

Applied Econometrics, Econ 141-241

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Spring 2004

Course description: This course deals with empirical research in macroeconomics and international finance. The aim of the course is to provide the student with a series of tools for the empirical analysis of time-series, and to give the student a taste of the current empirical research in macroeconomics and international finance.

One of the aims of the course is to give the student a chance to pursue a small project and conduct simple empirical research, and we will use the econometrics package “E-views” for that purpose.

Pre-requisites: Econ 139, Econ 51, Linear Algebra

Books: Stock and Watson, Econometrics, Addison-Wesley, 2002 (required)
Diebold, Elements of Forecasting, South-Western 1998 (recommended)

Package: Eviews (available at the U-store)

Requirements: The grade will be based on course assignments (20%), a midterm exam (30%) and a final assignment (50%).

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Topics

1. Review of basic econometrics (Stock and Watson, chapters 4 and 5).
 - The linear regression model (univariate): Assumptions, theorems (LLN, CLT), test statistics (t-tests and F-tests).
 - Multivariate regressions
 - White heteroskedasticity robust standard errors
2. Introduction to Time Series Econometrics
 - Autocorrelation
 - Autoregressions and ADL models
 - Granger causality
3. Unit root tests: problems and solutions. Augmented Dickey Fuller test.
4. Structural breaks: problems and solutions. Chow and QLR tests.
5. Serial correlation: problems and solutions. HAC robust estimation.
6. Dynamic multipliers.
7. ARMA stationary models: mean, variance, autocorrelation calculations and impulse-response functions (Hamilton, Time Series Analysis, chapter 1)
8. VARs
 - a. Theoretical and estimation issues (Stock and Watson, chp. 14)
 - b. Impulse-responses and variance decompositions
 - c. Multi-period forecasting
 - d. Empirical Analysis: Forecasting and Policy Analysis with VARs (Stock and Watson, Vector Autoregressions, *Journal of Economic Perspectives* 1991).
9. Cointegration and VECM
 - a. Theoretical issues: tests for cointegration, estimation of cointegrating vectors (Stock and Watson, chp. 14)
 - b. ECM representation (notes)
10. GLS. Advantages and drawbacks relative to OLS. Elliott, Rothenberg and Stock (1996) test for unit roots. Cochrane Orcutt correction for serial correlation.
11. ARCH and GARCH
 - a. Theory
 - b. Empirical applications: Analysis of Financial Markets
12. Introduction to Monte Carlo simulations (in a problem set)
13. GMM estimation and relationship with Instrumental Variables and OLS (optional, together with a primer on Matlab).

Empirical Applications and References:

Unit roots and cointegration

Stock, J.S. and M.Watson (1988), "Variable Trends in Economic Time Series," *Journal of Economic Perspectives*, Vol 2, No. 3.

VAR estimation and Impulse-Response Functions:

Stock, J. H. and M.W. Watson, Vector Autoregressions (with James H. Stock), *Journal of Economic Perspectives*, Fall 2001

ARMA models

Hamilton, James, *Time Series Analysis*, Princeton University Press, chapter 1.

Forecasting:

Diebold, F.X. (1998), "[The Past and Present of Macroeconomic Forecasting](#)," *Journal of Economic Perspectives*, 12, 175-192.

Meese, R. A., and Kenneth Rogoff (1983a), "Empirical Exchange Rate Models of the Seventies: Do They Fit Out-Of-Sample?", *Journal of International Economics*, pp. 3-24.

ARCH-GARCH

Robert Engle, "GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics", *Journal of Economic Perspectives*, 15(4), Fall 2001.

GMM

Wooldridge, Jeffrey, "Applications of Generalized Method of Moments Estimation", *Journal of Economic Perspectives* 15(4), Fall 2001.