

Mgmt741b/Econ671b:  
**Financial Economics II: Spring 2001**

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**Course Descriptions:**

This course covers some advanced materials on the theory of financial markets developed over the past three decades. The emphasis is on dynamic consumption, investment, and asset pricing models in a continuous-time setting. The articles listed in the course outline include many of the classical papers in the field as well as some of the most recent developments. Although many of the articles may appear to be incomprehensible initially, you are encouraged to read as many articles as possible. Lectures will be based on a series of lecture notes which emphasize on basic concepts as well as technical tools.

**Prerequisites:**

The prerequisite of this course is **Financial Economics I** (or familiarity with Huang and Litzenberger, *Foundations for Financial Economics*). Some graduate level knowledge of analysis and probability theory is highly recommended but not required.

**Class Schedule:** Fridays 1-4pm

**TA:** Masahiro Watanabe, 46 Hillhouse (Ground Floor)

**Course Requirements:**

1. Homework assignments and presentations (40%)
2. Midterm exam (30%)
3. Final exam (30%)

**Texts and References:**

1. Lecture notes: Available in class
2. References:
  - D. Duffie, *Dynamic Asset Pricing Theory*, Princeton University Press, 1992.
  - J. Ingersoll, *Theory of Financial Decision Making*, Rowman and Littlefield, 1987.
  - R. Merton, *Continuous Time Finance*, Blackwell, 1992.

3. Mathematical references:

H. Royden, *Real Analysis*, Macmillan, 1988

K. Chung and R. Williams, *An Introduction to Stochastic Integration*, Birkhauser, 2nd edition, 1990

R. Lipster and A. Shiryaev, *Statistics of Random Processes I: General Theory*, Springer, 1977

I. Karatzas and S. Shreve, *Brownian Motion and Stochastic Calculus*, Springer, 1998

P. Protter, *Stochastic Integration and Differential Equations*, Springer, 1990

4. Other references:

P. Wilmott, *Derivatives*, John Wiley & Sons, 1998

L. Nielsen, *Pricing and Hedging of Derivative Securities*, Oxford University Press, 1999

M. Musiela and M. Rutkowski, *Martingale Methods in Financial Modeling*, Springer, 1998

Karatzas and S. Shreve, *Methods of Mathematical Finance*, Springer, 1998

## Class Outline and Suggested Readings:

### Part 0.5: Mathematical Preliminaries:

Lecture notes.

### Part 1: Arbitrage and Martingales

- \*M. Harrison and D. Kreps, Martingales and Multiperiod Securities Markets, *Journal of Economic Theory*, **20**, 1979, 381–408.
- \*C. Huang, Information Structure and Equilibrium Asset Prices, *Journal of Economic Theory*, **35**, 1985, 33–71.
- K. Back and S. Pliska, On the Fundamental Theorem of Asset Pricing with an Infinite State Space, *Journal of Mathematical Economics*, **20**, 1991, 1-18.
- S. Clark, The Valuation Problem in Arbitrage Price Theory, *Journal of Mathematical Economics*, **22**, 1993, 463-478.
- D. Duffie and C. Huang, Multiperiod Securities Markets with Differential Information: Martingales and Resolutions Times, *Journal of Mathematical Economics*, **15**, 1986, 283-303.
- P. Dybvig and C. Huang, Nonnegative Wealth, Absence of Arbitrage, and Feasible Consumption Plans, *Review of Financial Studies*, **1**, 1989, 377-401.
- M. Harrison and S. Pliska, Martingales and Stochastic Integrals in the Theory of Continuous Time Trading, *Stochastic Processes and Their Applications*, **11**, 1981, 215–260.

- E. Jouini and H. Kallal, Martingales, Arbitrage and Equilibrium in Securities Markets with Transaction Costs, Unpublished manuscript, University of Chicago, 1991.
- D. Kreps, Arbitrage and Equilibrium in Economies with Infinitely Many Commodities, *Journal of Mathematical Economics*, **8**, 15–35, 1981.

## Part 2: Pricing and Hedging Contingent Claims

- \*F. Black and M. Scholes, The Pricing of Options and Corporate Liabilities, *Journal of Political Economy*, **81**, 1973, 637–654.
- \*J. Cox and C. Huang, Option Pricing and Application, *Frontiers of Financial Theory*, edited by S. Bhattachaya and G. Constantinides, Littlefield & Adams, 1987.
- \*R. Merton, Theory of Rational Option Pricing, *Bell Journal of Economics and Management Science*, **4**, 1975, 141–183.
- J. Cox and S. Ross, The Valuation of Options for Alternative Stochastic Processes, *Journal of Financial Economics*, **3**, 1976, 145–166.
- R. Geske, The Valuation of Compounded Options, *Journal of Financial Economics*, **7**, 1979, 63–81.
- W. Margrabe, The Value of An Option to Exchange One Asset for Another, *Journal of Finance*, **33**, 1978, 177–186.
- R. Merton, Option Pricing when the Underlying Stock Returns Are Discontinuous, *Journal of Financial Economics*, 1976, 125–144.
- M. Rubinstein, The Valuation of Uncertain Income Streams and the Pricing of Options, *Bell Journal of Economics*, **7**, 1976, 407–425.
- R. Stulze, Options on the Minimum or the Maximum of Two Risky Assets: Analysis and Application, *Journal of Financial Economics*, **10**, 1982, 161–185.

## Part 3: Consumption and Portfolio Decisions

### A. Complete Markets

- \*J. Cox and C. Huang, Optimal Consumption and Portfolio Policies When Asset Prices Follow a Diffusion Process, *Journal of Economic Theory*, **49**, 1989, 33–83.
- \*R. Merton, Optimum Consumption and Portfolio Rules in a Continuous Time Model, *Journal of Economic Theory*, **3**, 1971, 373–413.
- \*I. Karatzas, J. Lehoczky, S. Shreve, Optimal Portfolio and Consumption Decisions for a 'Small Investor' on a Finite Horizon, *SIAM Journal on Control and Optimization*, **25**, 1987, 1557–1586.

- J. Cox and H. Leland, Intertemporal Investment Policies, forthcoming *Journal of Economic Dynamics and Control*, 1992.
- J. Cox and C. Huang, A Variational Problem Arising in Financial Economics, *Journal of Mathematical Economics*, **21**, 1991, 465–488.
- H. He and C. Huang, Consumption-Portfolio Policies: An Inverse Optimal Problem, *Journal of Economic Theory*, April 1994.
- S. Pliska, A Stochastic Calculus Model of Continuous Trading: Optimal portfolios, *Mathematics of Operation Research*, **11**, 1986, 371–382

#### B. Incomplete Markets and Portfolio Constraints

- \*H. He and N. Pearson, Consumption and Portfolio Policies with Incomplete Markets and Short-sale Constraints: The Finite Dimensional Case, *Mathematical Finance*, **1/3**, 1991, 1–10.
- \*H. He and N. Pearson, Consumption and Portfolio Policies with Incomplete Markets and Short-sale Constraints: The Infinite Dimensional Case, *Journal of Economic Theory*, **54**, 1991, 259–305
- D. Cuoco, Optimal Consumption and Equilibrium Prices with Portfolio Constraints and Stochastic Income, *Journal of Economic Theory*, **72**, 1997, 33-73.
- J. Cvitanic and I. Karatzas, Convex Duality in Constrained Portfolio Optimization, *Annual of Applied Probability*, **2**, 1992, 767-818.
- J. Cvitanic and I. Karatzas, Hedging Contingent Claims with Constrained Portfolios, *Annual of Applied Probability*, **3**, 1993, 652-681.
- Karatzas, J. Lehoczky, S. Shreve and G. Xu, Martingale and Duality Methods for Utility Maximization in an Incomplete Markets, *SIAM Journal on Control and Optimization*, **29**, 1991, 702-730.
- H. He and H. Pagés, Consumption and Portfolio Decisions with Labor Income and Borrowing Constraints, *Economic Theory*, **3**, 1993, 663-693.

### **Part 4: Equilibrium Theory and Term Structure of Interest Rates**

#### A. Intertemporal Capital Asset Pricing Models

- \*D. Breeden, An Intertemporal Asset Pricing Model with Stochastic Consumption and Investment Opportunities, *Journal of Financial Economics*, **7**, 1979, 265–296.
- \*J. Cox, J. Ingersoll, and S. Ross, An Intertemporal General Equilibrium Model of Asset Prices, *Econometrica*, **53**, 1985, 363–384.

- \*D. Duffie and C. Huang, Implementing Arrow-Debreu Equilibria by Continuous Trading of Few Long-Lived Securities, *Econometrica*, **53**, 1985, 1337–1356.
- \*C. Huang, An Intertemporal Capital Asset Pricing Model: The Case of Diffusion Information, *Econometrica*, **55**, 1987, 117–142.
- \*R. Merton, An Intertemporal Capital Asset Pricing Model, *Econometrica*, **41**, 1973, 867–888.
- I. Karatzas, J. Lehoczky and S. Shreve, Existence and Uniqueness of Multi-Agent Equilibrium in a Stochastic, Dynamic Consumption and Investment Model, *Mathematics of Operations Research* **15**, 1990, 80-128.
- R. Lucas, Asset prices in an exchange economy, *Econometrica*, **46**, 1978, 1429–1445.
- S. Basak and D. Cuoco, An Equilibrium Model with Restricted Stock Market Participation, *Review of Financial Studies* **11**, 1998, 309-341.

#### B. Term Structure of Interest Rates

- \*M. Brennan and E. Schwartz, A Continuous Time Approach to the Pricing of Bonds, *Journal of Banking and Finance*, **3**, 1979, 133–155.
- \*J. Cox, J. Ingersoll, and S. Ross, A Theory of Term Structure of Interest Rates, *Econometrica*, **53**, 1985, 363–384.
- \*J. Cox, J. Ingersoll, and S. Ross, A Re-Examination of Traditional Hypothesis about the Term Structure of Interest Rates, *Journal of Finance*, **53**, 1981, 769–799.
- \*D. Heath, R. Jarrow, and A. Morton, Bond Pricing and the Term Structure of Interest Rates, A New Methodology, *Econometrica*, **60**, 1987, 77–105.
- Q. Dai and K. Singleton, Specification Analysis of Affine Term Structure Models, forthcoming *Journal of Finance*, 1999.
- D. Duffie and R. Kan, A Yield Factor Model of Interest Rates, *Mathematical Finance*, **6**, 1996, 379–406.
- M. Piazzesi, A Linear-Quadratic Jump-Diffusion Model with Scheduled And Unscheduled Announcements, working paper, Stanford University, 2000.

#### C. Pricing Financial Futures and Forwards

- \*J. Cox, J. Ingersoll, and S. Ross, The relation between forward prices and futures prices, *Journal of Financial Economics*, **9**, 1981, 321–346.
- D. Duffie and R. Stanton, Pricing continuously resettled contingent claims, *Journal of Economic Dynamics and Control*, 1992, 561–573.

## Part 5: Advanced Topics

### A. Non Time-Additive Utilities

- \* G. Constantinides, Habit Formation: A Resolution of Equity Premium Puzzle, *Journal of Political Economy* **98**, 1990, 519–543.
- \* S. Sundaresan, Intertemporally Dependent Preferences in the Theories of Consumption, Portfolio Choice and Equilibrium Asset Pricing, *Review of Financial Studies* **2**, 73–89.
- \*D. Duffie and L. Epstein, Stochastic Differential Utility, *Econometrica*, **60**, 1999, 353-394.
- J. Detemple and F. Zapatero, Asset Prices in an Exchange Economy with Habit Formation, *Econometrica*, **59**, 1633-1657.
- M. Schroder and C. Skiadas, Optimal Consumption and Portfolio Selection with Stochastic Differential Utility, forthcoming in *Journal of Economic Theory*, 1999.
- A. Hindy, C. Huang, and D. Kreps, On Intertemporal Preferences with a Continuous Time Dimension II: The Case of Uncertainty, *Journal of Mathematical Finance*, 1991.

### B. Durable Goods

- S. Grossman and G. Laroque, Asset Pricing and Optimal Portfolio Choice in the Presence of Illiquid Durable Consumption Goods, *Econometrica*, 25-51, 1990
- D. Cuoco and H Liu, Optimal Consumption of a Divisible Durable Good, *Journal of Economic Dynamic and Control*, forthcoming

### C. Connection between Discrete and Continuous Time Models

- \*J. Cox, S. Ross, and M. Rubinstein, Option Pricing: A Simplified Approach, *Journal of Financial Economics*, **7**, 1979, 229–264
- \*H. He, Convergence from Discrete to Continuous Time Contingent Claim Prices, *Review of Financial Studies*, **3**, 1990, 523–546.
- P. Boyle, J. Evnine, and S. Gibbs, Numerical Evaluation of Multivariate Contingent Claims, *Review of Financial Studies*, **2**, 1989, 241–250.

### D. Transactions Costs

- M. Davis and A. Norman, Portfolio Selection with Transaction Costs, *Mathematics of Operation Research*, **15**, 1990, 676–713.
- H. Leland, Option Pricing and Replication with Transaction Costs, *Journal of Finance*, **40**, 1985, 1283–1301.