Economics 395 (L01) (Use of Statistics in Economics)

Instructor: Heidi Esau
Phone:
Email: Heidi.esau@ucalgary.ca

Lecture Location: ST 129
Lecture Days/Time: M/W/F 1:00-1:50 PM

Office: SS344
Office Hours: M/W 2:00-3:00 PM

(Winter 2020)

Course Description:
Introduction to the use of econometric principles in economics. Building on the fundamental mechanics of statistics and probability, students will become familiar with the empirical application of econometrics to problems of measurement in economics. The course focuses on statistical reasoning, the gathering and manipulation of economic data, and the use of standard econometric software. The core of this course is based on the principles from random variables, expectation theory, and probability theory. The two-variable and multivariate linear regression models are introduced, developed and evaluated. The overriding purpose of the course is to provide the student with a strong intuitive understanding of how and why econometrics works and the empirical applications to support and strengthen this understanding.

Course Learning Outcomes:

Students who successfully complete this course will:
- Know and understand the Simple Linear Regression Model. Be able to transform a simple linear economic model to an econometric model – the role of the error term. Know the assumptions of the simple linear regression model and why we need them.
- Know the Least Squares Principle and estimators for the intercept and slope parameters in the model.
- Know how to interpret the estimated slope coefficient and elasticity.
- Have a knowledge of the use of econometric software (excel and Stata) in generating empirical estimates.
- Have an intuitive understanding of the Gauss Markov Theorem
- Know the sampling properties of the Least Squares Estimators- expected value, variance.
- Know the distribution of the least squares estimators and why this is important.
- Interval estimation and hypothesis testing for the least squares estimator.
- Know the difference between economic and statistical significance.
- Know how to calculate the variance of the estimates and the variance of the error term.
- Understand the purpose and importance of a multi-variable regression model.
- Know how to carry out hypotheses testing and model evaluation in a multi-variable setting.
- Understand the serious problems of heteroskedasticity on the distribution and hypothesis testing.
- Know how to test and correct for heteroskedasticity.
- Understand the importance and use of binary variables. A quantitative measure for a qualitative factor.

- Understand the linear probability model and applications.
- Understand proxy variables, functional form and model specification.

Course Outline:

Week	Topic	Readings	Notes
1	Introduction: Why study econometrics? Why it is useful for understanding economic problems and issues of measurement.	Wooldridge Ch. 1	Classes begin Jan. 13
1, 2	Review of basic probability and statistics: Opportunity to review important elements in Statistics useful	Wooldridge Appendices A, B, C; Review Stats 213	
** 3	Assignment #1 due		**Jan 27**
2,3	Simple Regression model: Fundamental characteristics and mechanics of regression analysis, the importance of the residual error term.	Wooldridge Ch. 2	
4	Multi-regression Model: A detailed understanding of why and what restrictions are required for a regression equation to generate empirically accurate information on the relationships among economic variables.	Wooldridge Ch. 3	
** 5	Assignment #2 due		**Feb 10**
**5	**MIDTERM 1**	**Wooldridge Chapters 1 – 3, Appendix A, B, C**	**Feb 14**
6	Mid-term Break		**Feb 17-21**
7	Multi-regression inference: Testing the statistical accuracy of the model and parameter estimates.	Wooldridge Ch. 4	
** 8	Assignment #3 due		Mar 9
8,9	Multi-regression further issues: Issues of functional form for specifying the regression model, selection of regressors, and using the estimated regression model for prediction.	Wooldridge Ch. 6	
**10	**MIDTERM 2**	**Wooldridge Chapters 3 - 6**	**Mar 16**
10,11	Qualitative information: The importance and use of binary (dummy) variables as regressors and choice variables. The linear probability model in economics is introduced.	Wooldridge Ch. 7	

11,12	Heteroskedasticity: The variance of the regression equation and the importance of constant variance (homoscedasticity) in economic inference and model valuation, tests and corrections.	Wooldridge Ch. 8	
** 12	<u>Assignment #4 due</u>		**Mar 30**
13,14	Model Specification: Issues arising in empirical application of regression models, testing functional specification, proxy variables and measurement error.	Wooldridge Ch. 9	
15	Course Review and Final Examination Preparation		
** 15	<u>Assignment #5 due</u>		**Apr 13**
	A **cumulative** final examination scheduled by the Registrar's Office	**Wooldridge <u>Chapters 1 – 4, 6– 9, Appendix A, B, C</u>**	

Prerequisites/corequisites:
Economics 201, Economics 203, Statistics 205, 211 or 213

Required Textbook(s):
Jeffrey M. Wooldridge Introductory Econometrics, A modern approach. 7th Edition, South-Western

Books on Reserve:
Adkins and Hill. *Using Stata for Principles of Econometrics*, 3rd Edition.
A. Colin Cameron & Pravin K. Triveldi, *Microeconometrics using Stata*, Revised Edition, Stata Press

Desire2Learn:
This course will make use of the Desire2Learn (D2L) platform. Students who are registered in the course can log on at http://d2l.ucalgary.ca through their student centre. Please note that D2L features a class e-mail list that may be used to distribute course-related information. These e-mails go to your University of Calgary e-mail addresses only.

Laboratory:
Quantitative analysis using standard statistical software; Stata (or another programming language such as Excel and R).
The final lab session was held on March 17. Students will only be responsible for Stata material learned on or prior to this date.

Grade Determination and Final Examination Details:

MIDTERM EXAMS (2)	40%	20% Each
FINAL EXAMINATION	35%	
ASSIGNMENTS (5)	25%	5% Each
	100%	

The official grading system will be used. See http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html.

A passing grade on any particular component of the course is not required for a student to pass the course as a whole.

The format of the assignments and the midterms will be discussed during the first week of lectures. Assignments are due at the beginning of class. **Late assignments will not be accepted.**

If a student's letter grade on the final exam exceeds their midterm(s) letter grade, the weight of the midterm(s) is (are) transferred to the final exam. The student must have written the midterm(s) or provided supporting documentation for the absence(s) such as a medical note or statutory declaration.

As per the Writing Across the Curriculum Statement in the Calendar, writing and grading thereof will be a factor in the evaluation of student work. See https://www.ucalgary.ca/pubs/calendar/current/e-2.html.

Any student work which remains undistributed after the last day of classes will be available to students through the instructor's office during the instructor's office hours.

The final examination will be an open-book, take-home exam. The exam will be available on D2L 24 hours before the end of the Registrar's scheduled final exam time. Students will hand in their exam in pdf format on D2L prior to the end of the scheduled completion time of their final exam using DropBox. If a student cannot write their final exam during this interval, they need to apply for a deferred exam at www.ucalgary.ca/registrar/exams/deferred_final. Under no circumstance will this be accommodated by the Department.

Tests and exams WILL NOT involve multiple choice questions.

Programmable calculators, cellphones, textbooks, course notes, and other electronic devices will not be allowed during the writing of tests or final examinations. Students are reminded that simply being able to access their cellphone during an exam is academic misconduct.

The midterms will be written during class time on the dates specified in the above course outline.

THERE WILL BE NO MAKEUP OR DEFERRED QUIZZES/TESTS/EXAMS under any circumstances, nor may the quizzes/tests/exams be written early. Students unable to write the quizzes/tests/exams because of documented illness, family emergency, religious observance, or university-sanctioned event will have the weight shifted to the final examination; otherwise a grade of zero will be assigned.

Reappraisal of Grades and Intellectual Honesty:
For Reappraisal of Graded Term Work, see Calendar I.2
 http://www.ucalgary.ca/pubs/calendar/current/i-2.html

For Reappraisal of Final Grade, see Calendar I.3
http://www.ucalgary.ca/pubs/calendar/current/i-3.html

Statement of Intellectual Honesty, see Calendar K.4
http://www.ucalgary.ca/pubs/calendar/current/k-4.html

Plagiarism and Other Academic Misconduct, see Calendar K.5
http://www.ucalgary.ca/pubs/calendar/current/k-5.html

Academic Accommodations:
Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services. SAS will process the request and issue letters of accommodation to instructors. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf.

Freedom of Information and Protection of Privacy (FOIP) Act:
Personal information is collected in accordance with FOIP. Assignments can only be returned to the student and will be accessible only to authorized faculty and staff. For more information, see http://www.ucalgary.ca/legalservices/files/legalservices/faq-students.pdf and http://www.ucalgary.ca/legalservices/files/legalservices/faq-faculty_0.pdf.

Internet and Electronic Communication Device information:
The use of cell phones for any purpose in class is prohibited. Computers and tablets may be used for note taking only unless otherwise authorized by the instructor.

Copyright Legislation:
See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf. Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Recording of Lectures:
Recording of lectures is prohibited, except for audio recordings authorized as an accommodation by SAS or an audio recording for individual private study and only with the written permission of the instructor. Any unauthorized electronic or mechanical recording of lectures, their transcription, copying, or distribution, constitutes academic misconduct. See https://www.ucalgary.ca/pubs/calendar/current/e-6.html.

Important Dates:
Please check: http://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html.

Student Organizations:
Faculty of Arts Students' Association (F.A.S.A.):
   Economics Department Representative
   Office: SS 803, E-mail: econrep@fasaucalgary.ca and Web: www.fasaucalgary.ca.

Society of Undergraduates in Economics:
   https://www.ucalgarysue.com/.

Society of Undergraduates in Economics is a student run organization whose main purpose is to assist undergraduate economics students to succeed both academically and socially at the University of Calgary. Services include access to the exam bank, career events such as Industry Night and information sessions, mentorship programs, and social events for members. They invite you to join by contacting SUE at societyofundergradsineconomics@gmail.com.

Faculty of Arts Program Advising and Student Information Resources:
- Have a question, but not sure where to start? The Arts Students' Centre is your information resource for everything in Arts! Drop in at SS102, call them at 403-220-3580, or email them at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at http://arts.ucalgary.ca/undergraduate, which has detailed information on common academic concerns, including program planning and advice.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625] or visit them in the MacKimmie Library Block

Student Support and Resources:
- See https://www.ucalgary.ca/registrar/registration/course-outlines for information on campus mental health resources, the Student Ombuds' Office, Student Success Centre, Safewalk, and Emergency Evacuation and Assembly.
- Online writing resources are available at https://ucalgary.ca/student-services/student-success/writing-support.

Notes:
1. Students are responsible for all assigned material, e.g., supplementary material posted on D2L, regardless of whether or not the material was covered in class.

HE
2019-11-25

Changes (Effective on Thursday, March 19):

- The Department of Economics has decided that we should not be meeting with students on campus for any reason, nor should students be meeting with each other in a face-to-face format.   All contact should be moved to virtual channels.

     o   No lab sessions.

- The main interaction is via online communication tools.

     o   I will post announcements on D2L Newsfeed. If announcements are important/urgent, I will also email you using the class mail-list.

     o   I will mainly use D2L Discussion Forum for Q&A and open discussion.

     o   My office hours take place in the regular hours using Zoom, email and discussion boards. I will use the "waiting room" feature when possible or you can me an email in advance to choose an appointment time.

- Please read any emails coming from myself (the instructor; heidi.esau@ucalgary.ca) or the TA (zahra.espanani@ucalgary.ca). Please reach out to us with any questions you have. Also let us know if you do not have access to D2L at earliest convenience.

Classes

- All the class material will be posted to D2L so that students who are not able to attend the lecture still have access to the material.

- The material covered in each lecture (after March 19) will be all found in <u>one</u> D2L file named "Date" (e.g. March 19 will contain all the materials covered on March 19).

- Before each lecture, I post reading material/slides (starting on March 19).

- Q&A: During the class time, the students are asked to post their questions on D2L discussion forum to receive immediate response from the instructor and/or the TA.

- Review: At the end of each (textbook) Chapter, I provide a review note that summarizes what we learned from the chapter.

Assignments

- No STATA/EXCEL questions will be asked in the rest of the assignments. I have removed the remaining questions involved with Stata software from Assignment 4 and 5.

Final Exam

- The final exam is an **open-book take-home** exam.
- You have **24 hours** to complete the exam before the submission deadline. The exam contains the same volume of questions as a two-hour closed-book final exam. Most students should be able to solve all the questions within 2 hours.
- The submission deadline is **the end time of the Registrar's scheduled exam time.**
- On the exam day:

1. download the exam from D2L (the PDF file (along with the formula sheets and tables) will be uploaded in "**final exam**" folder 24 hours before the end time)

2.   **hand-write** your answers on a piece of paper (iPad/tablet is OK).

3. the exam time is 2 hours.

4. Scan your answers (you can take a photo) and upload them into the Dropbox folder ("**Final exam submission**"). Make sure all the files are legible.

5. **submit your files before the D2L Dropbox folder closes. The folder will close at the end time** of the exam. The most recent submission will be graded (i.e. you can submit multiple times).

- You will get 1 extra credit if you submit your answers to the specified D2L Dropbox on time; you will get no extra credit if you submit them by email. If you have a problem with the system or you have no access to technology, send your answers to me and Zahra by email at heidi.esau@ucalgary.ca and zahra.espanani@ucalgary.ca .

- If you know that you will not have access to the D2L Dropbox on the exam date, please email me and Zahra two days before the exam. With advance notice, you will receive 1 extra credit regardless you submit by email or to the Dropbox folder.

- **No late submission will be accepted.** If I do not **receive** your submission in time, you will receive no credit for the final exam.

- **Warning:** This is a take-home exam. Please solve the questions by yourself. No discussion will be allowed. If we find the same answers and the same mistakes, the students are suspected to have cheated. Both students will receive 0, regardless of who helped who.

Other Support

- I will ask the TA to actively help students to learn the course material using emails and other online communication tools. I will also ask her to share helpful resources for self-learning the material.

- Our PASS leader holds PASS sessions using ZOOM. The information is posted on D2L.

Disclaimer

- These arrangements are subject to change. I will adjust and improve the delivery as I experiment with the online course delivery systems available. I will post the changes on D2L and email to the class mailing list when I make important/major changes.

Other Notes

- Please understand that things are changing rapidly, and the proposed plans may need to be adjusted or abandoned should circumstances change.

- The primary goals are your health and safety, followed by trying to finish the semester with the best possible learning outcomes under the circumstances.

HE

2020-03-18