The Estimation and Results Section of a Structural Estimation Paper

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Estimation Section

Main goal of Estimation Section

The Estimation Section of a structural estimation paper connects the content of the theory section with the content of the data section.

- You may want a separate results section if your post-estimation experiments require a lot of discussion (see last slide)

Estimation Section

- Describe which parameters are calibrated (weak calibration), and which parameters are estimated
  - Why did you choose to estimate those particular parameters and not the others?
  - What effects on the results might that choice have?
  - Example: DeBacker, et al (2017) Table 2, p. 20.
- Describe how data are mapped into model variables
  - Real world data often not perfectly represented by what is in your model
  - Example: DeBacker, et al (2017) Appendix A-2, p. 49

Estimation Method

- Describe your estimation method
  - GMM, MLE, SMM, bayesian, indirect inference
  - What is your criterion function?
  - How many iterations to solution, computation time, processors, optimization stats
  - Evidence of global maximum/minimum (robustness)
- Some of this discussion might be reserved for appendix
- All code and data should be open source and easily replicable
  - Caveats: private data, poachable topic

Measures of fit

- Give your parameter estimates and their standard errors in a table
  - Include number of observations and other estimation stats like likelihood function value or criterion function value
- Show your inside moments, their errors, and their standard errors
- Show your outside moments (moments not used for estimation)
  - These moments are a nice measure of how good your model is
  - Example: DeBacker, et al (2017), Fig. 5 p. 24, Tab. 5 p. 36
  - Outside moment is the variance of log wealth. Does not match well

Model Section Examples

- Rust, John, "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher," *Econometrica*, 55:5, pp. 999-1033 (Sep. 1987)
  - Estimates of cost function parameters in different slices of data, Tabs. 5, 6
  - Specification tests: Tab. 8
  - Hypothesis tests using estimated coefficients and standard errors: LR tests, Tabs. 9, 10
  - Key figures: Fig 5, 6, 7
  - No good demonstration of outside moment fit or lack thereof

Model Section Examples

- Altonji, Joseph G., Anthony A. Smith, Jr., and Ivan Vidangos, "Modeling Earnings Dynamics," *Econometrica*, pp. 1395-1454 (July 2013)
  - Section 4: Estimation Methodology
  - Good specification of MLE problem
  - Tables 4A, 4B give estimation results
  - Tables 5A, 5B show something similar to outside moment fit
  - Results are interesting variance decompositions

Results Section

- You may want a separate results sections if you have involved experiment
- After estimating model, what do you do with it? How do you answer your research question
- Estimated model is your laboratory