

Case Studies in Financial Engineering

MASTER IN FINANCE

2020/2021

1. Program

1) Deepening the Study of Derivatives

- a) The Greek letters
- b) Principal Protected Notes and Other Structured Products
- c) Exotic Options

2) Case Studies in Finance

Case Studies #1 to #7.

2. Requirements

Students are required to have a solid background in financial markets and instruments, as well as proficiency in English.

Students are also expected to perform their assignments according to high academic and professional standards, revealing maturity and creativity.

3. Support Materials

All materials are in English and made available in Aquila IT platform.

4. Faculty Members

Professor João Duque (jduque@iseg.ulisboa.pt), head of unit.

Professor Jorge Barros Luís (jbluis@iseg.ulisboa.pt).

5. Learning Goals

This curricular unit continues the study of Derivatives markets and products, also covering a wide range of topics on finance.

In the first part, the unit aims to complete the study of the first year course unit “Derivatives”, deepening the understanding of some fundamental instruments and techniques that are important when valuing derivatives. A student who successfully completes this curricular unit should:

- Know how to estimate the main Greeks of a derivative instrument using different methodologies;
- Identify volatility smiles, suggest volatility smile modelling and alternative valuation models to deal with the smile;
- Estimate volatility and correlation using different methodologies;
- Know the main exotic options and to value them using different methodologies;
- Know how to create, decompose and value a Principal Protected Note and other structured products using different valuation models.

The aim of the second part of this course unit is to get students familiarized with a broad range of issues on financial products and markets, including the understanding of their risks, hedging strategies, valuation and ethical dilemmas.

6. Teaching Method

The course is structured into weekly sessions of 3 hours.

There will be a single introductory lecture with both Professors for both classes simultaneously, on the 15th Sep.

Afterwards, a first set of 4 sessions focus on “Deepening the Study of Derivatives”, while the second set of 7 sessions covers the Case Studies.

The first set of sessions will be presented by Professor João Duque, between the 22nd Sept. and 23th Oct., in a common lecture for both classes, on Tuesdays’ sessions (except the last one that will occur on Friday).

The presentation and discussion of the case studies will be managed by Professor Jorge Barros Luís, in 7 sessions for each class, between the 27th Oct. and the 18th Dec. Given the two national holidays in Dec. (1st and 8th), the schedule of both classes is changed, in order to reduce the calendar gaps, as follows:

CSFE - TIMETABLE									
Week	Tuesday	Class			Room	Friday	Class	Room	Teacher
1	15/set	S72	&	S92	AF 21	18/set	No Class		JDq & JBL
2	22/set	S72	&	S92	AF 21	25/set	No Class		JDq
3	29/set	S72	&	S92	AF 21	02/out	No Class		JDq
	06/out	No Class				09/out	No Class		
4	13/out	S72	&	S92	AF 21	16/out	No Class		JDq
5	20/out	S72	&	S92	AF 21	23/out	No Class		JDq
6	27/out	S72			AF 21	30/out	S92	AF 22	JBL
7	03/nov	S72			AF 21	06/nov	S92	AF 22	JBL
8	10/nov	S72			AF 21	13/nov	S92	AF 22	JBL
9	17/nov	S92			AF 21	20/nov	S72	AF 22	JBL
10	24/nov	S92			AF 21	27/nov	S72	AF 22	JBL
11	01/dez	No Class				04/dez	S72	AF 22	JBL
12	08/dez	No Class				11/dez	S92	AF 22	JBL
13	15/dez	S92			AF 21	18/dez	S72	AF 22	JBL

Due to the current pandemic situation, sessions will be simultaneously in-person and online. Therefore, the rule set for the University will apply for the introductory and the first group of 4 lectures (i.e. until the 23rd October).

From then onwards, in the sessions allocated for the presentation and discussion of cases, only the students integrating the groups assigned to present or discuss the cases will be allowed to attend in-person, with the remaining students attending online.

7. Case Studies

The cases to be worked have been developed at top US business schools. The course Professors have prepared the questions to be answered by students for each case and upload them in the Aquila system.

a) Asset Management

Case 1: Thompson Asset Management, Harvard Business School, Case No. 9-914-565, July 10, 2014

b) Yield Curve

Case 2: The Yield Curve and Growth Forecasts, Darden School of Business, University of Virginia, Case No. UV5689, August 23, 2018

c) Risk Management with Derivatives

Case 3: Hedging at Porsche, Michigan Ross School of Business, Case No. W04C40, August 6, 2015

Case 4: 2012 Fuel Hedging at Jetblue Airways, Darden School of Business, University of Virginia, Case No. UV6683, Rev. March 1, 2016

Case 5: Exotic Interest Rate Swaps: Snowballs in Portugal, Harvard Business School Case No. 9-217-050, January 5, 2017

d) Structured Products with Options

Case 6: Deutsche Bank: Structured Retail Products, Harvard Business School Case No. 9-217-013, Rev. March 6, 2018

Case 7: Principal-Protected Equity-Linked Note, Darden School of Business, University of Virginia, Case No. UV7126, March 10, 2016

8. Working Groups

- a) Groups must be created by Students at Aquila until the 2nd Oct.2020. These Groups must have between 3 and 5 students, in order to obtain 7 Groups for each class.
- b) Each Group will present 2 cases and discuss one, according to the following schedule (Group number by order):

		S72			S92		
Week	Presentation	Discussion	Presentation	Presentation	Discussion	Presentation	
1							
2							
3							
4							
5							
6	1	4	6	1	4	6	
7	2	5	7	2	5	7	
8	3	6	1	3	6	1	
9	4	7	2	4	7	2	
10	5	1	3	5	1	3	
11	6	2	4				
12				6	2	4	
13	7	3	5	7	3	5	

c) The Groups in charge of presenting a case shall:

- 1) Prepare a PowerPoint presentation, to be sent to the Professor and the discussants until 48h before, as well as to the remaining colleagues as soon as possible.
- 2) Comply with a time limit of 45m.
- 3) Exhibit the most relevant details regarding the calculations done, by presenting the spreadsheets and other auxiliary files used.
- 4) Be prepared to answer the questions asked by the Professor, the discussants or other colleagues (via online connections).

d) The discussant Groups shall:

- 1) Prepare a PowerPoint presentation, to be sent by e-mail before the discussion to the Professor and the Groups in charge of the presentation;
- 2) Comply with a time limit of 20 minutes;
- 3) Be focused on all presentations of the case in the class, performing comparisons between all these presentations;
- 4) Be prepared to answer the questions asked by the Professor or colleagues.

e) Remaining students are also expected to intervene during the discussions.

9. Evaluation

a. Regular assessment period

(1) Cases (CS) (65% of final grade, with a minimum grade of 35/100)

- **Presentations (CP1 and CP2)** (50% or 70% of final grade): Each group has to solve one case study and present and discuss it during one of the sessions. Excel spreadsheets must be developed and explained whenever appropriate.

Furthermore, groups presenting the cases may also submit to the Professor a report on those cases, incorporating the outcomes of the discussions at the classroom.

These reports have to be submitted to the Professor until two weeks after the case presentation and will only be used to improve the grades obtained in the presentation of the cases during the discussion, with a weight of 10% of the final grade in Cases for each Case presented (**CR1 and CR2**).

- **Discussion (CD)** (50% or 70% of final grade): In addition to the cases presented, each group also has to discuss one of the colleagues' case.
- Classification in the Cases (**CS**):

$$CS = 0,3 \times CP1 + 0,3 \times CP2 + 0,10 \times \text{Max}(CP1, CR1) + \\ + 0,10 \times \text{Max}(CP2, CR2) + 0,15 \times CD + 0,05 \times PT$$

being *PT* the grade due to participation in the classes.

These classifications will be made available to students when final grades are released. Nonetheless, the Professor may provide some guidance in the classroom about his opinion on the work performed by Groups.

(2) Final Exam (FE) (35% of final grade, with a minimum grade of 35/100)

- The exam is closed book type, with access to a sheet with formulas and equations only, to be provided during the exam, which will cover the first section of the syllabus.

The final exam includes problems and questions based on the cases presented and discussed and also on the topics addressed in those cases. More than one case may be used.

(3) Final Grade (FG): $FG = 0.65 \times CS + 0.35 \times FE$

b. Repeat Exams

- **Composition** - questions about both parts of the course, each weighting 50% of the total classification. For the first section of the syllabus, the exam is closed book type, only with access to a sheet with formulas and equations (provided during the exam). For the second section, the exam is held on an open book basis. Each section of the exam has to be solved in separate sheets.
- **Grade** - students may benefit from the grade obtained in the cases presentation and discussion, if the repeat exam grade is below 10 (but in this case with a maximum grade of 10):

$$IF(0,35 x X_1 + 0,65 x X_2) \geq 10$$

$$FG = 0,35 x X_1 + 0,65 x X_2$$

$$IF(0,35 x X_1 + 0,65 x X_2) < 10$$

$$FG = \text{Min}(0,35 x X_1 + 0,65 \text{Max}(X_2; CS); 10)$$

being

FG = Final Grade

X_1 = the grade of Part 1 of the Repeat Final Exam (covering the “Deepening the Study of Derivatives”)

X_2 = the grade of Part 2 of the Repeat Final Exam (covering the Case Studies)

10. Interaction between Students and Professors

Professors are fully available to address students' doubts in the classes (before and after), by e-mail or in meetings to be scheduled, following requests presented by students via e-mail.

11. Main References

Textbook:

- Hull, John, Options, Futures and Other Derivatives, 10th edition, Prentice Hall, 2018.

Alternative:

- Willmott, Paul, Derivatives, University Edition, 1998, John Wiley & Sons, Chichester, England, UK.