# Asset pricing

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims at equipping the students with the technical apparatus for the theoretical and applied understanding of asset price fluctuations.

At the end of the course the students will be able to quantitatively and financially understand the returns from capital markets securities and from derivatives written on commodities.

Students will build solid skills to investigate the driving components of asset returns. In particular, they will be able to:

* employ a fairly general and flexible asset-pricing paradigm;
* understand the expected returns of derivatives written on non-tradable underlying quantities;
* quantify the constituents of expected returns;
* quantify the asset pricing impact of possibly correlated cashflow risk and interest rate risk;
* calibrate the Gibson-Schwartz model of spot/futures markets for commodities with convenience yield risk.

***COURSE CONTENT***

First module (4 CFU)

* Pricing contingent claims with payoffs and possible payouts.
* Evaluation of perpetual American options and analysis of their optimal exercise policy.
* Spot-price dynamics for commodities and analysis of the term structure of commodity futures prices.

First module (4 CFU)

* Stochastic processes representing the joint presence of cashflow risk and interest rate risk.
* Pricing equity claims exposed to cashflow risk and interest rate risk.
* Pricing equity derivative contracts exposed to cashflow risk and interest rate risk.

***READING LIST***

Detailed lecture notes made available on http://blackboard.unicatt.it/.

J.H. Cochrane, *Asset Pricing*, Princeton University Press, 2001.

S.E. Shreve, *Stochastic Calculus for Finance*, Springer-Verlag, 2004.

***TEACHING METHOD***

The course is based on frontal teaching with classroom applications of the theory covered.

***ASSESSMENT METHOD AND CRITERIA***

The valuation mark is based on a final written exam, which is made of open and/or multiple-choice questions, aimed at assessing the understanding the theory and the applications of the topics studied. The score awarded for each question is specified in the text of the exam. The total score obtained in the written exam, rounded to the closest integer (i.e. ceiled if the decimal part is at least 0.5, floored otherwise), will be the final mark of the course. The “cum laude” mention will be awarded if the rounded score is at least 31 and the student shows complete mastery of the subject. A mock exam, representing the format of the final written exam, is published on Blackboard.

***NOTES AND PREREQUISITES***

Students should be acquainted with:

– the fundamentals of macroeconomics (for instance, equilibrium in the money market) and of microeconomics (for instance, consumer choice);

– the fundamentals of financial mathematics (for instance, discounting and annuities) and of decision theory (for instance, expected utility theory);

– Linear algebra fundamentals (for example, matrix calculus and linear equation systems solutions).

– random variables and the features of their probability distributions (mean, variance and standard deviation), as well as the features of joint and conditional distributions (covariance and correlation, conditional expectation and variance).

– Fundamentals of econometrics (for ex., linear regression techniques, maximum likelihood methods).

*Office hours*

The instructors’ office hours are published on the corresponding personal web pages.