ECON 5243: Econometrics II

University of Oklahoma
Fall, 2018

Prerequisite: ECON 5123
Class Meets: Tu & Th 3:00 pm - 4:15 pm
Class Room: Cate Center 140
Office Hours: Tu & Th 11:30 - 12:30 pm.

Professor: Dr. Pallab Ghosh
Office: 422 Cate Center Drive
Telephone: 405 325 2643
Email: pallab.ghosh@ou.edu

This syllabus is a contract between you and me. By taking this course you agree to abide by the policies and rules listed within.

Course Description:

This course is essentially one for Micro-econometrics but is well suited to anyone in finance, accounting, sociology, political science, or any other disciplines of social science. The main goal of this course is to learn a set of econometrics tools which can be applied in empirical research in different fields of micro-economics. The course will emphasize the importance of research design for the identification of causal effects, as well as the limitations in the applicability of many commonly used techniques. Although we will learn different econometric methods, the formal requirements of the class will consist primarily of problem sets requiring students to analyze real data and replicate results from published papers in the hope that doing applied work will help you to learn the theory behind it.

This course is a sequence of ECON 5123 so students should be familiar with matrix algebra, basic (asymptotic) statistics/econometrics, and basic inference procedures. The course is build up based on all these tools so you won’t enjoy yourself or get much out of the course without this prior training. I will very frequently use all these techniques assuming students know the basics and will not spend much time on the details of those statistical procedures. However, if you ever have any doubts, please stop by in the office hours.

Course Grades:

Your course grade will be based on, (i) five homework assignments, (ii) one midterm exam, (iii) an independent research project (iv) final exam, as well as a possibility for bonus points based on class participation. The weights for these parts are listed below. Homework assignments will be based on both analytical questions and real data analysis by using statistical
softwares. In many instances you will be required to produce publication quality tables and figures showing the major results of these analyses, and you will be required to submit all programs used in generating your results.

The course has been divided in four major parts and each exam will cover two of them. There will be only analytical exam questions in both the exams. I will go over practice questions before both the exams to give you a better idea about the exams. As a graduate student, I expect you to handover your homework assignments in a professional outlet by using either PDF or Microsoft word document.

I believe in horizontal equity: all students who receive the same numerical grade will receive the same letter grade (i.e. a 90 will not be an A- for one student and an A for another). I also believe in vertical equity: higher numerical grades will (obviously) correspond to higher letter grades. After grading is complete, identical adjustments may be made to everyones grade if the median score is lower than expected.

At this point in your career the grade you receive in this course should have little impact on the quality of your dissertation thesis. One rule I follow is that no one will receive a grade in the ‘A range’ without completing all the problem sets, showing up in classes regularly and do well in the independent research project or the replication analysis. This is not surprising because combining homework assignments and research project consists of 50% of your final grade.

**Research Project/ Replication:**

You have two options either to submit an independent original research project or replicate all the empirical analysis of a journal article. Note that the journal has to be a well known economics journal and the article has to be one which we will not cover in the class. Journal of Applied Econometrics (JAE) has a replication section. If you would like to submit replication analysis, I will encourage you to look at some of the published to article from that section of

<table>
<thead>
<tr>
<th>Index</th>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Problem Sets</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Research Project/ Replication</td>
<td>20%</td>
</tr>
<tr>
<td>Class Presentation</td>
<td>5%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
</tbody>
</table>
the JAE. Your replication paper should principally involve one of the research designs listed on
the course outline below, or some variation, no exceptions to that rule. Remember that if the
codes of any article is available in online, you are not suppose to run the codes to produce the
replication results, in that case you need to use different softwares.

The most important part of the independent research project is to find a good research
question and for that you need a fair amount of knowledge about the literature in which your
are interested. This requires a huge time investment so the quality of your question has a high
correlation on how much time you are willing to invest. I expect you to submit a 10-12 pages
(not more than 3000 words) report where you need to address the following questions:

1. What is the research question?

2. Why is that research question important?

3. What is the contribution of your question in the literature?

4. What is the identification strategy? and why do you choose that?

5. Results and conclusion.

Please note that your research project topic or replication analysis article must be approved by
me by October 18th, 2018 along with proof that you have the data in hand and the final
submission deadline is December 6th, 2018.

Statistical analysis software

I recommend that students use Stata because Stata has already implemented most of the
course materials we will cover in this course. However, it is not required, you can use SAS,
Matlab, R, Gauss or any other statistical softwares for your homework and class project. I will
be able to read your codes from any of those listed softwares to verify the final output. Stata is
most popular in applied research since it is well accepted by the economists around the world
and it’s also very user friendly. However if you want to implement some new techniques which
are not available in Stata, matrix language softwares like R, Matlab and Guass will be a better
choice compared to Stata and SAS. It’s completely your decision to choose the right statistical
softwares for you.

Textbooks and Other References

- [CT]: Cameron, A. Colin and Pravin K. Trivedi (2005) Microeconometrics: Methods and
  Applications. Cambridge University Press.
The following articles, books, and notes are also very useful references for a wide range of material.


- Imbens, Guido and Jeffrey Wooldridge, “What’s New in Econometrics?” NBER 2007 Summer Institute Notes: Link


Course Readings

1 Basic Research Designs

1.1 Overview of Causal Reasoning

• Cameron and Trivedi (CT) chapter 2


1.2 Ordinary Least Squares

• Angrist and Pischke (AP) chapter 3, Greene, William (G) chapter 3 and 4, Cameron and Trivedi (CT) chapter 4.

1.3 Heteroskedasticity

• Greene, William (G) chapter 9, Davidson and Mackinnon (DM) chapter 7, Angrist and Pischke (AP) chapter 8

1.4 OLS Under Misspecification

- Wooldrige, Jeffrey (W) chapter 4, Davidson and Mackinnon (DM) chapter 3.

1.5 Measurement Error

- Cameron and Trivedi (CT) chapter 26, Wooldrige, Jeffrey (W) chapter 4.

1.6 Sample Selection Models

- Cameron and Trivedi (CT) chapter 16, Wooldrige, Jeffrey (W) chapter 17.
2 Selection on Unobservable Designs

2.1 Instrumental Variables

- Angrist and Pischke (AP) chapter 4, Cameron and Trivedi (CT) chapter 6, Davidson and Mackinnon (DM) chapter 8, Greene, William (G) chapter 8 and 9, Wooldrige, Jeffrey (W) chapter 5 and 6.

2.2 Difference-in-difference models

- Angrist and Pischke (AP) chapter 5
2.3 Regression Discontinuity Research Design

- Angrist and Pischke (AP) chapter 6


3 Selection on Observables Designs

3.1 Generalised Method of Moments

- Cameron and Trivedi (CT) chapter 6, Wooldrige, Jeffrey (W) chapter 8.

3.2 Quantile Regression

- Angrist and Pischke (AP) chapter 7


3.3 The Propensity Score and Matching


4 Advanced Modeling

4.1 Discrete Choice Models

- Cameron and Trivedi (CT) chapter 14-15, Wooldrige, Jeffrey (W) chapter 15.


4.2 Panel Data

- Baltagi chapter 2-4, Angrist and Pischke (AP) chapter 5, Wooldrige, Jeffrey (W) chapter 10.


Important Exam Details:

Your exam dates are October 11th and December 13th, 2018. I do not give makeup examinations, but if you have a reasonable excuse in my judgment for missing a midterm exam, then the final exam will count for 50% of your course grade. Similarly If you do not take the final exam for any reason you must provide me with a written explanation for you absence. If, in my judgment, your final exam absence is justified then your course grade will be adjusted by replacing your midterm exam weight as 50%. Excuses should be discussed before the exam dates and any unexcused absences from an exam will result in a zero on that exam.

Students who may need academic accommodations due to a disability should discuss their needs with me at the beginning of the semester. To obtain authorized accommodations, you should be registered with the Office of Disability Services and have an updated accommodation letter for me. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance. For more information about services and policy, please visit the university website.

Academic Integrity:

The University of Oklahoma Academic Integrity Policy holds students accountable for the integrity of the work they submit. The policy also governs the integrity of work submitted in exams and homework assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. You must do all of your exams independently. If it is determined that you have violated this standard of academic honesty you can receive an F in the course. For more information please visit the University of Oklahoma website.

Class Participation:

I strongly encourage you to participate in the class discussion and ask questions whenever something is not clear to you. Your class participation is a good indicator of your involvement in the class. I would assign 2 extra points based on your over all class participation and attendance in the class. This two points will be added after adding up all the weights so it will play an important role for the students who are at the margin of any letter grades.

After each class I will also ask you to write a one-minute paper, where you will answer two questions: (1) What is the most important thing you learned in class today? and (2)
What is the one thing that you wish you understood better from today’s class? Your answers are an important source of regular feedback on how I can make the material in ECON 5243 immediately more understandable. Be sure to print your name and student ID number on your one-minute paper.
### Table 2: Class Schedule

<table>
<thead>
<tr>
<th>Part</th>
<th>Week</th>
<th>Date</th>
<th>Tuesday</th>
<th>Date</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>Aug 21</td>
<td>Statistical Inference</td>
<td>Aug 23</td>
<td>Causal Reasoning</td>
<td></td>
</tr>
<tr>
<td>W2</td>
<td>Aug 28</td>
<td>Causal Reasoning &amp; OLS</td>
<td>Aug 30</td>
<td>OLS &amp; Heteroskedasticity</td>
<td></td>
</tr>
<tr>
<td>W3</td>
<td>Sep 04</td>
<td>OLS Misspecification</td>
<td>Sep 06</td>
<td>Measurement Error (<strong>PS1 Due</strong>)</td>
<td></td>
</tr>
<tr>
<td>W4</td>
<td>Sep 11</td>
<td>Sample Selection Models</td>
<td>Sep 13</td>
<td>Sample Selection Models</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Graded <strong>PS1 Due</strong>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W5</td>
<td>Sep 18</td>
<td>Instrumental Variables</td>
<td>Sep 20</td>
<td>Instrumental Variables (<strong>PS2 Due</strong>)</td>
<td></td>
</tr>
<tr>
<td>W6</td>
<td>Sep 25</td>
<td>Instrumental Variables (Graded <strong>PS2 Due</strong>)</td>
<td>Sep 27</td>
<td>Difference-in-Difference</td>
<td></td>
</tr>
<tr>
<td>W7</td>
<td>Oct 02</td>
<td>Regression Discontinuity</td>
<td>Oct 04</td>
<td>Regression Discontinuity (<strong>PS3 Due</strong>)</td>
<td></td>
</tr>
<tr>
<td>W8</td>
<td>Oct 09</td>
<td>Review of Midterm Exam (Graded <strong>PS3 Due</strong>)</td>
<td>Oct 11</td>
<td>Midterm (Part 1&amp;2)</td>
<td></td>
</tr>
<tr>
<td>Part 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W9</td>
<td>Oct 16</td>
<td>GMM and SEM</td>
<td>Oct 18</td>
<td>GMM and SEM</td>
<td></td>
</tr>
<tr>
<td>W10</td>
<td>Oct 23</td>
<td>Quantile Regressions</td>
<td>Oct 25</td>
<td>Quantile Regressions</td>
<td></td>
</tr>
<tr>
<td>W11</td>
<td>Oct 30</td>
<td>Propensity Score Matching</td>
<td>Nov 01</td>
<td>Propensity Score Matching (<strong>PS4 Due</strong>)</td>
<td></td>
</tr>
<tr>
<td>W12</td>
<td>Nov 06</td>
<td>Discrete Choice Models (Graded <strong>PS4 Due</strong>)</td>
<td>Nov 08</td>
<td>Discrete Choice Models</td>
<td></td>
</tr>
<tr>
<td>Part 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W13</td>
<td>Nov 13</td>
<td>Panel Data</td>
<td>Nov 15</td>
<td>Panel Data (<strong>PS5 Due</strong>)</td>
<td></td>
</tr>
<tr>
<td>W14</td>
<td>Nov 20</td>
<td>Panel Data (Graded <strong>PS5 Due</strong>)</td>
<td>Nov 22</td>
<td>No Class (Thanksgiving Break)</td>
<td></td>
</tr>
<tr>
<td>W15</td>
<td>Nov 27</td>
<td>Class Presentation</td>
<td>Nov 29</td>
<td>Class Presentation</td>
<td></td>
</tr>
<tr>
<td>W16</td>
<td>Dec 04</td>
<td>Class Presentation</td>
<td>Dec 06</td>
<td>Class Presentation (Research Paper Due)</td>
<td></td>
</tr>
<tr>
<td>Final Week</td>
<td>Dec 13</td>
<td>(Extra Office Hours for Final)</td>
<td>Dec 13</td>
<td>Final Exam (4:30-6:30 pm) (Cumulative)</td>
<td></td>
</tr>
</tbody>
</table>