

Econometrics M.Sc. Syllabus

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September 25, 2013

1 Lectures and Office Hours

- Lectures: Thu 13:40–16:30. Room 3231
- Office Hours: Fridays 15:00–17:00. Room 3430

2 Course description

Econometrics (M.Sc. level) is the first out of a three-semester sequence of courses designed for masters students at ICEF. The main objectives of the course are to introduce students to basic econometrics techniques and to prepare them to do their own applied work. Students are encouraged to think of the course as a preparation toward their thesis research project. The prerequisites of the course are Calculus and Statistics at an intermediate level. The knowledge of some computer-programming is welcome. The course is taught in English.

3 Teaching methods

The following methods and forms of study are used in the course:

- Lectures
- Practice in computer lab
- Self-study in computer lab (doing home assignments using Excel and STATA, working with economic data, doing research on the web)
- Self-study with literature

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4 Assessment

1. Homework Assignments
2. Midterm exams (80 minutes)
3. Written final exam (120 minutes)

Grade determination

This course includes a control work and one written final exam. The main form of evaluation is the final exam at the end of the semester, which contributes 50% of the final grade. However, according to university regulations **passing the final exam is necessary in order to get a passing mark for the course**. The final grade is also partly determined by the midterm exam (40%), the home assignments (5%), and class attendance and participation (5%).

The final grade for first-year Econometrics will be computed as the average of the grades obtained in each of the two semesters. Please note that the final exam in June will not be cumulative (it will cover topics from the second semester only).

5 Readings

Mandatory

1. Wooldridge J. M. *Introductory Econometrics: A Modern Approach*. South-Western College Publishing, 2000. (**WOO**)
2. Johnston J. and DiNardo, J. *Econometric Methods*. 4th Ed. McGraw-Hill 1997. (**JD**)
3. Angrist, J. and Pischke, J. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton Univ Press, 2009. (**AP**)

Additional Readings

1. Wooldridge J. M. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press, 2002.
2. Cameron, C.A. and Trivedi, P.K. *Microeconometrics: methods and applications*. Cambridge U.P., 2005. (**CT**)
3. Cameron, C.A. and Trivedi, P.K. *Microeconometrics Using STATA*. STATA Press, 2009.
4. Ruud P.A. *An Introduction to Classical Econometric Theory*. Oxford U.P., 2000.
5. Greene, W.H. *Econometric Analysis*. 6th Ed. Prentice-Hall, 2008.
6. Morgan, S.L. and Winship, C. *Counterfactuals and Causal Inference: Methods and Principles for Social Research*. Cambridge U.P., 2007.
7. Kennedy, P. *A Guide to Econometrics*. The MIT Press, 2003.

Internet Resources and Databases

1. *Data and other materials for Wooldridge's textbook.* www.msu.edu/~ec/faculty/wooldridge/book2.htm.
2. *Data and Computer Programs for Cameron and Trivedi's textbook.* www.econ.ucdavis.edu/faculty/cameron.
3. *The Current Population Survey Main Page.* www.census.gov/cps.
4. *The Russian Monitoring Survey.* www.cpc.unc.edu/projects/rlms.

6 Basic Course Outline

1. Introduction to Econometrics The FAQs of economics research. Causal Relationships. Experiments and Quasi-experiments. Identification and Statistical Inference. The Selection Problem. Cross Section and Longitudinal Data.

AP, Chapters 1–2. *WOO*, Chapter 1. *JD*, Chapter 1.

2. The Simple Regression Model Derivation of OLS estimates. Mechanics and Properties. Units of measurement and functional form. Unbiasedness and efficiency.

WOO, Chapter 2. *JD*, Chapter 2.

3. Multi-variate Regression Analysis Motivation: multiple sources of variation. Mechanics and interpretation of OLS. The “partialling out” interpretation and linear projections. Unbiasedness and efficiency: the Gauss-Markov Theorem.

AP, Chapter 3. *WOO*, Chapter 3. *JD*, Chapter 3.

4. Inference in the Multi-variate Regression Model Sampling distributions of the OLS estimators. Testing Hypothesis. Confidence Intervals.

WOO, Chapter 4. *JD*, Chapter 4.

5. Asymptotic Properties of OLS Consistency, asymptotic normality and asymptotic efficiency. The LM test. Sources of endogeneity: omitted variables, measurement error, simultaneity.

WOO, Chapter 5.

6. Further Issues in OLS estimation Data scaling and beta scores. Quadratic and interaction terms. Prediction. Dummy Variables. Proxy variables. Missing data and outliers.

WOO, Chapters 6, 7 and 9.

7. Heteroscedasticity Consequences for OLS. Heteroscedasticity-robust inference. Breusch-Pagan and White tests. WLS and FGLS.

WOO, Chapter 8. *JD*, Chapter 6.

8. Instrumental Variables and 2SLS Instruments as a solution to endogeneity. Reduced form equations. Exclusion restrictions. Rank condition. Two-stage least squares and GMM. Consistency and other asymptotic properties. Potential pitfalls. Local Average Treatment Effects.

AP, Chapter 4. **WOO**, Chapter 15. **JD**, Chapter 5. Angrist, J. and V. Lavy (1999), "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement," *The Quarterly Journal of Economics* 114, 533–575. Levitt, S.D. (1996), "The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation," *The Quarterly Journal of Economics* 111(2), 319–351.

9. Maximum Likelihood ML Estimators. Likelihood ratio, Wald and LM tests. GLS and 2SLS as ML estimators.

JD, Chapter 5.

7 Distribution of Hours

Unit	Topic title	Lectures	Contact hours	Self-study
1	Introduction	1	4	6
2	Simple Regression	2	8	12
3	Multivariate Regression	2	8	12
4	Inference	2	8	12
5	Asymptotic Properties	1	4	6
6	Further Issues	1	4	6
7	Heteroscedasticity	1	4	6
8	Instrumental Variables	2	8	12
9	Maximum Likelihood	1	4	6
	Total	13	52	78