Financial Data Analysis

(The elective seminar offers 6 credit points in the Master of Finance Program and in the Graduate Diploma Study)

Seminar Description:

The course is designed to introduce time series methodology mostly used in finance with a special emphasis placed on applications. It starts with basic statistical theory for handling financial time series. These lectures cover e.g. lognormal distribution, test of normality and random walk models. Subsequently univariate time series models are discussed in order to identify the models and make forecasts. In addition, the course deals with vector autoregressive processes, unit roots and cointegration analysis as well as stochastic volatility modeling. There will be computer exercises in EViews with practical examples. The financial data are taken from Financial Thomson Datastream or other vendors of financial data.

Time and Place

Lecture: October 26-30, 2009; 9.00 a.m. – 1.00 p.m.
Venue: Room 00 003c, Hermann-Herder-Str. 9

Tutorial: October 26-30, 2009; 2.00 – 5.30 p.m.
Tutor: Zeno Adams
Venue: Computer lab, Room -100, Rechenzentrum, Hermann-Herder-Str. 10

Organization: Anthony Strittmatter

Homepage: http://www.empiwifo.uni-freiburg.de/lehre-teaching-1/winter-term-0910/FDA

Organization

The seminar is addressed to advanced students of the Integrated Master Program in Finance and students of economics in their final year with the main focus on finance.

Prerequisites: Principles of econometrics and time series analysis

Credits: 6 credit points based on
- term paper (12 – 15 pages) 40 %
- presentation of the term paper, general participation and active discussion 30 %
- final exam 30 %

Registration: July 6–31, 2009 by email: anthony.strittmatter@vwl.uni-freiburg.de

Please provide information about advanced courses in statistics and econometrics already taken and grades achieved as well as the term count.
Schedule:  
i) The course will start at October, 12th 2009 (Room 3118) and will be held in a blocked format with introduction lectures in time series analysis and tutorials with practical applications in EViews-Software.

ii) The topics will be allocated after the introduction course. You will be asked to indicate 3 preferences because your first choice might be already assigned.

iii) The oral presentation takes place near the end of the semester in a blocked format. The precise timing and the number of sessions will depend on the number of registrations. It will be announced to registered students.

iv) The term paper can be produced in teams of two students. It has to be submitted until March, 26th 2010.

Limitation:  
25 students

Withdrawal:  
The course can be dropped without penalty until two weeks before taking the first exam (oral presentation). Thereafter withdrawal will count as a failed examination attempt!

Tutorials:  
In addition, there will be offered computer tutorials with Eviews which deal with case studies concerning financial data. The tutorial is given by Zeno Adams.

Course Outline

1. Introduction
   Distributional Properties of Returns  
   (One-Period and Multi-Period Simple Returns, Annualized Returns, Discrete and Continuously Compounded Returns, Statistical Distribution and their Moments, Normal and Lognormal Distribution, Test of Normality)

   Basics of Time Series Analysis  

2. Univariate time series models
   Autoregressive Models (AR(p))  
   (Properties of AR Models, Autocorrelation Function of an AR(1) Model, Order Determination of AR Models)

   Moving Average Models (MA(q))  
   (Properties of MA Models, Autocorrelation Function of an MA(1) Model, Order Determination of MA Models)

   ARMA(p,q)-Models  
   (Properties of ARMA(1,1) Models, General ARMA Models, Box-Jenkins Model Identification, Akaike Information and Schwarz Criterion, Forecasting Performance)

   Seasonal ARIMA-Models (SARIMA)
3. **Vector Autoregression (VAR)**
   
   Covariance-stationary VAR(p)-Process
   (VAR Processes, Impulse Response Function and Orthogonalization, Model Specification, Variance Decomposition)

   Estimation of VAR(p)-Process
   (Maximum Likelihood Estimation, LS Estimation)

   Granger Causality

   Variance Decomposition and Impulse Response Function

4. **Unit Roots and Cointegration**

   Unit Root Nonstationarity
   (Random Walk, Differencing, Dickey-Fuller and Augmented Dickey-Fuller Test, Test of Phillips-Perron)

   Cointegration und Error Correction Model
   (Engle-Granger bivariate Cointegration, Cointegration Regression, Granger Causality, Johansen Cointegration Test, Error Correction Representation)

5. **Volatility Forecasting – Conditional Heteroscedastic Models**

   The ARCH(q)-model
   (Characteristics of Volatility, Properties of ARCH Models, ARCH LM Test, Order Determination, Forecasting)

   The GARCH(p,q)-model
   (GARCH-M(in Mean), E(Exponential)GARCH, T(Threshold)GARCH)

   Value at Risk GARCH-type Model

   Multivariate GARCH Models (MGARCH)
   (Constant Conditional Correlation, Dynamic Conditional Correlation, BEKK, VEC Models)

6. **High Frequency Data Analysis and Market Microstructure**

**Literature**

**Textbooks:**


Box, G.E.P. and D.R. Jenkins (1976), *Time Series Analysis, Forecasting and Control*, San Francisco [S1/814]


Articles:


