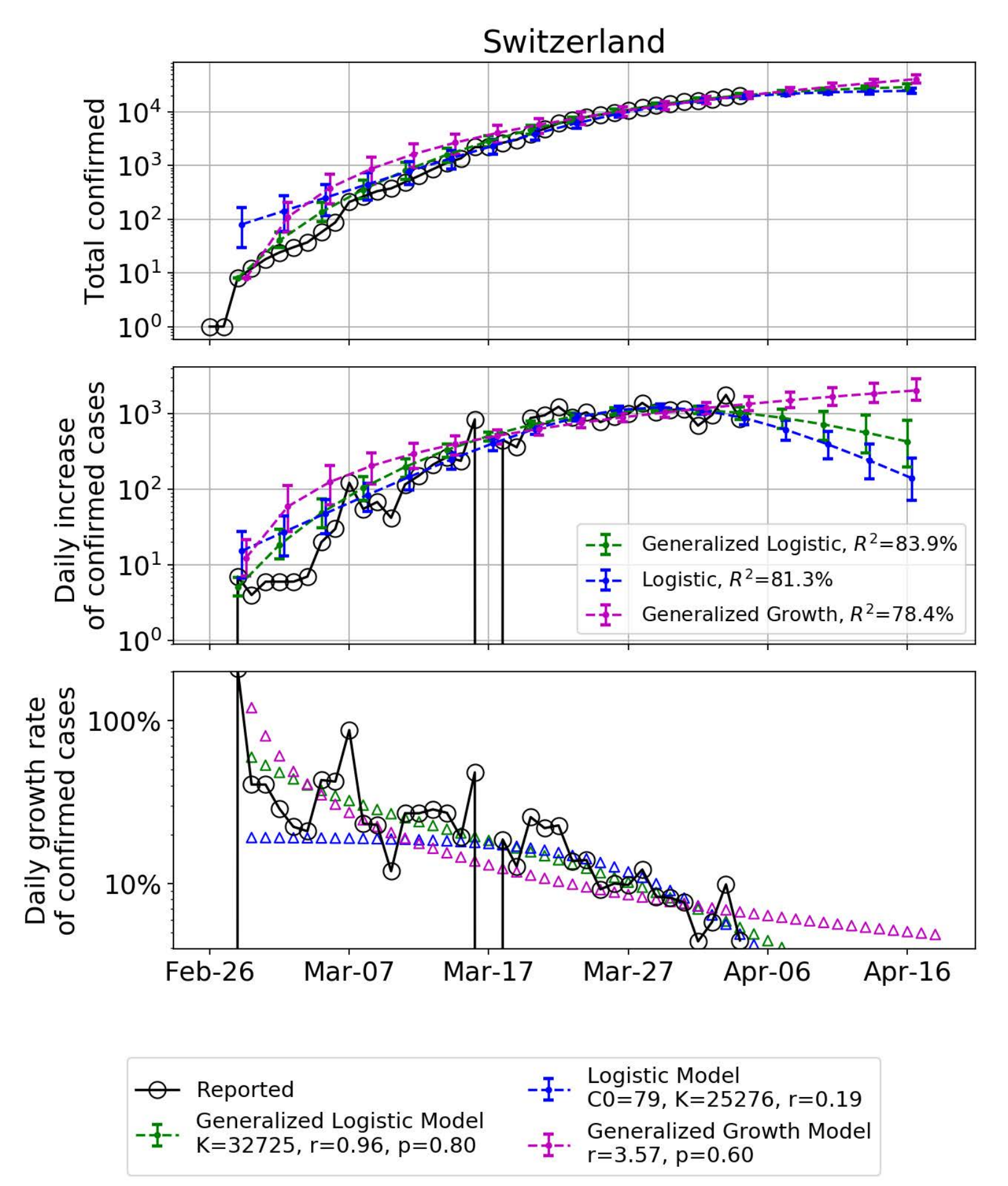

Germany
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=94.3%
Logistic, R^2=93.6%
Generalized Growth, R^2=91.1%
100%
10%
Feb-24
Mar-05
Mar-15
Mar-25
Apr-04
Apr-14
Reported
Generalized Logistic Model
K=153548, r=0.76, p=0.86
Logistic Model
C0=259, K=126538, r=0.19
Generalized Growth Model
r=2.70, p=0.69

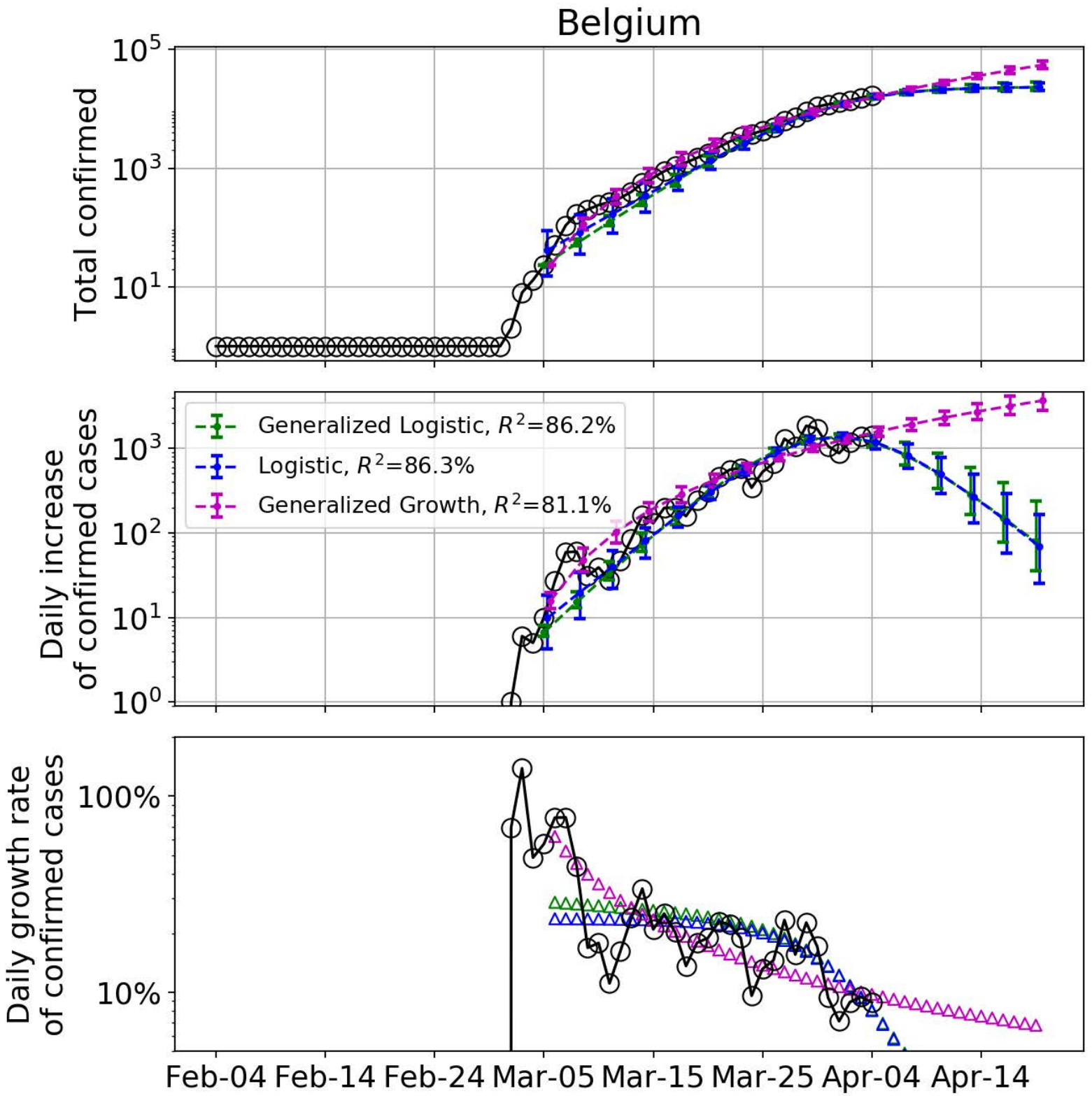

France
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=83.1%
Logistic, R^2=83.3%
Generalized Growth, R^2=80.7%
100%
10%
Jan-25
Feb-14
Mar-05
Mar-25
Apr-14
Reported
Generalized Logistic Model
K=113857, r=0.59, p=0.88
Logistic Model
C0=169, K=100479, r=0.18
Generalized Growth Model
r=2.09, p=0.71

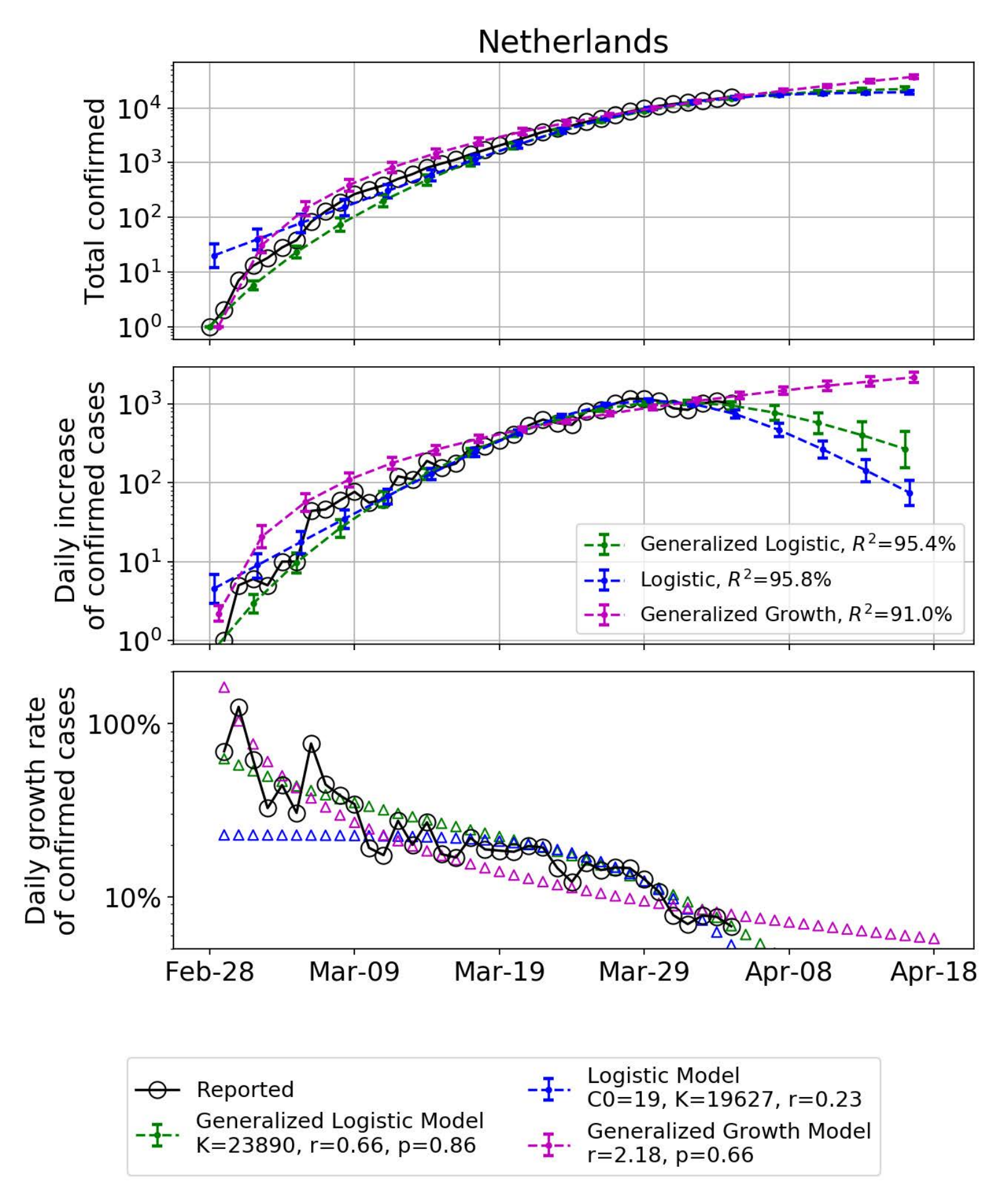

Iran
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=89.1%
Logistic, R^2=79.7%
Generalized Growth, R^2=89.1%
100%
10%
Feb-20
Mar-01
Mar-11
Mar-21
Mar-31
Apr-10
Apr-20
Reported
Generalized Logistic Model
K=74702985795, r=2.78, p=0.65
Logistic Model
C0=49, K=67151, r=0.18
Generalized Growth Model
r=2.78, p=0.65

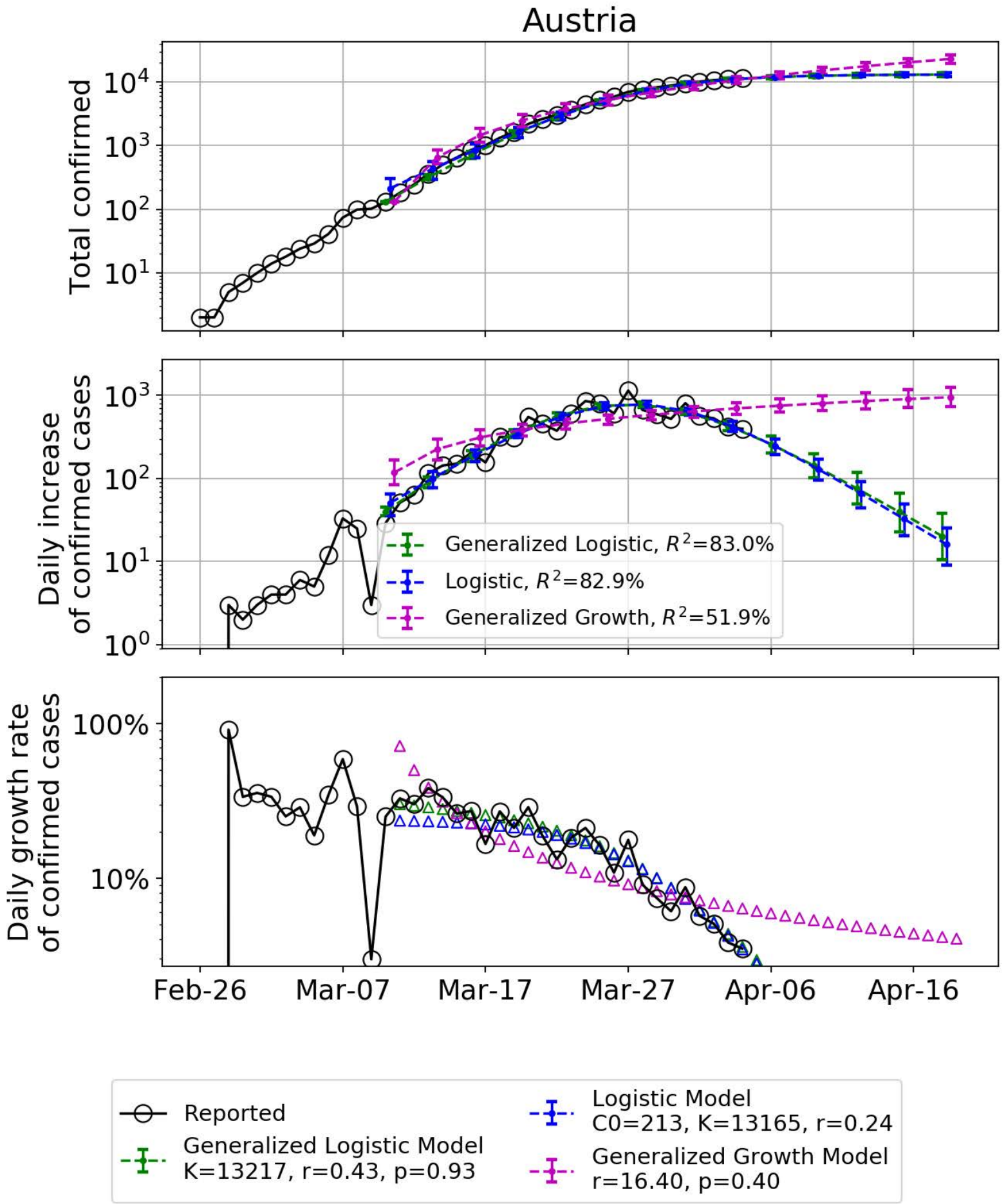

United Kingdom
Total confirmed
10^5
10^4
10^3
10^2
10^1
Daily increase of confirmed cases
Generalized Logistic, R^2=97.3%
Logistic, R^2=97.3%
Generalized Growth, R^2=97.1%
10^4
10^3
10^2
10^1
10^0
Daily growth rate of confirmed cases
100%
10%
Jan-31
Feb-10
Feb-20
Mar-01
Mar-11
Mar-21
Mar-31
Apr-10
Apr-20
Reported
Generalized Logistic Model
K=167228, r=0.42, p=0.91
Logistic Model
C0=86, K=118718, r=0.18
Generalized Growth Model
r=0.60, p=0.85

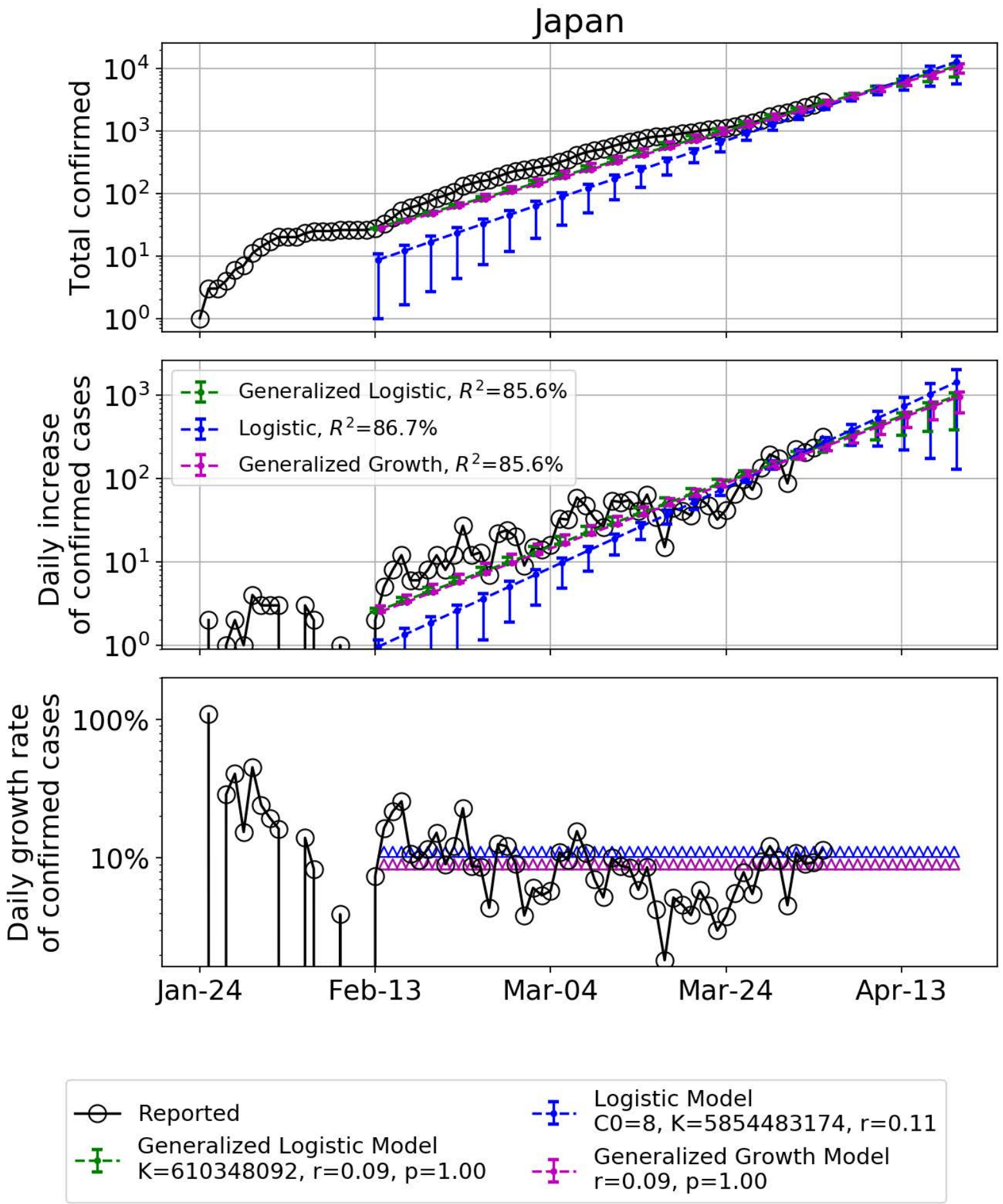

Turkey
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=94.0%
Logistic, R^2=93.3%
Generalized Growth, R^2=91.7%
Mar-12
Mar-17
Mar-22
Mar-27
Apr-01
Apr-06
Apr-11
Apr-16
Apr-21
Reported
Generalized Logistic Model
K=41165, r=1.34, p=0.83
Logistic Model
C0=179, K=34112, r=0.29
Generalized Growth Model
r=3.73, p=0.67


Switzerland
Total confirmed
10^4
10^3
10^2
10^1
10^0
Daily increase of confirmed cases
10^3
10^2
10^1
10^0
Generalized Logistic, R^2=83.9%
Logistic, R^2=81.3%
Generalized Growth, R^2=78.4%
Daily growth rate of confirmed cases
100%
10%
Feb-26
Mar-07
Mar-17
Mar-27
Apr-06
Apr-16
Reported
Generalized Logistic Model
K=32725, r=0.96, p=0.80
Logistic Model
C0=79, K=25276, r=0.19
Generalized Growth Model
r=3.57, p=0.60


Belgium
Total confirmed
10^5
10^3
10^1
Daily increase of confirmed cases
Generalized Logistic, R^2=86.2%
Logistic, R^2=86.3%
Generalized Growth, R^2=81.1%
10^3
10^2
10^1
10^0
Daily growth rate of confirmed cases
100%
10%
Feb-04 Feb-14 Feb-24 Mar-05 Mar-15 Mar-25 Apr-04 Apr-14
Reported
Generalized Logistic Model
K=23427, r=0.32, p=0.97
Logistic Model
C0=41, K=23255, r=0.24
Generalized Growth Model
r=1.75, p=0.70


Netherlands
Total confirmed
10^4
10^3
10^2
10^1
10^0
Daily increase of confirmed cases
10^3
10^2
10^1
10^0
Generalized Logistic, R^2=95.4%
Logistic, R^2=95.8%
Generalized Growth, R^2=91.0%
Daily growth rate of confirmed cases
100%
10%
Feb-28
Mar-09
Mar-19
Mar-29
Apr-08
Apr-18
Reported
Generalized Logistic Model
K=23890, r=0.66, p=0.86
Logistic Model
C0=19, K=19627, r=0.23
Generalized Growth Model
r=2.18, p=0.66


Austria
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=83.0%
Logistic, R^2=82.9%
Generalized Growth, R^2=51.9%
Feb-26
Mar-07
Mar-17
Mar-27
Apr-06
Apr-16
Reported
Generalized Logistic Model
K=13217, r=0.43, p=0.93
Logistic Model
C0=213, K=13165, r=0.24
Generalized Growth Model
r=16.40, p=0.40


Japan
Total confirmed
Daily increase of confirmed cases
Daily growth rate of confirmed cases
Generalized Logistic, R^2=85.6%
Logistic, R^2=86.7%
Generalized Growth, R^2=85.6%
100%
10%
Jan-24
Feb-13
Mar-04
Mar-24
Apr-13
Reported
Generalized Logistic Model
K=610348092, r=0.09, p=1.00
Logistic Model
C0=8, K=5854483174, r=0.11
Generalized Growth Model
r=0.09, p=1.00