



Econometrics

Eco 338

Professor: Li Qi

Office: Campbell Hall 224

Phone: 404-471-6556

E-mail: lqi@agnesscott.edu

Web site: Moodle

Office Hours: Tuesdays and Thursdays 11:30 am to 12:30 pm or by appointment

◆ **Course objective:** This course introduces students to regression methods for analyzing data in economics and related areas. It addresses both the theoretical and practical aspects of statistical analysis, focuses on techniques for estimating econometric models of various kinds and interpreting the estimates from such models. The objective is for the students to learn how to conduct – and how to critique - empirical studies in economics and related fields. Accordingly, the emphasis of the course is on empirical applications. The mathematics of econometrics will be introduced only as needed and will not be a central focus. This is a required course for the Economics major and minor. It fulfills the Social Sciences Requirement for students who entered prior to Fall 2015.

◆ **Student learning outcomes:** Students will

- learn to describe probability (including joint and cumulative probability) distribution of random variables, calculate probabilities (including joint and conditional probabilities) of random events, means, variance, standard deviation, covariance, correlation of random variables
- learn to use normal, chi-squared, F, and sampling distributions to calculate the probability of random events
- learn to apply law of large numbers and central limit theorem to construct sampling distributions, perform hypothesis testing and build confidence intervals
- learn to interpret linear and non-linear regression models, obtain OLS estimators, understand concepts such as theoretical assumptions for OLS estimators, regression residuals, R-square, SER, heteroskedasticity, omitted variable bias etc. and use these concepts to analyze and assess regression results
- learn to perform hypothesis testing and construct confidence intervals (sets) for regressions with single- or multiple-regressors as well as binary variable regressors

- learn how to assess internal and external validity of regression models
- learn to use Stata software to apply the above concepts and techniques to real data sets

◆ **Course prerequisites:** Eco 215

◆ **Lectures:** Tuesdays and Thursdays 10:00 am – 11:15 am at Walters G10 (ITS conference room).

◆ **Credit and workload:** Eco 338 is a 4-credit course. In addition to in-class time, you will be spending a minimum of 3 hours per week in preparation for our class sessions, including viewing material posted on Moodle, completing reading assignments before coming to class. You should also plan to spend an additional 5-7 hours per week working on problem sets and Stata projects, and studying for quizzes and exams for this course.

◆ **Textbooks:** J.H. Stock and M.W. Watson, *Introduction to Econometrics* (third edition), Addison-Wesley.

◆ **Moodle:** I will update this course's Moodle website regularly. Students are expected to check that site and their email for messages regarding the course.

◆ **Homework assignments:** The homework problems are designed to help you learn the material. Some of the assignments involve empirical analysis. The data for the problem sets will be posted on the course web page. Some of the problems assigned to your homework will be covered in the lectures and the solutions to the homework will be given in the next lecture and discussed as well. You will turn in all homework assignments on time and a few randomly chosen homework questions/assignments will be graded and count toward your course grade.

◆ **Homework policy:**

- To get full credit for your homework, you must hand it in on time, that is, at the end of the class on the due date.
- Homework handed in after the end of class on the due date is considered late homework. The penalty for lateness is $1/3$ of the assignment grade for every day late. For example, if your score is 90/100 but you are two-days late, then your homework score will be $90 - (2/3)*100$. After three days you will get no credit.
- Once you get your homework back, you have two weeks to request grade revision. Keep your homework on a safe place, since you may need it later in case of any grade clarification.

◆ **Optional exercise questions:** In addition to required homework assignments, I will post optional exercise questions for you to take at your own discretion. Solutions to these questions will also be provided.

◆ **Exams and exam policy:**

There will be three exams. Only the best 2 out of 3 exams will count toward the final grade of this course. Check exam dates in the course outline.

- Since you are already given an exam that you can drop for the final course grade, **no make-up exams will be made.**

- Only in very exceptional cases, students may be excused from missing an exam. Enough written evidence of the calamity must be provided. I will give make-up exams only when the conditions just specified are met. If a student does miss a test, the make-up test will be the 3rd exam at the end of the semester. If a student misses more than one exam without an extraordinary reason, her final grade will be reduced proportionately.

◆ **Empirical data Project:** You will be assigned a sequence of data projects throughout the semester and there will be a Stata test at the end of the semester. You are encouraged to use Stata for these projects because the instructor will provide specific help sessions for Stata. But you are allowed to use other statistical software. The policies for homework and exams specified above apply for these projects and test as well. Details of the data projects are available on the course website. We will also discuss these projects after the first software session in class.

◆ **Computing Software:** The statistical software package for this course is STATA, which is available on campus. But you are welcome to use other packages such as SAS, SPSS, Eviews, or TSP for the problem sets if you like. There will be “hand-on” STATA sessions at the beginning of the semester to aid you with the empirical problem sets and data projects.

◆ **Grading:**

The final grade will be a weighted average as follows:

- Two best exams 35% each (total 70%)
- Homework assignments 5%
- Empirical data project 20% (including a Stata Test 5%)
- Attendance and participation 5%

The course letter grades are determined as follows:

93 – 100	A	4.0
90 – 92.99	A –	3.67
87 – 89.99	B +	3.33
83 – 86.99	B	3.0
80 – 82.99	B –	2.67
77 – 79.99	C +	2.33
73 – 76.99	C	2.0
70 – 72.99	C –	1.67
67 – 69.99	D +	1.33
63 – 66.99	D	1.0
60 – 62.99	D –	.67
< 60	F	0

◆ **Attendance:** Academic work is the heart of the college experience and academic success at Agnes Scott College is directly related to class attendance. Attendance is part of the students' overall responsibility and performance in a given course. If you do not attend at least **two-thirds of the classes**, you will fail the course.

Attendance will be checked randomly and frequently throughout the semester. You are allowed to drop **two** no-show records at the end of the semester, but you will lose the attendance and participation credit for this class by **10** per cent for each additional no-show record. Since you are given the chance to drop two no-show records, no additional excuses will be granted for missing classes. Only in very exceptional cases (such as severe illness or family emergencies), students may be allowed to drop additional no-show records. Enough written evidence of the calamity must be provided. And in these cases of serious illness or injury or emergency that will require a student to miss academic work, she should notify the office of the dean of students (x6391) as soon as possible to inform the college of her situation. Late attendance will count only if you arrive within **5** minutes of the class start time. If you arrive later, it will count as **one-third** of an absence.

A student on academic probation is permitted only one absence in each academic course that is not due to serious illness, death of an immediate family member, and religious observance.

◆ **Academic honesty** The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College's mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. You should:

- review each course syllabus for the professor's expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.
- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.
- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and

the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.)

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

◆ **Policy on technology in the classroom**

The use of electronic devices during class can be discourteous and disruptive. Any student who wishes to use a tablet or a computer for notetaking should be aware of three important considerations:

- (1) Research shows that people who take notes electronically end up with poorer-quality notes and poorer recall.
- (2) Classmates and instructors may be distracted or irritated by the sound of a clacking keyboard during class.
- (3) Computers and tablets create an often irresistible temptation to multi-task during class, which impedes concentration and causes students to miss out on valuable content.

For these reasons, the use of electronic devices is strongly discouraged in this course, unless a student has received accommodations from the Office of Academic Advising and Accessible Education that specify the use of a computer or tablet. Any student who has not received accommodations may earn the right to use a computer or tablet for notetaking by completing the optional extra writing assignment outlined below. All cellphones must be turned off and put away during class time.

Electronics Exercise (optional)

Read the following two articles and write an essay of at least three paragraphs (500-600 words) in which you: (a) offer a thorough summary of each article; and (b) make a case for why you think that the use of a computer or tablet will enhance rather than impair your note-taking and your ability to participate responsibly in class.

- Maggy McGloin, “What You Miss When You Take Notes on Your Laptop,” *Harvard Business Review*, July 31, 2015. [<https://hbr.org/2015/07/what-you-miss-when-you-take-notes-on-your-laptop>]
- Susan M. Dynarski, “For Better Learning in College Lectures, Lay Down the Laptop and Pick up a Pen.” Report of the Brookings Institute, August 10, 2017. [<https://www.brookings.edu/research/for-better-learning-in-college-lectures-lay-down-the-laptop-and-pick-up-a-pen/>]

Submit via email to the Professor. If you successfully complete this assignment, the instructor will permit you to bring a computer or tablet to class *for note-taking purposes only*.

◆ **Pocketpoints.com to reward you for staying off your cell phone during class (use code 48799)**

◆ **Disabilities:** Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education ([404-471-6150](tel:404-471-6150)) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

◆ **Course Evaluations:** Course evaluations are completed online. Near the end of the semester, you will receive an e-mail message that will provide a link to follow in order to complete the evaluation online, outside of class. Student evaluations provide feedback that is valuable to the instructor, and I hope that all members of the class will complete this form.

◆ **Title IX:** For the safety of the entire community, any incidence of, or information about, sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, [404-471-6547](tel:404-471-6547)), Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, [404-471-6435](tel:404-471-6435)), or Vice President for Student Life and Dean of Students Karen Goff (kgoff@agnesscott.edu, [404-471-6449](tel:404-471-6449)).

◆ **Diversity and Inclusion:** This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and recognize the differences among our students, including racial and ethnic identities, religious practices, and gender expressions. We strive for our campus to be a safe space in which all students feel acknowledged and supported. At the same time, we understand that course content, critical inquiry, and classroom dialogues give us opportunities to examine topics from a variety of perspectives. Such discourse is a defining feature of a liberal arts education, and can compel debates that challenge beliefs and positions, sometimes causing discomfort, especially around issues related to personal identities. While we uphold and preserve the tenets of academic freedom, we request and invite your thoughtful and constructive feedback on ways that we can, as a community of learners, respectfully assist and challenge one another in our individual and collective academic work.

Reading List and Course Outline (tentative)

Week #			<u>Topic</u>	Readings:	Problem Sets:	
				<u>SW Ch. #</u>	<u>Posted</u>	
1	THU	Aug 29	Course Introduction/Economics Questions and Data	1		
2	TUE	Sep 3	Economic Questions and Data/Review of Probability	1/2		
	THU	Sep 5	Review of probability	2	PS#1	
3	TUE	Sep 10	Review of probability	2		
	THU	Sep 12	Review of Statistics	3	PS#2	
4	TUE	Sep 17	Review of Statistics	3		
	THU	Sep 19	Review of Statistics/Review of Stata (Data Cleaning and Basic Stata Commands)	3	Proj1	
5	TUE	Sep 24	Lab Session: Data Project 1			
	THU	Sep 26	Classic Linear Model: Bivariate	4/5	PS#3	
6	TUE	Oct 1	Classic Linear Model: Bivariate	4/5		
	THU	Oct 3	Classic Linear Model: Multiple	6	PS#4	
7	TUE	Oct 8	Exam 1	1-5		
	THU	Oct 10	Fall Break (No Class)	6/7		
8	TUE	Oct 15	Classic Linear Model: Multiple	6/7		
	THU	Oct 17	Classic Linear Model: Multiple	6/7		
9	TUE	Oct 22	Lab Session: Data Project 2		Proj 2	
	THU	Oct 24	Nonlinear Regression Functions	8		
10	TUE	Oct 29	Assessing Multiple Regression	9	PS#5	
	THU	Oct 31	Assessing Multiple Regression	9		

11	TUE	Nov 5	Regression with Panel Data/Exam 2 Review	10	PS#6	
	THU	Nov 7	Exam 2	6-8		
12	TUE	Nov 12	Regression with Panel Data	10		
	THU	Nov 14	Regression with Panel Data	10		
13	TUE	Nov 19	Probit Model	11		
	THU	Nov 21	Lab session: Data project 3		Proj 3	
14	TUE	Nov 26	Lab session: Data project 4		Proj 4	
	THU	Nov 28	Thanksgiving (no class)			
15	TUE	Dec 3	Stata Test/Review of Exam 3			
	THU	Dec 5	Exam 3	9-11		