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

Laura Alfaro  
*Harvard Business School & NBER*

Anusha Chari  
*UNC Chapel Hill & NBER*

Andrew Greenland  
*Elon University*

Peter K. Schott  
*Yale SOM & NBER*

*July 2020*
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 → 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.

\[
\Delta \ln(\hat{MV}_c) \equiv \sum_{n \in N} \frac{\text{Emp}_{n,c}}{\text{Emp}_c} \cdot \Delta \ln(\hat{MV}_n)
\]

Spatial Exposure

Employment Share

Industry Loss

Map of US Exposure, \(\Delta \ln(\hat{MV}_c)\)