The Cost of Privacy: Welfare Effects of the Disclosure of COVID-19 Cases

David Argente[*] Pennsylvania State University

Chang-Tai Hsieh[†] University of Chicago

Munseob Lee[‡] University of California San Diego

South Korea publicly disclosed detailed location information of individuals that tested positive for COVID-19. We quantify the effect of public disclosure on the transmission of the virus and economic losses in Seoul. We combine detailed foot-traffic data in Seoul with publicly disclosed information on the location of individuals who had tested positive. The data indicate that density of foot-traffic data declines in neighborhoods with a larger number of infected patients.

We then filter this data through the lenses of SIR model augmented in two ways. First, we include several sub-populations where the epidemic transmits across neighborhoods due to the flow of people across them. Second, we assume that the flow of people across neighborhoods is the outcome of individuals maximizing their utility by choosing a neighborhood to work and to enjoy their leisure time. The flow of people across neighborhoods generates economic gains from the optimal match of people with the place of work and leisure, but it is precisely this flow that transmits the virus across neighborhoods. We simulate the effect of the change in commuting patterns in response to the disclosure of public information on two key outcomes. First, we simulate how the change in commuting patterns lowers the transmission of the virus across neighborhoods. Second, we measure the economic losses from the fact that some individuals have changed their place of work or leisure. We estimate that over the next two years, South Korea's current strategy will lead to 17 thousand deaths, and economic losses that average 1.2% of GDP.

We then consider three scenarios. The first is no disclosure of information, which we model as a scenario in which there is no change in commuting patterns. We estimate that, compared to the case of complete disclosure, non-disclosure results in 13 thousand additional deaths in Seoul. The economic losses, on the other hand, are lower compared to full disclosure. A second scenario is a lockdown, which we model as a uniform reduction in the movement of the population across districts and in which a certain fraction of the population is forced to stay at home. We calibrate the length and intensity of the lockdown so that it results in the total number of cases under the full disclosure of information case. The lockdown would have to last for 100 days and at least 40% of the population would have to stay at home in order to have the same number of confirmed cases as in the full disclosure case. The welfare losses are almost twice as large as the full disclosure case because the "optimal" commuting patterns are severely disrupted for a large number of people. The last scenario is a partial shutdown, a policy that stops people from commuting to the first four districts that had a confirmed case in Seoul and that prohibits the residents of those districts to commute outside them. We show that shutdowns are very costly policies in terms of welfare and not very effective at delaying the spread of the disease.

[*]Email: dargente@psu.edu. Address: 403 Kern Building, University Park, PA 16801.
[†]Email: chsieh@chicagobooth.edu. Address: 5807 South Woodlawn Ave., Chicago, IL 60637.
[‡]Email: munseoblee@ucsd.edu. Address: 9500 Gilman Drive #0519, La Jolla, CA 92093-0519.