Economic Impact of the Most Drastic Lockdown During COVID-19 Pandemic Policy

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Methods
The contemporaneous covariance between $y_{it}$ and $y_{it}$ is given by:

$$\text{cov}(y_{it}, y_{it}) = \frac{1}{N} \sum_{i=1}^{N} \sum_{t=1}^{T} (y_{it} - \bar{y}_t)(y_{it} - \bar{y}_t)$$

where $n_i = \{y_{1i}, y_{2i}, \ldots, y_{Ti}\}$, $\bar{y}_t$ is the mean of $y_{it}$ for time $t$. Hsiao et al. (2012) show that minimizing

$$\frac{1}{2} \sum_{t=1}^{T} (\bar{y}_t - \mu)^2 - \frac{1}{2} \sum_{t=1}^{T} (\bar{y}_t - \mu)^2$$

yields consistent estimates of $\sigma^2$ and $\rho$. Use $\rho$ for the correlation coefficient. Define the predictor for counterfactual $\hat{y}_{it}$ without the COVID-19 outbreak and the lockdown policy effect $\Delta_{it}$ as:

$$\hat{y}_{it} = \beta_0 + \beta_1 y_{it} + \beta_2 t + \epsilon_{it}$$

Prediction for the drastic COVID-19 lockdown policy treatment effect:

$$\Delta_{it} = \hat{y}_{it} - \hat{y}_{it}$$

Results
Treatment effects on GDP, total retail, industry value-added growth rate, fixed capital investment, real estate investment, export, import, road passenger ridership, and road freight transport volume.

Discussion
- Pandemics have had strong adverse effects on economic prosperity.
- Facing the raging COVID-19 epidemic, the Chinese government rolled out perhaps the most aggressive disease containment effort (WHO, 2020).
- The lockdown treatment

Severality of the COVID-19 in the epicenter & non-epicenter regions in China

Anti-epidemic measures for epicenter

Methods
Model of untreated outcome $\hat{y}_{it}$ for $i = 1, \ldots, N$, $t = 1, \ldots, T$

$$\hat{y}_{it} = \hat{\alpha}_i + \hat{\beta}_t + \hat{\epsilon}_{it}$$

$\hat{\alpha}_i$ = province-specific effects

$\hat{\beta}_t$ = $K \times 1$ (unobserved) common factors that vary over time

$\hat{\epsilon}_{it}$ = vector of constant loadings that may vary across $i$

$K$ = number of common factors

$\hat{\epsilon}_{it}$ = ith unit idiosyncratic error with $E(\hat{\epsilon}_{it}) = 0$, $E(\hat{\epsilon}_{it} \hat{\epsilon}_{it}) = 0$ for $i \neq j$

Literature Cited


Summary of the loss/completion relative to counterfactual Hubei—Using AICC

Summary of the loss/completion relative to counterfactual Hubei—Using LASSO

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