

Business 326  
Introduction to Econometrics

Autumn Quarter, 1994  
Mr. Zellner

### Course Information

Business 326 course meetings will be held on Tuesdays, 6:00-9:00 PM in Rosenwald Hall, Room 15. The course is designed to give students an introduction to econometric methods and their applications to business and economic problems. There will be mid-quarter and end-of-quarter examinations. In addition, problem sets will be assigned that will be discussed at weekly problem section meetings (to be arranged) with Jeff Currie, Teaching Assistant who will assist you with computer programs, data bases, etc.

The text for the course is: D.N. Gujarati, *Basic Econometrics* (2nd ed.), McGraw Hill, 1988, denoted DNG below. Also, papers included in the Bus 326 Course packet will be assigned for reading.

Office Hours: Mondays, 1:30-3:00, Ro 205D and by appt.

Email: FAC\_AZELLNER@GSBVAX.UCHICAGO.EDU (for pressing questions)

### Course Topics and Reading Assignments

#### I. Econometrics and Business

##### A. Definition of Econometrics

1. Measurement, Data, Economic and Business Theory, Statistics and Computers
  - a. Accuracy of measurements (Get the Facts!)
  - b. Measurement without theory and theory without measurement
  - c. Usual, unusual and ugly facts
  - d. Data  $\leftrightarrow$  Theory
2. Objectives: Learning from Data and Experience and Solving Practical Problems
  - a. Generalizations and models that are reliable in explanation, prediction and solution of practical problems
    - (1) KISS (keep it sophisticatedly simple)
3. Examples of Econometric Analyses in Business
  - a. What is the problem?
  - b. Why is it important?
  - c. How can the problem be solved?

*Readings:* DNG, 1-9

A. Zellner, "The Philosophy and Objectives of Econometrics"  
"Statistical Analysis of Econometric Models" \* Section 1.2.14 Comments  
and Rejoinder.

Background references: R.J. Epstein, *A History of Econometrics*, North-  
Holland, 1987, and M.S. Morgan, *The History of Econometric Ideas*,  
Cambridge U. Press, 1990.

## II. Econometric Models for One or Two Variables

### A. Models to Represent "Random Variation"

("All variation is random unless shown otherwise.")

1. Random sequences and random walk models for stock prices and exchange rates
2. Coin-flipping and forecasting turning-points
3. "Bench-mark" models

### B. Simple Correlation ( $x \leftrightarrow y$ ) and Two Variable or Simple Regression ( $x \rightarrow y$ ) with Applications

1. Correlation, regression and causation
2. Interpretation of correlation and regression models
  - a. "Descriptive" versus "Causal"

*Readings:* DNG, Chs. 1-2

A. Zellner, "Notes on Simple Correlation and Regression"

A. Zellner, "Some Properties of the Durations of Economic Expansions  
and Contractions."

F.X. Diebold, "Are Long Expansions Followed by Short Contractions?\*"

### C. Estimation of Parameters and Goodness of Fit

1. Random walk models
2. Two variable regression
3. Methods of estimation
  - a. Least-squares, etc.
  - b. Maximum-likelihood
  - c. Bayes
  - d. Bayesian and Non-Bayesian Method of Moments

\*Included in Course Packet.

### 4. Properties of estimates and estimators

*Readings:* DNG, Chs. 3-4

### D. Random Walk and Two Variable Regression Model: Interval Estimation, Hypothesis Testing and Prediction

*Readings:* DNG, Chs. 5-6

A. Zellner and B.R. Moulton, "Bayesian Regression Diagnostics with  
Applications to International Consumption and Income Data."\*

## III. Multiple Regression Model and Applications ( $x_1, x_2, \dots, x_k \rightarrow y$ )

- A. Interpretation of model and its assumptions
- B. Estimation and testing procedures
- C. Prediction procedures

*Readings:* DNG, Chs. 5-6

D.A. Conway and H.V. Roberts, "Reverse Regression, Fairness and  
Employment Discrimination."\*

## IV. Special Problems in Regression Analysis

Multicollinearity

Autocorrelation

Left-out variables and faulty functional form

Time-series complications

Heteroscedasticity

Unobserved variables and measurement errors

Simultaneous-equation problems

*Readings:* DGN, Chs. 10-13

## V. Special Topics and Other Important Models

- A. Dummy Variables and Functional Forms for Relations
- B. Logit and Probit Models for Discrete Random Variables  
( $y = 1$  buy;  $y = 0$  don't buy, etc.)
- C. Two-Part Models

\*Included in Course Packet.

**Readings:** DGN, Chs. 14-15

Y. Mundlak, "Empirical Production Function Free of Management Bias."

D. Autoregressive, Distributed Lag and Forecasting Models

**Readings:** DGN, Ch. 16

A. Garcia-Ferrer, et al., "Macroeconomic Forecasting Using Pooled International Data."

A. Zellner and C. Hong, "Forecasting International Growth Rates Using Bayesian Shrinkage and Other Procedures."

VI. Simultaneous Equation Model

- A. Interpretation of Model and Examples
- B. Identification Problem
- C. Estimation, Testing and Prediction Procedures
- D. Applications and Evaluation

**Readings:** DGN, Chs. 17-19

A. Zellner and S.C. Peck, "Simulation Experiments with a Quarterly Macroeconometric Model of the U.S. Economy," in A. Zellner, *Basic Issues in Econometrics*, U. of Chicago Press 1984.

S.K. McNees, "Forecasting Accuracy of Alternative Techniques: A Comparison of U.S. Macroeconomic Forecasts," *Journal of Business and Economic Statistics* 4 (1986), 5-15.

VII. Summary and Overview

**Readings:** A. Zellner, "Past, Present and Future of Econometrics," Invited Address Notre Dame U., 1991.

**Additional General References**

E.R. Berndt, *The Practice of Econometrics*, Addison-Wesley, 1990.

W.H. Greene, *Econometric Analysis*, Macmillan, 2nd ed., 1993.

Z. Griliches and M. Intriligator, *Handbook of Econometrics*, Vols. I-III, North-Holland, 1983, 1984 and 1986.

J. Johnston, *Econometric Methods*, 3rd ed., McGraw-Hill, 1984.

G.G. Judge et al., *The Theory and Practice of Econometrics*, 2nd ed., Wiley, 1985.

G.S. Maddala, *Introduction to Econometrics* (2nd ed.), Macmillan, 1992.

A. Zellner, *An Introduction to Bayesian Inference in Econometrics*, Wiley, 1971 (reprinted by Krieger, 1987).

A. Zellner, *Basic Issues in Econometrics*, U. of Chicago Press, 1984.

\*Included in Course Packet.