Conclusion (Homework 6)

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In summary, we studied the relationship between social mobility and number of deaths due to Covid-19 as a stochastic process. We use a semiparametric model called the marginal structural model (MSM) to do the estimation, and use a moment-based approach to solve for the model parameters. Our results imply that a decreased social mobility would lead to a less number of deaths due to Covid-19. The sensitivity analysis implies that our apporach is robust to unmeasured confounding, a less strict Markov assumption, and different model selections.

There are several aspects we fail to consider or need improvement:

1. Our model assumption is only reasonable in a short term but not in a long term. Even with a same social mobility, its effect in spreading the virus would change in time. For example, in a long term, there may be a considerable more proportion of population wearing masks or receiving vaccines, which can lead to a less number of deaths even with a same social mobility.

2. We limit our estimation within the (50) states, but not across different states, since the quality of data can be vastly different between different states. This causes a paucity of data and requires us to make a homogeneous Markov assumption, which cannot be checked (with sensitivity analysis) without invoking more assumptions. Add counfounding related to state differences in our model might be possible and help to generalize our results.