

**EC 821**  
**Time Series Econometrics**  
Spring 1996

Tuesday-Thursday 10:30-11:45  
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The general objective of this course is to give student a firm grounding in modern time series analysis, with an emphasis on applications of interest to macroeconomists. The course material consists mainly of chapters from the book by J.D. Hamilton *Time Series Analysis* (JH from now on). A recommended supplemental text is *Applied Econometrics* by W. Enders. Supplementary papers are also listed which apply the various techniques to investigate important issues in economics.

Grades will be assessed from problem sets (10%), midterm exam (30%), final exam (30%), and course paper (30%).

There will be one problem set approximately every third week. They will consist of a mixture of theory and applied problems.

The course paper should consist of an econometric application of your own design. When you pick a subject, it is important to consult the existing literature in the area. Theoretical papers tend to be published in *Econometrica*, *Econometric Theory*, and the *Journal of Econometrics*. Many applied papers in time series econometrics are published in the *Journal of Business and Economic Statistics*, the *Journal of Applied Econometrics*, the *Review of Economics and Statistics*. Applied macroeconomics papers are published quite broadly, many can be found in the following journals: *American Economic Review*, *Journal of Political Economy*, *Quarterly Journal of Economics*, *Journal of Monetary Economics*, *Journal of Money, Credit and Banking*.

## **1. Univariate Time Series and ARMA Models**

JH, Ch. 1-7  
Enders, Ch. 1-2

## **2. Spectral Density and Covariance Matrix Estimation**

JH, Ch. 6

Andrews, D.W.K. (1991), "Heteroskedasticity and Autocorrelation Consistent Covariance Matrix Estimation," *Econometrica*, 59, 817-858.

Andrews, D.W.K. and J.C. Monahan (1991), "Heteroskedasticity and Autocorrelation Consistent Covariance Matrix Estimation," *Econometrica*, 60, 953-966.

Newey, W.K. and K.D. West (1987), "A Simple, Positive-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix," *Econometrica*, 55, 703-708.

Newey, W.K. and K.D. West (1994), "Automatic Lag Selection in Covariance Matrix Estimation," *Review of Economic Studies*, 61, 631-653.

## **3. Multivariate Time Series and Vector Autoregressions**

JH, Ch. 10-11  
Enders, Ch. 5

Blanchard, O., and D. Quah (1989), "The Dynamic Effects of Aggregate Demand and Aggregate Supply Disturbances", *American Economic Review*, 79, pp. 655-673.

Gali, J. (19??), "How Well Does the AD/AS Model Fit Postwar U.S. Data?", *Quarterly Journal of Economics*.

Sims, C.A. (1980) "Macroeconomics and Reality," *Econometrica* 48, 1-48.

#### **4. Unit Roots**

JH, Ch. 15-17  
Enders, Ch. 4

Campbell, J. and P. Perron (1991), "Pitfalls and Opportunities: What Macroeconomists Should Know About Unit Roots," *NBER Macro Annual*, 1991.

Leybourne and McCabe (1994) "A consistent test for a unit root," *Journal of Business and Economic Statistics*, 157-166.

Perron, P. (1989) "The great crash, the oil price shock, and the unit root hypothesis," *Econometrica*, 1361-1401.

Zivot, E. and D. Andrews (1992) "Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis," *Journal of Business and Economic Statistics*, 251-270.

#### **5. Cointegration**

JH, Ch. 18-20  
Enders, Ch. 6

Shin, Y. (1994) "A residual-based test of the null of cointegration against the alternative of no cointegration," *Econometric Theory*, 91-115.

Stock, J. and M. Watson (1993) "A simple estimator of cointegrating vectors in higher order integrated systems," *Econometrica*, 783-820.

#### **6. Structural Change and Time-Varying Parameters**

JH, Ch. 13

Andrews, D. (1993) "Tests for parameter instability and structural change with unknown change point" *Econometrica*, 821-856.

Andrews, D. and V. Ploberger (1994) "Optimal tests when a nuisance parameter is present only under the alternative" *Econometrica*, 1383-1414.

Hansen, B. (1992) "Tests for parameter instability in regressions with I(1) processes," *Journal of Business and Economic Statistics*, 321-336.

Stock, J.H. and M.W. Watson (1995) "Evidence on structural instability in macroeconomic time series relations."

#### **7. Non-Linear Models of the Business Cycle**

Hamilton, J.D. (1989), "A new Approach to the Economic Analysis of Non-Stationary Time Series and the Business Cycle", *Econometrica*, 57, pp. 357-384.

Hansen, B. (1992) "The likelihood ratio test under nonstandard conditions: Testing the Markov switching model of GNP," *Journal of Applied Econometrics*, S61-S82.

Koop, G.K., and P. Beaudry (1993) "Do Recessions permanently Change Output?", *Journal of Monetary Economics*, 149-163..

Potter (1995) "A nonlinear approach to U.S. GNP," *Journal of Applied Econometrics*, 109-125.

Terasvirta, T., and H.M. Anderson (1992), "Characterizing Nonlinearities in Business Cycles Using Smooth Transition Autoregressive Models", *Journal of Applied Econometrics*, S119-S136.

## **8. ARCH**

JH Ch. 21

Enders, Ch. 3

Bollerslev, T., R.Y. Chou, and K. F. Kroner (1992), "ARCH Modeling in Finance: A Review of the Theory and Empirical Evidence", *Journal of Econometrics*, 52, 5, pp. 5-59.

Bollerslev, T. and R.F. Engle (1993) "Common Persistence in Conditional Variances," *Econometrica*, 61, 167-186.

## **9. Stochastic Volatility**

Harvey, A., E. Ruiz and N. Shephard, (1994) "Multivariate Stochastic Variance Models," *Review of Economic Studies*, 61, 247-264.

Jacquier, E., N.G. Polson, and P.E. Rossi, (1994) "Bayesian Analysis of Stochastic Volatility Models," (and comments), *Journal of Business and Economic Statistics*, 12, 369-418.

## **Supplemental Reading:**

### **A.1 Money and Income Causality**

Sims, C.A. (1972), "Money, Income and Causality", *American Economic Review*, pp. 540-552.

Christiano, L. and L. Ljungqvist (1988), "Money Does Granger Cause Output in the Bivariate Money Output Relation", *Journal of Monetary Economics*, 22, pp. 217-235.

Stock, J.H., and M.W. Watson (1989), "Interpreting the Evidence on Money-Income Causality," *Journal of Econometrics*, 40, pp. 161-181.

### **A.2 Test of the Life Cycle-Permanent Income Hypothesis**

Hall, R.E. (1978), "Stochastic Implications of the Life Cycle, Permanent Income Hypothesis: Theory and Evidence", *Journal of Political Economy*, 86, pp. 971-987.

Mankiw, N.G., and M. D. Shapiro (1985), "Trends, Random Walks, and Tests of the permanent Income Hypothesis", *Journal of Monetary Economics*, 16, pp. 165-174.

Campbell, J. Y. (1987), "Does Saving Anticipate Declining Labor Income? An Alternative Test of the Permanent Income Hypothesis", *Econometrica*, 55, pp. 1249-1273.

Stock, J.H., and K.D. West (1988), "Integrated Regressors and Tests of the Permanent Income Hypothesis", *Journal of Monetary Economics*, 21, pp. 85-96.

Campbell, J. Y. and N. G. Mankiw (1989), "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence", *NBER Macroeconomic Annual*, Cambridge, Ma., MIT Press.

### **A.3 Asset Returns**

Hansen, L.P., and K.J. Singleton (1983), "Stochastic Consumption, Risk Aversion, and the Temporal Behavior of Stock Market Returns", *Journal of Political Economy*, 91, 2, April, pp. 249-265.

Campbell, J.Y., and R.J. Shiller (1987), "Cointegration and Tests of Present Value Models", *Journal of Political Economy*, 95, October, pp. 1062-1088.

### **A.4 The Stochastic Behavior of GNP and Other Macro Variables**

Nelson, C. R., and C. I. Plosser (1982), "Trends and Random Walks In Macroeconomic Time Series: Some Evidence and Implications", *Journal of Monetary Economics*, 10, 2, September, pp. 139-162.

Campbell, J.Y. and N. G. Mankiw (1987), "Are Output Fluctuations Transitory?," *Quarterly Journal of Economics*, 102, pp. 857-880.

Cochrane, J. (1988), "How big is the Random Walk in GNP?," *Journal of Political Economy*, 96, 893-900.

Campbell, J. and G. Mankiw (1987), "Permanent and Transitory Components in Macroeconomic Fluctuations", *American Economic Review*, 77, 2, may, 111-117.

Diebold, F. X., and G.D. Rudebush (1989), "Long Memory and Persistence in Aggregate Output", *Journal of Monetary Economics*, 24, pp. 189-209.

Christiano, L.J., and M. Eichenbaum (1990), "Unit Roots in Real GNP: Do we Know, and Do We Care?," *Carnegie Rochester Conference Series*, 32, pp. 7-62.

### **A.5 Cointegration: Applications**

King, R.G., C.I. Plosser, J.H. Stock, and M.W. Watson (1991), "Stochastic Trends and Economic Fluctuations", *American Economic Review*, 81, pp. 819-840.

Corbae, D. and S. Ouliaris (1988), "Cointegration Tests of Purchasing Power Parity", *Review of Economics and Statistics*, 70, pp. 508-511.

Edison, H.J, and E. O'N. Fisher (1991), "A long Run View of the European Monetary System", *Journal of International Money and Finance*, 10, pp. 53-70.

Meese, R. A., and K. Rogoff (1988) "Was it Real? The Exchange Rate Interest Rate Relation, 1973-1984", *Journal of Finance*, 43, pp. 933-948.

Johansen, S., and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration -- With Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, 52, 2, pp. 169-210.

Hendry, D.F., and N.R. Ericson (1991), "Modelling the Demand for Narrow Money in the United Kingdom and in the United States", *European Economic Review*, 35, 4, pp. 833-881.

### **A.6 Trends and Cycles**

Beveridge, S. and C. Nelson (1981) "A new approach to the decomposition of economic time series into a permanent and transitory components with particular attention to the measurement of the business cycle," *Journal of Monetary Economics*, 151-174.

Gonzalo, J. and C.W.J. Granger (1995) "Estimation of Common Long-Memory Components in Cointegrating Systems," *Journal of Business and Economic Statistics*, 13, 27-36.

Quah, D. (1992) "The relative importance of permanent and transitory components: Identification and some theoretical bounds," *Econometrica*, 107-118.

Watson, M. (1986) "Univariate detrending methods with stochastic trends," *Journal of Monetary Economics*, 49-75.