

**ECON 670 – FALL 2015**  
**SYSTEM AND PANEL ECONOMETRIC MODELS**  
**T-R 3:00-4:15PM Rm. 323 Cavanaugh Hall**  
**Course Syllabus**

- **Instructor:** Joseph Terza
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- **Office Hrs.:** Wednesday 9:30am-12:30pm, and by appointment
- **Course Website:** <https://oncourse.iu.edu/portal>
- **Prerequisite Course:**

E571. If you have not successfully completed E571 you *cannot be enrolled in this class*.

- **Software:** Stata 14<sup>®</sup>.
- **Exams, Homework and Grading:**

1. There will be four quarterly cumulative exams -- a midterm exam and a final. Your grade will be based on the average score on these four exams

- **Course objectives:**

There are three objectives of this course— 1) to introduce the student to the use of econometric methods for policy analysis and causal inference; 2) to introduce the student to the consequences of, and methodological remedies for, violations of the assumptions of the classical linear regression model; and 3) to achieve objectives 1 and 2 in applied contexts with “real world” datasets.

- **Academic Integrity Policy:**

Indiana University-Purdue University Indianapolis has a Code of Student Conduct, administered by the office of the Dean of Students. This Code sets standards for academic integrity at IUPUI for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism.

• **Topics to be Covered, Assigned Readings, and [Supplementary Reading]:**

**1. Introduction to Econometrics from a Policy Analytic Perspective including a Review of the Multiple Linear Regression Model (MLRM) in a Policy Analytic Context: Matrix Notation, Classical Assumptions, the Ordinary Least Squares (OLS) Estimator, Confidence Intervals and Hypothesis Testing.**

TE – Chapter 7

[GR – Chapter 2, Chapter 3 (3.1, 3.2), Chapter 4 (4.1 – 4.4, 4.6, 4.7), Chapter 5 (5.1 – 5.3), Appendix A

CT – Chapter 4 (4.1 – 4.4)]

**2. Violations of the Classical Linearity Assumption: Nonlinear Regression Models and M-Estimators.**

TE – Chapter 8

[GR – Chapter 6 (6.1 – 6.3), Chapter 11 (11.1 – 11.3 except for 11.2.4)

WO – Chapter 12 (12.1, 12.4, 12.7), Chapter 13 (13.1 – 13.3, 13.10)

CT – Chapter 5, Chapter 10]

**3. Violations of the Classical Normality Assumption: Fundamentals of the Theory of Asymptotic Inference for Econometrics, Asymptotic Theory for Nonlinear Models.**

TE – Chapter 9

[GR – Appendix D, Chapter 4 (4.9), Chapter 11 (11.2.4, 11.4, 11.6)

WO – Chapter 3, Chapter 4 (4.2), Chapter 12 (12.2, 12.3, 12.5, 12.6), Chapter 13 (13.4 – 13.6, 13.10)

CT – Appendix A

NM

WH – Chapters 1-6, especially Chapter 6]

**4. Discrete choice models: Binary Response Models (Probit, Logit), Ordered Response Models (Ordered Probit/Logit), Multinomial Response (Multinomial Logit, Nested Logit, Mixed Logit).**

TE -- Chapter 10

[GR – Chapter 23 (23.1 – 23.4, 23.10.1, 23.11.1 – 23.11.7)

WO – Chapter 15 (15.1 – 15.7, 15.9, 15.10)

CT – Chapter 14 (14.1 – 14.4), Chapter 15]

**5. Count-Valued Dependent Variable Models**

TE -- Chapter 16

[GR – Chapter 18 (18.4)

WO – Chapter 18 (18.2)

CT – Chapter 20]

**6. Sample Selection Models**

TE – Chapter 14

[GR – Section 24.5 (24.5.1 – 24.5.7)

WO – Chapter 17 (17.1 – 17.4)

CT – Chapter 16 (16.5 – 16.8)]

### **7. Limited Dependent Variable Models: Censored Data, Two-Part Models**

TE -- Chapter 11

[GR – Chapter 24 (24.1 – 24.3)

WO – Chapter 16 (16.1 – 16.7)

CT – Chapter 16 (16.1 – 16.4)]

### **8. Violations of the Classical Exogeneity Assumption: Linear and Nonlinear Estimation in the Presence of Endogenous Regressors**

TE -- Chapter 12

[GR -- Chapter 12 (12.1 – 12.7), 23.7

WO – 15.7 (15.7.1 – 15.7.3)

CT -- Chapter 6 (6.1, 6.2, 6.4)]

### **9. Generalized Method of Moments (GMM) Estimation for Nonlinear Models with Endogenous Regressors**

TE – Chapter 13

[GR – Chapter 15, 16.6

WO – Chapter 14 (14.1 – 14.3, 14.5)

CT – Chapter 6 (6.3, 6.5, 6.6)]

### **10. Specification and Estimation of Endogenous and Heterogeneous Policy Effects**

TE -- Chapter 15

HVa

HVb

[HUV

BA]

### **• Texts and Readings for This Course:**

#### **The Assigned Text for this Course is:**

(TE) Terza, J.V. (2015): *Econometric Methods for Health Policy Analysis and Health Services Research*, unpublished.

#### **Supplementary Readings from Econometrics Texts:**

(GR) Greene, W.H. (2012): *Econometric Analysis, 7<sup>th</sup> Ed.*, Upper Saddle River, NJ: Pearson Prentice-Hall

(WO) Woodridge, J.M. (2010): *Econometric Analysis of Cross Section and Panel Data, 2<sup>nd</sup> Ed.*, Cambridge, MA: MIT Press.

(CT) Cameron, A.C. and Trivedi, P.K. (2005): *Microeconometrics: Methods and Applications*, New York: Cambridge University Press.

(WH) White, H. (1994): *Estimation, Inference and Specification Analysis*, New York: Cambridge University Press.

### **Supplementary Readings from Journal Articles and Working Papers:**

(BA) Basu, A., Heckman, J.J.; Navarro-Lozano, S, and Urzua, S. (2007): "Use of Instrumental Variables in the Presence of Heterogeneity and Self-Selection: An Application to Treatments of Breast Cancer Patients," *Health Economics*, 16, 1133-57.

(HUV) Heckman, J. J.; Urzua, S., and Vytlacil E.J. (2006): "Understanding Instrumental Variables in Models with Essential Heterogeneity," *Review of Economics and Statistics*, 88, 389-432.

(HVa) Heckman J.J., Vytlacil E.J. (2007): "Econometric Evaluation of Social Programs, Part I: Causal Models, Structural Models and Econometric Policy Evaluation, Chapter 70" *Handbook of Econometrics, Vol 6B*, Ed. J. Heckman and E. Leamer, Amsterdam: Elsevier, 4779-4874.

(HVb) Heckman J.J., Vytlacil E.J. (2007): "Econometric Evaluation of Social Programs, Part II: Using the Marginal Treatment Effect to Organize Alternative Econometric Estimators to Evaluate Social Programs, and to Forecast Their Effects in New Environments, Chapter 71" *Handbook of Econometrics, Vol 6B*, Ed. J. Heckman and E. Leamer, Amsterdam: Elsevier, 4875-5143.

(NM) Newey, W.K. and McFadden, D. (1994): "Large Sample Estimation and Hypothesis Testing," in *Handbook of Econometrics, Volume 4*, Engel, R.F. and McFadden, D. eds., Amsterdam: North Holland, 2111-2245.