

ECON 330: Econometrics
Spring 2020
Syllabus

Instructor: Rabia Malik

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Class: Tues/Thurs: 10am-11:30am

Office Hours: Tues/Thurs: 11:45am-12:45pm (or by appointment)

TA: TBA

TA Office Hours: TBD

TA Office Hours: TBD

Description This is the second course in the statistics/econometrics sequence and looks at the broad range of estimation problems that often arise in economic applications. In particular, we look at the criteria used to select a particular estimation method and the scenarios under which the OLS estimator becomes sub-optimal. The purpose of this course is to teach students the basics of econometric theory and also to give them hands-on experience with using a statistical package *R*, which will be helpful in later applications especially for those students who choose to do an empirical senior project.

Goals On successful completion students will:

1. be able to develop a suitable regression model for a variety of empirically interesting problems and validate the selected model via a battery of tests
2. be able to compare different estimators based on their finite sample and asymptotic properties
3. develop a basic understanding of time series econometrics and be able to handle and make use of panel data
4. be proficient in the use of *R* for econometric analysis

Prerequisites

<Probability AND Statistics> OR *<Statistics and Data Analysis>*;
Microeconomics 1 OR *Principles of Microeconomics*; *Macroeconomics 1* OR
Principles of Macroeconomics

Text Book

Wooldridge, Jeffrey M. 2009. *Introductory Econometrics*. 4th edition. Thomson South-western.

Note that newer editions of the book can also be used since the chapters are the same. The book is readily available online.

Lectures

Two lectures of 90 minutes plus one 50-minute lab session per week. The course outline below refers to sections from your textbook. Relevant sections of the textbook are included in your course reading package and the reference texts may be obtained from the Library.

Online Resources

To learn *R* you may use:

David Dalpiaz's "Applied Statistics with R"

(https://daviddalpiaz.github.io/appliedstats/applied_statistics.pdf.)

RStudio's own introductory primers (<https://rstudio.cloud/learn/primers>)

Casey Crisman-Cox's introductory R primer

(<https://drive.google.com/file/d/0BzD2LimxGIzIeWppdWxCZHR1T2M/view>)

The power-point slides for the book are also available at:

<http://www.swlearning.com/economics/wooldridge/wooldridge2e/powerpoint.html>

Grading (updated post-COVID university shut down)

Take-home assignments (2)	10%
Lab Assignments (3)	2.5, 2.5, 5%
Exams (3)	60%
Lab Quizzes (2)	20%

Course Policies

Exams: There will be four announced exams, each worth 20% of the overall grade. There is **NO** n-1 policy for the exams.

Lab Quizzes: There will be two announced lab quizzes, worth 5% each, with **NO** n-1 policy.

Assignments: There will be 4 take-home assignments, each worth 2.5% of the grade. These assignments will roughly correspond to the material for each of the four exams to help students prepare for the exams.

Note: The instructor retains the right to change any of the topics or readings based on class needs. Students will be informed of any changes well ahead of time.

Detailed Course Outline

Sr. No.	Topic	Readings	Weeks
1	Introduction What is econometrics? Steps in empirical economic analysis The structure of economic data; random sampling Simple Regression Model Deriving the OLS estimates Algebraic properties Deriving statistical properties: mean and variance	Ch.1 Ch.2 Appendix B	2

2	Multiple Regression: Estimation Mechanics and Interpretation of OLS Classical Linear Model Assumptions The Gauss-Markov Theorem Properties of OLS – Mean and Variance	Ch.3	2.5
3	Multiple Regression: Inference Sampling Distribution of the OLS estimators The t-test – testing a single restriction Confidence Intervals Testing multiple restrictions Multiple Regression Analysis: OLS Asymptotics Law of Large Numbers and Central Limit Theorem Consistency Asymptotic Normality and Large Sample Inference	Ch.4 Ch.5; Appendix C	2.5
4	Topics in OLS Functional Form Goodness-of-fit and Model Selections	Ch.6.2; 6.3	0.5
5	Functional Form and Dummy Variables Dummy independent variables Using dummy variables for multiple categories Interactions using dummy variables Dummy <i>dependent</i> variable	Ch.7	1.5
6	Heteroskedasticity Consequences of Heteroskedasticity Robust inference Testing for heteroskedasticity Weighted Least Squares	Ch.8.1-8.4	1.5
7	More Topics in OLS Functional form misspecification Using proxy variables for unobserved explanatory variables OLS under measurement error	Ch.9.1;9.2; 9.4	1

* The readings are all from the Wooldridge textbook unless otherwise indicated