**LPO 7870-01 Research Design and Data Analysis II**

## Peabody College, Department of Leadership Policy and Organizations

**Spring 2022 Syllabus**

**Meeting time and location:**

Monday, 4:15-7:05 p.m., 6 Magnolia Circle 216

**Instructor:**

Carolyn Heinrich, Professor of Public Policy, Education and Economics

E-mail: [carolyn.j.heinrich@vanderbilt.edu](mailto:carolyn.j.heinrich@vanderbilt.edu)

Office location: 202B Payne Hall

Office hours: 11 a.m.-12 p.m. on Mondays or by appointment: please send an email to the instructor to schedule (Zoom or in person)

**Teaching Assistants:**

Mason Shero: mason.s.shero@vanderbilt.edu

Diana Castellanos: diana.c.quintero.castellanos@vanderbilt.edu

**Course Description:** The central objective of this course is to instruct students in “state of the art” methods for the core tasks involved in research design and policy and program evaluation and to provide an understanding of when and how these methods can be most usefully applied to produce knowledge and evidence of program and policy effectiveness. Topics that will be covered include: research design, causal attribution and validity; theory of measurement; basic descriptive and inferential statistics; missing data and survey non-response; statistical power; treatment implementation and measurement; multiple regression, and experimental and quasi-experimental methods of analysis.

These course topics will be explored with actual study data. Students will work with data and analyze them with a statistical program (e.g., learning methods for data analysis, imputation of missing data, nonexperimental estimation, etc.).

**Course pre-requisite:** Research Design and Data Analysis I or instructor consent

**Course materials:**

Required textbook:

* *Introduction to Econometrics*, James H. Stock and Mark W. Watson. You can buy the 2nd or 3rd edition.

Recommended textbook:

* Shadish, Cook and Campbell: *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*, ISBN-13: 978-0395615560

Research articles, supplemental readings and reports are also an important part of the reading list (see below). These materials will be available on Brightspace.

STATA is available to you in the computer labs on campus, but you may also purchase your own copy of the STATA statistical software through Vanderbilt University, which participates in STATA’s GradPlan pricing (<http://www.stata.com/order/new/edu/gradplans/campus-gradplan/>). Also, the university provides the option for accessing STATA using a virtual desktop. Detailed instructions are at the following link: https://libanswers.library.vanderbilt.edu/faq/290980

There are numerous support materials for using statistical software available for purchase, but you can also draw on freely accessible resources in learning statistical programming languages and software, including this excellent resource: <http://www.ats.ucla.edu/stat>. Stata also has built in technical support that you can access via the help command or other search options while working in the software itself.

**Course evaluation:**

Assignments: 3 assignments (15% each)

Mid-term exam: 30%

Final project (group or individual): 20%

Class and project participation: 5%

*Research design and data analysis assignments*: The research design and data analysis assignments are intended to give you the opportunity for practical application of the statistical concepts and tools learned in class, while also honing your statistical programming skills. The three assignments will each cover several weeks of material, and you will be given about 2 weeks to complete them; these assignments will each count toward 15% of your grade (45% total). Although you can consult with each other as you work on them, if you do not do your own work, you will not be prepared for the mid-term exam.

*(Post) midterm exam – March 28*: The exam will count toward 30% of your grade and will be comprehensive in the coverage of the course material up to that date.

*Final project* (group—max 3 people—or individual): You can choose to work individually or in pairs or trios (max 3 persons per group). We will provide you with a dataset and will ask you to estimate the effects of an intervention using different methods of analysis. This project will count toward 20% of your grade and is **due on Monday, May 2, 2022.**

*Participation*: Participation will be measured by the following metrics. First, class attendance: you are expected to regularly attend the class meetings and come prepared to fully participate in class discussions. Second, one week before class begins, you will need to fill out a simple, online questionnaire about yourself. Third, if you work in a group for the final project, you will be asked to self-report your contributions to specific aspects of the project.

We expect letter grades to be assigned according to the following distributional cut points, although we may make modifications based on the observed distribution of scores at the end of the course. The cut points are: A (100-93); A- (92-90); B+ (89-87); B (86-80); B- (79-77); C+ (76-74); C (73-66); C- (65-63); D (62-55); F (<55).

**Honor Code and Diversity and Inclusion:**

For this course, you are bound by the terms of the Vanderbilt Honor Code. Any breach of academic honesty, including cheating, plagiarism, or failing to report a known or suspected violation of the Code will be reported to the Honor Council. In particular, papers must assign credit to the sources you use. Material borrowed from another—quotations, paraphrases, key words, or ideas—must be credited following appropriate citation procedures (footnotes or parenthetical citation and bibliography).

You can view the full details of the honor code at the following link:

<http://www.vanderbilt.edu/student_handbook/the-honor-system#honorcode>

For group work, you are jointly responsible for ensuring that your work is in compliance with the honor code. That is, all group members are responsible for ensuring that each individual’s contributions to the product that is submitted for grading do not violate the honor code.

Vanderbilt University supports an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength.

**Classroom Accommodations:**

Vanderbilt is committed to equal opportunity for students with disabilities, as am I. If you need course accommodations due to a disability, please contact VU Student Access Services (https://www.vanderbilt.edu/student-access/) to initiate the process. After SAS has notified me of relevant accommodations, we will discuss how these accommodations may best be approached in this class, and I will facilitate the accommodations.

**Mental Health & Wellness:**

If you are experiencing undue stress that may be interfering with your ability to perform academically, Vanderbilt’s Student Care Network offers a range of support services. The Office of Student Care Coordination (OSCC) is the central and first point of contact to help you navigate and connect to appropriate resources. You can schedule an appointment with the OSCC at https://www.vanderbilt.edu/carecoordination/ or call 615-343-WELL. You can find a calendar of services at https://www.vanderbilt.edu/studentcarenetwork/satellite-services/.

If you or someone you know needs to speak with a professional counselor immediately, the University Counseling Center offers Urgent Care Counseling. Students should call the UCC at (615) 322-2571 during office hours to speak with an urgent care clinician. You can also reach an on-call counselor after hours or on the weekends by calling (615) 322-2571 and pressing option 2 at any time. You can find additional information at https://www.vanderbilt.edu//ucc/.

**Mandatory Reporter Obligations:**

All University faculty and administrators are mandatory reports. What this means is that all faculty, including me, must report allegations of sexual misconduct and intimate partner violence to the Title IX Coordinator. In addition, all faculty are obligated to report any allegations of discrimination to the Title IX Coordinator. I am willing to discuss with you such incidents but can only do so in the context of us both understanding my reporting obligations. If you want to talk with someone in confidence, officials in the Student Health Center, the University Counseling Center, and the Office of the Chaplain and Religious Life (when acting as clergy) can maintain confidentiality. The Project Safe Center serves as the central resource for those impacted by sexual misconduct and intimate partner violence and can assist with navigating all facets of the University’s resource and support network and other processes. In addition, officials in the Project Safe Center https://www.vanderbilt.edu/projectsafe/ have limited confidentiality, in that they must report the incidents but can do so without providing identifying information.

**COURSE OUTLINE AND READINGS**

Monday, January 24

**1.** **Research design,** **causal attribution and description, validity**

Murnane, Richard J., and John B. Willett. Methods matter: Improving causal inference in educational and social science research. Oxford University Press, 2010. Chapters 1, 2, and 3

Goode, Eric. More and More Autism Cases, Yet Causes Are Much Debated. The New York Times. January 26, 2004.

The New York Times. What Explains U.S. Mass Shootings? International Comparisons Suggest an Answer. November 7, 2017. https://www.nytimes.com/2017/11/07/world/americas/mass-shootings-us-international.html

(Optional) Shadish, Cook and Campbell, Ch. 1, “Experiments and Generalized Causal Inference”, Ch.2, “Statistical Conclusion Validity and Internal Validity” and Ch. 3, “Construct Validity and Internal Validity”

Monday, January 31

**2. Theory of measurement, types of measures/data, descriptive statistics**

Introduction to Econometrics, James H. Stock and Mark W. Watson, Ch. 3, Review of Statistics.

W. James Bradley and Kurt C. Schaefer, Chapter 6, “Limitations of Measurement in the Social Sciences” in *The Uses and Misuses of Data and Models*, Sage Publications, 1998.

**Assignment #1 available on Brightspace: Descriptive measures and sample statistics**

Monday, February 7, February 14, February 21

**3, 4 & 5. Multiple regression, model assumptions and violations of assumptions**

Introduction to Econometrics, James H. Stock and Mark W. Watson. Chapters 4-7 on regression analysis

Magnuson, K. A., Meyers, M. K., Ruhm, C. J., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. American Educational Research Journal, 41, 115-157.

Jacob, B., Berger, D., Hart, C. & Loeb, S. (2016). Can Technology Help Promote Equality of Educational Opportunities? RSF: The Russell Sage Foundation Journal of the Social Sciences.

Awang, Halimah and Salleh, Abdul Latif Haji. 2000. Determinants of Breastfeeding Duration in Peninsular Malaysia. Asia Pacific Journal of Public Health 12: 102-106.

**Assignment #1 due, Feb. 21**

Monday, February 28

**6. Statistical power, nonresponse, missing data and imputation**

Cohen, Jacob. "A power primer." Psychological bulletin 112.1 (1992): 155-159.

Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys. *Research in higher education*, *44*(4), 409-432.

Pampaka, Maria, Graeme Hutcheson & Julian Williams. 2016. Handling missing data: analysis of a challenging data set using multiple imputation. International Journal of Research & Method in Education, Vol. 39, Iss. 1.

Denk, Michaela and Michael Weber. 2011. Avoid Filling Swiss Cheese with Whipped Cream: Imputation Techniques and Evaluation Procedures for Cross-Country Time Series. IMF Working Paper WP/11/151.

**Assignment #2 available on Brightspace: Inferential statistics, missing data and imputation**

**Reference material for Assignment #2: (subject to change)**

Description of the Demographic and Health Surveys Individual Recode Data File, DHS III.

Kishor, Sunita and Gupta, Kamla. 2009. Gender Equality and Women’s Empowerment in India. Ministry of Health and Family Welfare Government of India, August.

**Spring break** (March 5-13, no class Monday, March 7)

Monday, March 14

**7. Nonlinear models and limited dependent variables**

Introduction to Econometrics, James H. Stock and Mark W. Watson. Chapter 8 on Nonlinear Regression Functions and Chapter 11 on Regression with a Binary Dependent Variable.

John G. Orme and Cheryl Buehler. 2001. Introduction to multiple regression for categorical and limited dependent variables. Social Work Research, Vol. 25, No. 1, pp. 49-61.

Ladd, Helen F. 2011. Teachers’ Perceptions of Their Working Conditions: How Predictive of Planned and Actual Teacher Movement? Educational Evaluation and Policy Analysis, vol. 33, 2: pp. 235-261.

Monday, March 21

**8. Experimental and quasi-experimental methods**

Introduction to Econometrics, James H. Stock and Mark W. Watson. Chapter 13, “Experiments and Quasi-Experiments”

Ravallion, Martin. 2001. “The Mystery of the Vanishing Benefits: An Introduction to Impact Evaluation.” World Bank Economic Review 15(1): 115-140.

## Glazerman, Steven, Mayer, Daniel and Paul Decker. 2006.Alternative routes to teaching: The impacts of Teach for America on student achievement and other outcomes. *Journal of Policy Analysis and Management*, **Volume 25 Issue 1, Pages 75 – 96.**

Cook, Thomas D., Shadish, William R. and Vivian C. Wong. 2008. Three Conditions under Which Experiments and Observational Studies Produce Comparable Causal Estimates: New Findings from Within-Study Comparisons. Journal of Policy Analysis and Management, Volume 27 Issue 4: 724 – 750.

**Assignment #2 due**

Monday, March 28

**9. (Post) mid-term exam**

**Assignment #3 available on Brightspace: Multiple regression with continuous and dichotomous outcomes**

**Reference material for Assignment #3: (subject to change)**

Awang, Halimah and Salleh, Abdul Latif Haji. 2000. Determinants of Breastfeeding Duration in Peninsular Malaysia. Asia Pacific Journal of Public Health 12: 102-106.

Alison Whitworth and Rob Stephenson. 2002. Birth spacing, sibling rivalry and child mortality in India. Social Science & Medicine, Volume 55, Issue 12, pp: 2107-2119.

Monday, April 4

**10. Implementation and process in impact evaluations**

W.K. Kellogg Foundation. 2004. Using Logic Models to Bring Together Planning, Evaluation, and Action: Logic Model Development Guide.

Impact Evaluation in Practice, Preparing for an Evaluation, pp. 31-44, World Bank

Shadish, Cook and Campbell, Ch. 10, “Treatment Implementation and Attrition”

Monday, April 11

**11. Regression Discontinuity Designs**

Bloom, H. (2012). Modern Regression Discontinuity Analysis. Journal of Research on Educational Effectiveness, 5(1), 43–82

Dougherty, S., Goodman, J., Hill, D., Litke, E., & Page, L. C. (2017). “Objective Course Placement and College Readiness: Evidence from Targeted Middle School Math Acceleration”, Economics of Education Review, 58, 141-161. DOI: <http://doi.org/10.1016/j.econedurev.2017.04.002>

Monday, April 18

**12. Panel/longitudinal data and methods for analysis/**

Introduction to Econometrics, James H. Stock and Mark W. Watson. Chapter 10, “Regression with Panel Data”

Hillman, Nicholas W., David A. Tandberg and Alyssa H. Fryar. 2015. Evaluating the Impacts of “New” Performance Funding in Higher Education. *Educational Evaluation and Policy Analysis*, Vol. 37, No. 4, pp. 501–519

Jepsen, C., Troske, K. 2014., Coomes, P. The Labor-Market Returns to Community College Degrees, Diplomas, and Certificates. Journal of Labor Economics, 32(1).

**Assignment #3 due**

Monday, April 25

**13. Nonexperimental methods: matching**

Heinrich, Carolyn J., Alessandro Maffioli and Gonzalo Vázquez. A Primer for Applying Propensity-Score Matching. Impact-Evaluation Guidelines. Technical Notes. No. IDB-TN-161. August 2010.

Heinrich, Carolyn J. 2007. “Demand and Supply-Side Determinants of Conditional Cash Transfer Program Effectiveness.” World Development, 35(1): 121-143.

Monaghan, David B. and Paul Attewell. 2015. The Community College Route to the Bachelor’s Degree. Educational Evaluation and Policy Analysis, Vol. 37, 1: pp. 70-91.

**Final project research product due Monday, May 2, 2022**

**SCHEDULE**

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| --- | --- | --- | --- |
| **Class No.** | **Date** | **Topic** | **Assignments** |
|  | **Jan. 7 (Friday)** |  | **Complete online survey about you** |
| **1** | **Mon. Jan 24** | **Research design,** **causal attribution and description, validity** |  |
| **2** | **Mon. Jan 31** | **Theory of measurement, types of measures/data, descriptive statistics** | **Assignment #1 available on Brightspace: Descriptive measures, sample statistics and logic models** |
| **3** | **Mon. Feb. 7** | **Multiple regression, model assumptions and violations of assumptions** |  |
| **4** | **Mon. Feb. 14** |  |
| **5** | **Mon. Feb. 21** | **Assignment #1 due** |
| **6** | **Mon. Feb. 28** | **Statistical power, nonresponse, missing data and imputation** | **Assignment #2 available on Brightspace: Inferential statistics, missing data and imputation** |
| **Spring break, no class** | | | |
| **7** | **Mon. Mar. 14** | **Nonlinear models and limited dependent variables** |  |
| **8** | **Mon. Mar. 21** | **Experimental and quasi-experimental methods** | **Assignment #2 due** |
| **9** | **Mon. Mar. 28** | **(Post) mid-term exam** | **MIDTERM EXAM**  **Assignment #3 available on Brightspace: Multiple regression with continuous and dichotomous outcomes** |
| **10** | **Mon. Apr. 04** | **Implementation and process in impact evaluations** |  |
| **11** | **Mon. Apr. 11** | **Nonexperimental methods: Regression Discontinuity Designs** |  |
| **12** | **Mon. Apr. 18** | **Panel/longitudinal data and methods for analysis** | **Assignment #3 due** |
| **13** | **Mon. Apr. 25** | **Nonexperimental methods: matching** |  |
| **14** | **Mon. May 02** |  | **FINAL PROJECT DUE** |