

ECON 415 - Introduction to Econometrics

ECON 514 - Econometrics Analysis

Winter - 2018

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Class Website: <https://canvas.emich.edu/>
Class: Wednesday 6:30-9:10 p.m.
Office Hours: Tues. Wed. 3:00-6:30 p.m.
and by appointment

"If applied econometrics were easy, theorists would do it."

-From Mostly Harmless Econometrics by Angrist and Pischke

"...we should listen to the data, but know when to tell the data to shut up!"

-Peter Kennedy, "Oh No! I Got the Wrong Sign! What Should I Do?", *Journal of Economic Education*, 2005.

Description

Econometrics is the branch economics that uses data to analyze economic relationships. Most economic data come from uncontrolled social experiments that take place every day in the economy. Econometrics differs from classical statistics because the latter focuses on analyzing data that come from controlled experiments. The purpose of this course is to introduce you to the body of statistical methods that are used to analyze data that come from uncontrolled experiments, and illustrate how these methods are applied in empirical research in economics. The focus of this class is on the development and application of the classical linear regression model. If time permits, other regression models will be introduced, such as the general linear regression model, fixed-effects regression model, and instrumental variables regression model. You will learn methods for estimating and testing hypotheses about the parameters of regression models, as well as a basic understanding of model specification issues. The emphasis of this class is on practical application and computer implementation. To implement the methods and techniques covered in lecture, you will learn how to use the SAS statistical software package to analyze real world data sets. SAS is a computer program that can be used to read, manage, analyze, and present data. It is widely used in academics and commercial establishments.

Prerequisites: ECON 201, ECON 202, and ECON 310 (or equivalent)

Textbook

Wooldridge, Jeffrey, Introduction to Econometrics: A Modern Approach, Cengage.

Supplemental Material

A teaching guide for the SAS statistical package (prepared by Professor Thornton), and data sets that accompany the SAS teaching guide can be downloaded from Canvas. Canvas will also include other information including the syllabus, assignment due dates, homework questions, data sets, and handouts. A good online resource for using SAS is <http://www.ats.ucla.edu/stat/sas/>

SAS Statistical Software

The SAS statistical program is available on computers at the Halle library multimedia commons and the social science computer lab, Pray-Harrold 717. Students can also install SAS on their home computer with a Windows operating system, but are permitted to use it for coursework for the semester only. To install SAS on your home computer follow the link <http://labstat.emich.edu/StudentSAS/index.php> to download self-extracting files. Login with your my.emich username and password and then download the self-extracting files. Create a folder on your computer to store the files. After downloading the files to the folder, click on the file named SAS94.part1. After all the files are downloaded into your folder click the setup file to launch the SAS installation wizard. When the window named “Select Deployment Type” appears, select “Install SAS Foundation and Related Software.” Continue with the default selections.

Grading

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Your grade will be based on a midterm exam (30%), final exam (30%), participation (10%), and problem sets (30%). The grading scale for the course is as follows:

A.....93-100%	B+.....86-89%	C+.....76-79%	D+.....66-69%
A-.....90-92%	B.....83-85%	C.....73-75%	D.....63-65%
	B-.....80-82%	C-.....70-72%	D-.....60-62%
			F.....0-69%

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Your grade will be based on a midterm exam (25%), final exam (25%), participation (10%), problem sets (20%), and an empirical project (20%). The grading scale for the course is as follows:

A.....93-100%	B+.....86-89%	C+.....76-79%	F.....0-69%
A-.....90-92%	B.....83-85%	C.....73-75%	
	B-.....80-82%	C-.....70-72%	

Exams

There will be one midterm exam and one final exam. The final exam is not comprehensive and will cover the material succeeding the midterm. The exams will cover materials from lecture, textbook, problem sets and any additional assigned readings. Each exam will consist of short and long answer questions, including problems. Tentative dates for the exams will be given in class.

Problem Sets

There will be approximately one problem set assigned every one to two weeks. These will be posted on Canvas together with the data needed for the assignment. Problem sets usually consist of questions that require computer work. Questions involving computer work will require you to use SAS statistical software to perform the data analysis. SAS is installed on all the computers in the computer lab located in room 717 of Pray-Harrold. You can also download a copy of SAS on your personal computer. Note that you must turn in your own problem set (no copying!). Evidence that students copied assignments from other classmates will result in a zero for that assignment for all students involved. The problem sets are due at the beginning of class on the due date. If a student fails to submit an assignment at the beginning of class on the due date, the student will receive a deduction of 10% for each day this problem set is late. Email submissions are accepted only for those with my advanced permission for missing a class.

Participation

Class participation only requires that you run the sample programs that are provided in the *Guide To The SAS Statistical Package*, and turn these in on Canvas by the required dates mentioned in class. The *Guide To The SAS Statistical Package* and corresponding data sets are on Canvas.

Empirical Research Paper (ECON 514)

The empirical research paper will give ECON 514 students a chance to use the material learned in class to research a topic in economics that they find interesting. Details of this research paper are on the last two pages of the syllabus.

Classroom Conduct

Any successful learning experience requires mutual respect. Neither instructor nor student should be subject to behavior that is rude, disruptive, intimidating, or demeaning. Views may differ on what counts as rudeness or courtesy. If you are not sure what constitutes good conduct in this classroom, ask the instructor. The instructor has primary responsibility for and control over classroom behavior and maintenance of academic integrity.

Students are expected to adhere to the standards and expectations detailed in the [Student Code of Conduct](#). In addition, cell phones, side conversations, tardiness, foul language, and the use of open laptops and ipads/tablets for purposes other than for class will not be tolerated. These are very disruptive to students and if the problem persists I will ask you to leave. If you are caught cheating I will give you a zero for that assignment/exam and if the problem persists I will take further action.

Disability Concerns

It is my goal that this class be an accessible and welcoming experience for all students, including those with disabilities that may affect their learning in this class. If you believe you may have trouble participating or effectively demonstrating learning in this course, please meet with me (with or without an accommodation letter from the Disability Resource Center) to discuss reasonable options or adjustments. During our discussion, I may suggest the possibility/necessity of your contacting the DRC (240 Student Center; (734) 487-2470; swd_office@emich.edu) to talk about academic accommodations. You are welcome to talk to me at any point in the semester about such issues, but it is best if we can talk at least one week prior to the need for any modifications.

Enhancing Student Skills

The University Writing Center (115 Halle Library; 487-0694) offers one-to-one writing consulting for undergraduate and graduate students. The UWC also has several satellite locations across campus (in Owen, Marshall, Pray-Harrold, and Mark Jefferson). For more information see the UWC web site: <https://www.emich.edu/uwc/>

The Academic Projects Center (116 Halle Library) also offers one-to-one writing consulting for students, in addition to consulting on research and technology-related issues. Additional information about the APC can be found at <https://www.emich.edu/apc>.

International Student Resource Center (200 Alexander Building) <http://www.emich.edu/esl/isrc/> is a service of the World Languages Department for EMU students who need help with their non-native English language for academic assignments. Help is provided for reading and comprehension, listening and note-taking, improvement of grammatical accuracy, compositions, study skills, and conversation. Note, this is not the Office of International Students.

Tentative Topics to be Covered

I. Introduction

1. Introduction to Econometric analysis (Chapter 1)

II. Mathematical Statistics

1. Fundamentals of Probability (Appendix B)
2. Fundamentals of Mathematical Statistics (Appendix C)

III. Simple Regression Analysis

1. Simple Regression (Chapter 2)

IV. Multiple Regression Analysis

1. Multiple Regression (Chapter 3)
2. Hypothesis Testing (Chapter 4)
3. Large Sample Properties (Chapter 5)
4. Further Issues (Chapter 6)
5. Dummy Variables (Chapter 7)
6. Heteroskedasticity (Chapter 8)

*This syllabus is subject to change. If I do make changes, I will announce them in class and email them.

Empirical Research Paper

(Required for those registered for ECON514)

The required paper is an empirical study that uses data to analyze an economic relationship related to a topic in which you are interested. The objective of the study is to explain the relationship, not prediction or forecasting. Your goal is to get a good estimate of the causal effect of one or more explanatory variables of interest on a dependent variables of interest. The paper should include five sections. (1) Introduction. (2) Data and descriptive statistics. (3) Econometric model. (4) Results. (5) Conclusions. This handout presents guidelines that you should follow when organizing and writing your paper.

Introduction

The introduction should include a short discussion of the topic in which you are interested, why the economic relationship you are analyzing is important, and the objective of the paper. The introduction typically includes a literature review of related research, but this is not required for this paper. It is essential that you clearly and concisely state the objective of the paper.

Empirical Model

The empirical model section should include the equation to be estimated and the assumptions of the model. As part of this section you should discuss the underlying economic theory that you use to build your empirical model and the corresponding hypothesis that you are testing. You also should include a discussion of the empirical approach. The empirical approach is the estimator used to obtain estimates of the parameters of the equation and hypothesis tests of interest.

Data

The data section discusses the data source(s), type of data, number of observations, definition and measurement of each variable, and provides descriptive statistics. It is important to clearly define each variable and state how it is measured. If there are a large number of variables, it may be useful to provide a table. A table with descriptive statistics should be included in the paper. It may appear either in the data section or an appendix. It should include the mean and standard deviation for each variable. It may or may not include additional descriptive statistics such as maximum and minimum values of variables.

Results

The results section has one or more tables that report the results of estimation and hypothesis testing. It also discusses these results. Results should always be provided in tables. The first table in the results section should report the coefficient estimates and either the standard error of the estimate, the t-statistic for the zero null hypothesis, or the p-value for the zero null hypothesis. Some researchers report two or all three of these statistics. If t-statistics are reported, some researchers will indicate significance at the 1%, 5%, and 10% level with one, two, and three asterisks. A formal t-test does not need to be done, but when discussing results you should either discuss statistical significance of variables (if t-statistics are reported) or strength of evidence of effects (if p-values are reported). If a number of hypothesis tests are performed, then it may be useful to report the restrictions being tested and test statistics in a separate table. These tests may include tests of parameter values and/or specification tests. Additional tables that may be included in the results section include elasticity

estimates and other estimates obtained from the estimated regression coefficients.

You are required to test for heteroskedasticity and multicollinearity and report the results. If you find evidence of heteroskedasticity or multicollinearity you need to discuss how you account for them in your empirical estimation.

The most important part of the results section is the discussion of the results. This includes the evidence of effects, implications of estimates and hypothesis tests, and the importance of these implications. When control variables are included in an equation, their coefficient estimates may or may not be discussed. Often times they are briefly discussed. However, most of the discussion focuses on the variable or variables of interest.

Conclusion

The conclusion section provides a succinct and substantive conclusion of what you have learned from the empirical study. It may concisely restate key estimates and findings. It often includes policy implications of the study, if there are any.

Additional Resources

In addition, please take full advantage of the writing and research resources available to you at EMU, including the following website:

- <https://www.emich.edu/uwc/resources/>

Meryl Brodsky (mbrodsky@emich.edu) is the economics department contact in Halle Library. For help with research, finding sources, collecting data, etc., please see:

- <http://guides.emich.edu/economics>

Individual sessions at the Writing Center are provided throughout the semester. See the following link for information on how to make an appointment, among other things:

- <https://www.emich.edu/uwc/>

A guide to citing sources is available at:

- <http://www.emich.edu/library/help/citing.php>

If you have any references please cite these in APA or Chicago Manual of style format.

Details and Formatting Guidelines

Your completed paper should be submitted to me through Canvas and must meet the following requirements or I will not accept it:

- The research paper must be submitted as a PDF file on Canvas prior to the deadline. Please title the document “Econometrics Paper - Last Name” (where “Last Name” is replaced with your last name). You are also required to turn in your data file and program file that you used to generate your results.
- The maximum page limit is 20 pages, including a title page and references. Figures and tables should be embedded in the document.
- Your paper should have a title page that includes: a title; author’s name and contact information; and an abstract.
- The document should be formatted as follows:
 - 12 pt. Times New Roman font
 - 1-inch margins
 - Double spacing
 - Page numbers in the bottom middle of the page
 - Chicago or APA style citations (using author-date for in-text citations)

Due dates: November 11, 2015, a 1-2 page proposal identifying four articles and equation to be estimated. December 9, 2015, final paper as described above.