Notes on Trade, Macro, and IO

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Chapter A

Econometrics

A.1 A Practical Guide to Shift-Share Instruments (Borusyak, Hull, and Jaravel, 2024)

A recent econometric literature shows two distinct paths for identification with shift-share instruments, leveraging either many exogenous shifts (Borusyak, Hull, and Jaravel, 2022; Adão, Arkolakis, and Esposito, 2019) or exogenous shares (Goldsmith-Pinkham, Sorkin, and Swift, 2020).

This paper presents the core logic of both paths and practical takeaways.

A.1.1 ADH (2003)'s SSIV

The influential China shock paper by ADH constructs an instrumental variable with a shift-share structure:

$$\text{SSIV}_i = \sum_k \text{emp share}_{i,k} \times \text{avg. of growth in Chinese import among non-US countries}_k \tag{A.1.1}$$

where k denotes industry and j denotes commuting zone.

A.1.2 Definition of SSIV

A shift-share structure follows

$$z_i = \sum_{k=1}^{K} \underbrace{s_{ik}}_{\text{Share}} \underbrace{g_k}_{\text{Shift}} \tag{A.1.2}$$

Remarks

- Shifts vary at a different level (e.g. industries) than the unit of analysis (e.g. local labor markets).
- Shares vary across units but are usually predetermined (e.g., employment shares are measured in a pre-period).
- To argue convincingly that SSIV are exogenous, one must explain what properties of the shifts and shares make z_i uncorrelated with ϵ_i (rather than simply stating $\text{Cov}[z_i, \epsilon_i] = 0$).
- $\sum_{k=1}^{K} s_{ik}$ is generally one. For incomplete share see Section A.1.3.

One strategy to ensure that the shift-share instrument z_i is exogenous is to have exogenous shift g_k. The key threat to identification in the exogenous shifts approach is the violation of the following condition: g_k **should be uncorrelated with an average of ϵ_i taken across units with weights s_{ik}.**

A.1.3 Incomplete Shift Share

In shift-share designs where the exposure shares $s_{i,k}$ do not add up to one, a special control must by included: the sum of shares, $S_i = \sum_k s_{i,k}$. This control remedies the bias arising from the correlation between S_i and the error.

A.1.4 A Checklist for the Shift-Based Approach

1. Thinking about what endogeneity bias is being addressed.
2. Bridge the gap between the observed and ideal shifts. Control for $\sum_k s_{ik} q_k$: shift-share aggregates of the industry-level confounders
3. Include the "incomplete share" control.
4. Lag shares to the beginning of the natural experiment.
5. Report descriptive statistics for shifts, such as mean and std. of z_i and g_k.
6. Implement balance tests for shifts in addition to the instrument.
7. Use correct standard errors.

Chapter B

Computational Economics

Bibliography

Adão, Rodrigo, Costas Arkolakis, and Federico Esposito. 2019. "General equilibrium effects in space: Theory and measurement." National Bureau of Economic Research.

Borusyak, Kirill, Peter Hull, and Xavier Jaravel. 2022. "Quasi-experimental shift-share research designs." *The Review of economic studies*, 89(1): 181–213.

Borusyak, Kirill, Peter Hull, and Xavier Jaravel. 2024. "A practical guide to shift-share instruments." National Bureau of Economic Research.

Goldsmith-Pinkham, Paul, Isaac Sorkin, and Henry Swift. 2020. "Bartik instruments: What, when, why, and how." *American Economic Review*, 110(8): 2586–2624.