

Financial Econometrics Summer School

Instructor: Eric Zivot (ezivot@u.washington.edu)
Time and Place: May 11-16 2009, American university
Related Webpage: <http://faculty.washington.edu/ezivot/econ512/econ512.htm>

Objectives and Scopes

This is financial econometrics course with a focus on time series techniques useful for modeling and forecasting financial data. It is a blend of econometric theory, financial models, data analysis, applications, and statistical programming using R and S-PLUS (with S+FinMetrics). The topics to be covered in the course include:

- Distribution and dynamic behavior of asset returns
 - Non-Gaussian distributions, extreme value theory and copulas
 - Return predictability
 - Applications to risk management
- Volatility modeling
 - Autoregressive conditional heteroskedasticity (ARCH) family of models
 - Stochastic volatility models
 - Applications to risk management and derivatives pricing
- Ultra high frequency time series
 - Market microstructure models
 - Realized variance, covariance and bi-power variation
 - Applications to volatility modeling and market microstructure models
- Continuous time models
 - Simulation and estimation of stochastic differential equations (diffusion models)
 - Applications to derivatives pricing

Preliminary Time Schedule

Each day will consist of four sessions, two morning and two afternoon. Within each interval, we will spend one of the two sessions on discussing the models and empirical applications. A second session, one in the morning and one in the afternoon, will be spent in the computer lab, where students will learn how to use R and S-PLUS and will estimate models and do empirical analysis of 'real' data sets.

Content and Topics

Below is a tentative outline by lecture and date. The order of topics may change. Depending on availability of time, and interest, other topics may be included and some topics may not be covered. In each of these sections, we will consider underlying theory, specific models, estimation, and received applications.

Lecture: Date	Topic	Reading
1: Monday, May 11 Morning session: 9:00-12:00	1. Asset returns 2. Time series concepts	MFTS, chs. 2-4 AFTS, chs 1,2 APDVP, 2 and 3
2: Monday, May 11 Afternoon session: 1:00-4:30	1. Return predictability	MFTS, ch. 6 APDVP, chs. 4-7
3: Tuesday, May 12 Morning session: 9:00-12	1. Introduction to risk management: Value-at-Risk and Expected Shortfall 2. Non-Gaussian distributions 3. Extreme value theory	MFTS, ch. 5 AFTS, ch. 7 APDVP, ch
4: Tuesday, May 11 Afternoon session: 1:00-4:30	1. Backtesting risk models 2. Multivariate dependence and copulas	MFTS, chs. 9 and 19
5: Wednesday, May 12 Morning session: 9:00-12	1. Univariate Garch models	MFTS, ch. 7 AFTS, ch. 3 APDVP, chs 8-10
6: Wednesday, May 11 Afternoon session: 1:00-4:30	1. Volatility prediction 2. Evaluating Garch models	MFTS, ch 9 APDVP, chs. 15-16
7: Thursday, May 12 Morning session: 9:00-12	1. Multivariate Garch models	MFTS, ch.13 AFTS, ch. 10
8: Thursday, May 11 Afternoon session: 1:00-4:30	1. Stochastic volatility models	MFTS, ch. 14 AFTS, chs. 3 and 10 APDVP ch. 11
7: Friday, May 12 Morning session: 9:00-12	1. Volatility modeling using high frequency data: realized variance	MFTS, ch. 9 AFTS, ch. 5 APDVP ch. 12
8: Friday, May 11 Afternoon session: 1:00-4:30	1. Practical issues associated with realized variance	

Notes: MFTS denotes *Modeling Financial Time Series with S-PLUS*, AFTS denotes *Analysis of Financial Time Series*, and APDVP denotes *Asset Price Dynamics, Volatility, and Prediction*.

Computer Lab Sessions and “Hands on Data”

The computer lab sessions will utilize R and S-PLUS, with S+FinMetrics, to illustrate the material covered in the course. Many of the examples will be taken from Zivot and Wang (2006), *Modeling Financial Time Series with S-PLUS, Second Edition* and Tsay (2007) *Analysis of Financial Time Series*. However, students are encouraged to bring their own data.

Target Group and Requirements

The course may be of interest to

1. PhD students interested in financial econometrics. Students from American University and other universities are welcome.
2. Faculty, professional economists, researchers and econometricians who work in the finance industry and have an interest in learning time series techniques useful for modeling and forecasting financial data.

NOTE: Participants should have prior knowledge of first year graduate level econometrics or equivalent, and familiarity with time series concepts and methods. Some familiarity with statistical programming using matrix languages (GAUSS, Matlab, Ox, R, S-PLUS) is helpful.

Credits

To receive credit for the course, students must complete an applied research paper on one of the topics covered in the class. The paper will be due a number of weeks after the course is completed.

Materials

1. Zivot, E. and Wang, J. (2006). *Modeling Financial Time Series with S-PLUS, Second Edition*. Springer-Verlag. A .pdf version of the book will be made available to participants.
2. Tsay, R. (2006). *Analysis of Financial Time Series, Second Edition*. Wiley. ISBN-13: 978-0471690740.
3. Taylor, S. (2007). *Asset Price Dynamics, Volatility, and Prediction*. Princeton University Press. ISBN-13: 978-0691134796. ISBN-13: 978-0691043012.

Supplemental reading from journal articles and non-required textbooks (available on course webpage).

About the Instructor

Eric Zivot is a Professor and Gary Waterman Distinguished Scholar in the Economics Department, Adjunct Professor of Statistics, and Adjunct Professor of Finance in the Foster School of Business at the University of Washington. He regularly teaches courses on econometric theory, financial econometrics and time series econometrics, and is the recipient of the Henry T. Buechel Award for Outstanding Teaching. He has been an associate editor the Journal of Business and Economic Statistics and Studies in Nonlinear Dynamics and Econometrics. He is the author of *Modeling Financial Time Series with S-PLUS* (with Jiahui Wang) and co-developer of S+FinMetrics. He has published papers in the leading econometrics journals, including *Econometrica*, *Econometric Theory*, the *Journal of Business and Economic Statistics*, *Journal of Econometrics*, and the *Review of Economics and Statistics*.