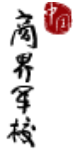




PHBS
北京大学汇丰商学院



FIN 523

Derivative Pricing

Module 4, 2019-2020

Course Information

Instructor: Domenico TARZIA

Office: PHBS Building, Room 654

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Office Hour: By appointment

Classes:

Lectures: Monday-Thursday: 13:30-15:20

Venue: Online Teaching on Zoom. Zoom Meeting: Derivative Pricing.
Zoom Meeting ID: 727-352-620

Course Website:

<http://cms.phbs.pku.edu.cn/index.php>

1. Course Description

1.1 Context

Course overview:

This course offers a complete overview of the main derivatives contracts, describing valuation issues and potential use with special reference to options contracts. Such contracts have become extremely popular investment tools over the past several decades, as they allow one to tailor the amount and kind of risk one takes, be it risk associated with changes in interest rates, exchange rates, stock prices, commodity prices, inflation, weather, etc. The first part of the course deals with a detailed analysis of futures, options and swaps; in the second part of the course more complex structures, such as exotic options, structured securities and credit derivatives are analyzed. The aim is to provide the students with the ability to understand different financial derivatives and their uses, methods of valuation of financial derivatives, and the assessment and management of risks associated with a portfolio of derivatives.

Prerequisites:

Students should have a good knowledge of basic finance concepts, including risk, return, arbitrage, efficient markets, and the time value of money. In addition, a course in basic statistics and probability theory would be useful.

1.2 Textbooks and Reading Materials

Required Textbooks:

- Hull, J., "Options, Futures and Other Derivatives", 9th Edition, 2017, (H). ISBN-10: 9781292212890 ISBN-13: 978-1292212890.

Recommended Textbooks:

- Bjork, T., "Arbitrage Theory in Continuous Finance, 3rd edition, 2009, (B). ISBN-10: 019957474X ISBN-13: 978-0199574742

Additional readings and material:

The instructor will post additional material on the course management system (CMS). The course name is "Derivative Pricing", the code is "DEPRIC".

2. Learning Outcomes

2.1 Intended Learning Outcomes

Learning Goals	Objectives	Assessment (YES with details or NO)
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	YES, since they will be exposed to fundamental theories in finance
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	NO
2. Our graduates will be skilled in team work and leadership.	2.1. Students will be able to lead and participate in group for projects, discussion, and presentation.	YES, since students will receive problem sets to be solved
	2.2. Students will be able to apply leadership theories and related skills.	NO
3. Our graduates will be trained in ethics.	3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it.	NO
	3.2. Our students will practice ethics in the duration of the program.	NO
4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	YES, since international financial markets will be analysed
5. Our graduates will be skilled in problem-solving and critical	5.1. Our students will have a good understanding of fundamental theories in their fields.	YES, since they will learn how to price

thinking.		derivatives
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	NO
	5.3. Our students will demonstrate competency in critical thinking.	NO

2.2 Course specific objectives

Students will be able to understand the main concepts underlying financial derivatives and investments strategies; and apply those concepts and skills to their own research. The course is designed so that they will be able to:

- Understand the structural differences among options, forwards, futures, and swaps.
- Understand how to price each of the above derivative securities with different pricing models and know model assumptions.
- Understand how to use these derivative securities for hedging and/or speculation purposes.

2.3 Assessment/Grading Details

Assessment Task	Weighting
In-class Participation and Problem Sets	30%
Midterm Exam	30%
Final Exam	40%
Total	100%

In-class Participation:

Students must be regular in class attendance. Fully attendance is required, and everyone is expected to actively participate in the class discussions.

Problem Sets:

Plagiarism is strictly punished. Late submission is unacceptable and will not be graded. Problem sets contain computational exercises. Instructions and deadlines about the problem sets will be given later on by instructor and available on the course management system.

Exams:

Midterm and final exam will be take-home exam. Instructions and deadline about midterm and final exams will be given later on by instructor and available on the course management system.

2.4 Academic Honesty and Plagiarism

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

3. Topics, Teaching and Assessment Schedule

Part I: Options, Forwards and Futures		
April 23	Fundamental Theorem of Asset Pricing No Arbitrage	
April 27	Options: bounds, put-call parity	Chapter 3 (H) Chapter 6 (H)
April 30	Options valuation models: binomial model.	Chapter 10 (H) Chapter 11 (H)
May 4	Brownian Motion/Wiener Process Ito's Lemma	Chapter 4 (B) Chapter 5 (B)
May 7	Options valuation models: Black and Scholes model	Chapter 13 (H) Problem Set 1
May 11	Pricing of forward and futures contracts	Chapter 1 (H) Chapter 2 (H)
May 14	Sensitivity coefficients (greeks) and their use in directional and volatility trading strategies	Chapter 14 (H) Chapter 15 (H) Problem Set 2
May 18	Midterm Exam	
Part II: Valuation of American and Exotic options		
May 21	Exotic options: analytical formula	Chapter 20 (H) Chapter 23 (H)
May 25	Monte Carlo valuation	Chapter 21 (H) Chapter 27 (H)
May 28	Finite-difference schemes	Chapter 21 (H) Chapter 27 (H)
Part III: Beyond Black-Scholes		
June 1	Multidimensional models	Chapter 14 (B)
June 4	Jump-diffusion model	

June 8	GARCH models Stochastic volatility models	
Part IV: Interest rate Derivatives		
June 11	Pricing and valuation of interest rate swaps	Chapter 4 (H) Chapter 7 (H) Problem Set 3
June 15	Numerator change. Caps and floors.	Chapter 18 (H) Chapter 28 (H) Chapter 29 (H)
Part V: Credit derivatives		
June 18	Credit derivatives: valuation of credit default swaps	Chapter 25 (H) Problem Set 4
June 22	Other credit derivatives: credit indices and collateralized debt obligation	Chapter 25 (H)
	Final Exam	