HCMG 900: ProSeminar in Health Services Research
Spring 2012
JMHH 304

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Overview

This course explores econometric methods widely used in health care research with a focus on "reduced form" applications in health economics. Concepts, applications, and practice are emphasized, as opposed to technical derivations of estimators and their properties. Methods covered include models of treatment effects; models with qualitative, limited, and transformed dependent variables; two-part, GLM, and sample selection models; count data and duration models; stochastic frontier models; regression discontinuity models; and matching / propensity score methods.

Prerequisites: Microeconomics, econometrics

Readings

The reading list consists of published articles and working papers, which should be read prior to class (approximately two papers per week). The papers are available on-line through PennText or posted on WebCafé. The course also will employ Andrew Jone's 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 WebCafé room, or you can buy a paperback copy. Useful econometric texts include W. Greene, *Econometric Analysis*; 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 HCMG and LDI visiting speaker seminars as requested and possible.

- Complete several hands-on data analysis assignments using data from the RAND Health Insurance Experiment or other sources (to be provided), preferably using *STATA*.

- Conduct an analysis of health-related data and present the results to the class.

- Present a brief evaluative summary in class of one paper from those starred on the reading list and one paper that you choose which is not on the reading list.

- Take a final exam.

Grading: Project – 30%; participation, assignments, and presentation – 40%; final – 30%

Course Outline and Readings

I. Course introduction and background / review on research methodology and estimation (Jan. 17)

    A.   Introduction to estimation and testing; review of basic linear regression
    B.   Panel data estimation
    C.   Difference-in-difference (D-D) analysis
    D.   D-D with panel data

Hanming Fang and Alessandro Gavazza, Dynamic Inefficiencies in an Employment-Based Health Insurance System: Theory and Evidence, *American Economic Review* 101 (2011); 3047-3077.

II. Introduction to dealing with selection, getting standard errors right, and miscellaneous helps (Jan. 24 and 31)

    A.   Instrumental variables estimation
    B.   Standard errors (WLS, grouped data)
    C.   Potential outcomes framework and implications
    D.   Diagnosing collinearity and influential observations

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

*Jason Fletcher, Social Interactions and Smoking: Evidence Using Multiple Student Cohorts, Instrumental Variables, and School Fixed Effects," *Health Economics* 19 (2010): 466-484.

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

Robert LaLonde, Evaluating the Econometric Evaluations of Training Programs with Experimental Data, *American Economic Review* (1986): 604-620.

Joshua Angrist and J-S Pischke, The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con Out of Econometrics, *Journal of Economic Perspectives* 24 (2010): 3-30.

III. Qualitative dependent variables (Feb. 7, 14)

    A.   Binary response models
    B.   Ordered multiple response models
    C.   Unordered multinomial response models

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

*Amy Davidoff, Linda Blumberg, and Len Nichols, State Health Insurance Market Reforms and Access to Insurance for High-Risk Employees, *Journal of Health Economics* 24 (2005): 725-750.

*Alan Krueger and Illyana Juziemko, The Demand for Health Insurance Among Uninsured Americans: Results of a Survey Experiment and Implications for Policy, NBER Working Paper No. 16978, April 2011.

*John Cawley, Asako Moriya, and Kosali Simon, The Impact of the Macroeconomy on Health Insurance Coverage: Evidence from the Great Recession, NBER Working Paper No. 17600, November 2011.

Bryan Dowd, et al., Health Plan Enrollment and Mortality in the Medicare Program, *Health Economics*, June 21, 2010.

IV. Limited and transformed dependent variables (Feb. 21, 28)

A. Modeling health expenditures with two-part and GLM models
B. Choosing a model
C. Sample selection models
D. Nonlinear models with endogenous variables
E. Quantile regression

Jones, Chapters 6-8, 11.

(Optional further background: 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.

Joseph Terza, Anirban Basu, and Paul Rathouz, Two-State Residual Inclusion Estimation: Addressing Endogeneity in Health Econometric Modeling, *Journal of Health Economics* 27 (2008): 531-543.

*David Madden, Sample Selection Versus Two-Part Models Revisited: The Case of Female Smoking and Drinking, *Journal of Health Economics* 27 (2008): 300-307.

*Dhaval Dave, Jennifer Tennant, and Gregory Coleman, Isolating the Effect of Major Depression on Obesity: Role of Selection Bias, NBER Working Paper No. 17068, May 2011.

*Christoph Schmidt and Harald Tauchmann, Heterogeneity in the Intergenerational Transmission of Alcohol Consumption: A Quantile Regression Approach, *Journal of Health Economics.* October 8, 2010.

V. Count data models (March 13)

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.

VI. Survival/duration analysis (March 20)

A. Survival, hazard, and cumulative hazard functions
B. Nonparametric methods
C. Proportional hazard models
D. Parametric models

Jones, Chapter 10.

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

*Paul Frijters, et al., Childhood Conditions and Length of Life: Evidence from the UK Boyd Orr Cohort: 1937-2005, *Journal of Health Economics* 29 (2010): 39-47.

VII. Other methods (March 27, April 3, or TBA)

    A.   Regression discontinuity models
    B.   Stochastic frontier models
    C.   Matching and propensity score methods (Jeff Silber, date tba)

**Christopher David Card and Carlos Dobkin, The Effect of Alcohol Consumption on Mortality: Regression Discontinuity Evidence from the Minimum Drinking Age, *American Economic Journal: Applied Economics* 1 (2009): 164-182.

Michael Rosko and Ryan Mutter, Stochastic Frontier Analysis of Hospital Inefficiency: A Review of Empirical Issues, *Medical Care Research and Review* 65 (2008): 131-166.

Daniel McCaffrey, et al., Marijuana Use and High School Dropout: The Influence of Unobservables, *Health Economics* 19 (2010): 1281-1299.

Jeffrey Smith and Petra Todd, Does Matching Overcome LaLonde's Critique of Nonexperimental Estimators, *Journal of Econometrics* 125 (2005): 305-353.

*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 (April 10, 17)

    A.   Testing for adverse selection
    B.   Health insurance market competition

(Background: Alma Cohen and Peter Siegelman, Testing for Adverse Selection in Insurance Markets, NBER working paper 15586, December 2009.)

*Hanming Fang, Michael Keane, and Dan Silverman, Sources of Advantageous Selection: Evidence from the Medigap Insurance Market, *Journal of Political Economy* 116 (2008): 303-350.

*Jason Brown, Mark Duggan, Ilyana Kuziemko, and William Woolston, How Does Risk Selection Respond to Risk Adjustment? Evidence from the Medicare Advantage Program, NBER Working Paper No. 16977, April 2011.

*Leemore Dafny, Mark Duggan, and Subramaniam Ramanarayanan, Paying a Premium on Your Premium? Consolidation in the U.S. Health Insurance Industry, *American Economic Review* (forthcoming). (Previous version: NBER Working Paper w15434, October 2009.)

Randall Cebul, et al., Unhealthy Insurance Markets: Search Frictions and the Cost and Quality of Health Insurance, *American Economic Review* 101 (2011): 1842-1871.

April 24:   **Data analysis presentations**