Econometric Methods: HUL315

Indian Institute of Technology Delhi

Department of Humanities and Social Sciences

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LTP Structure: 3-0-0
Discipline: Economics
Credit: 3.0

Where: LH 111 Mon & Thu 5:00 pm to 6:20 pm

1. Course Objectives & Scope

HUL315 aims to familiarize students with various regression methods used in the analysis of data within economics, finance, and many other fields. Besides covering the basic multiple linear regression models, the course covers advanced topics such as regression involving discrete random variables, instrumental variables regression, and analysis of random and quasi-experiments. The primary objective of this course is to enable students to proficiently conduct and critically evaluate empirical studies. The course places significant emphasis on practical applications rather than focusing exclusively on the mathematical aspects of econometrics, introducing mathematical concepts only as necessary.

2. Course Prerequisites

A strong foundation in linear algebra is required. Although I will provide a maths refresher, it might be insufficient for students from a non-mathematics background.

3. Required Textbook and Software

- Required textbook: J.H. Stock and M.W. Watson, Introduction to Econometrics.
- The R Project / STATA
- LaTeX editor

4. Recommended Textbooks and Software

- J.M. Wooldridge, Introductory Econometrics, South-Western College Publishing. (Optional book, which will not be used in class, but which provides a complementary treatment that some students might find helpful)
- Mostly Harmless Econometrics: An Empiricist's Companion, Joshua D. Angrist and Jörn-Steffen Pischke (referred to as MHE in the rest of the syllabus)

5. Grading Components

This course has four grading components: Group HomeWorks, Minor and a Major exam. You can submit the assignments on your own or in a group of five. You must type all assignments in LaTeX and submit a pdf copy online. Handwritten assignments will not be accepted. These assignments will be available online as the course progresses.

The weightage on the evaluation components is as following.

- Group HomeWorks (20%)
- In-class Surprise Quizzes (20%)
- Minor (30%)
- Major (30%)

6. Grading

The tentative cutoffs for letter grades are below. Please note that these are provisional cutoffs and are subject to changes.

Grade	Grade points	Description	Cutoff
A	10	Outstanding	80%
A-	9	Excellent	75%
B	8	Very good	70%
B-	7	Good	65%
C	6	Average	55%
C-	5	Below average	50%
D	4	Marginal	40%
E	2	Poor	20%
F	0	Very poor	10%
I	-	Incomplete	
NP	-	Audit pass	30%
NF	-	Audit fail	
W	-	Withdrawal	

7. Attendance & Punctuality

Learning is an interactive process, and regular attendance is an essential aspect of learning. You must be present in all the classes. Absence is only appropriate in extreme personal illness, injury, network or electrical failure, or close family bereavement. Voluntary activities such as job interviews, travel plans, joyous family occasions, etc., are not valid reasons for missing any class. Following the institute's policy, if a student's attendance is less than 75%, the student

will be awarded one grade less than the earned grade. Late arrival is disruptive to the learning environment, so you must be in class before the scheduled time. The class schedule is subject to change, and I will notify any such changes in advance.

8. Course Outline

7.1. Introduction

Topics: Introduction, Econometrics versus Machine Learning and Big Data Techniques,

Reading:

- Do Night Lights Cause Myopia? cbsnews.com, May 13, 1999 / 11:00 am
- Etzioni, Oren, Rattapoom Tuchinda, Craig A. Knoblock, and Alexander Yates. "To buy or not to buy: mining airfare data to minimize ticket purchase price." In Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining, pp. 119-128. 2003.

7.2. Review of Probability and Statistics

Topics: Probability theory, random variables, distributions, moments, joint distributions, independence, covariance, correlation coefficient, conditional expectations, some well knows distributions, random sample, statistical inferences.

Reading:

7.3. Bivariate regression I

Topics:

Reading:

7.4. Bivariate regression II

Topics:

Reading:

7.5. Multiple regression I

Topics:

Reading:

7.6. Multiple regression II

Topics:

Reading:

7.7. Multiple regression III

Topics:

Reading:

7.8. Nonlinear regression models I
Topics:
Reading:

7.9. Nonlinear regression models II
Topics:
Reading:

7.10. Assessing regression studies, I
Topics:
Reading:

7.11. Assessing regression studies II
Topics:
Reading:

7.12. Panel Data I
Topics:
Reading:

7.13. Panel Data II
Topics:
Reading:

7.14. Binary dependent variable I
Topics:
Reading:

7.15. Binary dependent variable II
Topics:
Reading:

7.16. Instrumental variable regression I
Topics:
Reading:

7.17. Instrumental variable regression II

Topics:
Reading:

7.18. IV regression III and program evaluation I
Topics:
Reading:

7.19. Program evaluation II
Topics:
Reading:

7.20. Program evaluation III
Topics:
Reading: