WARWICK BUSINESS SCHOOL

MSc Finance

BEHAVIOURAL FINANCE AND MARKET PSYCHOLOGY
SPRING 2007
Prof. Mark Salmon

Course Description

The vast majority of financial theory has been based on the assumption that agents in the market are rational expected utility maximizers despite the fact that there is fairly consistent evidence across a range economic environments that there are significant deviations from this model of behaviour.

A number of empirical anomalies or puzzles have been discovered in financial markets that are apparently incompatible with what is regarded as rational behaviour. "Behavioural Finance" is then an emerging discipline that represents a collection of different approaches which seek to explain these findings and perhaps refine our notions of rationality. In particular, it draws on the psychology and cognitive science literatures to consider how individual decision-making often deviates from rational choice in systematic ways. In part this may simply reflect limited intelligence or what economists refer to as bounded rationality, being a human inability to numerically evaluate decisions under uncertainty accurately. Notice that this implies a *quantitative* rationality as opposed to a *qualitative* rationality. Perhaps more importantly the observed anomalies give rise to alternative *behavioural* explanations that are difficult to rationalise in expected utility terms but are systematic and potentially derived from the recognition for instance that the way in which a decision is framed is critical or that *social* interaction is an important element in any market process. This raises wider notions of rationality beyond the individual who may consider the community welfare within which he operates and raises strategic rationality issues. Consider for instance, herd behaviour which is by definition a social phenomenon and closely related to the growth of speculative bubbles. These are the sort of issues we will explore in this course., both in their theoretical and practical impact on financial markets.

We start by briefly reviewing the efficient markets hypothesis, rational choice and expected utility theory. Then we consider alternative models of decision making, in particular Prospect Theory and the distinction between Risk and Knightian Uncertainty before turning to consider evidence from psychology on the biases that arise in individual decision-making.

We then address an important objection to the relevance of these biases in financial markets, namely that any distortion they cause will be quickly removed by rational *arbitrageurs*. In particular, we review recent research suggesting that the power of arbitrage is limited, because of the lack of substitutes, or because of noise trader risk.

After this, we turn to applications of the behavioral approach to topics that have not been fully understood from a rational perspective, namely closed-end funds, the equity premium puzzle, the behaviour of the aggregate stock market, the cross-section of average returns, and investor trading behavior – in other words the anomalies and paradoxes.

BOOKS

Required Reading:

Shleifer, Andrei (2000), Inefficient Markets: *An Introduction to Behavioral Finance*, Oxford University Press.

Kahneman, Daniel, and Amos Tversky ,*Choices, Frames and Values*, Cambridge University Press.

Montier James, (2002),*Behavioural Finance*, Wiley.

Direct Interest:

Shefrin, Hersh (2000), *Beyond Fear and Greed;* Understanding Behavioral Finance and the Psychology of Investing , Harvard Business School Press.

Shiller, Robert (2000), *Irrational Exuberanc*e, Princeton University Press.

Thaler, Richard (ed.), (1992), *Advances in Behavioral Financ*e, Russell Sage Foundation.

Thaler Richard, (1994), The Winner's Curse, Paradoxes and Anomalies of Economic Life, Princeton University Press.

Siegel J.J.,(1998) , Stocks for the Long Run, ,McGraw Hill. 2nd Edition.

Paulos, John Allen. (1988), Innumeracy, New York: Hill and Wang.

Sutherland Stuart, (1994) , Irrationality; the enemy within, Penguin Books.

Survey Papers:

Barbaris N. and Richard Thaler, "A Survey of Behavioral Finance" in the Handbook of the Economics of Finance, June 2003.

Hirshleifer David, (2001), Investor Psychology and Asset Pricing, *Journal of Finance*, 56, 1533-1597. http://www.cob.ohio-state.edu/fin/dice/papers/2001/2001-1.pdf

Web Sites:

http://fisher.osu.edu/fin/findir/viewByAof.html?aofID=15
http://www.undiscoveredmanagers.com/Behavioral%20Finance.htm
http://www.investorhome.com/anomaly.htm
http://www.investorhome.com/psych.htm
http://www.egroups.com/group/Behavioral-Finance
http://perso.wanadoo.fr/pgreenfinch/behavioral-finance.htm
http://www.deanlebaron.com/book/ultimate/chapters/invpsy.html
http://www.undiscoveredmanagers.com/Behavrlongshort.htm

http://www.beartopia.net/crowdpsy.html

A number of papers from the following list can be found on the web.

READING LIST

1. INTRODUCTION and MARKET EFFICIENCY

Shleifer, Andrei *Inefficient Market*s, Ch.1.

DeBondt, W.F.M & Thaler, R.H. (1995): Financial decision-making in markets and firms: A behavioral perspective. In: Robert A. Jarrow, Voijslav Maksimovic & William T. Ziemba (eds.): *Finance*, Handbooks in Operations Research and Management Science, vol. 9, chapt. 13, 385-410. Amsterdam: North Holland.
National Bureau of Economic Research, Working Paper No. 4777.

Lo,A. and J. Doyne Farmer,(2001) Frontiers of Finance: Evolution and Efficient Markets, http://web.mit.edu/alo/www/Papers/farmerlo.pdf

Lo,A. (2000) Finance: A Selective Survey, Journal of the American Statistical Association 95. http://web.mit.edu/alo/www/Papers/jasa3.pdf

Fama, Eugene (1991), "Efficient Capital Markets: II", *Journal of Finance* 46, 1575-1618.

Shiller, Robert (1984), "Stock Prices and Social Dynamics", *Brookings Papers on Economic Activity* 2, 457-498 [in *Advance*s, Ch.7.]

Shiller Robert (1997), Human Behaviour and the Efficiency of the Financial System, from his web page; http://aida.econ.yale.edu/~shiller

Rashes, Michael, (1999), "Massively Confused Investors Making Conspicuously Ignorant Choices (MCI-MCIC)," Harvard Mimeo.

Barbaris N.,and Andrei Shleifer,(2003) "Style Investing", *Journal of Financial Economics* 68, 161-199, May 2003.

2. PROSPECT THEORY ,PSYCHOLOGY and ECONOMICS

Camerer, Colin (1995), "Individual Decision Making", in Kagel and Roth (eds.), *Handbook of Experimental Economic*s, Princeton University Press.

Kahneman, Daniel, and Amos Tversky (2000), "Choices Frames and Values" in *Choices Frames and Values* eds. Kahneman, Daniel, and Amos Tversky , Cambridge University Press.

Kahneman, Daniel, and Amos Tversky , Prospect Theory: An Analysis of Decision Under Risk, in *Choices Frames and Values* eds. Kahneman, Daniel, and Amos Tversky , Cambridge University Press.
Kahneman, Daniel, and Mark Riepe (1998), "Aspects of Investor Psychology", *Journal of Portfolio Management* 24, 52-65.
Kahneman, Daniel, and Amos Tversky (1974), "Judgment Under Uncertainty: Heuristics and Biases", *Science* 185, 1124-31.
Kahneman, Daniel, and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision Under Risk", *Econometrica* 47, 263-91.
Rabin, Matthew (1998), "Psychology and Economics", *Journal of Economic Literatur*e, 11-46.
Thaler, Richard (1999), "Mental Accounting Matters", Working Paper, University of Chicago.
Odean, Terrance (1988), "Are Investors Reluctant to Realize their Losses", *Journal of Finance* 53, 1775-1798.
Salmon M. (2006) Loss Averse Performance Measurement (with G. Gemmill and S. Hwang) *Jnl of Asset Management*

3. KNIGHTIAN UNCERTAINTY

Maenhout, Pascal (2000), "Robust Portfolio Rules and Asset Pricing", working paper, Harvard University.
Dow J. and Sergio Werlang,(1992) Excess Volatility of Stock Prices and Knightian Uncertainty, *European Economic Review*,36,631-638.
Salmon M.(2006), Uncertainty Aversion in an Agent-Based Model of Foreign Exchange Rate Formation,(with R. Kozhan)
Basili Marcello, Knightian Uncertainty in Financial Markets: An assessment, *Mimeo Universita degli Dtudi di Siena, N.281 Febbraio 2000.*
Dow J. and Sergio Werlang ,(1992b), Uncertainty Aversion, Risk Aversion and the Optimal Choice of Portfolio, *Econometrica*, 60, 197-204.
Knight F.(1921), Risk, Uncertainty and Profit, Houghton Mifflin,Boston.
Machina Mark,(1989), Dynamic Consistency and non-Expected Utility Models of Choice under Uncertainty, *Journal of Economic Literature,* 27, 1622-1668.
Orszag J.M. and Michael Yang, (1995), Portfolio Choice with Knightian Uncertainty, *Journal of Economic Dynamics and Control, 19,5-7,873-901*
Epstein L. and Tan Wang,(1995), Uncertainty, Risk Neutral Measures and Security Price Booms and Crashes, *Journal of Economic Theory,* 67,1,40-83.
Lensberg T. (1999), ,Investment Behaviour under Knightian Uncertainty—An Evolutionary Approach. *Journal of Economic Dynamics and Control. 23,9-10, 1587-1604.*

Lien David, (2000), Production and Hedging under Knightian Uncertainty, *Journal of Futures Markets*, 20,4,397-404.
Epstein D. and Tan Wang, (1994), Intertemporal Asset Pricing Under Knightian Uncertainty, *Econometrica*, 62,2, 283-323.

4. LIMITS TO ARBITRAGE

a) Existence of Substitutes

Shleifer, Andrei, and Robert Vishny (1997), "Limits of Arbitrage", *Journal of Finance* 52, 35-55. (in *Inefficient Markets*, Chapter 4).
Lamont, Owen, (2000), Guilty as Charged: violations of the law of one price in financial markets, University of Chicago,

Shleifer, Andrei (1986), "Do Demand Curves for Stocks Slope Down?", *Journal of Finance*, 41, 579-90.
Wurgler, Jeff, and Katya Zhuravskaya (1999), "Does Arbitrage Flatten Demand Curves for Stocks?", Working Paper, Yale University.

b) Noise Trader Risk

Inefficient Markets, Ch.2, Ch.4.
DeLong, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert Waldmann, "Noise Trader Risk in Financial Markets", Journal of Political Economy 98, 703-738 [in *Advances*, Ch.2.]
Shleifer, Andrei, and Lawrence Summers (1999), "The Noise Trader Approach to Finance", *Journal of Economic Perspectives* 34, 19-33.

Froot, Kenneth, and Emil Dabora (1999), "How are Stock Prices affected by Location of Trade?", *Journal of Financial Economics* 53, 189-216.

c) Herd Behaviour and Sentiment

Cont R. and J-P Bouchard, (1999), Herd Behaviour and Aggregate Fluctuations in Financial Markets, web address:
Schaftstein D. and Stein J.C., (1990), Herd Behaviour and Investment, *American Economic Review*, 80,465-479.

Truman B., (1994) Analysts Forecasts and Herding Behaviour, *Review of Financial Studies*,7,(1), 97-124.
Banerjee A.,(1993), The Economics of Rumours, *Review of Economic Studies*,60, 309-327.

Hwang S. and M. Salmon,(2006), Sentiment and Beta Herding, *FERC Discussion Paper*.
Hwang S. and M. Salmon,(2004),Market Stress and Herding, *Journal of Empirical Finance*, Volume 11, Issue 4, September, Pages 585-616
Banerjee A.,(1992), A Simple Model of Herd Behaviour, *Quarterly Journal of Economics*, 107,3, 797-817.
Bikhchandani Sushil, David Hirschleifer and Ivo Welch, (1992), A Theory of Fads, Fashion, Custom and Cultural Change as Information Cascades, *Journal of Political Economy*, 100,5, 992-1026.
Barberis N.,"A Model of Investor Sentiment" (with Andrei Shleifer and Robert Vishny), *Journal of Financial Economics* 49, 307-343, September 1998.
Karakatsani N. and Salmon M. (2006), Nonlinearity and the impact of Sentiment on Asset prices, FERC Discussion paper.

d) Bubbles

Garber, P. M. "Famous first bubbles." *Journal of Economic Perspectives*, 4 (1990), 35-54.
Allen Franklin and Douglas Gale, (2002), Asset Price Bubbles and Stock Market Interlinkages, mimeo ,Wharton School, Univ Penn.
Allen Franklin and Douglas Gale, (2000), Bubbles and Crashes, *Economic Journal* vol 110, 236-255.

Blanchard O.J. (1979), "Speculative Bubbles, Crashes and rational Expectations." *Economic Letters*
Blanchard, O. J., and M.W. Watson. "Bubbles, Rational Expectations, and Financial Markets." In *Crises in the Economic and Financial Structure*, Paul Wachtel (Ed.), Lexington Boods, Lexington, MA.
Diba, B., and H. Grossman. "On the Inception of Rational Bubbles." *Quarterly Journal of Economics*, August (1987), 697-700.
Diba, B., and H. Grossman. "The Theory of Rational Bubbles in Stock Prices." *The Economic Journal*, 98 (1988), 746-754.
Evans, G.W. "A Test for Speculative Bubbles in the Sterling Dollar Exchange Rate: 1981-1984." *American Economic Review*, 76 (1986), 621-636.
Evans G.W. (1991), "Pitfalls in Testing for Explosive Bubbles in Asset Prices", *American Economic Review*, Vol. 81, No. 4, 922-930, September

5. PARADOXES AND ANOMALIES:
CLOSED-END FUNDS

Inefficient Markets, Ch. 3.
Advances, Ch.3.

Pontiff, Jeff (1996), "Costly Arbitrage: Evidence from Closed-end funds", *Quarterly Journal of Economics* 111, 1135-52.

Pontiff Jeff (1995), Closed end Funds Premia and Returns: Implications for Financial Market Equilibrium, *Journal of Financial Economics*, 37, 341-370.

Gemmill G. and Dylan Thomas, (2000), Investor Sentiment, Expenses and Arbitrage in Explaining the Discount on Closed End Funds, CUBS mimeo

Chen N-F, Kan R. and Miller M, (1993), Are the Discounts on Closed End Funds a Sentiment Index?, *Journal of Finance, 48, 795-800.*

6. PARADOXES AND ANOMALIES: THE AGGREGATE STOCK MARKET

a) Facts and Rational Approaches

Campbell, John Y. (1998), "Asset Prices, Consumption, and the Business Cycle", forthcoming in Taylor and Woodford (eds.) *Handbook of Macroeconomics*, North-Holland.

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.

Campbell, John Y. and Robert J. Shiller (Winter 1998), "Valuation Ratios and the Long-Run Stock Market Outlook", *Journal of Portfolio Management*..

Cochrane, John, "Where is the Market Going? Uncertain Facts and Novel Theories", *Economic Perspectives*, Federal Reserve Bank of Chicago, November/December 1997.

Fama, Eugene F. and Kenneth R. French (1988), "Dividend Yields and Expected Stock Returns", *Journal of Financial Economics* 22, 3-25.

Mehra, Rajnish and Edward Prescott (1985), "The Equity Premium: A Puzzle", *Journal of Monetary Economics* 15, 145-161.

Shiller, Robert (1981), "Do Stock Prices Move too Much to be Justified by Subsequent Changes in Dividends?", *American Economic Review* 71, 421-436 [in *Advances*, Ch.4.]

b) Behavioral Approaches I (equity premium puzzle)

Barberis, Nicholas, Ming Huang, and Tano Santos (2001),February, "Prospect Theory and Asset Prices", *Quarterly Journal of Economics*. http://gsbwww.uchicago.edu/fac/nicholas.barberis/research/new23.pdf

Bernartzi, Shlomo, and Richard Thaler (1995), "Myopic Loss Aversion and the Equity Premium Puzzle", *Quarterly Journal of Economics* 110, 75-92.

Gneezy, Uri, and Jan Potters (1997), "An Experiment on Risk Taking and Evaluation Periods", *Quarterly Journal of Economics* 112, 631-645.

Thaler, Richard, Amos Tversky, Daniel Kahneman, and Alan Schwartz (1997), "The Effect of Myopia and Loss Aversion on Risk-Taking: An Experimental Test", *Quarterly Journal of Economics* 112, 647-661.

Thaler, Richard, and Eric Johnson (1985), "Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice", *Management Science* 36, 643-660.

c) Behavioral Approaches II (volatility puzzle)

Barksy, Robert, and Brad De Long (1992), "Why does the stock market fluctuate?", *Quarterly Journal of Economics* 107, 291-311.

Hong, Harrison, and Jeremy Stein (1999), "Differences of Opinion, Rational Arbitrage, and Market Crashes", working paper, Stanford University.

Hong Harrison, Joesph Chen and Jeremy Stein (1999), "Forecasting Crashes: Trading Volume, Past Returns and Conditional Skewness in Stock Prices", working paper, Stanford University.

Modigliani, Franco and Richard Cohn (1974), "Inflation and the Stock Market, *Financial Analysts Journal* 35, 24-44..**6.**

7: PARADOXES AND ANOMALIES: THE CROSS-SECTION OF AVERAGE RETURNS

a) Facts

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

Bernard, Victor (1992), "Stock Price Reactions to Earnings Announcements", in Thaler (ed.) *Advances in Behavioral Financ*e, ch.11.

Chopra, Navin, Josef Lakonishok, and Jay Ritter (1992), "Measuring Abnormal Performance: Do stocks overreact?", *Journal of Financial Economics* 31: 235-268 [in *Advance*s, Ch.10]

De Bondt, Werner, and Richard Thaler (1985), "Does the Stock Market Overreact?", *Journal of Finance* 40, 793-808 [in *Advance*s, Ch.9.]

Fama, Eugene F. and Kenneth R. French (1992),"The Cross-Section of Expected Stock Returns", *Journal of Finance* 47, 427-465.

Ikenberry, David, Josef Lakonishok, and Theo Vermaelen (1995), "Market Underreaction to Open Market Share Repurchases", *Journal of Financial Economics* 39, 181-208.

Jegadeesh, Narasimhan and Sheridan Titman (1993), "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency", *Journal of Finance* 48, 65-91.

La Porta, Rafael (1996), "Expectations and the Cross-Section of Returns", *Journal of Finance* 51, 1715-1742.

Lakonishok, Josef, Andrei Shleifer, and Robert W. Vishny (1994), "Contrarian Investment, Extrapolation, and Risk", *Journal of Finance* 49, 1541-1578.

La Porta, Rafael, Josef Lakonishok, Andrei Shleifer, and Robert W. Vishny (1994), "Good News for Value Stocks: Further Evidence on Market Efficiency”, *Journal of Finance* 49, 1541-1578.

Lakonishok, Josef and Seymour Smidt (1988), “Are Seasonal Anomalies Real? A Ninety Year Perspective”, *Review of Financial Studies* 3, 257-280.

Lee, Charles, and Bhaksaran Swaminathan (1999), “Price Momentum and Trading Volume”, forthcoming, *Journal of Financ*e.

Loughran, Tim, and Jay Ritter (1995), “The New Issues Puzzle”, *Journal of Finance* 50, 23-50.

Michaely, Roni, Richard Thaler, and Kent Womack, “Price Reactions to Dividend Initiations and Omissions”, *Journal of Finance* 50, 573-608.

b) Rational Approaches.

Cochrane, John, “New Facts in Finance”, *Economic Perspective*s, Federal Reserve Bank of Chicago, Third Quarter 1999.

Fama, Eugene F. and Kenneth R. French (1993), “Common Risk Factors in the Returns of Bonds and Stocks”, *Journal of Financial Economics* 33, 3-56.

Fama, Eugene F. and Kenneth R. French (1996), "Multifactor Explanations of Asset Pricing Anomalies", *Journal of Finance* 51, 55-84.

c) **Behavioral Approaches**

Barberis, Nicholas, and Ming Huang (1999), “Mental Accounting, Loss Aversion, and Individual Stock Returns”, working paper, University of Chicago.
http://gsbwww.uchicago.edu/fac/nicholas.barberis/research/cross.pdf

Barberis, Nicholas, Andrei Shleifer, and Robert Vishny (1998), "A Model of Investor Sentiment", *Journal of Financial Economics* 49, 307-345 [in *Inefficient Market*s,Ch.5.]
http://gsbwww.uchicago.edu/fac/nicholas.barberis/research/sent.pdf

Daniel, Kent and Sheridan Titman (1997), "Evidence on the Characteristics of Cross-Sectional Variation in Stock Returns", *Journal of Finance* 52, 1-33.

Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam (1998), “Investor Psychology and Security Market Under- and Overreactions”, *Journal of Finance* 53, 1839-1885.

Fama, Eugene F. (1998), "Market Efficiency, Long-Term Returns, and Behavioral Finance", *Journal of Financial Economics* 49, 283-307.

Hong, Harrison, and Jeremy Stein (1999), “A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets”, *Journal of Finance* 54, 2143-2184.

Hong, Harrison, Terence Lim, and Jeremy Stein (2000), “Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies”, *Journal of Finance* 55, 265-295.

Mark Salmon