Econ 320: Econometrics LAB

Instructor: Dr. Paloma Lopez de mesa Moyano, Rich 214A, 727-7222 (Econ. Dept: 727-4639), e-mail: paloma.moyano@emory.edu.

Time and Location:

LAB1  Friday : 10:00 am – 10:50 am, White Hall 102.
LAB2  Friday : 1:00 pm – 1:50 pm, White Hall 102.
LAB3  Friday : 3:00 pm – 3:50 pm, White Hall 102.

Note: You may only attend the section in which you are registered; all sections are full and we cannot have an overcrowded classroom for any of the lab sessions. Classes begin on 01/15/2019 and end on 04/28/2019. Classes do not meet on 03/12/2019 and 03/14/2019.

Office Hours: My regular office hours for the Spring Semester are Friday, 4:30pm – 7:30pm.

Course Description and Objective: Data analysis is a highly valued skill in the job market. In this class, you will learn how to organize and analyze data using computer-programming software. We will focus primarily on the R language, which has powerful tools to manage and analyze data. We will develop the skills to apply the concepts you learn in class and present data and analysis in an organized manner. We will also learn how to think algorithmically within the R environment, with the aim to prepare you for more advanced data analysis tasks in your future classes or in other endeavors. Your programming skills will only improve when you struggle to figure things out on your own. This class will provide the guidance to develop the basics of R for econometrics analysis and, hopefully, the desire to keep practicing and challenging yourself with new and different quantitative problems and questions. After taking this course, students should be able to:

1. Manipulate data sets in R.
2. Create graphs and summary statistics with data.
3. Run simple and multiple regressions in R and understand the output of those.
4. Preform inference analysis in R.
5. Write reports using Rmarkdown

IMPORTANT: You need to bring your laptop for every class. This will allow you to run your code in class, make sure that you are able to replicate what we do in class on your own, and take notes on your code.

DataCamp: You have received an invitation to join our class on DataCamp. I have created this class using your Emory email address as it appears on Canvas. Make sure that you join the class on DataCamp by the first week of classes (check your junk email if you have not seen the invitation). DataCamp assignments will be posted on Canvas as a reminder, but you have to go to DataCamp to complete them. There is no late submission available on DataCamp. Make sure you check the deadline and do your work. DataCamp is a great tool and will make your R learning process faster and easier.
Questions: You can come to my office hours, ask questions at the end of the class if we finish early or email me. However, good programming skills come with a lot of self-teaching and fixing your code on your own – so the rules for asking questions are the following:

1- First see if R itself has the answer to your question (in the first class you will learn how to use R help)
2- If not solved by (1), look for online resources (these will also be provided in the introductory classes)
3- You can simultaneously ask your colleagues using the Canvas discussion board. When mistakes are common I will post the common mistakes in the discussion board or as announcement on Canvas so make sure you have Canvas notifications turned on.
4- If after trying these you couldn’t find an answer to your question, we can look at it together. But you must prove that you tried 1-3 first. I will reply to emails within a 24 hours window during weekdays.

Email: Make sure to add your section and time of class at the beginning of the subject of every email you send me. For example if you are enrolled in the econometrics class in the 10 am Lab on Friday the subject of your email should start with: ECON320 LAB1 Friday 9 am. This will make our communication more efficient. I will reply to emails within a 24 hours window during weekdays. Emails sent after 7 pm on Friday or during the weekend will be taking as Monday emails.

Discussion Board: This term we will be using the Canvas discussion board for class discussion. The system is highly catered to getting you help quickly and efficiently from classmates and/or myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on the Canvas discussion board.

Grading: This lab represents 25% of your grade for Econ 320. I will provide a total grade to your theory instructor. I will do random quizzes in class, assignments will be posted at the beginning of class and you have until midnight that day to submit your assignment. The worst assignment grade will be removed. There is a penalty of 10% for late submission. If you miss class make sure you check Canvas for the assignment. You will have to submit a final project at the end of the semester in which you apply the skills learned in the lab using a real dataset.

<table>
<thead>
<tr>
<th>Grade distribution</th>
<th>% of your lab session grade</th>
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<tbody>
<tr>
<td>DataCamp</td>
<td>15%</td>
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<tr>
<td>Quizzes/Assignments</td>
<td>40%</td>
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<tr>
<td>Final Project 1st part</td>
<td>15%</td>
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<tr>
<td>Final Project complete</td>
<td>30%</td>
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Attendance is not required but it is highly recommended that you don’t miss any class. Quizzes and participation points will be randomly given during class.

Important dates:

March 8th: Choose the dataset for your final project. Details on Canvas.
April 26th: Final project submission. Details on Canvas

Canvas: I will be using Canvas for all the course information. Please make sure you check it every day and get the notifications. All the relevant information for the course will be there.

Policies

General: Students are expected to adhere to the Emory College Honor Code as well as its Conduct Code, see http://college.emory.edu/home/academic/policy/conduct_code.html. Specifically the honor code is in effect throughout the semester. By taking this course, you affirm that it is a violation of the code to cheat on assignments and projects, to plagiarize, to deviate from the teacher’s instructions about collaboration on work that is submitted for grades, to give false information to a faculty member, and to undertake any other form of academic misconduct. You agree that the teacher is entitled to move you to another seat during examinations, without explanation. You also affirm that if you witness others violating the code you have a duty to report them to the honor council.

Special circumstances: Students requiring any type of special classroom/testing accommodation for a disability, religious belief, scheduling conflict, or other impairment that might affect his or her successful completion of this course must personally present the requested remedy or other adjustment in written form (signed and dated) to the instructor, i.e. supporting memorandum of accommodation from the Office of Disabilities Services, http://www.ods.emory.edu/. Requests for accommodations must be received and authorized by the instructor in written form no less than two weeks in advance of need. No accommodation should be assumed unless so authorized. In the event of needs identified later in the course, or for which an adjustment cannot be made on a timely basis, a grade of “I,” Incomplete for the course, will be given to accommodate the unanticipated request.

Missed assignments and late submission: Assignments dates will be posted on Canvas with at least one week in advance if not at the begging of the semester. Assignments are available for submission at the begging of the class until midnight that Friday. Late submission is allowed up to 6 days with a penalty of 10% per day, no excuses. No resubmission is allowed after the assignment is graded. Solutions are posted before each class and submissions are not allowed after that, no excuses. For your final project the due dates are posted since the first day of classes, make sure that you organize your time to work on it accordingly. Late submission of the final project deliverables has penalty of 10% per day, with out any excuses.

Dishonesty: Any student who is found to have cheated or to have plagiarized will receive an “F” for the course. The university defines academic misconduct as:

“... Academic misconduct is an offense generally defined as any action or inaction which is offensive to the integrity and honesty of the members of the academic community ...”

For full information about Emory's policy on academic misconduct, please check the following links: http://college.emory.edu/home/academic/policy/honor_code.html (see Articles 4, 5, 6 & 7)

Class attendance: Attendance is mandatory and encouraged. If a student misses a lecture, the student should not expect the instructor to repeat the material at another time (such as the instructor’s office hours).
In/Out of classroom conduct: Students are expected to adhere to the Emory University Code of Conduct, see http://conduct.emory.edu/policies/code/index.html.

- Use of cell/smartphones during lecture time and exams is always prohibited, as is taking pictures during class, and leaving the room to answer or make a call.

- You are only allowed to use your laptop for the purpose of the class, work for other classes, messaging, reading email, browsing Facebook or any other social network, is absolutely forbidden.

- Basic classroom etiquette requires that you be quiet and attentive in class. This means that, except when we are engaged in-group discussion, only one person will be talking in the classroom at any time. Everyone in the room will give respectful attention to the sole speaker. Students creating disruptions in class will be asked to leave the class and will still be responsible for any material missed. Continued disruptions will be dealt with in accordance with university policy.

- Any level of ‘chatting’ with friends, sleeping, reading newspapers, leaving early, and/or eating in class are disruptive and rude to your classmates and me. If for some reason you have to leave early or arrive late on a particular day, please sit in the back of the class, leave or arrive quietly, and notify me via e-mail as far in advance as possible. This will be allowed as long as it is of an infrequent nature. Use the time in class wisely, appropriately, and efficiently.

- You are welcome to drop by my office during office hours and by appointment only. If you need to send me an e-mail, please remember that e-mail is a means of communication and you should be always respectful in your writings. I reserve the right to either answer your query via e-mail (within 24 hours after receiving it on week days) or in person (by asking you to set up an appointment to meet later on).

Outline
This list is tentative and subject to changes. The order of the topics might also change.

Intro to R and Rmarkdown (Review)
1) Installing R and Packages
2) Documents in Rmarkdown
3) Create a working directory

Data Manipulation for regression analysis in R.
1) Import/Load data into R
2) Different data structures in R
3) Merging data
4) Transposing data in R, long vs wide format
5) Summary statistics in R (dplyr package)

The Simple Regression Model.
1) Regression commands
2) Scatter plot and fitted line (ggplot package)

Multiple Regression Analysis: Estimation
1) Multiple regression command
2) Regression Commands to retrieve information from the regression output
3) Prediction
4) Stargazer package for output presentation. Writing regression equations in Rmd
5) Understanding of regression output in R.

Multiple Regression Analysis: Inference

1) The $t$ Test in R.
   i. Testing against One-Sided Alternatives.
   ii. Two-Sided Alternatives.
   iii. Testing Other Hypotheses about $\beta_j$.
   iv. Computing $p$-Values for $t$ Tests in R.
2) Confidence Intervals.
3) Testing Hypotheses about a Single Linear Combination of the Parameters.
4) Testing Multiple Linear Restrictions: The $F$ Test.
   i. Testing Exclusion Restrictions.
   ii. Computing $p$-Values for $F$ Tests.
   iii. The $F$ Statistic for Overall Significance of a Regression.
   iv. Testing General Linear Restrictions.

Multiple Regression Analysis with Qualitative Information: Binary (or Dummy) Variables Describing Qualitative Information.

1) A Single Dummy Independent Variable.
2) Using Dummy Variables for Multiple Categories.
3) Interactions Involving Dummy Variables.
   i. Interactions among Dummy Variables.
4) A Binary Dependent Variable: The Linear Probability Model.

Heteroskedasticity

1) Testing for Heteroskedasticity.
   i. The White Test for Heteroskedasticity.
2) Weighted Least Squares Estimation.

Instrumental Variables Estimation and Two Stage Least Squares (If time permits)