CEAR Workshop: Behavioral Risk Management

February 10 and 11, 2012
Center for the Economic Analysis of Risk
Department of Risk Management and Insurance, Robinson College of Business
Georgia State University, Atlanta.  http://cear.gsu.edu

General Information

Risk management refers to all of the tools that decision-makers have to adjust to risk. It includes obvious tools such as portfolio management, financial derivatives and the purchase of insurance. But it also includes the operational strategies of “self-protection” and “self-insurance” that allow the decision-maker to change the lotteries they face. It includes informal and formal risk sharing arrangements, and their implications for contracting. It includes the interaction of risks in one domain with risks from other domains (“background risk” and multiattribute risks). And it includes ways in which decision-makers form subjective beliefs about risks, and manage risks that might occur far in the future. The workshop brings together researchers interested in the manner in which risk management behavior can be understood with theoretical, experimental and econometric methods. Alternative theoretical models are welcome, although analyses that are disconnected from theory are not. Researchers from a variety of disciplines will find this workshop of interest, including economics, finance, risk management, insurance, accounting, and psychology. The workshop will consist of roughly twelve plenary sessions in which speakers have an hour to present.

This workshop complements one on Behavioral Insurance, held in December 2011 at the Munich Risk and Insurance Center. Each workshop will be associated with a separate special symposium section of the Journal of Risk and Insurance, with papers subject to peer review.

Funding

The Center for the Economic Analysis of Risk (CEAR) will provide travel support and cover local expenses for participants that are presenting papers or acting as discussants. The usual university guidelines apply, although we can provide extra nights of support for overseas visitors if needed.

Organizer

Glenn Harrison is the organizer of this workshop, and will be the special editor for the symposium section of the Journal of Risk and Insurance associated with this workshop. He is the C.V. Starr Chair of Risk Management and Insurance at GSU, and Director of CEAR.

Dates & Times

Friday 2/10 – 9am to 5.45m. Refreshments and lunch will be provided.
Saturday 2/11 – 9am to 3.30pm. Refreshments and lunch will be provided.

Contact Mark Schneider at cear@gsu.edu for special dietary needs.

Location

The CEAR Seminar Room is on the 11th floor of the J. Mack Robinson College of Business at Georgia State University. Here is a map link to CEAR; the physical address is 35 Broad Street, 11th Floor, Atlanta, GA 30303.

Lodging

CEAR recommends lodging at the Ellis Hotel: (404) 602.0563, 176 Peachtree Street NE, Atlanta, GA 30303. www.ellishotel.com. The hotel is within walking distance to CEAR.
Program

Friday February 10

9.00  Glenn Harrison (GSU and CEAR) Welcome and General Introduction

9.15 – 10.15  Glenn Harrison (GSU and CEAR) and Jimmy Martinez (GSU) Behavioral Risk Management: A Survey

10.15 – 10.30  Coffee Break

10.30 – 11.30  Raffaele Miniaci (University of Brescia) Estimating Return Expectations and Risk Aversion in Household Portfolios

11.30 – 12.30  Yan Yan Liu (International Food Policy Research Institute) The Dynamics of Insurance Demand under Liquidity Constraints and Insurer Default Risk

12.30 – 1.30  Lunch (buffet in CEAR Seminar Room)

1.30 – 2.30  Christian Knoller (Ludwig-Maximilians-University, Munich) Multiple Reference Points and the Demand for Principal-Protected Life Annuities: An Experimental Analysis

2.30 – 3.30  Morten I. Lau (Durham University) Willingness to Pay for Insurance in Denmark

3.30 – 3.45  Coffee

3.45 – 4.45  Johannes Jaspersen (Ludwig-Maximilians-Universitaet, Munich) Probability Elicitation with Severe Time Pressure: A Rank-Based Procedure

4.45 – 5.45  AJ Bostian (University of Virginia) Prudential Saving: Evidence from a Laboratory Experiment

6.30  Dinner for invited guests (Location Ellis Hotel)

Saturday February 11

9.00 – 9.45  Ulrich Schmidt (University of Kiel) Insurance Demand and Prospect Theory

9.45 – 10.00  Coffee

10.00 – 11.00  Jacqueline Volkman-Wise (Temple) Prospect Theory and the Demand for Insurance

11.00 – 11.15  Coffee

11.15 – 12.15  David R. Rivenbark (University of Central Florida) Valuing the Risk from Privacy Loss: Experimentally Elicited Beliefs Explain Privacy Behavior

12.15 – 1.30  Lunch (buffet in CEAR Seminar Room)

1.30 – 2.30  Paul J.M. Klumpes (EDHEC) The Sustainability of Investment Decision Making

2.30 – 3.30  Dylan Fitz (University of Wisconsin at Madison) Subjective Beliefs, Risk, Learning and Technology Adoption
Abstracts and Co-Authors

Estimating Return Expectations and Risk Aversion in Household Portfolios, by Raffaele Miniaci (University of Brescia) and Sergio Pastorello (University of Bologna).

In this paper we focus on cross-sectional phenomena, such as the apparent lack of diversification in household portfolios, and the low fraction of households investing in risky assets. Many authors have tried to justify this observation using some of the factors cited above. Most of these studies, however, share the common feature of being based on reduced form specifications which do not completely exploit the restrictions placed by the theoretical utility maximization model on the econometric specification and on the link between the discrete and the continuous components of portfolio choice. We exploit two sources of information on households expectations and risk aversion: their portfolio choices and their self assessed willingness to take financial risk. To the best of our knowledge it is the first time that objective and subjective information are jointly used in a structural model to investigate actual household wealth allocation. We consider a definition of wealth which includes real estate, business wealth and the related debt. As real estate and business wealth are illiquid, the households optimize their financial portfolio conditional on this portion of wealth. Furthermore, we assume that the total amount of debt cannot exceed the value of real assets and that households face short-selling constraints. The constrained mean-variance optimization problem gives rise to seven possible portfolio regimes, which are modeled through a structural tobit model. This latter is augmented with an order probit like equation in order to consider the subjective information discussed above. The model is estimated by weighted maximum likelihood using the Survey of Consumer Finances from 1998 to 2007, we simulate the model to evaluate the effects of aggregate demographic and economic shocks on participation patterns, asset demands, risk attitude and expectations.

Willingness to Pay for Insurance in Denmark by Rasmus H. Jacobsen (Copenhagen Business School), Jan V. Hansen (Danish Insurance Association), Morten I. Lau (Durham University) and Jonas Z. Schaarup (Danish Insurance Association)

We estimate the maximum amount that Danish households are willing to pay for three different types of insurance: auto, home and house insurance. We use a unique combination of claims data from the largest private insurance company in Denmark, measures of individual risk attitudes and discount rates from a field experiment with a representative sample of the adult Danish population, and information on household income and wealth from registers at Statistics Denmark. We assume that households maximize expected inter-temporal utility subject to an inter-temporal budget constraint with several possible states of nature, where all uncertainty is realized in the initial period and any loss incurred by an accident is subtracted from initial wealth. The estimated willingness to pay is based on annual claims and should thus be considered as an annual premium. Since there is some uncertainty about the estimates of risk attitudes and discount rates, there is some uncertainty about the estimated willingness to pay. We use a randomized factorial design in our sensitivity analysis where each simulation involves a random draw from independent normal distributions of the estimated risk and time preferences. The results show that the willingness to pay is marginally higher than the actuarial fair value under Expected Utility Theory. However, the willingness to pay may be up to ten times higher for some household groups when we allow for probability weighting and assume Rank Dependent Utility Theory compared to the estimated values under EUT.

Multiple Reference Points and the Demand for Principal-Protected Life Annuities: An Experimental Analysis by Christian Knoller (Ludwig-Maximilians-University, Munich)

We analyze if multiple reference point theories can explain the relatively high attractiveness of annuities containing a capital guarantee. Therefore, we conducted a laboratory experiment where participants were confronted with an experimental annuitization decision from a mental accounting perspective. Previous research has shown that combining mental accounting and prospect theory can explain why annuities containing a guarantee are preferred to standard annuities, but this approach suffers from the shortcoming that from this perspective people would not annuitize their assets at all, but rather invest the money in a risk-free alternative. Recent research has extended prospect theory by additional reference points, in particular goals and thereby found a cushion effect. When all possible outcomes of two options are above a certain goal, this goal serves as a cushion against negative emotions like disappointment and regret. Hence, individuals have a higher
propensity to choose the risky option over the risk-free alternative with the same expected value. In our experiment we find that individuals are more willing to purchase an annuity if it contains a capital guarantee. More-over, we find evidence that individuals using this guarantee as a cushion were even more willing to choose the annuity. Hence, the cushion effect can partially explain the high demand for capital guarantee features in annuity contracts.

**Behavioral Risk Management: A Survey**, by Glenn W. Harrison and Jimmy Martínez (Georgia State University)

Behavioral risk management applies alternative models of human behavior to the decisions underlying choices in risk situations. The use of alternative models allows an evaluation of the effect of different behavioral assumptions on inferences about risk perception, risk attitudes, and risk management. We consider theoretical, experimental and econometric applications of different behavioral assumptions. The literature is reviewed and some gaps filled, providing a systematic overview of the field of behavioral risk management. We consider the effect of allowing for rank-dependent probability weighting, loss aversion, ambiguity and the presence of traded and non-traded assets on the classic theorems of risk management. Finally, we review the subtle econometric issues that arise when estimating models of risk management behavior, particularly when using naturally-occurring data. A unifying theme of our review is the importance of allowing for alternative behavioral assumptions when undertaking welfare evaluations of risk management choices and regulatory policies. Our review also contains numerous cautions about the subtleties of theoretical, experimental and econometric work in the field of behavioral risk management.

**Probability Elicitation with Severe Time Pressure: A Rank-Based Procedure**, by Johannes Jaspersen (Ludwig-Maximilians-Universitäten, Munich) and Gilberto Montibeller (London School of Economics and Political Science).

The issue of probability elicitation has been discussed at length in the scientific literature. While many of the proposed procedures have focused on the precision of the elicited probabilities, it has mostly been neglected to consider the speed of the elicitation process. Additionally most of the elicitation procedures are numerical in nature. While this promotes the precision of the elicited probabilities, there can be various reasons for an expert to refuse giving such estimates. This is particularly the case if very uncertain and politicized topics like emergent threats are the focus of the analysis. We propose a new elicitation procedure based on ordinal rankings alone. This way we can accomplish a quick and non-numerical elicitation process. The probabilities are subsequently approximated from the ranking by an algorithm based on the principle of maximum entropy. The procedure can elicit probabilities for a wide range of different event-types including a new way of eliciting the probabilities for low-probability events. We use a Monte Carlo simulation to validate the accuracy of the approximated probabilities.

**Prospect Theory and the Demand for Insurance**, by David L. Eckles (University of Georgia) and Jacqueline Volkman Wise (Temple)

We examine the effect of prospect theory preferences on the demand for insurance. Prospect theory implies individuals make decisions by evaluating gains and losses relative to a reference point, where utility is concave over gains and convex over losses; furthermore, losses are weighed more heavily than gains in this setting. We incorporate such preferences in the utility function for an individual and investigate various reference points for an individual making insurance purchasing decisions. We find that prospect theory can explain the preference for low deductibles for mandatory insurance, the lack of demand for non-mandatory insurance like catastrophe insurance, and the over-demand to insure small losses as seen with the purchasing of warranties.

**Prudential Saving: Evidence from a Laboratory Experiment**, by AJ A. Bostian (University of Virginia and Christoph Heinzell (Toulouse School of Economics).

Prudence is a behavioral attitude that is broadly applicable to settings involving risk. It has particular importance in intertemporal choice theory, where it can be interpreted as the intensity of intertemporal substitution. Prior laboratory experiments to elicit prudence have addressed it in a pure-risk sense, by examining behavior in static lotteries and other gambles. It is tempting to impute these results into an intertemporal context, leveraging the fact that “risk aversion” and “elasticity of intertemporal substitution” are
directly mappable under expected utility. However, many empirical studies of intertemporal behavior suggest that the two ideas may be distinct. To address prudence in its intertemporal sense, we instead design a small-scale laboratory experiment around a two-period consumption/savings model in order to detect prudence via savings choices. The utility concept in this model disentangles risk preferences from intertemporal preferences, and suggests the type of exogenous variation to present to subjects in the experiment. The experimental design involves a “multiple price list” with scenarios involving income risk and interest-rate risk. In each scenario, subjects must choose how much of their first-period income to save for the second period. The design also implements field-like wealth levels and real time lags to ameliorate the possibility of the decisions being a laboratory artifact. We estimate risk and intertemporal preferences at the individual level using a subject’s savings data and the model’s structural Euler equation. Excluding outliers, the average coefficient of relative risk aversion is 2.06, the average elasticity of intertemporal substitution is 0.75, and the average coefficient of relative prudence is 3.90. These averages mask a good deal of subject-level heterogeneity, as the respective coefficients of variation are, at a minimum, 70%.

**Insurance Demand and Prospect Theory**, by Ulrich Schmidt (University of Kiel)

Empirical evidence has shown that people are unwilling to insure rare losses at subsidized premiums and at the same time take-up insurance for moderate risks at highly loaded premiums. This paper explores whether prospect theory, in particular diminishing sensitivity and loss aversion, can accommodate this evidence. A crucial factor for applying prospect theory to insurance problems is the choice of the reference point. We motivate and explore two possible reference points, state-dependent initial wealth and final wealth after buying full insurance. It turns out that particularly the latter reference point seems to provide a realistic explanation of the empirical evidence.

**Subjective Beliefs, Risk, Learning and Technology Adoption**, by Jean-Paul Chavas, Dylan Fitz, Laura Schechter, Brad Barham, and Vanessa Rios Sala (all with University of Wisconsin at Madison)

There has been much interest in investigating how beliefs are formed about risk exposure and how this information is used in making decisions. This involves two important issues. First, how do decision makers generate subjective beliefs and update them over time?

Second, how do information and risk preferences interact to shape decisions? Our paper explores these issues both theoretically and empirically. The empirical analysis relies on experimental and survey data to investigate risk preferences, learning processes and technology adoption among US corn and soybean farmers.

On the theory side, we consider a decision maker choosing among a finite number of alternatives in a way consistent with the expected utility model. Both probability assessment and risk preferences (represented by the shape of the utility function) play a role. New information allows assessed probabilities to evolve over time, which in turn affects decisions. The rationale for such decisions can be represented by a discrete choice model (e.g., as pioneered by McFadden). Our conceptual innovation is to specify “subjective probabilities” as a weighted function of “objective probabilities” predicted from Bayesian learning. The resulting discrete choice model can be estimated by maximum likelihood. This provides a basis for a formal test of Bayesian learning. And by considering alternative specification for the weights, this allows the investigation of different learning rules (e.g., how quickly is past information “forgotten”?). What weights are put on the most recent information? How are “low probability events” treated? Importantly, under the expected utility model, this approach can be applied while controlling for the role of risk aversion. In addition, the evidence on learning rules can be related to the cognitive abilities of each decision maker and to their actual decisions made under risk.

This model is tested empirically in an examination of the role of risk and learning in adoption decisions, and applied to US corn and soybean farmers deciding whether to adopt biotechnology on their farm. The analysis relies on a field experiment involving 200 farmers. The experiment involved three steps. First, we observed how each farmer chose among alternative risky prospects, and we used this information to estimate their risk preferences (assuming constant relative risk aversion). As expected, we found that most farmers are risk averse (although there was much heterogeneity in risk aversion across individuals). Second, in a series of controlled experiments, we observed how each farmer’s decisions evolved with new information (step 2). Third, we collected data on the performance of each individual in a series of memory and cognition tests (step 3). The
empirical analysis uses a discrete choice model to estimate which learning rules were used in step 2 by each farmer. The analysis of learning controls for the risk preferences of each individual (as given by their relative risk aversion parameter estimated in step 1). We find strong evidence against Bayesian learning. We also document the heterogeneity of learning rules across individuals. Next, this information is used to analyze two key issues. First, how do learning rules vary with the cognitive abilities of each individual (as measured from memory tests and cognition tests in step 3)? For example, we document how the discounting of past information varies with each individual memory’s skills. Second, we investigate how risk preferences and learning rules relate to each farmer’s decisions to adopt biotechnology on their farm. Combined, these analyses provide useful insights on the linkages between risk, learning and technology adoption.

The Dynamics of Insurance Demand under Liquidity Constraints and Insurer Default Risk, by Yanyan Liu (International Food Policy Research Institute) and Robert J. Myers (Michigan State University)

This paper develops a dynamic model of demand for agricultural insurance by risk-averse farmers who can borrow and lend subject to a credit constraint and face risk of insurer default. Credit constraints and the possibility of insurer default both reduce the demand for insurance. We then propose a new insurance design that allows farmers to enter an insurance contract while delaying payment of the premium until the end of the insured period. We then show how this new design can effectively increase insurance take-up by relaxing liquidity constraint and ameliorating farmers concerns about insurer default. The value of this new design is computed based on several assumptions. We also investigate the effects of the associated problem of farmers reneging on their delayed premium payment if the insured event does not occur.

The Sustainability of Investment Decision Making, by Paul J.M. Klumpes (EDHEC) and Jack Stecher (Carnegie Mellon)

This study evaluates the long-term sustainability of performance of fund managers by decomposing reported alpha into the underlying win-loss ratio and the hit rate. We also develop new methods for evaluating persistence by using simple forecast verification techniques. We test the properties of a decision-level measure investment management performance based on loss-aversion based on the combination of the win-loss ratio and the hit rate, which appears to evidence the sustainability of performance in ways not captured by the standard risk-aversion based alpha. These results are robust based on quartile and decomposed to the mandate level. We derive and test a simple new multidimensional measure of mutual fund performance management using a combination of the hit rate and the win-loss ratio using a combination of inputs and outputs that describe the multi-attribute nature of the tasks and objectives of fund managers. The measure is combined with other features of fund management to develop a multi-attribute measure of ‘efficiency’; we decompose this into both scale and mix efficiency and separately measure this for overweight and underweight portfolio management decisions. We test these predictions on an internationally diversified portfolio of 215 pension fund managers. Performance is decomposed by quartile and we further discriminate how the hit rate and the win-loss ratio can help clarify the effect of sentiment on over performances and relative underperformers. We explain performance in terms of a trade-off between the alpha and hit rate and win-loss ratio, conditioned on other factors associated with the judgment process. The interaction of judgment and action type for relatively poor performers, while the hit rate explains these effects for the relatively good performers. Our results clarify and extend prior research which documents behavioural biases in decision-making. We also find that the difference between overweights and underweights are statistically significant and suggest that the efficiency scores we derive are meaningful and new measures to evaluate managerial performance across mandates and weightings. We conduct robustness checks by testing alternative direct measures of performance persistence using weather forecasting techniques. Our findings support the notion that learning and experience are evidenced from win-to-loss ratios in ways that are not exhibited by either the alpha or hit rate. The findings have significant implications for the applicability of these performance metrics to analyse the long-term sustainability of portfolio decision making.

Valuing the Risk from Privacy Loss: Experimentally Elicited Beliefs Explain Privacy Behavior, by David R. Rivenbark (University of Central Florida)

The privacy literature has recognized a dichotomy between reported values of privacy and actual behavior. People tend to say they value privacy highly, and then behave in ways which seem to contradict these
statements. In this experiment, the consequences of privacy loss were controlled using a voluntary contributions mechanism that isolated personal information from the natural world. Elicited values were higher than what has typically been observed in the literature. The evidence does not support a “privacy paradox.” Subjective expected utility maximization explains the dichotomy. Trust and asymmetric beliefs are substantial determinants of (information) values.