

TOR VERGATA UNIVERSITY

Ph.D. in Economics and Finance

A.Y. 2018-2019

Topics in Microeconometrics

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Overview

The duration of the course is 12 hours. It will be given during the four weeks period May 7 to May 28, 2019, in one session per week, three hours each. The purpose of the course is to provide students with advanced analytical tools, by deepening some of the microeconomic topics that they may have learned earlier, or by introducing new concepts. The course is mainly dedicated to panel data microeconometrics, covering both aspects of estimation and hypotheses testing.

The first session begins with a review of the basic definitions and limit theorems that are important for studying large-sample properties of estimators (of linear regression models) and testing procedures. Then, after a detailed presentation of the different concepts of exogeneity, a common statistical framework is used to introduce Ordinary Least Squares (OLS) and Generalized Least Squares (GLS) estimation of Seemingly Unrelated Regressions (SUR) and panel data models, the latter without explicitly introducing unobserved heterogeneity.

Session 2 introduces the System Instrumental Variables (SIV) estimation of linear regression models and the Generalized Method of Moments (GMM) framework, also relating it to the more traditional three-stage least squares estimator. It then offers a detailed presentation of the Generalized Instrumental Variables (GIV) estimator, also used in the more advanced treatment of linear unobserved-effects panel data models given in the last session.

The third session focus on traditional estimation procedures for linear unobserved-effects panel data models, emphasizing the relationships among random-effects, fixed-effects, and “correlated random-effects” (CRE) models. It also provides a detailed treatment of the Hausman testing framework for testing the random-effects and the strict exogeneity assumptions.

The last session discusses the GMM approach to estimating the standard linear unobserved-effects panel data models, emphasizing some equivalences between the traditional estimation procedures and GMM-3SLS estimators. The method of first differencing followed by GMM is also given separate treatment with application to dynamic models, such as those studied by Arellano and Bond (1991). Finally, it provides some details about the estimation of models with individual-specific slopes.

Prerequisites, Texts, Notes and Exam

This course is taught at a level assuming comfort with undergraduate econometrics, basics of probability theory, calculus and linear algebra. Grades will be based on home assignments and a final written exam. The course is based on a set of notes and the main reference is Wooldridge (2010). It is strongly recommended

to complement with the textbooks by Peracchi (2001) and Cameron and Trivedi (2005). Suggestions for further reading will be provided in class.

References

Wooldridge J.M. (2010) *Econometric Analysis of Cross-Section and Panel Data*, 2nd ed., MIT Press, Cambridge (MA).

Cameron A.C. and Trivedi P.K. (2005) *Microeconometrics*, Cambridge University Press, New York (NY).

Peracchi F. (2001) *Econometrics*, Wiley, Chichester (UK).

Detailed outline

1 Session 1

Basics of asymptotic theory

- Convergence of Deterministic Sequences
- Convergence and Boundedness in Probability
- Convergence in Distribution
- Limit Theorems for Random Samples
- Limiting Behavior of Estimators and Test Statistics

SUR and Panel Data: System OLS and GLS Estimation

- Examples of Systems of Equations
- System OLS Estimation
- System Generalized Least Squares
- Feasible GLS

2 Session 2

SUR and Panel Data: IV Estimation

- Examples of Systems with IVs
- The System IV Estimator
- Generalized Method of Moments
- The Generalized IV Estimator
- Hypotheses Testing
- More on Efficiency

3 Session 3

Linear Unobserved-Effects Panel Data Models

- Pooled OLS
- Fixed-Effects Estimation
- First-Differencing Estimation
- Random-Effects Estimation
- Comparison of estimators
- Mundlak and Chamberlain's approaches to Unobserved-Effects Models
- Hausman testing framework

4 Session 4

Linear Unobserved-Effects Panel Data Models II

- Equivalence Between GMM 3SLS and Standard Estimators
- RE and FE Instrumental Variables Methods
- Estimation under Sequential Exogeneity: First Differencing and GMM
- Random Trend Models
- General Models with Unit-Specific Slopes