ACCG329 Security Pricing and Hedging Course Outline[†]

Semester 1, 2005

1 Brief Description and Objectives

This course explores the principles, theory and techniques of asset pricing. The first half of the course focuses on portfolio analysis and multifactor models applicable to problems in investment analysis and asset allocation.

The second half of the course focuses on pricing techniques driven by arbitrage arguments. Arbitrage or relative pricing arguments underpin powerful, robust methods for pricing derivative securities.

Upon successful completion of this unit you will:

1. understand the economic arguments underlying important asset pricing models

2. be able to apply the models to practical problems

2 Course Pre-requisites

1. ACCG253 (P) or ACST200

2. ECON141 or STAT271

3 Faculty

Dr Egon Kalotay, *Lecturer in Charge*, Office: C5C 437, Ph: 9850 8490, e-mail: ekalotay@efs.mq.edu.au

Dr Ryle Perera, *Lecturer*, Office: C5C 443, Ph: 9850 8578, e-mail: rperera@efs.mq.edu.au

4 Unit Administrator

Ms Charlene Chen, Office: C5C 498b, Ph: 9850 9282, email: cchen@efs.mq.edu.au

5 Prescribed Texts

Modern Portfolio Theory and Investment Analysis by Elton, Gruber, Brown and Goetzmann. 6th Edition, John Wiley and Sons, Inc, 2003. ISBN 0-0471-23854-6.

Options, Futures and Other Derivatives by Hull. 5th Edition, Prentice Hall, 2003. ISBN 0-13-046592-5.

6 Assessment

Your final grade will be determined by your performance in the mid-semester test, major assignment and final exam as follows:

Assessment Weights for Final Grading	
Major Assignment	20%
Mid Semester Test	30%
Final Exam	50%

MID-SEMESTER TEST & FINAL EXAM

A 90-minute mid-semester test, based on the topics covered in lectures 1-5 (inclusive), will be held on Tuesday evening in week 7 (April 12, 2005).

The final exam will be a two hour paper based primarily on the material covered in weeks 8-13 (inclusive).

You must achieve a satisfactory level of performance in *both* the mid-semester test and the final exam to pass the course.

Non-programmable calculators may be used in both the mid-semester test and final exam. You are not permitted to use dictionaries in either the test or final exam.

MAJOR ASSIGNMENT

The major assignment will be a group project based on the material covered in weeks 1-5 of the course. I will provide the specific guidelines in week 3, together with administrative details.

Please note the following:

- Charlene Chen will maintain a master list of groups. Groups will need to be finalised by the end of week 3. If you do not know anyone in the course and want to be assigned to a group, then please e-mail Charlene (cchen@efs.mq.edu.au) by the end of week 1.

- Your assignment will need to include a statement of how much each member of the group contributed to the submitted work (summarised as a percentage contribution). Since you receive a group mark for your work, individual marks will need to be adjusted if there are unequal contributions. **I strongly encourage each of you to log your work progressively to avoid any confusion, arguments or 'misunderstandings'.**

- The major assignment is to be submitted at the beginning of the Tuesday lecture in week 12. Late submissions will attract a 10% penalty for each day of delay. Days end at 5:00pm for submission purposes. No assignment will be accepted after 5:00pm Friday, June 3.

7 Lecture Topics, Reading and Tutorial Assignments

IMPORTANT: If there are errors in the lecture notes or other documents (such as tutorial solutions or this course outline) they will be fixed as soon as the relevant lecturer becomes aware of them. To prevent any confusion we will version number all documents. In this way you can periodically visit the web page to check if you have the latest version of any given document.

Week 1: Optimal Portfolio Choice: Estimation Issues (*Week beginning February 28, 2005)*

Lecturer: Egon Kalotay

Reading: Elton, Gruber, Brown and Goetzmann (EGBG): Chapters 4,5 and 6.

Tutorial Questions due Week 2: Ch 4: Q 1, Ch 5: Q 1, 5, & 6, Ch 6: Q 1, 3 & 5. The question from chapter 4 is intended as revision.

Week 2: Optimal Portfolio Choice: Pragmatic Approaches and the CAPM (*Week beginning March 7, 2005)*

Lecturer: Egon Kalotay

Reading: EGBG Chapters: 7,8,9 & 13

Tutorial Questions due Week 3: Ch 7: Q 1, 2, 5, 6, & 8, Ch 9: Q 1, 2 & 3, Ch 13: Q 1, 2, 3, 4, 5, & 8. PLUS: See lecture notes for additional questions.

Week 3: The Arbitrage Pricing Theory (*Week beginning March 14, 2005)*

Lecturer: Egon Kalotay

Reading: EGBG Chapter 16

Tutorial Questions due Week 4: Ch 16: Q: 1, 2, 3,& 4. PLUS: See lecture notes for additional questions.

Week 4: Informational Efficiency (*Week beginning March 21, 2005)*

Lecturer: Egon Kalotay

Reading: EGBG Chapter 17

Tutorial Questions due Week 5: Refer to the lecture notes

Week 5: Multifactor Pricing Models: Theory, Evidence & Applications (*Week beginning March 28, 2005)*

Lecturer: Egon Kalotay

Reading: EGBG Chapter 14 & 15

Tutorial Questions due Week 6: Refer to the lecture notes

NOTE: March 28 is the Easter Monday public holiday - there are no Monday classes this week.

Week 6: Introduction to Derivatives (*Week beginning April 4, 2005)*

Lecturer: Ryle Perera

Reading: Hull Chapters 1, 2 & 7

Tutorial Questions due <u>Week 8</u>: Hull, Ch 1 Questions and Problems (Q&P):1.2, 1.28, 1.29, Ch 2 Q&P: 2.3, 2.4, 2.12, 2.26, Ch 7 Q&P: 7.1, 7.4, 7.6, 7.7, 7.11

Week 7: Mid-Semester Test (*Week beginning April 11, 2005)*

No tutorials in week 7. The mid-semester test will be held this week. Most students will sit the test during the Tuesday 5-7pm lecture time on April 12. Due to larger than expected enrolment numbers, some students may be required to sit the test at 7-9pm on the same night. We'll provide you with further details in lectures and on the web as the date approaches.

Mid-Semester Break (*April 16-May 1, 2005)*

Week 8: Forwards, Futures and Swaps (*Week beginning May 2, 2005)*

Lecturer: Ryle Perera

Reading: Hull Chapters 3 & 6

Tutorial Questions due Week 9: Hull, Ch 3 Q&P: 3.3, 3.6, 3.12, 3.17, 3.19,

3.24, Ch 6 Q&P: 6.1, 6.3, 6.7, 6.14, 6.15

Week 9: Basic Properties of Option Prices (*Week beginning May 9, 2005*)

Lecturer: Ryle Perera

Reading: Hull Chapter 8

Tutorial Questions due Week 10: Hull, Ch 8 Q&P: 8.2, 8.7, 8.10, 8.15, 8.21, 8.22

Week 10: Introduction to Binomial Trees and Stock Price Behaviour (*Week beginning May 16, 2005*)

Lecturer: Ryle Perera

Reading: Hull, Chapters 10 & 11

Tutorial Questions due Week 11: Hull Ch 10 Q&P: 10.1, 10.3, 10.4, 10.9, Ch 11 Q&P: 11.2, 11.4, 11.5, 11.9

Week 11: Option Pricing using Black Scholes (*Week beginning May 23, 2005*)

Lecturer: Ryle Perera

Reading: Hull, Chapters 12 & 13

Tutorial Questions due Week 12: Hull Ch 12 Q&P: 12.1, 12.2, 12.3, 12.4, 12.5, 12.7, 12.18, Ch 13 Q&P: 13.4, 13.6, 13.16, 13.18, 13.27

Week 12: Hedging Derivatives and Introduction to Value at Risk (VaR) (*Week beginning May 30, 2005*)

Lecturer: Ryle Perera

Reading: Hull, Chapters 14 & 16

Tutorial Questions due Week 13: Hull Ch 14 Q&P: 14.2, 14.3, 14.4, 14.5, 14.12, 14.13, Ch 16 Q&P: 16.3

Week 13: Revision (*Week beginning June 6, 2005*)

Lecturer: Egon Kalotay

ABOUT LECTURES: There are two lecture streams. The first is on Mondays 5-7pm in W5A T2, the second on Tuesdays 5-7pm in X5B T1. Attendance at lectures is not compulsory, but highly recommended.

LECTURE NOTES: will be available on the web, prior to the lecture - usually the week before the lecture. Enter the course code and log in to the course web page from: **http://www.lib.mq.edu.au/resources/reserve/** and check the announcements page regularly for updates.

The lecture notes define the course content; the textbooks should be viewed as a supplement to the lecture notes. As a general rule, if the textbook covers material that is not mentioned in the lectures, it will only be examinable if it is covered in one of the assigned tutorial questions.

ABOUT READINGS AND HOMEWORK: Always check the lecture notes for additional reading or additional tutorial questions. The reading guide provided above is approximate: there may be material in some of the chapters that are not covered in the course, or there may be material in lectures not covered in the book.

ABOUT TUTORIALS: Tutorial lists will be posted outside ERIC, together with instructions on how to change tutorials. Attendance at tutorials is recommended but **optional**. Tutorials are run to discuss problems with students who have attempted assigned tutorial questions beforehand. Tutorials are not a session for mindlessly copying down solutions. Solutions to tutorial questions will be made available in ERIC in the week following the relevant lecture.

Tutors will maintain a record of participation in 2005. Whilst tutorial attendance does not carry any weight in grading, it will be used as one of the criteria in assessment of applications for special consideration at the end of semester - particularly in cases where performance in other assessment tasks is marginal.

8 Regarding Special Consideration

Students requesting special consideration should acquaint themselves with: Bachelor Degree Rules 6(3) and 8 by reading the University Calendar or visiting the website at http://www.cal.mq.edu.au/

A FAMOUS APPEAL

The following concerns a question in a physics degree exam at the University of Copenhagen.

"Describe how to determine the height of a skyscraper with a barometer."

One student replied:

"You tie a long piece of string to the neck of the barometer, then lower the barometer from the roof of the skyscraper to the ground. The length of the string plus the length of the barometer will equal the height of the building."

This highly original answer so incensed the examiner that the student was failed immediately. The student appealed on the grounds that his answer was indisputably correct, and the university appointed an independent arbiter to decide the case. The arbiter judged that the answer was indeed correct, but did not display any noticeable knowledge of physics. To resolve the problem it was decided to call the student in and allow him six minutes in which to provide a verbal answer which showed at least a minimal familiarity with the basic principles of physics.

For five minutes the student sat in silence, forehead creased in thought. The arbiter reminded him that time was running out, to which the student replied that he had several extremely relevant answers, but couldn't make up his mind which to use. On being advised to hurry up the student replied as follows:

"Firstly, you could take the barometer up to the roof of the skyscraper, drop it over the edge, and measure the time it takes to reach the ground. The height of the building can then be worked out from the formula H = 0.5g x t squared. But bad luck on the barometer."

"Or if the sun is shining you could measure the height of the barometer, then

set it on end and measure the length of its shadow. Then you measure the length of the skyscraper's shadow, and thereafter it is a simple matter of proportional arithmetic to work out the height of the skyscraper."

"But if you wanted to be highly scientific about it, you could tie a short piece of string to the barometer and swing it like a pendulum, first at ground level and then on the roof of the skyscraper. The height is worked out by the difference in the gravitational restoring force $T = 2 \pi \sqrt{l / g}$."

"Or if the skyscraper has an outside emergency staircase, it would be easier to walk up it and mark off the height of the skyscraper in barometer lengths, then add them up."

"If you merely wanted to be boring and orthodox about it, of course, you could use the barometer to measure the air pressure on the roof of the skyscraper and on the ground, and convert the difference in millibars into feet to give the height of the building."

"But since we are constantly being exhorted to exercise independence of mind and apply scientific methods, undoubtedly the best way would be to knock on the janitor's door and say to him 'If you would like a nice new barometer, I will give you this one if you tell me the height of this skyscraper'."

The student was Niels Bohr, the only Dane to win the Nobel prize for Physics.