

ADEC 7320 Econometrics, 3 Credits
Woods College of Advancing Studies
Summer 2019 Semester, July 2 – August 16, 2019
Class meeting day/time: Fully Asynchronous

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Boston College Mission Statement

Strengthened by more than a century and a half of dedication to academic excellence, Boston College commits itself to the highest standards of teaching and research in undergraduate, graduate and professional programs and to the pursuit of a just society through its own accomplishments, the work of its faculty and staff, and the achievements of its graduates. It seeks both to advance its place among the nation's finest universities and to bring to the company of its distinguished peers and to contemporary society the richness of the Catholic intellectual ideal of a mutually illuminating relationship between religious faith and free intellectual inquiry.

Boston College draws inspiration for its academic societal mission from its distinctive religious tradition. As a Catholic and Jesuit university, it is rooted in a world view that encounters God in all creation and through all human activity, especially in the search for truth in every discipline, in the desire to learn, and in the call to live justly together. In this spirit, the University regards the contribution of different religious traditions and value systems as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

Course Description

This course develops the foundations of predictive data analytics by introducing the key concepts of applied econometrics, the application of statistical tools used to estimate economic relationships. The main topics covered in this course include: simple and multiple linear regression, binary and multinomial logistic regression, variable selection and shrinkage methods, count regression, generalized linear models, weighted least squares, generalized least squares, robust regression, and panel regression. The course is heavily weighted towards practical application using the R statistical programming language and data sets containing missing values and outliers. The course also addresses issues of exploratory data analysis, data preparation, model development, model validation, and model deployment.

Textbooks & Readings (Required)

- *A Modern Approach to Regression with R*, by Simon J. Sheather. **(MARR)**
- *Linear Models with R*, by Julian J. Faraway. **(LMR)**
- *Extending the Linear Model with R*, Julian J. Faraway. **(ELMR)**

Textbooks & Readings (Recommended)

- *Introductory Econometrics: A Modern Approach*, by Jeffrey M. Wooldridge.
- *Using R for Introductory Econometrics*, by Florian Heiss.

Required Software

The primary software environment is the R statistical programming language, which can be downloaded for free from <http://www.r-project.org>. RStudio is the recommended interface for the R statistical programming language software, which can also be downloaded for free at <http://www.rstudio.org>.

Canvas

Canvas is the Learning Management System (LMS) at Boston College, designed to help faculty and students share ideas, collaborate on assignments, discuss course readings and materials, submit assignments, and much more - all online. As a Boston College student, you should familiarize yourself with this important tool. For more information and training resources for using Canvas, click [here](#). In the case of any technical difficulties or concerns, please contact canvas@bc.edu or 617-552-HELP (4357) for immediate assistance. NOTE: Canvas requires [particular computer specifications](#) and wifi access. It is important that you plan accordingly, particularly for courses that have online components.

Course Objectives

1. Students will demonstrate a practical understanding of the fundamental applied econometric modeling techniques across cultural settings and will learn the impact of culture, gender, and age in econometrics as demonstrated by the analysis of real-world data sets.
2. Students will demonstrate ethical data usage and data understanding pertaining to the selection of appropriate types and combinations of econometric models given particular business situations as demonstrated by the building, assessment and implementation of models.
3. Students will gain intermediate level, practical knowledge of data analysis and econometrics, as demonstrated by the successful completion of homework assignments, suggested textbook exercises and a group project, as well as contributions to class discussions.
4. Students will be able to effectively use a statistical/econometric software package, as demonstrated by the implementation of various applied econometric techniques using R to build and deploy specific models based on real-world business problems to learn how to enhance business capabilities and extend the value of existing data.

Course Approach

The course is conducted entirely online (fully asynchronous) via Canvas. Each week, the student will complete assigned readings from the required textbooks, review the lecture notes, watch the supplemental lecture videos, complete optional (but recommended) textbook exercises, complete homework assignments, and participate in the discussion board. There is also a final course project and presentation. Students are expected to complete all deliverables by their assigned due dates.

Course Communication

Canvas will be used for posting relevant course materials throughout the term, and it will serve as the primary mechanism for course communication. I will be active on Canvas, typically every weekday.

You are encouraged to post your course related questions on the "Ask Your Instructor" forum on the course discussion board where other students will be able to benefit from your inquiries. To discuss personal or sensitive concerns, please email me directly at nathaniel.bastian@bc.edu. You can expect me to respond to questions by email within 24 hours. If you do not hear back from me within 24 hours of sending an email, please resend your message.

There are no set office hours. Please know that I am open to scheduling a virtual live meeting with individuals or groups, by request, at pre-agreed to times. I encourage students to be proactive in getting questions answered through the many available methods.

Weekly Online Discussions

Student participation in weekly online discussions is an integral part of this course. The goal of the discussions is to interactively discuss course-related content to achieve the desired learning objectives.

- All online discussion participation requirements must be met to earn the participation points for that week.
- Students can participate day or night, and participants have time to reflect on their response and create succinct easy-to-read replies (quality is preferred over quantity).
- It is imperative to remain respectful of all viewpoints and positions and, when necessary, agree to respectfully disagree.
- While active and frequent participation is encouraged, cluttering the discussion board with inappropriate, irrelevant, or insignificant material will not earn additional points and may result in receiving less than full credit. Frequency is not unimportant, but content of the message is paramount.
- Earning full participation credit each week requires a complete response to a short professional article related to data analytics.
- After reading the article, you will discuss what you found to be interesting and what you learned, while answering several questions pertaining to your related professional experiences.
- The first post of your question must be done by Wednesday evening to receive full credit. You should then return on another day later in the week, reading through the discussion threads, and provide a second reply to another student's comments, by Sunday evening.
- For the second posting, students should demonstrate that they have read through the discussion as it has matured during the week.
- Posting an initial response after Wednesday (late), posting both required responses on the same day, answering a second discussion question or yourself (only) later in the week, or replying with "good point" or other non-substantive replies, earn no participation credit for the week.
- *Please remember to cite all sources (when relevant) in order to avoid plagiarism.*

Course Assignments

Individual homework assignments, suggested textbook exercises, and the final group project successively build capability and confidence in the course material. In addition to the final group project report and presentation, students will complete and submit several individual homework assignments. You can expect me to provide feedback, grade and return assignments within 10 days.

Unless otherwise noted, *all work is due on the assigned day by 11:59 PM (Eastern Time)*. This includes homework assignments, participation in the discussion board, and the final group project. Please do not hesitate to ask if you have questions or concerns.

It is expected that you will spend 10 hours per week on out-of-class assignments and exercises. Please note that some weeks will require more time and some weeks less time but the average is approximately 10 hours per week over the term.

Late Policy

Late work is not accepted and no credit will be earned on late work unless the student has arranged an extension ahead of time with me (and that is quite possible, I am flexible with everyone's challenging circumstance and time constraints); with rare exceptions based on individual circumstances (inability to communicate with me ahead of time based on an emergency, for example).

Course Requirements

The grading distribution is as shown (below), but additional details on the various course requirements

are also described on Canvas and in the Course Outline.

Component	Weight
Homework Assignments <ul style="list-style-type: none"> - There are 3 homework assignments (200 points each) used to re-enforce course concepts and provide implementation experience in R. 	60%
Discussion Forum Participation <ul style="list-style-type: none"> - There are 7 weekly discussion forum assignments (10 points each) on Canvas. - In order to receive full credit, you must submit your initial post by Wednesdays and your second response post by Sundays. 	10%
Final Course Project Report <ul style="list-style-type: none"> - Students will conduct a final course project with their Critical Thinking Group (2 – 3 students) using the econometric modeling techniques covered in class to solve a real-world problem of interest. - Only one project report should be submitted per group. 	30%
Final Course Project Presentation <ul style="list-style-type: none"> - Student groups will present the final course project. 	
TOTAL	100%

Written Work

Woods College students are expected to prepare professional, polished written work. Written materials must be typed and submitted in the specified format. Strive for a thorough yet concise style. Cite literature appropriately, using APA, MLA or CLA style. Develop your thoughts fully, clearly, logically and specifically. Proofread all materials to ensure the use of proper grammar, punctuation and spelling. For writing support, please contact the [Connors Family Learning Center](#).

Grading Scale

Your grade will be based on your final weighted average score. The letter grade will be assigned in accordance with the graduate grading system for Woods College:

Quality of Performance	Letter Grade	Range %	GPA
Excellent - work is of exceptional quality	A	93 - 100	4.00
	A-	90 - 92.9	3.67
Good - work is above average	B+	87 - 89.9	3.33
Satisfactory	B	83 - 86.9	3.00
Below Average - passing but does not count toward degree	B-	80 - 82.9	2.67
Poor - passing but not for degree credit	C	70 - 79.9	2.00
Failure - not passing	F	< 70	0.00

All students can access final grades through Agora after the grading deadline each semester. Students who complete course evaluations can access grades earlier, as they are posted.

Course Schedule

Week / Dates	Topic	Readings	Key Tasks
Week #1 7/2 – 7/7	Simple Linear Regression: Estimation, Inference, Prediction and Explanation	<i>MARR</i> – Ch. 1, 2 <i>LMR</i> – Ch. 1 – 5 Discussion Article	- Discussion #1 Due - HW #1 Assigned
Week #2 7/8 – 7/14	Simple Linear Regression: Diagnostics and Transformations	<i>MARR</i> – Ch. 3 <i>LMR</i> – Ch. 6, 9, 14 Discussion Article	- Discussion #2 Due
Week #3 7/15 – 7/21	Multiple Linear Regression: Missing Data, Diagnostics and Transformations	<i>MARR</i> – Ch. 5, 6 <i>LMR</i> – Ch. 7, 13 Discussion Article	- Discussion #3 Due - HW #1 Due - HW #2 Assigned
Week #4 7/22 – 7/28	Binary and Multinomial Logistic Regression	<i>MARR</i> – Ch. 8 <i>ELMR</i> – Ch. 2, 7 Discussion Article	- Discussion #4 Due
Week #5 7/29 – 8/4	Variable Selection and Shrinkage Methods	<i>MARR</i> – Ch. 7 <i>LMR</i> – Ch. 10, 11 Discussion Article	- Discussion #5 Due - HW #2 Due - HW #3 Assigned
Week #6 8/5 – 8/11	Count Regression and Generalized Linear Models	<i>ELMR</i> – Ch. 5, 8, 9 Discussion Article	- Discussion #6 Due
Week #7 8/12 – 8/16	Weighted Least Squares, Generalized Least Squares, and Robust Regression	<i>MARR</i> – Ch. 4, 9 <i>LMR</i> – Ch. 8 Discussion Article	- Discussion #7 Due - HW #3 Due - Final Project Due
Optional	Panel Regression	<i>ELMR</i> – Ch. 11 Article	

Attendance

All course goals, learning objectives, and assessments are supported through classroom elements that can be accessed at any time, as learning in this course is fully asynchronous via Canvas. To measure class participation (or attendance), your participation in threaded discussion boards is required, graded, and paramount to your success in this class. Consistent with BC's commitment to creating a learning environment that is respectful of persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to observe their religious holidays without jeopardizing their academic status. Students are responsible for reviewing course syllabi as soon as possible, and for communicating with the instructor promptly regarding any possible conflicts with observed religious holidays. Students are responsible for completing all class requirements for days missed due to conflicts with religious holidays.

Accommodation and Accessibility

Boston College is committed to providing accommodations to students, faculty, staff and visitors with disabilities. Specific documentation from the appropriate office is required for students seeking

accommodation in Woods College courses. Advanced notice and formal registration with the appropriate office is required to facilitate this process. There are two separate offices at BC that coordinate services for students with disabilities:

- [The Connors Family Learning Center \(CFLC\)](#) coordinates services for students with LD and ADHD.
- [The Disabilities Services Office \(DSO\)](#) coordinates services for all other disabilities.

Find out more about BC's commitment to accessibility at www.bc.edu/sites/accessibility.

Scholarship and Academic Integrity

Students in Woods College courses must produce original work and cite references appropriately. Failure to cite references is plagiarism. Academic dishonesty includes, but is not necessarily limited to, plagiarism, fabrication, facilitating academic dishonesty, cheating on exams or assignments, or submitting the same material or substantially similar material to meet the requirements of more than one course without seeking permission of all instructors concerned. Scholastic misconduct may also involve, but is not necessarily limited to, acts that violate the rights of other students, such as depriving another student of course materials or interfering with another student's work. Please see the [Boston College policy on academic integrity](#) for more information.