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HCMG 900: ProSeminar in Health Services Research

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Overview

This course explores econometric methods widely used in health economics and health services research with a focus on "reduced form" applications. The overriding objective is for you make significant progress in your ability to conduct high-quality empirical analysis. Concepts, applications, and practice are emphasized, as opposed to technical derivations of estimators and their properties. Methods covered include difference-in-difference and IV methods; models with qualitative and count dependent variables; models of health care expenditures/utilization, including two-part, sample selection, and GLM models; survival/duration models; regression discontinuity models; and matching / propensity score methods.

Readings

The reading list consists of published articles and a few working papers, which should be read prior to class (approximately two papers per week). The papers have been chosen to illustrate the application, generally recent, of different empirical methods and strategies and to minimize overlap with your other classes. They are available on-line through PennText and will be posted on Canvas (https://wharton.instructure.com/courses/1310793). You should also read selected chapters in Andrew Jones' primer, *Applied Econometrics for Health Economists: A Practical Guide* (OHE Research, 2nd ed., 2007). A pre-print version is available online and will be posted to Canvas, or you can buy a paperback copy.

Useful econometric texts for reference include J. Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, and A. Cameron and P. Trivedi, *Microeconometrics.* J. Angrist and J-S. Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion* is interesting. The *STATA* reference manuals also provide useful background on particular methods.

Other Requirements and Grading

In addition to reading the assigned papers prior to class, you are required to:

- Attend selected LDI and AEW seminars as requested and possible.
- Complete several hands-on data analysis assignments using a supplied data set drawn from the Medical Expenditure Panel Survey, using *STATA* or *R.*
- Conduct an econometric analysis of health-related data and present the results to the class (replications, extension, new analysis, or simulation).
- Present to the class a paper that you choose.
- Take the final exam.

Grading: Project – 35%; participation, assignments, and presentation – 40%; final – 25%

Outline and Readings

I. Introduction and background (Jan. 19)

A. Structural, reduced form, and treatment effects approaches
B. Classical estimation and testing

II. Introduction to dealing with selection, standard errors, weighting, and identifying ill-conditioned data (Jan. 26, Feb. 2, Feb. 9)

A. The fundamental problem in inference
B. Difference-in-difference (D-D) analysis
C. Instrumental variables estimation
D. Getting standard errors right
E. WLS and what are we weighting for?
F. Should we care about collinearity?

Melissa Kearney and Phillip Levine, Media Influences on Social Outcomes: The Impact of MTV's *16 and Pregnant* on Teen Childbearing, *American Economic Review* 105(2015): 3597-3632.

Katherine Baicker and Jacob Robbins, Medicare Payments and System-Level Health-Care Use: The Spillover Effects of Medicare Managed Care, *American Journal of Health Economics* 1(2105): 399-431.

Leemore Dafny, Jonathan Gruber, and Christopher Ody, More Insurers Lowers Premiums: Evidence from Initial Pricing in the Health Insurance Marketplaces, *American Journal of Health Economics* 1(2015): 53-81.

Craig Garthwaite, Tal Gross, and Matthew Notowidigdo, Public Health Insurance, Labor Supply, and Employment Lock, *Quarterly Journal of Economics* (2014): 653-696.

Gary Solon, Steven Haider, and Jeffrey Wooldridge, What are We Weighting For? NBER w18859, Feb. 2013.

Karen Callaghan and Jie Chen, Revisiting the Collinear Data Problem: An Assessment of Estimator "Ill-Conditioning" in Linear Regression, *Practical Assessment, Research & Evaluation* 13(2008): 1-6.

III. Qualitative dependent variables (Feb. 16, 23)

A. Linear probability, probit, and logit models
B. Ordered probit / logit models
C. Unordered multinomial response models

Andrew Jones, *Applied Econometrics for Health Economists* ("Jones"), Chapters 2-5.

Ronen Avraham and Max Schanzenbach, The Impact of Tort Reform on Intensity of Treatment: Evidence from Heart Patients, *Journal of Health Economics* 39(2015): 273-288.

Neale Mahoney, Bankruptcy as Implicit Health Insurance, *American Economic Review* 105(2015): 710-746.

Mauro Laudicella, Paolo Li Donni, and Peter Smith, Hospital Readmission Rates: Signal of Failure or Success, *Journal of Health Economics* 32(2013): 9-21.

Ethan Katz, Bias in Conditional and Unconditional Fixed Effects Logit Estimation, *Political Analysis* 9(2001): 379-384.

IV. Count data (Mar. 1)

A. Poisson and negative binomial models
B. Zero inflated models

Eric Budish, Benjamin Roin, and Heidi Williams, Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials, *American Economic Review* 105 (2015): 2044-2085.

Jones, Chapter 9.

V. Modeling health expenditures (Mar. 15)

A. Two-part models vs. sample selection models
B. GLM
C. Nonlinear models with endogeneity
D. Quantile regression

Jones, Chapters 6-8, 11.

(Optional further background – not for the faint of heart: Borislava Mihaylova, et al., Review of Statistical Methods for Analyzing Healthcare Resources and Costs, *Health Economics,* August 21, 2010; and Steven Hill and G. Edward Miller, Health Expenditure Estimation and Function Form: Applications of the Generalized Gamma and Extended Estimating Equations Models, *Health Economics,* 2009.)

Melinda Buntin and Alan Zaslavsky, Too Much Ado about Two-Part Models and Transformation? Comparing Methods of Modeling Medicare Expenditures, *Journal of Health Economics* 23 (2004): 525-542.

David Powell and Dana Goldman, Disentangling Moral Hazard and Adverse Selection in Private Health Insurance, NBER working paper 21858, January 2016.

VI. Survival/duration analysis (March 22)

A. Survival, hazard, and cumulative hazard functions
B. Proportional hazard models

Jones, Chapter 10.

Andrew Wilper, et al., Health Insurance and Mortality in US Adults, *American Journal of Public Health* 99 (2009).

Marco Huesch, External Adjustment Sensitivity Analysis for Unmeasured Confounding: An Application to Coronary Stent Outcomes, *Health Services Research* (2013).

VII. Other methods and student article presentations (Mar. 29, April 5, 12)

A. Regression discontinuity analysis
B. Matching and propensity score methods
C. Each student presents a paper he or she chooses
D. Randomization in health care / medical research – Mark Neuman (April 12)

Michael Anderson, Carlos Dobkin, and Tal Gross, The Effect of Health Insurance on Emergency Department Visits: Evidence from an Age-Based Eligibility Threshold, *Review of Economics & Statistics* 96(2014): 189-195.

Sylvia Helena Barcellos and Mireille Jacobson, The Effects of Medicare on Financial Risk and Financial Strain, *American Economic Journal—Economic Policy* 7 (2015): 41-70.

Melissa Garrido, et al., Methods for Constructing and Assessing Propensity Scores, *Health Services Research* 49(2014): 1701-1720.

VIII. Special topics (April 19)

Amanda Starc and Robert Town, Internalizing Behavioral Externalities: Benefit Integration in Health Insurance, NBER working paper no. 21783 – Amanda will present

Bianca Frogner, H.E. Frech III, and Stephen Parente, Comparing Efficiency of Health Systems Across Industrialized Countries: A Panel Analysis, *BMC Health Services Research* 15(2015).

IX. Data analysis presentations (April 26)

X. Final Exam, date and time to be arranged