BPHD 8120: ECONOMETRICS I

Syllabus for Fall 2022
9:05 a.m. – 11:50 a.m. M
Friday 207

Instructor

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Office Hours

9:00 a.m. – 10:00 a.m. WF
2:15 p.m. – 4:15 p.m. MW
If these hours are not convenient, feel free to make an appointment with me for another time or to stop by at another time when I am in the office.

Catalog Course Description

BPHD 8120: Econometrics I – Advanced study of the theory and application of statistics to economic problems. Topics include the derivation of least squares estimators, maximum likelihood estimation, and problems of multicollinearity, heteroskedasticity, and autocorrelation. Prerequisites: Admission to the Ph.D. in Business Administration or permission of the instructor.

Course Objectives

We will investigate basic econometric methods that are used in applied work in fields such as economics, finance, and public policy. We will focus on understanding the strengths and limitations of the methods we cover, on using econometric software to apply these methods, and on interpreting the results we get.

Textbooks and Other Resources

There are three textbooks that are required for this course:

(1) Verbeek, Marno. 2017. *A Guide to Modern Econometrics*, 5th edition. New York, NY: John Wiley and Sons.

(2) Stock, James H., and Mark W. Watson. 2019. *Introduction to Econometrics*, 4th edition. Boston, MA: Pearson Education.

(3) Wooldridge, Jeffrey M. 2020. *Introductory Econometrics*, 7th edition. Boston, MA: Cengage Learning.

There are other introductory or specialized econometrics textbooks that you may find useful:

Baltagi, Badi H. 2008. *Econometrics*, 4th edition. Berlin: Springer-Verlag.

Enders, Walter. 2010. *Applied Econometric Time Series*, 3rd edition. New York, NY: John Wiley and Sons.

Greene, William H. 2012. *Econometric Analysis*, 7th edition. Upper Saddle River, NJ: Pearson Prentice Hall.

Gujarati, Damodar N. 2015. *Econometrics by Example*, 2nd edition. New York, NY: Palgrave Macmillan.

Gujarati, Damodar N., and Dawn C. Porter. 2009. *Basic Econometrics*, 5th edition. New York, NY: McGraw-Hill/Irwin.

Hamilton, James D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press.

Johnston, Jack, and John DiNardo. 1997. *Econometric Methods*, 4th edition. New York, NY: McGraw-Hill.

Judge, George G., R. Carter Hill, William E. Griffiths, Helmut Lütkepohl, and Tsoung-Chao Lee. 1988. *Introduction to the Theory and Practice of Econometrics*, 2nd edition. New York, NY: John Wiley and Sons.

Kennedy, Peter. 2008. *A Guide to Econometrics*, 6th edition. Malden, MA: Blackwell.

Kmenta, Jan. 1986. *Elements of Econometrics*, 2nd edition. New York, NY: Macmillan.

Maddala, G.S. 1992. *Introduction to Econometrics*, 2nd edition. New York, NY: Macmillan.

Pindyck, Robert S., and Daniel L. Rubinfeld. 1998. *Econometric Models and Economic Forecasts*, 4th edition. New York, NY: Irwin/McGraw-Hill.

Wooldridge, Jeffrey M. 2010. *Econometric Analysis of Cross Section and Panel Data*, 2nd edition. Cambridge, MA: The MIT Press.

Gujarati and Porter (2009), Maddala (1992), and Pindyck and Rubinfeld (1998) are other useful introductory texts. Gujarati (2015) is an introductory text that focuses more on applications of econometric analysis and less on the theory of econometrics. Baltagi (2008), Johnston and DiNardo (1997), Judge, Hill, Griffiths, Lütkepohl, and Lee (1988), and Kmenta (1986) are more advanced but still accessible introductory texts that rely on matrix algebra to a greater extent than Gujarati and Porter (2009), Maddala (1992), Pindyck and Rubinfeld (1998), Stock and Watson (2019), and Wooldridge (2020). Enders (2010), Greene (2012), Hamilton (1994), and Wooldridge (2010) offer especially advanced treatments. Kennedy (2008) emphasizes the

intuition behind econometric analysis. It can take some time to develop an appreciation for this book, but come to appreciate it you surely will.

Software

I will support STATA for the econometric analyses that you will be doing in this course. You are free to use other software, but I may not be able to help you if you have any trouble completing assignments with other software. STATA is available on all Belk College computers. You can purchase STATA at a reduced rate through the STATA website (http://www.stata.com/order/new/edu/gradplans/student-pricing/). STATA is also available via Apporto. The website https://spaces.uncc.edu/pages/viewpage.action?pageId=49033481 has instructions for accessing Apporto. The websites https://dss.princeton.edu/training/, https://stats.idre.ucla.edu/stata/, and https://www.ssc.wisc.edu/sscc/pubs/sfr-intro.htm provide a number of examples and other resources that you may find helpful as you work with STATA.

Means of Student Evaluation

Grades will be determined by your performance on 4 problem sets (12.5% each), two tests (15% each), and a comprehensive final examination (20%). Letter grades for the course will be based on the following scale: A, 90%-100%; B, 80%-89.99%; C, 70%-79.99%; U, below 70%. Grades will be based solely on your performance on the problem sets, the tests, and the comprehensive final examination. Individual extra credit assignments will **NOT** be made.

Problem Sets

Problem sets must be typed and must be submitted by email on the assigned due date. A problem set may be submitted after the due date, but there will be a penalty of one letter grade for each day that the submission is late. Once a problem set has been graded and returned, or once the solutions to a problem set have been distributed, no late submission will be accepted, and a grade of zero will be assigned. Problem sets will be due on September 9, September 23, October 28, and November 11.

Tests and Comprehensive Final Examination

The first test will be given on October 3, the second test will be given on November 21, and the comprehensive final examination will be 8:00 a.m. – 10:30 a.m. on December 12 (the exam time slot assigned to this course).

Academic Integrity

All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code and on the Student Conduct and Academic Integrity website. The Code is available from the Dean of Students Office or online at legal.uncc.edu/policies/up-407. Additional resources are available on the Student Conduct and Academic Integrity website.

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

Disability Accommodations

Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations.

Revision of Syllabus during Semester

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class and by email.

Attendance

Students are expected to attend every class and remain in class for the duration of the session. Failure to attend class or arriving late to class may affect your ability to achieve course objectives, and this can affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular attendance is a student's obligation, as is a responsibility for all of the work of class meetings, including tests and written tasks.

The individual instructor has the authority to excuse a student's class absence(s) and to grant a student an academic accommodation (turn in a late assignment, provide extra time on an assignment, reschedule an exam, etc.). Under Academic Affairs Policy on Course Attendance and Participation, however, University-sanctioned events or activities are considered excused absences. A University-sanctioned event or activity is one in which a student formally represents the University to external constituencies in athletic or academic activities. This policy does not supersede individual program attendance and/or participation requirements that are aligned with accreditation or licensure. For more information and student responsibilities to account for such an absence, see provost.charlotte.edu/policies-procedures/academic-policies-and-procedures/course-attendance-and-participation.

Students are encouraged to work directly with their instructors on class absences for medical appointments, military/court orders, and/or personal and family emergencies, such as a death in the immediate family, where a student is able to provide an instructor with appropriate supporting documentation of the absence. The final decision for approval of absences and missed work or make-up work is determined by the instructor.

The Office of Student Assistance and Support Services (SASS) can provide notification to faculty of emergency situations, when a student is unable to do so and when the office has been made aware of such emergencies. In such situations, the SASS office may also be able to assist with verification of such emergencies, once a student is able to return to classes. The SASS office does not provide verification of absences for car trouble, weather issues, personal activities, work, weddings, vacations, or University-sponsored events. Absences related to such activities should be discussed directly with the faculty member.

Should students need assistance from the SASS office in verifying an emergency situation, they can submit an online request form (sass.charlotte.edu/services/absence-verification) and attach supporting documentation. Please be aware that students are not required to go through the SASS office at any time for absence verification and that the SASS office does not have the authority to excuse absences, allow for make-up work, or provide other academic accommodations.

In cases of absence due to pregnancy or parenting (pregnancy, childbirth, false pregnancy, termination of pregnancy, or recovery from any of these conditions), students should contact the Office of Civil Rights and Title IX to obtain absence verification by completing the online form at http://bit.ly/332eaGd.

Instructor Absence or Tardiness

If I am late in arriving to class, you must wait a full 30 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions that I give you about my expected tardiness.

Computer Use in the Classroom

Students are permitted to use computers during class only for taking notes and for doing other class-related work. Those using computers during class for work that is not related to this class must leave the classroom for the remainder of the class period.

Recording in the Classroom

Electronic video, image capture, and/or audio recording is not permitted during class, whether conducted in person or online, unless the student obtains permission from the instructor. If permission is granted, any distribution of the recording is prohibited. Students with specific electronic recording accommodations authorized by the Office of Disability Services do not require instructor permission; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited.

Belk College of Business Diversity Statement

The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Outline of Topics and Reading Assignments

I assume that you have a working knowledge of calculus, matrix algebra, and statistics. The material that you need for this course is covered in Math Refreshers A, B, and C of Wooldridge (2020), Advanced Treatment D of Wooldridge (2020), Chapters 2 and 3 of Stock and Watson (2019), and Appendices A and B of Verbeek (2017). If this is your first course in econometrics, you should see Chapter 1 of each of the required texts for introductions to the subject.

I. Linear Regression with One Regressor
   Wooldridge (2020), Chapter 2, pp. 20-37 & pp. 40-51
   Stock and Watson (2019), Chapter 4, pp. 102-114

II. Linear Regression with Multiple Regressors: Introduction
   Wooldridge (2020), Chapter 3, pp. 67-83, pp. 87-89, & pp. 93-97
   Stock and Watson (2019), Chapter 6, pp. 175-183

III. Linear Regression with Multiple Regressors: Matrix Formulation
Verbeek (2017), Chapter 2
Wooldridge (2020), Chapter 3, pp. 89-92
Wooldridge (2020), Chapter 5
Stock and Watson (2019), Chapter 4, pp. 114-122
Stock and Watson (2019), Chapter 6, pp. 183-192

IV. Linear Regression with Multiple Regressors: Additional Topics
Verbeek (2017), Chapter 3
Wooldridge (2020), Chapter 3, pp. 83-87 & pp. 92-93
Wooldridge (2020), Chapter 2, pp. 37-40
Wooldridge (2020), Chapter 6
Wooldridge (2020), Chapter 2, pp. 51-53
Wooldridge (2020), Chapter 7, pp. 221-239
Stock and Watson (2019), Chapter 6, pp. 169-174

V. Generalized Least Squares and Heteroskedasticity
Verbeek (2017), Chapter 4, Sections 4.1 – 4.5
Wooldridge (2020), Chapter 8
Stock and Watson (2019), Chapter 5 & 7

VI. Regression with a Binary Dependent Variable: Introduction
Wooldridge (2020), Chapter 7, pp. 239-244
Stock and Watson (2019), Chapter 11

VII. Regression Analysis with Time Series Data: Autocorrelation
Verbeek (2017), Chapter 4, Sections 4.6 – 4.11
Wooldridge (2020), Chapter 10, pp. 334-336 & pp. 339-345
Wooldridge (2020), Chapter 11
Wooldridge (2020), Chapter 12, pp. 395-415

VIII. Regression Analysis with Time Series Data: Estimating Dynamic Causal Effects
Verbeek (2017), Chapter 9, Section 9.1
Stock and Watson (2019), Chapter 16
Wooldridge (2020), Chapter 10, pp. 336-338

IX. Regression Analysis with Time Series Data: AR Models, ADL Models, and Forecasting
Verbeek (2017), Chapter 8, Sections 8.1 – 8.2 & 8.6 – 8.10
Stock and Watson (2019), Chapter 15, pp. 513-540

X. Regression Analysis with Time Series Data: Trends and Breaks
Verbeek (2017), Chapter 8, Sections 8.3 – 8.5
Stock and Watson (2019), Chapter 15, pp. 540-554, & Chapter 17, pp. 616-620
Wooldridge (2020), Chapter 10, pp. 351-360
Wooldridge (2020), Chapter 18, pp. 610-616 & pp. 622-628