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Lockdowns and innovation: evidence from the 1918 influenza pandemic

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To measure local invention, Berkes et al. use monthly patenting rates as a proxy. These data are retrieved from the Comprehensive Universe of U.S. Patents (CUSP), which describes "the city of each inventor, filing and award dates, technology class, and ownership status for the near-universe of U.S. patents since 1836." The authors' data for NPI length comes from an updated version of a database constructed by Markel et al. ("Nonpharmaceutical interventions implemented by US cities during the 1918–1919 influenza pandemic," *JAMA Network*, 2007). From these sources, Berkes et al. build a sample of 50 large U.S cities, which accounted for 21 percent of the population and 39 percent of all patent filings in 1910, and estimate the effect of NPIs, during the 1918 pandemic, on the local patenting rates of these cities.

To estimate the effect of NPIs on patenting rates, the authors use a difference-in-differences (DD) framework. This framework contains a control group and treatment group. The control group, or "short-NPI cities," includes cities with a cumulative length of NPIs of less than 90 days, and the treatment group, or "long-NPI cities," comprises cities with the cumulative length of NPIs of more than 90 days. In their sample, the share of cities classified in the treatment group is 0.36. A key assumption of the DD framework is that the control group and the treatment group are homogenous, and their key difference is the application of the "treatment." The authors find that their model satisfies the homogenous assumption and cite evidence that both groups (control and treatment) had similar trends in monthly patenting rates before the 1918 pandemic and had sharp rebounds in patenting rates following the pandemic.

In their standard DD model, the authors find that cities in the treatment group, those with longer NPIs, had higher patenting rates then cities in the control group. The authors also find that the effect of longer NPIs was substantially stronger for patents with multiple inventors—they report a higher patenting rate for multiple inventor patents overall in the treatment group, compared with single inventor patents.

Berkes et al. paper contributes greatly to COVID-19 research. Their research examines the long-run economic effects of a similar pandemic from our history and serves as a resource for future research on the long-run economic effects of the current pandemic. The authors, however, warn against directly comparing the two pandemics. They point out that modern communications technologies may substitute for social interaction during the current pandemic. In addition, the NPIs of 1918 were shorter and less extensive than the social-distancing restrictions of today. The authors conclude by stating their research shows that policies restricting social interactions affect invention rates through a variety of channels. Thus, the net effect of these policies will be determined by the behavioral, economic, and public policy forces that shape the relative strength of those channels.