Aggregate and Firm-Level Stock Returns During Pandemics, in *Real Time*

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Goal

- To investigate precisely how investors might incorporate the expected impact of pandemics into aggregate & firm-level stock returns, in *real time*.
- We examine whether *unanticipated* changes in predicted infections based on daily re-estimation of simple epidemiological models of infectious disease forecast next-day stock returns (COVID-19, SARS).
- Provide a rationale for the seemingly divergent narratives about the state of the economy $\rightarrow$ equity & labor market performance.

Motivation

- Standard asset pricing models perform poorly during times of great volatility.
  - Why? Investor ability to accurately forecast cash flows and discount rates compromised during times of heightened uncertainty.
  - COVID-19 shock: large magnitude, systemic, low probability & difficult to price risk $\rightarrow$ unknowable nature.

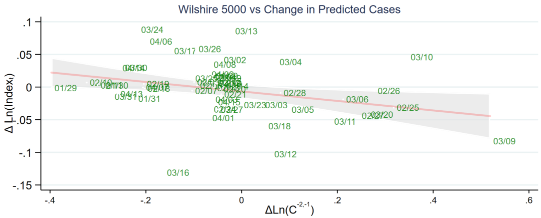
- The most salient information for pricing assets during pandemics may lie within the trajectory of disease progression.
  - Zero in on information (health shock process) where the signal to noise ratio is potentially high.

Method: Simple Epi Models & Market Returns

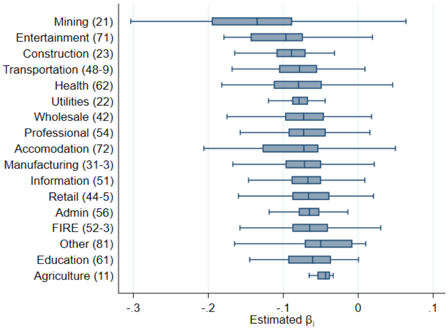
- Our identification strategy differs from existing approaches in that we exploit exogenous changes in investors' information about the trajectory of the pandemic.

- Steps:
  - Model cumulative infections as (i) exponential or (ii) logistic curve.
  - Re-estimate the parameters each day using information on reported cases up to that day.
  - Use these parameters to compute the predicted number of cases for trading day t.
  - *Unanticipated* daily news about pandemic progression: Predicted Cases$_{t-1}$ vs. Predicted Cases$_{t-2}$
  - Examine how market returns on day $t \rightarrow$ aggregate & firm levels covary with "news" about disease progression

Overview of Findings



- Doubling of predicted COVID-19 infections → declines of 4% to 10 % (Wilshire 5000).
- SARS similar pattern → declines of 8 % to 11% (Hang Seng)

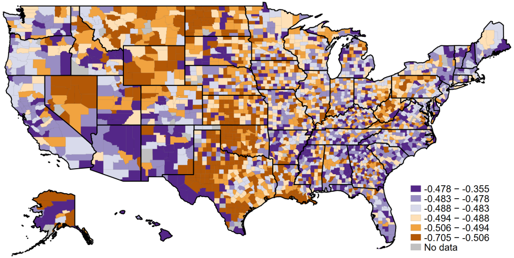


- Changes in market value negative, on average, and vary widely within & across sectors.

Linking Equity Markets to Labor Markets

- Estimate firms' losses in market value from COVID exposure. Aggregate firms' losses to industry level. Create a Bartik Shock to relate industry exposure to the spatial incidence of job loss.

$$\overbrace{\Delta Ln(\widehat{MV_c})}^{\text{Spatial Exposure}} \equiv \underbrace{\sum_{n \in N}}_{\text{Industries}} \overbrace{\frac{Emp_{n,c}}{Emp_c}}^{\text{Employment Share}} * \underbrace{\Delta Ln(\widehat{MV_n})}_{\text{Industry Loss}}$$



Map of US Exposure, $\Delta Ln(\widehat{MV_c})$