Syllabus
Econometrics II

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1 Summary of Content

This course is concerned with theory and practice underlying the development of quantitative economic models. Students are expected to have some understanding of economic relationships (such as demand and production functions); another requisite is a good background in macroeconomics, calculus, statistics and econometrics. The main emphasis of the course is on how we can best specify the economic relationships and how we can then best estimate statistically the resulting equation. It will become clear that the latter is by no means an easy task as the very restrictive assumptions of the simple linear regression model are relaxed.

2 Topics

- Classical Linear Model
  - Classical Regression Linear Model
  - Linear Restrictions
  - Disturbance Problems
  - Nonlinear LS Estimator
- Panel Data Analysis
  - Panel Data: Introduction;
  - Different Model Specifications for Panel Data;
  - Specification Assumptions for the Random Components;
  - Fixed Effects Model;
  - Random Effects Model;
  - Optimal Estimator and Specification Tests: Pooled, Fixed and Random Effects Models;
  - Inference: Hausman and Breusch-Pagan Tests;
  - SUR Model;

  - Dynamic Panel Data Models:
    * Instrument Variables Model for Dynamic Panel: Anderson-Hsiao;
    * GMM-Diff (Generalized Method of Moments) for Dynamic Panel: Arellano-Bond;
    * GMM-Sys for Dynamic Panel: Blundell-Bond;
    * Non Stationary Tests for Panel Data;
    * Dynamics, Cointegration and Poolability in Panel Data Models.

- Univariate Time Series Analysis
  - Univariate Preliminary Analysis;
  - The Stationarity Issue in AR Models: the Unit Root Tests;
  - Unit Roots and Spurious Regressions;
  - The Dynamic Specifications (ARDL);
  - Long Run Relationships and Cointegrated Variables.

- Multivariate Time Series Analysis: Structural Vectorautoregressive Models
  - Vectorautoregressive Models;
  - Moving-Average Representation;
  - Impulse Responses:
    1. The Identification Problem: Introduction;
    2. Cholesky Decomposition;
    3. Long-Run Recursive VAR-Models;
    4. Blanchard-Quah Decomposition;

- Specific Topics:
  - "Stochastic Frontier Models", Mastromarco (2009);
  - Growth accounting and efficiency frontier models.
  - Parametric frontier models:

* Growth Accounting and the Solow Residual;
* Modified Ordinary Least Squares (MOLS);
* Measurement of Efficiency;
* Panel Data Stochastic Frontier Models;
* Time-Invariant Inefficiency:
  - Fixed Effects Model;
  - Random Effects Model;
  - Maximum Likelihood Estimation.

  Time-Varying Inefficiency:
  - Time-Varying Inefficiency models;
  - A Model for Stochastic Technical Inefficiency Effects for Panel Data: Battese and Coelli 1995.

– "Nonparametric Inference in Efficiency Analysis: Recent Developments and New Challenges", Simar (2009);

* Nonparametric approach: basic concepts;
* Nonparametric approach: strengths and drawbacks;
* The Non-parametric Envelopment Estimators: The DEA Estimator;
* The Non-parametric Envelopment Estimators: The FDH Estimator;
* Pratical Computation: Univariate and Multivariate Generalisation;
* FDH as linear programming;
* DEA estimator Convexity of the attainable set;
* DEA estimator; Efficiency Estimators;
* Sensitivity Analysis of Nonparametric Efficiency Estimators How to Bootstrap in DEA- FDH;
  - General Principles and the Data Generating Process;
  - Statistical Assumptions: the DGP;
  - Smoothing: polar coordinates;
  - Homogenous Bootstrap;

- The smoothed bootstrap;
- Heterogenous bootstrap;
- Bootstrapping FDH Efficient Scores.

1. **Reference Books:**

   - *General Topics*:
     Greene (1993); Baltagi (2013), Hsiao (1986) Lütkepohl (1991, 2005); Verbeek (2006); Gardini et al. (2000); Hamilton (1994).
   - *Specific Topics*:
     Kumbhakar and Lovell (2000); Coelli et al. (1998); Daraio and Simar (2007).

2. **Reference Handouts:**

   - *General Topics*: Mastromarco (2009, 2017a); Woitek (2009).
   - *Specific Topics*: Mastromarco (2009, 2017b);.

References

Baltagi, B. H.: 2013, *Econometric Analysis of Panel Data*, Wiley.

Coelli, T., Rao, D. and Battese, G.: 1998, *An Introduction to Efficiency and Productivity Analysis*, Kluwer, Boston.

Daraio, C. and Simar, L.: 2007, *Advanced Robust and Nonparametric Methods in Efficiency Analysis. Methodology and Applications*, Springer, New York.

Gardini, A., Cavaliere, G., Costa, M., Fanelli, L. and Paruolo, P.: 2000, *Econometria. Volume Primo*, FrancoAngeli, Milano, Italy.

Greene, W. H.: 1993, *Econometric Analysis*, MacMillan. 2nd ed.

Hamilton, J.: 1994, *Time Series Analysis*, Princeton University Press.

Hsiao, C.: 1986, *Analysis of Panel Data*, Cambridge University Press, Cambridge.

Kumbhakar, S. and Lovell, C.: 2000, *Stochastic Frontier Analysis*, Cambridge University Press, Cambridge.

Lütkepohl, H.: 1991, *Introduction to Multiple Time Series Analysis*, Springer, Berlin, Heidelberg, New York, Tokio.

Lütkepohl, H.: 2005, *New Introduction to Multiple Time Series Analysis*, Springer, Berlin, Heidelberg, New York, Tokio.

Mastromarco, C.: 2009, *Stochastic Frontier Models*, Dipartimento di Scienze dell'Economia - University of Salento.

Mastromarco, C.: 2017a, *Classical Regression Linear Model*, Dipartimento di Scienze dell'Economia - University of Salento.

Mastromarco, C.: 2017b, *Static and Dynamic Panel Data Models*, Dipartimento di Scienze dell'Economia - University of Salento.

Simar, L.: 2009, *Nonparametric Inference in Efficiency Analysis: Recent Developments and New Challenges*, Institut de Statistique - Université Catholique de Louvain, Belgium.

Verbeek, M.: 2006, *Econometria*, Zanichelli, Bologna, Italy.

Woitek, U.: 2009, *Structural Vectorautoregressive Models*, University of Zurich.