Finance Theory I
Fall Semester, 2018.
Course Outline (updated 9/11/18)

Instructors
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Class Times
The class will meet once a week on Tuesday from 2:30 to 5:30pm in Tisch UC-05. As per the Stern calendar, the first class is on Sep 4 and the last in on Dec 11, with no classes on Sep 11 or Oct 9. Exams will either be given in class or at a time mutually agreed to by the instructor and the students enrolled in the course.

Course Objectives
Finance Theory I is the first of 5 second-year finance Ph.D courses offered by the Stern School. Its focus is modern valuation theory in a discrete-time setting. The course is also designed to prepare students for the other 4 finance Ph.D. courses.

Lectures
There are 13 classes. The first class will be an organizational/overview class. Professor Lynch will teach the next 6 classes and Professor Savov will teach the last 6 classes. Professor Lynch's last class will be on Tuesday October 30.

Assessment
There will be a midterm and a final exam, as well as problem sets and homeworks. The midterm will be worth 50%, the final will be worth 35%, and the homeworks for Professor Savov's half of the course will be worth 15%. The midterm will cover the material taught by Professor Lynch in the 2nd to 7th classes, while the final will cover the material taught by Professor Savov in the last 6 classes. The midterm will be closed book except for the typed lecture notes discussed below, and one 8½" x 11" sheet which can be written on both sides. A student who fails to submit 2 or more of the problems sets on time for Professor Lynch's half of the course will automatically get a score of 0% out of 50% for his half of the course. Problem sets solutions must be hand- written and late solutions will not be accepted.

Professor Lynch's Half of the Course

Professor Lynch has a set of typed lecture notes covering most of the topics to be covered in the course. The relevant chapters for each of his lectures will be emailed to students in advance. Finance Theory I Final and Midterm exams for the years 2000, 2001, 2002, 2004 and 2005 and solutions for the 2000, 20001 and 2002 Midterms will also be emailed. You can look over (and take notes about) rough solutions to the other exams by stopping by Professor Lynch's office.

Professor Savov's Half of the Course

Professor Savov will distribute the slides that are being projected in class, one week ahead of time. For most classes, there will be two or three recent papers that the students are required to read before the class.

Textbooks

Required

1. Campbell, J.Y., 2018, Financial Decisions and Markets: A Course in Asset Pricing, Princeton University Press (Ca).
2. Cochrane, J., 2001, Asset Pricing, Princeton University Press (Co).

Recommended

These are books worth buying independent of your enrollment in the course if you are planning to do serious finance research.

1. Campbell, J.Y., A.W. Lo, and A.C. MacKinlay, 1997, The Econometrics of Financial Markets, Princeton University Press (CLM).
2. Ingersoll, J., Theory of Financial Decision-making, Rowman and Littlefield (I).
3. Duffie, D., Dynamic Asset Pricing Theory, Princeton University Press (D).
4. Back, K., 2010, Asset Pricing and Portfolio Choice Theory, Oxford University Press, New York.

Preliminary Reading

If your mathematical background is weak, the following readings will probably be useful.

1. Chiang, A., Fundamental Methods of Mathematical Economics, McGraw Hill (This is a basic book and easy to read, but full of techniques that you need to know about.)
2. Ingersoll, Mathematical Introduction (A laundry list of useful information).
3. Sargent, T., Dynamic Macroeconomic Theory, Harvard University Press, Chapter 1 (This is a reasonably non-technical introduction to dynamic programming.).
4. Small, C. G. and D.L. McLeish,1994, Hilbert Space Methods in Probability and Statistical Inference, John Wiley and Sons, Chapters 1-3.

Outline

Prices in a Single-period Setting

Topics:
1. Law of One Price and asset returns
2. No arbitrage and asset returns.
3. Stochastic discount factors.
4. Complete versus incomplete markets.
5. Mean-variance frontiers for returns.
6. Beta representations for returns.
7. Relations between discount factors, mean-variance frontiers, and Betas.
8. Conditioning information.

Reading:
1. Co, Chapters 1-8.
2. Ca, Chapter 4.
3. CLM, Chapter 1 and Section 8.1.
4. Hansen, L. and S. Richard, 1987, The role of conditioning information in deducing testable restrictions implied by dynamic asset pricing models, *Econometrica* 55, 587-613. JSTOR
5. Hansen, L. and R. Jagannathan, 1991, Implications of security market data for models of dynamic economies, *Journal of Political Economy* 99, 225-262. JSTOR
6. Hansen, L. and R. Jagannathan, 1997, Assessing specification errors in stochastic discount factor models , *Journal of Finance* 52, 557-590. JSTOR

Prices in a Multi-period Setting

Topics:
1. Present value formula with a constant discount factor.
2. Present value formula with a stochastic discount factor.
3. Bubbles.
4. An approximate decomposition for dividend-price ratios.
5. An approximate decomposition for returns.
6. Completing markets through dynamic trading.

Reading:
1. Ca, Chapter 5.
2. CLM, Section 7.1.
3. Cochrane, John H., 1991. "Volatility Tests and Efficient Markets: A Review Essay." *Journal of Monetary Economics* 27, 463-485. This is a review of both the volatility literature and Shiller's Market Volatility book.
4. Cochrane, J. H., 1992. "Explaining the Variance of Price-Dividend Ratios." *Review of Financial Studies* 5, 243-280. JSTOR
5. Campbell, John Y., 1991. "A variance decomposition for stock returns." *Economic Journal* 101, 157-179. JSTOR

Equilibrium Pricing Models and Portfolio Separation

Topics:

1. Time-separable preferences.
2. Portfolio allocation decisions.
   a. Single period and multi-period.
   b. Campbell-Viceira approximation.
3. Equilibrium Pricing: Representative agent
   a. C-CAPM.
   b. CAPM.
   c. I-CAPM
   d. Endowment economies.
4. APT. (time permitting)
5. Heterogeneity and Equilibrium: Homogenous beliefs. (time permitting)

Reading:

1. Ca, Chapters 1, 2, 3, 6, and 9, and Section 10.1.
2. Co, Chapter 9.
3. I, Chapter 1.
4. Constantinides, George M., 1989. "Theory of Valuation: Overview and Recent Developments." in Bhattacharya, Sudipto, and George M. Constantinides, editors, 1989. Theory of Valuation: Frontiers of Modern Financial Theory. Rowman & Littlefield.
5. CLM, Sections 5.1, 6.1 and 8.2.
6. I, Chapters 4 and 11.
7. Campbell, J., Viceira, L., 1999. Consumption and portfolio decisions when expected returns are time varying. *Quarterly Journal of Economics* 114, 433-495. JSTOR
8. Fama, Eugene F., 1970, Multiperiod consumption-investment decisions, *American Economic Review* 60, 163-174. JSTOR
9. I, Chapters 3, 7-10.
10. Mas-Colell, Andreu, Michael D. Whinston, and Jerry R. Green, 1995. Microeconomic Theory. Oxford University Press. Chapters 6 (choice under uncertainty) and 19 (general equilibrium under uncertainty).
11. Lucus, R., Jr, 1978, Asset prices in an exchange economy, *Econometrica* 46, 1429-1446. JSTOR
12. Mehra, R. and E. C. Prescott, 1985, The equity premium: A puzzle, *Journal of Monetary Economics* 15, 145-161.
13. I, Chapter 5-6.
14. Fama, Eugene F., 1996, Multifactor portfolio efficiency and multifactor asset pricing, *Journal of Financial and Quantitative Analysis* 33, 441-465. JSTOR
15. Ross, S., 1978, Mutual Fund Separation and Financial Theory - The Separating Distributions, *Journal of Economic Theory* 17, 254-286.

Midterm Exam

Stylized Facts about the Riskless Rate and Equity Prices and Returns

Topics:

1. Representative Agent Anomalies:
   a. Equity Premium Puzzle.
   b. Riskfree Rate Puzzle.
   c. Equity Volatility Puzzle.
2. Equity Return Predictability.
3. Cross-sectional Puzzles.

Reading:

1. Ca, Chapter 3.3 and 5.
2. Co, Chapter 20 and 21.1.
3. CLM, Chapter 8.2.
4. Cochrane, John H., 2011, Presidential Address: Discount Rates, Journal of Finance 66, 1047-1108.
5. Campbell, J., 2000, Asset Pricing at the Millennium, *Journal of Finance* 55, 1515-1568.
6. Campbell and Shiller, 1988, The dividend-price ratio and expectations of future dividends and discount factors, Review of Financial Studies, 1, 195-228.
7. Campbell and Shiller, 1991, A Variance Decomposition for Stock Returns", *Economic Journal* 101:157–179, March 1991.
8. Cochrane, John H., New Facts in Finance, NBER Working Paper #7169.
9. Cochrane, John H., Financial Markets and the Real Economy (esp. Chapter 2).
10. Cochrane, John H., and Lars Peter Hansen, 1992. "Asset Pricing Explorations for Macroeconomics." In Blanchard, Olivier J. and Stanley Fischer, editors. 1992 Macroeconomics Annual. Cambridge, MIT Press.
11. Hodrick, R. J., Dividend yields and expected stock returns: Alternative procedures for inference and measurement, *Review of Financial Studies* 5, 357-386.
12. Mehra, R. and E. C. Prescott, 1985, The equity premium: A puzzle, *Journal of Monetary Economics* 15, 145-161.
13. Binsbergen, Jules H. van, and Ralph S.J. Koijen, 2010, Predictive regressions: A present-value approach, The Journal of Finance 65(4), 1439-1471.

Stylized Facts about the Bond Prices, Bond Returns, and Currency Returns

Topics:

1. Bonds
    a. Yields, Forward rates, Bond Returns: definitions and stylized facts
    b. The Expectations Hypothesis and its empirical failure.
    c. Failure of the CCAPM to explain bond puzzles.
2. Currency returns
    a. Definitions and SDF approach
    b. Uncovered Interest Rate Parity, Real Exchange Rate Volatility, Correlation, and Backus-Smith Puzzles
    c. Failure of the CCAPM to explain currency puzzles

Reading:

1. Ca, Chapter 8.1-2.
2. Co, Chapter 19.1-2.
3. CLM, Chapter 10.
4. Backus, David, Silverio Foresi, and Chris Telmer, 2001, Affine term structure models and the forward premium anomaly, *Journal of Finance* LVI, 279–304.
5. Backus, David K.; Smith, Gregor W. (1993), "Consumption and real exchange rates in dynamic economies with non-traded goods", *Journal of International Economics* 35 (3-4): 297–316
6. Brandt, Michael, John Cochrane, and Pedro Santa-Clara, 2006, International risk-sharing is better than you think, or exchange rates are too smooth, *Journal of Monetary Economics*
7. Campbell John and Robert Shiller, Yield Spreads and Interest Rate Movements: A Bird's Eye View, *Review of Economic Studies* 58:495–514, July 1991
8. Fama, Eugene, 1984, Forward and spot exchange rates, *Journal of Monetary Economics* 14, 319–338.
9. Hansen, Lars Peter, and Robert J. Hodrick, 1980, Forward exchange rates as optimal predictors of future spot rates: An econometric analysis, *Journal of Political Economy* 88, 829–853.
10. Wachter, J., 2006, A Consumption-Based Model of the Term Structure of Interest Rates, *Journal of Financial Economics*, 79, 365–399.

New Models to Address Stylized Facts about Asset Prices: Habit models

Reading:

1. Ca, Chapter 6.7.
2. Co, Chapter 21.2.
3. CLM, Chapter 8.3-8.4
4. Campbell, John Y. and John H. Cochrane, 1999. By Force of Habit: A Consumption-based Explanation of Aggregate Stock Market Behavior. *Journal of Political Economy* 107, 205-251. JSTOR
5. Constantinides, George M., 1990, Habit formation: A Resolution of the equity premium puzzle, *Journal of Political Economy* 98, 519-543. JSTOR
6. Verdelhan, Adrien, 2010, A Habit-Based Explanation of the Exchange Rate Risk Premium, *Journal of Finance*, February 2010, Vol. 65, No 1, pp 123-145.
7. Wachter, Jessica A., 2005, Solving models with external habit, *Finance Research Letters* 2, 210–226.
8. Wachter, J., 2006, A Consumption-Based Model of the Term Structure of Interest Rates, *Journal of Financial Economics*, 79, 365–399.

New Models to Address Stylized Facts about Asset Prices: Epstein-Zin and Long-Run Risk Models

Reading:

1. Ca, Chapter 6.4-6.5.
2. Epstein, Larry G. and Stanley E. Zin, 1989, Substitution, Risk Aversion and the Temporal Behavior of Asset Returns, *Journal of Political Economy* 99, 263-286.
3. Bansal, Ravi, and Amir Yaron, 2004. Risks for the Long-Run: A Potential Resolution of Asset Pricing Puzzles. *Journal of Finance* 59, 1481-1509.
4. Bansal, Ravi, Dana Kiku, and Amir Yaron, 2010. An Empirical Evaluation of the Long-Run Risks Model for Asset Prices.
5. Colacito, Ricardo, and Max Croce, "Risks for the Long Run and the Real Exchange Rate" *Journal of Political Economy*, Volume 119, No. 1 (February 2011), pp. 153-181.

New Models to Address Stylized Facts about Asset Prices: Idiosyncratic Risk Models

Reading:

1. Ca, Chapter 11.1.
2. Brav A., Constantinides G., and C. Geczy, Asset Pricing with Heterogeneous Consumers and Limited Participation: Empirical Evidence, *Journal of Political Economy,* 2002, vol. 110, no. 4.
3. Constantinides, George M. and Darrell Duffie, 1996, Asset Pricing with Heterogeneous Consumers, *Journal of Political Economy* 104, 219-240.
4. Mankiw, N. Gregory, 1986, The equity premium puzzle and the concentration of aggregate shocks, *Journal of Financial Economics* 17, 211-219.
5. Krueger, Dirk, and Hanno Lustig, When is market incompleteness irrelevant for the price of aggregate risk (and when is it not)? *Journal of Economic Theory*, Volume 145, Issue 1, January 2010, Pages 1-41.
6. Alvarez, Fernando and Urban Jermann, Efficiency, Equilibrium, and Asset Pricing with Risk of Default**,** *Econometrica*, July 2000, Vol. 68, No. 4, pp. 775-797
7. Guvenen, Fatih, A Parsimonious Macroeconomic Model for Asset Pricing, Econometrica, 2009, vol 77(6), pp 1711-1740
8. Guvenen, Fatih, Macroeconomics with Heterogeneity: A Practical Guide, Federal Reserve Bank of Richmond Quarterly, Fall 2011
9. Favilukis, Jack, Sydney Ludvigson, and Stijn Van Nieuwerburgh, Macroeconomic Implications of Housing Wealth, Housing Finance, and Limited Risk-Sharing in General Equilibrium, Journal of Political Economy, February 2017

Term Structure Models and Stylized Facts

Topics:

1. Concepts
2. Model of the Expectations Hypothesis
3. Vasicek Model
4. Cox-Ingersoll-Ross Model
5. Affine-yield Models.
6. Empirics of the Term Structure
    a. Bond Excess Return Predictability.

Reading:

1. Ca, Chapter 8.3-8.5
2. Co, Chapter 19
3. CLM, Chapter 11.1.
4. Cochrane, J. and M. Piazzesi. 2005. American Economic Review 95, 138-160.

Frictions

Topics:
1. Intermediary-Based Asset Pricing
2. Margin-Based Asset Pricing

Reading:
1. Ca, Chapter 12.3
2. He Zhiguo and Arvind Krishnamurty, 2013, Intermediary Asset Pricing, American Economic Review 103(2), pp 732-770.
3. Brunnermeier Markus and Yuliy Sannikov, 2014, A Macroeconomic Model with a Financial Sector, American Economic Review 104(2), pp 379-421
4. Nicolae Garleanu and Lasse Pedersen, Margin-based Asset Pricing and Deviations from the Law of One Price, Review of Financial Studies, 24(6), pp 1980-2022, January 2011.
5. He Zhiguo and Arvind Krishnamurty, A Model of Capital and Crises, Forthcoming Review of Economic Studies
6. Adrian Tobias and Hyun Song Shin, Financial Intermediaries and Monetary Economics, Handbook of Monetary Economics, 3A, ch 12, ed. B. Friedman and M. Woodford, pp 601-650
7. Adrian Tobias and Hyun Song Shin, Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007-09
8. Drechsler Itamar, Alexi Savov, and Philipp Schnabl, 2018, A Model of Monetary Policy and Risk Premia, Journal of Finance 73(1), pp 317-373
9. Moreira Alan and Alexi Savov, 2017, The Macroeconomics of Shadow Banking, Journal of Finance 72(6), pp 2381-2432

Final Exam Take home