OUTLINE AND AIMS

This subject is concerned with the econometric modeling of financial data and tests of some standard asset pricing models. We begin with a discussion of the key empirical characteristics of financial data. Next, we formulate tests of standard asset pricing models in the framework of the general linear regression model. We then move on to a discussion of time series methods for modeling stationary data. We are then in a position to model volatility in asset return data that is evident for short (weekly or daily) holding periods. Our focus will be on the ARCH/GARCH class of volatility models. This approach is applied to modeling the time-varying risk premium on financial assets and to Value-at-Risk (VaR) calculations which many financial institutions use to assess the risk of their portfolios. We then briefly discuss time series methods for modeling non-stationary data. This will allow us to model both the long-run relationships and short-run interactions among financial time series.

Throughout the course, the techniques will be demonstrated using actual financial data using the econometric software EViews, Version 5. Eviews is menu-driven and very easy to use.

On completion of this course students should be able to apply modern econometric methods to model financial data and to use these models to provide input into the financial decision making process.

ASSESSMENT

The total assessment comprises the following components:

- Tutorial Assignments 10%
- Mid-session Exam 25%
- Final Exam 65%

There will be tutorial exercises each week. From time to time, tutorial exercises will be collected and marked. These marked tutorial exercises will comprise 10% of the assessment. I will give at least one week’s notice of the tutorial questions to be collected. The mid-session exam will be held during the lecture time of Week 8 and will comprise 25% of the assessment.

Many tutorial exercises involve estimating econometric models with real financial data (that will be posted on the course’s web-site, along with lecture notes and tutorial exercises). To access the web-site, it is necessary to log in at: http://www.webct.unsw.edu.au.
Your username is a lower case “z” followed by your 7 digit student ID number (e.g. z1234567) and your password is your UniPass. These exercises can be done relatively easily in the software program EViews, which can be accessed in the Faculty of Commerce and Economics computing labs.

As the university currently holds a site license for EViews 5 (the latest version), individual copies of EViews 5 can be purchased for US$100, without paper bound copies of the manuals, or for US$143, with paper bound copies of the manuals. Both prices include shipping. Please note that the help facility in Eviews 5 contains the manuals in pdf format. Please see me for the appropriate form if you would like to purchase Eviews 5.

**PRESCRIBED TEXT**

The textbook for the subject is:


This book is written at an introductory level and covers all the material we will discuss in class. In addition, it describes how to estimate the econometric models under discussion in the software program EViews.

**TOPICS COVERED**

1. **Understanding Financial Data**
   - (a) Descriptive Statistics
   - (b) Predictability of Returns
   - (c) Distribution of Returns
   Brooks: Chapter 1; Sections 1.1 – 1.7
   Chapter 2; Sections 2.1 – 2.3, 2.5

2. **Linear Regression Tests of Asset Pricing Models**
   - (a) Tests of the CAPM and Arbitrage Pricing Models
   - (b) Diagnostics
   - (c) Robust standard errors
   - (d) Estimation of the Linear Regression Model by Maximum Likelihood
   Brooks: Chapter 3, Sections 3.1 – 3.18,
   Chapter 4, Sections 4.1, 4.3 – 4.10
   Chapter 8, Appendix (covers Maximum Likelihood Estimation)

3. **Introduction to Time Series Methods**
   - (a) Stationarity
   - (b) ARMA Processes
   - (c) Autocorrelation Function
   - (d) Forecast Function
   Brooks: Chapter 5, Sections 5.1 – 5.8, 5.10, 5.12 – 5.13
4 Risk and Volatility Models
(a) ARCH and GARCH models
(b) Testing for ARCH/GARCH effects
(c) Estimation of ARCH/GARCH models by Maximum Likelihood
(d) Diagnostic checking
(e) Application of ARCH/GARCH models to Value-at-Risk (VaR) calculations

Brooks: Chapter 8, Sections 8.1 – 8.9. See the expository article by Engle (2001) listed below under additional references for application of GARCH to VaR.

5 Extensions of ARCH/GARCH models
(a) ARCH/GARCH in Mean
(b) Asymmetric ARCH/GARCH models
(c) Inclusion of Exogenous Variables
(d) Nonnormality

Brooks: Chapter 8, Sections 8.10-8.14, 8.16-8.20.

6 Modeling Long-run Relationships in Finance
(a) Spurious regressions
(b) Unit root processes
(c) Bivariate cointegration
(d) Error-correction models and causality

Brooks: Chapter 7, Sections 7.1, 7.2, 7.4 – 7.6, 7.8, 7.13 pages 420-426.

ADDITIONAL REFERENCES

(a) Textbooks

The third edition of textbook:


contains a very nice chapter on ARCH/GARCH models and it also covers all the standard time series methods we discuss. All the examples in this text are estimated with EViews. Note that this is the textbook for the course *Business Forecasting* so if you plan to do that course you may want to purchase this book in addition to, or as a substitute for, the text by Brooks.

The following books cover most of the material very well. In particular, Enders has a very nice treatment of standard ARCH/GARCH models and both Enders and Johnston and Di-Nardo have straightforward expositions of maximum likelihood estimation.


The following book treats the material at a more advanced level than the textbook. However, this book is quite difficult in places.


(b) Journal Articles

The ARCH/GARCH modeling strategy was originally developed in the following classic articles:


A nice expository discussion of ARCH/GARCH type modeling and its application to value-at-risk (VaR) is:


This expository article by Engle is highly recommended reading.

The following article generalizes the GARCH model to include interest-rate level effects:


(c) Australian References

We may refer to the following articles in lectures or tutorials, which apply some of the techniques under study to Australian financial data.


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