Filtering not properly fitted countries using MSSE

01월 04일

서울대학교 박태성 교수님

생물정보통계 연구실

박사과정 구태완 **석사과정** 한결희, 이도은
학부과정 고영현, 김학용, 김태현, 정혜원

MSE vs MAPE

Mean Squared Error (MSE) vs Mean Absolute Percentage Error (MAPE)

- $MSE = \frac{1}{N}\sum_{t=1}^{N}(Y_t - \widehat{Y}_t)^2$ -> Scale을 반영하지 못함.

- $MAPE = \frac{100}{N}\sum_{t=1}^{N}\left|\frac{Y_t - \widehat{Y}_t}{Y_t+1}\right|$ -> Y_t (일일 확진자 수)가 작으면 과대추정.

where $\boldsymbol{Y_t}$ is the number of daily cases , $\widehat{\boldsymbol{Y_t}}$ is the predicted value for Y_t ,
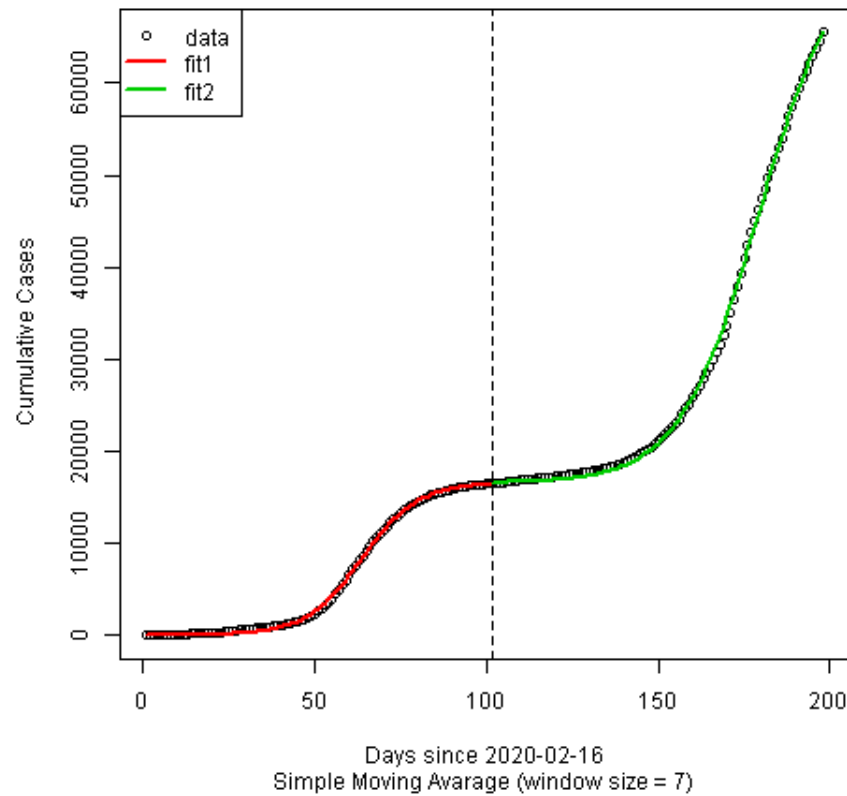
MSSE

Mean Squared Scaled Error (MSSE)

$$- MSSE = \frac{1}{N}\sum_{t=1}^{N}\left(\frac{Y_t - \widehat{Y_t}}{\bar{Y}}\right)^2$$

where $\boldsymbol{Y_t}$ is the number of daily cases , $\widehat{\boldsymbol{Y_t}}$ is the predicted value for Y_t ,
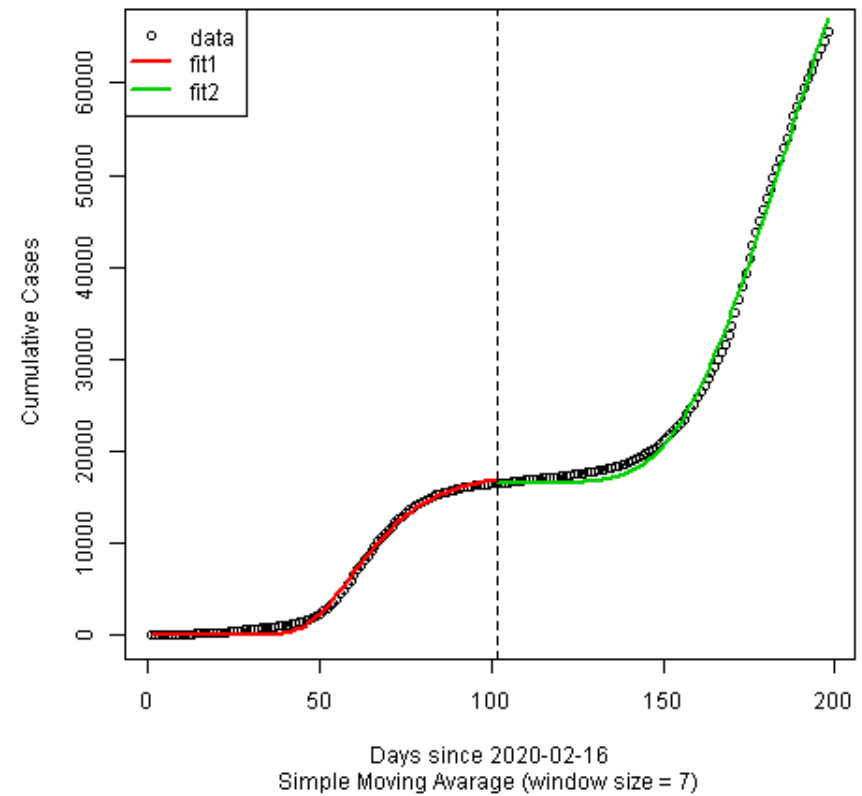
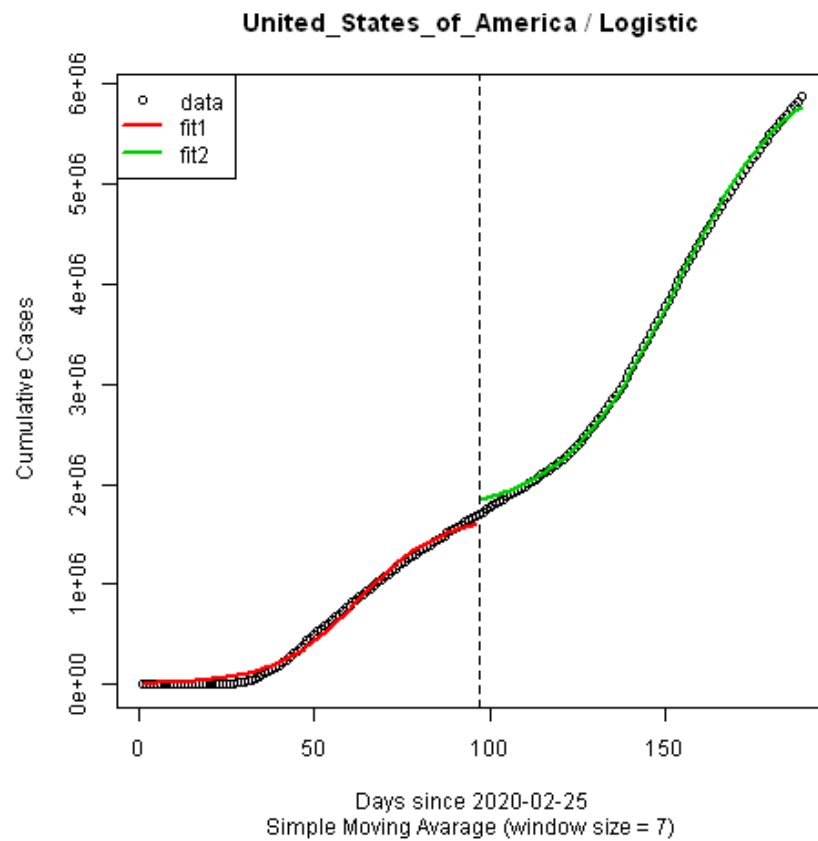$\overline{\boldsymbol{Y}}$ is the mean of $\{Y_t\}$ for $t = 1, \dots, N$

Japan / Logistic

MSSE = 0.0472408101620523

Japan / Gompertz

MSSE = 0.095499693868303

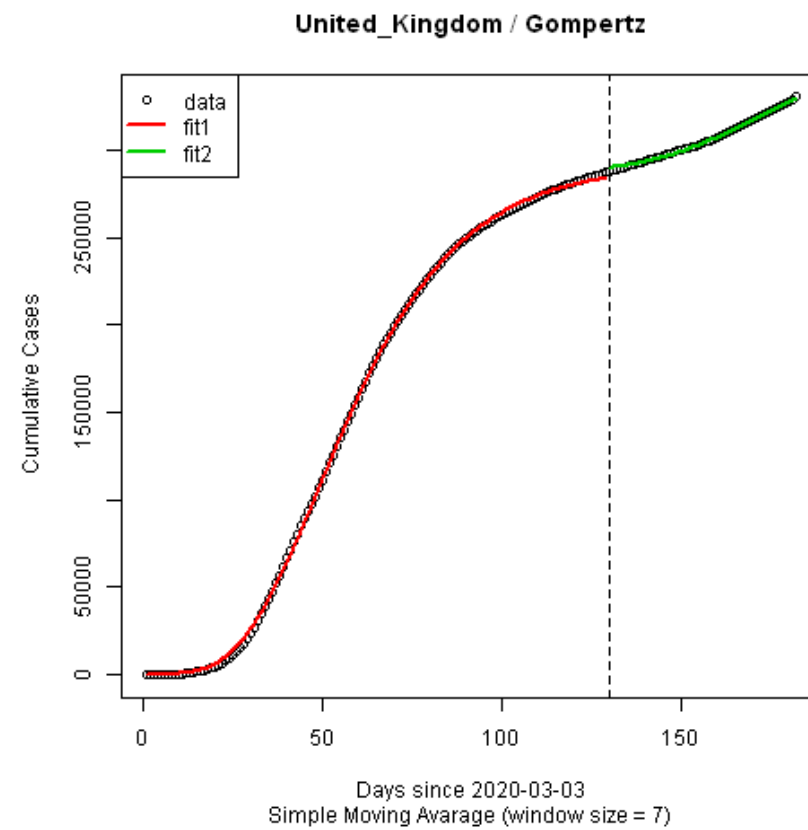United_States_of_America / Logistic

MSSE = 0.0656212441858175

United_States_of_America / Gompertz
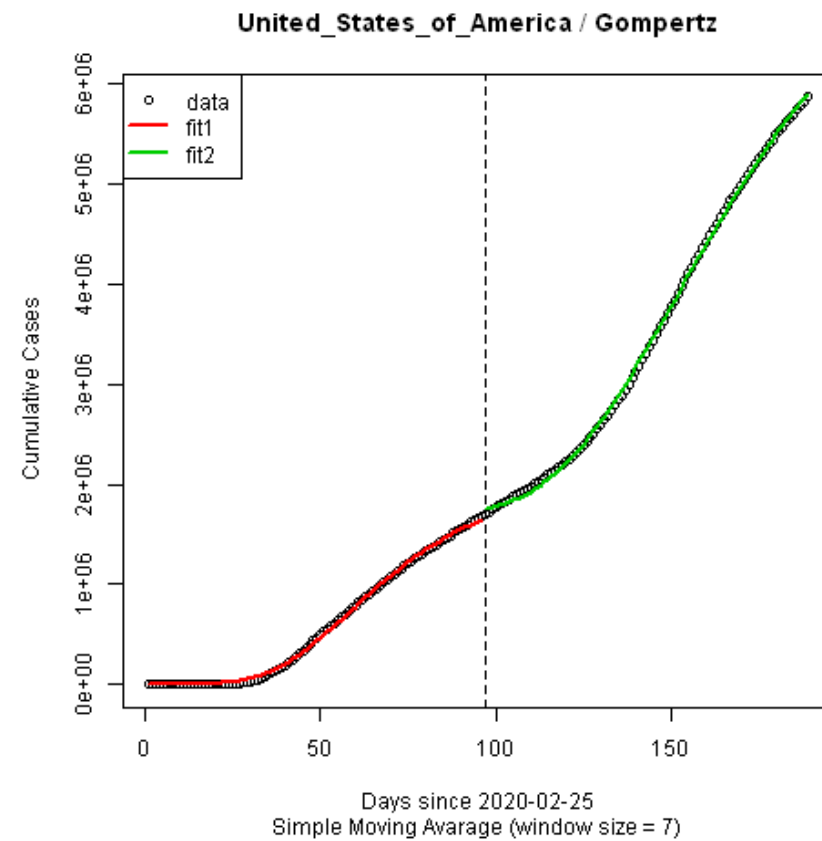
MSSE = 0.0230935353651733

United_Kingdom / Logistic

MSSE = 0.073450844261742

United_Kingdom / Gompertz
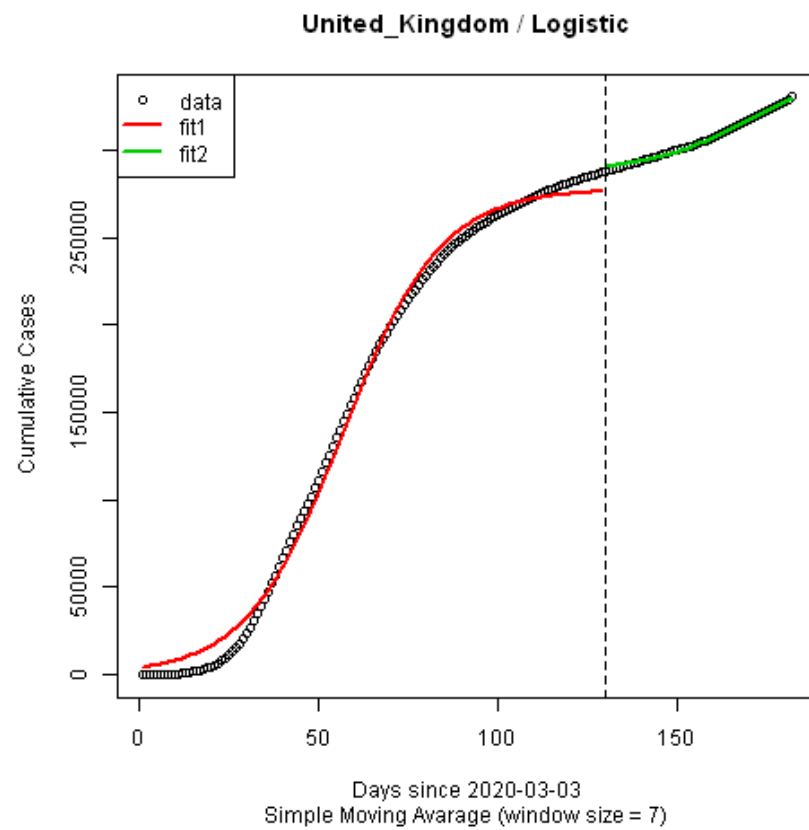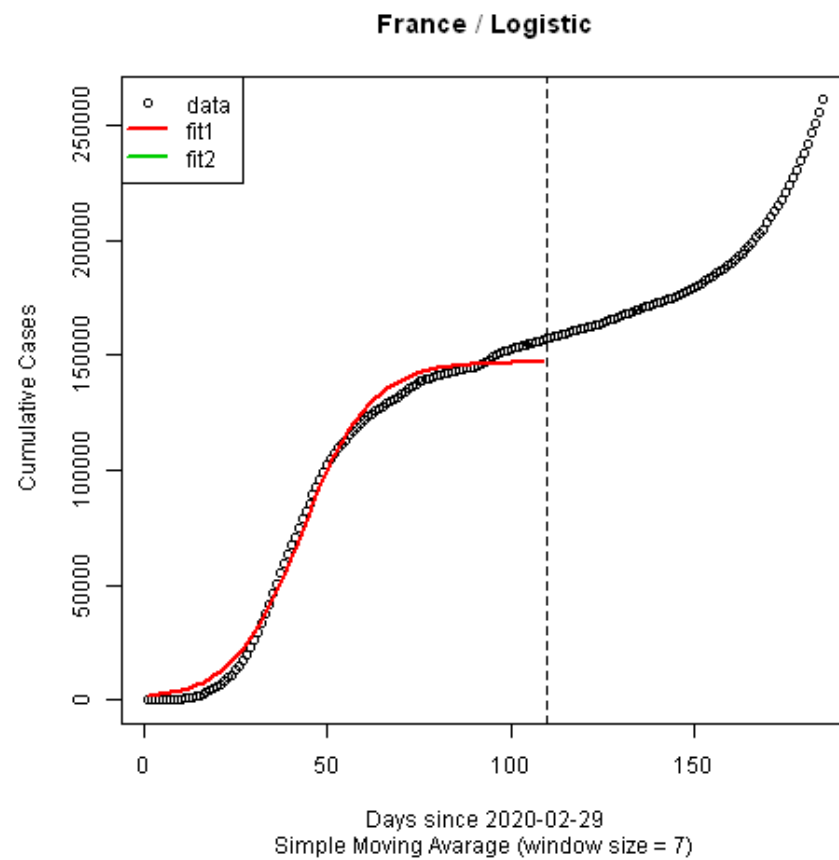
MSSE = 0.0251241604433823
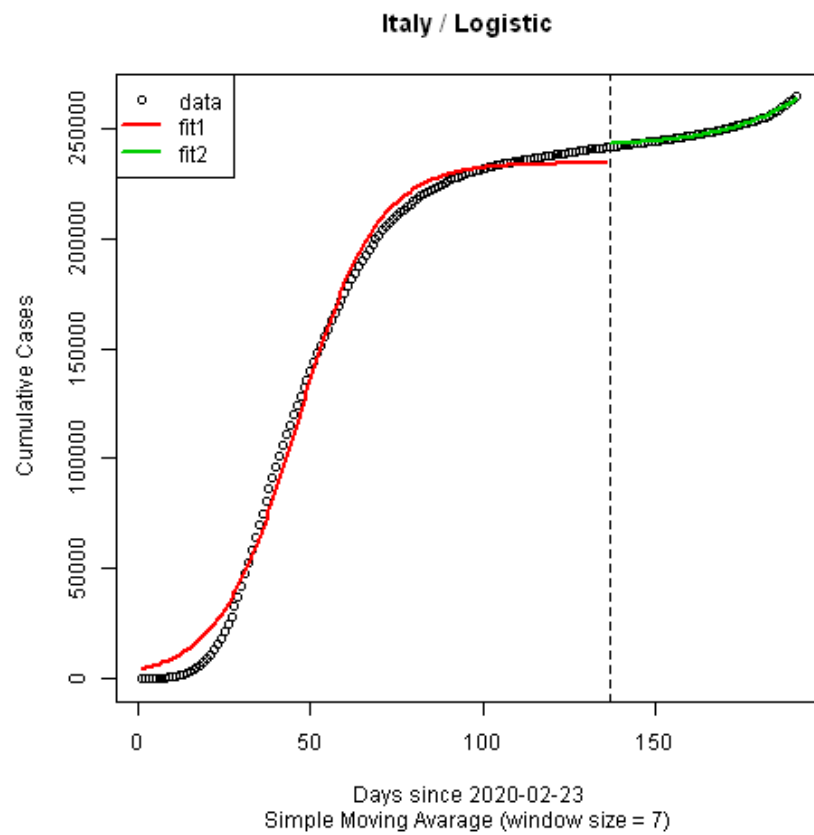
MSSE = 0.1474903497915   MSSE = 0.021911646 1768186
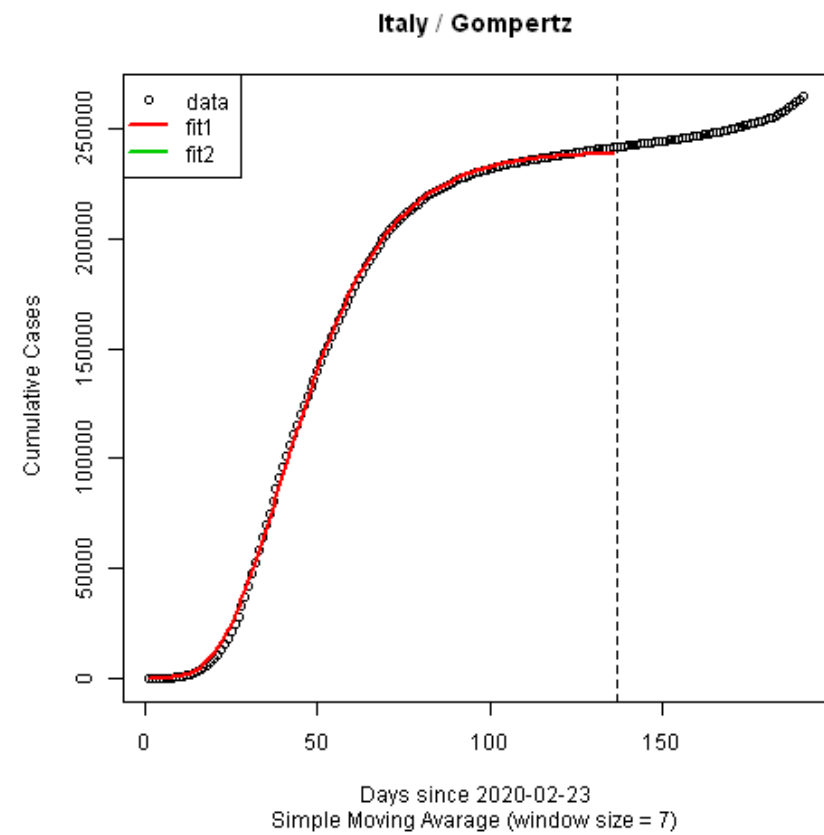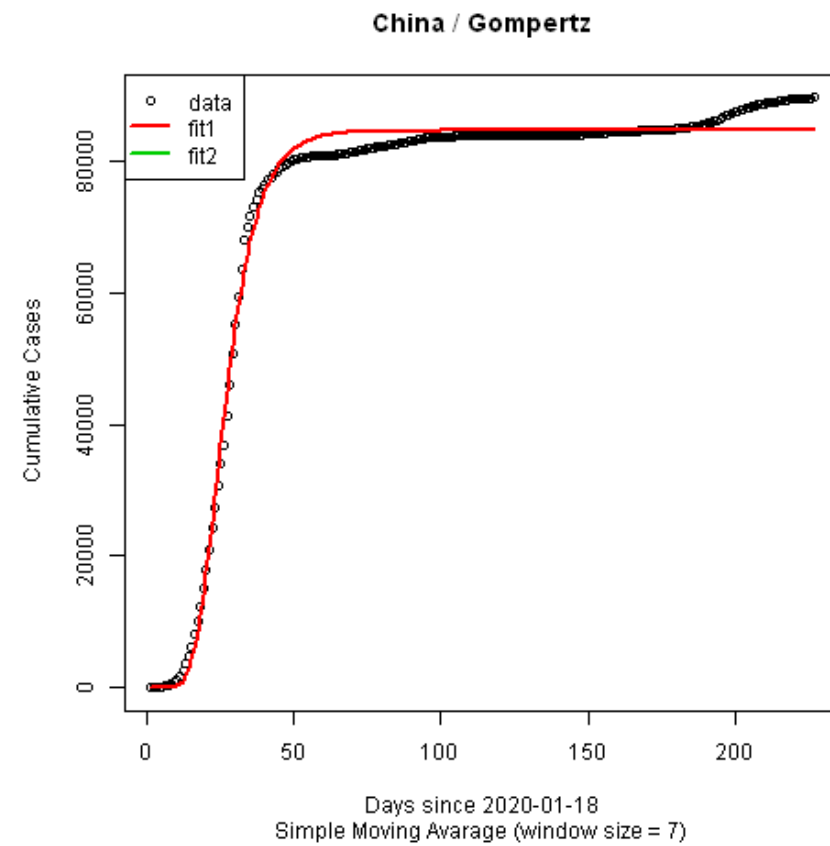
France / Logistic

MSSE = 0.126514391218183

France / Gompertz
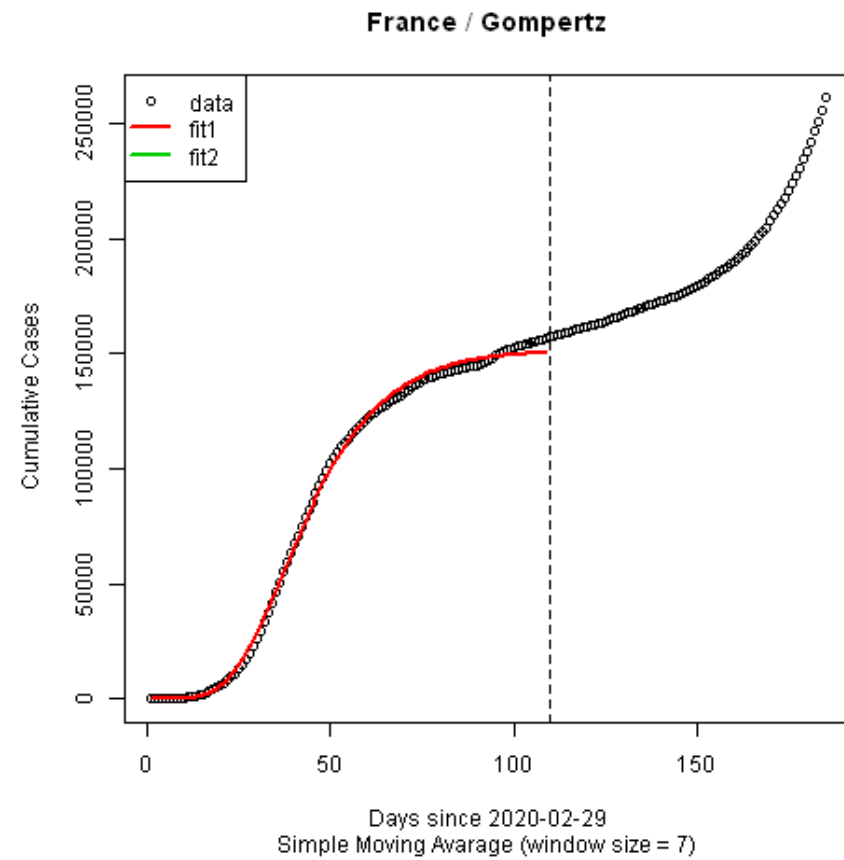
MSSE = 0.0523266231286347

China / Logistic

Cumulative Cases

Days since 2020-01-18
Simple Moving Average (window size = 7)

MSSE = 0.325181978417923

China / Gompertz

Cumulative Cases

Days since 2020-01-18
Simple Moving Average (window size = 7)
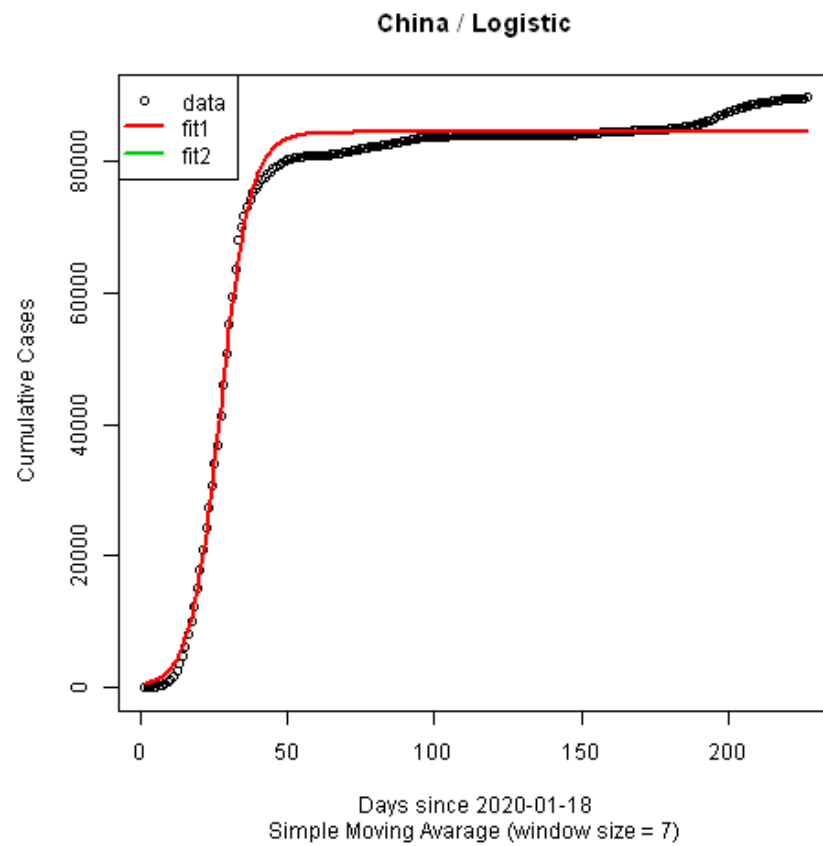
MSSE = 0.582192867942544

South_Korea / Logistic

South_Korea / Gompertz
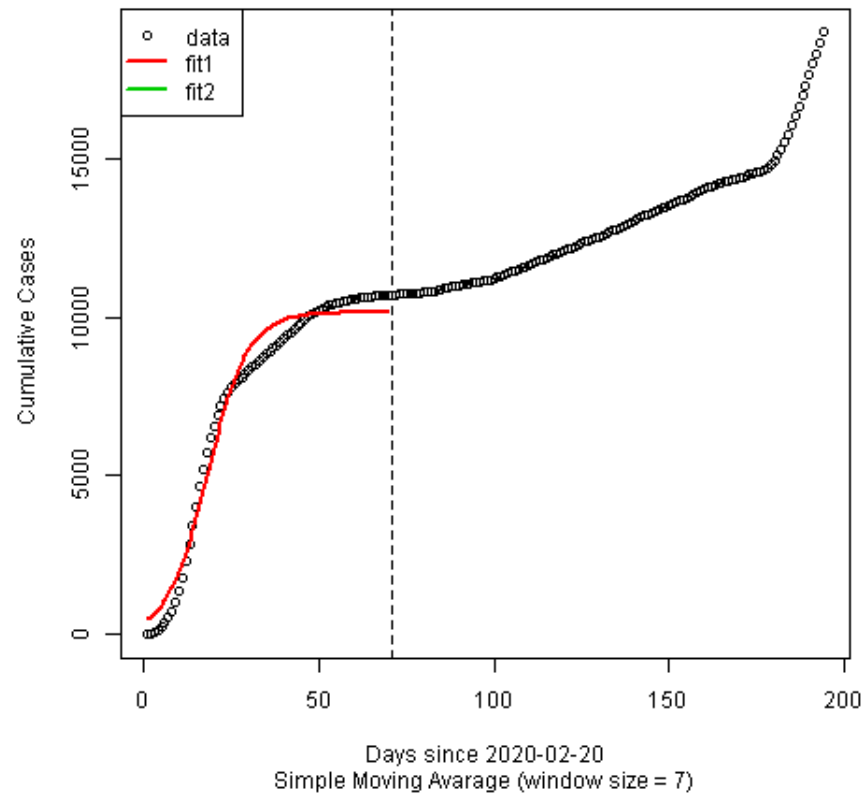
MSSE = 0.332924377554716
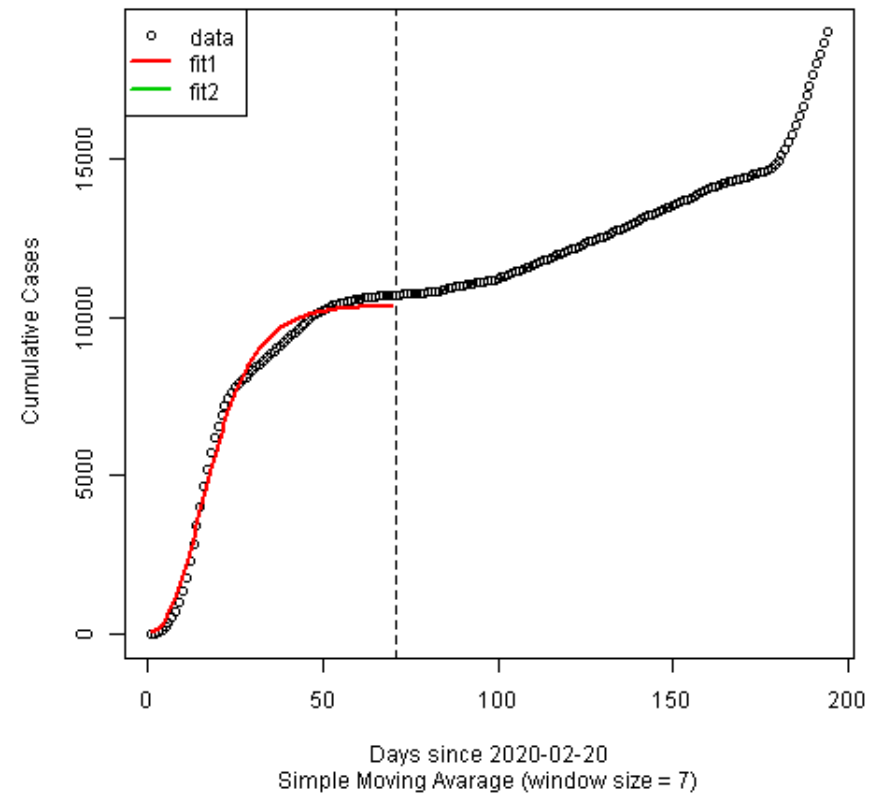
MSSE = 0.188891727825744

Djibouti / Logistic

Cumulative Cases vs. Days since 2020-04-05
Simple Moving Avarage (window size = 7)
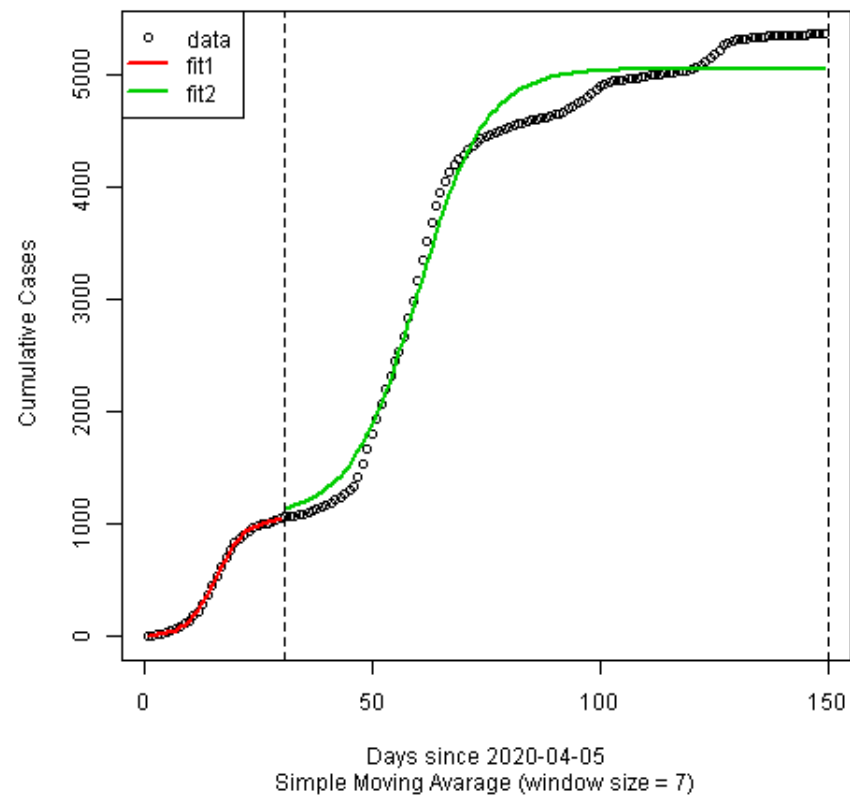
MSSE = 0.262227536686218

Djibouti / Gompertz

Cumulative Cases vs. Days since 2020-04-05
Simple Moving Avarage (window size = 7)
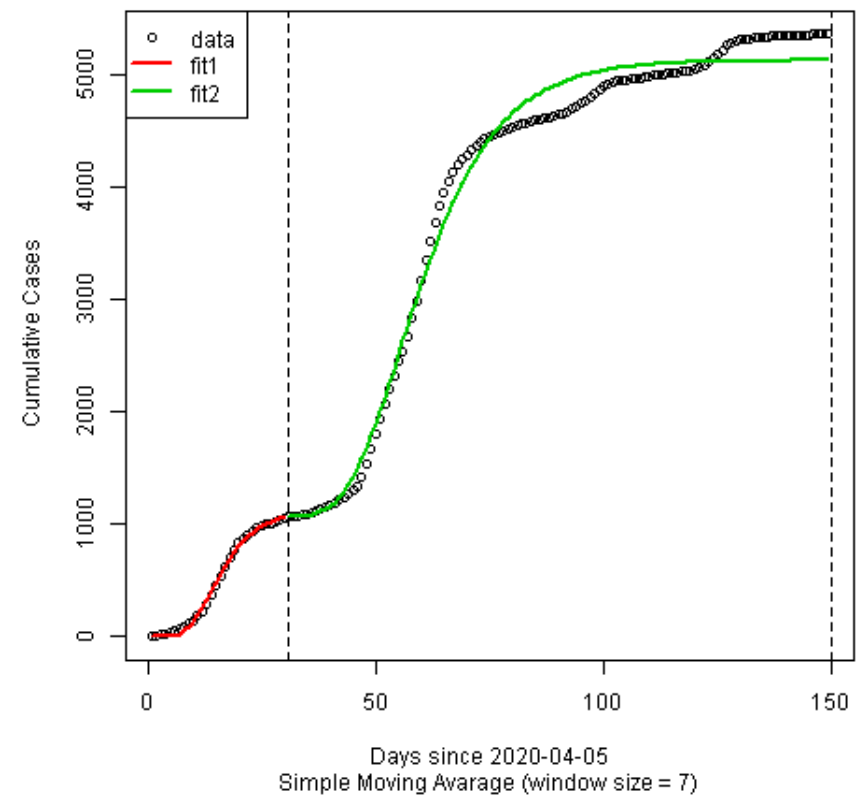
MSSE = 0.297786683326851

Thailand / Logistic
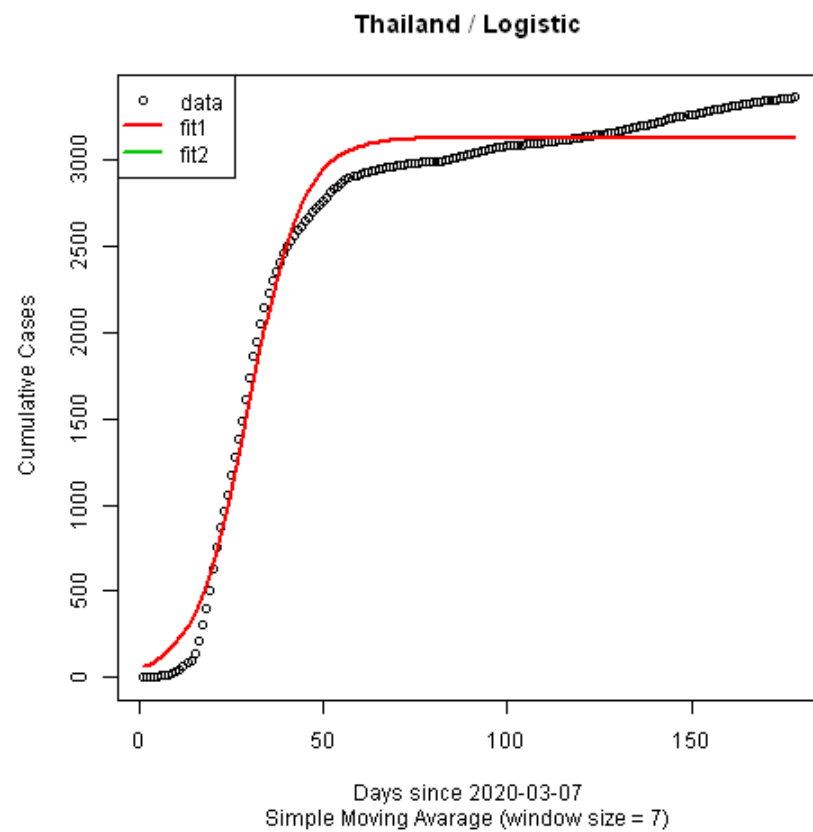
MSSE = 0.409838367855645

Thailand / Gompertz
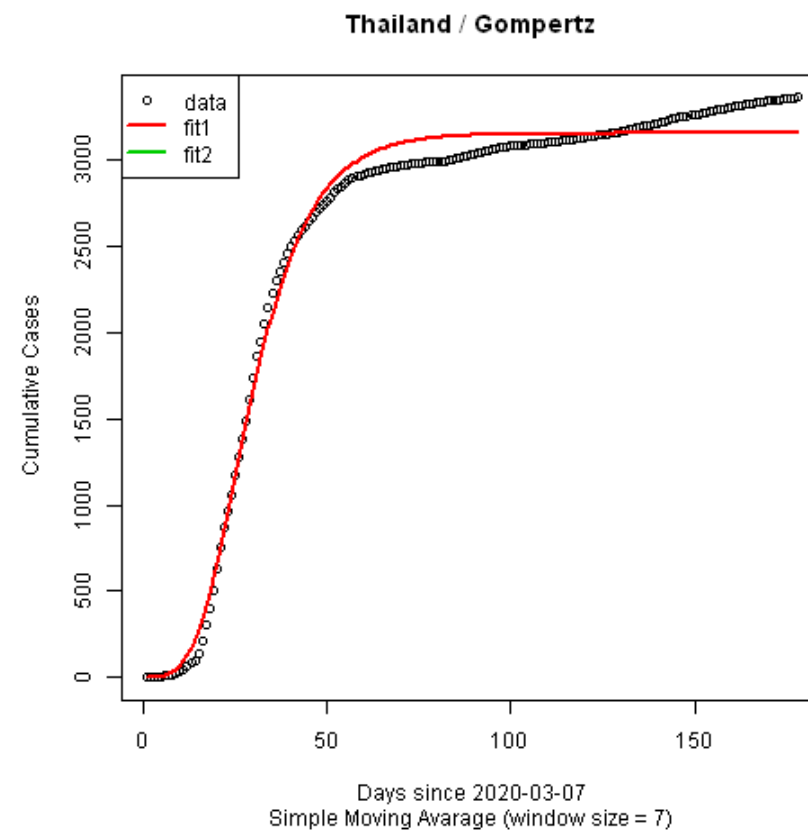
MSSE = 0.220907456275208

Rwanda / Logistic
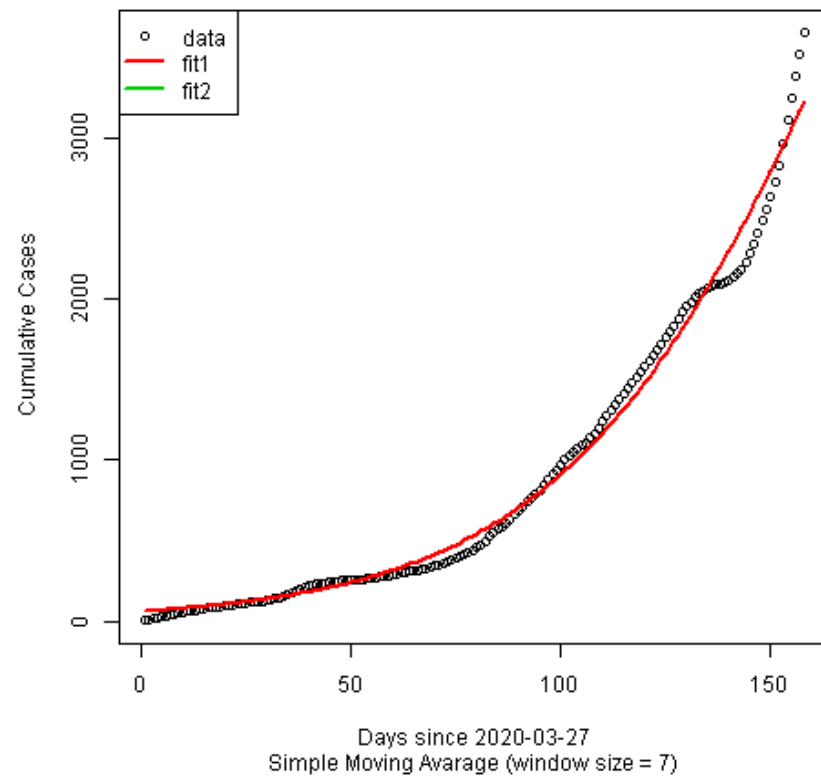
Rwanda / Gompertz

MSSE = 0.707876818681935

MSSE = 0.651178020925684

Equatorial_Guinea / Logistic

Equatorial_Guinea / Gompertz
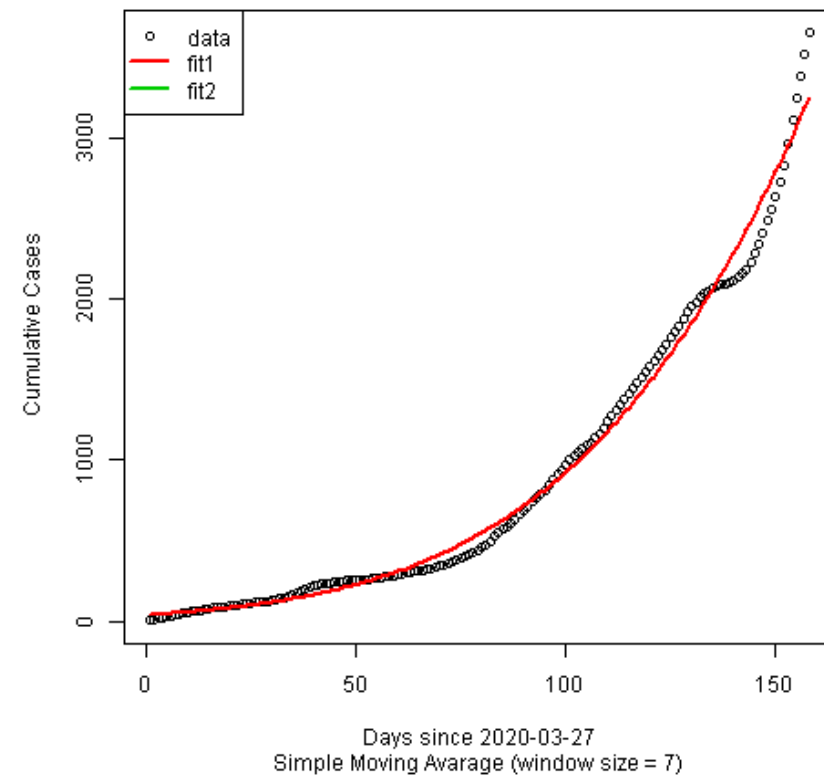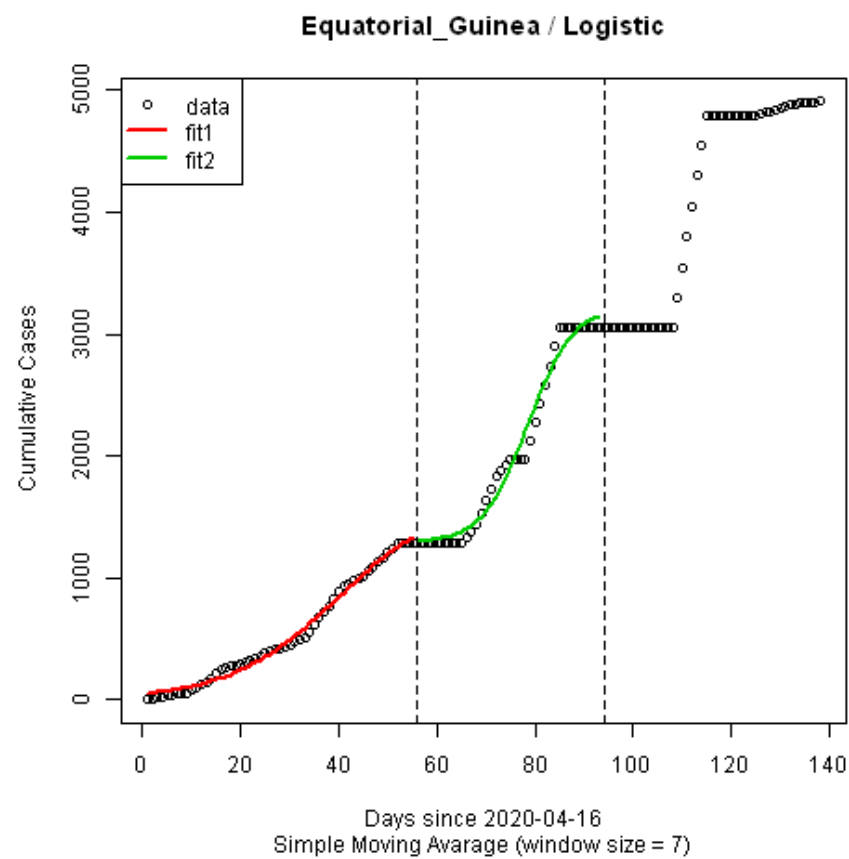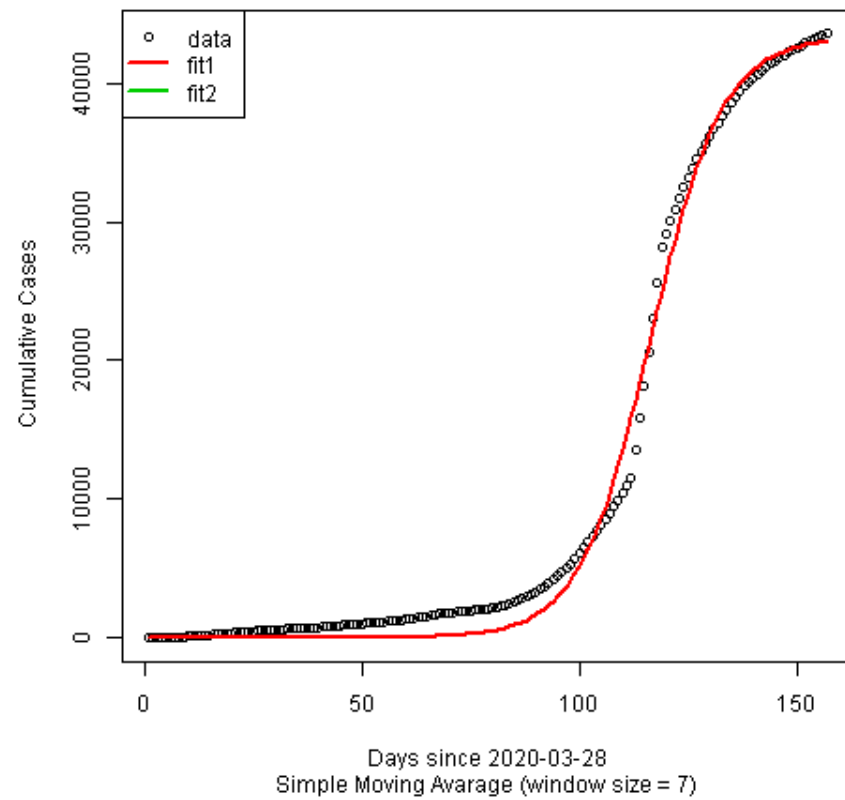
MSSE = 0.63867981951264
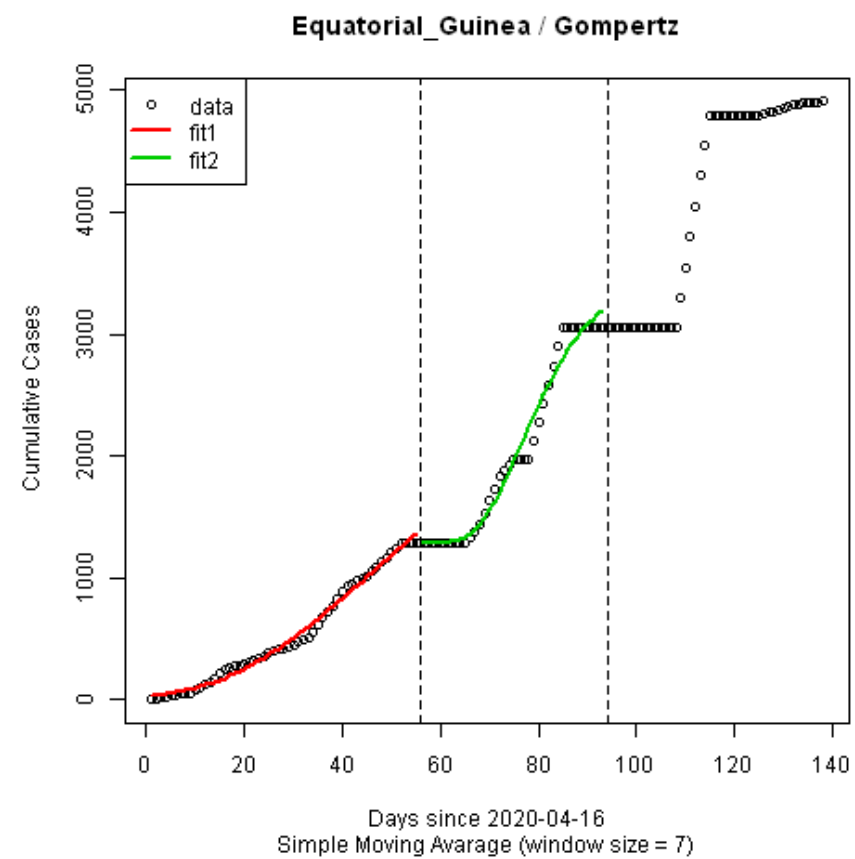
MSSE = 0.688163764513623

Kyrgyzstan / Logistic — Kyrgyzstan / Gompertz

MSSE = 1.02293143702645
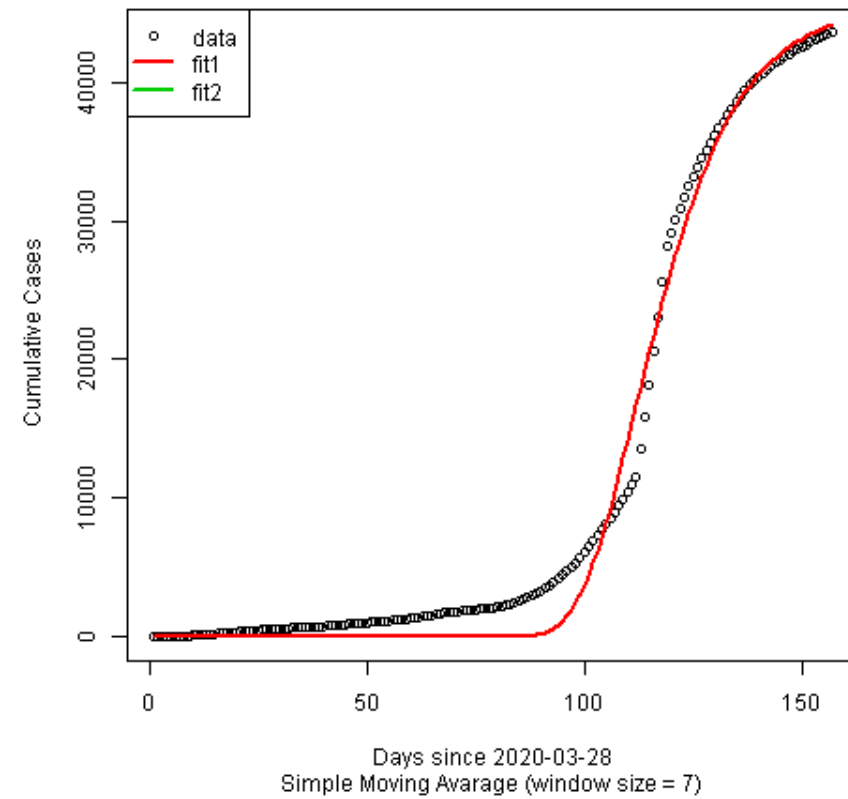
MSSE = 1.27271534445623

Aruba / Logistic
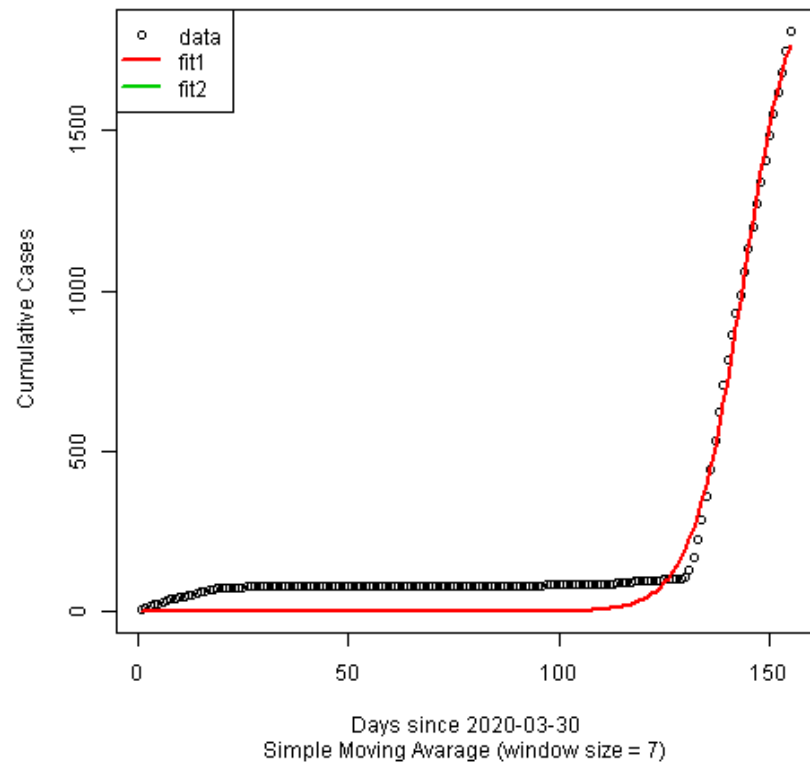
Aruba / Gompertz

MSSE = 0.41355852911879
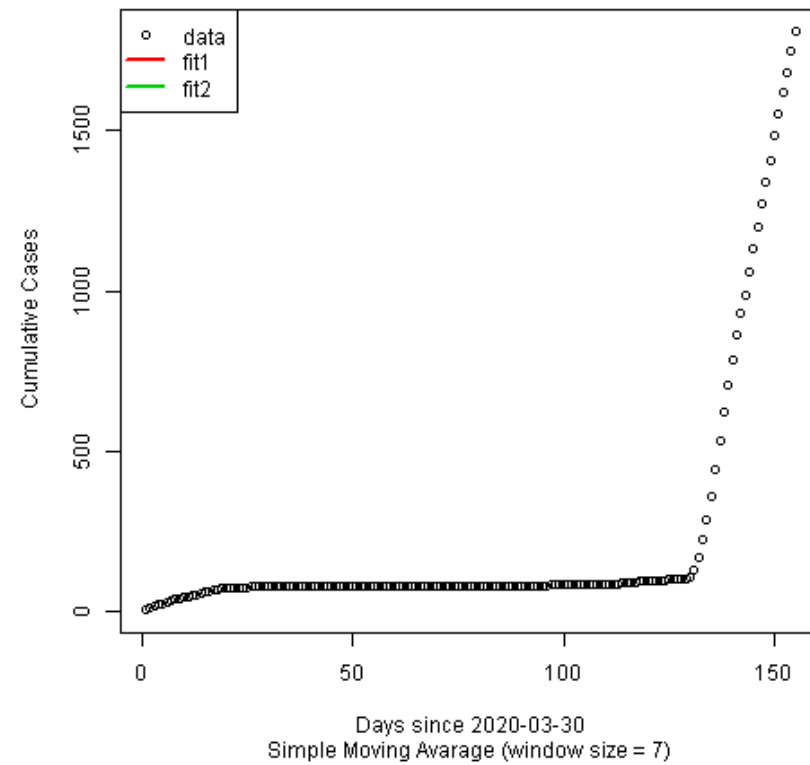
Not fitted

결론

- $MMSE = \frac{1}{N}\sum_{t=1}^{N}(\frac{Y_t - \widehat{Y_t}}{\bar{Y}})^2$ 기준 0.4 이상인 국가들 제외

- Logistic : Aruba / **Equatorial_Guinea** / **Kyrgyzstan** / **Rwanda** / Thailand

- Gompertz : China / **Equatorial_Guinea** / **Kyrgyzstan** / **Rwanda** / Zambia