

Econometrics I (ECON/FIN 6620)
<http://frank.mtsu.edu/~eaeff/662/econometrics.html>
BAS S302 Thursdays, from 6:00pm to 9:00pm

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My office is located in BAS N308. Official office hours will be held from 10:00am to 12:00pm on Monday, Wednesday, and Thursday. However, if these hours are not convenient, feel free to set up an appointment. The best way to contact me is by e-mail (eaeff@mtsu.edu). In addition, my phone has voice mail, and I will try to respond to messages as quickly as possible.

What can this course do for you?

Up through the 1980s, theoretical work was unquestionably the most prestigious activity in economics. But theory can often be used to argue for different sides of the same issue, and it is only very simple models that will deliver precise and unambiguous conclusions. As computing power became cheaper and rich data sets more widely available, economists increasingly began to turn to empirical work. Econometrics is the set of statistical techniques developed to test the kinds of hypotheses economists typically forward, and to control for problems in the kinds of data economists typically use. Today, all economists are expected to be able to do empirical work, and econometrics provides the economist with the techniques needed for publishing in academic journals and for doing consulting work.

We will learn how to use R, the open-source statistical package that contains procedures written by many of the world's greatest statisticians. Procedures found in R may not be available elsewhere, a fact that gives the R user some advantage in publishing papers using the newest techniques. And R is completely free, so that you can download and use it in your teaching and research wherever life takes you.

Learning by doing.

The best way to learn econometrics is to do econometrics. In this course, there will be little emphasis on statistical theory. Instead, you will be evaluated on your ability to carry out econometric studies, using R, both on a Windows PC and on the departmental Linux workstation (beast). You should plan on spending about 10 hours per week on homework--a bit more the first weeks.

Grading.

30% of your semester grade will be based on tasks performed by groups, each with two to three members. If convenient, group membership should change each week. Every week, homework will be assigned, due the following class period. Each group turns in one set of answers. A peer assessment, conducted on December 17, will determine your group work grade. A final exam—given December 3—will count for 35% of the grade. Questions on the final will reflect the homework assignments. 35% of your grade will be based on an individual term paper, which should be ready to present to the class on December 17 (during final exam week). The paper may cover any topic having to do with economics, and should employ some of the techniques we will learn this semester. You must clear the topic with me in advance.

Materials.

1. You are required to purchase: Christian Kleiber and Achim Zeileis. *Applied Econometrics with R*. Springer: 2008 (ISBN: 0387773169). This book covers topics that will appear not only in this course, but in Econometrics II and III. You should purchase it online.
2. You are required to obtain an econometrics textbook. You can find the best price online. I can recommend the following books, arrayed in order of increasing difficulty:
 - a. *Econometric Models and Economic Forecasts (Fourth Edition)* by Robert S. Pindyck and Daniel L. Rubinfeld, McGraw-Hill, 1998 (paperback ISBN: 0071188312). Best choice for most MBAs and MAs.
 - b. *Introductory Econometrics: A Modern Approach (Fourth Edition)* by Jeffrey M. Wooldridge, Thomson/South-Western, 2006 (ISBN: 0324581629). This book is probably the best book for a first-year PhD student—one can read it and learn basic econometrics. Wooldridge also has a very popular but more advanced text on cross-section and panel data.

- c. *Econometric Analysis (Sixth Edition)* by William H. Greene, Prentice-Hall, 2007 (ISBN: 0135132452). This book sits on the shelf of more people doing applied econometrics than any other. The book is fairly encyclopedic, and is too advanced for most first-year PhD students to use as a means of learning basic econometrics—rather it is best-suited for looking up the nuances of particular estimation techniques.
 - d. *Microeconometrics: Methods and Applications* by A. Colin Cameron and Pravin K. Trivedi, Cambridge University Press, 2005 (ISBN: 0521848059). An increasingly popular book—the top choice of some of our 4th year PhD students. Like Greene’s book, it provides good insight into many advanced estimation techniques.
3. I highly recommend Peter Kennedy’s *A Guide to Econometrics (Sixth Edition)*. Wiley-Blackwell: 2008 (ISBN: 1405182571). This book is regarded as one of the best sources of intuition into the various topics of econometrics. Many of our PhD students have said that it is the most useful book for a first-year student.
 4. Two especially helpful free introductions to R:
 - a. <http://cran.r-project.org/doc/contrib/Farnsworth-EconometricsInR.pdf>
 - b. http://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Outline

There are fourteen class sessions. The first twelve weeks will consist of a mixed lecture-lab format, covering the topics in the following outline. In the thirteenth week (Dec. 3), we will have our final. In the fourteenth week (December 17) we will listen to term paper presentations and conduct the peer evaluation. Some topics may be changed as the semester progresses.

Date	Topic
Sept. 3	Introduction to R and the beast
Sept. 10	Introduction to estimators and elementary diagnostics (t-tests, F-tests, and R^2)
Sept. 17	Specification: influential variables, and influential observations
Sept. 24	Listwise deletion and multiple imputation
Oct. 1	Applications of F-tests: Granger causality; fixed effects
Oct. 8	Multicollinearity and omitted variables
Oct. 15	Heteroskedasticity
Oct. 22	Autocorrelation: Temporal
Oct. 29	Endogeneity
Nov. 5	Autocorrelation: Spatial
Nov. 12	Bootstrapping and Monte-Carlo Simulations
Nov. 19	Forecasting
Nov. 26	<i>Thanksgiving Holiday—No Class</i>
Dec. 3	Final Exam
Dec. 10	<i>Official Study Day—No Class</i>
Dec. 17	Paper Presentations and Peer Evaluation