Economics 300-01
Quantitative Methods in Economics
Fall 2018
Class: Tuesdays and Thursdays 8:50-10:10am in PAC 107
Labs: Fridays 9:20-10:40 am in ALLB204

Professor: Abigail Hornstein
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Office Hours: Tuesdays and Wednesdays 2-3:30pm, and by appointment
Lab Instructor: Manolis Kaparakis
CAs: Grant Westfahl and Preksha Sreewastav – Tuesdays 7:30-9pm in PAC 107
                    Fiona Sun and Yuki Yu – Wednesdays 7:30-9pm in PAC 125

General Course Information

Purpose: This course is designed to provide you with a foundation in probability and statistics, both to help you understand statistical phenomena in general and to serve you as a tool in the further study of economics. The emphasis is on learning techniques and computer programs that are widely used by economists. By the end of the semester, you will be able to read empirical economics papers and produce empirical research.

Course grade:
    20% determined by Professor Kaparakis (see "Laboratory work")
    80% determined by Professor Hornstein

    Assignments and credit for course grade from Professor Hornstein:
        Class participation   5%
        Problem Sets   10%
        Statistics blog posts   5%
        Midterm #1   15%
        Midterm #2   20%
        Midterm #3   20%
        Research Paper   25%
            -   *Proposal*   *5%*
            -   *Paper*   *20%*
    Unexcused absences from exams, non-delivery of the final paper, or non-satisfactory performance in the lab will result in a failing grade for the course.

Readings: The required text is a free e-book titled "Statistics for Economists: A Beginning" by John E. Floyd, which can be downloaded at https://www.economics.utoronto.ca/jfloyd/stats/ecstats.pdf. Chapter numbers in the course schedule refer to this text. Additional short items will be shared on the course moodle and/or distributed in class.

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[1] Emails received before 7pm on weekdays should receive a same day response.

Grading Policy: I will use the "Dear Abby" scale for grading: 0, 1, 2 (the "hurdle" level), 3, 4 (minor problems), or 5. To find your letter grade equivalent, divide by the number of questions to get your average score on the 0-5 scale. Then convert according to: 4.5=A, 4.0=A-, 3.7=B+, 3.3=B, 3.0=B-, 2.7=C+. 2.3=C, 2.0=C-, 1.7=D+, 1.3=D, 1.0=D-.

Problem sets will receive a check minus, check, or check plus. The 0-5 scale equivalents are: check plus, 4.5; check, 3.4; and check minus, 2.3. Late problem sets will receive a grade of 1.0 irrespective of the quality of the work shown.

Class Participation: Class attendance is expected. You are expected to complete all assigned readings before class. I will use our class-time to focus on the most important or complex topics. If you know that you will have to be late and/or leave early, please let me know in advance. For every absence in excess of 3 not excused by a class dean (i.e., due to a health or family emergency), your class participation grade will be lowered by a full letter (i.e., if you miss four class sessions and would otherwise have received an A for class participation, it will be recorded instead as a B, etc.).

Please adhere to the following policies:
- Be on time for class.
- Not leave class early.
- Avoid getting up during class sessions unless absolutely necessary. This is not only very disruptive to all people in the classroom but shows a lack of respect for all present.
- Please switch your phones to "airplane mode" and turn off the ringer volume.

Students who meet the above expectations will receive a *B* for class participation. To earn a higher grade a student will need to ask insightful questions as well as answer questions posed by me or others. I will give a *C* or lower for class participation to students who never participate in class or who are often not able to answer questions.

Problem Sets: Problem sets are assigned regularly (nearly every week). They have several purposes: to review and extend concepts from lecture or the textbook; to introduce related topics not covered in lecture; and to provide feedback on your comprehension of the material to date. *Note: problem sets will occasionally cover material before it is covered in class.* There will be nine problem sets and your eight best problem set grades will be counted towards your course grade.

Your TAs are not allowed to answer questions about the problem sets before they are submitted. The weekly TA sessions are optional opportunities for you to review the material by working with the TAs to solve problems that have been assigned previously at the same juncture in this course. Thus, the material covered in the TA sessions will parallel and complement what we do in class and what you do independently in the problem sets.

Problem sets will be due Thursdays at 4:15 pm, and should be submitted via the Econ 300-01 slot in the departmental locked box. Solutions will be available online as soon as the submission deadline passes.

Grading will be on a check-plus, check, check-minus scale. Quick guide to problem set grades:
- Check-plus: all questions answered correctly or all questions answered using right strategies (but with possible computational errors).
- Check-minus: some questions skipped or many questions answered incorrectly.

- Check: almost everything in between.

You will need a calculator for the exams.[2] I therefore recommend you use a calculator for at least some of the problem sets so that you are comfortable on the exam days.

Up to three people may cooperate on each problem set; when students submit joint problem sets all students will get the same grade. Please do *not* list any students' name on the problem sets; instead, please put students' WesIDs. Assignments will be returned in class.

Statistics blog posts: Economic terminology and statistical analysis are ubiquitous in the media, whether defined traditionally as referring to newspapers such as the *New York Times* or as loosely as *Vox* articles (or the like) shared in your social media feeds. Each student will be assigned to one of roughly 11 subject areas in the 2nd week of the semester. (These student-area matchings will be based on responses recorded on the student information cards.) Blog posts must be made on or before specified dates; and responses on or before a second date (also specified). Responses need to touch on both other posts to your subject area and, when appropriate, should also reflect what students have posted on related topics. Credit will be given for completion of this task. For the most part, I (the professor) will not make comments as this should be a safe space for you to share and discuss data but I may make posts from time to time.

Laboratory work: Homework assignments, as well as the course project, will involve the use of an electronic spreadsheet, Excel, and, more commonly, a statistical analysis package, Stata. Both Excel and Stata are installed on all public access computers on campus labs and classrooms. The software will also be accessible from your own computers through a virtual environment; information will be discussed during the lab sessions.

This class has a linked lab session, which is mandatory, that meets every Friday 9:20-10:40am. The lab sessions follow a hands-on learning-by-doing approach and will give you the opportunity to practice data analysis and explore statistical tools and techniques we discuss in the class using real world data. Some of these data (e.g. DataInsight, ICPSR, iPOLL) are accessible through subscriptions to data sources maintained by our Library (see also http://libguides.wesleyan.edu/USstats).

The lab section is taught by Manolis Kaparakis and will meet in Allbritton 204. The lab component of the course will count for 20% of the course grade. Manolis Kaparakis will inform you of his expectations for a passing grade in the lab section.

Exams: Optional drop-in review sessions prior to each exam will be held the night prior to each exam.

Students will be allowed to start each midterm exam 20 minutes early if they would like extra time. *Exams will be given at these times only – no exceptions.*

Midterm #1   Thursday, October 4th
Midterm #2   Tuesday, October 30th
Midterm #3   Tuesday, December 4th

You should view the problem sets as being mini-exams in the sense that the exam questions will be calibrated to the same degree of difficulty as the problem set questions. The key differences between

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[2] If you do not already have a calculator, it is not necessary for you to buy a fancy calculator.

problem sets and an exam will be: (1) time constraints, and (2) resources (you can't ask other folks for advice). Note, that these constraints automatically mean that the exam questions will have to be easier and/or shorter than problem set questions. (You will have access to exams from the most recent semester via the course moodle.)

Research Paper: The research paper is intended for you to develop "hands-on" experience with statistical techniques. A good paper will utilize concepts learned in this course to explore economic concepts of interest to you. Your paper can either be a replication of an existing empirical paper published in an academic journal, using similar data that you collect, or your own original empirical work.[3] Most papers will blend the two extremes – that is, they will be your own personal spins on a prior paper. *This is how economics research is generally done!*

Note: a paper *must* draw on economics articles published in peer-reviewed academic journals. [In that light, it is not possible to write a moneyball type paper on sports economics as you will not find literature to draw upon.]

Writing a paper is a time-consuming task, and it is very important to choose a topic that is feasible within your schedule constraints. Hence, you will submit a proposal. I will try to give you my feedback on your proposal as soon as possible, and you can start working on the paper after getting my feedback.

The final paper will be around <u>10 pages</u> in length (not counting tables and figures). You are required to use the Microsoft default settings – i.e., 11 or 12-point font, double-spaced text, 1-inch margins on all sides). Papers that are shorter than 9 pages or longer than 15 pages will receive a one letter grade deduction for each page deviation from these bounds (i.e., an 8 or 16 page paper would get a maximum grade of B while a 7 or 17 page paper would get a maximum grade of C). Shorter, focused papers are preferable to longer, rambling ones. You will be penalized for excessive length, or including uninformative tables or graphs. Also, do not include a printout of your data unless I request it specifically.

Evaluation: Grading is based primarily on the quality of your analysis. However, I expect your papers to be well written and free of any grammatical, logical, or spelling errors. You are encouraged to take advantage of the writing workshop on campus.

Late submissions: Late submissions are penalized one letter grade per day late or fraction thereof.

<u>**Components and deadlines**</u>
Proposal (2-3 pages): Due 4:15pm on Monday, November 5th
Describe your research question and why the question is interesting. You will have chosen at least three published, peer-reviewed economics papers that motivate your research question. (You will draw upon papers that have a similar research question as yours or use similar data or methodology.) Provide bibliographic information for each of the papers (the title, authors, year of publication, and the name of the journal in which the paper was published)[4] and write a short summary of the similarities and differences of those papers relative to your planned paper. This process will provide a starting point for

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[3] If you replicate a published paper using the original dataset as made available by the authors on their website or elsewhere, and make no substantive changes to the model or dataset than your paper grade will be reduced by a full letter (i.e., an A quality paper will receive a grade of B, and so forth).
[4] Newspaper or magazine articles are not appropriate references; Wikipedia and its ilk are unacceptable.

your work and it will also help you get an idea of how economics papers are structured and worded (e.g., neutral, objective language is used). Finally, provide sample descriptive statistics (number of observations, mean, variance, etc.) of the key variable(s) you will examine in your paper. Also, explain in detail how you will obtain the rest of your data.

This document must be uploaded to turnitin in word format (not pdf even though turnitin permits pdf submissions).[5] All document should be named "Lastname 300f18 Proposal". You can submit the proposal any time prior to the deadline if you want to have more time to write the paper; early submissions should also be emailed as attachments to ensure they are noticed.

Final Research Paper (10 pages[6]): Due by 5pm on Dec. 7th (last day of classes) with automatic extension, without penalty, until 5pm Dec. 11th (end of reading period). Describe and motivate your research question and provide a brief literature review. Explain in detail how you obtained your data and the statistical technique used to answer your question. Present your results and explain the economic meaning of the results. If you are aware of any shortcomings of your paper, describe them and explain why you were unable to resolve the issue. Submit a hard copy in the locked box, and upload your paper to turnitin.

Turnitin: In addition to submitting your final papers directly to me, the proposal and final paper must also be submitted by you to the appropriate class folders on turnitin.com. (Obviously, if you have non-computer-readable attachments, you will not need to upload those into the system.) Directions on how to use turnitin can be found on www.turnitin.com. Once you have set up your account, "enroll" in this course – the class ID number is 18461888 and the password is "econ300".

Honor Code: All work submitted for a grade in this course must be your own original work. You are encouraged to discuss your work with your fellow students, but in accordance with the Honor Code, submitting another person's work as your own would constitute plagiarism and will not be tolerated. The research paper cannot be submitted in another course without express prior permission from both me and the instructor of the other course. If you propose a topic that is related to a topic that you wrote about in a prior semester, you must seek express prior permission from me. If you have any questions about the application of the honor code, please contact me.

Students with Disabilities: Wesleyan University is committed to ensuring that all qualified students with disabilities are afforded an equal opportunity to participate in, and benefit from, its programs and services. To receive accommodations, a student must have a disability as defined by the ADA. Since accommodations may require early planning and generally are not provided retroactively, please contact Accessibility Services as soon as possible. If you believe that you need accommodations for a disability, please contact Accessibility Services, located in North College, Rooms 021/022, or call 860-685-5581 for an appointment to discuss your needs and the process for requesting accommodations.

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[5] I will download all submissions from turnitin, and edit/comment on them in tracking mode in word. Graded documents will then be returned to students by email with the file renamed "Lastname 300f18 Proposal AH".
[6] See full details about paper length earlier in the syllabus.

Course Schedule

Below is an approximate schedule for the material. All readings are from the textbook except where otherwise indicated (and posted to moodle). All assignments are due by 4:15 pm on the date indicated (usually Thursdays). Midterm exams will be given in class.

Course objectives
1. Define quantitative tools (probability, statistics, regression)
2. Identify populations and samples, and understand similarities and differences.
3. Evaluate economic models using quantitative tools.
4. Apply quantitative tools to examine economic question of interest using individually identified datasets.

Lesson#	Date	Topic	Readings	Assignment
Unit 1: Probability (Objectives 1, 2)				
1	Tues. Sep. 4	Course overview, Intro to stats	1.1-1.4	
2	Thurs. Sep. 6	Intro to stats, Descriptive statistics	1.3-1.5	
	Fri. Sep. 7	Lab 1: Excel basics		
3	Tues. Sep. 11	Descriptive statistics, Probability	1.5-1.8 (skip equations 1.8-1.9), 2.1, 2.2	
4	Thurs. Sep. 13	Probability distributions 1	2.2-2.5, 2.11, 2.7-2.8	PS1 (due 9/13)
	Fri. Sep. 14	Lab 2: Meet Stata		
5	Tues. Sep. 18	Probability distributions 2	2.9-2.10, 2.6	
6	Thurs. Sep. 20	Probability distributions 3	3.1-3.3 (skip equation 3.7), 3.5, 3.7, 3.9	PS2 (due 9/20)
	Fri. Sep. 21	Lab 3: Descriptive analyses – numbers and tables		Blog 1
7	Tues. Sep. 25	Probability distributions 4	3.9, 1.9, 3.10	
8	Thurs. Sep. 27	Probability distributions 5; Joint distributions	2.6, 1.10, 3.4-3.6	PS3 (due 9/27)
	Fri. Sep. 28	Lab 4: Descriptive analyses – pictures		Blog 1 reply
Unit 2: Statistics (Objectives 1, 2, 3)				
9	Tues. Oct. 2	Joint distributions; sampling	3.6, 4.1	
	Wed. Oct. 3	Drop in review session in PAC 107 6-7:30pm, optional		
	Thurs. Oct. 4	**Midterm #1 (all material thus far)**		
	Fri. Oct. 5	Lab 5: Library resources		
10	Tues. Oct. 9	Sampling; point estimation	4.2-4.4	
11	Thurs. Oct. 11	Point estimation; confidence intervals 1	4.4-4.6	PS4 (due 10/11)
	Fri. Oct. 12	Lab 6: Data sources		

12	Tues. Oct. 16	Confidence intervals 2	4.6-4.7, 4.9	
13	Thurs. Oct. 18	Confidence intervals 3; hypothesis testing 1	4.8, 5.1, 6.1-6.4	PS5 (due 10/18)
	Fri. Oct. 19	Lab 7: Data management 1		Blog 2
14	Thurs. Oct. 25	Hypothesis testing 2	5.2-5.7	PS6 (due 10/25)
	Fri. Oct. 26	Lab 8: Hypothesis testing		Blog 2 reply

Unit 3: Regression (Objectives 1, 3, 4)

	Mon. Oct. 29	Drop in review session in PAC 107 6-7:30pm, optional		
	Tues. Oct. 30	**Midterm #2 (all material since prior midterm; prior material may be implicitly tested through assumptions)**		
15	Thurs. Nov. 1	Simple regression	8.1-8.2	
	Fri. Nov. 2	Lab 9: Data management 2		Paper proposal (due 11/5)
16	Tues. Nov. 6	OLS	8.3	
17	Thurs. Nov. 8	Multiple regression 1	8.4, 8.7-8.9	PS7 (due 11/8)
	Fri. Nov. 9	Lab 10: Programming with Stata		
18	Tues. Nov. 13	Multiple regression 2	9.1-9.2, 9.6	
19	Thurs. Nov. 15	Multiple regression 3	9.5, 9.9	PS8 (due 11/15)
	Fri. Nov. 16	Lab 11: Regression with Stata 1		
20	Tues. Nov. 20	Multiple regression 4	9.9, 8.10, W&W 461-464	
21	Tues. Nov. 27	Correlation and quality of fit	9.7, 8.6, 8.5, 9.3	
22	Thurs. Nov. 29	Topics in Regression Analysis 1	9.8, W&W 693-709, 712-719	PS9 (due 11/29)
	Fri. Nov. 30	Lab 12: Reporting		Blog 3
	Mon. Dec. 3	Drop in review session in PAC 107 6-7:30pm, optional		
	Tues. Dec. 4	**Midterm #3 (all material since prior midterm; prior material may be implicitly tested through assumptions)**		
23	Thurs. Dec. 6	Topics in Regression Analysis 2	TBD (Note: material covered today will be needed for your paper and subsequent courses)	
	Fri. Dec. 7	Lab 13: Regression with Stata 2		Blog 3 reply
	Tues. Dec. 11, 5pm	**Research Paper[7]**		**Research paper**

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[7] Technically, this is due at 5pm on the last day of classes (Dec. 7th) but students may have an automatic extension, without penalty, until the end of reading period. Thus, the final deadline for this paper to be submitted via the locked box and turnitin is 5pm on Tuesday, December 11th.