Economics 5263

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1 Purpose

The purpose of this course is to prepare entering graduate students in business and economics to use regression analysis given a well-defined problem. Emphasis will be placed on your ability to understand when to adopt a particular model or technique, how to implement it, and how to interpret your results.

This course is the second in a two-course sequence that covers the use of regression analysis in econometrics. Specifically, you will be introduced to regression techniques that are suitable for use in macroeconomics, financial economics, and microeconomics. This is strictly an applied course. For a more thorough understanding of univariate time-series modeling in the time and frequency domains I suggest you take STAT 5053 followed by its theoretical extension to regression modeling in Time Series Econometrics, ECON 6233.

Econometrics exists because much can go wrong in statistical analysis when data are not the outcomes of repeatable experiments. As part of your study you will learn a few techniques about identifying when data are not being generated in a way that will allow basic statistical models to be used. Some techniques that may yield valid inference when things go wrong will be discussed. Unfortunately, there is never any guarantee that your analysis is valid or that the assumptions that permit valid inference are met by your data. In the end, though, obtaining useful results from statistical analysis is as much art as science. Whether you are able to become a competent artist or not is a function of your knowledge, creativity, and humility. I can help you with the first part, as for the rest you are on your own.

2 Textbooks

Required

James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 3rd edition, Addison-Wesley, 2010.

Other Sources

There is an excellent website that is provided by the author and publisher of your book. It can be found at

http://wps.aw.com/aw_stock_ie_3

A. Colin Cameron and Pravin K. Trivedi, Microeconometrics Using Stata, revised edition. http://www.stata.com/news/mus.html.

Adkins and Hill, *Using Stata for Principles of Econometrics, 4th edition*, 2011. This book is good for point-and-click instructions and for the basics. It is not nearly as thorough as Cameron and Trividi, but it has its uses. The new edition has more stuff in it than the previous one. Also, Cameron and Trividi has NO time series topics, making our book much more useful for this course. Note, there are some typesetting problems in the book that are distracting at best. It is unclear whether Wiley intends to fix these at this point....

Adkins, *Using gretl for Principles of Econometrics, 4th edition*, 2011. It is freely available from my website,

http://learneconometrics.com/gretl/using_gretl_for_POE4.pdf.

Kennedy, Peter. A Guide to Econometrics, 6th edition. John Wiley, 2008. This is a particularly valuable book for anyone whose plan of study includes more econometrics. Chapter 22 on what can go wrong and what to do about it is worth $35 that Amazon charges for this book.

3 Prerequisites

The prerequisite for this course is Econ 5213.

4 Course Outline

1 Linear Regression Review

- 1.1 Estimation
- 1.2 Statistical Properties of the estimators
- 1.3 Hypothesis Testing
- 1.4 Confidence Intervals

2 Regression with Panel Data

- 2.1 Panel Data
- 2.2 Panel data with two time periods: "before and after comparisons"
- 2.3 Fixed effects regression
- 2.4 Random effects regression
- 2.5 Example: Drunk driving laws and traffic deaths

3 Dynamic Regression Models and Autocorrelation

- 3.1 HAC Standard Errors
- 3.2 Nonlinear Least Squares
- 3.3 Testing for Autocorrelation
- 3.4 Autoregressive Distributed Lag Model

4 Introduction to Macroeconometrics

- 4.1 Tests for Stationarity
- 4.2 Spurious Regressions
- 4.3 Cointegration
- 4.4 Vector Error Correction (VECM)
- 4.5 Selecting Lag Length
- 4.6 Cointegration Tests
- 4.7 Vector Autoregression (VAR)

5 Introduction to Financial Econometrics

- 5.1 ARCH and GARCH
- 5.2 Testing for ARCH

5 Software

There are two basic pieces of software that you can use to complete assignments in class: Stata and gretl. Given a choice, I'd prefer you to use Stata. It is professional strength software and learning how to use it will serve you well in the future. If you commute and are unable to get regular access to Stata, gretl is offered as a free substitute. In addition, I have written a book that will show you how to use gretl that is also free.

Stata

The first is *Stata*. *Stata* is currently available in the CBA labs and on the CBA Trading Floor.

For those interested in what *Stata* can do, here is a link to a *Stata* brochure:

http://www.stata.com/products

and to a brief list of *Stata*'s statistical capabilities

http://www.stata.com/capabilities

For a comparison to SAS, Stata, and SPSS visit:

http://www.ats.ucla.edu/stat/technicalreports/

Gretl

Gretl is an acronym for Gnu Regression, Econometrics and Time-series Library. It is a software package for doing econometrics that is easy to use and reasonably powerful. Gretl is distributed as free software that can be downloaded from http://gretl.sourceforge.net and installed on your personal computer. Unlike software sold by commercial vendors (SAS, Eviews, Shazam to name a few) you can redistribute and/or modify Gretl under the terms of the GNU General Public License (GPL) as published by the Free Software Foundation.

Gretl comes with many sample data files and a database of US macroeconomic time series. From the Gretl web site, you have access to more sample data sets from many of the leading textbooks in econometrics, including ours *Introduction of Econometrics* by Stock and Watson. Gretl can be used to compute least-squares, weighted least squares, nonlinear least squares, instrumental variables least squares, logit, probit, tobit and a number of time series estimators. Gretl uses a separate Gnu program called *gnuplot* to generate graphs and is capable of generating output in LaTeX format. Gretl is under development so you can probably expect some bugs, but in my experience it is pretty stable to use with my Windows XP systems.

6 Exams

There will be 3 exams in the course. All exams must be taken at the designated time. No make up exams will be given. If you miss an exam you will receive a grade of zero.

7 Grades

Your grade in this class will be based on your performance on 3 exams, and homework assignments.

Grades will carry the following weights and be measured according to the accompanying scale.

Grade Weights	
Exam 1	30%
Exam 2	30%
Exam 3	30%
Homework	10%

Grades	
92%–100%	A
79%–92%	B
68%–79%	C
57%–68%	D
$< 57\%$	F

Note: One or more of the exams *may* contain a take-home portion that will require you to do some work using Stata or Gretl. Although I encourage you to collaborate with fellow students on homework assignments, **I expect you to work alone on any take-home tests**.

8 Homework

There will be some homework in the course. The best way to learn econometrics is to do econometrics. A large portion of your homework will require you to use a computer. The computer software we are using is Stata or Gretl. Stata is a Windows program that operates under the Windows XP operating system on the microcomputers in the CBA lab. Gretl is free and has Mac, Windows, and Linux versions available for download.

I do not accept late homework under any circumstance. I expect homework to be legible and well organized. I encourage you to work with others in the class while doing homework, and you may turn in assignments in groups of 2. The homework receives style points, so

identical answers may receive different grades. I am predisposed to to look favorably upon work that is well organized and legible.

Unless you are specifically told otherwise by me, all homework must be turned in at the beginning of the class period on the date that it is due. Homework will not be accepted if late.

9 Attendance

Regular attendance is expected. You are responsible for any material you miss because of absence. In general, I do not permit students to copy my notes. If you miss class and need a copy of the notes, please obtain them from one of your classmates. And remember, if you miss an exam, you'll earn a zero.

10 Cheating Policy

Cheating will not be tolerated. Any violation of the University's academic integrity policy will be prosecuted according to University regulations. If you are not sure what this is about, then visit the **Academic Integrity** link at the bottom of my website. Basically, you will receive a grade of 0 on any test or assignment you are caught cheating on. If the violation is especially egregious or it threatens my ability to evaluate work for others in the course, then you could earn an F for the course and be suspended from the University. Remember, you are responsible for the security of your work (in other words, if someone copies your work, you will also receive a zero on the test or assignment).

References

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