

CIS 84000 Quantitative Empirical Methods in Information Systems

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Class Meetings: Fri 1:30-3:30 PM
Class Room: ISS Conference RM 11-217

Department of Computer Information Systems
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1. Overview:

Empirical research in Information Systems increasingly relies on quasi-experimental and design-based methods to establish causal relationships in platform, policy, and technology settings. These methods, such as difference-in-differences, instrumental variables, regression discontinuity designs, and matching, are now central to leading publications in IS, management, and economics.

The objective of this doctoral-level seminar is to train students to design, implement, and defend causal empirical research in Information Systems. The course emphasizes identification strategies over estimators, with a particular focus on platform economies, digital markets, policy interventions, and societal impacts of information technology.

Rather than surveying methods in isolation, the course is structured around research design logic. Students will learn how empirical strategies map to assumptions, how those assumptions are justified in IS settings, and how reviewers evaluate credibility. The course integrates lectures, replication-based coding exercises, and student-led paper discussions.

The class will meet once a week for around 2 hours. By the end of the course, students should be able to:

- Formulate causal research questions in IS contexts
- Select appropriate identification strategies
- Implement core empirical methods using real data
- Critically evaluate empirical IS papers
- Develop a research proposal suitable for top IS conferences and journals

2. Recommended Textbooks:

Core (Strongly Recommended)

- Joshua D. Angrist, Jorn-Steffen Pischke (2009) *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.
- Jeffrey M. Wooldridge. (2010) *Econometric Analysis of Cross Section and Panel Data* (Second Edition).

Supplementary / Reference

- Willian H. Greene (2012) *Econometric Analysis* (Seventh Edition). Pearson Education Limited. (International edition available on Amazon.com)
- Cunningham, S. (2021). *Causal inference: The mixtape*. Yale university press.

3. Course Structure and Expectations

The class includes lectures, readings, independent computational work, and presentations. Class attendance is critical as interaction with peers is an essential aspect of this course and the learning process associated with it.

- I will communicate with you through your Baruch College e-mail. I expect that you read it at least once a day.
- Classroom norms and etiquette: You are expected join each class on time and actively participate in discussions. We will often use computers for exercises or searches in class. Please keep other non-academic materials, including social media closed.

Each class meeting is organized as follows:

1. Student-led paper presentations (20–30 minutes) on readings from the *previous* week’s method
2. Instructor-led lecture (45–50 minutes) introducing a new empirical method or design
3. Hands-on coding or replication walkthrough (30–40 minutes) using real or simulated data

This structure is designed to ensure that students first learn the identification logic of a method before evaluating how it is applied in published research.

4. Class Assessment:

(a) Grading

Student performance will be evaluated based on the following components:

- **Weekly reading memos (15%)**
Students submit short memos focusing on the causal research question, identification strategy, assumptions, and potential threats to validity of the assigned readings.
- **In-class paper presentations and discussion (20%)**
Students present selected empirical papers and lead discussions emphasizing research design and identification. In every class, students are assigned to present one selected paper with a set of PPT slides.

Each class presentation should take around 15 minutes and leaves 5 minutes for discussion. The instructor will assign papers to students’ next presentation at end of each meeting, according to the students’ preference
- **Econometrics and coding exercises (15%)**
Short assignments using Stata or R to implement core empirical methods discussed in class.
- **Replication-based empirical assignment (20%)**
Students replicate a key result from a published empirical paper and conduct at least one extension or robustness analysis.
- **Research proposal (30%)**
Each student develops a design-focused research proposal suitable for submission to a major IS conference or journal.

Each student must produce a research-in-progress paper (research proposal) that has the quality to be accepted by major IS conferences, such as WISE and CIST. Around 7th week of this course, the students must formulate 3-4 research questions that can be answered by proposed empirical analyses. In the later weeks, the instructor will work with the student to select one of them and to

develop it into a research paper. The student will present the research paper in the last week.

The evaluation of the research paper depends on the potential impacts of the research topic, comprehensiveness and depth of the literature review, coherence, and logic of the proposed hypotheses, the correctness of the research methods/design, and strength of the preliminary results (if there is any):

- Instructor evaluation: 80%
- Peer evaluation: 20%

(2) Late and Assignment Incompletion Policy

Assignments are due prior to 12:59 p.m. on the dates announced in classes. Late submission of problem sets will lead to a two-point reduction for missing the deadline. Two additional points for a one-week delay, and zero thereafter. Each incompletion of assigned reading and presentation will lead to a two-point reduction.

5. Academic Integrity:

The CIS Department fully supports Baruch College's policy on Academic Honesty, which states, in part:

"Academic dishonesty is unacceptable and will not be tolerated. Cheating, forgery, plagiarism and collusion in dishonest acts undermine the college's educational mission and the students' personal and intellectual growth. Baruch students are expected to bear individual responsibility for their work, to learn the rules and definitions that underlie the practice of academic integrity, and to uphold its ideals. Ignorance of the rules is not an acceptable excuse for disobeying them. Any student who attempts to compromise or devalue the academic process will be sanctioned."

The use of AI (ChatGPT and similar) for coursework and assignments is strictly prohibited. This includes, but is not limited to, the use of AI-generated text, speech, programming code or images, as well as the use of AI tools or software to complete any portion of a project and assignment. Any use of AI tools to complete your work or a portion of your work will result in a grade of 0.

A report of suspected academic dishonesty will be sent to the Office of the Dean of Students. Additional information and definitions can be found at:

https://www.baruch.cuny.edu/academic/academic_honesty.html

6. Accommodation for Disability and Religious Observance

Baruch has a continuing commitment to providing reasonable accommodations for students with disabilities. Students with disabilities who may need some accommodation in order to fully participate in this class should contact Student Disability Services as soon as possible at disability.services@baruch.cuny.edu or call 646/312-4590.

At Baruch, we acknowledge that as a student, you are balancing many demands. During the semester, if you start to experience personal difficulties or stressors that are interfering with your academic performance or day to day functioning, please consider seeking free and confidential support at the Baruch College Counseling Center. For more information or to make an appointment, please visit their website at <https://studentaffairs.baruch.cuny.edu/counseling/> or call 646-312-2155. If it's outside of business hours (Monday-Friday 9-5pm) and you need immediate assistance, please call 1-888-NYC-WELI3 (888-692-9355). If you are concerned about

one of your classmates, please share that concern by filling out a Campus Intervention Team form at <https://studentaffairs.baruch.cuny.edu/campus-intervention-team>.

If you wish to be absent from class to observe a religious holiday, make arrangements in advance with the instructor.

7. Tentative Schedule and Topics (Subject to change)

| Weeks | Dates | Topics | Method Focus | Key Activities |
|---------|--------|---|------------------------------------|-------------------------------|
| Week 1 | Jan 30 | Introduction to Causal Research in IS | Potential outcomes, selection bias | Instructor lecture + examples |
| Week2 | Feb 6 | Panel Data & Fixed Effects in IS | FE, within estimators | Code walkthrough |
| Week 3 | Feb 13 | Difference-in-Differences: Core Design | DiD, parallel trends | Code + examples |
| Week 4 | Feb 20 | DiD Papers in IS + Event Studies | Event studies, pre-trends | Student presentations |
| Week 5 | Feb 27 | Advanced DiD & Policy Shocks | Staggered adoption | Code + diagnostics |
| Week 6 | Mar 6 | Instrumental Variables | IV, LATE | Code walkthrough |
| Week 7 | Mar 13 | IV Papers in IS & Platform Markets | Instrument credibility | Student presentations |
| Week 8 | Mar 20 | No class | | |
| Week 9 | Mar 27 | Regression Discontinuity Design | Sharp vs fuzzy RD | Code + visualization |
| Week 10 | Apr 3 | Spring Recess | | |
| Week 11 | Apr 10 | RD Papers + Matching Logic | RD vs matching | Student presentations |
| Week 12 | Apr 17 | Matching & Matching-DiD | PSM, CEM | Code + comparison |
| Week 13 | Apr 24 | Robustness, Falsification & Sensitivity | Placebos, Oster bounds | Code + critique |
| Week 14 | May 1 | Research Design Integration | Method choice | Proposal prep |
| Week 15 | May 8 | Research Proposal Presentations | | Student presentations |
| Week 16 | May 15 | Final Research Presentations | | Student presentations |

Note: Reading list will be provided at the beginning of the semester to reflect students' background