Structural Estimation in Economics

ECON 6100Z Summer 2017

Lecture Room: Rm 1010, LSK
Time: Tuesday & Friday 02:00PM - 05:20PM
Start: June 20th
End: July 14th

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Course Description

Economics differs from other social sciences in that it not only provides a coherent theoretical framework to explain phenomena in the world, but also develops a tool to measure its theoretical framework. This tool is Econometrics. Econometrics, by definition, should be the bridge connecting "econo" with "metrics", where "econo" means economic theory, and "metrics" means measurement. The theory part, such as consumer theory, firm theory, and general equilibrium, is covered in today's microeconomics or macroeconomics class. The theory provides important insight on what matters, but leaving the question of measurement unanswered. For example, Econ 101 tells us that the deadweight loss of a property tax depends on the price elasticities of supply and demand, but pure theory cannot measure the value of these elasticities. The measurement part, especially various estimation methods, is covered in today's econometrics class. There an equation or multiple equations are posed, and the focus is how to estimate the parameters in the equation(s). Where the equation(s) to be measured come from is typically ignored.

This course tries to bridge the gap between economic theory and measurement. In particular, this course presents an introduction to structural estimation in economics. "Structural" means STRUCTURE derived from economic theory, and "estimation" corresponds to various estimation methods already covered in today's econometric class. The focus of this course is how to derive econometric equations from economic theory and then use suitable procedures for estimation and inference. This course would first introduce the concept of structural estimation and also the concept of causality, the very focus of today's empirical work. After introduction, you would learn through examples from labor economics and development economics about these issues: what a complete structure is? To what do error terms in econometric equations correspond? How does structural estimation deal with unobserved heterogeneity, one important type of error terms? Then we would go back to the conceptual part and discuss identification, which one can better appreciate after understanding the basic ideas of structural estimation. Here I would introduce the concept of identification and different identification approaches. Finally, I would discuss how to combine structural estimation methods and experimental (reduced-form) methods, which are prevalent in today's empirical work, especially in development economics.

Intended Learning Outcomes

- Analyze economic problems in a structural way
- Build own economic models
- Tell good structure from bad structure

Prerequisite

MATH 2023 Multivariable Calculus OR ECON 2174 Math for Economists & ECON 3334 Introduction to Econometrics OR ECON 5280 Applied Econometrics

Assessment Scheme

- Class Participation: 5%
- Paper Presentation: 45
    - Slides 20%
    - Presentation 20%
    - Q&A in class 5%
- Final Exam: 50%

Arrangement

June 20: Introduction
June 23: Examples from Labor Economics
June 27: Examples from Development Economics & Student Presentation 1
June 30: Heterogeneity in Structural Equations
July 4: Discrete Choices & Presentation 2
July 7: Identification, Control Function and Propensity Score
July 11: Structural Equations and Experimental Methods & Presentation 3
July 14: Review Session and Final Exam

References

1. Introduction
   1.1 Philosophies underlying Structural Modelling
   1.2 Is There a Consumption Function?

   Deaton, Angus. 1992. Clarendon Lectures in Economics *Understanding Consumption*. Oxford: Oxford University Press.

   1.3 Where does Mincer Equation Come?

   Heckman, James J., Lance J. Lochner, and Petra E. Todd. 2006. "Chapter 7 Earnings Functions, Rates of Return and Treatment Effects: The Mincer Equation and Beyond." *Hanbook of the Economics of Education*, 307–458.

2. Examples from Labor Economics
   2.1 Static

   Dixit, Avinash K. 1990. *Optimization in Economic Theory*. Oxford University Press.

Heckman, James J. 1974. “Shadow Prices, Market Wages, and Labor Supply.” *Econometrica* 42(4): 679–94.

2.2 Dynamic

Heckman, James J, and Thomas Macurdy. 1980. “A Life Cycle Model of Female Labour Supply.” *The Review of Economic Studies*.

MaCurdy, Thomas. 1981. “An Empirical Model of Labor Supply in a Life-Cycle Setting.” *Journal of Political Economy* 89(6): 1059–85.

3. Examples from Development Economics

Townsend, Robert M. 1994. “Risk and Insurance in Village India.” *Econometrica* 62(3): 539–91.

Deaton, Angus, and Christina Paxson. 1994. “Intertemporal Choice and Inequality.” *Journal of Political Economy* 102(3): 437–67.

4. Heterogeneity in Structural Equations

Blundell, Richard, and Thomas M. Stoker. 2007. “Chapter 68 Models of Aggregate Economic Relationships That Account for Heterogeneity.” In *Handbook of Econometrics*, 4609–66.

5. Discrete Choices Methods

Heckman, James J., and Edward J. Vytlacil. 2007. “Chapter 70 Econometric Evaluation of Social Programs, Part I: Causal Models, Structural Models and Econometric Policy Evaluation.” *Handbook of Econometrics* 6(SUPPL. PART B): 4779–4874.

Train, Kenneth E. 2003. “Discrete Choice Methods with Simulation.” *Cambridge University Press*: 1–388.

6. Identification, Control Function and Propensity Score

6.1 Alternative Definitions of Causality

6.2 The Concept of Identification

Heckman, James J., and Edward J. Vytlacil. 2007. “Chapter 70 Econometric Evaluation of Social Programs, Part I: Causal Models, Structural Models and Econometric Policy Evaluation.” *Handbook of Econometrics* 6(SUPPL. PART B): 4779–4874.

6.3 Control Function

Heckman, James J., and Richard Robb. 1985. “Alternative Methods for Evaluating the Impact of Interventions. An Overview.” Journal of Econometrics 30(1–2): 239–67.

6.4 Propensity Score

Heckman, James J, and Richard Robb. 1986. “Alternative Methods for Solving the Problem of Selection Bias in Evaluating the Impact of Treatments on Outcomes.” In Drawing Inferences from Self-Selected Samples, ed. Howard Wainer. New York, NY: Springer New York, 63–107.

7. Structural Equations and Experimental (Reduced-form) Methods

Heckman, James J., and Edward J. Vytlacil. 2007. “Chapter 71 Econometric Evaluation of Social Programs, Part II: Using the Marginal Treatment Effect to Organize Alternative Econometric Estimators to Evaluate Social Programs, and to Forecast Their Effects in New Environments.” *Handbook of Econometrics* 6(SUPPL. PART B): 4875–5143.

Suri, Tavneet. 2011. “Selection and Comparative Advantage in Technology Adoption.” *Econometrica* 79(1): 159–209.