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 models of treatment effects, including 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/1231358). 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 one paper from those starred on the reading list and one 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. 21)

A. Classical estimation and testing
B. Regression 101
C. Panel data utopia

II. Introduction to dealing with selection, standard errors, weighting, and identifying ill-conditioned data (Jan. 28, Feb. 4)

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?

Phillip Levine, Parental Involvement Laws and Fertility Behavior, *Journal of Health Economics* 22 (2003): 861-878.

Amy Finkelstein and Robin McKnight, What Did Medicare Do? The Initial Impact of Medicare on Mortality and Out of Pocket Spending, *Journal of Public Economics* 92(2008): 1644-1668.

Mark McClellan, B. McNeil, and Joseph Newhouse, Does More Intensive Treatment of AMI in the Elderly Reduce Mortality: Analysis Using Instrumental Variables, *Journal of the American Statistical Association* 272(1994).

*Amalia Miller and Catherine Tucker, Can Information Technology Save Babies? *Journal of Political Economy* 119 (2011).

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. 11, 18)

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.

Katherine Baicker, et al., The Oregon Experiment – Effects of Medicaid on Clinical Outcomes, *New England Journal of Medicine* 168 (2013), including Supplemental Appendix (especially pp. 1-13).

Robert Weathers II and Michelle Stegman, The Effect of Expanding Access to Health Insurance on the Health and Mortality of Social Security Disability Insurance Beneficiaries, *Journal of Health Economics* 31(2012): 863-875.

*Neale Mahoney, Bankruptcy as Implicit Health Insurance, NBER w18105, May 2012.

*Andrew Sfekas, Is There a Medicaid Penalty? The Effect of Hospitals' Medicaid Population on Their Private Payer Market Share, *Health Economics* 22(2013): 1360-1376.

IV. Count data (Feb. 25)

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

Jones, Chapter 9.

*Darius Lakdawalla and Neeraj Sood, HIV Breakthroughs and Risky Sexual Behavior, *Quarterly Journal of Economics* 121 (2006): 1063-1102.

*Michael French, Hai Fang, and Ana Balsa, Longitudinal Analysis of Changes in Illicit Drug use and Health Services Utilization, *Health Services Research* 46 (2011): 877-899.

V. Modeling health expenditures (Mar. 4, 18)

A. Two-part models vs. sample selection models
B. GLM
C. Nonlinear models with endogeneity (uh-oh)
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.

Pinar Karaca-Mandic, Jean Abraham, and Kosali Simon, Is the Medical Loss Ratio a Good Target Measure for Regulation in the Individual Market for Health Insurance? *Health Economics* (2013).

Christopher Afendulis, Michael Chernew, and Daniel Kessler, The Effect of Medicare Advantage on Hospital Admissions and Mortality, NBER w19101, June 2013.

*Benjamin Le Cook and Willard Manning, Measuring Racial/Ethnic Disparities across the Distribution of Health Care Expenditures, *Health Services Research* 44 (2009): 1603-1621.

VI. Survival/duration analysis (March 25)

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 (April 1, 8, 15)

A. Regression discontinuity models
B. Matching and propensity score methods
C. Each student presents a paper she chooses

*****Michael Anderson, Carlos Dobkin, and Tal Gross, The Effect of Health Insurance Coverage on the Use of Medical Services, *American Economic Journal: Economic Policy* 4(2012): 1-27.

*Douglas Almond, Joseph Doyle, Amanda Kowalski, and Heidi Williams, Estimating the Marginal Returns to Medical Care: Evidence from At-Risk Newborns, *Quarterly Journal of Economics* (2010).

John Brooks and Robert Ohsfeldt, Squeezing the Balloon: Propensity Scores and Unmeasured Covariate Balance, *Health Services Research* 48(2013): 1487-1507.

(You might also take a look at Anirban Basu, Daniel Polsky, and Willard Manning, Estimating Treatment Effects on Healthcare Costs Under Exogeneity: Is There a Magic Bullet? *Health Services and Outcomes Research Methods* 11 (2011): 1-26.)

VIII. Special topics (TBA, April 22)

IX. Data analysis presentations (April 29)

X. Final Exam, date and time to be arranged