Derivatives and Risk Management

Professor: Manuel Moreno Fuentes  
E-mail: manuel.moreno@uclm.es  
Office hours: by appointment

Objectives

The goal of this course is to study the fundamentals of financial risk management using in most of the cases derivatives assets. The course has three main objectives:

a) To understand the role of financial risk management as well as the techniques available for its measurement in financial and non-financial corporations.

b) To review the set of financial instruments available in modern financial markets as well as the strategies that a firm can use to optimise the management of the risks this company is faced to, and

c) To build a framework that will help integrate financial risk management into the overall corporate strategy of the firm.

In summary, the main objective of this course is to present an overview of the different potential applications for risk management of derivative assets. Other potential applications of derivatives that can also be covered are, for instance, a) speculation in markets (how to get money departing from a certain guess on future movements in markets) and b) design of (arbitrage) strategies to make riskless profits from observed arbitrage opportunities.

Course Description

The course focuses on the area of financial risk management with special emphasis on financial derivatives. This type of assets represents one of the key components of modern financial markets. The mere size of derivatives markets (futures, options, swaps, etc.) dwarfs that of any other type of markets in existence and is measured in thousands of trillions of U.S. dollars. The key reason for that is that financial assets allow astute investors to easily change risk exposure of their investment portfolios and, thus, tailor them to their particular needs and desires.

In this course, we depart from the design and pricing of financial derivatives and we aim to understand how such contracts are used in the management practice around the world. While pricing of derivatives can be rather technical and complex, the fundamental economic reasoning behind derivatives pricing methods is quite simple. In our approach, we aim to give always first the “big picture” and motivation and only then dwell into technical details as it will be necessary from the practical point of view. At the end of the course you should be able to understand the structure of the main types of derivative contracts and, even more important, thoroughly understand how these assets can be used to manage the exposure to a certain risk. Jointly with that, you should also be able to obtain prices for these assets in different situations.
This part will involve the understanding of international financial markets for equity and derivatives. We will review the workings of swaps, futures, options, and other more customized derivatives. The emphasis here will be in the applications of these instruments for risk management by corporations. Finally, we will review examples throughout the course in which financial engineering of corporate risks was crucial for the success (and failure) of a company strategy.

Methodology

Every lecture will typically contain some of the following 3 elements:

a) Presentation and discussion of a reading set.

b) Case presentation and discussion, and

c) Lecturing (theory concepts).

The recommended dynamics for the student is to work on the readings set or case before the corresponding session, attend the session and participate actively in the readings or case discussion. Then read the corresponding chapters / readings (if additional details are needed) and work on the corresponding issue after the session.

The Section “Calendar and Contents” below includes a detailed list of all the readings that will be covered through the course. In what follows you will find a description of each of these elements, the class dynamics, and the grading criterion.

Prerequisites

The course will cover some financial instruments and strategies which could be quite complex. The course assumes that students have no prior knowledge about how derivative instruments work and one of the main objectives of the course is to guarantee that students finish with a good handle on the mechanics of these instruments. As most of these instruments are quantitative in essence, familiarity with quantitative and analytical techniques is strongly recommended.

Cases

Several of the lectures include a “Case Discussion”. The cases are meant to summarize and exercise the concepts studied in the lecture/s. As a way to introduce the case and structure its analysis a set of questions will precede the case. All the students are expected to read the cases with the questions in mind in order to contribute to the class discussion. This will be graded through case discussion.

Every case will be assigned to a particular student or group who will be in charge of

1. Introducing the topic during approximately the first part of the class
2. Leading the discussion (extra material, complementary questions, ...)

Course Name | Derivatives and Risk Management

Note: This document is only informational, detailed contents and faculty may change.
These tasks will be graded. The average will constitute the **case discussion** grade for the particular student/s (in case of group work, all the students will obtain the same grade except the group unanimously decides otherwise).

**Lecturing**

As a general rule, most of the lectures will introduce new concepts and theory. The objective is to make it as participative and dynamic as possible. Therefore, students are encouraged to intervene with clarifying and constructive questions or remarks anytime during the lecture.

The material covered in every lecture is contained in the recommended readings. The specific material is mentioned opportunely in the course schedule. Due to the obvious time constraint, class slides will only cover the main aspects of every topic. A successful preparation for the exam requires reading the corresponding material and working on the suggested problems (if any) after every session.

**Suggested problems**

Some lectures may include a **suggested set** of problems from the recommended readings. These problems are designed to help you understand and digest the course material and serve as a self-guide of your progress and as preparation for the final exam. Students are encouraged to work regularly on the suggested problems and check personally with the instructor any question/doubt. Some sessions can focus on discussing / solving some of these problems, especially those that elicit questions/doubts from a sufficiently large number of students.

**Evaluation criteria**

To pass the course, you must earn at least 50 points out of 100, according to the following distribution:

1. **Case discussion and problems resolution** (50 points). Students will be required to discuss and/or present the cases involved in the course. The students will be assigned a certain case. Their discussions / presentations should help to form an opinion about a certain firm’s strategies. In general terms, the grade will depend on how you arrived at your conclusions regardless your opinion agrees with mine. Problems resolution is also included in this item.

2. **Final exam** (50 points). You are allowed to bring in one page (written on both sides) including the material (mathematical expressions, graphs,...) you feel convenient.

As with all courses taught at the UPF BSM, students who fail the course during regular evaluation will be allowed ONE re-take of the examination/evaluation. Students that pass any Retake exam should get a **5 by default as a final grade for the course**. If the course is again failed after the retake, students will have to register again for the course the following year.

In case of a justified no-show to an exam, the student must inform the corresponding faculty member and the director(s) of the program so that they study the possibility of rescheduling the exam (one possibility being during the “Retake” period). In the meantime, the student will get an “incomplete”, which will be replaced by the actual grade after the final exam is taken. The “incomplete” will not be reflected on the student’s Academic Transcript.

**Course Name | Derivatives and Risk Management**

Note: This document is only informational, detailed contents and faculty may change.
Plagiarism is to use another’s work and to present it as one’s own without acknowledging the sources in the correct way. All essays, reports or projects handed in by a student must be original work completed by the student. By enrolling at any UPF BSM Master of Science and signing the “Honor Code,” students acknowledge that they understand the schools’ policy on plagiarism and certify that all course assignments will be their own work, except where indicated by correct referencing. Failing to do so may result in automatic expulsion from the program.”

**Calendar and Contents**

| INTRODUCTION IDENTIFYING, MEASURING, AND HEDGING THE EXPOSURE TO FINANCIAL RISKS | 1. Introduction: Course overview, description, and work plan. Reasons and Incentives for Financial Risk Management (FRM)  
Reading: Introduction to derivatives  
Hull, Chapter 1 | 6 hours |
| --- | --- | --- |
| THE BUILDING BLOCKS OF RISK MANAGEMENT SYSTEMS | 2. Derivatives: forwards and futures  
Readings:  
Mechanics of forward and futures markets  
Hedging strategies using futures  
Hull, Chapters 2 and 5 | 7 hours |
| 3. Derivatives: options and option-like instruments  
Readings:  
Mechanics of options markets  
Properties of stock options  
Hull, Chapters 9 and 10 | 8 hours |
### OPTION PRICING

4. Binomial pricing and replicating portfolio. Black-Scholes option pricing and practical applications

Reading: Option pricing
Hull, Chapter 12, 14 and 18

4 hours

### APPLICATIONS OF FINANCIAL RISK MANAGEMENT

5. Derivatives: forward and futures for speculation

Case: Speculation in the Financial Futures Market: A Local Tries to Break the Bund (London Metropolitan University 299-009-1)

Reading: Determination of forward and futures prices
Hull, Chapter 3

1 hour

6. Cross-Hedging Basis Risk and application of basis risk

Cases: Metallgesellschaft AG (HBS 9-194-097 & IMD 3-0613)

1 hour

7. Derivatives: Potential applications for speculation / hedging. Combining options to achieve optimal risk / payoff strategies

Cases: The Collapse of Barings (London Business School 401-020-1 & 401-021-1)

Reading: Hedging / Speculative Strategies Involving Options
Hull, Chapter 11

1 hour

8. Using options to limit your risk

Case: Pine Street Capital (HBS 9-201-071)

1 hour

9. An application of FRM


1 hour

---

**Reading Materials**

The course will use class materials including handouts, cases, and some other readings. There exist many very good books that review the basic financial instruments and tools commonly used in derivatives pricing and financial risk management.

---

**Course Name | Derivatives and Risk Management**

Note: This document is only informational, detailed contents and faculty may change.
In short, the course will use material extracted from the following books:


This book is the classical reference for applications of derivatives (trading, pricing, valuation, and risk management) for preparation for the CFA exam (levels I, II, and III).


This book is a classical reference in this area. It was chosen in 2003 as the “most influential book” on the financial area as a result of a worldwide survey among practitioners and academics.

This book is the extended version of the following one:


Bio of Professor

Manuel Moreno holds a Ph. D. in Economics by University Carlos III de Madrid and a B. Sc. in Mathematics by Universidad Complutense de Madrid. He is currently Associate Professor of Finance and Vicedean of Quality at Universidad Castilla-La Mancha, Adjunct Professor at the IE Business School, and Associate Editor of the journal Studies in Economics and Finance. He is also coordinator of the Official Master in Banking and Quantitative Finance and of the Ph. D. Program in Quantitative Finance and Economics, both at Universidad de Castilla-La Mancha

He has previously held teaching and research positions at the Financial Option Research Centre (Warwick Business School), IESE Business School, Universidad Carlos III (Madrid) and Universidad Pompeu Fabra (Barcelona). In the past, he was the Founder and Co-Director of the Master Sc. in Finance at Universidad Pompeu Fabra (Barcelona), Associate Editor of Revista de Economía Financiera and Co-President of the Scientific Committee at the XIV Meeting of the Spanish Finance Association. Instructor in several “in company” courses in institutions, as for instance, Caixa Catalunya, Endesa or Banco Popular.

He has received several prizes for his research activity as, for instance, the Barclays Global Investors Australia Research Award or the prize Mutua Pelayo in the IX Italian-Spanish Congress on Financial and Actuarial Mathematics. He has also published extensively in leading scientific journals as, for example, Australian Journal of Management, Energy Economics, European Journal of Operational Research, Journal of Banking and Finance, Journal of Computational Finance, Journal of Futures Markets, Physica A, Quantitative Finance, or Review of Derivatives Research, as well as in several professional volumes.

Finally, he has been awarded different prizes to his teaching skills including the distinction “Jaume Vicens Vives” to the University teaching quality, awarded by the Government of Generalitat de Cataluña, being nominated for "Best Professor of the Year IE Business School Prize 2011" in full-time Masters. Included in the Top 3 of the professors in the course 2010-11, and fourteen Prizes of Teaching Excellence in Instituto de Empresa Business School.
Derivatives and Risk Management will be of particular interest to you if you are working, or planning to work, in an organisation in the financial sector or in the finance division of a company or public sector/not-for-profit organisation. The subject matter of the course is, though, designed to be useful for managers and prospective managers whose immediate responsibilities are outside the domain of risk management. Given the growing catalogue of risk management failures in all sectors - and the growing emphasis being placed on effective risk management by all organisations - the content of t