Introduction to Applied Econometrics  
Econ 400 (4 Credits), Fall 2020  
University of Wisconsin-Madison  

Instructor  
Christopher McKelvey, Lecturer, cmckelvey@wisc.edu  

Teaching Assistants  
Manisha Jain, PhD Student, mjain34@wisc.edu  
Dan McLeod, PhD Student, dpmcleod@wisc.edu  

Instructional Mode  
Due to the COVID-19 pandemic, lectures will be held online this semester.  
Mid-semester changes to the mode of instruction may be necessary as university policy responds to the evolving public health environment. But at this point, the plan is for two discussion sections (302 and 303) to be held online, and for two discussion sections (301 and 304) to be taught face-to-face until Thanksgiving break, and online thereafter.  

Course Overview  
This course provides an introduction to econometrics – the statistical methods economists use to evaluate empirical relationships and test economic theory. Because this is an applied course, our emphasis will be on (a) developing the econometric skills necessary to read and understand empirical papers in economics and (b) the application of econometrics to real-world data using modern statistical software. A wide range of statistical techniques will be covered, including: univariate & multiple regression, differences-in-differences, instrumental variables, limited dependent variables, fixed-effects models, and regression discontinuity. Throughout the course, we will be interested in the extent to which statistical models can be used to conduct causal inference.  
Note: Our department offers two introductory econometrics courses: Econ 400 and Econ 410. Econ 400 places less emphasis on theory and a correspondingly greater emphasis on applied techniques. Econ 410 takes a more mathematical & theoretical approach, deriving formulas and proving results wherever possible. Econ 400 and 410 are not a sequence. Students take only one of the two. Students doing our math emphasis major, including all those pursuing honors in the major, must take Econ 410.  

Prerequisites  
The prerequisite for this class is Econ 310.
Class Meetings and Office Hours

Our scheduled lecture time is **Tuesday and Thursday** from **8:00 to 9:15am** in the North American Central Time Zone.

On a typical class day, because the lecture is **online** and **synchronous**, I encourage you to (virtually) attend lecture at the scheduled time, as this way you will be able to ask questions in real time. However, if you must miss class, rest assured that lectures will also be recorded and made available for later playback.

There are two days (**October 15** and **December 10**) where we will use our class time for an online midterm, **so you must be available at our scheduled lecture time these two days**. For more information, see the “Evaluation” section below.

Synchronous lectures are susceptible to technical snafus, so if difficulties arise I may opt to switch to pre-recorded lectures.

Instructor and TA office hours will be conducted online. A schedule of office hours and instructions on how to attend is available via the course website.

Required Course Materials

Because this is an online course, you must have a **reliable internet connection** for the duration of the course (**September 2** through **December 10**). Unless you are attending a face-to-face discussion section, there is no need for you to be physically present in Madison at any point during the term.

Our **textbook** is: James H. Stock and Mark W. Watson (2014). Introduction to Econometrics. Pearson, Updated Third Edition (ISBN: 9780133486872). If you prefer to save a bit of money, you will also be able to get by using the original Third Edition (ISBN: 9780138009007) or the International Softcover Edition (ISBN: 9789352863501). We will not be using any of Pearson’s online resources, so there is no need to pay extra for a textbook that comes bundled with MyLab.

This course requires frequent use of a **computer** (Mac or Windows) with **Stata** installed. Because UW-Madison has a site-license, Stata can be downloaded for free from the Campus Software Library. While completing the problem sets and midterms, you will also need a **calculator**.

Course Website

All course materials will be posted on our course website on Canvas: [https://canvas.wisc.edu/courses/219738](https://canvas.wisc.edu/courses/219738)

Evaluation

Your overall grade for the course will be based on the following components:
• First Midterm: The first open-book, open-note midterm is worth 25% of your overall grade. It will be administered online and must be completed from 8:00 to 9:15am in the North American Central Time Zone on October 15. This midterm will not be rescheduled for any reason. On a case by case basis, in the event of a truly unavoidable circumstance, I may elect to shift the weight of the first midterm to the second midterm. In order to qualify, you must notify me of the circumstance in advance of the midterm, it must make completion of the midterm impossible, and it must be fully documented.

• Second Midterm: The second open-book, open-note midterm is worth 25% of your overall grade. It will be administered online and must be completed from 8:00 to 9:15am in the North American Central Time Zone on December 10.

• Problem sets: There will be weekly problem sets, which together are worth 50% of your overall grade – so completing them will be critical to your success. For full credit, problem sets must be submitted in Canvas before the submission deadline. Late problem sets may be submitted after this deadline, but will receive a 20% per day deduction. In order to provide you with hands-on experience using the methods taught in this course, the computer package Stata will be used extensively on the problem sets. To receive full credit, you must submit your Stata log. To help prepare you for these assignments, Stata will be used during lectures and tutorials will also be provided during discussion section. You are encouraged to form a study group with your classmates, but you must write up your answers independently (meaning that you should not be looking at another student’s answers as you write up your own). Problem sets with identical answers will not be accepted (i.e., receive zero credit).

Your overall grade for this class will be curved. This curve can help your grade, but cannot hurt it. For those who like the gory detail, I compute your grade using two different methods. First, I assign grades according to a percentage scale, where A = [92,100], AB = [88,92), B = [82,88), BC = [78,82), C = [70,78), D = [60,70), F = [0,60). (In other words, if you receive an overall grade in the class of 92% or better, then you’ll receive an A.) Second, I assign grades according to a percentile scale, where A = [80,100], AB = [60,80), B = [40,60), BC = [20,40), C = [6,20), D = [3,6), F = [0,3). (In other words, if you perform better than 80% of the class, then you’ll receive an A). Your overall grade in the class is the higher of these two grades.

I strive to make all of the grading transparent and fair. If you are unhappy with the way a problem has been graded, I encourage you to discuss it with me, but you must bring the concern to me within two weeks of when you were first able to view the graded problem set or exam.

**Learning Outcomes**

Following the completion of this course, students will be able to:
• Discuss the properties of an ordinary least squares (OLS) estimator for a linear regression model

• Test theories about the true model using formal hypothesis tests

• State the assumptions underpinning OLS, recognize violations of these assumptions, discuss the consequences of such violations, and – where possible – suggest alternative statistical approaches that are more appropriate given the circumstances

• Evaluate the extent to which econometric methods can be used to determine whether a statistical association represents a causal relationship

• Use statistical software to apply these statistical techniques to analyze the relationship between real-world economic variables

• Read and interpret results from applied economics journal articles that employ these statistical techniques

Credits

This class meets for two 75-minute class periods plus a single discussion session each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of the classroom for every class period. This syllabus includes more information about meeting times and expectations for student work.

Students with Disabilities

If you have approval from the McBurney Center for disability-related accommodations, please contact me to discuss how these accommodations will be implemented for this course. This should be done as soon as possible, and no later than two weeks before the first midterm.

Grievance Procedure

The Department of Economics has developed a grievance procedure through which you may register comments or complaints about a course, an instructor, or a teaching assistant. The Department continues to provide a course evaluation each semester in every class. If you wish to make anonymous complaints to an instructor or teaching assistant, the appropriate vehicle is the course evaluation. If you have a disagreement with an instructor or a teaching assistant, we strongly encourage you to try to resolve the dispute with him or her directly. The grievance procedure is designed for situations where neither of these channels is appropriate.

If you wish to file a grievance, you should go to room 7238 Social Science and request a Course Comment Sheet. When completing the comment sheet, you will need to provide a detailed statement that describes what aspects of the course you find unsatisfactory. You will need to sign the sheet and provide your student identification number,
your address, and a phone where you can be reached. The Department plans to investigate comments fully and will respond in writing to complaints.

Your name, address, phone number, and student ID number will not be revealed to the instructor or teaching assistant involved and will be treated as confidential. The Department needs this information, because it may become necessary for a commenting student to have a meeting with the department chair or a nominee to gather additional information. A name and address are necessary for providing a written response.

**Misconduct Statement**

Academic integrity is critical to maintaining fair and knowledge based learning at UW-Madison. Academic dishonesty is a serious violation: it undermines the bonds of trust and honesty between members of our academic community, degrades the value of your degree, and defrauds those who may eventually depend upon your knowledge and integrity.

Examples of academic misconduct include, but are not limited to: cheating on an examination (copying from another student's paper, referring to materials on the exam other than those explicitly permitted, continuing to work on an exam after the time has expired, turning in an exam for regrading after making changes to the exam), copying the homework of someone else, submitting for credit work done by someone else, stealing examinations or course materials, tampering with the grade records or with another student's work, or knowingly and intentionally assisting another student in any of the above. Students are reminded that online sources, including anonymous or unattributed ones like Wikipedia, still need to be cited like any other source; and copying from any source without attribution is considered plagiarism.

The Dept. of Economics will deal with these offenses harshly following UWS14 procedures ([http://students.wisc.edu/saja/misconduct/UWS14.html](http://students.wisc.edu/saja/misconduct/UWS14.html)):

1. The penalty for misconduct in most cases will be removal from the course and a failing grade,

2. The department will inform the Dean of Students as required and additional sanctions may be applied.

3. The department will keep an internal record of misconduct incidents. This information will be made available to teaching faculty writing recommendation letters and to admission offices of the School of Business and Engineering.

If you think you see incidents of misconduct, you should tell your instructor about them, in which case they will take appropriate action and protect your identity. You could also choose to contact our administrator (Tammy Herbst-Koel: therbst@wisc.edu) and your identity will be kept confidential.