Misinformation and Social Distancing: Evidence from 762 Million Tweets

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1 Introduction

The early stages of the COVID-19 pandemic saw a rapid and significant shift in economic incentives for those in countries where the virus had spread. The quality of information on the pandemic was key to determining the early response to the various non-pharmaceutical interventions (NPIs) put in place; I study the role of varying levels of information quality circulated on social media. Over the last decade, consumption of news has shifted from traditional sources of media to the online sphere, and, accordingly, the market for news has become more fragmented. A degree of polarisation on both ends of the political spectrum has occurred, and with it a certain level of online misinformation. The typical consumption pattern for misinformation is through social media, particularly Twitter and Facebook (in the English-speaking world). Using inferred and explicit geolocation data, I study the extent to which greater misinformation spread influences compliance with NPIs via the SafeGraph metric of social distancing.

In this dissertation, I study multiple aspects of this policy problem. First, I consider the impact of weather on the effectiveness of intermediate measures. Weather affects transmission directly by affecting the half-life on surfaces and airborne transmission, but also indirectly, as a proxy for socialising outdoors and other similar activities. This works on a day-to-day channel and as a historical characteristic. Historical temperatures point to norms of summer activities: areas with very hot summers may socialise more indoors than temperate areas. Conversely, daily temperature and humidity impact indoors vs. outdoors mobility and physical transmission itself. The interaction of good weather with intermediate NPI measures presents a tradeoff, particularly to younger age groups.

Using a difference-in-differences framework, I test to see if the variation in social distancing is explained by daily weather conditions. I also test to see if historical weather conditions, alongside commuting norms and neighbourhood norms, explain variation in mobility patterns. Off the back of these results, I include a weather metric in an epidemiological model.

Second, I examine the role of regional factors on NPI effectiveness. Using spatial techniques, I study the impact of population density, housing mode, and job position on effectiveness of NPIs. I aim at a first step to replicate the results of Almagro et al., 2020[1]. The authors establish an initial effect from commuting to essential work, and after a lockdown, an effect from crowding in housing. I aim to build on this analysis by controlling for commuting (with SafeGraph data) and examining a causal effect of housing modality. ***Next Step:*** **Think about and set out a research design for this experiment. I'm thinking something along the lines of studying people that move house?**

Third, I use the Imperial College COVID-19 model to estimate latent infection levels, and to simulate counterfactual deaths. I trace the economic cost against the benefit of counterfactual lives saved and infections avoided, and test the robustness of my results against alternative value of statistical life (VSL) specifications. I address Pindyck (2020)'s criticism of using VSLs to measure health policy costs.

[1] "COVID disparities stem from patterns of commuting and housing crowding"

2 Data

3 Methods

I use a hierarchical Bayesian epidemiological model to estimate latent infections. Broadly, the economics literature has preferred to use variants of the Susceptible-Infected-Recovered (SIR) model to estimate epidemiological parameters with Maximum Likelihood, rather than take a 'structural equations' Bayesian approach. A common criticism of the Bayesian approach is that it fails to take behavioural concerns into account. In the context of a benefit-cost analysis, I now show that it is possible to apply behavioural tradeoffs to the model while retaining the benefits of the hierarchical model – namely the .

4 Results

`581 words in main body, excluding headers and bibliography.`

References

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Pindyck, R. (2020, May). *COVID-19 and the Welfare Effects of Reducing Contagion* (w27121). National Bureau of Economic Research. Cambridge, MA. Retrieved October 22, 2020, from http://www.nber.org/papers/w27121.pdf. (Cit. on p. 1)