

## **Master 104 – Empirical Asset Pricing**

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The aim of this course is to provide an introduction to empirical asset pricing, with a focus on selected topics. The first four sessions (12 hours) of the course will be dedicated to the econometric theory behind the tests of CAPM, main failures of the CAPM, and recent developments in asset pricing with a focus on conditional models, multi-factor models, and consumption-based asset pricing models. The next two sessions (6 hours) will be dedicated to applications of empirical asset pricing problems via Stata software. The last session (3 hours) will comprise group presentations of selected papers that will constitute part of the term project.

### **Part 1: Issues in Empirical Asset Pricing**

#### **Session 1: Testing Asset Pricing Models: An Overview**

This section will provide an overview of asset pricing tests starting with a quick review of the CAPM and its testable implications, conceptual and econometric issues in tests of CAPM and the portfolio formation approach. Next, we will focus on statistical methods in asset pricing tests with a comparison of time-series and cross-sectional regressions, and conclude with a quick review of Fama and MacBeth (1973) methodology.

#### **Session 2: Cross-Sectional Anomalies**

This section is aimed at providing a critical review of the CAPM by focusing on well-documented asset pricing anomalies in the literature. We start with a summary of Fama and French (1992) results based on size (market capitalization) and B/M (book-to-market ratio) by examining the data, methodology, regression results, critique and suggested interpretation of results. We also discuss a follow-up paper by Fama and French (1993) by interpreting the empirical success of the 3-factor model proposed in the paper. Next, we examine another persistent anomaly documented in the literature, i.e. the momentum effect of Jegadeesh and Titman (1993). The section concludes with two recent and most cited anomalies, the idiosyncratic volatility puzzle of Ang et al. (2006) and betting-against-beta (BAB) factor of Frazzini and Pedersen (2014).

#### **Session 3: Recent Developments in Asset Pricing - I**

This section provides an overview of alternative asset pricing tests with a particular focus on conditional CAPM of Jagannathan and Wang (1996), and conditional CCAPM of Lettau and Ludvigson (2001). Critique of conditional models by Ghysels (1998) and Lewellen, Nagel, and Shanken (2009) will be briefly discussed, and a conditional threshold CAPM model that takes into account aggregate volatility expectations will be studied.

## **Session 4: Recent Developments in Asset Pricing - II**

The theory part of the course concludes with a review of recent applications of Merton's ICAPM (1973), such as bad beta/good beta of Campbell and Vuolteenaho (2004), cash flow and discount rate news decomposition of Campbell, Polk, and Vuolteenaho (2010), and business cycle explanation of Zhang (2005).

## **Part 2: Stata- Applications in Asset Pricing**

### **Session 5: Introduction to Stata and Some Basic Tests**

Stata interface, basic commands, importing and manipulating financial data, creating, merging, and sorting variables, basic OLS regressions, post-estimation tests, creating tables and charts.

### **Session 6: Simple Programming with Stata and Applications in Asset Pricing**

Portfolio formation exercises (one-way and two-way portfolio sorts), rolling-window estimations, time-series regressions with Newey-West autocorrelation and heteroskedasticity robust errors, cross-sectional regressions.

## **Part 3: Presentation of Selected Papers**

### **Session 7: Group Presentations**

The last three hours of the course is dedicated to group presentations of papers that will also form the basis of the term project. The students are expected to summarize in 15 minutes the importance of the selected paper, its position in the literature, the addressed research question(s), the data and methodology used, and the main empirical findings of the paper.

**Assessment:** The assessment will be based on i) in-class participation (10%), ii) group presentations (25%), and iii) a 20-30 page term project (65%) aimed at replicating the results of a seminal asset pricing paper chosen by students (in groups of two to three) and confirmed by the course director(s). The project should provide a brief introduction and literature review, details of the data, and the chosen methodology, alongside with the presentation, interpretation and critique of the results.

### **Useful Stata links:**

<http://data.princeton.edu/stata/default.html>

<http://www.ats.ucla.edu/stat/stata/>

[http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se\\_programming.htm](http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm)

<http://www.lse.ac.uk/methodology/tutorials/Stata/home.aspx>

<http://www.statalist.org/forums/>

**Course Schedule:**

Session 1: 18/01/2016, 10.15-13.30 (La Defense Campus)

Session 2: 25/01/2016, 10.15-13.30 (La Defense Campus)

Session 3: 01/02/2016, 10.15-13.30 (La Defense Campus)

Session 4: 08/02/2016, 10.15-13.30 (La Defense Campus)

Session 5: 15/02/2016, 10.15-13.30 (TBA)

Session 6: 22/02/2016, 10.15-13.30 (TBA)

Session 7: 26/02/2016, 10.15-13.30 (TBA)

**Office Hours:**

Wednesdays 4-6 pm.

**Reading list:****Books:**

John H. Cochrane, (2005). *Asset Pricing*. Revised Edition, Princeton University Press. (Chapters 1, 7, 8, 9, 12, 20)

Campbell, J. Y., A. W. Lo, and A. C. MacKinlay, (1997). *The Econometrics of Financial Markets*. Princeton University Press. (Chapters 5, 6)

Huang, C.F., and R. H. Litzenberger, (1988), *Foundations for Financial Economics*, North-Holland.

**Articles to be covered in the class:**

Fama, E. F., and J. MacBeth (1973). "Risk, return and equilibrium: Empirical tests", *Journal of Political Economy*, 81, 607-636.

Fama, E. F., and K. R. French, (1992). "The cross-section of expected stock returns", *Journal of Finance*, 47, 427-465.

Fama, E. F., and K. R. French, (1993). "Common risk factors in the returns on stocks", *Journal of Financial Economics*, 33, 3-56.

Berk, J. B., (1995). "A critique of size-related anomalies", *Review of Financial Studies*, 8, 275-286.

Ang, A., R. J. Hodrick, X. Yuhang, and X. Zhang, (2006). "The cross-section of volatility and expected returns", *Journal of Finance*, 51, 259-299.

Ang, A., R. J. Hodrick, X. Yuhang, and X. Zhang, (2009). "High idiosyncratic volatility and low returns: International and further U.S. evidence", *Journal of Financial Economics*, 91, 1-23.

Arisoy, Y. E. (2014). "Aggregate volatility and market jump risk: An option-based explanation to size and value premia", *Journal of Futures Markets* 34, 34-55.

DeBondt, W. F., and R. Thaler, (1985). "Does the stock market overreact?" *Journal of Finance*, 40, 793-805.

Jegadeesh, N., and S. Titman, (1993). "Returns to buying winners and selling losers: Implications for stock market efficiency", *Journal of Finance*, 48, 65-91.

Frazzini, A., and L. H. Pedersen, (2014). "Betting against beta", *Journal of Financial Economics*, 111, 1-25.

Jagannathan, R, and Z. Wang, (1996). "The conditional CAPM and the cross-section of expected returns", *Journal of Finance*, 51, 3-53.

Lettau, M., and S. Ludvigson, (2001). "Resurrecting the (C)CAPM: A cross-sectional test when risk premia are time-varying", *Journal of Political Economy*, 109, 1238-1287.

Lewellen, J., and S. Nagel, (2006). "The conditional CAPM does not explain asset-pricing anomalies", *Journal of Financial Economics*, 82, 289-314.

Lewellen, J., S. Nagel, and J. Shanken, (2009). "A skeptical appraisal of asset pricing tests", *Journal of Financial Economics*, 96, 175-194.

Arisoy, Y. E., A. Altay-Salih, and L. Akdeniz, (2015) "Aggregate volatility expectations and threshold CAPM", Working Paper.

Campbell J. Y., and T. Vuolteenaho, (2004). "Bad beta, good beta", *American Economic Review* 94, 1249-1275.

Campbell, J. Y., C. Polk, and T. Vuolteenaho, (2009). "Growth or glamour? Fundamentals and systematic risk in stock returns", *Review of Financial Studies*, 23, 305-344.

Zhang, L., (2005). "The value premium", *Journal of Finance*, 60, 67-103.

### **Some influential articles in asset pricing:**

Markowitz, H., (1952), "Portfolio Selection", *Journal of Finance*, 7, 77-91.

Sharpe, W. F., (1964), "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk", *Journal of Finance*, 19, 425-442.

Lintner, J., (1965), "The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets", *Review of Economics and Statistics*, 47, 13-37.

Mossin, J, (1966), "Equilibrium in a Capital Asset Market", *Econometrica*, 34, 768-783.

Lintner, J., (1969), "The Aggregation of Investors' Diverse Judgements and Preferences in Purely Competitive Security Markets", *Journal of Financial and Quantitative Analysis*, 4, 347-400.

Fama, E. F., (1970), "Multiperiodic Consumption-Investment Decisions", *American Economic Review*, 60, 163-174.

Brennan, M. J., (1971), "Capital Market Equilibrium with Divergent Borrowing and Lending Rates", *Journal of Financial and Quantitative Analysis*, 6, 1197-1205.

Lintner, J., (1971), "The Effects of Short Selling and Margin Requirements in Perfect Capital Markets", *Journal of Financial and Quantitative Analysis*, 6, 1173-1195.

Mayers, D., (1972), "Nonmarketable Assets and Capital market Equilibrium Under Uncertainty" in Jensen Ed., *Studies in the Theory of Capital Markets*, Praeger.

Black, F., M. C. Jensen, and M. Scholes, (1972), "The Capital Asset Pricing Model: Some Empirical Tests", in Jensen Ed., *Studies in the Theory of Capital Markets*, Praeger.

Merton, R. C., (1973), "An Intertemporal Capital Asset Pricing Model", *Econometrica*, 53, 1315-1335.

Solnik, B., (1974), "An Equilibrium Model of the International Capital Market", *Journal of Economic Theory*, 8, 500-524.

Ross S. A., (1976), "The Arbitrage Pricing Theory of Capital Asset Pricing", *Journal of Economic Theory*, 13(3), 314-360.

Basu, S., (1977), « Investment Performance of Common Stocks in Relation to their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis », *Journal of Finance*, 32, 663-682.

Elton ,E. J., and M. J. Gruber, (1978), "Taxes and Portfolio Composition", *Journal of Financial Economics*, 6, 399-410.

Breeden, D., (1979), "An Intertemporal Asset Pricing Model with Stochastic Consumption and Investment Opportunities", *Journal of Financial Economics*, 7, 265-296.

Roll, R., and S. A. Ross, (1980), "An Empirical Examination of the Arbitrage Pricing Theory", *Journal of Finance*, 35, 1073-1103.

Banz, R., (1981), "The Relationship between Return and Market Value of Common Stocks", *Journal of Financial Economics*, 9(1), 3-18.

Basu, S., (1983), "The relationship between Earnings Yield, Market Value, and Return for NYSE Common Stocks", *Journal of Financial Economics*, 12, 129-156.

Chen, N.F., R. Roll, and S. A. Ross, (1986), "Economic Forces and the Stock Market", *Journal of Business*, 59, 383-403.

Bhandari, L. C., (1988), "Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence", *Journal of Finance*, 43, 507-528.

Black, F., (1993), "Return and Beta", *Journal of Portfolio Management*, 20, 8-18.

Carhart, M., (1997), "On Persistence in Mutual Fund Performance", *Journal of Finance*, 52, 57-82.

Hirshleifer, D., (2001), "Investor Psychology and Asset Pricing", *Journal of Finance*, 56(4), 1533-1597.

Ferguson, M. F. and R. L. Shockley, (2003), "Equilibrium Anomalies", *Journal of Finance*, 58, 2549-2580.

Fama, E. F. and K. R. French, (2006), "The Value Premium and the CAPM", *Journal of Finance*, 61, 2163-2185.

Ang, A., J. Chen and Y. Xing, (2006), "Downside Risk", *Review of Financial Studies*, 19, 1191-1239.

Ang, A. and J. Chen, (2007), "The CAPM over the Long Run: 1926-2001", *Journal of Empirical Finance*, 14, 1-40.