

Econometrics IV

Module 6, 2018-19

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Course information

Course Website: <http://www.nes.ru/ru/programs/econ/acad-progr/>

Instructor's Office Hours: by appointment

Class Time: TBA

Room Number: TBA

TA: Sergey Golovan

Course description

The objective of the course is to familiarize students with advance concepts of econometric analysis. During the course students learn how to apply advance econometric models to data. Also the participants of the course will employ basic commands in STATA software and will do practical exercises.

The objective of this course is to give a very good understanding of the most widely based estimation techniques for non-linear models: Maximum Likelihood (MLE) and Generalized Method of Moments (GMM). The material assumes that a student has a working knowledge of inference tools in Econometrics III. During the course students learn how to apply advance econometric models to large cross-section or long time or panel data. Also the participants of the course will employ basics in PYTHON and will do practical exercises.

Course requirements, grading, and attendance policies

Students are assumed to have sufficient background in statistics and econometrics I, II, III. There are 14 lectures and 7 seminars. During first six weeks each week a problem set will be distributed. Best 5 problem sets will be counted for 20% of the final grade. The final written format A4 exam will give 80% of the final grade. The final exam lasts 3 hours and contains 4 problems. On the exam no exit is permitted but questions are allowed. The format A4 makeup exam lasts 2 hours and contains 2 problems. The second makeup is carried out in oral form.

Course contents

Week 1: MLE. Introduction. Likelihood function and likelihood principle. (Ch. 13).

Week 2: Conditional, joint and marginal ML. Consistency and asymptotic normality. (Ch. 13).

Week 3: Asymptotic efficiency, Cramer-Rao inequality. Hypothesis testing: Wald, Likelihood Ratio, Lagrange Multiplier. Examples and applications of MLE (Ch. 13).

Week 4: GMM. Endogeneity, instrumental variables, 2SLS. Moment restrictions and moment functions. (Ch. 14).

Week 5: Consistency and asymptotic normality. Efficient GMM. Test for overidentifying restrictions.(Ch. 14).

Week 6: Hypothesis testing: Wald, Distance Difference, Lagrange Multiplier. Hausman specification test. Examples and applications of GMM. (Ch. 14).

Week 7: Panel Data. Error component models (ECM). OLS, GLS, LSDV, Within and Between estimators in one-way ECM. Dynamic panel. Panel binary choice models: random effects probit and fixed effects logit. (Ch. 10).

Description of course methodology

A typical lecture includes a theoretical part on course material. During the second part of the lecture we discuss how a new econometric method can be applied for practical cases.

Sample tasks for course evaluation

Problem 1. True or False?

1. For T large, N fixed and endogenous regressors in a standard ECM model, we have to eliminate individual effects to estimate b consistently.
2. Under standard regularity assumptions GMM estimator in a non-linear model could be more efficient than MLE.
3. Any additional overidentifying moment restrictions in GMM framework are only useful in testing model misspecification.

Problem 2.

1. The set of instruments should be valid and relevant in order for the emerging instrumental variables estimator to be
 - (a) unbiased
 - (b) consistent
 - (c) more asymptotically efficient than the OLS estimator
 - (d) all of the above
2. Under appropriate regularity conditions, the maximum likelihood test statistics W , LR and LM

- (a) are asymptotically independent chi-squared distributed
- (b) are asymptotically chi-squared distributed but the differences between them are asymptotically non-negligible
- (c) are equal up to differences that asymptotically converge in probability to zero
- (d) None of the above statements is true

Course materials

Required textbooks and materials

Wooldridge, J. "Econometric Analysis of Cross Section and Panel Data", MIT Press, 2002

Additional materials

Cameron, A. Colin and Pravin K. Triverdi "Microeconometrics: Methods and Applications", (8th edition), Cambridge University Press, 2009

STATA software, Version 11, <http://www.stata.com/>

Further references will be provided during the course.

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.