Empirical Techniques and Application to Finance

MFIN6201:

Session 1, 2004
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### About the Course

#### Timetable

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<th>Week beginning</th>
<th>Week Number</th>
<th>Topic</th>
<th>Assessment</th>
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<tr>
<td>23 Feb</td>
<td>0</td>
<td>Orientation week</td>
<td></td>
</tr>
<tr>
<td>1 March</td>
<td>1</td>
<td>Review of Basic Probability Theory and Markov Chains</td>
<td></td>
</tr>
<tr>
<td>8 March</td>
<td>2</td>
<td>Estimation Techniques</td>
<td></td>
</tr>
<tr>
<td>15 March</td>
<td>3</td>
<td>Non-Parametric Method of Estimation</td>
<td></td>
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<tr>
<td>22 March</td>
<td>4</td>
<td>State Space Models</td>
<td></td>
</tr>
<tr>
<td>29 March</td>
<td>5</td>
<td>State Space Models (Continued)</td>
<td>Quiz</td>
</tr>
<tr>
<td>5 April</td>
<td>6</td>
<td>Discrete Time Stochastic Model of Asset Price: Application to Mining Project</td>
<td></td>
</tr>
<tr>
<td>12 April</td>
<td></td>
<td>Mid-session recess</td>
<td></td>
</tr>
<tr>
<td>19 April</td>
<td>7</td>
<td>Lattice Model of Interest Rates and Its Application</td>
<td></td>
</tr>
<tr>
<td>26 April</td>
<td>8</td>
<td>Global Bubbles in Mature Stock Markets and Their Linkages</td>
<td></td>
</tr>
<tr>
<td>3 May</td>
<td>9</td>
<td>Filtering Risk Premia From the Forward Foreign Exchange Markets</td>
<td></td>
</tr>
<tr>
<td>10 May</td>
<td>10</td>
<td>Filtering Equity Risk Premia from Derivative Prices</td>
<td></td>
</tr>
<tr>
<td>17 May</td>
<td>11</td>
<td>Alternative Characterization of the Volatility in the Growth Rate of Real GDP</td>
<td>Assessment 1&amp;2 Due</td>
</tr>
<tr>
<td>24 May</td>
<td>12</td>
<td>Linkage Between Emerging and Developed Equity Markets</td>
<td></td>
</tr>
<tr>
<td>31 May</td>
<td>13</td>
<td>Interaction Between the Stock Market Volatility and the GDP</td>
<td></td>
</tr>
<tr>
<td>7 June</td>
<td>14</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td>14 June</td>
<td></td>
<td>Exam study period</td>
<td></td>
</tr>
<tr>
<td>21 June</td>
<td></td>
<td>Exam week</td>
<td></td>
</tr>
<tr>
<td>28 June</td>
<td></td>
<td>Exam week</td>
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</table>
Course Overview

This course is a core offering in the Applied Finance stream of the MFIN program.

This course begins with a review of probability and statistical techniques commonly used in quantitative finance. It covers estimation of parametric and non-parametric models with application to commonly encountered problems in finance. Introduces participants to suitable software products for exercises in these areas. The course then covers advanced tools to deal with economic and financial systems with unobserved components and its application to financial economics. Estimation technique of such models based on Expectation Maximisation algorithm are also discussed. Recent advances in research in the areas of speculative prices; market risk premium will be discussed. Throughout the course the emphasis is on computer implementation of various empirical techniques currently in use.

Assumed Knowledge

Participants need to be able to use a word processing package (such as WORD) and a spreadsheet (such as EXCEL). They should also have some familiarity with a statistical software package such as EVIEWS and some understanding of a programming language e.g. Fortran, C++, or GAUSS. Participants are assumed to have a good mathematics background and analytical skill as well as basic understanding of the concepts of probability and statistics.

Course Aims

The aims of this course are:

- To be able to analyse financial/economic systems with a view to developing a suitable empirical model
- To understand how to estimate the parameters of such a model using the most appropriate method from the variety of techniques introduced
- To evaluate the estimation results from the perspective of practical significance
- To understand how to incorporate unobserved components in an empirical model
- To appreciate how to build a regime changing model
- To develop confidence in using some of the standard software products for model implementation
Course Structure

Week 1
Week 2 (Basic probability theories, model estimation: parametric and non-parametric)
Week 3

Week 4
Week 5 (Unobserved component models and estimation issues)

Week 6 (Discrete time lattice models with applications to realistic situations)
Week 7

Week 8
Week 9 (Application of state space models discussed in weeks 4 and 5 to:
Speculative asset prices, risk premium in foreign exchange and equity markets)
Week 10

Week 11 (Models involving changes in regime driven by unobserved Markov chain;
Builds on Markov chain discussed in week 1; Applications include GDP
growth rate volatility, market linkage, interaction between stock market
and business cycle variable.)
Week 12
Week 13

Format and teaching approach

The course is offered through three-hour blocks of lecture and practice sessions combined over the whole session. In each weekly session the lecture part will first introduce the concepts and techniques related to the topic. This will be followed by computer-based relevant practical exercises to reinforce those concepts.

To benefit most from the class, it is important that the students read-ahead the topics before the class. It is also necessitated due to the highly advanced technical nature of the course. This would greatly help interaction between the participants in the class.
Staff and contacts

Course Coordinator

Course Coordinator: A/Prof. Ramaprasad Bhar
Email address: R.Bhar@unsw.edu.au
Telephone: 02 9385 4930
Location: Room 3056A, Level 3, Quadrangle Building
University of New South Wales, Kensington Campus

Administration Coordinator

MFin Coordinator: Kathleen Jarvis
Email address: k.jarvis@unsw.edu.au
Telephone: 02 9385 5864
Location: Room 3038, Level 3, Quadrangle Building
University of New South Wales, Kensington Campus

CBD Class Venue

Venue: Clifton and Associates
Address: 190-200 George Street, Sydney
Telephone: 02 9250 0999
Resources

The textbook

There is no one fixed textbook for this course. However, materials for some of the lectures are supported by the following list of reference books as well as the journal articles. Associate Professor Ram Bhar’s own research work and publications have contributed to the development of the remaining lecture topics, as identified in the relevant lecture materials.

Other useful resources

Reference Books and journals

Books:

Journal Articles:


Software

All exercises, assignments for this course require use of Excel, Eviews, or Gauss software environment.

Other

Course notes and related data and software will be available through WebCT

WebCT

Master of Finance courses use a WebCT environment for all on-line components. WebCT course sites may include such resources as lecture notes, timetables, class profiles, staff contact details and discussion areas. The WebCT site for this course can be accessed from the WebCT log-in page at: http://www.webct.unsw.edu.au.
Assessment

The following table gives an indication of the relative weighting of the assessment components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
<td>15%</td>
</tr>
<tr>
<td>Assignment 1</td>
<td>15%</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>15%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>55%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

A class quiz of 45 minutes duration will be held during week 5 or 6 of the lecture program. The two assignments will be due in week 12 and these will be based upon the topics covered in the first seven weeks. The final examination will cover all lecture topics and will be of three-hour open book style.

Students are responsible for becoming familiar with the rules about academic misconduct, including plagiarism (see the 2004 Master of Finance Student Information Guide for more details).

All exams are conducted in accordance with the UNSW Rules for the Conduct of Examinations and it is the student’s responsibility to be familiar with these rules. For more information, refer to the Master of Finance 2004 Student Information Guide or the UNSW examination website at: https://my.unsw.edu.au/student/atoz/Examinations.html

Participation

Active participation is an important component of the Master of Finance program. All students are expected to participate in class discussions and activities.
Grading and feedback

All assignments and examinations are assessed using the Fail, Pass, Credit, Distinction, and High Distinction grading system (see table below)

<table>
<thead>
<tr>
<th>Code</th>
<th>Grade</th>
<th>% Mark</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>High Distinction</td>
<td>85-100</td>
<td>An outstanding performance</td>
</tr>
<tr>
<td>DN</td>
<td>Distinction</td>
<td>75-84</td>
<td>A superior, well above average performance</td>
</tr>
<tr>
<td>CR</td>
<td>Credit</td>
<td>65-74</td>
<td>A good, above average performance</td>
</tr>
<tr>
<td>PS</td>
<td>Pass</td>
<td>50-64</td>
<td>An acceptable level of performance</td>
</tr>
<tr>
<td>FL</td>
<td>Fail</td>
<td>0-49</td>
<td>Unsatisfactory performance</td>
</tr>
</tbody>
</table>

A more comprehensive list of possible grades can be found at https://my.unsw.edu.au/student/atoz/Results.html

Unless otherwise indicated, feedback for all assessment (except final examination) will be provided within two weeks of submission.

Assignment submission

Unless otherwise arranged with the lecturer, all assessment must be submitted in the class in which it is due. All assignments must be accompanied by an Assessment Cover Sheet. Copies of the assessment cover sheet are available on the Master of Finance website at: http://www.mfin.unsw.edu.au/students/forms.htm

Late submission

Assignments are due on the date indicated in this overview. Extensions will only be granted on medical or compassionate grounds under extreme circumstances, and will not be granted because of work and other commitments. Requests for extensions must be made in writing to the lecturer prior to the due date. Medical certificates or other evidence of extreme misfortune must be attached and must contain information that justifies the extension sought.

Late assignments, which have not been granted an extension, will not be marked. While we are sensitive to problems that may arise from time to time, students are required to submit their assignments at the designated time in order to maintain a fair and equitable system.

Refer to the 2004 Master of Finance Student Information Guide for more information.
Word count & assignment format

Word count limits (if applicable) are strict and penalties will apply for exceeding the word limit.

All assessment should include an assignment cover sheet. Written work such as essays should be typed in 12point font, double spaced, and stapled with allowance made (3 cm on each side) in the margin for comments and feedback. Please do not bind assignments.

For mathematical or formula-based assignments, calculations and working should be shown.
Student responsibilities

Attendance and participation

Students are expected to be regular and punctual in attendance at all classes in the courses in which they are enrolled. It is important to note that if students attend less than eighty per cent of their possible classes they may be refused final assessment. All requests for non-attendance at class must be submitted to your lecturer or the Director, Master of Finance Program.

In addition to attendance at class, it is strongly recommended that students attend the Learning Partnership program, which aims to provide wide exposure to the kinds of practical issues faced in the management of financial institutions.

Academic honesty

Students and staff are governed by the normal laws, which regulate our daily lives. But in addition the University has its own code of rules and conduct. This is because good conduct and academic honesty are fundamental to the mission of the University as an institution devoted to the pursuit of excellence in scholarship and research, and to the service of society. These principles apply not only to students but to the whole University community, including staff engaged in research. They have been developed over many years and are widely supported by staff and students. Staff and students are committed to good conduct and academic honesty and are keen to see that these values and principles are upheld.

The University Council has defined student misconduct as follows (29th August 1994): Student misconduct includes student academic misconduct and also encompasses conduct which impairs the reasonable freedom of other persons to pursue their studies or research or to participate in the life of the University.

It is the responsibility of all students to familiarize themselves with the rules that govern student and academic misconduct. For more information, please see: https://my.unsw.edu.au/student/atoz/AcademicMisconduct.html

Plagiarism

Plagiarism is considered academic misconduct and, as such, will be severely penalized. Plagiarism involves using the work of another person and presenting it as one’s own. Acts of plagiarism include copying parts of a document without acknowledging and providing the source for each quotation or piece of borrowed material. These rules against plagiarism apply whatever the source of the work relied upon may be, whether printed, stored on a compact disc or other medium, found on the World Wide Web or Internet.
Similarly, using or extracting another person’s concepts, experimental results or conclusions, summarizing another person’s work or, where, there is collaborative preparatory work, submitting substantially the same final version of any material as another student constitutes plagiarism.

It is your responsibility to make sure you acknowledge within your writing where you have “sourced” the information, ideas and facts etc.

The basic principles are that you should not attempt to pass off the work of another person as your own, and it should be possible for a reader to check the information and ideas that you have used by going to the original source material. Acknowledgment should be sufficiently accurate to enable the source to be located speedily. If you are unsure whether, or how, to make acknowledgment consult your lecturer.

For more information on plagiarism and how to avoid it, visit the UNSW Learning Centre website: [http://www.lc.unsw.edu.au/onlib/plag.html](http://www.lc.unsw.edu.au/onlib/plag.html)