

# **ECONOMETRIC METHODS I**

**AEB 6571**

Spring 2007

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392-1881 x 316

## **Purpose and Objectives**

The purpose of the course is to introduce the student to current econometric methods and the underlying econometric theory in preparation for empirical research. Least squares procedures are studied, including hypothesis testing, limitations of the standard linear model and alternative estimation approaches. Consideration is also given to nonlinear models, maximum likelihood methods, simultaneous equation models, and limited dependent variable models.

## **Grading**

Mid-term examination February 27	25%
Problem sets	15%
Term paper	30%
Final examination May 3 – 3:00-5:00pm	30%

## **Office Hours**

G-83 McCarty Mon. & Wed.	3:00-4:30
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## **Web Site**

The course will utilize the WebCT Vista facility <<http://lss.at.ufl.edu/>> on campus. This syllabus and all other information pertaining to the course are posted at this site. All class assignments will be posted at the site.

## **Problem Sets**

There will be periodic problem sets. You are to use the Gauss software for the calculations. The Gauss Light software is available for download for free; instructions are on the course web site. (The full version of Gauss is available on the FRE network.) There are links to tutorials on the course web site. You are advised to work on the problems in small groups, but you are to write up your own individual results and solution to be turned in.

## University of Florida Policies and Student Assistance

### Academic Honesty

Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the **Honor Code**:

*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

Failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.

### UF Counseling Services

Resources are available on campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. [University Counseling Center](#), 301 Peabody Hall, 392-1575, personal and career counseling;
2. [Student Mental Health](#), Student Health Care Center, 392-1171, personal counseling;
3. [Center for Sexual Assault/Abuse Recovery Education \(CARE\)](#), Student Health Care Center, 392-1161, sexual assault counseling; and
4. [Career Resource Center](#), Reitz Union, 392-1601, career development assistance and counseling.

### Computing

All faculty, staff and students of the University are governed by the [Acceptable Use Policy](#) as set forth by the UF Office of Information Technology.

**Text**

Greene, William H. *Econometric Analysis*, 5<sup>th</sup> ed. Upper Saddle River, NJ: Prentice Hall, 2003.

**Recommended Supplement**

Kennedy, Peter. *A Guide to Econometrics*, 5<sup>th</sup> ed. Cambridge: MIT Press, 2003.

**Additional Text References**

Abadir, Karim M., and Jan R. Magnus. *Matrix Algebra*. New York: Cambridge University Press, 2005.

Amemiya, Takeshi. *Advanced Econometrics*. Cambridge: Harvard University Press, 1985.

Amemiya, Takeshi. *Introduction to Statistics and Econometrics*. Cambridge: Harvard University Press, 1994.

Cameron, A. Colin, and Pravin K. Trivedi. *Microeconometrics: Methods and Applications*. New York: Cambridge University Press, 2005.

Davidson, Russell, and James G. MacKinnon. *Estimation and Inference in Econometrics*. New York: Oxford University Press, 1993.

Deaton, Angus. *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*. Baltimore, MD: World Bank by Johns Hopkins University Press, 1997.

Gallant, A. R. *Nonlinear Statistical Models*. New York: Wiley, 1987.

Goldberger, Arthur S. *Econometric Theory*. New York: John Wiley & Sons, 1964.

Goldfeld, S. M. and R. E. Quandt. *Nonlinear Methods in Econometrics*. Amsterdam: North-Holland Publishing Co., 1972.

Griliches, Zvi and Michael D. Intriligator. [\*Handbook of Econometrics. Vol. 1-5\*](#). Amsterdam: North-Holland, 1983.

Harvey, Andrew C. *Time Series Models*. 2nd ed. Cambridge, Mass.: MIT Press, 1993.

Harville, David A. *Matrix Algebra from a Statistician's Perspective*. New York: Springer, 1997.

- Hill, R. Carter. *Learning Econometrics Using GAUSS: A Computer Handbook to Accompany Introduction to the Theory and Practice of Econometrics*, sec. ed. New York: John Wiley and Sons, Inc., 1989.
- Johnston, J., and John DiNardo. *Econometric Methods*, 4th ed. New York: McGraw Hill, 1997.
- Judge, George G., R. Carter Hill, W. E. Griffiths, Helmut Lütkepohl, and Tsoung-Chao Lee. *Introduction to the Theory and Practice of Econometrics*, Second ed. New York: John Wiley & Sons, 1988.
- Judge, George G., W. E. Griffiths, R. Carter Hill, Helmut Lütkepohl, and Tsoung-Chao Lee. *The Theory and Practice of Econometrics*, Second ed. New York: John Wiley & Sons, 1985.
- Maddala, G. S. *Introduction to Econometrics*, 2<sup>nd</sup> ed. New York: Macmillan, 1992.
- Maddala, G. S. *Limited-Dependent and Qualitative Variables in Econometrics*. New York: Cambridge, 1983.
- Nerlove, Marc, David M. Grether, and Jose L. Carvalho. *Analysis of Economic Time Series: A Synthesis*. Revised edition. San Diego: Academic Press, 1995.
- Press, William H., Brian P. Flannery, Saul A. Teukolsky, and William T. Vetterling. *Numerical Recipes: The Art of Scientific Computing*. New York: Cambridge University Press, 1986.
- Ruud, Paul A. *An Introduction to Classical Econometric Theory*. New York: Oxford University Press, 2000.
- Theil, H. *Principles of Econometrics*. New York: John Wiley and Sons, 1971.
- Wooldridge, Jeffrey. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Mass.: The MIT Press, 2002.

The recommended readings are the references to the text, Greene, plus those with an asterisk. Other listed readings are to clarify or augment Greene as you wish.

## I. Introduction

- Greene, ch. 1; Appendices A-E for review  
 Abadir & Magnus. *Matrix Algebra*.  
 Cameron & Trivedi, Ch. 1-3.  
 Fuchs, Victor R., Alan B. Krueger, and James M. Poterba. Economists' Views about Parameters, Values and Policies: Survey Results in Labor and Public Economics, *J. Econ. Lit.* 36(1998):1387-1425.  
 Harville, D.A. *Matrix Algebra from a Statistician's Perspective*  
 \*Heckman, J.J. [Causal Parameters and Policy Analysis in Economics: A Twentieth Century Retrospective](#), *Quart. J. Econ.* 115(Feb. 2000):45-97.  
 Heckman, J.J. [Micro Data, Heterogeneity, and the Evaluation of Public Policy: Nobel Lecture](#), *J. Polit. Econ.* 109(Aug. 2001):673-748.  
 Intriligator, Economic and Econometric Models, in Griliches and Intriligator, *Handbook of Econometrics*, vol. 1.  
 Kennedy, ch. 1  
 Kreuger, Alan B. Symposium on Econometric Tools, *J. Econ. Perspectives.* 15(Fall 2001):3-11.  
 Maddala, *Introduction*, pp. 1-8  
 \*McCullough, B.D. [Econometric Software Reliability: Eviews, LIMDEP, Shazam, and TSP](#), *J. Applied Econometrics* 14(1999):191-202.  
 \*McCullough, B.D. and H. D. Vinod. [The Numerical Reliability of Econometric Software](#), *J. Econ. Lit.* 37(1999):633-65.  
 McCullough, B. D. and H. D. Vinod. Verifying the Solution from a Nonlinear Solver: A Case Study, *American Economic Review* 93(2003):873-892.  
 Shachar, Ron and Barry Nalebuff. Comment, *American Economic Review* 94(2004):382-390.  
 McCullough, B.D., and H. D. Vinod. Reply, *American Economic Review* 94(2004):391-396.  
 Drukker, D.M., and V. Wiggins. Comment, *American Economic Review* 94(2004):397-399.  
 McCullough, B.D., and H. D. Vinod. Reply, *American Economic Review* 94(2004):400-403.  
 Theil, pp. 1-6  
 Vinod, H.D. [Review of Gauss for Windows, Including its Numerical Accuracy](#), *J. Applied Econometrics* 15(2000):211-220.  
 \*Zellner, A. [Philosophy and Objectives of Econometrics](#), *J. Econometrics* 136(2007):331-339.

## II. Least squares estimation

- Greene, ch. 2-4  
 Amemiya, pp. 81-151  
 Cameron & Trivedi, 4.1-4.4  
 Davidson & MacKinnon, ch. 4  
 \*Griliches, Economic Data Issues, ch. 25 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 3  
 Johnston & DiNardo, ch. 3  
 Judge, et al., *Introduction*, ch. 5  
 Judge, et al., *Theory*, ch. 2  
 Kennedy, ch. 2,3  
 Krasker, et al., Estimation for Dirty Data and Flawed Models, ch. 11 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 1  
 Maddala, *Introduction*, ch. 4,7  
 Press, et al., pp. 52-54  
 Theil, ch. 3

## III. Large sample results and alternative estimators

- Greene, ch. 5  
 Bound, Brown, & Mathiowetz, Measurement Error in Survey Data, in *Handbook of Econometrics*, v. 5, ch. 59  
 Cameron & Trivedi, ch. 26 & 27  
 Kennedy, ch. 9; App. C  
 Maddala, *Introduction*, ch. 11  
 Newey & McFadden, Large Sample Estimation and Hypothesis Testing, in *Handbook of Econometrics*, v. 4, pp. 2111-2245  
 Stock & Trebbi, Retrospectives: Who Invented Instrumental Variable Regression? *Journal of Econ. Perspectives* 17(2003):177-194  
 Wooldridge, ch. 5

## IV. Inference and prediction

- Greene, ch. 6  
 Amemiya, pp. 20-26, 31-38  
 Cameron & Trivedi, Ch. 7  
 Johnston & DiNardo, pp. 86-100  
 Judge, *Introduction*, ch. 6  
 Kennedy, ch. 4  
 Maddala, *Introduction*, ch. 4  
 Stock & Watson, Forecasting Output and Inflation: The Role of Asset Prices, *J. Econ. Lit.*, 41(2003):788-829

## V. Model specification

- Greene, ch. 7, 8  
 Andrews, D. W. K., End-of-Sample Instability Tests, *Econometrica*, 71(2003):1661-1694.  
 Cameron & Trivedi, Ch. 8  
 Davidson & MacKinnon, ' 6.5, 7.9, 11.3, 11.4  
 Godfrey, L. G. *Misspecification Test in Econometrics*. New York: Cambridge University Press, 1988.  
 Hansen, Bruce E. The New Econometrics of Structural Change: Dating Breaks in U.S. Labor Productivity, *J. Econ. Perspectives* 15(Fall 2001)117-128.  
 Hausman, J. [Specification Tests in Econometrics](#), *Econometrica* 46, 1978, pp. 1251-1271.  
 Johnston & DiNardo, ch. 4  
 Kennedy, ch. 5,14  
 Leamer, Model Choice and Specification Analysis, ch. 5 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 1  
 Maddala, *Introduction*, ch. 12  
 Piehl, Testing for Structural Breaks in the Evaluation of Programs, *Rev. Econ. & Stat.* 85(2003):550-558.  
 Theil, pp. 548-51

## VI. Nonlinear estimation

- Greene, ch. 9, 17  
 Amemiya, Non-linear Regression Models, ch. 6 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 1  
 Berndt, et al., Estimation and Inference in Nonlinear Structural Models, *Annals of Economic and Social Measurement*, 3/4, 1974, pp. 653-665.  
 Cameron & Trivedi, Ch. 5  
 Davidson & MacKinnon, 3.6, 6.3, 8.9  
 Gallant  
 Judge, et al., *Introduction*, ch. 12  
 Judge, et al., *Theory*, ch. 6  
 Kennedy, pp. 109-112  
 McCullough, B. D. and H. D. Vinod. Verifying the Solution from a Nonlinear Solver: A Case Study, *American Economic Review* 93(2003):873-892.  
 Shachar, Ron and Barry Nalebuff. Comment, *American Economic Review* 94(2004):382-390.  
 McCullough, B.D., and H. D. Vinod. Reply, *American Economic Review* 94(2004):391-396.  
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McCullough, B.D., and H. D. Vinod. Reply, *American Economic Review* 94(2004):400-403.

Morey, Edward R. An Introduction to Checking, Testing, and Imposing Curvature Properties: The True Function and the Estimated Function, *Can. J. Econ.* 19(1986):207-235.

Murphy, Kevin M., and Robert H. Topel. Estimation and Inference in Two-Step Econometric Models, *J. Bus. Econ. Stat.* 3(1985):370-79.

Quandt, Computational Problems and Methods, ch. 12 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 1

## VII. Models with nonspherical disturbances

Greene, ch. 10

Johnston & DiNardo, pp. 162-66

Judge, et al., *Introduction*, ch. 8

Kennedy, pp. 133-136

### A. Heteroskedasticity

Greene, ch. 11

Amemiya, pp. 198-207

Deaton, ch. 2

Johnston & DiNardo, pp. 166-74

Judge, et al., *Introduction*, pp. 351-83

Judge, et al., *Theory*, ch. 11

Kennedy, pp. 136-139

Maddala, *Introduction*, ch. 5

White, H. [A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity](#), *Econometrica* 48(1980):817-838.

### B. Serial correlation

Greene, ch. 12

Johnston & DiNardo, pp. 174-95

Judge, et al., *Introduction*, pp. 384-410

Judge, et al., *Theory*, ch. 8

Kennedy, pp. 139-144

Maddala, *Introduction* ch. 6

## VIII. Distributed lag models

Greene, ch. 19

Hendry, et al., Dynamic Specification, ch. 18 in Griliches & Intriligator, *Handbook of Econometrics*, vol. 2



Judge, et al., *Introduction*, ch. 17  
 Judge, et al., *Theory*, ch. 9, 10  
 Kennedy, pp. 163-166  
 Maddala, *Introduction*, ch. 10

## **IX. Time-Series Models**

Greene, ch. 20  
 Davidson & MacKinnon, ch 19, 20  
 Engle, Robert. GARCH 101: The Use of ARCH/GARCH Models in Applied  
 Econometrics, *J. Econ. Perspectives*, 15(Fall 2001):157-168.  
 Maddala, *Introduction*, ch. 13, 14  
 Johnston & DiNardo, ch. 7,8  
 Judge, et al., *Introduction*, ch. 16  
 Kennedy, ch. 18  
 Nerlove, et al.  
 Harvey  
 Stock, J.H. Unit Roots, Structural Breaks and Trends, *Handbook of Econometrics*, v. 4.  
 Watson, M. Vector Autoregressions and Cointegration, *Handbook of Econometrics*, v. 4.

## **X. Limited dependent variable models**

Greene, ch. 21,22  
 Amemiya, pp. 267-354, 360-83  
 Cameron & Trivedi, Ch. 14, 15, 16, 17, 18, 19, 20  
 Heckman, Simple Estimators for Treatment Parameters in a Latent-Variable Framework,  
*Rev. Econ. & Stat.* 85(2003):748-755.  
 Heckman, James J., and Edward Vytlacil, Structural Equations, Treatment Effects, and  
 Econometric Policy Evaluation, *Econometrica* 73(2005):669-738.  
 Johnston & DiNardo, Ch. 13  
 Kennedy, ch. 15, 16  
 Maddala, *Introduction*, pp. 322-344  
 Maddala, *Limited Dependent and Qualitative Variables in Econometrics*, pp. 149-96  
 McFadden, Daniel. Economic Choices (Nobel Lecture). *Amer. Econ. Rev.* 91(June  
 2001):351-378.  
 McFadden, Econometric Analysis of Qualitative Response Models, ch. 24 in Griliches &  
 Intriligator, *Handbook of Econometrics*, vol. 2  
 Wooldridge, ch. 15-20.

**XI. Systems of equations**

- Greene, ch. 14  
 Aigner, et al., Latent Variable Models in Econometrics, ch. 23 in Griliches & Intriligator,  
*Handbook of Econometrics*, vol. 2  
 Judge, et al., *Introduction*, ch. 11  
 Judge, et al., *Theory*, ch. 12, 17  
 Theil, ch. 7

**XII. Simultaneous equations**

- Greene, ch. 15  
 Cameron & Trivedi, Ch. 2  
 Chow, Gregory C. A Two-Step Procedure for Estimating Linear Simultaneous Equations  
 with Unit Roots, *Rev. Econ. and Statistics* 75(1993):107.  
 Dhar, Chavas & Gould, An Empirical Assessment of Endogeneity Issues in Demand  
 Analysis for Differentiated Products, *AJAE* 85(2003):605-617  
 Haavelmo, T. The Statistical Implications of a System of Simultaneous Equations,  
*Econometrica* 11, 1943, pp. 1-12.  
 Hausman, Specification and Estimation of Simultaneous Equation Models, ch. 7 in  
 Griliches & Intriligator, *Handbook of Econometrics*, vol. 1  
 Ekeland, Ivar, James J. Heckman, and Lars Nesheim. [Identification and Estimation of  
 Hedonic Models](#), *JPE* 112(2004):S60-S109.  
 Johnston & DiNardo, pp. 305-18  
 Judge, et al., *Introduction*, ch. 14, 15  
 Judge, et al., *Theory*, ch. 14, 15  
 Kennedy, ch. 10  
 Maddala, *Introduction*, ch. 9  
 Manski, Identification Problems in the Social Sciences and Everyday Life, *S. J. Econ.*  
 70(2003):11-21  
 Pope & Just, Distinguishing Errors in Measurement from Errors in Optimization, *AJAE*  
 85(2003):348-358  
 Theil, ch. 9, 10