Visualization, Identification, and Estimation in the Linear Panel Event-Study Design

Simon Freyaldenhoven[1] Christian Hansen[2]
Jorge Pérez Pérez[3] Jesse M. Shapiro[4]

[1]Federal Reserve Bank of Philadelphia

[2]University of Chicago

[3]Banco de México

[4]Brown University and NBER

The views expressed are those of the speaker and not necessarily those of the Federal Reserve Bank of Philadelphia, the Federal Reserve System, or Banco de México.

Performance of Different Estimators

Setup

$$y_{it} = \alpha_i + \gamma_t + q_{it}'\psi + \sum_{m=-G}^{M} \beta_m z_{i,t-m} + C_{it} + \varepsilon_{it} \qquad \text{(linear panel model)}$$

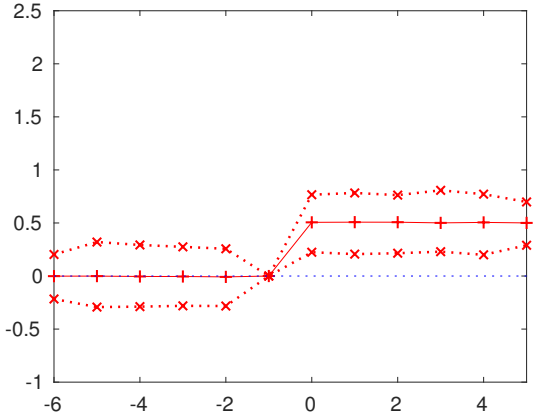
$$y_{it} = \sum_{k=-G-L_G}^{M+L_M-1} \delta_k \Delta z_{i,t-k} + \delta_{M+L_M} z_{i,t-M-L_M} + \delta_{-G-L_G-1}(-z_{i,t+G+L_G}) + \alpha_i + \gamma_t + q_{it}'\psi + C_{it} + \varepsilon_{it}$$

(estimating equation)

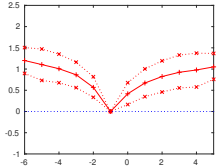
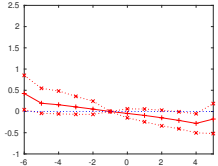
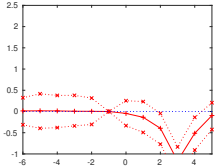
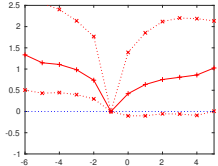
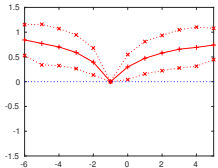
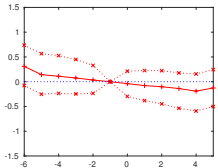
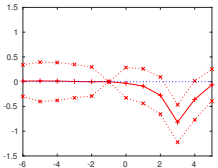
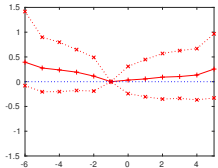
Simulation designs

- $N = 50$, $T = 40$
- Policy adopted when ($C_{i,t+P}$ + noise) crosses a threshold
- Vary P and structure of C_{it}

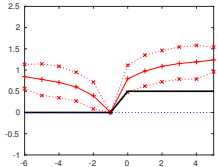
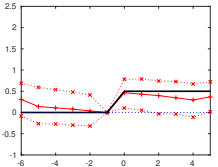
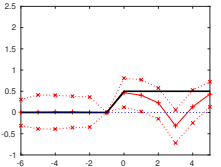
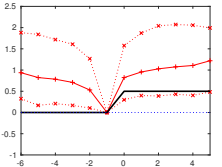
Event-study path of unconfounded outcome $y_{it} - C_{it}$



Summary of data-generating processes

Mean-rev. trend	Monotone trend	No pre-trend	Multidimensional
Confound C_{it}			
			
Proxy x_{it} if available			
			

Performance of different estimators

Mean-rev. trend	Monotone trend	No pre-trend	Multidimensional
Two-way fixed effects			
			

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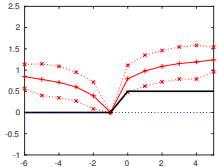	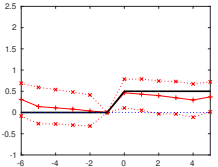	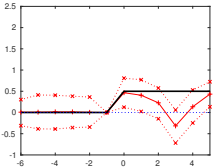	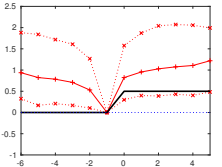
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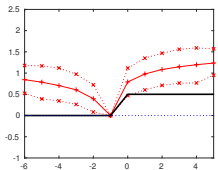	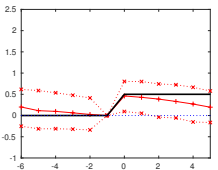	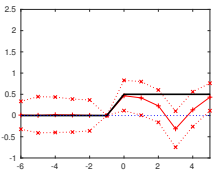	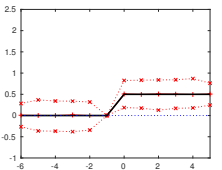

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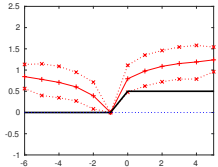	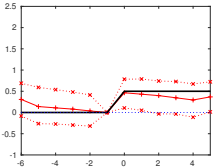	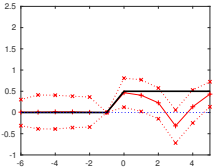	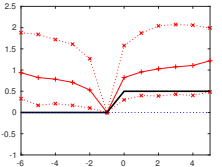
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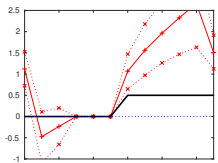	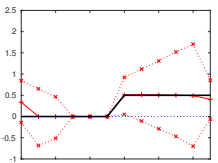	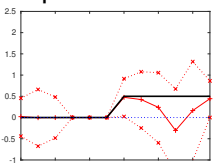	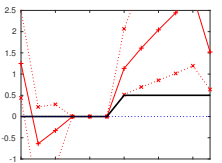

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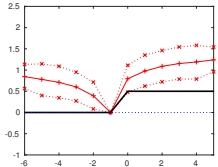
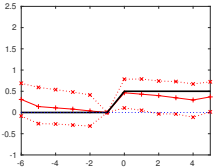
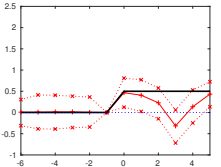
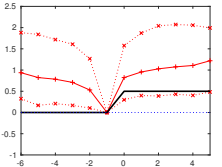
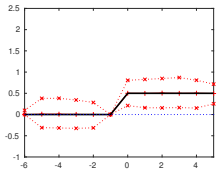
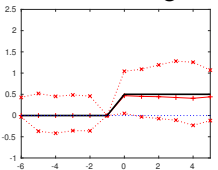
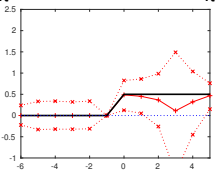
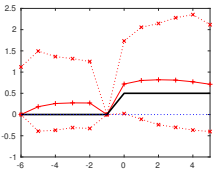
			
Instrumenting for x_{it} with leads of z_{it}			
			

Takeaways

- No estimator performs well uniformly under all reasonable DGPs
- Performance of estimator cannot typically be gauged from the data at hand
- Importance of motivating modeling assumptions on economic grounds