

**UNIVERSITY OF SIENA - FACULTY OF ECONOMICS - DEPARTMENT OF ECONOMICS**

**IV Workshop *LabSi***  
on  
**Behavioral Finance: Theory and Experimental Evidence**

**Certosa di Pontignano, Siena**  
**6 – 8 April 2006**

**BOOK OF ABSTRACTS**

co-sponsored by  
**Monte dei Paschi di Siena (MPS) and Busini s.r.l.**

**IV Workshop *LABSI***  
on  
**Behavioral Finance: Theory and Experimental Evidence**

**Certosa di Pontignano, Siena**  
**6 – 8 April 2006**

**PROGRAM**

**Friday 7<sup>th</sup> April**

**9:30**

**INVITED LECTURE**

**Gur Huberman** (Columbia Business School) (co-authored with Daniel Dorn)

*“Talk and Action: What Individual Investors Say and What they Do?”*

**10:15**

**PLENARY SESSION A**

Chair: **Alain Chateaufneuf** (Université Paris 1, Panthéon-Sorbonne)

Massimo Massa\* and **Andrei Simonov\*\*** (\*INSEAD and Cepr, \*\*Stockholm School of Economics)

*“Shareholder Homogeneity and Firm Value. The Disciplining Role of Non-Controlling Shareholders”*

Oded Braverman,\* **Shmuel Kandel,\*\*** and Avi Wohl\* (\*Tel Aviv University, \*\*Tel Aviv University, Wharton School, University of Pennsylvania, and CEPR)

*“The (Bad?) Timing of Mutual Fund Investors”*

**11:30**

**PLENARY SESSION B**

Chair: **Darren Duxbury** (Leeds University Business School)

**Adelson Piñón\*** and Martin Weber\*\* (\*Universität Mannheim and Madrid Autonomous University  
\*\*Universität Mannheim and CEPR, London)

*“The Influence of Present and Prior Alternatives on Risk Aversion”*

**Gerlinde Fellner** and Erik Theissen (University of Bonn)

*“Short sales constraints, divergence of opinion and asset values - Evidence from the laboratory”*

Selima Ben Mansour,\* **Elyès Jouini\*** and **Clotilde Napp\*\*** (\*Université Paris-Dauphine, \*\*Université Paris-Dauphine and CREST)

*“Is there a pessimistic bias in individual beliefs? Evidence from survey data”*

**14:30**

**INVITED LECTURE**

**Alain Chateaufneuf** (Université Paris 1, Panthéon-Sorbonne) (co-authored with Ghizlane Lakhnati)

*“From Sure to Strong Diversification”*

**15:15**

**PARALLEL SESSIONS C1 – C2**

**SESSIONS C1**

Chair: **Angelo Melino** (University of Toronto)

**Richard Fairchild** (University of Bath)

*“The effect of Managerial Overconfidence, asymmetric information, and moral hazard on capital structure decisions”*

**Barbara Alemanni \*** and **Alessandra Franzosi\*\*** (\*Università di Genova \*\*Borsa Italiana)

*“Portfolio and psychology of high frequency online traders”*

**Marie Pfiffelmann** (Laboratoire de Recherche en Gestion et en Economie, Strasbourg)

*“Which optimal design for LLDAs?”*

**SESSIONS C2**

Chair: **Luigi Luini** (Università di Siena)

Arvind Ashta,\* Brice Corgnet,\*\* Christophe Godlewski\*\*\* and **Angela Sutan\*\*\*\*** (\*CEREN Dijon, \*\*University Carlos III, Madrid \*\*\*LARGE, Strasbourg, \*\*\*\*CEREN, Dijon, and BETA, Strasbourg)

*“The power of words in financial markets: soft versus hard information, a strategy method experiment”*

Diego Salzman\* and **Emanuela Trifan\*\*** (\*CORE Université catholique de Louvain \*\*Darmstadt University of Technology)

*“Emotions, Bayesian Inference, and Financial Decision Making”*

**Philip S. Marey** (Maastricht University)

*“Interest rate expectations: an experimental study”*

**17:00**

**PARALLEL SESSIONS D1 – D2**

**SESSIONS D1**

Chair: **Marcello Basili** (Università di Siena)

Simone Bianco \* and **Roberto Renò\*\*** (\*University of North Texas \*\*Università di Siena)

*“Dynamics of intraday serial correlation in the Italian futures market”*

**Martin Ågren** (Uppsala University)

*“Loss Aversion and Higher Moments”*

**Philipp E. Otto** and Nick Chater (University College London)

*“Note on Ways of Saving: Mental Mechanisms as Tools for Self-Control?”*

**Grzegorz Mardyla** (Yokohama National University)

*“Trigger-happy confidence”*

**SESSIONS D2**

Chair: **Elyès Jouini** (Université Paris-Dauphine)

**Alexandra Niessen** and Stefan Ruenzi (University of Cologne and Center for Financial Research, Cologne)

*“Sex Matters: Gender and Mutual Funds”*

**Simone Alfarano,\*** Iván Barreda\*\* and Eva Camacho\*\*\* (\*University of Kiel \*\*University of Castellón \*\*\*University Autonoma of Madrid)

*“On the strategies of heterogeneous and imperfectly informed traders”*

**Greg B. Davies** (University College London)

*“Dynamic Reference Points: Investors as Consumers of Uncertainty”*

## Saturday 8th April

9:00

### INVITED LECTURE

**Darren Duxbury** (Leeds University Business School) (co-authored with Barbara Summers)

*“Peak Impact: Financial risk perception and the peak of the return distribution”*

9:45

### PLENARY SESSION E

Chair: **Andreas Ortmann** (Cerge-Ei, Prague and University of Trento)

**Brian Kluger\*** and Dan Friedman\*\* (\*University of Cincinnati \*\*University of California at Santa Cruz)

*“Financial Engineering and Rationality: Experimental Evidence Based on the Monty Hall Problem”*

**Luigi Guiso \*** and Tullio Jappelli\*\* (\*University of Rome Tor Vergata, Ente Einaudi and CEPR, \*\*University of Salerno, CSEF, and CEPR)

*“Information Acquisition, Overconfidence and Portfolio Performance”*

**Ugo Rigoni** and Massimo Warglien (Università Cà Foscari Venezia)

*“Analogical transfer of experience and the misuse of diversification. A real option investment experiment”*

11:30

### PLENARY SESSION F

Chair: **Gur Huberman** (Columbia Business School)

Thorsten Hens and **Martin Vlcek** (University of Zurich)

*“Does Prospect Theory Explain the Disposition Effect?”*

**Robin Pope,\*** Reinhard Selten,\* Sebastian Kube\*\* and Jürgen von Hagen\* (\*Bonn University \*\*University of Karlsruhe)

*“Experimental Evidence on the Benefits of Eliminating Exchange Rate Uncertainties and Why Expected Utility Theory causes Economists to Miss Them”*

Gunduz Caginalp \* and **Vladimira Ilieva\*\*** (\*University of Pittsburgh \*\*The Institute of Behavioral Finance)

*“The Dynamics of Trader Motivations in Asset Bubbles”*

**IV Workshop *LABSI***  
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**ABSTRACTS**

**Talk and Action: What Individual Investors Say and What They Do?**

Daniel Dorn\* and Gur Huberman\*\*

*\*LeBow College of Business, Drexel University \*\*Graduate School of Business, Columbia University*

Combining survey responses and trading records of clients of a German retail broker, this paper examines some of the causes for the apparent failure to buy and hold a well-diversified portfolio. The subjective investor attributes gleaned from the survey help explain the variation in actual portfolio and trading choices. Self-reported risk aversion is the single most important determinant of both portfolio diversification and turnover; other things equal, investors who report being more risk tolerant hold less diversified portfolios and trade more aggressively. Less experienced investors similarly tend to churn poorly diversified portfolios. The effect of perceived knowledge on portfolio choice is less clear cut; holding other attributes constant, investors who think themselves knowledgeable about financial securities indeed hold better diversified portfolios, but those who think themselves more knowledgeable than the average investor churn their portfolios more.

**Shareholder Homogeneity and Firm Value. The Disciplining Role of Non-Controlling Shareholders**

Massimo Massa\* and Andrei Simonov\*\*

*\*INSEAD and CEPR \*\*Stockholm School of Economics*

We study how the shareholding structure of a firm affects its stock price and profitability. We argue that the degree of shareholder homogeneity affects firm value. Homogeneous shareholders act as a disciplining device on managers, inducing them to be more transparent and to engage less in value destroying activities. This leads to higher firm profitability, higher stock price and lower volatility. Shareholder homogeneity represents an alternative and indirect source of corporate governance based on the stock market. We test this hypothesis by using a dataset containing information on all the shareholders for each firm in Sweden from 1995 to 2001. We construct two proxies for shareholder homogeneity: the first is based on the age cohort of the shareholders, and the second on their degree of college interaction. For each firm, we measure the degree of homogeneity of all shareholders. Using this proxy, we show that greater homogeneity increases firm profitability and returns, and reduces analysts' forecasting errors and dispersion, and stock volatility.

## **The (Bad?) Timing of Mutual Fund Investors**

Oded Braverman,\* Shmuel Kandel,\*\* and Avi Wohl\*\*\*

*\*Tel Aviv University, \*\*Tel Aviv University, Wharton School, University of Pennsylvania, and CEPR*

This paper provides a new look at the timing of mutual fund investors. We re-examine the relationship between investors' aggregate net flows into and out of the funds and the returns of the funds in subsequent periods. The negative relationship that we find (using monthly data of aggregate US equity mutual funds in the years 1984-2003 and a statistical test based on bootstrapping of returns) causes mutual fund investors, as a group, to realize a lower long-term accumulated return than the long-term accumulated return on a "buy and hold" position in these funds. The "bad" performance of mutual fund investors can be explained either by "behavioral explanations" such as investor sentiment or by "rational market explanations" that are based on time-varying risk premiums. We present a simple overlapping-generation model which predicts a negative relationship between flows and subsequent returns. It is assumed that flows into and out of funds are not related to information about future cash flows (dividends), but are caused by changes in other factors affecting the demand for stocks. Hence, a positive (negative) net flow in a given month implies a positive (negative) price change in the same month, but also lower (higher) expected future returns. We show that in each month the change in the expected future returns may be relatively small (relative to the return variance), but the accumulated effect of these changes may be significant. This result may explain why previous studies, using monthly data of flows and returns in either simple regression models or VAR, could not have significantly detected the monthly change in the expected future returns even in a 15-year sample.

## **The Influence of Present and Prior Alternatives on Risk Aversion**

Adelson Piñón\* and Martin Weber\*\*

*\*Universität Mannheim and Madrid Autonomous University \*\*Universität Mannheim and CEPR, London*

In a series of decision problems the influence of present and past options involving potential gains and potential losses was tested. This was done in two financial contexts (lottery vs. portfolio) eliciting individual preferences by means of several mixed gambles. No reduction of risk aversion was found when an option with higher expected value was included in a high probability of losing set. Nevertheless, it was found such reduction when the probability of winning was high mediated by frame. In the lottery treatment, the higher the probability of winning the higher the anchor effect of the added option. In the between-trial condition, when subjects focused on gains (losses) they were less risk averse after a high risk background with high probability of winning (losing). In the portfolio treatment, neither within-trial nor between-trial effects were found, showing that a small frame manipulation was successful in making individuals context-independent. Activation and salience may explain how particular information tends to induce predictable patterns of choice under risk.

## **Short sale constraints, divergence of opinion and asset values - Evidence from the laboratory**

Gerlinde Fellner and Erik Theissen

*University of Bonn*

The overvaluation hypothesis (Miller 1977) predicts that a) stocks are overvalued when there are short selling restrictions and that b) the overvaluation is increasing in the degree of divergence of opinion. We design an experiment that allows us to test these predictions in the laboratory. Our results support the hypothesis that prices are higher in the presence of short selling constraints. The overvaluation does not depend on the degree of divergence of opinion.

## **Is there a pessimistic bias in individual beliefs? Evidence from survey data.**

Selima Ben Mansour,\* Elyès Jouini\* and Clotilde Napp\*\*

*\*Université Paris-Dauphine \*\*Université Paris-Dauphine and CREST*

The aim of this paper is to determine whether individuals exhibit in their beliefs a behavioral bias towards pessimism, in a lottery or more generally in an investment opportunities framework. For this purpose, we design a field survey aiming at deriving a measure of pessimism from answers to hypothetical scenarios. We observe in the context of our experiment that individuals are on average pessimistic. We analyze how pessimism is distributed among individuals, in particular in link with gender, age and income. We also analyze how our notion of pessimism is related to more general notions of pessimism already introduced in psychology.

## **From Sure to Strong Diversification**

Alain Chateauneuf and Ghizlane Lakhnati

*Université Paris 1, Panthéon-Sorbonne*

This paper presents a characterization of weak risk aversion in terms of preference for sure diversification. Similarly, we show that strong risk aversion can be characterized by weakening preference for diversification, as introduced by Dekel [11], in what we name preference for strong diversification.

## **The effect of Managerial Overconfidence, asymmetric information, and moral hazard on capital structure decisions.**

Richard John Fairchild

*School of Management, University of Bath*

Researchers in behavioral corporate finance are increasingly recognising that managers may not be fully rational, and that their financing and investment decisions may be affected by psychological biases. One particular bias that managers may be prone to is overconfidence. We examine the combined effects of managerial overconfidence, asymmetric information and moral hazard problems on the manager's choice of financing (debt or equity). We demonstrate the following: a) in the asymmetric information model, overconfidence is unambiguously bad. It induces excessive use of welfare-reducing debt, b) in the moral hazard model, the effect of overconfidence is ambiguous. It has a positive effect by inducing higher managerial effort. However, it may lead to excessive use of debt and higher expected bankruptcy costs. Overall, we contribute to the debate on managerial overconfidence by demonstrating that managerial overconfidence is not necessarily bad for shareholders. Our theoretical analysis explains why firms may persist with excessive, value reducing debt levels, and has implications for empirical tests of financing decisions.

## **Portfolio and psychology of high frequency online traders**

Barbara Alemanni\* and Alessandra Franzosi\*\*

*\*University of Genoa \*\* Borsa Italiana Spa*

In Italy, online trading is an important and well established phenomenon. This paper investigates the portfolio and psychological traits of Italian high frequency online traders. Our analysis is based upon a telephonic survey conducted with more than 200 online traders. The sample is composed of both active traders, those conducting at least two trades per month, and heavy traders, those with daily negotiation activities. In this paper, first we investigate the trading and portfolio characteristics of our sampled investors. A measure of portfolio composition and turnover is given, together with trading habits such as: the market and frequency of negotiation. The second part of the paper deals with two psychological characteristics of Italian online traders: overconfidence, i.e. the extent to which they overestimate the precision of their information, and self-monitoring, which is a form of social intelligence. Differently from other papers, where overconfidence is assumed by the trading behaviour of investors, we directly investigate the degree of overconfidence of online traders. In our analysis, we give evidence on different manifestations of overconfidence such as: miscalibration, better than average effect, illusion of control and excessive optimism. We also questioned our sampled investors on their degree of social intelligence. Both overconfidence and self-monitoring are then related to portfolio characteristics and trading habits. The paper concludes with an econometric analysis to test how trading habits can be related to sociodemographic and to psychological traits. We observe how overconfidence and good self-monitoring positively affect trading frequency.

## **Which optimal design for LLDA's?**

Marie Pfiffelmann

*Laboratoire de Recherche en Gestion et en Economie, Pôle Européen de Gestion et d'Economie, Strasbourg*

Expected Utility Theory has been considered for several decades as a benchmark for describing decision making under risk. According to this normative model of rational choices, attitude towards risk is entirely characterized by the shape of the utility function. In economics and finance, we generally assume that risk-averse behavior is modeled by a concave utility function. However, this assumption of strict risk-aversion has recently been seriously questioned. On the one hand, individuals' preferences for insurance lead to a risk-averse behavior. On the other hand, acceptance for gambling expresses risk-seeking behavior. Two conflicting behavioral choices are therefore observed. Such behavioral choices are also observed in the financial field. More precisely, lottery linked deposit accounts (LLDA) have recently become very popular in many countries (Guillen and Tschoegl 2002). These deposit accounts are financial assets that provide an interest rate determined by a lottery. Their existence cannot be explained in the framework of expected utility models since a risk-averse person would accordingly always prefer to draw the expected value of a lottery rather than participate in the gamble. Gambling is therefore inconsistent with expected utility theory. However, the popularity of these financial assets can be better understood by behavioral finance studies. Indeed, the Rank Dependant Expected Utility (Quiggin 1982) and the Cumulative Prospect Theory (Tversky, Kahneman 1992) provide a good explanation for the emergence of these deposit accounts by integrating simultaneous risk-averse and risk-seeking behaviors. In previous papers, we have shown how investors with individual preferences as described by Kahneman and Tversky's prospect theory, can be attracted by these financial assets. We compared two LLDA's: the Premium Savings Bonds issued by the British Treasury and the Savings Account MM-max launched by the French insurance company "les Mutuelles du Mans". The strong asymmetry of the Premium Bonds makes this financial asset more attractive than the Savings Account MMmax. In fact, the Premium Bonds propose a very substantial potential gain associated to an infinitesimal probability. The desire to earn a large amount of money drives the investors to overweight this low probability of winning. Furthermore, we pointed out that a modification of the payment structure for the lottery of the MMmax account (in order to increase its asymmetry) could improve its appeal (without increasing in the same time the cost of the account's issuer). The purpose of the present paper is to determine the optimal design of the LLDA given that all investors have identical Kahneman and Tversky's individual preferences. First, we analyze the case of the deposit account MMmax. In order to optimize the lottery design, we minimize the anticipated losses of the issuing under the investor's participation constraint. The optimization program leads to

an optimal and very relevant structure of payment. In fact, the results show that the lottery should be strongly asymmetrical. The explanation lies in the tendency individuals have to overweight the extremely low probability of the desired outcome. In the next step, we generalize the results and analyze the problem of the optimal design of LL- DAs. Our aim is now to determine the optimal payment structure and the associated optimal probabilities. Our results allow us to discuss the shape of the Kahneman and Tversky's weighting function. Links with the behavioral portfolios theory (Shefrin and Statman 2000) can be established.

## **The power of words in financial markets: soft versus hard communication, a strategy method experiment**

Arvind Ashta,\* Brice Corgnet,\*\* Christophe Godlewski\*\*\* and Angela Sutan\*\*\*\*

\**CEREN Dijon*, \*\**University Carlos III, Madrid* \*\*\**LARGE, Strasbourg*, \*\*\*\**CEREN, Dijon, and BETA, Strasbourg*

The main objective of this paper is to analyze the impact of non-informative communications on asset prices. An experimental approach allows us to control for the release of non-relevant messages. We introduce the release of messages in standard experimental asset markets with bubbles (Smith, Suchanek and Williams 1988) through a strategy method experiment. We conjecture that a priori uninformative messages can significantly impact the level of asset prices. Uninformative communications may be used by boundedly rational subjects to compute the fundamental value of the asset. In addition, rational agents may anticipate such an effect and adapt their strategy to the messages received. We asked 182 subjects to construct strategies about their action in a standard experimental asset market environment. Our analysis sheds light on the possibility of manipulation and stabilization of financial markets by influential agents such as financial “gurus” or central bankers.

## **Emotions, Bayesian Inference, and Financial Decision Making**

Diego Salzman\* and Emanuela Trifan\*\*

\**CORE Université catholique de Louvain* \*\**Darmstadt University of Technology*

This paper presents a model in which rational and emotional investors are compelled to make decisions under uncertainty in order to ensure their survival. Using a neurofinancial setting, we show that, when different investor types fight for market capital, emotional traders tend not only to influence prices but also to have a much more developed adaptive mechanism than their rational peers, in spite of their apparently simplistic demand strategy and distorted revision of beliefs. Our results imply that prices in financial markets could be seen more accurately as a thermometer of the market mood and emotions rather than as simple informative signals as stated in traditional financial theory.

## **Interest rate expectations: an experimental study**

Philip S. Marey

*ROA, Maastricht University*

In an experiment we investigate how interest rate expectations are determined by the current yield curve, the recent history of interest rates, and macroeconomic forecasts. An upward (downward) sloping yield curve is interpreted as a signal for rising (falling) interest rates, whereas a recent increase (decrease) in interest rates is seen as a signal for falling (rising) interest rates. As far as macroeconomic information is concerned, GDP forecasts play a more significant role than CPI forecasts. More information does not necessarily lead to better forecasts. Interest rate history increases the dispersion of forecasts, while the effect of macroeconomic information on dispersion is ambiguous. There is a significant positive correlation between forecasting performance and intellectual abilities of subjects. Forecasts are on average in the right direction, but tend to underestimate the size of the change.

## **Dynamics of intraday serial correlation in the Italian futures market**

Simone Bianco\* and Roberto Renò\*\*

*\*Center for Nonlinear Science, University of North Texas \*\*Università di Siena*

We study the serial correlation of high-frequency intraday returns on the Italian stock index futures (FIB30) in the period 2000-2002. We find that intraday autocorrelation is mostly negative for time scales lower than 20 minutes, mainly due to the bid-ask bounce effect. While this supports the efficiency of the Italian futures market, we also provide evidence that intraday serial correlation becomes positive in high volatility regimes. Moreover we find that it is mainly unexpected volatility to make serial correlation rise, and not its predictable part. Our results are supportive of the Chan (1993) model.

## **Loss Aversion and Higher Moments**

Martin Ågren

*Uppsala University*

This paper studies cumulative prospect theory under the assumption of normal inverse Gaussian distributed returns. Such an assumption takes the higher order moments of financial returns distributions into account. Using numerical techniques, and a model calibration to empirical parameter estimates, I find that: (a) prospect theory investors choose mean-variance efficient portfolios, (b) prospective utility generally decreases when skewness increases, (c) prospective utility increases with kurtosis, (d) the investor's portfolio choice displays large horizon effects, i.e., a larger weight is placed on stocks if the horizon is longer, and (e) when assuming a normal inverse Gaussian re- turns distribution, the prospect theory investor places a larger weight on stocks, relative to when normality is assumed. This last finding is explained by the extensive kurtosis of financial returns distributions. The results broaden the understanding of prospect theory preferences in portfolio choice problems.

## **Note on Ways of Saving: Mental Mechanisms as Tools for Self-Control?**

Philipp E. Otto and Nick Chater

*University College London*

With Keynes (1936) it is part of accepted theory that we have different motives for saving, including the need to secure means for the future. To bridge the gap between motives and observed behavior, we assume it is necessary to understand how people actually try to achieve their saving goals. A new method of visualizing existing saving concepts is introduced, which shows that individuals apply a range of saving strategies to organize their finances. Based on a financial personality survey it is shown how external as well as internal control for saving can be improved systematically.

## **Trigger-Happy Confidence**

Grzegorz Mardyla

*Yokohama National University*

We propose a simple, information-based explanation for the appearance of overconfidence with respect to information quality. In our setting, an agent who engages in information acquisition activities with a view to increase its quality, does not possess perfect knowledge about the underlying characteristics of the information environment. Such an agent continues her information gathering until she perceives its quality to reach a satisfactory level. In effect, she enters the next, decisive phase of her problem, with less information than would be optimal, thus exhibiting a form of trigger-happiness, with mistaken beliefs, and, she is overconfident about the accuracy of her beliefs. We motivate our model with and relate it to several settings including the ever-growing phenomenon of online investing and excess business entry. Our framework also provides a way to demonstrate in one, unified setting, the distinctiveness of two phenomena, namely hubris and excessive certainty, both of which have been often used interchangeably to mean “overconfidence”.

## **Sex Matters: Gender and Mutual Funds**

Alexandra Niessen and Stefan Ruenzi

*University of Cologne and Centre for Financial Research, Cologne*

To shed some light on the sophisticated relationship between women, men and money, we investigate gender differences among US mutual fund managers. Based on findings from the existing literature on gender differences, we hypothesize that female fund managers take less risk and follow less extreme investment styles that are more consistent over time. Furthermore, we expect female fund managers to be less overconfident and therefore to trade less. Our empirical results support all of these hypotheses. We then turn to the consequences that arise for investors and fund companies, but find no evidence that behavioral differences between female and male fund managers are reflected in fund performance. The more surprising appears our finding, that female managed funds have significantly lower inflows. As fund families earn their fee income on their assets under management, we search for compensating incentives for fund families to employ female fund managers despite their low fund flows. We find that firms with a high probability of being sued for discrimination, i.e. large and well-established firms, are most likely to employ women. Furthermore, female fund managers are more likely to be employed in less conservative states of the U.S. We conclude with implications of our findings for investors and fund management companies.

## **On the strategies of heterogeneous and imperfectly informed traders**

Simone Alfarano,\* Iván Barreda\*\* and Eva Camacho\*\*\*

*\*University of Kiel \*\*University of Castellón \*\*\*University Autonoma of Madrid*

Financial markets have been traditionally analysed under the theoretical framework of the Efficient Market Hypothesis (EMH). Nevertheless, only indirect implications of the EMH have been investigated so far, since private information is not observable. Two main approaches have been used to overcome this problem: controlled economic experiments and computer simulations of artificial financial markets. In this paper we focus on the first approach. In the experimental asset market here implemented, the subjects decide whether to keep their money in a bank account with a constant risk-free interest rate or invest in a risky asset paying a random dividend. The asset's value is determined by a dividend stream that follows a random walk and the price of the assets in the market is determined in a continuous double auction with open order book. In the experimental study three different treatments were implemented. In the first one, subjects trade with no information on the future dividend value. We use this treatment as a baseline. In the second one, it is common knowledge that traders have homogeneous but imperfect information about the value of the dividend in the next period. In the third treatment, parallel to the asset trading, we introduce an information market where the traders can buy an imperfect prediction of the future value of the dividend with a maximum of 4 periods ahead. The accuracy of the prediction decreases with the chosen time horizon, whereas its price remains constant. This treatment allows us to observe the informational structure of the market, endogenously determined by the traders' strategies. The structure of our market adds a further element of complexity to the existent experimental literature. The information, in fact, is not only imperfect and heterogeneous, but evolves over time as a consequence of our assumption on the evolution of the dividend as a random walk. We can precisely compute the efficiency of the market, measured as the capacity of the traders to correctly identify the free-arbitrage price or fundamental value of the asset. Interestingly, we can link the level of efficiency of the market to the evolution of the traders' behavior. Our experiment is designed to analyze whether different degrees of heterogeneity in the information at the disposal of the traders is responsible of their observed heterogeneous behavior, and, ultimately, whether such heterogeneity of strategies plays a crucial role in the empirical identified market inefficiencies.

## **Dynamic Reference Points: Investors as Consumers of Uncertainty**

Greg B. Davies

*University College London*

The effect of shifting the cumulative prospect theory reference point in the evaluation of prospects has received very little attention in the literature. However, the riskless choice literature has studied these effects extensively. Employing new notation to render these concepts theoretically tractable, I then analyse the role of shifting reference points on dynamic prospect evaluation. To bring riskless choice theory to bear on the problem of choice under risk I embed risky prospects in the riskless choice framework, which allows initial constraints to be placed on the nature of shifts in value and decision weighting functions as the reference point shifts.

## **Peak Impact: Financial risk perception and the peak of the return distribution**

Barbara Summers and Darren Duxbury

*Leeds University Business School*

This paper investigates financial risk perception, evaluating the influence of the peak of the return distribution. Variance and skew are manipulated experimentally to operationalize movement of the peak of the distribution vertically and horizontally, respectively. The results provide strong support for the existence of a 'peak evaluation heuristic.

## **Financial Engineering and Rationality: Experimental Evidence Based on the Monty Hall Problem**

Brian Kluger\* and Daniel Friedman\*\*

*\*University of Cincinnati \*\*University of California at Santa Cruz*

Financial engineering often involves redefining existing financial assets to create new financial products. This paper investigates whether financial engineering can alter the environment so that irrational agents can quickly learn to be rational. The specific environment we investigate is based on the Monty Hall problem, a well-studied choice anomaly. Our results show that, by the end of the experiment, the majority of subjects understand the Monty Hall anomaly. Average valuation of the experimental asset is very close to the expected value based on the true probabilities.

## **Information Acquisition, Overconfidence and Portfolio Performance**

Luigi Guiso \* and Tullio Jappelli\*\*

*\*University of Rome Tor Vergata, Ente Einaudi and CEPR, \*\*University of Salerno, CSEF, and CEPR*

Rational investors perceive correctly the value of financial information. Investment in information is therefore rewarded with a higher Sharpe ratio. Overconfident investors overstate the quality of their own information, and thus attain a lower Sharpe ratio. We contrast the implications of the two models using a survey of customers of an Italian leading bank with portfolio data and measures of financial information. We find that the portfolio Sharpe ratio is negatively associated with investment in information. The negative correlation is stronger for men than women, for those who claim they know stocks well and for the less well educated, arguably because these groups of investors are more likely to be overconfident. We also show that investment in information is associated with more frequent trading, less delegation of portfolio decisions and less diversified portfolios. In each case, the effect of information is stronger for investors who, a priori, are suspected to be more overconfident.

## **Analogical transfer of experience and the misuse of diversification. A real option investment experiment**

Ugo Rigoni and Massimo Warglien

*Ca' Foscari University, Venice*

Diversification is an effective investment strategy for dealing with risky alternatives, but sometimes it can be a misleading heuristic. In fact, when the payoff function is convex the variance of the random variables should increase the incentive to invest. Concave payoffs prevail when the investments are irreversible, while convex returns prevail when the investment process is characterized by some kind of flexibility. An important example of convex revenue structure is offered by investing in options. In this paper we demonstrate experimentally that, when facing a real option investment, individuals often fail to recognize its structure and inappropriately adopt a diversification strategy, making a suboptimal investment choice. We conjecture that investors may inappropriately transfer decision making strategies that turned out to be successful in similar domains, as suggested by case-based decision making theory and by psychological theories of analogical inference. A second experiment, in which we provided subjects with additional cases supporting “the diversification heuristic” or instead contradicting it, supports such a hypothesis. While subjects exposed to cases supporting the “diversification” heuristic reproduced the behavior of the first experiment, subjects exposed to the case suggesting to concentrate reversed the prevailing behavior, choosing (correctly) the risky option.

## **Does Prospect Theory Explain the Disposition Effect?**

Thorsten Hens and Martin Vlcek

*Institute for Empirical Research in Economics, University of Zurich*

The disposition effect is the observation that investors hold winning stocks too long and sell losing stocks too early. A standard explanation of the disposition effect refers to prospect theory and in particular to the asymmetric risk aversion according to which investors are risk averse when faced with gains and risk-seeking when faced with losses. We show that for reasonable parameter values the disposition effect can however not be explained by prospect theory as proposed by Kahneman and Tversky. The reason is that those investors who sell winning stocks and hold losing assets would in the first place not have invested in stocks. That is to say the standard prospect theory argument is sound ex-post, assuming that the investment has taken place, but not ex-ante, requiring that the investment is made in the first place.

## **Experimental Evidence on the Benefits of Eliminating Exchange Rate Uncertainties and Why Expected Utility Theory causes Economists to Miss Them**

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Conclusions drawn about exchange rate management typically follow expected utility theory and ignore the costs that uncertainty generates for governments, central banks, firms and unions in: (i) discovering available acts, (ii) choosing among them; and (iii) existing until learning the outcome of the chosen risky/ uncertainty act. Allowing for these costs involves the stages of knowledge ahead framework, Pope (1983, 1995, 2005). A laboratory experiment suggests that (i), (ii) and (iii) together outweigh the advantages of having a flexible exchange rate as an instrument for managing a country's employment, interest rate, price level and international competitiveness goals.

## **The Dynamics of Trader Motivations in Asset Bubbles**

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Asset market experiments are analyzed by distinguishing, *ex post facto*, participants who trade on fundamentals versus those who trade on momentum (i.e., buying when price is rising). The distinction is made when prices are above fundamental value, so that (in each period) those who have more offers than bids (net offerers) are classified as fundamentalists while those who have more bids than offers (net bidders) are defined to be momentum players. By analyzing the data of individual behavior we are able to address a number of key questions regarding bubbles. We find evidence that the cash supply of the momentum traders diminishes and the cash supply of the fundamental traders increases as the bubble forms. This suggests that the bubble is fueled by the cash of the momentum players and the reversal is caused by inadequate cash in their possession. These data are used in conjunction with a difference equation for price dynamics for two groups. The momentum traders exhibit a positive coefficient for price derivatives and a very small negative coefficient for trading based upon the deviation from fundamental value. Surprisingly, however, the fundamental traders, who exhibit a positive coefficient for trading on valuation, also exhibit a significantly positive coefficient for trend based buying. Thus, even those who are net offerers, classified as fundamentalists, are selling less and buying more of overvalued stock when there is a strong positive recent price change. There is also evidence that some fundamentalists change strategy to momentum trading as prices soar. An additional result is that the trend coefficient of the momentum traders vanishes with the implementation of an “open book” that allows traders to see all trades as they are entered.

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