Econometrics
Spring 2013

**Text:** *Essentials of Econometrics* by D. Gujarati. The ISBN is 0-07-297092-8. The book is required and you will need it during the semester. You may purchase either the 3rd or 4th edition, and international paperback editions are also fine. The pages/readings in the course schedule at the end of this document refer to the 4th edition.

In addition, for the first two or three weeks of the course, we will also rely on *Statistics Review for Econometrics and Time Series* by Haley and McGee. This is available as a pdf on D2L.

You may also find chapters from your *Introductory Economics and Business Statistics* text relevant. I list the chapters here as Coretxt.

**D2L:** D2L will be used in this class to distribute homework, answers to the homework, practice exams, as well as provide other materials for class. Grades will be accessible through D2L. You are responsible for announcements posted.

**Software:** This is an applied econometrics class and you will be conducting extensive analyses of data, both for the homework and for your project. To do so, we will use the industry standard software, Stata. This is only installed in the Econ Student Lab in Sage 2411. You can also purchase a student version of Small Stata for the semester for $32. This would allow you to do your homework and projects anywhere that’s most convenient.


Choose the Grad Plan option and find UW Oshkosh. Choose the 6-month license of Small Stata 12. You will have to provide a copy/image of your student ID with your order.

**Objectives:** By the send of the semester, there are a number of technical skills I hope you will acquire, including:

1. Understand the theoretical foundations of regression analysis;
2. Understand how to collect and organize data as well as learn about different sources of data and how to use them;
3. Develop your ability to use statistical models to analyze economic activities and gain insight into consumer and producer behaviors;
4. Understand how to form an economic research question; and
5. Learn how to report statistical information.

In addition, I hope that you will develop a deeper understanding of statistical analysis, and be able to both think critically about statistical information (in the news, in magazines, in data) and correctly identify how and when to use statistics to understand real world events, in order to gain
greater understanding of why things happen. Thus, in addition to the above objectives, I hope you will

6. Be able to identify whether “good” statistics is being used to explain economic events in the news. Is the reporter accurate? Is the politician correctly representing how the economy works? Have the numbers been reported in a way that is accurate?
7. Identify what statistical tools or models to apply to different situations.
8. Discuss how we evaluate different policies and governmental programs.
9. Be able to explain what kind of data you would need to evaluate an economic policy or business plan.

**Grades** in this course will be based on performance, not on need. There will be two exams, 5 homework assignments, and one paper.

- Two exams, each worth 18% of your grade (total 180 pts).
- 22% (120 pts) of the course points will be divided equally among 6 homework assignments. Late assignments will be docked 10% per day late (this includes weekends). However, homework will NOT be accepted after it has been discussed in class. Working in groups is strongly encouraged; however, each individual must turn in his or her own homework assignment (no photocopies). One of these homework assignments will substitute for class lecture on Tuesday, February 5.
- 40% (200 pts) of your grade will be determined by your research paper, to be discussed in detail throughout the semester (see also below).

**Important Notes:**
- This class will *not* be curved. You must earn *at least* 55% of the points in the course to pass. The grading is as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>100% - 93%</td>
</tr>
<tr>
<td>A-</td>
<td>92.99% - 90%</td>
</tr>
<tr>
<td>B+</td>
<td>89.99% - 87%</td>
</tr>
<tr>
<td>B</td>
<td>86.99% - 83%</td>
</tr>
<tr>
<td>B-</td>
<td>82.99% - 80%</td>
</tr>
<tr>
<td>C+</td>
<td>79.99% - 77%</td>
</tr>
<tr>
<td>C</td>
<td>76.99% - 73%</td>
</tr>
<tr>
<td>C-</td>
<td>72.99% - 70%</td>
</tr>
<tr>
<td>D+</td>
<td>69.99% - 67%</td>
</tr>
<tr>
<td>D</td>
<td>66.99% - 63%</td>
</tr>
<tr>
<td>D-</td>
<td>62.99% - 60%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60%</td>
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- Incompletes will only be given in accordance with the rules listed in your student handbook. In addition, I require that for an incomplete, you must have completed a *minimum of 50%* of the course work and be *passing* at that point.
- Attendance is not mandatory but it is strongly encouraged. You are responsible for any announcements or information given out in class and/or posted on D2L.

**Project Details**

Think of your econometrics project as a senior research paper in economics. This is your chance to apply what you’ve learned in other classes about economic theory to the real world using data. This project will ultimately be about 15 pages long, including tables. There are an infinite number of projects and topics that can be studied—just to get an idea, try looking at *National Tax Journal, Public Finance Review, Contemporary Policy Analysis, Journal of Labor Economics, Sports Economics, Education Economics,* and the *Industrial Labor Review* for examples.
Possible topics:

- Why some countries have faster economic growth, better education systems, or higher incomes than others;
- The relationship between free trade or the economic freedom index and income across countries;
- Regional/racial/gender differences on returns to education or wages in an industry;
- Impact of college athletic performance on applications, graduation of athletes, alumni donations;
- What determines differences in insurance rates across states;
- The impact of crime on state economic growth;
- Do more fast food restaurants in a community raise the likelihood of child obesity;
- What is the relationship between state tax rates and employment or new business starts;
- What are the characteristics of a profitable publicly-owned company;
- Do older CEOs earn more money, other factors held constant;
- Any project that compares some policy across states (like gun control laws or death penalty laws), or attempts to figure out what characteristics make a state more likely to have a huge budget deficit;
- A project that compares policies (education, infrastructure, women’s rights, control of AIDS spread) across countries;
- A project that compares sports revenues to the characteristics of the sports team (do teams with publicly owned stadiums make more money than teams with privately owned stadiums?)

Organization of the Paper

1. Introduction and Statement of Your Question
2. Literature Review
3. Description of the Data
4. Description of your Model (steps 3 and 4 can be reversed)
5. Regression specification and results
6. Conclusions

Steps to Build Your Project Paper

**Step 1:** Pick a general topic such as returns to education. Find 3 econometric articles in economics journals that address the topic of your choice. Read the articles. You can access a number of excellent economics journals on the web through Econlit at the Polk Library website. (We will take a look at these in class.)

Create a bibliography of the 3 articles you found. **See the works cited sheet for appropriate referencing. This is worth 5 points.**

**Step 2:** Write a literature review covering the 3 articles you choose. A literature review is a discussion of the current academic views and research on a particular topic. The review should cover the “major” articles in the area. If a single article is referenced over and over, then you know it’s a major article. It will also be useful to limit yourself to research done since 2000, since it is important in economics to be current. For example, see this literature review addressing the topic of “Age Discrimination in US Labor Markets.”
You should pick a topic on which there has already been serious economic research, though often times you won’t find a review of the exact project that you’re thinking of. In the latter case, you need to find papers generally related to your topic. The review must give a coherent overview of key findings, and should be organized in terms of the findings. Simply listing papers, with short descriptions of what is in each paper, is not satisfactory. You may be guided in your literature review by finding answers to some of the following questions:

1. What are the main concepts and ideas in the article you have read?
2. What was the author’s central question?
3. Where did they find their data?
4. Do the author’s ideas agree with or corroborate ideas you have come across in other articles? Or do the ideas differ from them? What are the points of agreement and/or differences?
5. How do you explain the differences in the viewpoints?
6. What is the conclusion drawn by the authors?
7. Which of these concepts, ideas and conclusions do you find relevant to your own work and why?
8. Are the articles you read in agreement with each other or not?

A rough draft of your literature review should be 3 to 5 pages in length. This is worth 20 points.

**Step 3:** Formulate a question you want to ask. You can apply a question/model someone else did to different data, or add a variable to a regression that you think has been left out. Make sure you can state this question in a single sentence. For example: Does graduating from college lead to higher lifetime earnings for professional football players? This would be an application of the returns to education literature applied to a different group of people with different data. Other examples of questions might include: Do social programs that educate women about the use of condoms reduce the spread of HIV and AIDS in African countries? Does the length of criminal sentences reduce crime? Does the threat of the death penalty reduce homicides in states that have the death penalty?

The write up of your question should be one paragraph to one page—what is the question? Why is it important or interesting to you? What variables do you think you will need to find? This is worth 10 points.

**Step 4:** Specify an economic model. Using economic theory (and common sense) write down a model that describes how the dependent variable is related to the independent variables of the model. You model must have at least 5 independent variables, one of which must be a dummy or categorical variable.

Your economic model should be about 2 pages in length and include detailed descriptions of the variables, how you think they relate to your dependent variable (positively or negatively), and where you think you will be able to find the data. This is worth 15 points.

**Step 5:** Find the data for you variables. Sometimes you will have to modify your model to fit the data that is available. There are a number of data sources listed on D2L including the Bureau of Labor Statistics (BLS), the US Census, and the Statemaster and Nationmaster websites.
Step 6: Describe the data. Create a table that indicates what each variable is, how it is measured, and the mean and standard deviation of each variable. In some cases you might want to look at correlation coefficients between variables or test an individual variable's mean. For example, you could do a t-test of whether women earn less than men in a sample of lawyers. Write up your data description.

Data description and your table should be about 2 pages in length, not including the table. This is worth 20 points.

Step 7: Run the regression indicated by your model. Analyze the results. Test the results and the model specification. Consider different forms of specifying the model for the regression—quadratics, logs, dummy or categorical variables.

Check your regression specification with me. This is worth 10 points.

Step 8: Pick what you find to be the most convincing specification of your model that answers your central question. Write up your results. Report you regression results, the standard errors, the number of observations and the R². Discuss the tests you ran (t-tests on individual variables, F-tests, checking for heteroskedacity or multicollinearity) and the results.

Step 9: Your conclusions. What did you find? What is the answer to your question of interest? If you had infinite time and money, what else would you like to include in your model and study? How could you extend this model in the future or what does it suggest for future research? Can you draw any policy conclusions or make any policy recommendations based on your research?

Step 10: Final presentation of your research question and findings in class on Tuesday, May 7 or Thursday, May 9. Powerpoint presentations expected.

The presentation is graded and worth 10 points. You also receive 10 points for attendance, which you can only earn by attending both days and asking at least 1 question per day.

Step 11: Turn in the paper. That’s it in a nutshell. We’ll talk in detail about each step in class. The final paper with all necessary parts is due Friday, May 10th. Papers can, of course, be turned in early (see extra credit options below). Papers must be turned in on hard copy or to the D2L dropbox. Paper copies preferred. There is no other way to submit your final paper.

Your paper is worth 200 points total (40% of your total grade).

Bibliography February 15
Literature Review February 22
Statement of Question March 8
Economic Model March 29
Data Description and Table April 5
Regression Specification April 26

It is easy to get behind or put off your paper, which usually results in disastrous things happening. To try to prevent that, I’ve assigned due dates for 6 early parts of the paper and 80 points.

Presentations May 7 and 9 (20 points)
Final Paper May 10 (100 points)
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics and Readings</th>
<th>Due on this Week</th>
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<tbody>
<tr>
<td>Week 1 – Jan. 28</td>
<td><em>Introduction</em> Read Chapter 1 &amp; Apps A and B &amp; Chapters 1 to 3 in Haley &amp; McGee</td>
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<tr>
<td>Week 2 – Feb. 4</td>
<td><em>Statistics Review</em> Appendices A to D &amp; Chapter 4 in Haley &amp; McGee</td>
<td>Out of class assignment for Tuesday, February 5. This counts as a homework assignment. Due Friday.</td>
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<tr>
<td>Week 3 – Feb. 11</td>
<td><em>Distributions &amp; Hypothesis Testing</em> Appendices A to D &amp; chapter 5 in Haley &amp; McGee</td>
<td>HW 1 (Due Friday)</td>
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<tr>
<td>Week 4 – Feb. 18</td>
<td><em>Simple Regression</em> Read Chapter 2 and 11.1 to 11.3 &amp; 11.5 in Coretxt</td>
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<tr>
<td>Week 5 – Feb. 25</td>
<td><em>Inference &amp; Simple Regression</em> Read Chapter 3, Chapter 8 in Coretxt for reference</td>
<td>HW 2 (Due Friday)</td>
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<tr>
<td>Week 6 – March 4</td>
<td><em>Multiple Regression</em> Chapter 4 and 11.4 &amp; 11.5 in Coretxt</td>
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<tr>
<td>Week 7 – March 11</td>
<td><em>Multiple Regression Inference</em> Chapter 4 continued</td>
<td>Exam 1 (Thurs., March 14)</td>
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<td>Spring Break</td>
<td>SPRING BREAK</td>
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<tr>
<td>Week 8 – March 25</td>
<td><em>More Variable Types: Quadratics &amp; Nonlinearities</em> Read Chapter 5</td>
<td>HW 3 (Due Friday)</td>
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<td>Week 9 – April 1</td>
<td><em>Dummy Variables</em> Read Chapter 6</td>
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<tr>
<td>Week 10 – April 8</td>
<td><em>Evaluating Models</em> Chapters 7, 8</td>
<td>HW 4 (Due Friday)</td>
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<tr>
<td>Week 11 – April 14</td>
<td><em>Heteroskedacity</em> Chapter 9</td>
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<td>Week 12 – April 22</td>
<td><em>Linear Probability Model, Probit and Logit</em> Read 6.7, 12.6</td>
<td>HW 5 (Due Friday)</td>
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<tr>
<td>Week 13 – April 29</td>
<td><em>Wrap Up, Models, and Other Issues</em></td>
<td>Exam 2 on Thursday, May 2.</td>
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<tr>
<td>Week 14 – May 6</td>
<td>Presentations</td>
<td>Paper due Friday, May 10 (you can earn 1 extra credit point per day that you turn the paper in early, up to 4 points)</td>
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Note that the first chapters listed refer to your Gujarati textbook.