

# FINANCIAL ECONOMICS

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## 1 Course Description

The course is an introduction to the modern theory of asset pricing. The central theme of the theory is the relationship between lack of arbitrage opportunities and equilibrium. Both conditions imply the existence of "state prices," or positive discount factors, such that the price of any security is simply the state-price weighted average of its payoffs. Identifying these state prices will be an essential part of the course. Equilibrium asset pricing for instance shows how to deduce state prices from aggregate consumption behavior, providing an explicit link between asset prices and macroeconomic fundamentals.

In the first part of the course we will introduce all the relevant concepts in the simple framework of static economies. In the second part we will extend these results to a multi-period framework. In order to ease the exposition and keep technicalities at a minimum level, we will maintain the following assumptions throughout the course: discrete time and symmetric, complete information. The treatment of continuous time finance and asset pricing under asymmetric information is left to other courses.

Any person interested in asset pricing or macro-finance should be familiar with the topics covered by this course.

## 2 Course Material

There is no single textbook for this course. Texts that cover the material relevant for this course in a closer way are Duffie (2001), LeRoy and Werner (2001), Cochrane (2001) and Huang and Litzenberger (1988). Other useful references are Ingersoll (1987), Civitanic and Zapatero (2004), Lengwiler (2004) and Ross (2005). Background material in microeconomics can be found in Mas-Colell, Whinston, and Green (1995). Specific

references, including handouts and original articles, will be provided for each topic during the course.

### **3 Requirements**

Students are assumed to be familiar with basic Mathematics, Statistics and Microeconomics. Prospective students might want to refresh concepts like preferences, utility maximization and choice under uncertainty looking at chapters 1-3, 6 and the mathematical appendix of Mas-Colell, Whinston, and Green (1995), or any equivalent microeconomics textbook. In terms of Finance, the course will be completely self-contained.

### **4 Course Outline**

#### **I Static Economies.**

##### **1.1 Arbitrage and Pricing.**

- The security markets.
- Arbitrage and state prices.
- Fundamental Theorem of Finance.
- Risk neutral probabilities, state price densities.
- Representation Theorem.

##### **1.2 Equilibrium and Pricing.**

- Individual agent optimality.
- Equilibrium and Pareto optimality.
- Equilibrium, representative agents and pricing.

##### **1.3 Asset pricing models.**

- State-Price beta models.
- CAPM.
- APT.
- Factor models and discount factors.

#### **1.4 Derivative pricing.**

- Options and other derivatives.
- Law of one price and arbitrage bounds.
- Modigliani-Miller Theorem.
- The binomial model.

### **II Multi-period Economies.**

#### **2.1 Arbitrage and Pricing.**

- The security markets.
- Arbitrage, state prices and martingales.
- Arbitrage and equivalent martingale measures.

#### **2.2 Equilibrium and Pricing.**

- Individual agent optimality.
- Equilibrium and Pareto optimality.
- Equilibrium, representative agents and pricing.
- Consumption CAPM.

#### **2.3 Derivative pricing.**

- Valuation of redundant securities
- Black-Scholes model: arbitrage, equilibrium and binomial pricing.

## References

- Civitanic, J., and F. Zapatero, 2004, *Economics and Mathematics of Financial Markets*. MIT Press.
- Cochrane, J., 2001, *Asset Pricing*. Princeton University Press.
- Duffie, D., 2001, *Dynamic Asset Pricing Theory*. Princeton University Press.
- Huang, C., and R. Litzenberger, 1988, *Foundations for Financial Economics*. North-Holland.
- Ingersoll, J. E., 1987, *Theory of Financial Decision Making*. Rowman & Littlefield.
- Lengwiler, Y., 2004, *Microfoundations of Financial Economics*. Princeton University Press.
- LeRoy, S. F., and J. Werner, 2001, *Principles of Financial Economics*. Cambridge.
- Mas-Colell, A., M. Whinston, and J. Green, 1995, *Microeconomic Theory*. Oxford University Press.
- Ross, S., 2005, *Neoclassical Finance*. Princeton University Press.