

Theory of Contracts

Renegotiation and Optimality in Agency Contracts, by Ching-to Albert Ma (Boston University)

We analyse renegotiation in a hidden action principal-agent model. Contract renegotiation offers are made by the agent. A refinement is imposed on the principal's beliefs: if precisely one action is optimal with respect to both the principal's and the agent's contracts, the principal believes that that action has been taken. With the refinement imposed, perfect-Bayesian equilibrium allocations are identical to the second best in the classical principal-agent model without renegotiation. When renegotiation is led by the agent and when equilibria satisfy the refinement, equilibrium allocations are ex ante efficient. *Review of Economic Studies*, January 1994, 61(1) No. 206: 109-129. (Reprinted with permission of the *Review of Economic Studies*.)

Risk Perception and Economic Behavior

Agency Communication, Community Outrage, and Perception of Risk: Three Simulation Experiments, by Peter M. Sandman (Newton Centre, Massachusetts), Paul M. Miller (Rutgers University), Branden B. Johnson (New Jersey Department of Environmental Protection and Energy), and Neil D. Weinstein (Rutgers University)

Three experimental studies were conducted employing hypothetical news stories to compare the effects on reader risk perceptions of two situations: when agency communication behavior was reported to be responsive to citizens' risk concerns, vs. when the agency was reported to be unresponsive. In the first two experiments, news stories of public meetings filled with distrust and controversy led to ratings indicating greater perceived risk than news stories reporting no distrust or controversy, even though the risk information was held constant. This effect appeared clearly when the differences in meeting tone were extreme and subjects made their ratings from their recall of the stories, but it was much weaker when the differences were moderate and subjects were allowed to go back over the news stories to help separate risk information from conflict information. In the third experiment, news stories about a spill cleanup systematically varied the seriousness of the spill, the amount of technical information provided in the story, and the agency behavior and resulting community outrage. The outrage manipulation significantly affected affective and cognitive components of perceived risk, but not hypothetical behavior intentions. Seriousness and technical detail had very little effect on perceived risk. *Risk Analysis*, December 1993, 13(6): 585-598. (Reprinted with permission of *Risk Analysis*.)

Evaluating the Effect of Alternative Risk Communication Devices on Willingness to Pay: Results from a Dichotomous Choice Contingent Valuation Experiment, by J. B. Loomis and P. H. du Vair

Two versions of a contingent valuation questionnaire that differ only in the device used to communicate risks from hazardous waste were sent to California households. Both risk communication devices provide willingness-to-pay functions that vary in a statistically significant fashion with the absolute risk reduction. However, these empirical results also demonstrate that different risk communication devices produce statistically different logit equations and, hence, estimates of willingness to pay for reductions in exposure to hazardous waste. The pros and cons of using each risk communication device in contingent valuation method surveys is also discussed. *Land Economics*, August 1993, 69(3): 287-298. (Reprinted with permission of the *Journal of Economic Literature*.)

High Risk or Low: How Location on a "Risk Ladder" Affects Perceived Risk, by Peter M. Sandman, Neil D. Weinstein, and Paul Miller (Rutgers University)

Efforts to explain risk magnitude often rely on a "risk ladder" in which exposure levels and associated risk estimates are arrayed with low levels at the bottom and high ones at the top. Two experiments were conducted to test the hypothesis that perceived threat and intended mitigation vary with the location of the subject's assigned level on the risk ladder. Subjects were New Jersey homeowners, asked to assume a particular level of radon or asbestos contamination in their homes, to read a brochure explaining the risk, and then to complete a questionnaire. Both studies found that the difference between an assigned level one-quarter of the way up the ladder and the same level three-quarters of the way up the ladder significantly affected threat perception; the effect on mitigation intentions was significant in only one of the studies. Variations in assigned risk also affected threat perception and mitigation intentions. Variations in test magnitude (e.g., 15 fibers per liter vs. 450 fibers per cubic foot, roughly equivalent risks) had no effect, nor did the distinction between radon and asbestos affect the dependent variables. These findings suggest that communicators can design risk ladders to emphasize particular risk characteristics. *Risk Analysis*, February 1994, 14(1): 35-45. (Reprinted with permission of *Risk Analysis*.)

Demographic Influences on Risk Perception, by Ian Savage (Northwestern University)

Over the past 15 years, psychologists have empirically investigated how people perceive technological, consumer, and natural hazards. The psychometric-attitudes to risk being summarized by three factors: "dread," whether the risk is known, and personal exposure to the risk. The results have been used to suggest that certain types of hazards are viewed very differently from other

hazards. The purpose of this paper is somewhat different, in that it investigates whether individual demographic characteristics influence psychomatic perceptions of risk. This paper makes use of a large, professionally conducted, survey of a wide cross-section of the residents of metropolitan Chicago. One thousand adults were interviewed in a random-digit dial telephone survey, producing a useable dataset of about 800. Data on the three risk factors mentioned above were obtained on 7-point scales for four common hazards: aviation accidents, fires in the home, automobile accidents, and stomach cancer. The survey also collected demographic data on respondents' age, schooling, income, sex, and race. Regressions were then conducted to relate the demographic characteristics to risk perceptions. Some strong general conclusions can be drawn. The results suggest that women, people with lower levels of schooling and income, younger people, and blacks have more dread of hazards. The exception being age-related illnesses which, not unnaturally, are feared by older people. Unlike previous literature, we cannot substantiate the argument that these groups of people are less informed about hazards and thus less accepting of them. The most likely leading explanation of the relationship between demographic factors and dread of a hazard is the perceived personal exposure to the hazard. People with greater perceived exposure to a hazard are more fearful. *Risk Analysis*, August 1993, 13(4): 413-420. (Reprinted with permission of *Risk Analysis*.)

Representations of Risk Judgments, by Barbara A. Mellers and Shi-jie Chang (University of California, Berkeley)

The present paper examines models that describe the judged riskiness of gambles having some probability of losing a specified amount, otherwise losing nothing. Most theories of risk judgments and risky choice assert probabilities and utilities combine multiplicatively. However, in some situations, risk judgments can be represented as an additive combination of probability and utility. Results are consistent with a change-of-process theory (Mellers, Chang, Birnbaum, and Ordóñez, 1992, *Journal of Experimental Psychology: Human Perception and Performance*.) Factors that influence the decision strategy for combining probability and utility are examined. *Organizational Behavior and Human Decision Processes*, February 1994, 57(2): 167-184. (Reprinted with permission of Academic Press, Inc.)

Risk-Taking, Framing Effects, and Affect, by Haim Mano (University of Missouri, St. Louis)

This paper examines the influence of affect's two primary dimensions, Pleasantness and Arousal, on risk-taking behaviors. In Study 1, higher levels of Arousal led subjects to pay less for insurance to protect themselves from potential losses. In Study 2, a between-subjects design examined willingness-to-pay for statistically equivalent lotteries and insurance. Higher Arousal led to higher risk-seeking expressed as higher willingness-to-pay for lotteries but lower willingness-to-pay for insurance. Higher Negative Affectivity (i.e., Un-

pleasantness and high Arousal) led to higher willingness-to-pay for insurance for possible losses of substantial value. Also, higher Calmness (i.e., Pleasantness and low Arousal) led to greater willingness-to-pay for lotteries. The results are interpreted in terms of two mechanisms: (i) congruency between Pleasantness and selected risk-taking decision strategy and (ii) Arousal-induced restriction in attentional capacity. *Organizational Behavior and Human Decision Processes*, January 1994, 57(1): 38-58. (Reprinted with permission of Academic Press, Inc.)

Robust Tolerance for Ambiguity, by James Bowen, Zi-lei Qiu, and Yi Li (University of Texas, Arlington)

We argue first that "ambiguous prospects" should be defined in a way that is compatible with dictionary definitions and other technical uses of ambiguity. We then define an ambiguous prospect as a disjunction of risky prospects. Then to harmonize some findings in the literature we test the hypothesis that people are ambiguity indifferent up to moderate amounts of ambiguity and are ambiguity averse only for large amounts of ambiguity. To test the hypothesis we found probability equivalents to risk for prospects of varying degrees of ambiguity. Up to an ambiguity range of .7 the equivalents were near that of a normatively equivalent risky prospect while the equivalents of highly ambiguous prospects differed. We interpret the data in terms of competing desires for minimum effort and maximum accuracy. *Organizational Behavior and Human Decision Processes*, January 1994, 57(1): 155-165. (Reprinted with permission of Academic Press, Inc.)

FROM THE EDITOR

Game Theory

Conditional Influence Diagrams in Risk Management, by Yuan Hong and George Apostolakis (University of California, Los Angeles)

This paper introduces conditional influence diagrams into risk management. A contaminated-site cleanup involving two stakeholders is used as a hypothetical case study. The treatment choices must satisfy several conflicting objectives. Any decision made by one stakeholder will affect the choices of the other stakeholder. In building the influence diagrams for each of the stakeholders, the logical relationship of all relevant factors is determined and the values of these factors are analyzed. The influence diagrams are then used to evaluate the possible choices of each stakeholder based on decision options of the other stakeholder. These results are analyzed using game theory methods to gain insights useful to risk management and to demonstrate how mutual trust and cooperation can lead to decisions benefiting both stakeholders. *Risk Analysis*, December 1993, 13(6): 625-636. (Reprinted with permission of *Risk Analysis*.)