

Covid19 has stimulated a vast production of scientific papers on epidemiological parameters and modelling. Data are often incomplete, and precise assessment of accurate parameters for predictive models is still an issue.

Against that background, our paper focuses on some general methodological questions: To which extent can model parameters vary while still fitting experimental data? Which are the factors that influence the spreading of the epidemics across regions and countries? Which are the determinants of epidemics inside a country? Can early quarantine interventions suppress the growth of an epidemic?

To such an aim, we introduce a general framework, which can represent the behavior of a large class of compartmental models. We tune our model on the Italian data, and we exploit a fine grained massive set of mobility data. We then analyze the response of the model to different lockdown configurations, keeping into account both the role of the mobility and the role of social contacts.

First, we find that, while mobility contributes to spreading the epidemics among different administrative entities and drives delays observed in epidemic starts, it plays a minor role once epidemics have started. This is an important and general finding, which can inspire specific policy actions aimed at gradually reconstructing the mobility network, provided that specific enabling measures are adopted.

Second, we find that the age composition of the population and the structure of social contacts between age classes is a factor that, if not taken into account, can seriously undermine models' predictions. Carefully considering the interactions among different age groups can strongly mitigate the severity and the economic impact of post-lockdown quarantines.

For its generality, and for the relevance of our main findings within the policy realm, we believe that our study is of interest for the audience of your journal

Yours sincerely

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