

Econ203 Fundamental Econometric Methods

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Learning Outcomes

This course introduces you to the art and science of econometric modeling as applied to economics, business, and all other branches in social sciences. We could easily apply it to many other areas such as the natural sciences. You are going to learn how to develop, statistically test, and apply econometric models. This course emphasizes intuitive understanding of econometrics, as opposed to a more abstract and theoretical approach. Hands-on experience with econometric computer software is an important part of this class. Expect to **spend a lot of time on computers**. This course aims at laying down a basic but solid foundation for quantitative analysis. You may also regard taking this course as learning how to use a “tool” or a professional technique, very useful for the wide range of careers you plan to pursue. So you have to make yourselves committed to this course and be willing to sacrifice all your trifles throughout this semester. You have to make such a commitment to this course.

Prerequisites

You need to have good background in Statistics, Introductory Quantitative Method, or some higher-level statistics course. You should also have completed some economics courses, ideally intermediate macro and micro. While calculus can make some points easier to understand, I will only use it if all students have had calculus (in which case I still only use it sparingly). For some very important ideas, however, you need some Math backup since intuition and Math often go hand in hand, as you know.

Textbooks

- A. **Required:** A.H. Studenmund, *Using Econometrics: A Practical Guide*, 5th edition Pearson Addison-Wesley, 2006 (or 4th edition 2001 if the latest edition is not available yet).
- B. **Supplementary:** D. Gujarati, *Basic Econometrics*, 4th edition, McGraw-Hill, 2003.

It is very important for you to preview the chapters as outlined in course contents below before you come to class. You could be “at loss” very quickly without at least some preview. Notice that I ask you questions as a regular check upon your preview and sometimes I have to resort to the written form to check on you.

Measurement of Learning Outcomes

Homework assignments & attendance	5%	(to be given and checked regularly)
A regression project outline	5%	(due on October 14)
A regression project presentation	10%	(starting from October 21)
The regression project	20%	(due on November 17)
The final	60%	(by university schedule)

You are responsible for anything I have talked about in class but the required textbook has not, or anything the textbook has talked about but I have not in class. Your course grade depends on your performance in those requirements. In accordance with the University policy, I give a grade of "I" (incomplete) only under very unusual circumstances. Poor performance is not justification for an "I". Details for each of the requirements are given below.

A Regression Project Outline

The outline is due October 14 Tuesday and it must be ready for presentations starting from the following week. I will discuss with you on the feasibility of your topic. The point is to help you avoid wasting time in writing something quite off the mark. Consider i) how you choose a particular dependent variable and a set of independent variables; ii) why your choice is important; iii) how you plan to do your project; iv) what readings give you inspirations and why; v) citations. There is a wide range of topics for your research project. The key to a successful project is to set up a null hypothesis.

The Project Presentation

Each one of you (or two of you, depending on the student enrollment for the course) has to present your completed outline to your classmates. On the presentation day all students should come to help with the presenter. Each student has to ask at least one question. The purpose is clear: to enhance the communications skills and bilateral or multilateral coordination so that your paper can be corrected or enriched. Both your fellow classmates (responsible for 5%) and the instructor (responsible for 5%) will mark your presentations. You need to enrich your outline and incorporate the constructive comments to finish your project. Each presenter has to take notes of the questions asked in the first round of the presentations. Oftentimes students would like to change topics after “so much criticism” in the first round. But if he or she continues with the original topic, we want to make sure that the presenter has incorporated all the feedback from his presentation.

The Regression Project

Each one of you (or two of you) must run a regression for a chosen topic by yourself!

- 1) You need to determine a topic. Consider what a particular variable will be the dependent variable and how this variable is explained or determined by a set of other variables.
- 2) You need to know the relevance of your project and the existing literature. You need to summarize the major findings of relevant literature. Novelty of your project is highly appreciated or rewarded, but not required.
- 3) You need to find data from outside our textbooks for a dependent variable and for at least two independent variables. Report the data source.
- 4) You need to check the problems of, among other things, the multicollinearity, the serial correlation, the heteroskedasticity, and non-stationarity.
- 5) You should be able to explain your result.
- 6) You need to report all your computer commands to carry the tests and to run your regressions. You have to submit the original data, the treated data, and your project in both hard and soft copy.
- 7) Last, you should be able to tell how you can improve upon your finished work.

Homework Problems and Attendance

We are going to have quite some number of problem sets. The exact number will be determined by my judgment of the students' background. The problem assignments are critical for understanding the materials and performing well on the exams. In doing your problem sets, each of you should make independent efforts to make sure that you understand everything by yourself. I will randomly collect and check some or all of the assigned homework problems, but will also suggest other problems that I think would be helpful for you. If you make a reasonable effort to complete all assignments, I will at least give you some credits even if you did them all wrong. You must always prepare to submit your assignment on time. Late submissions will not be accepted. I'll keep a record for your submissions and your tutorial attendance. If your name is called, but you cannot submit your completed homework, I'll make deduction of your marks. If needed, the homework submissions can be your presentations on the blackboard.

The final is comprehensive and will be conducted on computers.

Computer Sessions

These sessions cover computer techniques and homework assignments. You need to get two blank disks available for downloading data, copying Eviews programming language and estimation experiments, and sometimes, submitting your calculation results.

Schedule Changes

Since this class is quite independent, we may switch quite freely from computer application class to problem session class. I am the only one who may decide for such a switch. You should disregard any rumors, notices, or announcements made by others. If I do not arrive in the classroom within ten minutes in the beginning of the class time period, you may assume that class has been canceled for the day, in which case I would like to make some arrangements for the make-up classes.

Calculators

The minimum requirements for a pocket calculator for this course include the following: addition, subtraction, multiplication, division, squares, square roots, chain calculations, and memory. I expect you to know how to fully utilize your calculator in working problems in this course. Under no conditions will the results of the statistical calculations without accompanying problem setup and intermediate steps receive full credit on exam problems. You are responsible for insuring that your calculator is in working condition for exams. Failure of a calculator is not sufficient to justify a make-up exam. I do not permit sharing of calculators during exams.

Cheating

I will not tolerate cheating! I hope that each of you will not tolerate cheating, either! I will take measures to discourage some possible temptations. I will ask the rest of the class to be patient with these measures, especially since they are for your benefits. I would greatly appreciate any information that you may have regarding incidents of cheating by other students in the class, and assure you complete confidentiality. For anyone caught cheating, the minimum penalty will be a zero on the exam and a report to be filed with (1) the Office of Discipline or Judicial Affairs and (2) the Chairman of the Department of Economics. There will be no exceptions to this policy.

Miscellaneous

- a) Classrooms prohibit eating or drinking.
- b) I do not permit reading of newspapers during class time.
- c) I wish to retain a relaxed atmosphere, however, I expect you to refrain from loud or excessive talking since it is disturbing to me and to other students.

I am committed to providing a learning environment with open communication and mutual respect. Just as you can expect me to treat you with respect, I expect each of you to treat everyone in this classroom with respect.

Indicative Contents

We may add or delete some topics as needed according to the background of the students in this class. Notice that there could be some changes as well because of some specific needs for doing DR projects in the future. I will give you at least a one-week notice for any change in the planned topics or exam dates unless an unforeseen emergency prohibits adequate notice of a postponement.

Review of Basic Statistics and Hypothesis Testing

- 1) Type I and Type II Errors
- 2) Decision Rule of Hypothesis Testing (Table-Reading)
- 3) The t-Statistic (One-Sided, Two-Sided Test, and its Limitations)
- 4) Confidence Intervals
- 5) The Chi-Square Statistic
- 6) The F-Statistic
- 7) Correlation Coefficient
- 8) Some Nonparametric Statistics (Test for Randomness)
- 9) Some Basic Topics in Sampling (Errors, Size, Cluster Sampling)
- 10) Decision Making under Uncertainty
- 11) Bayesian Analysis

Introduction and Overview

- A. Introduction (Studenmund Ch.1)
- B. Ordinary Least Squares (Ch.2)
- C. Applications (Ch.3)
- D. Classical Linear Model: Assumptions and Properties of OLS (Ch. 4)

Specification of the Model

- E. Choosing Independent Variables (Ch. 6)
- F. Functional Form (Ch. 7)

The Simple Linear Model under Less than Ideal Conditions

- G. Multicollinearity (Ch.8)
- H. Serial Correlation (Ch.9)
- I. Heteroskedasticity (Ch.10)
- J. Applications (Ch. 11)

Other Topics

- K. Lag Models (Ch. 12)
- L. Dummy Independent and Dependent Variables (Logit, Probit, and Tobit Models (Ch. 13)
- M. Simultaneous Equations (Ch. 14)
- N. Forecasting (Ch. 15)
- O. Spurious Correlation and Nonstationarity
- P. Cointegration and Error Correction Mechanism