

## *Topics in Political Methodology: Linear Models*

Dr. Michael McDonald

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### Office Hours

Tuesday 11:30-12:30

or by appointment

### **Introduction**

Linear regression is among the most widely-used statistical models in the social sciences. The conceptual framework of a set of independent variables affecting a dependent variable is a foundation upon which many theories are built and improved. Where assumptions to the linear model are not met is a foundation upon which many more complicated statistical models rests.

The goal of this course is to provide students with a solid background in the assumptions of ordinary least squares estimation, how to detect violations of the assumptions, and what to do when a violation exists. Students with this knowledge in their tool box of skills will be able to quickly grasp and evaluate the information presented in typical modern statistics-based research projects and more confidently explore how they may make their unique contribution to the social sciences.

### **Readings**

The readings that will be discussed each class are listed below as a Reading Assignment for that day of class.

The required text is:

Wooldridge, Jeffrey M. 2013. Introductory Econometrics: A Modern Approach, 5<sup>th</sup> edition (Cengage).

Additional readings are available from the professor.

### **Class Dropbox Webpage**

Class materials, such as this syllabus and other class readings are available on the class Dropbox webpage. You may access these files at the link below (you do not a Dropbox account to access these files). To keep copying costs down, this will be the only location where these materials are available.

<https://www.dropbox.com/sh/lu1213sofbxm4k7/AAC7oLf6cKuDrMUfjNq4AdfMa?dl=0>

## Grades

Grades consist of a paper, a midterm, a final, and 8 homework assignments

<u>Assignment</u>	<u>Due</u>	<u>% of Overall Grade</u>
10 Homework Assignments (2% each)	See Syllabus	20%
Midterm	Feb 23	20%
Final	April 25	25%
Term Paper		
Replication Selection	January 26	5%
Replication Results	March 8	5%
Completed Paper & Presentation	April 19	25%

## Homework Assignments

Homework assignments are listed on the syllabus. Homework assignments are graded on a pass/fail system. Students may be asked to redo an assignment to receive a pass.

You are asked to work on the homework assignments on your own, although you may seek help and advice from your peers. On the day an assignment is due, the class will go over at least one question – usually more than one – before the assignment is turned in. At that time, students can correct any errors before turning in their assignment. The goal of the homework assignments is to prepare students for the exams. Cheating by looking up the answers online (and they are available there) will only lead to poor performance on the exams.

## Term Paper

For the term paper you will conduct a replicate a linear regression analysis as presented in a published work (with permission from the instructor you may use your original data). The goal is to produce a paper of quality equal to a manuscript that could be submitted to a journal.

You will replicate the original work as best as you can, noting where you fail to reproduce results. You will then apply the regression diagnostic tests that we will cover in the course to determine if any violations of the regression assumptions have occurred. You will then improve upon the original work in any of a number of ways:

- Correct violations of the regression assumptions
- Posit and test new theories by adding additional variables
- Investigate sensitivity to measurement
- Reanalyze the research with a new data set (e.g., new data that have become available since publication or exploration of an entirely new dataset).

It is important to make good progress on the paper throughout the semester since there are several tasks – paper selection, data collection, analysis, and writing – that must

take place and cannot wait until the end of the semester. The following deadlines are to be set for the project:

January 26. Select replication study. Write a 2 page paper describing the theory, data, method, and findings of your selected study.

March 8. Present replication results. Present the professor with output demonstrating that you replicated the results. If exact replication was not obtained, write a memo of no more than 3 pages describing what issues prevented faithful replication.

April 19. Final Paper and Presentation. Submit final 25-30 page paper. You will make a 15 minute presentation to the class on your paper, simulating a conference paper presentation.

It is common for students to make one or more than one false starts when selecting a replication study, due to data availability or inappropriate model specification (e.g., selecting a paper that uses a non-linear model). Do not wait until January 25 to begin the process of selecting a paper to replicate.

All papers will be double-spaced, using Times New Roman font, and normal margins. Please use in-line parenthetical citations with a bibliography at the end. The bibliography and any charts and figures do not count towards the page limit.

### **Honor Code**

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.

Basically, don't cheat. You cheat yourself of your education and more severe punishment may follow. Helping someone else is cheating, too. If you have any questions if your approach to completing an assignment may violate the honor code, please contact the professor for guidance.

### **Disability Statement**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation.

Students with disabilities should follow this procedure as early as possible in the semester.

### **Evaluations**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

**Please note this is a tentative syllabus and subject to change.**

<b>Week 1</b> <b>Tues: Jan 5</b>	<b>The Nature of Econometrics and Economic Data</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 1</li> </ul>
<b>Week 2</b> <b>Tues: Jan 12</b>	<b>The Simple Regression Model</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 2</li> </ul> <u>Homework 1</u> <ul style="list-style-type: none"> <li>• 2.1, 2.3, 2.6, C2.1, C2.2, C2.4</li> </ul>
<b>Week 3</b> <b>Tues: Jan 19</b>	<b>Multiple Regression Analysis: Estimation</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 3</li> </ul> <u>Homework 2</u> <ul style="list-style-type: none"> <li>• 3.3, 3.4, 3.5, C3.2, C3.6, C3.9</li> </ul>
<b>Week 4</b> <b>Tues: Jan 26</b>	<b>Multiple Regression Analysis: Inference</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 4</li> </ul> <u>Homework 3</u> <ul style="list-style-type: none"> <li>• 4.3, 4.4, 4.6, C4.1, C4.7, C4.10</li> </ul>
<b>Week 5</b> <b>Tues: Feb 2</b>	<b>Multiple Regression Analysis: OLS Asymptotics</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 5</li> </ul> <u>Homework 4</u> <ul style="list-style-type: none"> <li>• 5.1, 5.2, 5.4, C5.1, C5.2, C5.4</li> </ul>
<b>Week 6</b> <b>Tues: Feb 9</b>	<b>Multiple Regression Analysis: Further Issues</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 6</li> </ul> <u>Homework 5</u> <ul style="list-style-type: none"> <li>• 6.3, 6.6, 6.8, C6.2, C6.9, C6.12</li> </ul>
<b>Week 7</b> <b>Tues: Feb 16</b>	<b>Multiple Regression Analysis with Qualitative Information: Binary (or Dummy) Variables</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Woolridge Chapter 7</li> </ul> <u>Homework 6</u> <ul style="list-style-type: none"> <li>• 7.2, 7.3, 7.10, C7.4, C7.10, C7.14</li> </ul>
<b>Week 8</b> <b>Tues: Feb 23</b>	<b>MIDTERM</b>
<b>Week 9</b> <b>Tues: Mar 1</b>	<b>SPRING BREAK</b>
<b>Week 10</b> <b>Tues: Mar 8</b>	<b>More on Interaction Terms</b> <u>Reading Assignment</u> <ul style="list-style-type: none"> <li>• Bear F. Braumoeller. 2004. "Hypothesis Testing and</li> </ul>

	<p>Multiplicative Interaction Terms." International Organization 58(4): 807-20.</p> <ul style="list-style-type: none"> <li>• Thomas Brambor, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." Political Analysis 14(1): 63-82.</li> <li>• Robert W. Jackman. 1973. "On the Relation of Economic Development to Democratic Performance." American Journal of Political Science 17(3): 611-21.</li> </ul> <p><u>Homework 7</u></p> <ul style="list-style-type: none"> <li>• TBA</li> </ul>
<b>Week 11</b> <b>Tues: Mar 15</b>	<p><b>Heteroskedasticity</b></p> <p><u>Reading Assignment</u></p> <ul style="list-style-type: none"> <li>• Woolridge Chapter 8</li> </ul> <p><u>Homework 8</u></p> <ul style="list-style-type: none"> <li>• 8.2, 8.4, 8.5, C8.2, C8.5, C8.8</li> </ul>
<b>Week 12</b> <b>Tues: Mar 22</b>	<p><b>Basic Regression Analysis with Time Series</b></p> <p><u>Reading Assignment</u></p> <ul style="list-style-type: none"> <li>• Woolridge Chapter 10</li> </ul> <p><u>Homework 9</u></p> <ul style="list-style-type: none"> <li>• 10.1, 10.4, C10.1, C10.2</li> </ul>
<b>Week 13</b> <b>Tues: Mar 29</b>	<p><b>Instrumental Variables Estimation and Two Stage Least Squares</b></p> <p><u>Reading Assignment</u></p> <ul style="list-style-type: none"> <li>• Woolridge Chapter 15</li> </ul> <p><u>Homework 10</u></p> <ul style="list-style-type: none"> <li>• 15.1, 15.2, C15.1, C15.2, C15.3</li> </ul>
<b>Week 14</b> <b>Tues: Apr 5</b>	<p><b>Limited Dependent Variable Models and Sample Selection</b></p> <p><u>Reading Assignment</u></p> <ul style="list-style-type: none"> <li>• Woolridge Chapter 17</li> </ul>
<b>Week 15</b> <b>Tues: Apr 12</b>	<p><b>Work on Papers</b></p> <p>Students will schedule meeting with professor to review paper progress</p>
<b>Week 16</b> <b>Tues: Apr 19</b>	<p><b>Class Presentations</b></p>
<b>Week 17</b> <b>Mon: April 25</b>	<p><b>FINAL @ 7:30-9:30am</b></p>