Syllabus for ECO7425
Graduate Econometrics II
Fall 2022

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Office hours: Tu/Th 12:30-1:30 or by appointment

Course schedule: TuTh 11- 12:15
Course meets: Deuxieme Maison 323

1. Course Description and Objectives

This is the second course of the graduate econometrics sequence. The goal of this course is to provide students with econometrics tools are useful in conducting high-quality empirical research in applied microeconomics and related fields. Specifically, the course will focus on applied econometric methods for estimating causal effects of policy interventions. These methods include instrumental variable estimation, matching, fixed effect models, regression discontinuity designs. The course will also cover more general econometric theory such as maximum likelihood estimation and non-parametric estimation.

The primary target of this course is Ph.D. students, while the course can benefit master students too. This course will not be easy, and students are expected to study hard.

2. Prerequisites

ECO7424 or equivalent. Knowledge of matrix algebra, probability theory, and basic asymptotic theory is necessary and expected.

3. Course Requirements

Class attendance is expected although not mandatory or graded. There will be short quizzes throughout the semester, four problem sets, and a final exam.

3.1 Short quizzes (20%)

There will be homework quizzes throughout the semester. They are basically small exercises to prove/verify what is covered in lectures. The purpose is to help you follow and understand course materials. You can work with classmates, although you must write your answers.

3.2 Problem sets (50%)

There will be three (or four) homework assignments that combine theoretical and data analysis. You will need to use Stata or similar statistical software. You can (and are encouraged to) work with classmates, although you must write your answers by yourselves.

3.3 Final exams (30%)
A final exam will be at 9:45-11:45 on December 8 in Deuxieme Maison 323.

3.4 Grading
If you choose not to turn in an assignment on time, you will loose 20% of the total points that you earn on the assignment for each day that it is late.

Assignment	Points
Short quizzes	20
Problem sets	50
Final exam	30

Final letter grade will be awarded according to the scale below:

A	>=93
A-	<93 & >= 90
B+	<90 & >=85
B	<85 & >=80
B-	<80 & >=75
C+	<75 & >=70
C	<70 & >=65
D	<65 & >=60
F	< 60

4. Course Outline and Readings

Textbooks: There is no required textbook. While there is no particular book this course will follow, the following three books will be useful throughout the course.

- [**AP**] Angrist, Joshua D., and Jörn-Steffen Pischke. 2008. *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.
- [**H**] Hansen, Bruce E. 2022 *Econometrics*.
- [**W**] Wooldridge, Jeffrey M. 2010. *Econometric analysis of cross section and panel data*. MIT press.

The following papers cover many of the empirical methods for estimating treatment effects that this course will teach. Abadie & Cattaneo (2018) provides succinct review of many of the methods covered in this course. This article may help you to have an overall picture and build good interpretations. Imbens & Wooldridge (2009) provides more detailed review of many methods of estimating causal effects in a textbook manner.

- Abadie, Alberto, and Matias D. Cattaneo. 2018. "Econometric methods for program evaluation." *Annual Review of Economics* 10: 465-503.
- Imbens, G.W. and Wooldridge, J.M., 2009. Recent developments in the econometrics of program evaluation. *Journal of economic literature*, *47*(1), pp.5-86.

(*Note.* Underscored are the main references. Black-circle bulleted are theoretical references, while white-circle are empirical papers.)

The schedule is subject to change. I may add or drop readings during the semester. I will announce changes in class and update the syllabus.

1. Introduction: CEF, Causality, Regressions, etc.
   - AP 3
   - H 2, 3

2. Hypothesis testing
   - H 9

3. Instrumental variables
   - W 5
   - AP 4
   - H 12
   - Staiger, Douglas and James H. Stock (1997): "Instrumental variables regression with weak instruments," Econometrica, 65, 557-586.
   - Stock, James H. and Motohiro Yogo (2005): "Testing for weak instruments in linear IV regression," in Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg, eds Donald W.K. Andrews and James H. Stock, Cambridge University Press, 80-108.
   - Angrist, Joshua D. 1990. "Lifetime earnings and the Vietnam era draft lottery: evidence from social security administrative records." *American Economic Review*: 313-336.
   - Angrist, Joshua D., and Alan B. Keueger. (1991) "Does compulsory school attendance affect schooling and earnings?." *The Quarterly Journal of Economics* 106.4: 979-1014.

4. Introduction: Maximum likelihood estimation (MLE)
   This section provides quite basic theory of MLE in a general manner, so any graduate level textbook can be a good reference.
   - Hansen, Bruce E. 2022. *Introduction to Probability and Statistics for Economists.*
   - Casella, George, and Roger L. Berger. *Statistical inference*. Vol. 2. Pacific Grove, CA: Duxbury, 2002.

5. Limited dependent variable models
   This section briefly covers commonly used limited dependent variable models.
   - H 25-27
   - W 15-17

6. Introduction: Non-parametric estimation
   This section covers only an introductory material to give you a basic idea and concept about non-parametric methods.
   - H 19-20

- Li, Q., & Racine, J. S. (2007). *Nonparametric econometrics: theory and practice*. Princeton University Press.

7. Panel data, difference-in-differences, and fixed effects
   - AP 5
   - H 4.22-4.24
   - H 18
   - W10, 20
   - Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. (2004) "How much should we trust differences-in-differences estimates?" *Quarterly journal of economics* 119.1: 249-275.
   - Duflo, Esther. 2001. "Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment." *American Economic Review* 91: 795-813.
   - Besley, Timothy, and Robin Burgess. (2004) "Can labor regulation hinder economic performance? Evidence from India." *The Quarterly journal of economics* 119.1: 91-134.

8. Regression discontinuity
   - AP 5
   - H 18
   - W21
   - Lee, David S., and Thomas Lemieux. 2010. "Regression discontinuity designs in economics." *Journal of economic literature* 48.2: 281-355.
   - McCrary, Justin. 2008. "Manipulation of the running variable in the regression discontinuity design: A density test." *Journal of econometrics* 142.2: 698-714.
   - Cattaneo, Mattias, Nicolas Idrobo, and Rocio Titiunik. (forthcoming). *A Practical Introduction to Regression Discontinuity Designs: Volume I and II*.
   - Angrist, J. D., and V. Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *Quarterly Journal of Economics* 114.2: 533-575.
   - Lee, David S. 2008. "Randomized experiments from non-random selection in US House elections." *Journal of Econometrics* 142: 675-697.

9. Estimation methods based on CIA (selection on observables)
   8.1. Regression adjustment
   8.2. Nearest neighbor matching estimators
   8.3. Propensity score methods
   8.4. Regression
   - AP 3.3
   - W 21
   - Imbens and Wooldridge 2009, sec 5
   - Abadie and Imbens 2006
   - Abadie and Imbens 2011

- Busso, Matias, John DiNardo, and Justin McCrary. 2014. "New evidence on the finite sample properties of propensity score reweighting and matching estimators." *Review of Economics and Statistics* 96: 885-897.
- Hahn, Jinyong. 1998. "On the Role of the Propensity Score in Efficient Semiparametric Estimation of Average Treatment Effects." Econometrica, 66(2): 315–31.
- Heckman, James J., Hidehiko Ichimura, and Petra E. Todd. 1998. "Matching as an Econometric Evaluation Estimator." Review of Economic Studies, 65(2): 261–94.
- Heckman, James J., Hidehiko Ichimura, Jeffrey A. Smith, and Petra E. Todd. 1998. "Characterizing Selection Bias Using Experimental Data." Econometrica, 66(5): 1017–98.
- Kang, Joseph DY, and Joseph L. Schafer. 2007. "Demystifying double robustness: A comparison of alternative strategies for estimating a population mean from incomplete data." *Statistical science* 22: 523-539.
- Angrist, Joshua D. 1998. "Estimating the Labor Market Impact of Voluntary Military Service Using Social Security Data on Military Applicants." *Econometrica*: 249-288.
- Dehejia, Rajeev H., and Sadek Wahba. 1999. "Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs." Journal of the American statistical Association 94: 1053-1062.
- Jalan, Jyotsna, and Martin Ravallion. "Does piped water reduce diarrhea for children in rural India?." *Journal of Econometrics* 112.1 (2003): 153-173.

Disability Resource Center

If you have a documented disability, please bring your documentation and come to talk to me as soon as possible so that I can make suitable accommodations for you. If you believe that you have a disability and desire accommodation, please register with the Disability Resource Center, GC 190 as soon as possible. The FIU Disability Resources Center strives to promote student success by working collaboratively with students, faculty and staff to create an inclusive educational environment. The university is committed to advancing students learning and enhancing personal development. Any information provided will be kept confidential. Documentation of your disability will need to be sent to the Disability Resource Center (GC 190).

Religious Observance

Accommodations will be made for students who wish to observe their religious holidays. Students should make their requests known at the beginning of the semester.

Academic Dishonesty

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are

found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook. Academic Misconduct includes (but is not limited to) giving or receiving assistance on a test, quiz, or homework assignment for which such assistance is not permitted, falsifying a document to obtain an excusal from a test, having another person use a phony ID to take a test for you, and using unauthorized notes on a test or quiz.

I encourage you to read FIU's academic integrity policy:
http://integrity.fiu.edu/misconducts.html