University of Pennsylvania
The Wharton School
Professor Amir Yaron

Empirical Research in Finance FNCE-934, Spring 2008

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I. OBJECTIVES

This course is intended for PhD students in finance and related fields. It is designed to teach students how to conduct empirical research in asset pricing. By the end of this semester, students are expected to:

1. have a comprehensive conceptual framework of research in empirical asset pricing (i.e., be familiar with the topics, the methodologies used, classic papers and recent contributions to frontier topics).
2. be able to analyze and evaluate new research efficiently; and
3. have acquired the skills to conduct and present original empirical research in finance.

II. Prerequisite

To register for or audit FNCE 934 you must have completed FNCE 911 and FNCE 921, as well as STAT 510 and STAT 511. In addition, you must have completed, or be currently registered for FNCE 922.

III. Lectures and Exams

Lectures:	Fridays SH-DH 109 1:00-4:00 PM
Final Exam:	TBA

IV. Communication

Email is my main mode of communication. I will use email to send assignments and administrative notices to all registered students. The official information source for FNCE 934 is my course web site:

http://savage.wharton.upenn.edu/TEACHING/FNCE934.html

It holds all lecture notes and assignments that I have handed out to date. I will hand out a login and password to my web site. Please keep this information to yourself.

V. Time Requirement

This is a very demanding course, irrespective of whether you are registered or just auditing. The average student can expect to spend at least 15 hours per week outside of class with assigned readings, problem sets, reviewing lectures, and working on the project.

VI. Grading and Auditing Privileges

The following components make up your course grade, if you are a registered student, or if you are an auditing student:

- **Pre-Class Preparation:**

  To make this class work, everyone has to work through every assigned reading before class. If you don't want to work hard, I don't want you in this class.

  Registered Students: The first time I discover you did not work through an assigned paper, I will issue you a warning. The second time, and every time thereafter, that I discover you did not work through an assigned paper before class, I will deduct 1/3rd of a grade from your final grade.

  Auditing students: The first time I discover you did not work through the assigned papers, I will issue you a warning. The second time, I will withdraw your auditing privilege.

- **Assignments (25pts):**

  About every other week I will assign fairly lengthy homework. These assignments can be worked on in groups but have to be written/completed individually and be handed in at or before the beginning of class on the day they are due. You should start working on the assignments as soon as possible. Some of the assignments could take several days to complete. Under no circumstances will I accept late homework.

  The assignments are designed to help you understand the material, digest the assigned papers that I do not cover in class, and familiarize yourself with empirical research. Many problems will require the use of computers. You must know or quickly learn a statistical programming language. I recommend that you use Matlab, Gauss, although other software packages like SAS, RATS, or EVIEWS may work. Of course, you may be a hard-core programmer and use C, C++, Fortran, or the more user friendly Fortan90.

- **Referee Reports & Presentation (25pts):**

  Most weeks that you are not working on an assignment, you will have to write a referee report on a paper I will distribute in class. Each referee report should be no longer than four pages, one-half spaced. Depending on the ultimate size of the class, I will a) assign different papers to different students and b) require that students present an executive summary of their report to the class on one of the papers marked as $\star$ in the reading list. In the second half of the semester you will have to present a summary of paper from the list I provide.

  The referee reports extend your knowledge of the literature and give you an idea of the empirical and methodological questions current research focuses on. Perhaps more important, they teach you to form an opinion about whether a piece of research is outstanding or only mediocre. You will not be graded on whether your opinion agrees with mine, but rather on how you come to your conclusions and how well you back them up. It is quite possible that I will change my mind after reading your report.

- **Final Exam (25pts):**

  There will be a final examination. Since life after graduate school is an open-book experience, you are allowed to bring in and use any materials you like, as long as you

are not disturbing other students. Any material discussed in class or in the assigned readings (i.e. required readings) is fair game for the exam. Auditing students: You are exempt from the exam.

- **Research Paper (25pts):**

  You will have to submit a semi-original research paper by June 30, 2008. Failure to submit a paper by this dates will result in 0 points. I realize that this is not your thesis, so I do not expect that you come up with a new methodology or attack an uncharted research question. However, you should think of a paper topic that (a) uses a methodology introduced in this course, or more advanced, to answer an empirical question of interest to you and/or (b) improve on someones answer to an empirical question by refining a methodology of interest to you. The paper should be no longer than 15 pages, one-half spaced, not including tables and figures. I am more interested in seeing your mind at work, than I am in reading a well polished piece research with extensive literature review. Generally, I think the more clever your idea is, the shorter can the paper be. In preparing your research proposal, you should choose a topic and bring yourself to the frontier of the existing literature. You should search the recent finance journals for related published papers and the SSRN or other sources for current working papers. Auditing students: You are exempt from the research paper.

- **Participation:**

  I expect that you become an active participant in the class. You should ask questions, raise issues, contribute your knowledge, and challenge the opinions of others, including mine. I will use participation as away to increase your grade in cases in which your grade is at the borderline. This class will be a lot more enjoyable for everyone if you do. Auditing students: You are required to participate, just like registered students. If you establish a reputation for sitting quietly in the back-row, I may withdraw your auditing privilege.

VII. Texts & Readings

You should have access to the following books:

- Campbell, J., A. Lo, and A.C. MacKinlay, 1997, *The Econometrics of Financial Markets*, Princeton University Press.
- Cochrane, J., 2001, *Asset Pricing*, Princeton University Press.
- Hamilton, J., 1994, *Time Series Analysis*, Princeton University Press.
- Judd Kenneth, 1998, *Numerical Methods in Economics*
- Singleton Kenneth *Empirical Dynamic Asset Pricing*, Princeton University Press.

Other books that you might find useful for this course are:

- Duffie, D., *Dynamic Asset Pricing Theory.*
- Gilks, W., S. Richardson, and D. Spiegelhalter, *Markov Chain Monte Carlo in Practice.*
- Gourieroux, C., and J. Jasiak, 2001, *Financial Econometrics: Problems, Models, and Methods*, Princeton University Press.
- Judge, G., et al., *The Theory and Practice of Econometrics.*

- Karlin, S., and H. Taylor, *A First Course in Stochastic Processes*.
- Karlin, S., and H. Taylor, *A Second Course in Stochastic Processes*.
- Ljungqvist, Lars, and Thomas J. Sargent, 2004, *Recursive Macroeconomic Theory*, 2nd edition, The MIT Press.
- Marimon, Ramon, and Andrew Scott, 1999, *Computational Methods for the Study of Dynamic Economies*, Oxford University Press.
- Merton, R., *Continuous-Time Finance*.
- Mills, T., The Econometric Modeling of Financial Time Series.
- Sargent, T., *Dynamic Macroeconomic Theory*.
- Silverman,B.W., *Density Estimation for Statistical and Data Analysis*.
- Wooldridge, Jeffrey M., 2002, *Econometric Analysis of Cross Section and Panel Data*, The MIT Press.

This course will evolve throughout the semester. Here is a preliminary reading list for the semester.

The approach is to list important topical areas within the overall literature and a sample of papers from each area. The choice of articles is a mix of classic papers and recent contributions so that you can trace the evolution of the research in each area to the present. The lectures will be devoted to discussing the genesis of important ideas in the literature and concurrent developments that stimulated many of the ideas. I will also try to critically evaluate the findings and research designs employed in past research. The main objective is to offer competing hypotheses and interpretations for the observed findings, and to present unresolved issues and directions for future research.

Contents

1 Preliminaries and Introduction

Required

1. Campbell, John Y., 2000, Asset Pricing at the Millennium, Journal of Finance, LV (4), 1515-1567.
2. Hamilton, J., 1994, *Time Series Analysis*, Princeton University Press, Chapters 8,11,19.

Recommended

1. Cochrane, John H., 2005, Financial Markets and the Real Economy, NBER Working paper, W11193.
2. Cochrane, John H., 2001, Asset Pricing, Chapters 20 and 21
3. Constantinides, George M., 2002, Rational Asset Prices, Journal of Finance, LVII (4), 1567 - 1591.
4. Fama, Eugene, 1976, Foundations of Finance, Chapter 5.
5. Fama, Eugene F., 1991, Efficient Capital Markets: II, Journal of Finance, XLVI (5), 1575 1617.

2 Time Varying Moments of Returns

2.1 Time Series Return Predictability

Required

1. Campbell, J., and R. Shiller, 1988, The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors, Review of Financial Studies 1, 195-228.
2. Campbell, Lo, and MacKinlay, 1997, Chapter 7.
3. Hodrick, R., 1992, Dividend Yields and Expected Stock Returns: Alternative Procedures for Inference and Measurement, Review of Financial Studies 5, 357- 386.
4. Stambaugh, Robert F., 1999, "Predictive Regressions, Journal of Financial Economics," 54, 375–421.

Recommended

1. $\star$ Ang A. and Bekaert G. "Is Predictability there?", working paper, GSB, Columbia University.
2. Bansal Ravi and Amir Yaron "The Asset Pricing-Macro Nexus and Return-Cash Flow Predictability, Working Paper, Wharton.
3. Boudoukh Jacob, Matthew Richardson and Robert Whitelaw, The Myth of Long-Horizon Predictability, 2006, Review of Financial Studies, forthcoming.

4. Campbell, J., 1991, A Variance Decomposition of Stock Returns, Economic Journal 101, 157-179.

5. Campbell, J., and R. Shiller, 1987, Cointegration and Tests of Present Value Models, Journal of Political Economy 95, 1062-1087.

6. Cochrane, John H., 1991, Volatility Tests and Efficient Markets, Journal of Monetary Economics, 27, 463-485.

7. Cochrane John, 1991, "Explaining the Variance of Price-Dividend Ratios" Review of Financial Studies 5:2, 243-280.

8. ⋆ Cochrane John, 2007, "The Dog That Did Not Bark: A Defense of Return Predictability," forthcoming, Review of Financial Studies

9. Fama, Eugene F., and Kenneth R. French, 1988a, Dividend Yields and Expected Stock Returns, Journal of Financial Economics, 22, 325.

10. Fama, E., and K. French, 1988a, Permanent and Temporary Components of Stock Prices, Journal of Political Economy, 96, 246-273.

11. Fama, E., and K. French, 1989, Business Conditions and Expected Returns on Stocks and Bonds, Journal of Financial Economics 25, 23-49.

12. Ferson, Wayne E., Sergei Sarkissian, and Timothy T. Simin, 2002, Spurious Regressions in Financial Economics? Journal of Finance, Forthcoming.

13. ⋆ Lustig Hanno and Stijn Van Nieuwerburgh. The Returns on Human Capital: Good News on Wall Street is Bad News on Main Street. Working Paper, NYU and UCLA.

14. ⋆ Lettau, Martin and Stijn Van Nieuwerburgh, 2006, Reconciling the Return Predictability Evidence, Review of Financial Studies, forthcoming.

15. Lamont, Owen, 1998, "Earnings and Expected Returns, Journal of Finance," 53, 1563 - 1587.

16. LeRoy, Stephen, and Richard Porter, 1981, The present value relation: Tests based on implied variance bounds, Econometrica 49, 555–574.

17. ⋆ Lettau, M, and S. Ludvigson, 2001, Consumption, Aggregate Wealth, and Expected Stock Returns, Journal of Finance 56, 815 - 850.

18. Lewellen, Jonathan W., 2004, Predicting Returns with Financial Ratios, Journal of Financial Economics, 74 (2), 209 235.

19. Lo, A., 1991, Long Term Memory in Stock Market Prices, Econometrica 59, 1279- 1313.

20. Lo, Andrew W., and A. Craig MacKinlay, 1990, Data-Snooping Biases in Tests of Financial Asset Pricing Models, Review of Financial Studies, 3, 431 - 468.

21. Poterba, J., and L. Summers, 1988, Mean Reversion in Stock Returns: Evidence and Implications, Journal of Financial Economics 22, 27-60.

2.2 Volatility Models

Required

1. Bollerslev, T., 1986, Generalized Autoregressive Conditional Heteroscedasticity, Journal of Econometrics 31, 307-327.

2. Bollerslev, T., R. Chou, and K. Kroner, 1980, ARCH Modeling in Finance: A Review of the Theory and Empirical Evidence, Journal of Econometrics 52, 5-59.

3. Hamilton, J., 1989, A New Approach to the Economic Analysis of Nonstationary Time Series and the Business Cycle, Econometrica 57, 357-384.

Recommended

1. Clark, P., 1973, A Subordinated Stochastic Process Model with Finite Variance for Speculative Prices, Econometrica 41, 135-156.

2. Engle, R., 1982, Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of U.K. Inflation, Econometrica 50, 987-1008.

3. Engle, R., V. Ng, and M. Rothschild, 1990, Asset Pricing with a Factor- ARCH Covariance Structure: Empirical Estimates for Treasury Bills, Journal of Econometrics 45, 213-237.

4. Nelson, D., 1991, Conditional Heteroskedasticity in Asset Returns: A New Approach, Econometrica 59, 347-370.

5. Pagan A., and G.W. Schwert, 1990, Alternative Models for Conditional Stock Volatility, Journal of Econometrics 45, 267-290.

6. Tauchen George, 2004, "Recent Developments in Stochastic Volatility: Statistical Modelling and General Equilibrium Analysis," Working paper, Duke University.

7. Schwert, G.W., 1989, Why Does Stock Market Volatility Change Over Time?, Journal of Finance 44, 1115-1153.

2.3 Relation between Conditional Means and Variances

Required

1. Bollerslev, T., R. Engle, and J. Wooldridge, 1988, A Capital Asset Pricing Model with Time Varying Covariance, Journal of Political Economy 96,116-131.

2. French, K., W. Schwert and R. Stambaugh, 1987, Expected Stock Returns and Volatility, Journal of Financial Economics 19, 3-30.

3. Lawrence R. Glosten, Ravi Jagannathan, David E. Runkle, 1993, "On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks," The Journal of Finance, Vol. 48, No. 5, pp. 1779-1801

4. Whitelaw, R., 1994, Time Variations and Covariations in the Expectation and Volatility of Stock Market Returns, Journal of Finance 49, 515-541.

Recommended

1. Brandt, M., and Q. Kang, 2004, On the Contemporaneous and Intertemporal Relationship between the Conditional Mean and Volatility of Stock Returns, Journal of Financial Economics 72, 217-257.

2. ⋆ Campbell J. and Hentchell L. 1992, No News is Good News: A Asymmetric changing Volatility in Stock Returns, Journal of Financial Economics 31, 281-318.

3. Harvey, C., 1989, Time Varying Conditional Covariance in Tests of Asset Pricing Models, Journal of Financial Economics 24, 289-317.

3 Intertemporal Equilibrium Asset Pricing

3.1 Consumption-Based Asset Pricing – Representative Agent

Required

1. Abel, Andrew B., 1990, Asset prices under habit formation and catching up with the Joneses, American Economic Review 80, 38–42.

2. Bansal, Ravi, and Amir Yaron, 2004, "Risk for the Long Run: A Potential Resolution of Asset Pricing Puzzles," Journal of Finance, 59(4), 1481-1509,

3. 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.

4. Constantinides, G., 1990, Habit Formation: A Resolution of the Equity Premium Puzzle, Journal of Political Economy 98, 519 – 543.

5. Epstein, L., and S. Zin, 1989, Substitution, Risk Aversion, and the Temporal Behavior of Consumption and Asset Returns: An Empirical Analysis, Journal of Political Economy 99, 263-286.

6. Hansen, L.P., and R. Jagannathan, 1991, Implications of Security Market Data for Models of Dynamic Economies, Journal of Political Economy 99, 225 – 262.

7. Hansen, L.P., and K. Singleton, 1982, Generalized Instrumental Variables Estimation of Nonlinear Rational Expectation Models, Econometrica 50, 1269 – 1286.

8. Lucas Robert Jr., 1978, "Asset Prices in an Exchange Economy", Econometrica, 46, 1429-1446.

9. Mehra, R., and E. Prescott, 1985, The Equity Premium: A Puzzle, Journal of Monetary Economics 15, 145 – 161.

Recommended

1. Abel, Andrew B., 1999, Risk premia and term premia in general equilibrium, Journal of Monetary Economics 43, 3–33.

2. Bansal Ravi, Khatachtarian Varoujan, and Amir Yaron, "Interpretable Asset Markets?", European Economic Review. 49, April 2005: 531-560.

3. Bansal, Ravi, and Wilbur J. Coleman II, 1997, A monetary explanation of the equity premium, term premium and the risk-free rate puzzles, Journal of Political Economy, 104, 1135–1171.

4. Breeden, Douglas, Michael Gibbons, and Robert Litzenberger, 1989, Empirical Tests of the Consumption Oriented CAPM, Journal of Finance, 44, 231 - 262.

5. Brown, D., and M. Gibbons, 1985, A Simple Econometric Approach for Utility-Based Asset Pricing Models, Journal of Finance 40, 359 – 381.

6. Campbell, John Y., and John H. Cochrane, 2000, Explaining the Poor Performance of Consumption-based Asset Pricing Models, Journal of Finance, LV (6), 2863 - 2878.

7. Campbell, J., 1993, Intertemporal Asset Pricing without Consumption Data, American Economic Review 83, 487 – 512.

8. Campbell, Lo, and MacKinlay, 1997, Chapter 8.

9. Campbell, John Y., 2002, Consumption-Based Asset Pricing, forthcoming, Handbook of the Economics of Finance, Edited by George Constantinides, Milton Harris, and Rene Stulz, North-Holland.

10. Cecchetti, Stephen G., Pok-Sang Lam, and Nelson C. Mark, 1990, Mean reversion in equilibrium asset prices, American Economic Review 80, 398–419

11. Cochrane, John H., and Lars P. Hansen, 1992, Asset Pricing Explorations for Macroeconomics, NBER Macroeconomic Annual, 115 - 165.

12. ⋆ Mariano Croce, Martin Lettau and Sydney Ludvigson, 2006, "Investor Information, Long-Run Risk, and the Duration of Risky Cash-Flows" with M. Lettau and S.C. Ludvigson working paper, NYU.

13. ⋆ Epstein, Larry G. and Martin Schneider 2003, "Recursive multiple-priors," Journal of Economic Theory, vol. 113(1), pages 1-31

14. Ferson, Wayne E., and George M. Constantinides, 1991, Habit Persistence and Durability in Aggregate Consumption: Empirical Tests, Journal of Financial Economics, 29, 199 - 240.

15. ⋆ Hansen Lars, Thomas Sargent, 2006, "Fragile Beliefs and the price of model uncertainty," Working Paper, University of Chicago.

16. Hansen, Lars Peter, and Kenneth J. Singleton, 1982, Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models, Econometrica, 50, 12691288.

17. ⋆ Hansen Lars Peter, John Heaton, and Nan Li. Consumption Strikes Back?, Working Paper, University of Chicago.

18. Heaton, J., 1995, An Empirical Investigation of Asset Pricing with Temporally Dependent Preference Specifications, Econometrica 63, 681 – 718.

19. Hansen, L.P., and R. Jagannathan, 1997, Assessing Specification Errors in Stochastic Discount Factor Models, Journal of Finance 52, 557-590.

20. Hansen, L.P., and K. Singleton, 1983, Stochastic Consumption, Risk Aversion and the Temporal Behavior of Asset Returns, Journal of Political Economy 91, 249 – 268.

21. Hansen, L.P., and K. Singleton, 1984, Errata, Econometrica 52, 267 – 268.

22. ⋆ Lustig Hanno, Stijn Van Nieuwerburgh, and Adrien Verdelhan, 2007, The Wealth-Consumption Ratio: A Litmus Test for Consumption-based Asset Pricing Models," Working Paper, UCLA.

23. Kandel, Shmuel, and Robert F. Stambaugh, 1991, Asset returns and intertemporal preferences, Journal of Monetary Economics 27, 39–71.

24. ⋆ Klibanoff, Peter , Massimo Marinacci and Sujoy Mukerji. "A Smooth Model of Decision Making under Ambiguity". Econometrica, Vol. 73, No. 6 (November, 2005), 18491892

25. ⋆ Maccheroni, Fabio , Massimo Marinacci and Aldo Rustichini. Ambiguity Aversion, Robustness, and the Variational Representation of Preferences. Econometrica, Vol. 74, No. 6 (November, 2006), 14471498

26. Weil, P., 1989 The Equity Premium Puzzle and the Risk-Free Rate Puzzle, Journal of Monetary Economics 24, 410 – 421.

3.2 Financial Econometric Methods

Required

1. Gallant, R., and G. Tauchen, 1996, Which Moments to Match, Econometric Theory 12, 657–681.

2. Cochrane John , Asset Pricing, Chapter 20.

3. Hansen, L.P., 1982, Large Sample Properties of Generalized Method of Moments Estimators, Econometrica 50, 1029–1054.

4. Lee, B., and B. Ingram, 1991, Simulation Estimation of Time-Series Models, Journal of Econometrics 47, 197–205.

5. Ogaki, M., 1993, Generalized Method of Moments: Econometric Applications, in Handbook of Statistics, Vol. 11.

6. Tauchen G. and R. Hussey, 1991, "Quadrature-Based Methods for Obtaining Approximate Solutions to Nonlinear Asset Pricing Models," Econometrica, Volume 59, No. 2, pp. 371–396.

Recommended

1. Duffie, D., and K. Singleton, 1993, Simulated Moments Estimation of Markov Models of Asset Prices, Econometrica 50, 987-1007.

2. Gallant, R., and D. Nychka, 1987, Seminonparametric Maximum Likelihood Estimation, Econometrica 55, 363-390.

3. Gallant, R., and G. Tauchen, 1989, Seminonparametric Estimation of Conditionally Constrained Heterogeneous Processes: Asset Pricing Applications, Econometrica 57, 1091-1120.

4. Hansen, Lars Peter, and James H. Heckman, 1996, The Empirical Foundations of Calibration, Journal of Economic Perspective, 10 (1), 87 - 104.

5. Hansen, L.P., J. Heaton, and A. Yaron, 1996, Finite Sample Properties of Some Alternative GMM Estimators, Journal of Business and Economic Statistics 14, 262 – 280.

3.3 Production Based Asset Pricing

Required

1. Cochrane, J., 1991, Production-Based Asset Pricing and the Link between Stock Returns and Economic Fluctuations, Journal of Finance 46, 207-234.

2. Jermann, Urban J., 1998, Asset Pricing in Production Economies, Journal of Monetary Economics, 41, 257 - 275.

Recommended

1. Boldrin, Michele, Larry Christiano, and Jonas Fisher, 2001, Habit Persistence, Asset Returns, and the Business Cycle, American Economic Review, 91 (1), 149 - 166.

2. Chen, Nai-Fu, 1991, Financial Investment Opportunities and the Macroeconomy, Journal of Finance, 46, 2, 529 - 554.

3. Fama, Eugene, F., 1990, Stock Returns, Expected Returns, and Real Activity, Journal of Finance, 45, 1089 - 1108.

4. Gomes, Joao F., Amir Yaron, and Lu Zhang, 2002a, Asset Prices and Business Cycles with Costly External Finance, Review of Economic Dynamics, Forthcoming.

5. Hall, Robert E., 2001, The Stock Market and Capital Accumulation, American Economic Review, 91 (5), 1185 - 1202.

6. ⋆ Kuehn Lars-Alexander, 2007, "Asset Pricing with Real Investment Commitment", Working Paper UBC.

7. Lettau, Martin, and Sydney Ludvigson, 2002, Time-Varying Risk Premia and the Cost of Capital: An Alternative Implication of the Q Theory of Investment, Journal of Monetary Economics, 49, 31 - 66.

8. ⋆ Lamont, Owen A., 2000, Investment Plans and Stock Returns, Journal of Finance, LV (6), 2719 - 2745.

9. ⋆ Lochstoer Lars, 2006, Long-Run Risk through Consumption Smoothing, Working Paper, LBS.

10. ⋆ McGrattan, Ellen, and Edward C. Prescott, 2001b, Taxes, Regulations, and Asset Prices, NBER Working Paper, NO. w8623.

11. Rouwenhorst, G., 1995, Asset Pricing Implications of Equilibrium Business Cycle Models, in Frontiers of Business Cycle Research, T. Cooley, Ed., Princeton University Press, Princeton, NJ.

4 Heterogeneous Agents and Incomplete Markets

Required

1. Alvarez F. and U. Jermann, " Quantitative asset pricing implications of endogenous solvency constraints." Review of Financial Studies 14 (November 2001): 1117 – 52.

2. Constantinides, G., and D. Duffie, 1996, Asset Pricing with Heterogenous Consumers, Journal of Political Economy 104, 219-240.

3. Heaton J. and D. Lucas, 1996, "Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing," Journal of Political Economy, 104, 443-487.

4. Krusell P. and T. Smith, 1998, "Income and Wealth Heterogeneity in Macroeconomy," Journal of Political Economy, 106, 867-896.

5. Mankiw, Gregory N. 1986, The equity premium and the concentration of aggregate shocks." Journal of Financial Economics 17, September, 211–219.

Recommended

1. ⋆ Basak S. and D. Cuoco, 1998, "An Equilibrium Model with Restricted Stock Market Participation." Review of Financial Studies 309-341.

2. Brav Alon; Constantinides M., George; and Chris, Christopher C. "Asset pricing with heterogeneous consumers and limited participation: Empirical evidence." Journal of Political Economy 110 (August 2002): 793–824.

3. Chan, Lewis, and Leonid Kogan, 2001, Catching Up with the Jones: Heterogeneous Preferences and the Dynamics of Asset Prices, Journal of Political Economy, Forthcoming.

4. Chien Yi Li, Cole Hal, Hanno Lustig, (2007), "A Multiplier Approach to Understanding the Macro Implications of Household Finance", Working Paper, UCLA.

5. ⋆ Constantinides G., Donaladson G. and R. Mehra, 2004, "Juniors Can't Borrow: A New Perspective on the Equity Premium Puzzle", Quarterly Journal of Economics.

6. Den Haan, W.J., 1997, Solving Dynamic Models with Aggregate Shocks and Heterogeneous Agents. Macroeconomic Dynamics , 1(2), 355 – 386.

7. Den Haan, W.J., 1996, Heterogeneity, aggregate uncertainty and the short term interest rate, Journal of Business and Economic Statistics, , 14(4) 399 – 411.

8. Gomes Francisco and Alex Michalides, 2007, "Asset Pricing with Limited Risk Sharing and Heterogeneous Agents", forthcoming Review of Financial Studies.

9. ⋆ Guvenen, Fatih, 2002, A Parsimonious Macroeconomic Model for Asset Pricing: Habit Formation or Cross-sectional Heterogeneity? Working Paper, University of Rochester.

10. Heaton J. and D. Lucas, 1992, "The Effects of Incomplete Insurance Markets and Trading Costs in a Consumption-Based Asset Pricing Model" Journal of Economic Dynamics and Control.

11. Huggett Mark, 1993, The Risk Free Rate in Heterogeneous-Agents, Incomplete Insurance Economies, Journal of Economic Dynamics and Control, 17, 953-969.

12. ⋆ Krusell, Per, and Smith, Anthony A. Income and wealth heterogeneity, portfolio choice, and equilibrium asset returns." Macroeconomic Dynamics 1 (June 1997): 387-422.

13. Lucas, Deborah J. Asset pricing with undiversifiable risk and short sales constraints: Deepening the equity premium puzzle, Journal of Monetary Economics 34 (December 1994): 325-41.

14. ⋆ Lustig, Hanno. The market price of aggregate risk and the wealth distribution." Manuscript, Stanford University, 2001.

15. ⋆ Lustig Hanno and Stijn Van Nieuwerburgh. Housing Collateral, Consumption Insurance and Risk Premia: an Empirical Perspective, Journal of Finance, Vol. 60 (3), pp.1167-1219

16. ⋆ Lustig Hanno and Stijn Van Nieuwerburgh. Quantitative Asset Pricing Implications of Housing Collateral Constraint, Working Paper NYU and UCLA.

17. ⋆ Monika Piazzesi and Martin Schneider, 2006, Inflation and the Price of Real Assets working paper, U. of Chicago.

18. Telmer Chris, 1993, Asset Pricing Puzzles and Incomplete Markets, Journal of Finance, 48, 1803-1832.

19. Storesletten, Kjetil; Telmer, Chris I.; and Yaron, Amir, 2000, Asset pricing with idiosyncratic risk and overlapping generations." Manuscript, Carnegie Mellon University,

20. Storesletten, Kjetil; Telmer, Chris I.; and Yaron, Amir. Consumption and risk sharing over the life cycle," Forthcoming Journal of Monetary Economics, 2002.

21. Storesletten, Kjetil; Telmer, Chris I.; and Yaron, Amir. Cyclical Dynamics of Idiosyncratic Labor Market Risk," Forthcoming Journal of Political Economy, 2003.

22. Vissing-Jorgensen, Annette, 2002, Limited asset market participation and the elasticity of intertemporal substitution, Journal of Political Economy 110, 825 – 853.

23. Zhang Harold ,Endogenous Borrowing Constraints with Incomplete Markets, Journal of Finance, 52, 2187 – 2209.

5 The Cross-Section of Returns

5.1 Cross-Sectional Expected Returns – ICAPM and Beta Method

Required

1. Bansal R. Dittmar R. and C. Lundblad 2005, "Consumption, Dividends, and the Cross-Section of Equity Returns," Journal of Finance.

2. Campbell, Lo, and MacKinlay, 1997, Chapter 5 and 6.

3. Fama, Eugene F., and Kenneth R. French, 1992, The Cross-Section of Expected Stock Returns, Journal of Finance, 47, 427465.

4. Fama, Eugene F., and Kenneth R. French, 1995, Size and Book-to-Market Factors in Earnings and Returns, Journal of Finance, 50, 131155.

5. Fama, Eugene F., and Kenneth R. French, 1996, Multifactor Explanations of Asset Pricing Anomalies, Journal of Finance, 51, 5584.

6. Gibbons, Michael R., Stephen A. Ross, and Jay Shanken, 1989, A Test of the Efficiency of a Given Portfolio, Econometrica, 57, 1121-1152.

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