

## Economics 285E: Advanced Econometrics

Fall 2004

**Instructor:** Tae-Hwy Lee

**Lectures:** TR 9:40 a.m. - 11:00 a.m., SPR 3123

**Office Hours:** TR 9:00-9:30 a.m., TR 2:00-2:30 p.m., or open door

**Course Requirements:** The course grade will be based on a research paper and a 30 minute presentation. The paper will apply material treated in the course (or suitable extensions of it) to a topic of interest in econometrics – either theoretical, applied, monte carlo, or a survey. A first draft proposal for the paper will be due on November 12, a revised draft proposal due in class on November 23, and the final version of the research paper due on 12 noon, December 13. All versions should be typed. All presentations will be scheduled on December 2, 9:00-11:00 a.m.

**Course Outline:** This course will consist of two parts: (1) asymptotic theory and bootstrap theory and (2) financial econometrics (nonlinearity, issues in forecasting, quantile, extreme values, copula, and etc.).

### 1 Asymptotics

White, Halbert (2001), *Asymptotic Theory for Econometricians*, revised edition, Academic Press.

Pötscher, B.M. and I.R. Prucha (2001), “Basic Elements of Asymptotic Theory”, in B.H. Baltagi (ed.), *A Companion to Theoretical Econometrics*, Chapter 10, Blackwell.

Spanos, A. (1986), *Statistical Foundations of Econometric Modelling*, Cambridge University Press. (error bounds and asymptotic expansions, pp. 202-208)

### 2 Bootstrap

Horowitz, J. (2001), “The Bootstrap”, *Handbook of Econometrics*, Vol. 5, North Holland.

Hall, Peter (1992), *The Bootstrap and Edgeworth Expansion*, Springer Verlag. (Chapters 1-3)

Hall, Peter (1994), “Methodology and Theory for the Bootstrap”, in R.F. Engle and D.F. MaFadden, eds., *Handbook of Econometrics*, Volume 4.

Efron, B. (1979), “Bootstrap Methods: Another Look at the Jackknife”, *Annals of Statistics*, 7, 1-26.

Efron, B. and R. LePage (1992), “Introduction to Bootstrap”, in *Exploring the Limits of Bootstrap*, R. LePage and L. Billard (eds.), Chapter 1, 3-10, John Wiley & Sons, Inc.

Liu, R.Y. (1988), “Bootstrap Procedures under Some Non-iid Models”, *Annals of Statistics*, 16, 1697-1708.

Politis, D. N. and J. P. Romano (1994), “The Stationary Bootstrap”, *Journal of American Statistical Association*, 89, 1303-1313.

Politis, D. N., J. P. Romano, and M. Wolf (1999), *Subsampling*, Springer-Verlag: New York.

Wu, C.F.J. (1986), “Jackknife, Bootstrap, and Other Resampling Methods in Regression Analysis”, *Annals of Statistics*, 14, 1261-1350.

### 3 Nonlinearity

- Lee, T.-H., Halbert White and Clive W. J. Granger (1993), “Testing for Neglected Nonlinearity in Time Series Models: A Comparison of Neural Network Methods and Alternative Tests”, *Journal of Econometrics*, 56, 269-290.
- Granger, Clive W. J. and Lee, T.-H. (1999), “The Effect of Aggregation on Nonlinearity”, *Econometric Reviews*, 18(3), 259-269.
- Hong, Y. (1999), “Hypothesis Testing in Time Series via the Empirical Characteristic Function: A Generalized Spectral Density Approach”, *Journal of American Statistical Association*, 84, 1201-1220.
- Hong, Y. and T.-H. Lee (2003a), “Inference on Predictability of Foreign Exchange Rates via Generalized Spectrum and Nonlinear Time Series Models”, *Review of Economics and Statistics*, 85(4), November 2003.
- Hong, Y. and T.-H. Lee (2003b), “Diagnostic Checking for Adequacy of Nonlinear Time Series Models”, *Econometric Theory*, 19(6), 1065-1121, December 2003.
- Campbell, J.Y., A.W. Lo, and A.C. MacKinlay (1997), *The Econometrics of Financial Markets*, Princeton University Press. Chapter 12
- Granger, C.W.J. and T. Teräsvirta (1993), *Modelling Nonlinear Economic Relationships*, Oxford University Press.
- Fan, J. and Yao, Q. (2003), *Nonlinear Time Series: Nonparametric and Parametric Methods*, Springer Verlag.
- Gourieroux, C. and J. Jasiak (2001), *Financial Econometrics*, Princeton University Press.
- Tsay, R.S. (2002), *Analysis of Financial Time Series*, Wiley.
- Lee, T.-H. and Weiping Yang (2004), “A Bivariate Threshold Autoregressive Conditional Density Model Using Copula with Application in Output Growth and Unemployment”

### 4 Forecasting

#### 4.1 Forecast Comparison

- Diebold, F. X. and R. Mariano. 1995. Comparing predictive accuracy. *Journal of Business and Economic Statistics* 13: 253-265.
- Hansen, P. R. 2001. An unbiased and powerful test for superior predictive ability. Brown University.
- Giacomini, R. and H. White. 2003, “Tests of conditional predictive ability”. UCSD.
- West, K.D. (1996), “Asymptotic Inference about Predictive Ability”, *Econometrica*, 64 1067-1084.
- White, Halbert (2000), “A Reality Check for Data Snooping”, *Econometrica*, 68(5), 1097-1126.
- Clark, Todd E. and K.D. West, K.D. (2004), “Alternative Approximations for Inference About Predictive Ability”.

## 4.2 Forecast Combination

Bates, J.M. and C.W.J. Granger (1969), “The Combination of Forecasts”, *Operations Research Quarterly*, 20, 451-468. Also see Granger and Newbold (1986, Chapter 9)

Aiolfi, M. and A. Timmermann (2004), “Persistence in Forecasting Performance and Conditional Combination Strategies”, UCSD.

Granger, C.W.J. and Y. Jeon (2004), “Thick Modeling”, *Economic Modelling*, 21, 323-343.

BMA: <http://www.research.att.com/~volinsky/bma.html>

## 4.3 Bagging

Breiman, L. (1996a), “Bagging Predictors”, *Machine Learning*, 24, 123-140.

Breiman, L. (1996b), “Heuristics of Instability and Stabilization in Model Selection”, *Annals of Statistics*, 24(6), 2350-2383.

Bühlmann, P. and B. Yu (2002), “Analyzing Bagging”, *Annals of Statistics*, 30(4), 927-961.

Inoue, A. and L. Kilian (2004), “How Useful Is Bagging in Forecasting Economic Time Series? A Case Study of U.S. CPI Inflation”

Lee, T.-H. and Yang Yang (2004a), “Bagging Binary Predictors for Time Series”, submitted to *Journal of Econometrics*.

## 4.4 Forecast Evaluation/Optimality

Granger, C.W.J. (1999a), “Outline of forecast theory using generalized cost functions”. *Spanish Economic Review* 1: 161-173.

Granger, C.W.J. (1999b), *Empirical Modeling in Economics*. Cambridge: Cambridge University Press.

## 4.5 Forecasting Mean

Hong, Yongmiao and T.-H. Lee (2003a), “Inference on Predictability of Foreign Exchange Rates via Generalized Spectrum and Nonlinear Time Series Models”, *Review of Economics and Statistics*, 85(4), November 2003.

Gloria González-Rivera, Tae-Hwy Lee, and Santosh Mishra (2003), “Jumps in Rank and Expected Returns: Introducing Varying Cross-sectional Risk, with Gloria González-Rivera and Santosh Mishra, submitted to *Review of Economics and Statistics*.

Bao, Y. and T.-H. Lee (2004), “Asymmetric Predictive Abilities of Nonlinear Models for Stock Returns: Evidence from Density Forecast Comparison”.

Chan, W.H. and J.M. Maheu (2002), “Conditional Jump Dynamics in Stock Market Returns,” *Journal of Business and Economic Statistics*, 20, 377-389.

Jegadeesh, Narasimhan and Sheridan Titman (1993), “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency”, *Journal of Finance*, 48, 65-91.

Jegadeesh, Narasimhan and Sheridan Titman (2001), “Profitability of Momentum Strategies: An Evaluation of Alternative Explanations”, *Journal of Finance*, 56, 699-720.

Jegadeesh, Narasimhan and Sheridan Titman (2002), “Cross-sectional and Time-series Determinants of Momentum Returns”, *Review of Financial Studies*, 15, 143-157.

## 4.6 Forecasting Variance

González-Rivera, G., T.-H. Lee, and S. Mishra (2004), “Forecasting Volatility: A Reality Check Based on Option Pricing, Utility Function, Value-at-Risk, and Predictive Likelihood”, forthcoming, *International Journal of Forecasting*.

## 4.7 Forecasting Correlation

Engle, R.F. (2002), “Dynamic Conditional Correlation: A Simple Class of Multivariate Generalized Autoregressive Conditional Heteroskedasticity Models”, *Journal of Business & Economic Statistics*, July 2002, 339-350.

Bollerslev, T. (1990), “Modeling the Coherence in Short-run Nominal Exchange Rates: A Multivariate Generalized ARCH Approach”, *Review of Economics and Statistics*, 72, 498–505.

Tse, Y.K. and A.K.C. Tsui (2002), “A Multivariate Generalized Autoregressive Conditional Heteroscedasticity Model With Time-Varying Correlations”, *Journal of Business & Economic Statistics*, July 2002, 351-362.

Engle, R.F. and Kroner K.F. (1995), “Multivariate Simultaneous Generalized ARCH”, *Econometric Theory*, 11, 122-50.

Lee, T.-H. and Xiangdong Long (2004a), “Multivariate GARCH with Non-Elliptical Distribution”.

Lee, T.-H. and Xiangdong Long (2004b), “Dynamic Conditional Correlation Models Using Elliptical Copulae”.

## 4.8 Forecasting Quantile

Komunjer, I. (2004), “Quasi-Maximum Likelihood Estimation for Conditional Quantiles”, *Journal of Econometrics*, forthcoming.

R.Giacomini and I. Komunjer (2004), “Evaluation and Combination of Conditional Quantile Forecasts”, *Journal of Business and Economic Statistics*, conditionally accepted.

Komunjer, I. and Q. Vuong (2004), “Efficient Conditional Quantile Estimation” in progress.

Fitzenberger, B. (1997), “The Moving Blocks Bootstrap and Robust Inference for Linear Least Squares and Quantile Regressions”, *Journal of Econometrics*, 82, 235-287.

Hansen, Bruce (2004), “Interval Forecasts and Parameter Uncertainty”, submitted to *Journal of Econometrics*

Bao, Y., T.-H. Lee, and B. Saltoglu (2004a), “Evaluating Predictive Performance of Value-at-Risk Models in Emerging Markets: a Reality Check”, submitted to *Journal of Forecasting*.

Hansen, Bruce (2004), “Interval Forecasts and Parameter Uncertainty”

Koenker, R. and Bassett, G. (1978), “Regression Quantiles”, *Econometrica*, 46, 33-50.

Christoffersen, P.F. (1998), “Evaluating Interval Forecasts”, *International Economic Review* 39: 841-864.

Clements, M.P. and N. Taylor (2003), “Evaluating Interval Forecasts of High-Frequency Financial Data”, *Journal of Applied Econometrics*, forthcoming.

## 4.9 Forecasting Sign

Christofferson, P.F. and F.X. Diebold (2003), “Financial Asset Returns, Market Timing, and Volatility Dynamics”, submitted to *Review of Financial Studies*.

Hong, Y. and J. Chung (2003), “Are the Directions of Stock Price Changes Predictable? Statistical Theory and Evidence”, Cornell University.

Lee, T.-H. and Yang Yang (2004), “Bagging Binary Predictors for Time Series”.

## 4.10 Forecast Density

Diebold, F. X., T. A. Gunther, and A. S. Tay. 1998. Evaluating density forecasts with applications to financial risk management. *International Economic Review* 39: 863-883.

Berkowitz, J. 2001. Testing density forecasts with applications to risk management. *Journal of Business and Economic Statistics* 19: 465-474.

Bao, Y., T.-H. Lee, and B. Saltoglu (2004), “A Test for Density Forecast Comparison with Applications to Risk Management”.

Clements, M. P. and J. Smith. 2000. Evaluating the forecast densities of linear and non-linear models: applications to output growth and unemployment. *Journal of Forecasting* 19: 255-276.

Diebold, F. X., J. Hahn, and A. S. Tay. 1999. Multivariate density forecast evaluation and calibration in financial risk management: high-frequency returns of foreign exchange. *Review of Economics and Statistics* 81: 661-673.

Tay, A.S. and K.F. Wallis (2000), “Density Forecasting: A Survey”, *Journal of Forecasting*, 19, 235-254.

Bao, Y. and T.-H. Lee (2004), “Nonlinear Predictability of Foreign Exchange Rates and Stock Prices: Evidence from Density Forecast Comparison”

Granger, C.W.J., T. Teräsvirta, and A.J. Patton (2004), “Common Factors in Conditional Distributions”, *Journal of Econometrics*, forthcoming.

## 4.11 Evaluating Calibrated Density

Corradi V. and N.R. Swanson (2004), “A test for the distributional comparison of simulated and historical data”, *Economics Letters*, November, 85(2), 185-194.

Jung, Y., T.-H. Lee and Weiping Yang (2004a), “Comparison of New Open Economy Macroeconomic Models for Exchange Rate Fluctuations”.

Jung, Y., T.-H. Lee and Weiping Yang (2004b), “Dynamics of Inflation Rate: Comparison of New Keynesian Models via Simulated Density”.

## 4.12 Extreme Value Theory

Embrechts, P., C. Klüppelberg, and T. Mikosch. 1997. *Modeling Extremal Events for Insurance and Finance*. New York: Springer Verlag.

Bao, Y., T.-H. Lee, and B. Saltoglu (2004a), “Evaluating Predictive Performance of Value-at-Risk Models in Emerging Markets: a Reality Check”, submitted to *Journal of Forecasting*.

### 4.13 Realized Volatility

<http://www.eco.fundp.ac.be/cerefim/realvol/home.html>

Ole Barndorff-Nielsen (Aarhus University), Neil Shephard (Oxford University) Power and Bipower Variation with Stochastic Volatility and Jumps

Xin Huang, George Tauchen (Duke University) The Relative Contribution of Jumps to Total Price Variance

Torben Andersen (Northwestern University, NBER), Tim Bollerslev (Duke University, NBER), Francis Diebold (University of Pennsylvania, NBER) Some Like it Smooth, and Some Like it Rough: Untangling Continuous and Jump Components in Measuring, Modeling, and Forecasting Asset Return Volatility

John Maheu (University of Toronto), Thomas McCurdy (University of Toronto, CIRANO) Modeling Foreign Exchange Rates with Jumps?

Eric Ghysels (University of North Carolina at Chapel Hill, CIRANO), Pedro Santa-Clara, Rossen Valkanov (University of California at Los Angeles) Predicting Volatility: Getting the Most out of Return Data Sampled at Different Frequencies

Yacine Ait-Sahalia (Princeton University, NBER), Per Mykland (University of Chicago), Lan Zhang (Carnegie Mellon University) How Often to Sample a Continuous-Time Process in the Presence of Market Microstructure Noise

Federico Bandi, Jeffrey Russell (University of Chicago) Microstructure Noise, Realized Volatility, and Optimal Sampling

### 4.14 ACD

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