Econ 6818: Econometric Methods & Applications

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Econometics:

Quoting from *A Guide to Econometrics*,

> "You haven't told me yet," said Lady Nuttal, "what it is your fiancé does for a living."
> "He's an econometrician." replied Lamia, with an annoying sense of being on the defensive.
> Lady Nuttal was obviously taken aback. It had not occurred to her that econometricians entered into normal social relationships. The species, she would have surmised, was perpetuated in some collateral manner, like mules.
> "But Aunt Sara, it's a very interesting profession," said Lamia warmly.
> "I don't doubt it," said her aunt, who obviously doubted it very much. "To express anything important in mere figures is so plainly impossible that there must be endless scope for well-paid advice on how to do it. But don't you think that life with an econometrician would be rather, shall we say, humdrum?"
> Lamia was silent. She felt reluctant to discuss the surprising depth of emotional possibility which she had discovered below Edward's numerical veneer.
> "It's not the figures themselves," she said finally, "it's what you do with them that matter."

Some other quotes from *A Guide to Econometrics*:

> Econometrics is what econometricians do.
>
> Econometrics is the study of the application of statistical methods to the analysis of economic phenomena.
>
> What distinguishes an econometrician from a statistician is the former's preoccupation with problems caused by violations of statisticians's standards assumptions; owing to the nature of economic relationships and the lack of controlled experimentation, these assumptions are seldom met.
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> Econometricians are often accused of using sledgehammers to crack open peanuts while turning a blind eye to data deficiencies and the many questionable assumptions required for the successful application of these many techniques.
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> Econometric theory is like an exquisitely balanced French recipe, spelling out precisely with how many turns to mix the sauce, how many carats of spice to add, and for how many milliseconds to bake the mixture at exactly 474 degrees of temperature. But when the statistical cook turns to raw materials, he finds that

> hearts of cactus fruit are unavailable, so he substitutes chunks of cantaloupe; where the recipe calls for vermicelli he used shredded wheat; and he substitutes green garment die for curry, ping-pong balls for turtle's eggs, and for Chalifougnac vintage 1883, a can of turpentine. (Valavanis)
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> It is the preparation skill of the econometric chef that catches the professional eye, not the quality of the raw materials in the meal, or the effort that went into procuring them (Griliches)
>
> The art of the econometrician consists in finding the set of assumptions which are both sufficiently specific and sufficiently realistic to allow him to take the best possible advantage of the data available to him (Malinvaud)

The applied econometrician: The applied econometrician, unlike the theoretical econometrician, needs to worry as much about her data as about the theory. The forecasts and predictions generated by the econometric model are only as good as the data that produced them.

Course Description: Econ 6818 is a course in applied econometrics and statistics for M.A. students in economics. Important components are economic theory, probability theory, distribution theory, statistics, sampling and inference. Extensive use will be made of mathematical, statistical and econometric software.

Web page: My web site is located at http://www.colorado.edu/Economics/morey/index.html . From it you can link to the web page for Econ 6818, or you can go directly to web page for the course at http://www.colorado.edu/Economics/morey/6818/6818home.html .

> All past and current assignments, review questions, and additional readings will be made available at this site on an as-need basis.

Texts:

> Alexander Mood, Franklin Graybill, and Duane Boes, *Introduction to the Theory of Statistics*, McGraw Hill, 1974. ISBN 0-07-042864-6
>
> Damodar Gujarati, *Essentials of Econometrics***,** Erwin/McGraw Hill, 1999. ISBN 0-07-303265-4

For those who desire additional texts,

> Peter Kennedy, *A Guide to Econometrics* (4th edition), MIT Press, 1998. ISBN 0-262- 61140-6. This is an excellent book that provides, in words, the big picture. It is often a required book for this course. I recommend it highly.
>
> Russell Davidson and James MacKinnon, *Estimation and Inference in Econometrics*,

Oxford University Press, 1993. I recommend this book to those who want an advanced text in theoretical econometrics. It is well written. Russell and I went to graduate school together. This book is not for the faint of heart, and you are not responsible, in this course, for an understanding of econometrics at this level. However, for those so inclined, one can benefit greatly from studying this book.

Additional reading and notes: I will assign some additional readings for some topics.

Software: The computer software *Mathematica* will be an important tool. We will use it to investigate distributions such as the Normal, Chi-Square, Student t and F distribution; distributions that play crucial roles in econometrics. We will use it to draw random samples from these distribution. We will use it to write our own code for different econometric estimates, to do simulations, and to do Monte Carlo studies. The graphical capabilities of *Mathematica* will allow us to visualize important concepts.

Mathematica is available on the computers in the computer room for Econ graduate students. There is no need to purchase Mathematica: While it is not necessary to purchase *Mathematica* for the course, one can purchase a PC version. A student version can be acquired from the Buffalo Chip or the Colorado Bookstore. There is both a DOS and MAC version. I'm told the student version does everything the regular version does but slower. The regular version requires more hardware than the student version. If you consider buying *Mathematica,* first make sure you have the hardware to run it, even the student version takes a considerable amount. Also wait until you have played with it some on the CU system.

We will use the econometrics software *?????*.

Prerequisites: The course is required of all M.A. students. A prerequisite is the completion of the first semester courses in theory and math econ. Some of the statistical theory we will use was introduced in Econ 6808 (mathematical economics) – I hope.

Class format: Lecture/problem solving/discussion/computer/estimation

Hands on experience will be stressed. Class format will include both individual and group problem solving. We will extensively use random sampling to investigate the properties of a statistic, and then relate what we find to statistical theory. After completing the course, you will be better able to critically evaluate and apply econometric theory.

You will spend a considerable amount of class time interactively formulating and solving problems and building models. Small groups will often be utilized.

View the readings and my lectures as complements rather than substitutes. A lot of the basic material that you will be responsible for will be presented in lecture and is material

that is not explicitly in the readings.

Details: There will be problem sets, short projects and short exams. Some of these activities will be done using *Mathematica,* some using other software. Your best (N-1) grades on these activities will constitute 30% of your course grade, the midterm 15%, and the final 30%. The final will be cumulative. An econometrics project will constitute 25% of your course grade.

Jennifer Thacher, a finishing PhD student, will be assisting me with the assignments.

Review questions: Review questions will be handed out for each section of the course. Knowledge of these review questions will be will be **very helpful** when taking the short exams and final. I strongly encourage you to write out answers to the review questions and discuss them with you classmates. You will want to form study groups.

In class I will ask many questions. I also expect you to ask questions. In addition to these question, I will sometimes give you the opportunity to earn, or lose, points by verbally answering specific questions. Participation in this latter activity is completely voluntary.

Group Assignments: Some of the assignments will be done in groups. I will tell you in advance if an assignment is a group endeavor. The group will work together and just turn in one assignment. Everyone in the group will get the same grade for that assignment. Group activities are one of my ways of giving you an incentive to work and study together.

Econometrics project: You will complete an econometrics project. You should begin now. Soon I will ask you to present me with a proposed project. I am fairly flexible about what constitutes a project, but it must involve estimation and data. The data can be either real or generated; that is, it can be simulated, collected by someone else, or collected by you. I will want to know something about the properties of your sample. There will be a number of assignments throughout the term with respect to this project, including a presentation you will make in class. The purpose of the project to develop your skills as an applied econometrician.

Possible projects include:

A Monte Carlo study of different estimators
Replication? of the results in some published study (this will require that you quickly obtain the author's data)
Developing and estimating an econometric model using published data
Developing and estimating an econometric model using data you collect
Specifying a question and then developing a sampling plan that will allow you to answer the question with an econometric model.

Some authors, like me, have some of the data sets they have used available on their web page.

I will consider group projects, but they better be good. You might consider presenting your project as a web page, but make sure you have discussed this with me in advance. If a project is exceptional, I will publish it on the web page for this class, independent of whether it was designed as a web page.

As is always the case, the presentation of an excellent project requires that its write-up is clear and well written. Before you hand in your project to me, have your write-up critiqued by two of your peers. I will ask your reviewers to state that they have carefully reviewed your paper and given you written and verbal comments. Reviewers - don't be afraid to point out ambiguities when you find them. This review process is akin to what happens to a paper when you submit it to a journal; it gets reviewed by a panel of your peers. This process greatly improves papers, even though at the time one typically hates the reviewers. If the class so desires, we can make the review process blind.

Some projects by previous students in this course can be found at
http://www.colorado.edu/Economics/morey/6818/student/6818proj.html

Office hours: My office hours will on Monday and Wednesday from 11:00 to 12:15, and by appointment. If you can't make it to the office hours, catch me before or after class to schedule a time. My office is Econ 122. Please feel free to contact me by email Edward.Morey@Colorado.edu about setting up an appointment. Sometimes it will take a day or so for me to get back to you.