Survey of Finance Theory I

Basic Information

Course number	26:390:571 Section 1	
Meeting times / location	Wednesdays 1:00-3:50PM	1WP-464
Instructor	Yichuan Liu	
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Course Overview

This course introduces students to basic concepts and fundamental theories in financial economics with a particular emphasis on asset pricing. The course content is based on the neoclassical framework and follows the core concepts and major developments of modern finance: starting with expected utility theory and Arrow-Debreu pricing, followed by the static consumption-portfolio problem, eventually leading to no-arbitrage and general equilibrium models. While theory is the main focus, there will also be discussions of empirical methods and evidence whenever they are relevant. All of the models will be covered in a static discrete-time framework to keep the mathematics simple while retaining important intuitions.

Prerequisites

- Knowledge of the following is helpful but not essential:
  - Calculus and linear algebra: e.g., matrix notation, matrix algebra, derivative and integration.
  - Some statistics and econometrics: e.g., probabilities, regression.
  - Basic finance

Textbooks

The lecture notes are the most important reference material for exam purposes. The following are recommended (but not required) textbooks:

- *Asset Pricing* by John Cochrane (Princetown University Press)
  Revised edition (2005)
- *Asset Pricing and Portfolio Choice Theory* by Kerry Back (Oxford University Press)
  First edition (2010)

Course Material

- All up-to-date course materials, including announcements, lecture notes and solutions, can be found on BLACKBOARD.
- Practice problems on Blackboard are for review purposes and do not count towards the final grade.

Course Requirements and Grading

The final grade is made up of the following items:

Midterm Exam: 45%

The midterm exam will take place during class on Wednesday, Mar. 22.

Final Exam: 55%

The final exam will take place during the last class on Wednesday, Apr. 26.

Course Policies

General

- Attendance is essential for passing the course. Note taking is necessary as the lecture notes are sometimes simplified.
- Please refrain from using laptops or smartphones in class.
- Check Blackboard regularly for updates and announcements.

Exams

- Exams are closed-book; one non-graphing calculator is allowed.
- In case of grading errors, appeals can be made in writing only and must include a detailed explanation of the errors in question. The entire exam will be checked for errors, and the re-grading may raise or lower the score.
- Absence in the midterm:
  - All cases: no make-up exam will be provided; the final exam will be worth 100%.
  - Valid medical reason: a doctor's note must be submitted within a reasonable time frame; the illness must be reasonable severe.
  - All other cases: one full letter grade will be deducted from the final grade (i.e., A $\rightarrow$ B)
- Absence in the final exam:
  - Valid medical reason: a doctor's note must be submitted within a reasonable time frame; the illness must be reasonable severe; a make-up exam will be provided at a later date.
  - All other cases: a mandatory fail grade will be assigned.

Academic Integrity

- It's simple: don't cheat on exams. Violators will be reported to the school and face serious consequences.

Tentative Schedule and Suggested Reading List

1. (Jan. 18, Jan. 25) Introduction; The State Space and the Fundamental Theorem of Finance

[1] John C Cox and Stephen A Ross. The valuation of options for alternative stochastic processes. *Journal of financial economics*, 3(1):145–166, 1976.

[2] Eugene Fama, Lawrence Fisher, Michael Jensen, and Richard Roll. The adjustment of stock prices to new information. *International economic review*, 10, 1969.

[3] J Michael Harrison and David M Kreps. Martingales and arbitrage in multiperiod securities markets. *Journal of Economic theory*, 20(3):381–408, 1979.

[4] David M Kreps. Arbitrage and equilibrium in economies with infinitely many commodities. *Journal of Mathematical Economics*, 8(1):15–35, 1981.

[5] Burton G Malkiel and Eugene F Fama. Efficient capital markets: a review of theory and empirical work. *The journal of Finance*, 25(2):383–417, 1970.

[6] Richard Roll. Orange juice and weather. *American Economic Review*, 74(5):861–880, 1984.

[7] Stephen A Ross. A simple approach to the valuation of risky streams. *Journal of Business*, pages 453–475, 1978.

[8] Paul A Samuelson. Proof that properly anticipated prices fluctuate randomly. *Industrial management review*, 6(2), 1965.

2. (Feb. 1) Arbitrage Pricing Theory (APT) and Pricing Anomalies

[9] Andrew Ang, Robert J Hodrick, Yuhang Xing, and Xiaoyan Zhang. The cross-section of volatility and expected returns. *The Journal of Finance*, 61(1):259–299, 2006.

[10] Ray Ball and Philip Brown. An empirical evaluation of accounting income numbers. *Journal of accounting research*, pages 159–178, 1968.

[11] Rolf W Banz. The relationship between return and market value of common stocks. *Journal of financial economics*, 9(1):3–18, 1981.

[12] Nicholas Barberis, Andrei Shleifer, and Robert Vishny. A model of investor sentiment. *Journal of financial economics*, 49(3):307–343, 1998.

[13] Victor L Bernard and Jacob K Thomas. Post-earnings-announcement drift: delayed price response or risk premium? *Journal of Accounting research*, 27:1–36, 1989.

[14] Nai-Fu Chen, Richard Roll, and Stephen A Ross. Economic forces and the stock market. *Journal of business*, pages 383–403, 1986.

[15] Philip H Dybvig. An explicit bound on individual assets' deviations from apt pricing in a finite economy. *Journal of Financial Economics*, 12(4):483–496, 1983.

[16] Philip H Dybvig and Stephen A Ross. Yes, the apt is testable. *The Journal of Finance*, 40(4):1173–1188, 1985.

[17] Eugene F Fama and Kenneth R French. The cross-section of expected stock returns. *the Journal of Finance*, 47(2):427–465, 1992.

[18] Eugene F Fama and Kenneth R French. Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, 33(1):3–56, 1993.

[19] Eugene F Fama and Kenneth R French. Multifactor explanations of asset pricing anomalies. *The journal of finance*, 51(1):55–84, 1996.

[20] Eugene F Fama and James D MacBeth. Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy*, pages 607–636, 1973.

[21] Harrison Hong and Jeremy C Stein. A unified theory of underreaction, momentum trading, and overreaction in asset markets. *The Journal of Finance*, 54(6):2143–2184, 1999.

[22] Gar Huberman. A simple approach to arbitrage pricing theory. 1982.

[23] Jonathan E Ingersoll. Some results in the theory of arbitrage pricing. *The Journal of Finance*, 39(4):1021–1039, 1984.

[24] Narasimhan Jegadeesh and Sheridan Titman. Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48(1):65–91, 1993.

[25] Lubos Pastor and Robert F Stambaugh. Liquidity risk and expected stock returns. 2001.

[26] Richard Roll and Stephen A Ross. An empirical investigation of the arbitrage pricing theory. *The Journal of Finance*, 35(5):1073–1103, 1980.

[27] Stephen A Ross. The arbitrage theory of capital asset pricing. *Journal of economic theory*, 13(3):341–360, 1976.

[28] Jay Shanken. The arbitrage pricing theory: is it testable? *The Journal of Finance*, 37(5):1129–1140, 1982.

[29] Jay Shanken. Multi-beta capm or equilibrium-apt?: A reply. *The Journal of Finance*, 40(4):1189–1196, 1985.

[30] Richard G Sloan. Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting Review*, pages 289–315, 1996.

3. (Feb. 8) Introduction to Derivatives

[31] Fischer Black and Myron Scholes. The pricing of options and corporate liabilities. *The journal of political economy*, pages 637–654, 1973.

[32] Michael J Brennan. The pricing of contingent claims in discrete time models. *The journal of finance*, 34(1):53–68, 1979.

[33] John C Cox, Stephen A Ross, and Mark Rubinstein. Option pricing: A simplified approach. *Journal of financial Economics*, 7(3):229–263, 1979.

[34] Robert C Merton. Theory of rational option pricing. *The Bell Journal of economics and management science*, pages 141–183, 1973.

[35] Robert C Merton. On the pricing of corporate debt: The risk structure of interest rates*. *The Journal of Finance*, 29(2):449–470, 1974.

[36] Mark Rubinstein. The valuation of uncertain income streams and the pricing of options. *The Bell Journal of Economics*, pages 407–425, 1976.

4. (Feb. 15) Expected Utility Theory

[37] Kenneth J Arrow. Aspects of the theory of risk-bearing (yrjo jahnsson lectures). *Yrjo Jahnssonin Saatio, Helsinki*, 1965.

[38] Peter A Diamond and Joseph E Stiglitz. Increases in risk and in risk aversion. *Journal of Economic Theory*, 8(3):337–360, 1974.

[39] Philip H Dybvig and Steven A Lippman. An alternative characterization of decreasing absolute risk aversion. *Econometrica*, 51(1):223–24, 1983.

[40] Israel N Herstein and John Milnor. An axiomatic approach to measurable utility. *Econometrica, Journal of the Econometric Society*, pages 291–297, 1953.

[41] Miles S Kimball. Standard risk aversion. *Econometrica: Journal of the Econometric Society*, pages 589–611, 1993.

[42] John W Pratt. Risk aversion in the small and in the large. *Econometrica: Journal of the Econometric Society*, pages 122–136, 1964.

[43] Stephen A Ross. Some stronger measures of risk aversion in the small and the large with applications. *Econometrica: Journal of the Econometric Society*, pages 621–638, 1981.

[44] Michael Rothschild and Joseph E Stiglitz. Increasing risk: I. a definition. *Journal of Economic Theory*, 2:225–243, 1970.

[45] Michael Rothschild and Joseph E Stiglitz. Increasing risk: Ii. its economic consequences. *Journal of Economic Theory*, 3(1):66–84, 1971.

[46] Paul A Samuelson. Probability, utility, and the independence axiom. *Econometrica: Journal of the Econometric Society*, pages 670–678, 1952.

[47] Menahem E Yaari. Some remarks on measures of risk aversion and on their uses. *Journal of Economic theory*, 1(3):315–329, 1969.

5. (Feb. 22, Mar. 1) The Static Portfolio-Consumption Problem and the Consumption Beta Model

[48] Rolf W Banz and Merton H Miller. Prices for state-contingent claims: Some estimates and applications. *Journal of Business*, pages 653–672, 1978.

[49] Douglas T Breeden and Robert H Litzenberger. Prices of state-contingent claims implicit in option prices. *Journal of business*, pages 621–651, 1978.

[50] Philip H Dybvig. Inefficient dynamic portfolio strategies or how to throw away a million dollars in the stock market. *Review of Financial Studies*, 1(1):67–88, 1988.

[51] Philip H Dybvig and Stephen A Ross. Portfolio efficient sets. *Econometrica: Journal of the Econometric Society*, pages 1525–1546, 1982.

[52] Peter C Fishburn and R Burr Porter. Optimal portfolios with one safe and one risky asset: Effects of changes in rate of return and risk. *Management Science*, 22(10):1064–1073, 1976.

[53] Rajnish Mehra and Edward C Prescott. The equity premium: A puzzle. *Journal of monetary Economics*, 15(2):145–161, 1985.

[54] Robert C Merton. On the microeconomic theory of investment under uncertainty. *Handbook of mathematical economics*, 2:601–669, 1982.

[55] Stephen A Ross. Options and efficiency. *The Quarterly Journal of Economics*, 90(1):75–89, 1976.

6. (Mar. 8) General Equilibrium

[56] Kenneth J Arrow. The role of securities in the optimal allocation of risk-bearing. *The Review of Economic Studies*, pages 91–96, 1964.

[57] Robert E Lucas Jr. Asset prices in an exchange economy. *Econometrica: Journal of the Econometric Society*, pages 1429–1445, 1978.

[58] Roy Radner. Equilibrium under uncertainty. *Handbook of mathematical economics*, 2:923–1006, 1982.

[59] Mark Rubinstein. An aggregation theorem for securities markets. *Journal of Financial Economics*, 1(3):225–244, 1974.

7. (Mar. 22) Midterm Exam

8. (Mar. 29) The Capital Asset Pricing Model (CAPM)

[60] Fischer Black. Capital market equilibrium with restricted borrowing. *The Journal of Business*, 45(3):444–455, 1972.

[61] David Cass and Joseph E Stiglitz. The structure of investor preferences and asset returns, and separability in portfolio allocation. *Journal of Economic Theory*, 2:122–160, 1970.

[62] Gary Chamberlain. A characterization of the distributions that imply mean-variance utility functions. *Journal of Economic Theory*, 29(1):185–201, 1983.

[63] Philip H Dybvig. Short sales restrictions and kinks on the mean variance frontier. *The Journal of Finance*, 39(1):239–244, 1984.

[64] Philip H Dybvig and Jonathan E Ingersoll Jr. Mean-variance theory in complete markets. *Journal of Business*, pages 233–251, 1982.

[65] Philip H Dybvig and Stephen A Ross. The analytics of performance measurement using a security market line. *The Journal of finance*, 40(2):401–416, 1985.

[66] Philip H Dybvig and Stephen A Ross. Differential information and performance measurement using a security market line. *The Journal of Finance*, 40(2):383–399, 1985.

[67] Eugene F Fama. Risk, return, and equilibrium. *The Journal of Political Economy*, 79(1):30–55, 1971.

[68] Eugene F Fama and Kenneth R French. The cross-section of expected stock returns. *the Journal of Finance*, 47(2):427–465, 1992.

[69] Kenneth R French and Richard Roll. Stock return variances: The arrival of information and the reaction of traders. *Journal of financial economics*, 17(1):5–26, 1986.

[70] Michael R Gibbons, Stephen A Ross, and Jay Shanken. A test of the efficiency of a given portfolio. *Econometrica: Journal of the Econometric Society*, pages 1121–1152, 1989.

[71] Martin J Gruber and Stephen A Ross. The current status of the capital asset pricing model (capm). *The Journal of Finance*, 33(3):885–901, 1978.

[72] Gur Huberman and Shmuel Kandel. Mean-variance spanning. *The Journal of Finance*, 42(4):873–888, 1987.

[73] Alan Kraus and Robert H Litzenberger. Skewness preference and the valuation of risk assets. *The Journal of Finance*, 31(4):1085–1100, 1976.

[74] John Lintner. The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The review of economics and statistics*, 47(1):13–37, 1965.

[75] John Lintner. The aggregation of investor's diverse judgments and preferences in purely competitive security markets. *Journal of Financial and Quantitative Analysis*, 4(4):347–400, 1969.

[76] Harry Markowitz. Portfolio selection. *The journal of finance*, 7(1):77–91, 1952.

[77] Robert C Merton. An analytic derivation of the efficient portfolio frontier. *Journal of financial and quantitative analysis*, 7(4):1851–1872, 1972.

[78] Jan Mossin. Equilibrium in a capital asset market. *Econometrica: Journal of the Econometric Society*, pages 768–783, 1966.

[79] Richard Roll. A critique of the asset pricing theory's tests part i: On past and potential testability of the theory. *Journal of financial economics*, 4(2):129–176, 1977.

[80] Richard Roll. Ambiguity when performance is measured by the securities market line. *The Journal of Finance*, 33(4):1051–1069, 1978.

[81] Stephen A Ross. The capital asset pricing model (capm), short-sale restrictions and related issues. *The Journal of Finance*, 32(1):177–183, 1977.

[82] Paul A Samuelson. General proof that diversification pays. *Journal of Financial and Quantitative Analysis*, 2(1):1–13, 1967.

[83] William F Sharpe. Capital asset prices: a theory of market equilibrium under conditions of risk. *The journal of finance*, 19(3):425–442, 1964.

9. (Apr. 5) Dynamic Asset Pricing and the Intertemporal CAPM

[84] Andrew B Abel. Stock prices under time-varying dividend risk: An exact solution in an infinite-horizon general equilibrium model. *Journal of Monetary Economics*, 22(3):375–393, 1988.

[85] Andrew B Abel. Risk premia and term premia in general equilibrium. *Journal of Monetary Economics*, 43(1):3–33, 1999.

[86] Douglas T Breeden. An intertemporal asset pricing model with stochastic consumption and investment opportunities. *Journal of financial Economics*, 7(3):265–296, 1979.

[87] Gary Chamberlain. Asset pricing in multiperiod securities markets. *Econometrica: Journal of the Econometric Society*, pages 1283–1300, 1988.

[88] John C Cox, Jonathan E Ingersoll Jr, and Stephen A Ross. An intertemporal general equilibrium model of asset prices. *Econometrica: Journal of the Econometric Society*, pages 363–384, 1985.

[89] Darrell Duffie and Chi-Fu Huang. Implementing arrow-debreu equilibria by continuous trading of few long-lived securities. *Econometrica: Journal of the Econometric Society*, pages 1337–1356, 1985.

[90] Robert C Merton. An intertemporal capital asset pricing model. *Econometrica: Journal of the Econometric Society*, pages 867–887, 1973.

[91] Roy Radner. Existence of equilibrium of plans, prices, and price expectations in a sequence of markets. *Econometrica: Journal of the Econometric Society*, pages 289–303, 1972.

10. (Apr. 12) Market Efficiency and Asymmetric Information Models

[92] J Bradford DeLong, Andrei Shleifer, Lawrence H Summers, and Robert J Waldmann. Noise trader risk in financial markets. *Russell Sage Foundation, New York*, pages 23–58, 1993.

[93] Douglas W Diamond and Robert E Verrecchia. Information aggregation in a noisy rational expectations economy. *Journal of Financial Economics*, 9(3):221–235, 1981.

[94] Lawrence R Glosten and Paul R Milgrom. Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of financial economics*, 14(1):71–100, 1985.

[95] Sanford Grossman. On the efficiency of competitive stock markets where trades have diverse information. *The Journal of Finance*, 31(2):573–585, 1976.

[96] Sanford J Grossman and Joseph E Stiglitz. On the impossibility of informationally efficient markets. *The American economic review*, 70(3):393–408, 1980.

[97] Bengt Hölmstrom. Moral hazard and observability. *The Bell Journal of Economics*, pages 74–91, 1979.

[98] Albert S Kyle. Continuous auctions and insider trading. *Econometrica: Journal of the Econometric Society*, pages 1315–1335, 1985.

[99] Paul Milgrom and Nancy Stokey. Information, trade and common knowledge. *Journal of Economic Theory*, 26(1):17–27, 1982.

[100] Jean Tirole. On the possibility of speculation under rational expectations. *Econometrica: Journal of the Econometric Society*, pages 1163–1181, 1982.

11. (Apr. 19) Buffer / Review

12. (Apr. 26) Final Exam