ECO 1400F (L0201)
ECONOMETRICS (MFE)

University of Toronto
Department of Economics
Fall, 2022

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Office hours:
Thursday 3-4 (online), or by appt

COURSE DESCRIPTION

This is an introductory graduate level econometrics course for students in the MFE program. The course aims to provide a solid grounding in the practice of econometrics. This entails a balance of theoretical preparation and "hands on" experience. The lectures emphasize econometric theory, but students are given considerable opportunity to put it to use in computer-based assignments and a substantive term paper.

The course assumes basic familiarity with elementary statistics, matrix algebra, and some previous exposure to regression analysis; however, we begin from "square one" with simple regression analysis. By the end of the course, students can expect that they will be able to conduct their own empirical investigations, as well as to evaluate critically econometric and other statistical evidence.

TEXTBOOK

Introductory Econometrics: A Modern Approach (7th Edition), by Jeffrey M. Wooldridge (Cengage Learning, 2020). NB: An ebook version ($60) is also available from UofT bookstore.

The required Wooldridge book is very sophisticated but written at a level accessible to undergraduates. It has a wonderful collection of computer assignments and will be the only book you need for this course. However, my lecture notes will use much more matrix algebra.

As supplementary texts, I recommend:
Econometric Theory and Methods, by R. Davidson and J. G. MacKinnon, (OUP Press, 2004)
Econometric Analysis of Cross Section and Panel Data (2nd ed), by J. M. Wooldridge (MIT Press, 2010)
Probability and Statistics for Econometrics by B. Hansen 2021 (H1)
Econometrics by B. Hansen 2021 (H2)

Those of you who want a textbook that matches more closely the tone of the lectures may appreciate the Davidson and MacKinnon book. It emphasizes theory, but at a level that MA students can handle, and it is a great reference for the foundations of econometrics. Some of the exercises are real brain teasers.

The supplementary Wooldridge text is aimed at PhD students, but gives an excellent advanced discussion of many of the topics in the required text using similar notation.

The Hansen books are aimed at first-year PhD students. The first is an excellent review of statistics and is useful for those of you who want to delve more deeply into topics such as matrix algebra, properties of the conditional expectation function, and LST. The second covers the material in this course (and more), but at a higher level and with proofs.

SOFTWARE

As the course involves a considerable amount of computing, students will have to learn and use a statistical software package. The only package that will be supported *by the TAs* is **Stata** (I will also require that you submit Stata programs to document your term paper). Stata is installed on the network of computers in the basement of the Gluskin Building. However, I *strongly* recommend that students purchase a copy of STATA for use on their own computers. Stata can be purchased (in a variety of flavours-- **Stata/BE 17** is the current recommended edition, and you can decide if you want the six-month, one-year or "perpetual" license) and downloaded at a discount price for UofT students directly from Stata.

GRADING

The final grade will be based on 4 problem sets, class participation, a mid-term exam, a final exam, and a term paper, with the following weights:

Task	Weight	Due Date
Problem Sets	15%	Problem Set 1, Sept 29, 2022 Problem Set 2, Oct 13, 2022 Problem Set 3, Nov 17, 2022 Problem Set 4, Dec 5, 2022
Class Participation	5%	
Mid-Term Exam	15%	Friday Oct 21, 2022 9:10-10:30 TBA
Final Exam	25%	Exam Period
Term Paper	40%	No later than 4pm on Thurs Dec 8, 2022

The problem sets will involve both theoretical and empirical exercises. Their primary value is to serve as a learning (rather than evaluation) tool, and to help you prepare for the exams and term paper. They will be coarsely graded and are worth 3.75% each. You will be assigned to a team for each problem set. You are encouraged to collaborate with your classmates, but each team must hand in its own version of the problem set solution, indicating which other students (if any) made a considerable contribution to their answers. Unauthorized aids (eg. accessing problem set solutions from a web site) are NOT ALLOWED; their use will be treated as plagiarism. Problem sets are due by 11am on the date indicated. Late problem sets will receive a grade of zero.

The term paper requirement will be described in more detail early in the term. It will entail an empirical investigation of an economic question. The paper will involve "original" empirical work, as well as a critical reading of a few pertinent articles related to the question. It must be no longer than 15 pages (double spaced) in length. I will provide a list of candidate topics, but students are advised to select their own topic, subject to my approval, and the paper structure must conform to the project requirements (to be defined later). An outline (statement of topic) will be required by 11 am on **October 17**. Papers handed in after 4:00 pm on Dec 8 but before 4:00 pm on Monday, Dec 12 will receive a 15% penalty for each day or part thereof (Saturday and Sunday included). Papers will not be accepted after this final deadline.

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that *apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (https://uoft.me/pdt-faq (Links to an external site.)).".*

CROWDMARK

This course will use Crowdmark, a collaborative online grading tool for marking and providing feedback on graded term assessments. Crowdmark provides efficiencies with grading, data recording, returning term assessments and handling regrade requests. Copies of student work marked in Crowdmark, including grading and feedback, will be available online to students for at least one year. Digital (i.e., online) copies will serve as the authoritative record for course administrative purposes, and paper copies of assessments scanned and uploaded to Crowdmark will be destroyed after the term has ended and final grades are approved. If you have questions about how your information is stored on Crowdmark, please contact your course instructor.

MEETINGS

We meet for four hours every week: Monday and Wednesday from 11:00-1:00. Some of this time will be used for the occasional tutorial (see Quercus for a schedule). All classes will be held in SS1070.

We have two TAs assigned to this course. The Stata TA will be responsible for Stata questions only, whether related to the assignment or the term paper. The main TA for the course will grade problem sets and tests, and will also be available for consultation regarding the computer assignments and term papers. Office hours and contact information for both TAs will be posted on our course web site.

My office hours are listed above. They may change to accommodate conflicts or due to other obligations that I have. Announcements will be made through our course web-page available on **Quercus**.

EMAIL POLICY

I usually reply to email within one day. But I do not respond to email sent within 24 hours of your test or exam. If your question requires me to write equations or scan computer output, then you should see me during my office hours. To avoid having your email trapped by my spam filter, I require you to send me email from your UTOR account. Use the class identifier and a brief description on the subject line [for example, 1400: HAC reference]. There are limits to how much time I can spend answering email, so please don't abuse this privilege. Email should NOT be seen as a means to receive private tutorials or review material that was covered in class but you missed. Also, the TAs are under no obligation to respond to your email, so please limit your questions for them to their tutorials or office hours.

PLANNED COVERAGE

The following is a list of the topics and corresponding readings, and anticipated duration of coverage. The core material is covered in the first 5 weeks. We then turn to extensions.

0. Statistics Review
Conditional Mean, Law of Iterated Expectations, Best Linear Predictor
Melino: Review of Basic Statistics and Problem Set 0
H2: Chapter 2.1-2.19, 2.25, 2.28, 2.30

1. The Nature of Econometrics and Econometric Data (0.5 weeks).

W: Chapter 1, "The Nature of Econometrics and Econometric Data"
W: EACSPD: Ch 2.
H1: Ch 1-2

2. Least Squares and Regression Analysis in the Classical Linear Normal Model

A. The simple regression model (in matrix notation) (1.0 weeks)

W: Chapter 2, "The Simple Regression Model"
: Appendix D "Summary of Matrix Algebra";
: Appendix E "The Linear Regression Model in Matrix Form"

B. Multiple Regression (3.5 weeks)

W: Chapter 3, "MRA: Estimation"
DM: Ch 2,
DM: Ch 3.1-3.5
H2: Ch 2.18-2.28, 3
W: Chapter 4, "MRA: Inference"
DM: Ch 4.1-4.4
H2: Ch 4-5

W: Chapter 5, "MRA: OLS Asymptotics"
DM: Chapter 3.2, 4.5
W: EACSPD: Ch 12.
H1: Ch 7.1-7.11, 8.1-8.9
H2: Chapters 6.1-6.8,7.1-7.19

3. Extensions for cross-sectional data (2.5 weeks)

W: Chapter 6, "MRA: Further Issues"
DM: Ch 3.6
W: Chapter 7, "MRA: Dummy Variables"
W: Chapter 8, "Heteroskedasticity"
DM: Ch 7.1-7.5
W: Chapter 9: "More on Specification and Data Issues"

4. Time Series Topics (3.5 weeks)

W: Chapter 10 "Basic Regression Analysis with TS Data"
W: Chapter 11 "Further Issues in Using OLS with TS Data"
DM: Ch 13
W: Chapter 12 "Serial Correlation and Heteroskedasticity in TS data"
DM: Ch 14
W: Chapter 18 "Advanced Time Series Topics"

5. Endogeneity and Simultaneity. (1.0 weeks)

W: Chapter 15 "Instrumental Variables Estimation and 2SLS"
DM: Ch 8.1-8.7
H2: Ch 12
W: Chapter 16 "Simultaneous Equations Models"
DM: Ch 12.4