Covid19 has stimulated a huge production of scientific papers, not only medical side, but also about epidemiological parameters and modelling. However, data are often incomplete and precise assessment of accurate parameters for predictive models is still an issue.

In our paper we tackle such a problem from a different point of view, asking methodological questions: how much can model parameters vary while still fitting experimental data? Which are the factors that influence the spreading of the epidemics among the countries? Which are the determinants of epidemics inside a country? Can early quarantine interventions really stop the growth of an epidemic?

To such an aim, study a model general enough to represent the behavior of a wide class of compartimental models. To avoid working in an unrealistic parameter region, we tune our model on Italian data. By considering worst case scenarios exit strategies, we then analyze the response of the model to different lockdowns keeping into account both the role of the mobility and the role of social contacts.

We find that anticipating the quarantine or imposing a too strong lockdown can induce counter-intuitive effects, like the worrisome “hammer and the dance” effect that has been recently proposed.

We find that, while mobility contributes to spreading the epidemics among different administrative entities and is responsible for the delays observed in epidemic starts, it plays a minor role once epidemics have started, suggesting that flows of essential goods do not represent a major risk in an already infected region or country.

We find that demography and the structure of social contacts among age classes is a factor that, if not taken into account, can seriously undermine a model predictions; on the other hand, carefully considering exit strategies tailored on the interactions among the population age groups can strongly reduce the severity and the economic impact of post-lockdown quarantines.

For all this reasons, we believe that our study is of interest for the audience of your journal

Yours sincerely

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