Syllabus

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Welcome to this course! Here you'll find details on the syllabus.

1 Topics

1.1 Identification, Credible Inference, and Marschak's Maxim

We formally define identification and discuss (via examples) what people really mean when they talk about identification and **credible inference**. We use the **Generalized Roy Model** to compare identification via functional form to nonparametric identification.

We introduce **Marschak's Maxim** as a guide for doing empirical model-based research.

1.1.1 Reading

The two survey articles by Keane (2010) (link) and Angrist and Pischke (2010) (link) - although aging - provide two important perspectives on the issues of credible inference in economics. Low and Meghir (2017) provide a nice review of the advantages of the structural approach.

The original paper by Marschak (1953) may be of interest. Heckman and Vytlacil (2007) provide a nice discussion of Marschak's Maxim in the context of policy evaluation. They introduce (Heckman and Vytlacil 2005; Carneiro, Heckman, and Vytlacil 2011) the *Marginal Treatment Effect* as a tool for thinking about quasi-experimental estimators and policy evaluation.

1.2 Extremum Estimators

We introduce the concept of an **extremum estimator** and discuss conditions under which this estimator has good asymptotic properties, with specific applications to **maximum likelihood**, **minimum distance**, and **generalized method of moments** estimators. We discuss optimal weighting of the relative efficiency properties of these estimators.

1.2.1 Reading

This section relies heavily on the Newey and McFadden (1994) chapter of the Handbook of Econometrics. Although not necessary, Hayashi (2011) provides a very thorough treatment of all of these estimators.

1.3 Simulation Methods

We introduce simulation methods for the estimation of structural models, including the **Simulated Method of Moments**, **Indirect Inference**, and the **Bootstrap** method for inference.

1.3.1 Reading

You may find the Horowitz (2001) handbook chapter useful. Cameron and Trivedi (2005) provide a useful discussion of simulation-based estimators in their textbook.

1.4 Panel Data Methods

We talk about individual heterogeneity and discuss the use of panel data for detecting individual heterogeneity in data.

1.5 Discrete Choice and Dynamic Discrete Choice

We review some of the formalities of discrete choice models and consider estimation of these models in the presence of **dynamics**.

2 Assessment

There will be 7 problem sets. Your best 5 of these 7 problem sets will be worth 20%. Hence, you can skip two if you want.

Here is the proposed timeline of due dates. Submissions **must** be made through Canvas as a notebook (e.g. jupyter or quarto) formatted to html with printed output.

Assignment	Due Date
Assignment 1	March 22
Assignment 2	March 29
Assignment 3	April 5
Assignment 4	April 12
Assignment 5	April 19
Assignment 6	April 26
Assignment 7	May 3

3 Office Hours

I will provide a link on Canvas to sign up for my weekly office hours.

Reading List

Angrist, Joshua D., and Jörn-Steffen Pischke. 2010. "The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con Out of Econometrics." *Journal of Economic Perspectives* 24 (2).

Cameron, A Colin, and Pravin K Trivedi. 2005. *Microeconometrics: Methods and Applications*. Cambridge university press.

Carneiro, P., J. J. Heckman, and E. J. Vytlacil. 2011. "Estimating Marginal Returns to Education." *American Economic Review* 101 (October): 2754–81. http://www.nber.org/papers/w16474.

Hayashi, Fumio. 2011. *Econometrics*. Princeton University Press.

Heckman, James, and Edward Vytlacil. 2005. "Structural equations, treatment effects, and econometric policy evaluation." *Econometrica* 73 (3): 669–738.

———. 2007. "Chapter 70 Econometric Evaluation of Social Programs, Part i: Causal Models, Structural Models and Econometric Policy Evaluation." In, edited by James J. Heckman and Edward E. Leamer, 6:4779–874. Handbook of Econometrics. Elsevier. https://doi.org/https://doi.org/10.1016/S1573-4412(07)06070-9.

Horowitz, Joel L. 2001. "The Bootstrap." In *Handbook of Econometrics*, 5:3159–3228. Elsevier.

Keane, Michael P. 2010. "A Structural Perspective on the Experimentalist School." *Journal of Economic Perspectives* 24 (2).

Low, Hamish, and Costas Meghir. 2017. "The Use of Structural Models in Econometrics." *Journal of Economic Perspectives* 31 (2).

Marschak, Jacob. 1953. "Economic Measurements for Policy and Prediction." In *Studies in Econometric Method*, edited by W. Hood and C. Koopmans. John Wiley & Sons.

Newey, Whitney K, and Daniel McFadden. 1994. "Large Sample Estimation and Hypothesis Testing." *Handbook of Econometrics* 4: 2111–2245.