

Applied Microeconometrics

Professor

Arturo A. Aguilar Esteva
Office: 3rd floor, CIE Building, Sta. Teresa campus
arturo.aguilar@itam.mx

Schedule

Monday and Wednesday, 5:30 – 7:00 PM
Office Hours: Schedule your appointment on my website.

Course Description

The purpose of these course is to provide the theoretical and practical tools necessary to make an empirical analysis of the relationship between two or more variables. This knowledge will be helpful to answer questions and verify hypotheses using data that describes characteristics, behaviors or decision of individuals, households, firms, markets, government, etc. The causality problem will be greatly emphasized to determine the effect (or lack of effect) that a change in a variable has on another variable.

In each topic we will begin covering the theoretical “support” and then put it into practice. In each method we will analyze its pros and cons. To strengthen the understanding of some topics, students will need to use the methods learned in class using real datasets and a statistical package (mainly Stata and/or R). By the end of the course, the students should be able to: use real data to test hypotheses and answer questions using the most adequate statistical method; recognize the limitations and contributions of each method; analyze the use of these methods.

Grading

30% Problem sets

20% Midterm Exam¹

30% Final Exam

10% Data Challenge²

5% Zoom Q's³

5% Participation / podcasts⁴

¹ Students can decide whether to take the Midterm Exam or not. If a student doesn't take it, the Final Exam will weight 50%. If a student attends the Midterm Exam, he/she will not be able to invalidate the grade. The Final Exam is always cumulative.

² The Data Challenge will take place in teams. The possibility of making the Data Challenge individually is always open.

³ Zoom Q's are multiple choice questions made during class with Zoom or Google Forms.

⁴ In some classes students will be randomly selected to answer some questions about a podcast or a video. Students can be selected more than once in each semester. If a student is selected and he/she didn't attend that class his/her odds of being selected in the future increase.

Course Material

The course material (class notes, problem sets, solutions, links to videos, etc.) will be available in *Canvas*.

References

(SW) Stock, James and Mark Watson (2011). "Introduction to Econometrics," 3rd. ed., Addison Wesley

(W) Wooldridge, Jeffrey M. (2012). "Introductory Econometrics. A Modern Approach," 5th ed., Southwestern Cengage Learning

(MH) Angrist, J. and J.S. Pischke (2009). "Mostly Harmless Econometrics," Princeton University Press

(D) Duflo, Esther, Glennerster, Rachel and Michael Kremer (2007). "Using Randomization in Development Economics Research: A Toolkit." CEPR Discussion Paper No. 6059.

(CIT) Cattaneo, M., Idrobo, N. and R. Titiunik (2018). "A Practical Introduction to Regression Discontinuity Designs. Volume I and II. *Cambridge University Press*.

Syllabus

1. **Statistics Review**

Ref: (SW) Cap. 2 y 3; (W) Appendix B y C

- a. Hypotheses tests
- b. Law of Large Numbers and Central Limit Theorem

2. **Ordinary Least Squares**

Ref: (SW) Cap. 4, 5, 6, 7, 8, 9; (W) Cap. 2, 3, 4, 6.2, 6.4, 7, 8

- a. Estimation and coefficient interpretation
- b. Hypotheses tests
- c. Functional forms
- d. Adding controls
- e. External and internal validity
- f. SE: homoskedasticity and heteroskedasticity
- g. Quantile regression

3. **Panel Data**

Ref: (SW) Cap. 10; (W) Cap. 13, 14

- a. Structure
- b. First Differences
- c. Fixed Effects
- d. Clustered SEs

4. **Experimental Methods**

Ref: (SW) Cap. 13.1, 13.2, 13.3; (D) Article; (MH) Cap. 2

- a. Potential Outcomes
- b. ATE, LATE, ITT, TOT
- c. Natural Experiments
- d. Sample size and statistical power

5. **Quasi-Experimental Methods**

Ref: (MH) Cap. 4-6; (SW) 12, 13.4, 13.5, 13.6; (W) Cap. 13.2, 15; (CIT) Article

- a. Difference-in-Differences
- b. Instrumental Variables
- c. Regression Discontinuity
- d. Matching