

Economics 312, Spring 2021, Part B: Syllabus

Link to [Part A Syllabus](#)

Instructor: James J. Heckman

- Lecture times: Tuesday and Thursday, 5:00pm – 6:20 pm
- Lecture classroom: Virtual
- Zoom Link: <https://uchicago.zoom.us/j/98769123441?pwd=QzNDZ0FINU4waFhwN1hEUHJvOUk1dz09>
- Teaching Assistants:
 - Ana Vasilj (avasilj0810@gmail.com)
 - Office hours: Wednesdays, 9am – 10am
 - Samuel Higbee (samueltigbee@uchicago.edu)
 - Office hours: Mondays, 4:30pm – 5:30pm
 - TA Sessions: Friday, 4:10pm – 5:10pm
 - Zoom Link: <https://uchicago.zoom.us/j/98247497997?pwd=b0x1aUJZwZ3lDNzhZdW9ESlNvdjVZQT09>
 - **NOTE:** Please email the TAs if you plan to attend their Office Hours so that they do not wait unnecessarily. Please email them before office hours with any specific questions so that they can prepare.

If you experience problems with this website, please contact [Jennifer Pachon](#).

Course Description

This course examines alternative ways to describe and learn from economic data and address well-posed economic questions. We consider:

1. Alternative modes of inference, including different approaches to testing and synthesizing evidence from multiple sources
2. Counterfactuals and economic policy evaluation in three current “causal” frameworks
3. Using economics to analyze economic data focusing on discrete choice and the Generalized Roy model and its extensions and applications
4. The fundamental role of information asymmetries in choosing estimators.

Class Requirements

There will be a written exam during finals week. Problem sets are due each week. They will be graded and count toward the final grade. The assignments will include analytical, free-response, and empirical questions. These questions will require the use of programming languages like Python, R, or MATLAB. Any programming language is accepted for the simulation exercises. If students have any questions on Problem Sets they should first ask the TA and only ask the professor if the TA is unable to help.

For the problem sets in Part B of the course, you may form groups of up to 3 people, maximum, with no exceptions.

These study groups will be permanent for the rest of the course. **Please send the list of people with your names as**

seen on Canvas to the TAs by Friday, April 30. The TAs will set up groups on Canvas so that a group can submit its answers. Please upload an electronic version to Canvas (no late submissions are accepted) before the deadline, with one submission per group. Note that groups consisting of more than 3 members earn a mark of 0.

Rules for submission:

- Include everyone's names in the submitted document
- The deadline for each assignment is the start of the lecture on the day that the problem set is due (5 PM on Tuesdays and Thursdays unless otherwise stated)
- The documents containing the write-up (including but not limited to paragraph answers, equations, graphs, plots, diagrams, tables) must be in PDF format and you are strongly encouraged to use LaTeX to typeset your solutions. A collaborative platform like Overleaf would be useful
- Please submit your code along with the write-up: both the source file(s) and the PDF version of the code if possible. Platforms like RMarkdown (for R), Jupyter (for Python and R) and MATLAB live scripts can be especially useful to include equations and text in Markdown cells alongside code blocks. The code should be well-formatted, with comments and well-labeled variable names as appropriate

Goals of the Course

1. Develop a critical understanding of evidence in economics and how to interpret it
 - i. Understand the consequences of how data are generated (sampling plans) and how to account for them
 - ii. Replicability and consilience as essential activities of scientific economics
 - iii. Alternative modes of inference
 - a. Classical statistics: limitations and Bayesian and likelihood alternatives
 - b. Testing hypotheses
 - c. How to learn from rejections of hypotheses: Abduction.
2. Understand that econometrics is a field rooted in economics. Econometrics is much more than statistics:
 - i. Using economics to interpret data and to motivate choices of estimators and test statistics
 - ii. Using economics and data to address policy problems
 - a. Different classes of policy problems pose different challenges
 - b. "Causal parameters" vs. "structural parameters": is there any useful distinction?
3. Tools
 - i. Basic economic choice models that help to organize and interpret evidence in a variety of fields
 - ii. Comparison of estimation methods in the context of Generalized Roy Models and extensions:
 - a. Structural methods
 - b. IV
 - c. Matching
 - d. Control functions
 - e. Longitudinal data and difference-in-differences
 - f. Duration models
 - iii. Fundamental role of information and information asymmetries in choosing estimators and devising test statistics

Lecture Notes

Lecture notes for each week will be posted on the Canvas site in advance of each lecture on the website. The handouts distill and complement the readings.

2021 Syllabus

Recommended readings are indicated by (*). All other readings on this list and the supplement are background.

Topic 1. Learning from Data

- (*)[Richard Feynman on Social Science](#) (Vimeo video)
- Hansen, Lars Peter, and James J. Heckman. (1996). "[The Empirical Foundations of Calibration](#)." *Journal of Economic Perspectives*, 10(1):87-104.

A. Replicability in Economics

- (*)Christensen, Garret, and Edward Miguel. (2018). "[Transparency, Reproducibility, and the Credibility of Economics Research](#)." *Journal of Economic Literature*, 56(3):920-80.
- Leamer, Edward E. (1983). "[Let's Take the Con Out of Econometrics](#)." *The American Economic Review*, 73(1):31-43.
- [Reproducibility and Replicability in Economic Science](#). Levenstein. Presentation at the American Statistical Association's Joint Statistical Meetings in Vancouver, Canada, July 29, 2018. Session on Transparency, Reproducibility, and Replicability.
- Chang, Andrew C., and Phillip Li. 2015. "[Is Economics Research Replicable? Sixty Published Papers from Thirteen Journals Say "Usually Not"](#)." Board of Governors of the Federal Reserve System. Finance and Economics Discussion Series. 2015-083.

B. Abduction

- (*)Heckman, James J. and Burton Singer. (2017). "[Abducting Economics](#)," *American Economic Review: Papers and Proceedings*, 107(5):298-302.
- Singer, Burton. (2008). "[Comment: Implication Analysis as Abductive Inference](#)." *Sociological Methodology*, 38:75-83.
- Moffitt, Robert A. (2019). "[The Role of Ethnographic and Qualitative Research in Learning About the Low-Income Population](#)," in *American Family Diaries: Can Ethnographic Research Help Shape Public Policy?* Aparna Mathur and Jennifer J. Silva, eds. Washington, DC: American Enterprise Institute.
- Heckman, James J., and Brook S. Payner. (1989). "[Determining the Impact of Federal Antidiscrimination Policy on the Economic Status of Blacks: A Study of South Carolina](#)." *The American Economic Review*, 79(1):138-177.
- (*)Humphries, John Eric. (2019). "[The Causes and Consequences of Self-Employment over the Life Cycle](#)," Unpublished manuscript, Yale University, Department of Economics.
- Friedman, Milton. (1953). "[The Methodology of Positive Economics](#)," in M. Friedman, *Essays in Positive Economics*. Chicago: University of Chicago Press. See Footnote 11 and surrounding text.
- Friedman, Milton (1957). [Theory of the Consumption Function](#). Princeton, NJ: Princeton University Press.

Topic 2: Discrete Choice, Self-Selection and the Generalized Roy Model

- (*)Heckman, James J. (2018). "[Selection Bias and Self-Selection](#)." In *The New Palgrave Dictionary of Economics*, 12130-12147. London: Palgrave Macmillan UK.
- Domencich, T. A. and D. McFadden. (1975). [Urban Travel Demand: A Behavioral Analysis](#). Amsterdam: North Holland. Chapters 3 and 4.
- Matzkin, Rosa L. (2007). "[Nonparametric identification](#)." In *Handbook of Econometrics*, edited by J. J. Heckman and E. E. Leamer, eds. Chapter 73, pp. 5307-5368. Amsterdam: Elsevier.

- Borjas, George J. and Anthony Edo. (2021). "[Gender, Selection into Employment, and the Wage Impact of Immigration](#)," NBER Working Paper No. 28682.
- Heckman, James J., and Guilherme Sedlacek. (1985). "[Heterogeneity, Aggregation, and Market Wage Functions: An Empirical Model of Self-Selection in the Labor Market](#)." *Journal of Political Economy*, 93(6):1077-1125.
- Heckman, James. (1974). "[Shadow Prices, Market Wages, and Labor Supply](#)." *Econometrica*, 42(4):679-694.

Topic 3. Causality

- Heckman, James J. and Rodrigo Pinto. (2022). "[Econometric Causality: How to Express it and Why it Matters](#)." Forthcoming, *Annual Review of Economics*.
- *Heckman, James J. 2021. "[Dialogue on Causality Between James Heckman and Ian Shrier](#)" Unpublished manuscript, University of Chicago, Center for the Economics of Human Development.
- (*)Heckman, James J. (2008). "[Econometric Causality](#)," *International Statistical Review*, 76(1): 1-27.
- Heckman, James J. and Pinto, Rodrigo. (2020). "Causal Calculus for the Hypothetical Model Framework," Unpublished manuscript, University of Chicago, Center for the Economics of Human Development.

Topic 4. Randomization

- (*)Heckman, James J. (2020). "[Randomization and Social Policy Evaluation Revisited](#)." In: *Randomized Control Trials in the Field of Development: A Critical Perspective*. F. Bédécarrats, I. Guérin, and F. Roubaud, eds. New York, NY: Oxford University Press.
- Kline, Patrick, and Christopher R. Walters. (2016). "[Evaluating Public Programs with Close Substitutes: The Case of Head Start](#)." *The Quarterly Journal of Economics*, 131(4):1795-1848.
- (*)Banerjee, A. V., and E. Duflo. (2017). "[An Introduction to the "Handbook of Field Experiments"](#)." In *Handbook of Economic Field Experiments*, edited by Abhijit Vinayak Banerjee and Esther Duflo. Chapter 1, pp. 1-24. Amsterdam: North-Holland.
- Duflo, Esther. (2020). "[Field Experiments and the Practice of Policy](#)." *American Economic Review*, 110(7):1952-73.
- Deaton, Angus. 2010. "[Instruments, Randomization, and Learning about Development](#)." *Journal of Economic Literature*, 48(2):424-455.

Topic 5. Instrumental Variables

- (*)Heckman, James J. 2010. "[Building Bridges between Structural and Program Evaluation Approaches to Evaluating Policy](#)." *Journal of Economic Literature*, 48(2):356-98.
- Heckman, James J., Sergio Urzua, and Edward Vytlacil. (2006). "[Understanding Instrumental Variables in Models with Essential Heterogeneity](#)." *The Review of Economics and Statistics*, 88(3):389-432.
- Heckman, James J. and Vytlacil, Edward J. (2007). "[Econometric Evaluation of Social Programs, Part II: Using the Marginal Treatment Effect to Organize Alternative Economic Estimators to Evaluate Social Programs and to Forecast Their Effects in New Environments](#)," in *Handbook of Econometrics*, Vol. 6B, J. Heckman and E. Leamer, eds. Amsterdam: Elsevier. pp. 4875-5144.
- Carneiro, Pedro, James J. Heckman, and Edward J. Vytlacil. (2011). "[Estimating Marginal Returns to Education](#)." *American Economic Review*, 101(6):2754-81.

Topic 6. Matching

- (*)Heckman, James, and Salvador Navarro-Lozano. (2004). "[Using Matching, Instrumental Variables, and Control Functions to Estimate Economic Choice Models](#)." *The Review of Economics and Statistics*, 86(1):30-57.
- Heckman, James, Hidehiko Ichimura, Jeffrey Smith, and Petra Todd. (1998). "[Characterizing Selection Bias Using Experimental Data](#)." *Econometrica*, 66(5):1017-1098.

- Heckman, James J., Robert J. Lalonde, and Jeffrey A. Smith. (1999). "[The Economics and Econometrics of Active Labor Market Programs.](#)" In *Handbook of Labor Economics*, edited by Orley C. Ashenfelter and David Card, Chapter 31, pp. 1865-2097. Amsterdam: Elsevier.
- Heckman, James J., Hidehiko Ichimura, and Petra Todd. (1998). "[Matching As An Econometric Evaluation Estimator.](#)" *The Review of Economic Studies*, 65(2):261-294.

Topic 7. General Principles Underlying All Econometric Estimators

- Heckman, James J. (2008). "[The Principles Underlying Evaluation Estimators with an Application to Matching.](#)" *Les Annales d'Economie et de Statistique*, 91-92, pp. 9-74.

Topic 8: Simultaneous Equations and Social Interactions

- (*)Johnston, J. (1963). "[Simultaneous Equation Systems,](#)" in *Econometric Methods*, 3rd Edition. St. Louis, MO: McGraw-Hill Book Company. Chapter 11, pp. 439-497.
- (*)Moffitt, Robert. (2001). "[Policy Interventions, Low-Level Equilibria, and Social Interactions.](#)" In *Social Dynamics*, edited by Steven N. Durlauf and Peyton Young. Cambridge, MA: The MIT Press. Chapter 3.
- Pierse, Richard G. (2020). "[Econometrics Lecture 7: Simultaneous Equations Models: Identification, Estimation and Testing](#)" Unpublished manuscript, National Institute of Economic and Social Research (NIESR).
- Blume, Lawrence E., William A. Brock, Steven N. Durlauf, and Yannis M. Ioannides. (2011). "[Identification of Social Interactions,](#)" In *Handbook of Social Economics*, J. Benhabib, A. Bisin, and M. Jackson, eds. Chapter 18, pp. 853-964. Amsterdam: North-Holland.

Topic 9: Longitudinal and Panel Data

- (*)Heckman, James J., and Richard Robb. (1985). "[Alternative Methods for Evaluating the Impact of Interventions: An Overview.](#)" *Journal of Econometrics*, 30(1-2):239-267.
- Hsiao, Cheng. (2003). [Analysis of Panel Data.](#) 2nd ed. Econometric Society Monographs. Cambridge: Cambridge University Press.
- Arellano, Manuel, and Bo Honoré. (2001). "[Panel Data Models: Some Recent Developments.](#)" In *Handbook of Econometrics*, Volume 5. James J. Heckman and Edward Leamer (eds.). Chapter 53, 3229-3296. Amsterdam: Elsevier.

Supplemental Reading

Topic 1. Learning from Data

- Misak, C. J. (2004). [Truth and the end of inquiry: A Peircean account of truth.](#) New York: Clarendon Press ; Oxford University Press.

Topic 2: Discrete Choice and Self-Selection

- Carneiro, Pedro, James J. Heckman, and Edward Vytlacil. (2010). "[Evaluating Marginal Policy Changes and the Average Effect of Treatment for Individuals at the Margin.](#)" *Econometrica*, 78(1):377-394.
- Heckman, J. J. and Honoré, B. (1990). "[The Empirical Content of the Roy Model.](#)" *Econometrica*, 58(5): 1121-1149.
- Iskhakov, Fedor, John Rust, and Bertel Schjerning. (2020). "[Machine Learning and Structural Econometrics: Comparisons and Contrasts.](#)" Georgetown University, Department of Economics. Unpublished manuscript.

Topic 3. Causality

Topic 4. Randomization

- [Randomized Control Trials in the Field of Development: A Critical Perspective.](#) F. Bédécarrats, I. Guérin, and F. Roubaud, eds. New York, NY: Oxford University Press.

Topic 5. Instrumental Variables

Topic 6. Matching

- Glewwe, Paul and Petra Todd. (2020). *Impact Evaluation in Developing Countries: Theory, Methods and Practice*, Washington, DC: The World Bank.

Topic 7. General Principles Underlying All Econometric Estimators

- Heckman, James J. (2008). "[The Principles Underlying Evaluation Estimators with an Application to Matching.](#)" *Annales d'Economie et de Statistique*, (91/92):9-73.

Topic 8: Simultaneous Equations and Social Interactions

Topic 9: Longitudinal and Panel Data

- Heckman, James J., and Richard Robb. (1985). "[Alternative Methods for Evaluating the Impact of Interventions.](#)" In *Longitudinal Analysis of Labor Market Data*, edited by James J. Heckman and Burton S. Singer, 156-245. Cambridge University Press.

Social Experiments

- Todd, Petra E., and Kenneth I. Wolpin. 2006. "[Assessing the Impact of a School Subsidy Program in Mexico: Using a Social Experiment to Validate a Dynamic Behavioral Model of Child Schooling and Fertility.](#)" *American Economic Review*, 96(5):1384-1417.
- Moffatt, Peter G. (2021). *Experimetrics: A Survey*. In Foundations and Trends® in Econometrics, 11(1–2):1-152.

Causal Analysis and Structural Analysis

- Heckman, James J. and Vytlacil, Edward J. (2007). "[Econometric Evaluation of Social Programs, Part I: Causal Models, Structural Models and Econometric Policy Evaluation.](#)" in *Handbook of Econometrics*, Vol. 6B, J. Heckman and E. Leamer, eds. Amsterdam: Elsevier. pp. 4779-4874.
- Blundell, Richard, and Monica Costa Dias. (2009). "[Alternative Approaches to Evaluation in Empirical Microeconomics.](#)" *The Journal of Human Resources*, 44(3):565-640.
- Abadie, Alberto, and Matias D. Cattaneo. (2018). "[Econometric Methods for Program Evaluation.](#)" *Annual Review of Economics*, 10(1):465-503.
- Athey, Susan, and Guido W. Imbens. (2017). "[The State of Applied Econometrics: Causality and Policy Evaluation.](#)" *Journal of Economic Perspectives*, 31(2):3-32.
- Pearl, Judea. (1995). "[Causal Diagrams for Empirical Research.](#)" *Biometrika*, 82(4):669-688.
- Jaber, Amin, Jiji Zhang, and Elias Bareinboim. (2019). "[Causal Identification under Markov Equivalence: Completeness Results.](#)" In *Proceedings of the 36th International Conference on Machine Learning*, Volume 97, edited by Chaudhuri Kamalika and Salakhutdinov Ruslan, pp. 2981-2989. Long Beach, CA: MLR Press.

Discrete Choice

- Ben-Akiva, Moshe, Daniel McFadden, and Kenneth Train. (2019). "[Foundations of Stated Preference Elicitation: Consumer Behavior and Choice-based Conjoint Analysis.](#)" *Foundations and Trends in Econometrics*, 10(1-2):1-144.