Syllabus of Financial Econometrics II: Panel Data
(Spring 2015 Term B)

Instructor: Wei Jiang, Arthur F. Burns Professor of Free and Competitive Enterprise
Class Meetings: 9:00am - 12:15pm, Wednesday, Uris 329
Office Hours: 4:00-5:00pm, Thursday, Uris Hall 140
Contact: wj2006@columbia.edu

Teaching Assistant: Danqing Mei (DMei14@gsb.columbia.edu)
Review Sessions: Friday (check session time and place on Canvas)

Target Audience

This is the second course in Financial Econometrics. It is required for first-year students in the Finance Ph.D. Program and the Master in Financial Economics Program. It is also open to graduate students and visiting scholars who satisfy pre-requisites. The minimum pre-requisites are:

1. One Ph.D. level course in econometrics;
2. One of each of the following courses at the graduate level or honor undergraduate level:
   Microeconomics; Calculus; Statistics; Probability Studies; and Matrix Algebra.

The course aims to cover the most important materials in Panel Data, with emphases on their applications to empirical research, especially empirical corporate finance. The course will deliver a comprehensive list of empirical methods that allow researchers to identify causal relationships in data. Such tools are essential for graduate students who aspire to conduct careful, state-of-art empirical research. In addition, the course will provide general guidance on formulating and executing (empirical) research ideas.

Assignments and Grades

Your grade will be based on class participation (10%), five homework assignments (25%), replication project (15%), and a final exam (50%).
1. Class participation has three elements: (1) Your contribution to the learning environment of the whole class; (2) The quality of your presentation (there are six slots allocated on a first come first served basis); (3) Professional conduct, starting with arriving on time.

2. All homework assignments and the replication project are individual assignments. You are encouraged to discuss work with your peers but must not consult anyone outside your class. Moreover, you must hand in your own write-up.

3. Please refer to the separate document for more detailed instruction about the replication project. Six slots (12 minutes each) are given to student presentations during the last class. Slots are assigned on a first-come first-served basis (on a Google Doc on Canvas calendar on the date of the last class, April 29th). Presenters will earn up to 5% bonus points.

4. The final exam will be scheduled during the week after the last lecture. The exam is closed-book with one letter size “cheat sheet” allowed, and lasts for three hours. A laptop is required for the exam (for writing). A latex-based word processing system is highly recommended.

References

The textbook for the course is:

*Econometrics Analysis of Cross Section and Panel Data*, by J. Wooldridge, the MIT press, 2002.

The following book is a good reference for students who need some refreshing of basic econometrics:


The following book could be a nice and accessible reading for students who want more economics out of econometrics:


Supplemental readings will be assigned to individual topics. While I will offer suggestions and recommendations, I mostly leave it to the students to pick their own reading list. Use Google Scholar and SSRN to identify classic and upcoming papers that fit your interest and level of technicality.
Course Outline

Here is a list of topics that I plan to cover in the course. The topics are not going to be aligned exactly to the lectures because they vary in depth and width. The exact content and sequence may also change depending on the dynamics of the class.

1. Introduction: What do we learn from regressions?
   
   We will start the course with a list of seemingly easy questions to test your intuition and real understanding of the very basic econometrics. We will then discuss how to interpret regression results in the economics/finance context, and how the interpretation changes with the assumptions we make. The most important takeaway from the topic is the meaning of “causality” and the necessary hurdle researchers must overcome before concluding causality from a statistical correlation.

   Pre-class reading:
   - Wooldridge, Chap 1-3.

   Post-class reading:
   - Wooldridge, Chap 4.

2. Panel data structure: Pooling and segregation of information
   
   This lecture lays out the basic structure of a panel dataset, and explores ways to extract information from both the time-series and the cross section. The key takeaways from this topic are the relation among estimates from “pooled,” “within” and “between” regressions, and the appropriate estimation of standard errors under different assumptions about the data generating process.

   Pre-class reading:

   Post-class reading:
   - Wooldridge, Chap 10.
3. Instrumental variables: How do we make the cure better than the disease?

*The IV method is by far the most important tool to identify causality in observational data.*

We first go over the basic econometrics associated with this method, and then delve into discussions about the empirical implications of the assumptions that make IV work (and work well). Lastly, we discuss the potential problems of the IV estimates under realistic circumstances.

Pre-class reading:

- Wooldridge, Chap 5.

- The following two articles are excellent work that informs on the debate on the IV method (all published in the same issue of the *Journal of Economic Literature*):
  
  

Post-class reading:

- Adelino, Gerardi, and Willen (2013):
  [https://faculty.fuqua.duke.edu/~mna11/pdfs/jrefe_2.7kg.pdf](https://faculty.fuqua.duke.edu/~mna11/pdfs/jrefe_2.7kg.pdf)

  It poses a criticism on Piskorski, Seru, and Vig (2010):

  regarding the IV method in the latter. What is your opinion?

4. Selection models: Identification in the non-linear models

*When a firm announces a diversifying acquisition, its stock price suffers. Can we conclude that diversification destroys value (a treatment effect) or that investors learn that the acquiring firm is worse than they expected (a selection effect)? Selection models are important only because selection is usually less interesting than treatment. The discrete nature of the choices makes the standard IV method non-applicable. This section focuses on how to incorporate selection issues in discrete-choice and other non-linear models.*

Pre-class reading:
5. Difference in difference: Event study in corporate finance

Conducting an event study establishing before-after differences is a straightforward exercise. The challenge is to construct the counterfactual. In this section we will discuss the key issues that concern the validity of the assumed counterfactual, such as exogeneity and sharpness of the event and parallel trends.

Pre-class readings:

Post-class reading:

6. Discontinuity: A thin layer that contains a lot of information

When assignment to a treatment is determined at least partly by the value of a variable lying on either side of a fixed threshold, there is hope to evaluating the causal effects of the treatment based on the assumption that observations in the narrow window around the cut-off should be “the same” in the absence of the treatment. We will discuss the numerous issues concerning the consistency and power of the method, as well as the best practice in applying it.

Pre-class reading:
- Imbens and Lemieux (2008, JOE):

Post-class reading:

Class Policies and Etiquette

1. About registration and auditing:
   a. All students who are allowed to take the course for credit must do so, as opposed to auditing. The reason is purely pedagogical: You get more out of the course if you commit yourself to living up to the standards.
   b. The course welcomes all curious learners provided you satisfy the pre-requisites and are committed to putting work toward the course. Even as an auditor, you must turn in some finished assignments (which will be graded), which could be a subset of the homework assignments. If you have nothing to turn in at the beginning of a class, I will ask you to leave. The reason for this rule is, again, purely pedagogical: You gain little (if any) auditing the course without doing any work on the assignments (or participating in class discussions). If you are up for the challenge, please send me your formal request and I will put your name to the Canvas course portal. If you do not want to put in the work, please free yourself from the drudgery of three-hour lectures.
   c. All students, regardless of registration status, are encouraged to participating in classroom discussions. I reserve the right to cold-call anyone in the classroom.
   d. For auditing students who are not able to register and who wish to obtain some certification: At your request, I will issue a personal letter indicating the grade you would earn if you fulfill all class requirements (including the homework, project, and exam).

2. About class attendance:
   a. Attending a class is a choice for you to make, and therefore you do not need to inform me before hand or explain to me afterwards about missing a class.
   b. If you decide to attend a class, you should make every effort to arrive about 2-5 minutes before the class starts. If you are late for more than 15 minutes, it is strongly recommended that you wait till the intermission (at 10:30am) to enter.
3. About behavior in classroom:
   a. Drink is allowed but not food.
   b. All electronic devices for communication purposes: cell phones, iPhones, Blackberries, and any other devices in this category, need to be turned off.
   c. Laptops, iPads, and any other devices in this category are strongly discouraged during the class time. If you find it absolutely necessary, you can use these devices to take notes. All devices are strictly prohibited during peer presentations.