



ECFS871

Risk and Portfolio Construction

AFC Term 1 MB 2017

Dept of Applied Finance and Actuarial Studies

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Disclaimer

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General Information

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|--|
| Unit convenor and teaching staff Lecturer Anthony Corr anthony.corr@mq.edu.au Contact via Email |
| Credit points 2 |
| Prerequisites (Admission to MAppFin or GradDipAppFin) and (AFCP801 or ECFS865) |
| Corequisites |
| Co-badged status |
| Unit description This unit deals with the identification, measurement and control of various risks within an investment management process. The emphasis is on gaining an in-depth qualitative understanding of the concepts. The sessions are partly treated as if the class group is an investment management firm's asset allocation committee. Emphasis is placed on the process that could be undertaken in a hypothetical firm. Discussion of the portfolio manager's mandate and how this affects the definition of portfolio risk leads to questions of the fundamental concepts of risk, sources of risk and the variety of control methods needed. Qualitative and quantitative control methods are examined. Portfolio construction techniques follow, with a focus on a wide range of optimisation techniques controlling these risks. |

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
- Understand, apply and interpret strategies to control portfolio risks, including their

appropriate applications and limitations.

Construct and effectively manage an institutional portfolio.

Apply appropriate alternative portfolio construction and risk control techniques to 'real world' situations, especially life cycle investing.

General Assessment Information

To pass this unit (requires a Mark of 50 or better) the student must pass the final examination.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|-------------------------------------|-----------|--------|--------------------|
| Pre-Unit Assignment | 5% | No | First class |
| Assignment | 35% | No | Refer to iLearn |
| Final Exam | 60% | Yes | Refer to Timetable |

Pre-Unit Assignment

Due: **First class**

Weighting: **5%**

Summary of Assessment Task

Individual / Group: Individual

Due Date: In first class

Grading Method: Refer to 'Standards Required to Complete the Unit Satisfactorily' section

Submission Method: At start of first class

Duration: Refer to Assignment coversheet

Extension Requests:

- No extensions are permitted.
- Late submission will result in zero marks.

On successful completion you will be able to:

- Apply appropriate alternative portfolio construction and risk control techniques to 'real world' situations, especially life cycle investing.

Assignment

Due: **Refer to iLearn**

Weighting: **35%**

Summary of Assessment Task

Individual / Group: Individual

Due Date: Refer to the Unit's iLearn site

Grading Method: Refer to 'Standards Required to Complete the Unit Satisfactorily' section

Submission Method: Online via Turnitin on the Unit's iLearn site

Duration: Refer to Assignment coversheet

Extension Requests:

- If you have extenuating circumstances that prevent you from submitting your assignment by the due date, please make arrangements with your Lecturer prior to the due date.
- Unless prior arrangements have been made, any late submission of assignments will automatically be penalised. In the absence of special circumstances, the penalty will be 10% of the available marks for the assessment for each business day (or part thereof) they are late.

Other Information: The Assignment will be placed on iLearn.

On successful completion you will be able to:

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- Construct and effectively manage an institutional portfolio.
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Final Exam

Due: Refer to Timetable

Weighting: 60%

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Summary of Assessment Task

Individual / Group: Individual

Due Date: Refer to Timetable. Assessments: Different Class Groups have different deadlines. Students should find the timetable and dates relevant to their group at www.mafc.mq.edu.au

Grading Method: Refer to 'Standards Required to Complete the Unit Satisfactorily' section

Submission Method: As per MAFC Program Rules & Procedures at www.mafc.mq.edu.au

Duration: 2 hours plus 10 minutes reading time

Examination Conditions:

- All examinations are open book. Any material and aid is permitted.
- Exam times and locations are noted in the unit timetable at www.mafc.mq.edu.au.
- Refer to MAFC Program Rules & Procedures at www.mafc.mq.edu.au.

Extension Requests:

- You are expected to present yourself for examination at the time and place designated in the relevant MAFC Timetable at www.mafc.mq.edu.au.
- Deferral of an examination is not permitted, unless special consideration has been approved by the Director of Studies under the University's Disruption to Studies Policy.
- Refer to MAFC Program Rules & Procedures at www.mafc.mq.edu.au for information on the University's Disruption to Studies Policy or non-attendance at an examination.

On successful completion you will be able to:

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
- Understand, apply and interpret strategies to control portfolio risks, including their appropriate applications and limitations.
- Construct and effectively manage an institutional portfolio.
- Apply appropriate alternative portfolio construction and risk control techniques to 'real world' situations, especially life cycle investing.

Delivery and Resources

CLASSES

Face-to-Face Teaching: Generally 20 hours

Timetable: Detailed timetable for classes are on the Centre's web site www.mafc.mq.edu.au

Consultation Times:

Students who wish to contact any of the teaching staff may do so through:

- The Unit's iLearn site, in relation to general queries (so that all students may benefit); or
- Individual consultation with the lecturer by email in the first instance, if necessary.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Text: Nil

Additional Readings:

- Additional readings are included in the unit notes and on iLearn.
- **Students should assume these readings are examinable unless otherwise advised.**

Lecture Notes: Available in printed form and electronically via iLearn.

Study Problems: Students are required to work systematically through suggested technical examples. These examples will not be collected but they will help you prepare for the exams. Answers to the examples will be posted to iLearn.

Calculators: In examinations, hand held calculators are permitted. Mobile phones and computers are not permitted.

Assumed Knowledge: Mathematical content

- Finance has a high level of numerate content. Consequently this Unit is, in parts, mathematical and arithmetical. As an indication of the level of algebra required, students should find the following problem easy to solve:

$$\text{Solve for } Z_5: \$1,000 = \$681.20(1+Z_5/2)^{10}$$

- Occasionally the Unit dips into the differential calculus. As an indication of the level of calculus required, Students should be able to interpret the following equation:

$$D = - ((1+y) / P) (\Delta P/\Delta y)$$

- Students should look at the Web link below to obtain notes on the minimum mathematical and statistical knowledge required to undertake the Master of Applied Finance degree: <http://www.mafc.mq.edu.au/applications/minimum-knowledge-requirement/pre-course-materials1/>
- Statistical content: as noted under “Pre-Unit Material” above.

Assumed Access: Access to a computer with word processing and spreadsheet capability is assumed, as is general student computer literacy.

TECHNOLOGY USED AND REQUIRED

Unit iLearn Site:

- Found by logging on to iLearn ilearn.mq.edu.au, then clicking on **Risk and Portfolio Construction**.
- This is where you will find forums, downloadable resources and links to important

pages.

- The forum allows you to communicate with other students and lecturer(s) and may provide supplementary material.
- You are requested to post your questions on the forums at least 24 hours prior to the assignment submission date or the examination date. Questions posted after that time may not be answered. **Please try to not leave your questions to the last few days.**

Important Notice:

- It is important that you familiarize yourself with the Unit's iLearn site.
- Students should check the Unit's iLearn site regularly (minimum twice a week and prior to all lectures) and look for updates and distribution of materials (including case studies) related to the unit or assessments and, if relevant, participate in forum discussions.

Unit Schedule

Introduction to risk

- What is risk?
 - Volatility of return, unacceptable level of return, surprise?
 - Standard deviation, Downside risk, tracking error etc
 - Market risk, competitor risk etc
 - Benchmark related risk
 - Explicit risk and implicit risk
 - Risk in single sector portfolios vs diversified portfolios
- What are the objectives of the investment process
- The role of benchmarks in portfolio construction
- Utility theory

Measurement and assessment

- How can risk be measured?
 - Ex post vs ex ante risk
 - Statistical problems
 - Interpretation
- Quantitative problems
 - Statistical, estimation, and model specification effects
 - Data mining
- Analysis of portfolio return

Resampling & Bootstrapping

- Rationale
- Example

Black-Litterman Methodology

- Reverse optimisation
 - Rationale and interpretation
- Black-Litterman
 - Rationale
 - Simple example
 - Practical use

Life Cycle Investing

- Introduce asset-liability investment management in a general framework
- Funding retirement income stream using the cash flow model developed in the LCI unit
- Strengths and weaknesses

Improving Monte Carlo simulations

- Variance reduction techniques to speed up the Monte Carlo analysis
 - Antithetic variates
 - Control variates
 - Reuse of random numbers
- Practical examples using the LCI model

Modelling investment returns

- More technical details to modelling investment returns for one asset and multiple asset buckets including correlation.
- Long-term estimates of mean returns, volatilities, correlations.
- Analysis of random walk vs some mean reversion process (e.g. valuation reversion)

Analysing portfolios

- Analysing different portfolio structures, e.g.
 - Glide path vs static asset allocation
 - Layering for safety
 - Option protection

Learning and Teaching Activities

Strategy

The Master of Applied Finance degree adopts a deep teaching and learning strategy, in which Students acquire and retain knowledge and also are able to make sense of the issues and concepts and apply them in the “real world”. The degree relies heavily on student engagement and participation by: (a) Continuous learning throughout the semester. This is encouraged through a combination of students undertaking prescribed reading throughout the units and / or completion of practice problems, case studies, assignments, class presentations etc and interaction via forums in the unit’s iLearn site; and (b) Assessments, which enable the student to demonstrate his / her understanding of the learning objectives achieved through the continuous learning.

Student Participation

Students participate in this unit by: (a) Attending lectures and participating in class discussion; (b) Before each class, completing the recommended readings of notes and text, and working systematically through suggested problem sets; (c) Interacting on the unit’s iLearn site; and (d) Completing all assessment tasks and exams. On average the unit will require students to complete, for every hour of class time, approximately 3 hours private study.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](#).

Students should also consult the MAFC Program Rules & Procedures found at <http://www.mafc.mq.edu.au>

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student enquiry service (MAFC-specific)

For all student enquires, please contact studentsupport@mafc.mq.edu.au

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Learning Skills

Learning Skills (http://www.students.mq.edu.au/support/learning_skills/) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
- Understand, apply and interpret strategies to control portfolio risks, including their appropriate applications and limitations.
- Construct and effectively manage an institutional portfolio.
- Apply appropriate alternative portfolio construction and risk control techniques to 'real world' situations, especially life cycle investing.

Assessment tasks

- Pre-Unit Assignment
- Assignment
- Final Exam

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
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Assessment tasks

- Pre-Unit Assignment
- Assignment
- Final Exam

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
- Understand, apply and interpret strategies to control portfolio risks, including their appropriate applications and limitations.
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Assessment tasks

- Pre-Unit Assignment
- Assignment
- Final Exam

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- Identify and measure the various sources of institutional portfolio risks.
- Distinguish the key attributes of alternative portfolio construction techniques, including their appropriate applications and limitations.
- Understand, apply and interpret strategies to control portfolio risks, including their appropriate applications and limitations.
- Construct and effectively manage an institutional portfolio.
- Apply appropriate alternative portfolio construction and risk control techniques to 'real world' situations, especially life cycle investing.

Assessment tasks

- Pre-Unit Assignment
- Assignment
- Final Exam

Changes from Previous Offering

Unit Schedule updated.

Important Notice

This Unit Guide may be subject to change. The latest version is on the Centre's web site www.mq.edu.au.

Students should read the Unit Guide carefully at the start of semester. It contains important information about the Unit. If anything is unclear, please consult one of the unit lecturers.

Standards Required to Complete the Unit Satisfactorily

University Policy on Grading:

- Macquarie University's Academic Senate has established a Grading Policy available at <http://www.mq.edu.au/policy/docs/grading/policy.html>. Your final result will include:
 - A Grade ranging from Fail to High Distinction; and

- A numerical Mark, which is a summation of the individual assessment components, providing the examination component is passed.
- It is important to note:
 - The Policy does not require that a minimum or maximum number of students are to be failed in any unit;
 - Grades will not be allocated to fit a predetermined distribution; and
 - Grades for all individual assessment items will be released to students, but Marks may not necessarily be released.

Specific Unit Grading:

- To pass this unit (requires a Mark of 50 or better) the student must pass the final examination.
- All final Marks and Grades in the Applied Finance Centre are determined by a grading committee and are not the sole responsibility of the unit convenor.
- The core criteria used to assess student work in this unit are:
 - Knowledge and understanding: Understanding key ideas, knowledge and use of concepts.
 - Application: Ability to apply theoretical ideas and frameworks in practice and in a critically reflective way.
 - Reasoning and analysis: Ability to analyse, use critical reasoning and principles to formulate a position, balancing theory and personal reflection.
 - Professional literacy and research: Understanding of professional factors (language and landscape) and ability to undertake appropriate research.
 - Communication and presentation: Ability to communicate and present effectively (written and oral, as relevant).
 - Use of mathematical and statistical ideas: Ability to use mathematical and statistical ideas, methods and formulae appropriately.
- Performance in relation to each of these criteria are assessed against the University’s grading descriptors:

| Grade | Expectation |
|------------------|---|
| High Distinction | Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the discipline. |
| Distinction | Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience. |

| Grade | Expectation |
|--------|--|
| Credit | Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the discipline. |
| Pass | Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes. |
| Fail | Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline. |

Review of Grade and final examination Script viewing:

- A student who has been awarded a final grade for a unit and who does not believe it is an accurate reflection of their performance, and has grounds for such a claim and can demonstrate those grounds, may apply to have their grade reviewed.
- For information on requesting a review of grade and/or viewing your final exam script, please refer to the University’s Grade Appeal Policy at <http://www.mq.edu.au/policy/docs/gradeappeal/policy.html> and MAFC Program Rules & Procedures at <http://www.mafc.mq.edu.au>.