

MACQUARIE
UNIVERSITY



FACULTY OF
BUSINESS AND ECONOMICS

ACST829

**CAPITAL BUDGETING AND
FINANCIAL MODELLING**

Semester 1, 2011

Department of Applied Finance and Actuarial Studies

**MACQUARIE UNIVERSITY
FACULTY OF BUSINESS AND ECONOMICS
UNIT OUTLINE**

Study Period: Semester 1 2011

Lecturer in Charge: Tim Kyng

Credit Points: 4

Prerequisites / Co-requisites: ACST603 or equivalent

Not to Count for Credit With: Nil

Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit.

ABOUT THIS UNIT

The purpose of the unit is:

- to teach students about established methods for the valuation and appraisal of investment projects
- Introduce the new “real options approach” to investment appraisal
- learn to use microsoft excel to build the financial models and perform the calculations for these methods
- introduce students to visual basic / excel macros

The unit covers established methods for the evaluation of investment projects and introduces the “real options approach” to this. The unit also teaches students how to use excel for building financial models and to perform project evaluation.

TOPICS

BASIC FINANCIAL THEORY

Basic financial mathematics: interest rates, present value, future value, annuities, bond valuation.

Methods for investment appraisal: Net Present Value, Internal Rate of Return, Payback Period, Accounting rate of return.

Analysis of leasing and leveraged leasing using IRR, NPV and other measures. Analysis of lease versus buy, lease versus borrow and buy, sale and leaseback decisions.

CAPITAL BUDGETING BASICS

- Overview of capital budgeting
- Project analysis under certainty: applications of NPV and IRR.
- Estimation of cashflows and discount rates for project appraisal
- Project analysis under risk: risk and uncertainty, the risk adjusted discount rate and certainty equivalent approaches, cost of capital
- estimation of parameters for financial models: quantitative and qualitative approaches
- approaches to dealing with risk and uncertainty in project appraisal: sensitivity and breakeven analysis, Simulation concepts and methods

OPTIONS AND REAL OPTIONS ANALYSIS

- Introduction to options: calls and puts, European and American options,
- Valuation of options using Black Scholes formulae, Monte Carlo Simulation and Binomial Tree methods: The arbitrage free / risk neutral valuation methodology.
- Options embedded in investment projects.
- Flaws in existing methods of project appraisal
- The “real options approach” to project valuation
- Exotic options formulae relevant to real options and project appraisal (compound options, switching options, chooser options, etc)

Excel for financial modelling:

- Introduction to excel
- writing excel formulae, copying and pasting, absolute and relative cell referencing.
- Financial modelling / analysis of leasing and leveraged leasing / Estimating beta factors and the security market line
- elementary methods of forecasting: linear regression, multiple regression, moving averages and weighted moving averages
- Excel functions: statistical functions, financial functions, date functions, array and matrix functions / using excel for simple and multiple linear regression / Monte carlo simulation in excel
- Building and using binomial trees for valuation of contingent claims and options

Visual basic for applications (VBA)

- User defined functions
- Conditional execution: using if and select case statements
- Types and loops
- Arrays: simple, multidimensional and dynamic arrays

TEACHING STAFF

Name	Role in unit	Phone	Email
Tim Kyng	Lecturer in Charge	98507289	timothy.kyng@mq.edu.au
To be advised	Tutor		

CONSULTATION TIMES

Consultation is available with students by appointment. Please see your lecturer during class time or email timothy.kyng@mq.edu.au to arrange a mutually agreeable time.

Tutor: to be advised

CLASSES

For campus students:

- A 2-hour lecture will be held each week at E4B214 on Friday from 10am to mid day.
- A 1-hour tutorial will be held each week at E4B214 on Friday from 1pm to 2pm.
- Further information on timetable can be found on the University web site at: <http://www.timetables.mq.edu.au>

For distance students:

- Lectures will be available by the use of Web Conferencing Software. That means you can participate lectures live. The exact URL to participate lectures live will be provided on Blackboard.
- All lecture and tutorial exercises and solutions will be available on Blackboard.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Textbook:

There is no specific required text for this unit. However the following books are useful references:

Capital budgeting: by Dayananda et al (ISBN 0 521 52098 3)
Financial Modelling: by Simon Beninga (ISBN 0 262 02482 9)

For the novice excel user, the book Teach Yourself Visually Excel 2003 by Maran (ISBN 0-7645-3996-5) is a good way to quickly learn the basics of excel assumed for this unit.

TECHNOLOGY USED AND REQUIRED

- Students will require access to the internet to download lecture slides and tutorial solutions.
- The assignments and most tutorial exercises will require the use of excel spreadsheet programs and possibly word processing software.
- Classes are held in a computer laboratory and each week we will work through various spreadsheet building exercises

UNIT WEB PAGE

To access the Blackboard website, go to <http://learn.mq.edu.au> and login using your usual login and password. You will then have access to the websites for all the units in which you are enrolled. If you have any trouble logging in (e.g. you have forgotten your password), please contact the Student IT Helpdesk.

Blackboard will contain all materials for this subject.

LEARNING OUTCOMES

The learning objectives of this unit are:

- 1)to gain an understanding of current established methods for the valuation and appraisal of investment projects
- 2)develop an introductory understanding of the “real options approach” to investment appraisal
- 3)to learn to use microsoft excel to build the financial models and perform the calculations to implement these methods
- 4)learn how to develop user defined functions using visual basic and use them from within excel

The learning outcomes of this unit are:

- 1) to be able to understand and apply current established methods for the valuation and appraisal of investment projects
- 2) to be able to critically evaluate these methods and their application
- 3) to be able to apply the knowledge of financial theory and mathematics to a wide range of financial and investment decisions
- 4) demonstrate awareness of the “real options approach” to investment appraisal and be able to apply it in simple situations
- 5) have an appreciation of the need for documentation and critical appraisal of the financial models used, the assumptions inherent in them and the parameter estimation methods used
- 6) have an appreciation of the need to document a spreadsheet implementation of a financial model
- 7) develop expertise in using excel’s built in financial and other functions, tools and capabilities to build financial models
- 8) develop problem solving skills and in particular develop skills in formulating a mathematical / financial problem and its solution into a spreadsheet model

TEACHING AND LEARNING STRATEGY

- The unit is taught via a combination of lectures, tutorial exercises and computer lab exercises. We cover many examples of financial valuation and decision making problems and how to solve these using spreadsheets. Our approach is one of learning by example and by practicing using excel to solve financial decision making problems.
- Students are expected to work independently. The assignments and the final exam will include the development of various excel spreadsheets and documentation for these, as well as essays / written reports and so on.

week	Topics Covered
1	(1) Basic Financial mathematics: Interest rates, present value, future value, annuities, perpetuities, bonds; (2) Introduction to excel
2	(1) Introduction to capital budgeting. (2) Further topics in financial mathematics: Present value and future value under varying interest rates, loans and leases, loan repayment schedules
3	(1) Project cashflows and methods for their estimation. (2) Examples of asset expansion, retirement and replacement projects
4	(1) Elementary methods of forecasting. (2) Matrix algebra and implementation in excel
5	(1) Analysis of leasing decisions, lease vs buy, (2) leveraged leases and their analysis using alternative measures of return.
6	(1) Project evaluation methods: npv, irr, pp, acr. Application to asset replacement, retirement and expansion projects. (2) Methods for choosing the discount rate for npv analysis.
7	(1) Methods for estimating model parameters (2) Sensitivity and breakeven analysis: implementation in excel
8	(1) Introduction to options and valuation via the black scholes model, (2) monte carlo simulation modelling for stock prices and options
9	Binomial option pricing methods and implementation in excel
10	The flaws in the traditional methods of investment appraisal and introduction to the real options approach to valuation of projects with flexibility
11	More on real options analysis: parameter estimation, embedded exotic options, application of exotic option valuation theory to real options examples
12	(1) Introduction to visual basic for the design of user defined functions. (2) Application to the pricing of compound options and other exotic options occurring in a real options context.
13	Final exam

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

Assessment Two assignments: 50%

Final exam: 50%

The assignments and the final exam will include the development of various excel spreadsheets and documentation for these, derivations of relevant mathematical formulae for solving financial decision problems, as well as essays / written reports on the theory and practice of financial decision making.

GRADUATE CAPABILITIES

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world.

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This unit contributes to this by developing the following graduate capabilities:

1. Application of Financial Mathematics and Finance Theory to many hypothetical and real world problems
2. Ability to develop spreadsheet models and implementations of the mathematical / financial theory for the purpose of analysing hypothetical and real world financial decisions. This is a highly valuable skill to have in the current workplace
3. Critically analyse current and historical issues in Financial Modelling and methodologies used in investment evaluation and decision making
4. Use of Integrative thinking to understand the role of financial and economic theory, mathematics and statistics in formulating solutions to financial and economic decision making problems and how to implement these in a spreadsheet program

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

A one hour multiple choice test will be conducted in week 4. The purpose of this test is to allow students to assess their progress and identify those students that are struggling with the subject matter. Where students are identified as being at risk they shall be invited to meet with their lecturer to discuss actions that will be implemented to address any issues. This test will not count for assessment purposes.

A final exam will be held in week 13, in class. This will be an open book exam and will be conducted in the same room as the lectures, which is a computer laboratory. The exam will be comprised of essay type questions, some numerical calculations, some mathematical derivations, and a take home project to develop a spreadsheet and its documentation for solving a complex financial decision problem

The assignments will be comprised of numerical calculations, mathematical derivations, short essays and development of spreadsheets for solving problems covered in lectures in the weeks prior to the due dates for the assignments.

	Assignments	Final exam
Due date	Assignment 1: 8 April Assignment 2: 13 may	Week 13
% Weighting	25% each	50%
Grading method	As advised on the assignment documents	As advised in class before the date of the final exam
Submission method	Submit to lecturer no later than due date	In class for a normal 2 ½ hour exam, plus a take home spreadsheet development exercise due in week 14
Feedback (<i>type, method, date</i>)	Assignments and comments returned to students within 10 working days	N/A
Estimated student workload (hours)	28 hours each	28 hours in total
Learning outcomes assessed		
1	TBA	TBA
2	TBA	TBA
3	TBA	TBA
4	TBA	TBA
5	TBA	TBA
6	TBA	TBA
Graduate capabilities assessed		
1	TBA	TBA
2	TBA	TBA
3	TBA	TBA
4	TBA	TBA
5	TBA	TBA

TBA = “to be advised”

ACADEMIC HONESTY

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately.

Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

GRADES

Macquarie University uses the following grades in coursework units of study:

HD - High Distinction
D - Distinction
CR - Credit
P - Pass
F - Fail

Grade descriptors and other information concerning grading are contained in the Macquarie University Grading Policy which is available at: <http://www.mq.edu.au/policy/docs/grading/policy.html>

GRADING APPEALS AND FINAL EXAMINATION SCRIPT VIEWING

If, at the conclusion of the unit, you have performed below expectations, and are considering lodging an appeal of grade and/or viewing your final exam script please refer to the following website which provides information about these processes and the cut off dates in the first instance. Please read the instructions provided concerning what constitutes a valid grounds for appeal before appealing your grade.

http://www.businessandconomics.mq.edu.au/new_and_current_students/undergraduate_current_students/how_do_i/grade_appeals

SPECIAL CONSIDERATION

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be

circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. A special consideration policy exists to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. The policy is available at: http://www.mq.edu.au/policy/docs/special_consideration/procedure.html

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at <http://www.student.mq.edu.au>.

IT CONDITIONS OF USE

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorised coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilising University IT facilities. The following regulations apply to the use of computing facilities and online services:

- Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.
- Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action without further notice.

Students must use their Macquarie University email addresses to communicate with staff as it is University policy that the University issued email account is used for official University communication.