Derivatives

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1. Course Objectives

The course is aimed at gaining basic knowledge of financial derivatives. In the first half of the course the basic principles of no arbitrage valuation are bridged with the trading practices of plain vanilla options and market volatility estimation and pricing. A central role is played by the explanation of the procedure which is currently applied to build a Volatility Index using a portfolio of quoted options. The notion of implied volatility surface and their dynamical evolution is introduced analyzing the class of local volatility market models. The second half of the course will focus on the Heston Stochastic Volatility Model (HSVM). A general pricing methodology for plain vanilla and exotic contracts will be discussed. Then the HSVM will be used to illustrate some practical applications of financial derivatives in investment banking and in the asset management industry.

2. Course Structure

- Pricing contingent claims in a single period Arrow Debreu economy
- From theory to practice: pricing and trading option contracts
- Market expectations, implied volatility and the volatility index.
- Local volatility modeling
- Pricing in stochastic volatility models: a stochastic calculus approach.
- The Heston Stochastic Volatility Model (HSVM)

3. Course Material

- Lecture notes and slides will be also distributed as further more advanced reference.
- Further reading, we suggest a classical text-book on advanced option pricing: J. Gatheral, The Volatility Surface: A Practitioner's Guide, Wiley, 2006.

4. Prerequisites
Basic knowledge of standard and stochastic calculus

5. Exam
Student evaluation will consist of a final written exam.