

Capital Market Theory, II

Course Syllabus, Fall 2006

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This course surveys important contributions in the theory of asset pricing in the past several decades. The intended audiences are doctoral students with finance or economics major, who have taken *Capital Market Theory, I*.

- The course will first give a general introduction to the dynamic theory of asset pricing and a brief review of financial mathematics.
- Then it will review the theory of contingent claims pricing in continuous-time arbitrage-free frictionless economies, which will be followed by a review of the theory of optimal consumption and investment policies, where the traditional dynamic programming approach and the martingale approach will be contrasted.
- Then it will go over the literature on equilibrium theory of dynamic asset pricing.
- What kind of asset price processes can be consistent with an economy comprising rational risk averse investors? What kind of trading strategies might be adopted by a rational risk averse investor? These questions will be answered after we review the theory of efficient trading strategies and viable price processes.
- Then the course will review the theory of term structure of interest rates.
- Several preference theories competing with the expected utility theory have been developed in recent years and the course will review their different implications than the expected utility theory on asset pricing.
- The course will then review the theory that clarifies the connections between discrete-time models with extremely frequent trading and their continuous-time limits.

- Finally, we shall review some of the recent contributions in dynamic asset pricing under information asymmetry.

Lecture notes will be passed out constantly. Students will be responsible for presenting some of the papers listed below. Oral presentation, weekly homework performances, and an in-class final exam will jointly determine the course grade. A more detailed schedule will be posted in September.

1. General Introductions.

- Campbell, J.Y., 2000, Asset pricing at the millennium, JF, 55, 1515-1568.
- Constantinides, G., 1989, Theory of valuation: overview and recent developments, in Theory of Valuation: Frontiers of Modern Financial Theory, Volume 1, by S. Bhattacharya and G.M. Constantinides (eds.), Rowmanand Littlefield, Maryland.
- Harrison, M., and S. Pliska, 1981, Martingales and stochastic integrals in the theory of continuous trading, Stochastic processes and their applications, 11. 215-260.
- Huang, C., 1991, An overview of modern financial economics, working paper (no.3304-91-EFA), Sloan school, MIT.
- Kreps, D., 1979, Three essays on capital markets, technical report 298, Institute for Mathematical Studies in Social Science, Stanford U.
- Sundaresan, S., 2000, Continuous-time methods in finance: a review and an assessment, JF, 2000, 1569-1623.

2. Contingent Claims Pricing.

- Back, K., 1991, Asset pricing for general processes, J. Math Econ., 20, 371-395.
- Chamberlain, G., 1987, Asset pricing in multiperiod securities markets, Econometrica, 56, 1283-1300.
- Cox, J., and C. Huang, 1989, Option pricing theory and its applications, in Theory of Valuation: Frontiers of Modern Financial Theory, Volume 1, by S. Bhattacharya and G.M. Constantinides (eds.), Rowmanand Littlefield, Maryland.

- Harrison, M., and D. Kreps, 1979, Martingales and arbitrage in multiperiod securities markets, JET, 20, 381-408.
- Kreps, D., 1981, Arbitrage and equilibrium in economies with infinitely many commodities, J. Math. Econ., 8, 15-35.
- Merton, R., 1973, Theory of Rational Option Pricing, Bell J. of Econ. and Management Science, 4, 141-183.
- Merton, R., 1990, Option Pricing when underlying stock returns are discontinuous, chapter 9 of Continuous-time Finance, Blackwell, Cambridge.
- Merton, R., 1990, Further developments in option pricing theory, Chapter 10 of Continuous-time Finance, Blackwell, Cambridge.
- Rubinstein, M., 1976, The valuation of uncertain income streams and the pricing of options, Bell J. Econ., 7, 407-425.
- Scheinkman, J., 1989, Market incompleteness and the equilibrium valuation of assets, in Theory of Valuation: Frontiers of Modern Financial Theory, Volume 1, by S. Bhattacharya and G.M. Constantinides (eds.), Rowmanand Littlefield, Maryland.

3. Optimal portfolios and trading strategies.

- Cox, J., and C. Huang, 1989, Optimal consumption and portfolio policies when asset prices follow a diffusion process, JET, 49, 33-83.
- Cuoco, D., and H. Liu, 1999, Optimal consumption of a divisible durable good, working paper, Wharton school, U Penn.
- Detemple, J., and C. Giannikos, 1996, Asset and commodity prices with multi-attribute durable good, Journal of Economic Dynamics and Control, 20, 1451-1504.
- Dybvig, P., and C. Huang, 1988, Nonnegative wealth, absence of arbitrage, and feasible consumption plans, RFS, 1, 377-401.
- Dybvig, P., 1995, Duesenberry's ratcheting of consumption and investment given intolerance for any decline in standard of living, RES, 62, 287-313.

- Grossman, S., and G. Laroque, 1990, Asset pricing and optimal portfolio choice in the presence of illiquid durable consumption goods, *Econometrica*, 58, 25-51.
- He, H., and N. Pearson, 1991, Consumption and portfolio policies with incomplete markets and short-sale constraints: the infinite dimension case, *JET*, 54, 259-304.
- Huang, C., and H. Pages, 1991, Optimal consumption and portfolio policies with an infinite horizon: existence and convergence, working paper (no. 3273-91-EFA), Sloan school, MIT.
- Merton, R., 1971, Optimum consumption and portfolio rules in a continuous-time model, *JET*, 3, 373-413.
- Merton, R., 1969, Lifetime portfolio under certainty: the continuous time case, *Rev. Econ. Statist.*, 247-257.
- Pliska, S., 1986, A stochastic calculus model of continuous trading: Optimal portfolios, *Mathematics of Operations Research*, 11, 371-382.
- Sethi, S., 1995, Optimal consumption-investment decisions allowing for bankruptcy: A survey, working paper, U Toronto.

4. Equilibrium asset pricing.

- Breeden, D., 1979, An intertemporal asset pricing model with stochastic consumption and investment opportunities, *JFE*, 7, 265-296.
- Constantinides, G., and D. Duffie, 1992, Asset pricing with heterogeneous consumers, working paper, U Chicago.
- Cox, J., J. Ingersoll, and S. Ross, 1985, An intertemporal general equilibrium model of asset prices, *Econometrica*, 53, 363-384.
- Duffie, D., 1986, Stochastic equilibria: existence, spanning number, and the no-expected-gain-from-trade hypothesis, *Econometrica*, 54, 1161-1184.
- Duffie, D., and C. Huang, 1985, Implementing Arrow-Debreu equilibria by continuous trading of few long-lived securities, *Econometrica*, 53, 1337-1356.

- Duffie, D., and M. Jackson, 1990, Optimal hedging and equilibrium in a dynamic futures market, *Journal of Economic Dynamics and Control*, 14, 21-33.
- Duffie, D., and W. Zame, 1989, The consumption-based capital asset pricing model, *Econometrica*, 57, 1279-1297.
- He, H., 1992, Option prices with stochastic volatilities: an equilibrium analysis, working paper, Haas school, UC Berkeley.
- Huang, C., 1987, An intertemporal general equilibrium asset pricing model: the case of diffusion information, *Econometrica*, 55, 117-142.
- Lucas, R., 1978, Asset prices in an exchange economy, *Econometrica*, 46, 1429-1445.
- Merton, R., 1973, An intertemporal capital asset pricing model, *Econometrica*, 41, 867-887.

5. “Reasonable” portfolios and asset prices.

- Bick, A., 1990, On viable diffusion price processes of the market portfolio, *JF*, 673-689.
- Dybvig, P., J. Ingersoll, and S. Ross, 1996, Long forward and zero-coupon rates can never fall, *Journal of Business*, 69, 1-25.
- He, H., and H. Leland, On equilibrium asset price processes, 1993, *RFS*, 6, 593-617.
- Huang, C., 1985, Information structure and equilibrium asset prices, *JET*, 35, 33-71.
- Huang, C., and H. He, 1992, Consumption portfolio policies: an inverse optimal problem, working paper, Sloan school, MIT.

6. Term Structure of Interest Rates.

- Breeden, D., 1986, Consumption, production, inflation, and interest rates, *JFE*, 16, 3-39.
- Cox, J., J. Ingersoll, and S. Ross, 1981, A reexamination of traditional hypotheses about the term structure of interest rates, *JF*, 769-799.

- Cox, J., J. Ingersoll, and S. Ross, 1985, A theory of the term structure of interest rates, *Econometrica*, 53, 385-407.
- Dai, Q., 2000. Specification analysis of affine term structure models, *JF*, 55, 1943-1979.
- Goldstein, R., and F. Zapatero, 1996, General equilibrium with constant relative risk aversion and Vasicek interest rates, *Mathematic Finance*, 6, 331-340.
- Heath, D., R. Jarrow, and A. Morton, 1992, Bond pricing and the term structure of interest rates: a new methodology for contingent claims valuation, *Econometrica*, 60, 77-105.
- Ho, T., and S. Lee, 1986, Term structure movements and pricing interest rate contingent claims, *JF*, 41, 1011-1029.
- Hull, J., and A. White, 1993, One-factor interest rate models and the valuation of interest-rate derivative securities, *JFQA*, 28, 235-254.
- Longstaff, F., and E. Schwartz, 1992, Interest rate volatility and the term structure: A two-factor general equilibrium model, *JF*, 47, 1259-1282.
- Pennacchi, G., 1991, Identifying the dynamics of real interest rates and inflation: evidence using survey data, *RFS*, 4, 53-86.
- Sundaresan, S., 1984, Consumption and equilibrium interest rates in stochastic production economies, *JF*, 39, 77-92.
- Richard, S., 1978, An arbitrage model of the term structure of interest rates, *JFE*, 6, 33-57.
- Vasicek, O., 1977, An equilibrium characterization of the term structure, *JFE*, 5, 177-188.
- Wang, J., 1996, The term structure of interest rates in an exchange economy with heterogeneous investors, *JFE*, 41, 75-110.
- Wen, K., 1999, Equilibrium valuation in a Vasicek economy with heterogeneous industries, working paper, Haas school, UC Berkeley.

7. Asset prices and Preferences.

- Bergman, Y., 1985, Time preference and capital asset pricing models, JFE, 14, 145-159.
- Detemple, J., and F. Zapatero, 1991, Asset prices in an exchange economy with habit formation, Econometrica, 59, 1633-1657.
- Duffie, D., and L. Epstein, 1992, Asset pricing with stochastic differential utility, RFS, 5, 411-436.
- Duffie, D., and C. Skiadas, 1991, Continuous-time security pricing: A utility gradient approach, research paper (no. 1096), Stanford U.
- Epstein, L., and T. Wang, 1994, Intertemporal asset pricing under Knightian uncertainty, Econometrica, 62, 283-322.
- Hindy, A., and C. Huang, 1993, Optimal consumption and portfolio rules with durability and local substitution, Econometrica, 61, 85-121.
- Svensson, S., 1989, Portfolio choice with non-expected utility in continuous time, Economics Letters, 30, 313-317.

8. Convergence of discrete-time to continuous-time models

- Amin, K., 1991, On the computation of continuous-time option prices using discrete approximations, JFQA, 26, 477-495.
- Amin, K., and J. Bodurtha, 1995, Discrete-time valuation of American options with stochastic interest rates, RFS, 8, 193-234.
- He, H., 1990, Convergence from discrete- to continuous-time contingent claims prices, RFS, 3, 523-546.
- Ho, T., R. Stapleton, and M. Subrahmanyam, 1995, Multivariate binomial approximations for asset prices with nonstationary variance and covariance characteristics, RFS, 8, 1125-1152.
- Nelson and Ramaswamy, 1990, Simple binomial processes as diffusion approximations in financial models, RFS, 3, 393-430.
- Sun, T., 1992, Real and nominal interest rates: a discrete-time model and its continuous-time limit, RFS, 5, 581-611.

9. Asset trading with information asymmetry.

- Back, K., 1992, Insider trading in continuous-time, RFS, 5, 387-409.
- Back, K., 2000, Imperfect competition among informed traders, JF, 55, 2117-2156.
- Duffie and Huang, 1986, Multiperiod security market with differential information: Martingale and resolution times, J. Math. Econ., 15, 283-303.
- He, H., and J. Wang, 1995, Differential information and dynamic behavior of stock trading volume, RFS, 8, 919-972.
- Hong, H., 2000, A model of returns and trading in futures markets, JF, 55, 959-988.
- Wang J., 1993, A model of intertemporal asset prices under asymmetric information, Review of Economic Studies, 60, 249-282.
- Wang J., 1994, A model of competitive stock trading volume, JPE, 102, 127-168.