Prof. Dr. Claus Weihs, Computergestützte Statistik, TU Dortmund, claus.weihs@tu-dortmund.de
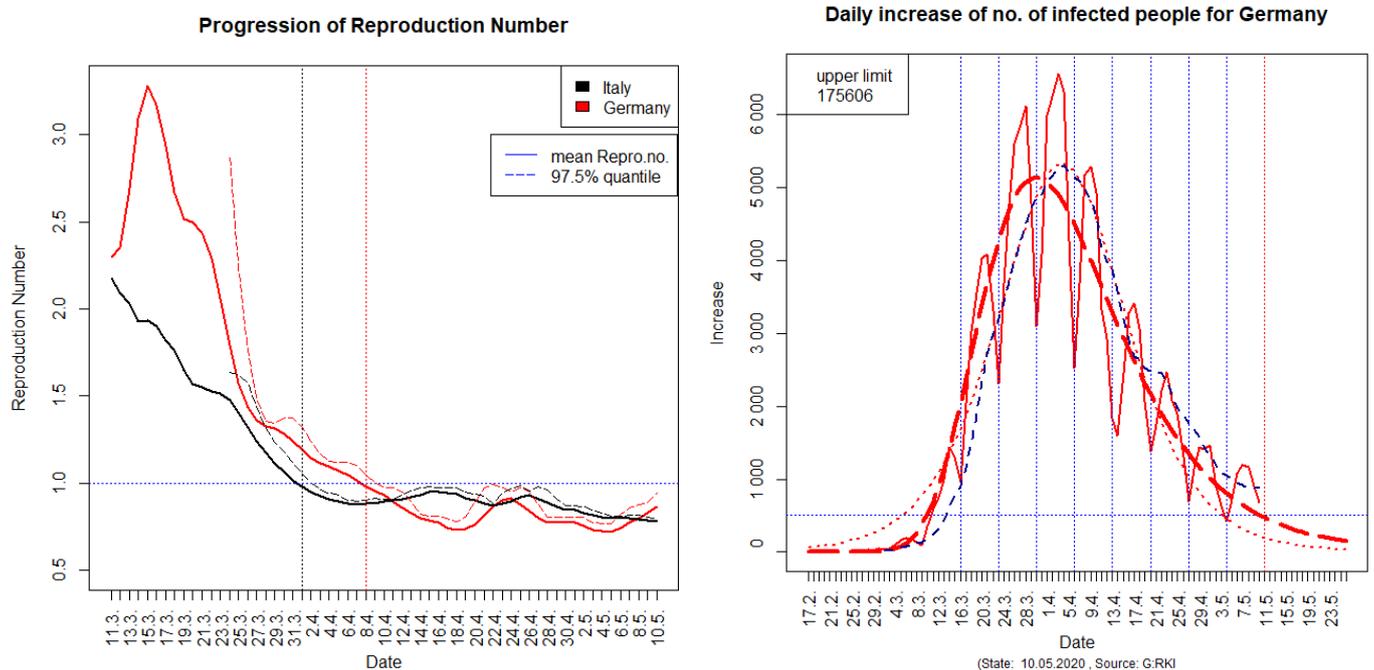
10.05.2020: COVID-19 Pandemic: 50th, final, update!! Germany: Estimations no longer consolidated: Stagnation predicted for 11.5.; upper limit higher than 175 000

The left figure shows the mean reproduction numbers (solid line) and the 97.5% quantile (dotted line) for the COVID-19 pandemic based on new infections reported by the Robert-Koch-Institut (RKI, Berlin) at the 10.5. and by Johns-Hopkins University for Italy. To avoid reporting artefacts, we smoothed observations by **moving averages** of order 7. **NOTE:** In order to deal with temporary values, **we artificially increased the last 3 observations by the 10-days mean of the ratio between the corresponding value after 3 updates and its actual appearance.** Then, we determined the **reproduction number** at time t by the ratio of the moving averages at times t and (t-4), i.e. by relating means of successive blocks of 4 values each. Vertical lines indicate the predicted intersections with 1, the horizontal line is at 1.

The right figure shows the daily real new infections of COVID-19 (solid line) and two kind of predictions (dotted and dashed lines) for **Germany**. Predictions are generated by a **weighted logistic model** (dotted line) and a **weighted Gompertz model** (bold dashed line), respectively. **For the first time, the Gompertz model had to be weighted also for Germany.** Vertical blue dotted lines indicate Mondays, the red vertical dotted line the start of **stagnation** of new infections (< 500) as predicted by the Gompertz model. The horizontal dotted line indicates 500 new infections. The **blue dashed line** indicates the 7-days moving average in order to smooth reporting artefacts.

Reproduction numbers are estimated to be lower than 1 since 1.4. for Italy and since 8.4. for Germany. The 95% uncertainty region is very narrow and steadily below 1 for Italy since the beginning of April.

However, note that the uncertainty region is again rising towards 1 for Germany.

The Gompertz model appears to be much more realistic than the logistic model in all time regions! With the Gompertz model, stagnation (< 500 new infections) we now predict only for the 11.5. for Germany (and for the 24.5. for Italy). **Regarding the curve of the daily increases and the 7-days moving average, it is quite safe that the weekly mean will be lower than 500 distinctly later than 11.5. (tomorrow!) for Germany.** The estimated upper limit of the no. of infected people in the first wave of the pandemic is now higher than **175 000** for Germany (and around 236 000 for Italy).

More indicators for Germany.: Reproduction number = 0.87, weekly mean of no. of infections= 879.

After 50 updates, this is the end of my reporting! Thank you very much for having been interested!