Princeton University

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Office: 209 Dial Lodge
Office Hours: Mo 4:25-5:30 pm

ECO467: Institutional Finance
Financial Crises, Risk Management and Liquidity

Time and Location:
Monday 1:30 am – 4:20 pm, BCF 103

Course Description:

Financial institutions play an increasingly dominant role in modern finance. This course studies financial institutions and focuses on the stability of the financial system. It covers important theoretical concepts and recent developments in financial intermediation, asset pricing under asymmetric information, behavioral finance and market microstructure. Topics include market efficiency, asset price bubbles, herding, liquidity crises, risk management, market design and financial regulation. The course also studies different trading strategies - that are primarily employed by hedge funds and proprietary trading desks.

A software that simulates the environment that professionals face on a trading desk will give students a more realistic and memorable learning experience and will illustrate certain theoretical concepts more vividly. The financial markets simulator "upTick" was developed by Professors Joshua Coval and Eric Stafford at Harvard University. Details about the financial markets simulator can be found at http://www.uptick-learning.com. Please download the software and install it at your laptop (please refer to the document posted on Blackboard for installing). In order to participate in the trading simulation who have to connect your (Windows) laptop to the Ethernet in BCF 103. You will also receive an Ethernet cable which enables to connect your laptop in the classroom for free. (Please do not lose it.) Before each simulation, students should run practice simulation at home and build "calculators" which help them to improve their trading performance.

Student participation in trading simulations and class in general is an important component of the course.

Prerequisites:
Eco 300 Microeconomic Theory (ideally Eco 310)

Requirements/grading:

Class participation/presentations	20 %
Midterm examination:	40 %
Final examination:	40 %

Although the exams are closed book, you may bring into the exam one 8 ½ x 11 sheet of paper. You can write on both sides and as small as you wish, but I recommend using this only as a psychological support to have a formula available "just in case." The exams won't be "fill in the blanks" exercises, nor will they rely on intensive formula-based computations. Preparing lots of pre-fabricated solutions from previous exams or assignments will only be distracting during the exam.

You will be allowed to use a silent battery operated calculator during the exams. Laptops, while useful for assignments, are not needed (nor allowed) in my exams.

Since the preceptor will grade all assignments and exams, all appeals of grades should first be addressed to the preceptor within a week. Verbal appeals of grades will not be accepted. We will be glad to regrade any assignment or exam. However, you must provide a statement in writing as to where and why there is a problem. Importantly, the entire exam or assignment will be regraded. As a result, the regarded score may increase, remain the same, or decrease. Exams or assignments written with pencil cannot be regraded.

Course material:

Additional course material (if necessary) will be made available on the course website <http://www.princeton.edu/~markus/teaching/Eco467/Teaching_Eco467.htm> after classes. All students who are registered for this class will also have access to Princeton's blackboard webpage. Please make use of the **bulletin board** feature of Princeton's blackboard course website to initiate discussions and answer your fellow students' questions. Please use the bulletin board responsibly and keep in mind that the accuracy of the answers is not guaranteed.

Preceptor:

For additional questions about the course material, please contact:

Dong Beom Choi
Office: Dial Lodge 303
e-mail: dchoi@princeton.edu
Office hours: Fr 2:00-3:00

Structure of the Course:

1) **Static (Riskfree) Arbitrage**
    a. No Arbitrage & Law of One Price
    b. Basics of Bond Pricing
2) **Informational Market Efficiency**
    a. Predictability
    b. Event Study Methodology (optional)
    c. Rational Expectations Equilibria
3) **Market Making**
    a. Limit versus Market Orders
    b. Insider Trading Models
4) **Portfolio Analysis, Black-Litterman Model and CAPM** (optional)
5) **Performance Evaluation – Hedge Funds**
    a. Sharpe Ratio, Alpha versus Beta, (Option-like Payoff)
    b. Survivorship, Backfilling and other Biases
6) **Theories of Banks – Maturity Mismatch**
7) **Risky Arbitrage, Risk Management, Liquidity**
    a. Fundamental Risk – Merger Arbitrage Strategies
    b. Noise Trader Risk, Synchronization Risk – Convergence Trades and Relative Value Strategies
    c. Funding Liquidity Risk - Leverage and Margin Setting
    d. Basics of Risk management (VaR & Stress Tests)
8) **Bubbles, Crashes and Herding**
9) **Dynamic Arbitrage Strategies to Replicate Non-linear payoffs** (optional)
    a. Basics of Option Pricing
    b. Convertible Bond Arbitrage Strategy
10) **Fixed Income: Money Market, Credit Market**
    a. CDOs – Tranching
    b. Credit Default Swaps
11) **Deciphering the Credit and Liquidity Crunch 2007-09**
12) **New Financial Architecture**
    a. Regulatory Reform (ex-ante vs. ex-post/ lean vs. clean)
    b. New Monetary Framework

Suggested Readings:

Students should focus on the readings denoted with stars. It often suffices to read the introduction of the article and skip the mathematical derivation of the results.

1. Static (Riskfree) Arbitrage

Robert L. McDonald, 2005, *"Derivatives Markets"*, 2nd edition, Addison Wesley, (pages 205 ff).

UPTICK SIMULATION: Law of One Price

2. Informational Market Efficiency

*"Walter Bagehot" (Jack L. Treynor), 1971. The Only Game in Town, *Financial Analysts Journal* 27, 12-14, 22.

*Sanford J. Grossman and Joseph Stiglitz, 1980, On the Impossibility of Informationally Efficient Markets, *American Economic Review* 70, 393-408.

Friedman, M., 1953, The Case of Flexible Exchange Rates, in *Essays in Positive Economics*, Chicago: University of Chicago Press.

*Bray, Margaret, 1985, Rational Expectations, Information and Asset Markets: An Introduction, *Oxford Economic Papers* 37, 161-195.

Andrei Shleifer, *Inefficient Markets – An Introduction to Behavioral Finance*, Oxford University Press, 2000 (Chapter 1)

UPTICK SIMULATION: Market efficiency.

3. Market Making

*Kyle, Albert S., 1985. Continuous Auctions and Insider Trading, *Econometrica* 53, (Sections 1 and 2 only, pp. 1315-1320.)

*Glosten, Larry and Paul Milgrom, 1985, Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders, *Journal of Financial Economics* 14, 71-100. (Intro only)

Milgrom, Paul R. and Nancy Stokey, 1982, Information, Trade and Common Knowledge, *Journal of Economic Theory*, 26, 17-27.

UPTICK SIMULATION: Price Formation

4. Portfolio Analysis, Black-Litterman Model and CAPM (optional)

*Bodie, Zvi and Alex Kane and Alan J. Markus, *Investments,* McGraw-Hill/Irwin; 6 edition (Chapters 5, 6, 7).

*Black, Fischer and Bob Litterman, Global Portfolio Optimization, *Financial Analyst Journal*, Sept/Oct. 1992, 48, 5 pp. 28-43.

Eugene Fama and Ken French, The Cross Section of Expected Returns, 1992, *Journal of Finance,* 47, 2, pp. 427-465.

UPTICK SIMULATION: Asset Allocation (optional).

5. Performance Evaluation – Hedge Funds

Clifford Asness, Robert Krail, and John Liew, Do Hedge Funds Hedge? *Journal of Portfolio Management*, Fall 2001.Vol.28, Iss. 1; pg. 6-14.

*John Cochrane, Options, Portfolios and Hedge Funds. August, 2005, http://faculty.chicagogsb.edu/john.cochrane/research/Papers/index.htm

Burt Malkiel and Atuna Saha, "Hedge Funds: Risk and Return," *Financial Analysts Journal*, Vol. 61, No. 6, November/December 2005.

6. Theories of Banks – Maturity Mismatch

S. Sharpe, 1990, Asymmetric Information, Bank Lending and Implicit Contracts: A Stylized Model of Customer Relationships, Journal of Finance vol. 45, pp. 1069-1087.

*Gary Gorton and George Pennachi, (1990), "Financial Intermediaries and Liquidity Creation", Journal of Finance, vol. 45(1), pp. 49-72.

*Douglas W. Diamond and Philip H. Dybvig, 1983, "Bank Runs, Deposit Insurance, and Liquidity, *Journal of Political Economy*, vol. 91 (June), pp. 401-19

Charles W. Calomiris and Charles M. Kahn (1991), "The Role of Demandable Debt in Structuring Optimal Banking Arrangements", *American Economic Review*, vol. 81 (June), pp. 497-513

Douglas W. Diamond and Raghuram G. Rajan (2001), "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking", *Journal of Political Economy*, vol. 109 (April), pp. 287-327)

*Markus K. Brunnermeier and Martin Oehmke, (2009), "The Maturity Rat Race", http://www.princeton.edu/~markus

7. Risky Arbitrage and Liquidity

Risky Arbitrage

*Abreu, Dilip and Markus Brunnermeier, 2002, Synchronization Risk and Delayed Arbitrage, *Journal of Financial Economics* 66, 341-360.

*DeLong, J. Bradford, Andrei Shleifer, Lawrence H. Summers and Robert Waldmann, 1990a, Noise trader risk in financial markets, *Journal of Political Economy* 98, 703-738.

DeLong, J.B., A. Shleifer, L. Summers and R. Waldmann, 1990b, Positive Feedback Investment Strategies and Destabilizing Rational Speculation, *Journal of Finance* 45, 375-395.

*Shleifer, Andrei and Robert W. Vishny, 1997, The Limits of Arbitrage, *Journal of Finance* 52, 35-55.

*Lamont, Owen A. and Richard H. Thaler, 2003, Can the Market Add and Subtract? Mispricing in Tech Stock Carve-outs, *Journal of Political Economy*, 111, 227-268.

Merger Arbitrage

*J. Fred Weston, Mark L. Mitchell and J. Harold Mulherin, Merger Arbitrage, Chapter 21 of *Takeovers, Restructuring, and Corporate Governance,* Pearson-PrenticeHall, fourth edition.

*Mark Mitchell and Todd Pulvino, 2001, Characteristics of Risk and Return in Risk Arbitrage, *Journal of Finance*, 56, 6, 2135-2175

UPTICK SIMULATION: Merger Arbitrage.

Liquidity

*Markus K. Brunnermeier and Lasse Pedersen, Market Liquidity and Funding Liquidity, www.princeton.edu/~markus

Sanford J. Grossman and Merton Miller, 1988, Liquidity and Market Structure, *Journal of Finance* 43, 617-633.

*Gary Gorton and Andrew Metrick, Securitized Banks and the Run on Repo, 2009, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1440752

Yakov Amihud and Haim Mendelson, 1986. Liquidity and stock returns, *Financial Analysts Journal*, May-June, 43-48.

Yakov Amihud, Haim Mendelson and Lasse Pedersen, Liquidity and Asset Prices, *Foundations and Trends in Finance*, 1, 4, pp. 269-364 http://pages.stern.nyu.edu/~lpederse/papers/LiquidityAssetPricing.pdf

LTCM Crisis

*Markus K. Brunnermeier, and Lasse Pedersen, Predatory Trading, *Journal of Finance*, 2005, 60(4) 1825-1863.

Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management*, Random House, 2000

8. Bubbles, Crashes and Herding

Bubbles

*Markus K. Brunnermeier, *Asset Pricing under Asymmetric Information - Bubbles, Technical Analysis, Herding and Crashes*, Oxford University Press, Jan. 2001 (Chapter 6).

*Blanchard, Olivier and Mark Watson, 1982, "Bubbles, Rational Expectations and Financial Markets," in P. Wachtel (ed.) *Crisis in the Economic and Financial Structure*: Bubbles, Bursts and Shocks, Lexington, Lexington, MA

Allen, Franklin and Douglas Gale, 1999, "Bubbles, Crises, and Policy*" Oxford Review of Economic Policy*, Vol. 15, No. 3.

*Allen, F., Morris, S., Postlewaite, A., 1993. Finite Bubbles with Short Sales Constraints and Asymmetric Information. *Journal of Economic Theory* 61, 206-229. (Introduction only)

*Abreu, Dilip and Markus Brunnermeier, 2003, Bubbles and Crashes, *Econometrica* 71, 173-204.

Harrison, J.M., Kreps, D.M., 1978, Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations, Quarterly Journal of Economics 93, 323-336.

Hong, Harrison, Jose Scheinkman, and Wei Xiong, 2003, Asset Float and Speculative Bubbles, *Journal of Finance 61, 2006, 1073-1117.*

Herding Models

*Markus K. Brunnermeier, *Asset Pricing under Asymmetric Information - Bubbles, Technical Analysis*, *Herding and Crashes*, Oxford University Press, Jan. 2001 (Chapter 5).

Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch, 1992, "A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades", *Journal of Political Economy*, 100, 992-1026.

Avery, Christopher and Peter Zemsky, 1998, "Multi-dimensional Uncertainty and Herd Behavior in Financial Markets", *American Economic Review*, 88 (4), 724-748.

EXPERIMENT ON HERDING

9. Dynamic Arbitrage Strategies to Replicate Non-linear payoffs (optional)

Delta-Hedging

Cox, John, Stephen Ross and Mark Rubinstein, 1979, Option Pricing: A Simplified Approach, *Journal of Financial Economics*, 7.

FINANCIAL MARKETS SIMULATOR: Convertible Bonds Arbitrage.

1987 Crash

The Brady and Miller Reports, 1988. Reproduced in Part II of: Barro, Robert J., Eugene F. Fama, Daniel R. Fischel, Allan H. Meltzer, Richard Roll and Lester G. Telser, *Black Monday and the Future of Financial Markets*, Dow-Jones-Irwin, 1989.

Greenwald, Bruce and Jeremy Stein, 1988. The Task Force Report: The Reasoning Behind the Recommendations, *Journal of Economic Perspectives* 2(3), 3-23.

Sanford Grossman, "An Analysis of the Implications for Stock and Futures Price Volatility of Program Trading and Dynamic Trading Strategies", *Journal of Business*, 1988, 61, 275-298.

10. Fixed Income. Money Market and Credit Market and Central Banks

Claudio Borio and William Nelson, Monetary Operations and the Financial Turmoil, *BIS Quarterly Review*, March 2008.

Josh Coval, Jakub Jurek, Erik Stafford, The Economics of Structured Finance, *Journal of Economic Perspectives*, 23(1), 2009.

Jefferson Duarte, Francis Longstaff and Fan Yu, Risk and Return in Fixed Income Arbitrage: Nickles in Front of a Steamroller?, *Review for Financial Studies*, 2007, 769-811.

Michael J. Fleming and Ken Garbade, The Repurchase Agreement Refined: GCF Repo, Current Issues in Economics and Finance, June 2003, Vol. 9, No. 6. http://www.newyorkfed.org/research/current_issues/ci9-6.html

Robert L. McDonald, 2005, *"Derivatives Markets"*, 2nd edition, Addison Wesley, (Chapter 26).

R. Glenn Hubbard, *Money, the Financial System, and the Economy*, Pearson/Addison Wesley, 2004.

11. Credit and Liquidity Crunch 2007-09

Before the crisis:

*Rajan, Raghuram, "Has Financial Development Made the World Riskier?" in *The Greenspan Era: Lessons for the Future*, Federal Reserve Bank of Kansas City, 2005. http://www.kc.frb.org/PUBLICAT/SYMPOS/2005/PDF/Rajan2005.pdf

Edward M. Gramlich, (2007), *Subprime Mortgages: America's Latest Boom and Bust*, Urban Institute Press

An Icelandic financial saga, Storm in a hot tub, Economist Article from May 30th, 2006.

Understanding crisis:

*Markus K. Brunnermeier, Deciphering the Credit and Liquidity Crunch 2007-08, 2009, *Journal of Economic Perspectives*, 23(1), 77-100.

*Gary Gorton, Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1401882

Franklin Allen and Douglas Gale (2007), *Understanding Financial Crises*, Clarendon Lectures in Finance, Oxford University Press

Carmen Reinhart and Ken Rogoff, 2008, "This Time is Different: A Panoramic View of Eight Centuries of Crises" http://www.economics.harvard.edu/faculty/rogoff/files/This_Time_Is_Different_SHORT.pdf , http://press.princeton.edu/chapters/s8973.pdf

Carmen Reinhart and Ken Rogoff, 2009, "The Aftermath of Financial Crises" http://www.economics.harvard.edu/faculty/rogoff/files/Aftermath.pdf

Victoria Ivashina and David Scharfstein, (2008) "Bank Lending During the Financial Crisis of 2008", Working Paper Harvard Business School

Jon Danielsson and Gylfi Zoega (2009), The Collapse of a Country http://risk.lse.ac.uk/rr/files/e.pdf

Douglas W. Diamond and Raghuram Rajan, (2009) "The Credit Crisis: Conjectures About Causes and Remedies", NBER Working Paper No. 14739; http://www.nber.org/papers/w14739

Tobias Adrian and Hyun Shin, (2008), Financial Intermediaries, Financial Stability and Monetary Policy, Proceedings of the 2008 Federal Reserve Bank of Kansas City Symposium at Jackson Hole. http://www.kc.frb.org/home/subwebnav.cfm?level=3&theID=10976&SubWeb=10660

12. New Financial Architecture

*Markus K. Brunnermeier, Andrew Crockett, Charles Goodhart, Avi Persaud and Hyun Shin, "The Fundamental Principles of Financial Regulation", 11th Geneva Report on the World Economy, CEPR, http://www.princeton.edu/~markus/research/papers/Geneva11.pdf

*Tobias Adrian and Markus K. Brunnermeier, CoVaR, www.princeton.edu/~markus

Philippe Jorion, *Value at Risk: The New Benchmark for Managing Financial Risk*, McGraw-Hill, 2nd edition, 2000.

Amendment to the Capital Accord to Incorporate Market Risk, (Basel II Accord) www.bis.org

*George Cooper, The Origin of Financial Crises: Central Banks, Credit Bubbles, and the Efficient Market Fallacy
The Crash of 2008 and What it Means: The New Paradigm for Financial Markets, 2009,