Barcelona GSE Graduate School of Economics

15F019

6 ECTS

Asset Prices and Market Frictions

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Introduction

This course provides a rigorous panoramic analysis of the interplay between asset pricing theory and the empirical evidence with and without illiquidity related market frictions. We present a unified treatment of asset pricing models using the stochastic discount factor framework, and discuss several key aspects of asset pricing as consumption risk, time-varying expected returns, predictability of future returns, non-separable preferences, and multi-factor asset pricing models. Then, we discuss the concepts of liquidity, order flow and price dynamics, the determinants of market illiquidity, the decisions in limit order book (LOB) markets, and high frequency trading. Finally, the course combines both areas to discuss asset pricing with funding and liquidity frictions, and intermediary asset pricing models.

Objectives

- Understand the foundations of asset pricing and the implications for investments and asset allocation
- Learn advanced issues of asset pricing under the stochastic discount factor framework
- Understand the importance of factor risks for asset pricing and asset allocation
- Understand the distinction between static and intertemporal asset pricing models
- Learn how to implement asset pricing empirical tests
- Understand how security markets are organized and how their liquidity can be measured
- Learn how various market imperfections affect price formation, liquidity, and speed of price discovery
- Understand how the interaction of order flow and price movements can be used to assess the relative importance of determinants of liquidity
- Learn how to introduce market frictions (market and funding liquidity) into asset pricing models
- Understand the impact of leverage constraints of financial intermediaries on asset pricing

Required Background Knowledge

The target audience for this course is economics and finance graduate students. The course presumes some exposure to undergraduate finance, economics, statistics and econometrics. The grade will be based on weekly problems and empirical exercises with real data and a final exam.

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Learning Outcomes

The students will learn how to implement advanced investment decisions under market frictions represented by market and funding liquidity, and by leverage constraints.

Methodology

The course is a combination of theory and empirical exercises with real data and problems. Students will learn the issues involved in the course by doing exercises with real data.

Evaluation

Weekly exercises by groups of 3 people will represent 40% of the grade. A closed book final exam will represent 60% of the course. All students must obtain at least 4 points out of 10 in the final exam for the 40% of the group exercises to be taken into account in the final grade.

Course contents

Part I: Asset Pricing (Prof. G. Rubio)

1. Frictionless Asset Pricing Models

1.1 Macroeconomic Foundations of Asset Pricing

1.1.1 Time-varying expected returns and basic moments of portfolio returns
1.1.2 The basic consumption-based asset pricing model
1.1.3 Risk and expected return
1.1.4 Time-varying expected returns and predictability
1.1.5 Risk-neutral pricing
1.1.6 Consumption-based pricing under power utility
1.1.7 The equity premium puzzle and the Hansen-Jagannathan volatility bound

1.2 Classic and Intertemporal Asset Pricing Models with Non-Separability

1.2.1 Overview
1.2.2 Factor asset pricing models
  1.2.2.1 The stochastic discount factor and the CAPM
  1.2.2.2 The conditional capital asset pricing model
  1.2.2.3 The intertemporal capital asset pricing model (ICAPM): basic principles
  1.2.2.4 The Fama-French three (five) factor model and the momentum factor
1.2.3 Testing multifactor asset pricing models

1.2.4 Factor asset pricing models: the empirical evidence
1.2.5 The stochastic discount factor under recursive preference
1.2.6 The habit-based asset pricing model

Part II: Liquidity and Trading Frictions (Prof. R. Pascual)

1. Liquidity
1.1. What liquidity is and why does it matter?
1.2. Liquidity provision
1.3. Measuring liquidity

2. Order flow, liquidity and securities price dynamics
2.1. Price dynamics and the efficient market hypothesis
2.2. Price dynamics with informative order flow
2.3. Price dynamics with order-processing costs
2.4. Price dynamics with inventory risk
2.5. Trade size and market depth

3. Estimating the determinants of market illiquidity
3.1. Bid-ask spread decomposition
3.2. Measuring the permanent impact of trades
3.3. Estimating the probability of informed trading

4. The make or take decision in limit order book (LOB) markets
4.1. The risks of submitting a limit order
4.2. Determinants of the bid-ask spread in LOB markets
4.3. The make and take decision and the state of the LOB

5. Commonality in liquidity
5.1. What is it?
5.2. International evidence
5.3. What causes commonality in liquidity?

6. A brief introduction to liquidity, asset prices, and corporate policies
6.1. The illiquidity premium
6.2. Market liquidity and corporate policies
6.3. Corporate policies and market liquidity

7. High frequency trading and liquidity
7.1. Algorithmic trading and high-frequency trading (HFT)

7.2. HFT trading strategies
7.3. HFT and its impact on liquidity
7.4. Empirical evidence
7.5. HFT and market quality
7.6. Market fragmentation

Part III: Asset Pricing and Trading Frictions (G. Rubio)

Asset Pricing with Frictions: Liquidity-Adjusted Asset Pricing Models

1.1 Liquidity Risk: Market-Wide Liquidity Shocks and Asset Pricing
1.2 Liquidity Crisis and Funding Liquidity: The Margin-based CAPM
1.3 Intermediary Asset Pricing Models

Specify a description, materials and cases that will be worked in class:

Session	Title, materials and cases
1	Time-varying expected returns and basic moments of portfolio returns The basic consumption-based asset pricing model
2	Risk and expected return Time-varying expected returns and predictability Risk-neutral pricing
3	Consumption-based pricing under power utility The equity premium puzzle and the Hansen-Jagannathan volatility bound
4	Factor asset pricing models The stochastic discount factor and the CAPM The conditional capital asset pricing model The intertemporal capital asset pricing model (ICAPM): basic principles
5	The Fama-French three (five) factor model and the momentum factor Testing multifactor asset pricing models Factor asset pricing models: the empirical evidence
6	The stochastic discount factor under recursive preference The habit-based asset pricing model
7	Liquidity

	Order flow, liquidity and securities price dynamics
8	Estimating the determinants of market illiquidity The make or take decision in limit order book (LOB) markets
9	Commonality in liquidity A brief introduction to liquidity, asset prices, and corporate policies
10	High frequency trading and liquidity
11	Liquidity Risk: Market-Wide Liquidity Shocks and Asset Pricing
12	Liquidity Crisis and Funding Liquidity: The Margin-based CAPM Intermediary Asset Pricing Models

Bibliography

References:

Part I:

∗ Rubio, G. (2016), (Class Notes 1.1).

∗ Cochrane, J. (2005), Asset Pricing, Princeton University Press. Chapter 1.

∗ Cochrane, J. (2011), Discount Rates, American Finance Association Presidential Address.

* Campbell, J. (2003), Consumption-Based Asset Pricing, Chapter 13 (pages 803-828), in Handbook of the Economics of Finance.

* Rubio, G. (2016), (Class Notes 1.2)

* Cochrane, J. (2005), Asset Pricing, Princeton University Press. Chapters 8, (pages 149-165) and 20 (pages 435-453)

* Campbell, J. (2003), Consumption-Based Asset Pricing, Chapter 13 (pages 829-887), in Handbook of the Economics of Finance.

Part II:

* Aldridge, I. (2013). High Frequency Trading. Wiley (2nd Edition).

* de Jong, F., and B. Rindi (2009). The Microstructure of Financial Markets. Cambridge University Press.

* Foucault, T., M. Pagano, and A.Roëll (2013). Market Liquidity: Theory, Evidence and Policy. Oxford University Press. **(Basic reference)**
* Gregoriou.G.N. (2015).The Handbook of High Frequency Trading. Elsevier Inc.
* Harris L. (2003).Trading and Exchanges.Oxford University Press.
* Hasbrouck, J. (2007). Empirical Market Microstructure: The Institutions, Economics, and Econometrics of Securities Trading. Oxford University Press. (**Basic reference**)
* O'Hara, M. (1995).Market Microstructure Theory. Blackwell Publishers Inc.

Part III:

* Rubio, G. (2016), (Class Notes 3.1)
* Amihud, Y., H. Mendelson, and L.H. Pedersen (2012), Market Liquidity: Asset Pricing, Risk, and Crisis, Cambridge University Press.
* Frazzini, A., and L. Pedersen (2014), Beta against Beta, Journal of Financial Economics 111, 1-25.
* Adrian, T., E. Etula, and T. Muir (2014), Financial Intermediaries and the Cross-Section of Asset Returns, Journal of Finance 69, 2557-2596.

Professor's Biography

Gonzalo Rubio:

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EDUCATION

Barcelona GSE Graduate School of Economics

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Asset Prices and Market Frictions

Bachelor in Business Economics

University of the Basque Country

Master in Business Administration (MBA)

Columbia University, New York

Ph.D. in Business Administration (Finance)

University of California at Berkeley

Title: *Asset Pricing and Equity Rights Issues* (Chairman: Jay Shanken)

AREAS OF INTEREST

Asset Pricing

Derivative Pricing

Macroeconomics and Finance

Financial Econometrics

RECENT SELECTED PUBLICATIONS IN ENGLISH

"The Cross-Sectional Variation of Volatility Risk Premia" (with Ana González-Urteaga), **Journal of Financial Economics**, forthcoming, 2015.

"The Reward for Trading Illiquid Maturities in Credit Default Swap Markets" (with A. Arakelyan, and P. Serrano), **International Review of Economics and Finance**, Vol. 39, 2015, 376-389.

"Macroeconomic and Financial Determinants of the Volatility of Corporate Bond Returns" (with B. Nieto and A. Novales), **Quarterly Journal of Finance**, Vol. 5, 2015, 1-41.

"Volatility Bounds, Size, and Real Activity Prediction" (with B. Nieto), **Review of Finance**, Vol. 18, 2014, 373-415.

"Stock Returns with Consumption and Illiquidity Risks" (with B. Nieto and E. Márquez), **International Review of Economics and Finance**, Vol. 29, 2014, 57-74.

"The Cross-Section of Expected Returns with MIDAS Betas" (with M. González and J. Nave), **Journal of Financial and Quantitative Analysis**, Vol. 47, 2012, 115-135.

"The Volatility of Consumption-Based Stochastic Discount Factors and Economic Cycles" (with B. Nieto), **Journal of Banking and Finance**, Vol. 35, 2011, 2197-2216.

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Professor's Biography

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EDUCATION

Bachelor in Business Adminstration

University Jaume I, Castellón

Ph.D. in Business Administration

University Carlos III

Title: *Market Microstructure, Adverse Selection Costs and Liquidity* (Chairman: Álvaro Escribano and Mikel Tapia)

AREAS OF INTEREST

Market Microstructure

Financial Econometrics

Financial Economics

RECENT SELECTED PUBLICATIONS IN ENGLISH

R. Pascual y B. Pascual-Fuster, 2014, "The relative contribution of ask and bid quotes to price discovery". *Journal of Financial Markets*, forthcoming.

Medina, V., A. Pardo y R. Pascual, 2014, "The timeline of trading frictions in the European CO2 market". *Energy Economics*, 42, 378-394.

A. Pardo y R. Pascual, 2012, "On the hidden side of liquidity". *European Journal of Finance*, 18, 10, 949-967.

D. Abad y R. Pascual, 2010, "Switching to a temporary call auction in times of high uncertainty". *Journal of Financial Research*, 33, 1, 45-75.

R. Pascual y D. Veredas, 2010, "Does the Open Limit Order Book Matter in Explaining Informational Volatility?". *Journal of Financial Econometrics*, 8, 1, 57-87.

R. Pascual y D. Veredas, 2009, "What pieces of limit order book information matter in explaining the behavior of aggressive and patient traders?". *Quantitative Finance*, 9, 5, 527-545.

Pascual, R., Pascual-Fuster, B., y F. Climent, 2006, "Cross-listing, Price Discovery, and the Informativeness of the Trading Process". *Journal of Financial Markets*, 9, 2, 144-161.

R. Pascual, A. Escribano y M. Tapia, 2004, "Adverse selection costs, trading activity and price discovery in the NYSE: An empirical analysis", *Journal of Banking and Finance*, 28, 1, 107-128.