Objectives:
Once the research question is established, there are three core steps to effective empirical work:

1. Establish what relationships are in the data
2. Interpret those relationships in light of your research objectives
3. Communicate those relationships as clearly, completely, and convincingly as possible

The main focus of the course will be on methods for establishing causal relationships in field data. This means we will discuss how to establish what relationships exist in the data, when you can interpret these relationships as causal, and how you can convince your audience of your results (without overselling).

Because methods aren’t too useful without interesting questions to answer, we will also spend time developing our “taste” for what constitutes a quality empirical research paper. The ultimate goal is for you to leave prepared to undertake your own empirical research.

We will also think carefully about the interaction between empirical design and theory, especially the importance of careful theoretical thinking for empirical research.

Preparation and Prerequisites: This course is designed to complement a graduate sequence in econometrics, but it should be accessible to students with basic knowledge of statistics and probability. We will focus on intuition and understanding how statistical models relate to the underlying data (and theory). Still, there will be technical material in readings, discussions, and assignments.

Grading:
Class participation: 10%
Class Discussant 1: 20%
Class Discussant 2: 20%
Research paper class presentation: 20% (April 26)
Research paper extended abstract: 30% (April 29)

Class participation: Attendance is mandatory. Class discussion is a critical component of the seminar. You will be expected to complete the readings assigned before class and come to class with comments and questions.

Class discussant (groups of two students): Discuss assigned class readings market with *. No written report required. I will circulate a sign-up sheet during the first day of class.
Research paper (individual or group): Individually or in a group of no more than two, select a research paper topic of your choice. We’ll work on it throughout the duration of the course to exemplify the concepts learned. At the end of the course, you will present your project in front of the class. You will also submit a written extended abstract of maximum 10 double-spaced pages of text plus tables, figures and references. It is possible that some projects require lengthy data collection. In that case, you should at least know what the data are like and how you can obtain the data so that the paper can be as specific as possible about the implementation.

Class Structure: Most sessions we will spend time on: 1) Listening to the class discussants’ report, 2) Lecture plus reviewing the assigned readings (all of them) and 3) Discussing your projects in light of session learnings. Two sessions are dedicated to replicating empirical papers. Read the paper to be replicated in advance. Note: All readings are required. The * marks readings assigned to class discussants, but everybody must reading everything.

Books:

Required:

Other books, not required for this class, but good references for anyone doing empirical work:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 January 12</td>
<td>Getting Started</td>
</tr>
<tr>
<td>2 January 19</td>
<td>Causal effects: Why do we care and why so hard to establish? (I)</td>
</tr>
<tr>
<td>3 January 26</td>
<td>Causal effects: Why do we care and why so hard to establish? (II)</td>
</tr>
<tr>
<td>4 February 2</td>
<td>Difference-in-Differences (I)</td>
</tr>
<tr>
<td>5 February 9</td>
<td>Difference-in-Differences (II)</td>
</tr>
<tr>
<td>6 February 16</td>
<td>Replication exercise</td>
</tr>
<tr>
<td>7 February 23</td>
<td>Instrumental variables</td>
</tr>
<tr>
<td>8 Change in day: Mon Feb 29, 10am</td>
<td>Matching (<em>Frank Nagle</em>)</td>
</tr>
<tr>
<td>9 March 8</td>
<td>Regression Discontinuity</td>
</tr>
<tr>
<td></td>
<td>March Break</td>
</tr>
<tr>
<td>10 March 22</td>
<td>Quantile regression; Event studies</td>
</tr>
<tr>
<td>11 March 29</td>
<td>Set - Theoretic Methods (<em>Peer Fiss</em>)</td>
</tr>
<tr>
<td>12 April 5</td>
<td>Replication exercise</td>
</tr>
<tr>
<td>13 April 12</td>
<td>Continuous, discrete and binary dependent variables (<em>Nan Jia – second half</em>)</td>
</tr>
<tr>
<td>14 April 19</td>
<td>Testing</td>
</tr>
<tr>
<td>15 April 26</td>
<td>Project Presentations</td>
</tr>
</tbody>
</table>
Week 1 (January 12): Getting started

Course goals

Syllabus

Getting started:
1) Data structure: Panel, Cross section; Unit of analysis
2) How to read (and write) an empirical paper (e.g., research question, data structure/unit of analysis, estimating equation(s); main effect, contingency, mechanism; robustness, falsification tests)

Week 2 (January 19): Causal effects: Why do we care and why so hard to establish? (I)

Theory: What is identification?
1) *MM Chapter 1
2) MHE Chapters 1 and 2

In practice

Week 3 (January 26): Causal effects: Why do we care and why so hard to establish? (II)

Theory: Regression fundamentals
1) *MM Chapter 2
2) MHE Chapter 3 (Only 3.2 (all subsections) and 3.4.3)

In practice
Field experiments
Describing interesting data

Week 4 (February 2): Difference-in-differences (I)

Theory: Difference-in-differences fundamentals
1) *MM Chapter 5 (Only 5.1 (all subsections))

In practice

Week 5 (February 9): Difference-in-differences (II)

Theory: Difference-in-differences, fixed effects, lagged variables and controls
1) *MHE Chapter 5

In practice
Week 6 (February 16): Paper replication exercise
Class exercise; data will be provided in class. Bring your laptop.

Week 7 (February 23): Instrumental variables
Theory: IV design (including 2SLS), Language of treatment effects
1) *MM Chapter 3
2) Imbens, Guido W., and Jeffrey M. Wooldridge. 2009. "Recent Developments in the Econometrics of Program Evaluation." Journal of Economic Literature, 47(1): 5–86. (Pay closer attention to sections 2.1, 2.2, 3.1, 5.1, 5.3, 5.4, 5.5, 6.3, 6.4, and 6.5)
In practice

Week 8 (March 1): Matching (Frank Nagle)
TBD

Week 9 (March 8): Regression Discontinuity
Theory: Sharp RD, Fuzzy RD
1) *MHE Chapter 6
2) MM Chapter 4
In practice
2) *Fehder, Dan. 2015. “Startup Accelerators and Ecosystems: Complements or Substitutes?” (job market paper)
(March 17: March Break)

Week 10 (March 22): Quantile regression, Event studies
Theory
Event studies
Quantile regression
2) *MHE Chapter 7
In practice
Week 11 (March 29): Set-Theoretic Methods (Peer Fiss)

Week 12 (April 5): Paper replication exercise
Class exercise; data will be provided in class. Bring your laptop.
Empirical paper TBD

Week 13 (April 12): Continuous, discrete and binary dependent variables
Theory
Continuous and discrete dependent variables (OLS and Poisson)
1) *MHE Chapter 3 (Only 3.1 (all subsections))
Binary dependent variables (Probit, Logit, Tobit)
4) *MHE Chapter 3 (Only 3.4.2) and Chapter 4 (Only 4.6.3)
Interaction terms (Nan Jia)
6) TBD

In practice
Count data
Binary Dependent Variables

Week 14 (April 19): Testing
Theory
Economic vs. statistical significance
Random effects and Hausman tests
In practice
Economic vs. statistical significance
Random effects and Hausman tests
Fit, R-squared, and explanation vs. prediction


Week 15 (April 26): Project presentation