



Financial Forecasting and Modelling

IFF-3-433

BCIM

2008

**become what you want to be**

## Table of Contents

1.	Unit Details .....	3
2.	Short Description .....	3
3.	Aims of the Unit .....	3
4.	Learning Outcomes .....	3
4.1	Knowledge and Understanding .....	3
4.2	Intellectual Skills .....	3
4.3	Practical Skills .....	3
4.4	Transferable Skills .....	3
5.	Assessment of the Unit .....	4
6.	Feedback .....	4
7.	Introduction to Studying the Unit .....	4
7.1	Overview of the Main Content .....	4
7.2	Overview of Types of Classes .....	4
7.3	Importance of Student Self-Managed Learning Time .....	4
7.4	Employability .....	4
8.	The Programme of Teaching, Learning and Assessment .....	4
9.	Learning Resources .....	6
9.1	Core Materials .....	6
9.2	Optional Materials .....	6
	NOTES .....	6

## 1. UNIT DETAILS

Unit Title:	Financial Forecasting and Modelling
Unit Level:	3
Unit Reference Number:	IFF-3-433
Credit Value:	15
Student Study Hours:	150
Contact Hours:	36
Private Study Hours:	114
Pre-requisite Learning (if applicable):	Quantitative Literacy, and a Level 2 Quants. unit
Co-requisite Units (if applicable):	
Course(s):	BABS/BABA
Year and Semester	Year 3 and Semester 2
Unit Coordinator:	Dr Gurjeet Dhesi
UC Contact Details (Tel, Email, Room)	02078157090, <a href="mailto:dhesig@lsbu.ac.uk">dhesig@lsbu.ac.uk</a> , L113b
Teaching Team & Contact Details (If applicable):	
Subject Area:	Quants.
Summary of Assessment Method:	75% Examination, 25% Coursework

## 2. SHORT DESCRIPTION

This elective unit introduces and explains the techniques of statistical inference, traditional econometrics and time series analysis (naïve and sophisticated) with the aim of providing an understanding (and the inherent difficulties) of financial forecasting and modelling.

## 3. AIMS OF THE UNIT

To provide an understanding of the wide range of techniques/methods for financial forecasting and modelling.

To explain the inherent difficulties encountered when modelling financial data and making financial forecasts.

## 4. LEARNING OUTCOMES

### 4.1 Knowledge and Understanding

To build appropriate econometric time series models for the data under consideration.

To interpret different types of financial forecasting models, and appreciate the measure of their goodness, and their limitations.

### 4.2 Intellectual Skills

To recognise and understand the technical vocabulary associated with forecasting techniques and models

### 4.3 Practical Skills

Students may be able to develop communication skills, numerically skills, use of information technology, learning how to learn, understanding of methodologies, and ability in critical analysis.

### 4.4 Transferable Skills

(see section 4.3)

## 5. ASSESSMENT OF THE UNIT

A three hour examination which will account for 75 percent of the total mark. Coursework will account for the remaining 25 percent of marks.

## 6. FEEDBACK

Feedback will normally be given to students 15 working days after the submission of an assignment.

## 7. INTRODUCTION TO STUDYING THE UNIT

### 7.1 Overview of the Main Content

This elective unit introduces and explains the techniques of statistical inference, traditional econometrics and time series analysis (naïve and sophisticated) with the aim of providing an understanding (and the inherent difficulties) of financial forecasting and modelling.

### 7.2 Overview of Types of Classes

The lecture programme will provide the themes and principles of the subject, which are then reinforced by seminars and directed self study. Some of the Discussion topics (a list of these, by no means complete, provided at the end of section 5) may also be covered via directed self-study and then discussed in seminars. Optional computer laboratory sessions will be arranged.

### 7.3 Importance of Student Self-Managed Learning Time

It is of the utmost importance that students do the homework, i.e. solve set problems, read appropriate material. Quants based subjects can only be mastered by having a hands on approach.

### 7.4 Employability

Financial Sector

## 8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Introduction to the unit

WEEK 1

Basic statistical measures:

Mean, Variance, Standard deviation  
Normal distribution, Skewness, Kurtosis  
Correlation and covariance.

WEEK 2

Statistical Inference:

Sampling distribution  
Confidence Intervals  
Hypothesis testing  
p-values  
Normality tests.

WEEK 3

## Introduction to Regression Analysis:

Simple Regression  
Multiple Regression  
Classical assumptions  
Significance of Independent variables-t-test and F-test. WEEK 4

## Heteroskedasticity, Multicollinearity, Autocorrelation:

Consequences  
Diagnostic tests  
Remedial measures. WEEK 5 AND 6

## ARIMA modelling for stationary data:

Concept of stationarity  
White noise as an ARIMA(0,0,0) model  
Model and sample autocorrelation functions for stationary data.  
Introduction to ARMA model building  
Diagnostic checks. WEEK 7 AND 8

## Nonstationarity in the mean:

Deterministic trend  
Stochastic trend  
Method of differencing/integrating to remove nonstationarity in the mean  
Random walk with and without drift  
Introduction to unit root testing  
Introduction to Cointegration. WEEK 9 AND 10

## Modelling asset prices as a stochastic process. WEEK 11

## Nonstationarity in the variance/conditional variance:

Box-Cox power transformations  
Conditional moments of time series  
Stochastic volatility  
ARCH models and extensions-introduction to modelling volatility of asset returns. WEEK 12

## TOPICS FOR DISCUSSION

- Discuss the implication of Chaos theory on financial forecasting.
- Hurst coefficient, Fat tails, Long tails, Pareto Distribution, Mandelbrot Fractals
- What is the importance of these to financial data?
- Measures of persistence and trend reversion.
- Fractional Integration and long memory processes.
- Econophysics approach to modelling correlations and complexity in finance.
- Technical Analysis -Art, Science or Astrology?
- Fundamental Analysis - Is it any better than throwing darts at an asset dartboard?
- What went wrong with Long Term Capital Management?
- Testing the EMH.
- Testing the CAPM.
- What degree of influence do noise traders (positive feedback traders) have on the financial market?
- What is the relevance of derivatives for financial forecasting?
- Financial forecasting by neural networks.

- Time series analysis how useful for financial markets? Realm of application?
- Causal Econometric methods how useful for financial markets? Realm of application?
- What is bid ask spread how is it arrived at /estimated?
- Stochastic Volatility
- Modulated markov chains
- Numerical methods - Monte Carlo Simulation.

## 9. LEARNING RESOURCES

### 9.1 Core Materials

Watsham T J and Parramore K - Quantitative methods in Finance-ITP 1998

### 9.2 Optional Materials

Gujarati D - Essentials of Econometrics - McGraw hill 1999

- Basic Econometrics - McGraw Hill 1995

Makridakis S, Wheelwright S and Hyndman R J - Forecasting Methods and Applications- Wiley 1998

Mills T C - Time Series Techniques for Economists - C.U.P.- 1994

- The Econometric Modelling of Financial Time Series - C.U.P. 1999

Pindyck R and Rubinfeld D - Econometric models and Economic Forecasts

-Mcgraw Hill 1991

Hamilton J D - Time Series Analysis - Princeton University Press 1994

Campbell J Y, Lo A W and MacKinley A C - The Econometrics of Financial Markets

-Princeton University Press 1997

Lo A W and MacKinley A C- A Non random walk down wall street- Princeton University Press 1999.

Elton E and Gruber M - Modern Portfolio Theory and Investment Analysis- Wiley 1995.

Malkiel B G - A Random Walk Down Wall Street - Norton 1996

Bernstein P L - Against the Gods, the remarkable story of risk - Wiley 1996

## NOTES