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Probability Weighting in Damage Claiming Decisions

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Abstract: We present experimental evidence suggesting that insurance policyholders ignore the possibility of damage recurrence when deciding whether to submit a claim for a current small loss. The neglect results in successive claiming for current small damage levels. When the probability of damage recurrence is disclosed, subjects increase their cutoff damage for submitting a claim, and the recurrence probability is significantly overweighted in accordance with Prospect Theory principles. Our results suggest that regulatory agencies and insurance companies should consider disclosure of statistical information on damage recurrence to policyholders. [Key words: claim decisions, damage recurrence, bonus-malus, Prospect Theory, probability weighting.]

INTRODUCTION

Car insurance rates in many countries follow a *bonus-malus* rating system where the annual premium rates depend on the number of claims made by the driver over several years. Drivers that do not file a claim enjoy special "good driver discounts," while drivers that claimed damage once or more pay considerably higher rates. Empirical studies (see: Dionne and Ghali, 2005 and the references therein) suggest that the bonus-malus system may effectively alleviate moral hazard and induce cautious driving by policyholders.[1] The experiment discussed in this note refers to the Israeli system in which the annual premium rate depends on the number of claims

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made over an interval of three years. The rates paid by drivers with one damage claim are about 50% higher than those paid by drivers that enjoy the no-claims discount. The rates paid by drivers with two damage claims are more than twice as high as the minimal rates.

The steep increase in premium associated with the number of preceding claims makes the decision whether to file a claim for current damage non-trivial.[2] On one hand, drivers would want to file a claim in order to save the current repair costs (i.e., above the deductible). On the other hand, drivers should take into consideration the increased premium schedule they would face following the claim. In particular, drivers should be aware of the fact that by filing a claim for current small damage their insurance company may significantly increase their annual insurance rates should there be a subsequent damage occurrence.

The formal literature in economics and insurance studies the claiming policy problem from the perspective of rational decision making under conditions of complete information. De Pril (1979), Venezia and Levy (1980), Venezia (1984), and Dellaert et al. (1993), in particular, formulate the optimal claiming decision as a stochastic dynamic programming problem, and characterize the minimal damage level for which a rational driver should file a claim. These rational characterizations, however, build on specific assumptions regarding the distribution (and conditional distribution) of damage, and require solution of complicated mathematical programming problems. In reality, insurance policyholders do not hold "objective" information on the distribution of future damage. Moreover, the experimental economics literature has long acknowledged that even when such information is provided, subjects consistently deviate from the optimal plan (see Hey and Dardanoni, 1988; Anderhub et al., 2000; and the more recent discussion by Carbone and Hey, 2001).

In this note we examine the actual claiming considerations of insurance policyholders in "*minimal information*" conditions where policyholders do not have information on the distribution of damage, but are aware of the *bonus-malus* premium schedule and may also respond to "statistics" published by insurance companies or the media. For this, we run an MBA survey experiment where subjects are asked to disclose the minimal damage level for which they would file a claim in two different stylized scenarios: a car insurance scenario and dental insurance scenario. We focus on the aspect of recurrent damage consideration and examine whether disclosure of information on the probability of recurrence affects the claiming decisions of subjects in each scenario.

The results of the experiment reveal that subjects tend to ignore the possibility of damage recurrence unless it is explicitly disclosed in the instructions. Our subjects chose to file claims for minor damage levels when the possibility of damage recurrence was not disclosed. When the probability of recurrence was revealed (in part (b) of the survey), the subjects significantly increased their cutoff damage level for submitting a claim, thereby choosing not to file a claim for previously smaller damage levels. Estimation of the experimental data reveals that the probability of damage recurrence is significantly overweighted in accordance with Prospect Theory principles.

More than two-thirds of survey participants in the experiment held private comprehensive car insurance policies at the time of the survey (others drove a company vehicle). The data for the car insurance scenario was based on market premium rates and empirical recurrence statistics. Our results thus suggest that "neglect of damage recurrence" may characterize claiming decisions in reality. Insurance policyholders may therefore benefit from regulatory disclosure of statistical information on the possibility of recurrence.

THE SURVEY

The survey was conducted using 74 MBA students at the College of Management, Israel. The average age of the participants was about 31. About 66% of the subjects held a private comprehensive car insurance policy at the time of the survey (most of the others drove a company vehicle that was insured by their firm). More than 90% of the participants expressed familiarity with the term "deductible" in the insurance context; about 80% marked familiarity with the term "no claims discount." The survey was divided into two parts, (a) and (b). Each part referred to two different scenarios: a car insurance case and a dental insurance case.

In part (a), subjects were asked to assume that an insurance event has just occurred and they are waiting for a professional assessment of the cost of damage. The instructions described a simple bonus-malus premium system where policyholders that did not claim damage over three years pay the *lowest premium*, those that claimed damage once over the last three years pay a *medium premium*, and those that claimed damage twice or more pay the *highest premium*. Subjects were further asked to assume that they had not filed a claim with the insurance company for three years, and had just paid the corresponding (minimal) insurance premium "yesterday" (i.e., the day before the insurance event). The questionnaire also described the deductible system: a fixed, claim independent deductible of 1200 NIS in the car insurance case, and a 20% deductible in the dental insurance case.[3] The basic tradeoffs between claiming and not claiming for small

Table 1. Car and Dental Insurance Scenario Data (*in NIS*)

Part		Car insurance	Dental insurance
(a)	Lowest premium	3000	600
	Medium premium	4500	2000
	Highest premium	7000	5000
	Deductible	1200 (fixed)	20% of damage
(b)	Recurrence probability	25%	10%
	Expected damage in recurrence	15000	20000

damage levels were briefly explained to the subjects (see the translated questionnaire provided in the Appendix). Subjects were asked to state the minimal damage amount for which they would file a claim. Subjects were also asked if they would be interested in additional data in order to determine their cutoff damage levels. Those that answered positively were requested to describe the additional data they wished to examine.

The specific data presented to the subjects in part (a) is summarized in Table 1. The data for the car insurance case was based on the actual rates of a leading car insurance company in Israel.[4] The data for the dental insurance case was hypothetical.[5]

In part (b) of the survey, which was distributed after collecting part (a), students received "additional information" on the conditional probability of damage recurrence. The probabilistic information was ascribed to an "independent expert," and subjects were asked to assume it was reliable and applied to their individual case. In the car insurance questionnaire, subjects were told: "*The fact that your vehicle was engaged in an accident implies that there is a 25% chance that you would be engaged in another accident during this year. The average damage amount in such recurrent accidents is 15000.*" In the dental insurance case, subjects were similarly told "*Your dental conditions indicate that there is a 10% chance that you will need an additional treatment (following the current treatment) within the next year. The cost of a second treatment is 20000 NIS on average.*" The basic data on premiums and deductibles that was provided in part (a) was represented again in small letters. Subjects were asked if the additional information changed the minimal damage level for which they would file a claim and asked to write down their updated threshold damage level for claim submission (see Appendix).

Table 2. Average (Median) Cutoff Damage Level (*in NIS*)

	Average (median) CDL: Part (a)	Average (median) CDL: Part (b)	Wilcoxon statistic (significance)
Car insurance case (N = 74)	4862.8 (4650)	5850.4 (5500)	z = 3.385 (p = 0.0011)
Dental insurance case (N = 68)	4674.5 (4100)	5758.5 (4450)	z = 2.629 (p = 0.0106)

RESULTS

The average *Cutoff Damage Level* (henceforth: *CDL*) provided by the subjects for the car insurance and the dental insurance scenarios is provided in Table 2. In both cases, the disclosure of information on the likelihood of damage recurrence brought a significant increase in *CDL*. In the car insurance case, for example, the average cutoff damage level for filing a claim with the insurance company increased by more than 20%, from 4862.8 to 5850.4. A Wilcoxon signed-ranks test (Siegel and Castellan, 1988) confirms that the increase is significant at $p = 0.0011$. An individual-level comparison revealed that 38 of the 74 subjects (51.3%) increased their *CDL* in response to the additional information, 27 subjects (36.5%) chose the same *CDL* in both parts of the questionnaire, and only 9 subjects (12.2%) decreased their *CDL* in response to the information on damage recurrence.[6] The increase in *CDL* is robust in the sense that it appears for different subgroups of the N = 74 sample. In particular, the increase appears for those subjects that held a private insurance policy and for those that did not hold a private policy. It also appears in each of the five classes from which the subjects were recruited.

The data for the dental insurance case reveals similar trends.[7] The average *CDL* increased by 23% following the disclosure of 10% recurrence probability (see Table 2). Individual-level examination shows that 28 of the 68 subjects (41.2%) increased their *CDL* in part (b) of the survey, while only 6 subjects (8.8%) decreased their claiming cutoff levels. The proportion of subjects that did not revise their *CDL* in response to the recurrence information was larger in the dental insurance scenario, as 34 subjects (50%) chose not to revise their cutoff level in this case. Seventeen of these subjects admitted that they did not take into consideration a possible need for recurrent treatments in part (a), but still chose not to revise their *CDL* in response to the additional information. Some subjects explained that they were "only concerned with the immediate consequences of their decisions," or that they would "rather take the risk and ignore small probabilities of recurrence."

The large differences between the *CDL*s provided in parts (a) and (b) of the survey suggest that disclosure of information on the likelihood of damage recurrence may significantly affect small-damage-claiming decisions. It is thus interesting to note that less than 20% of the participants asked for such additional information in part (a) of the questionnaire.[8]

ESTIMATION

We build on Kahneman and Tversky's (1979) *Prospect Theory* to model the decision problems presented to the survey participants. The five specific assumptions of our model were: ***(I)*** Subjects do not take into account the possibility of damage recurrence unless they receive explicit information on this possibility.[9] ***(II)*** The disutility from a loss (payment) of X is independent of individual wealth levels and represented by the CRRA function, $L(X) = X^{\alpha}$. ***(III)*** Subjects weight the probabilities of damage-recurrence provided in part (b) of the questionnaire; $w(p)$ denotes the subjective weight of probability p. ***(IV)*** In considering the possibility of damage recurrence, subjects pre-assume that they would claim the insurance company for the second damage.[10] ***(V)*** Subjects discount future payments at a constant annual discount rate δ.

These assumptions are used to derive four equations that characterize the four *CDL*s collected in the survey.

Consider first the car-insurance data described in part (a). Let $C > 1200$ denote the actual amount of damage. If a subject does not make a claim with the insurance company for the damage, then she must pay C now, but her annual premium would be at the lowest level, 3000, in each of the next three years. On the other hand, if the subject makes the claim for the damage, she would pay only 1200 (i.e., the deductible) now, but her annual premium would rise to 4500 over the next three years. The cutoff damage level for this case would be the damage amount where the subject is indifferent between the two alternatives. Using *C1* to denote the corresponding *CDL*, we get the equation:

(1) $$(C1)^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot 3000^{\alpha} = 1200^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot 4500^{\alpha}$$

In part (b) the subjects learn that there exists a 25% probability for damage recurrence in the same year. If the subject does not make a claim with the insurance company for the first damage, then the second accident would increase the premium level from the lowest level (3000) to the medium level (4500). If, on the other hand, the subject claims damage for the first accident, then the second event would increase the premium level from medium (4500) to high (7000). Using *C2* to denote the *CDL* for this case, we get the equation[11]:

$$(2) \qquad (C2)^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot ((1 - w(0.25)) \cdot 3000^{\alpha} + w(0.25) \cdot 4500^{\alpha}) =$$

$$1200^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot ((1 - w(0.25)) \cdot 4500^{\alpha} + w(0.25) \cdot 7000^{\alpha})$$

Similar considerations give two equations for the dental insurance scenario. In the following equations we use *C3* to denote the *CDL* collected in part (a) of the survey and *C4* for the *CDL* collected in part (b).

$$(3) \qquad (C3)^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot 600^{\alpha} = (0.2 \cdot C3) + \sum_{t=1}^{3} \delta^{t} \cdot 2000^{\alpha}$$

$$(4) \qquad (C4)^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot ((1 - w(0.1)) \cdot 600^{\alpha} + w(0.1) \cdot 2000^{\alpha}) =$$

$$(0.2 \cdot C4) + \sum_{t=1}^{3} \delta^{t} \cdot ((1 - w(0.1)) \cdot 2000^{\alpha} + w(0.1) \cdot 5000^{\alpha})$$

For given values of *C1–C4*, equations (1)–(4) define a system of four non-linear equations in four unknowns: α, δ, $w(0.25)$ and $w(0.1)$. In the first two rows of Table 3, we provide the numeric solutions of the system for the average and median data collected in the experiment.[12] The solution for α is lower than 1, which reflects risk-seeking in the loss domain (Schoemaker and Kunreuther, 1979). The annual discount rate is about 10%. The solution for $w(0.25)$ (about 0.4) reflects a considerable overweight-

Table 3. Solution and Estimation of Equations

Solution/estimation method	A	δ	Γ	$w(0.25)$	$w(0.10)$
Solving parameters on average data	0.9114	0.9122	NA	0.421	0.218
Solving parameters on median data	0.9797	0.8758	NA	0.373	0.076
SUR estimation	0.9036	0.9245	NA	0.4242	0.2262
SUR estimation / TK weighting*	0.9264	0.9344	0.6332	NA	NA
SUR estimation / Prelec weighting	0.9319	0.9342	0.5110	NA	NA

*TK weighting refers to the Tversky and Kahneman (1992) probability weighting function.

ing of the 25% loss-recurrence probability. The solution for $w(0.10)$ on the average data reflects an overweighting of the 10% probability to 21.8% weight. The overweighting of the 10% probability does not, however, appear in the solution for the median data (possibly because of the large number of participants that chose to ignore the 10% recurrence probability in part (b); see the discussion in section 3).

In the third line of Table 3 we report the results of seemingly unrelated regression (SUR) estimation of the system of equations (1)–(4) on the experimental data. The Zellner (1962) SUR method is used to allow for correlation of random errors in equations (1)–(4). The results of the estimation are similar to the numeric solution for the average data. All parameters are statistically significant at $p < 0.001$. At the 4th line of the table, we assume that probability weighting takes the commonly used Tversky and Kahneman (1992) functional form: $w(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}}$.[13] The estimated parameter for γ (0.6332) is statistically significant at $p = 0.0654$ ($t = 1.87$) and similar to the ones obtained in many preceding studies (e.g., Camerer and Ho, 1994; Wu and Gonzalez, 1996; Abdellaoui, 2000). An estimation of the Prelec (1998) weighting function $w(p) = \exp(-(-\ln p)^\gamma)$ gives similar results, and the estimate for γ is significant at $p = 0.0691$ ($t = 1.85$).

To check the assumption that subjects do not take into account the possibility of damage recurrence when it is not explicitly introduced (assumption *I*), we generalized the equations for part (a) (equations 1 and 3) by adding parameters x and y that represent the "subjective" probability of recurrence in each scenario. The revised form of equation (1), for example, is:

$$(1') \qquad (C1)^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot ((1-x) \cdot 3000^{\alpha} + x \cdot 4500^{\alpha}) = 1200^{\alpha} + \sum_{t=1}^{3} \delta^{t} \cdot ((1-x) \cdot 4500^{\alpha} + x \cdot 7000^{\alpha})$$

where x denotes the subjective assessment of same-year recurrence (before the disclosure of 25% recurrence-probability in part (b)). SUR estimation of α, δ, γ, and x (with TK probability weighting) for the system (1'), (2)–(4) did not produce a significant coefficient for x; the estimated coefficients α, δ, and γ were close to those obtained for the constrained version with $x = 0$. Similar results were obtained in estimation of other specifications and in corresponding estimations for the dental insurance scenario.[14]

DISCUSSION

Results from our experimental survey suggest that insurance consumers neglect the possibility of damage recurrence in their current claiming decisions. The decision whether to file a claim with the insurance company for a current loss is not affected by the possibility that additional claiming may increase (double) the annual premiums for several years—unless the recurrence probability is specifically disclosed. The insurance marketplace is competitive and established. Claiming decisions, however, are made by individual policyholders that typically do not posses statistical information on the distribution of first and recurrent damage. Our survey thus provides insight into actual claiming decisions.[15] Our results imply that the incomplete information under which claiming decisions are made may induce inefficient claiming. The results thus suggest that regulatory agencies and insurance companies may be interested in disclosure of probabilistic information on damage recurrence to consumers filing a claim.

Preceding experimental research demonstrates that subjects violate expected utility theory (Watt et al., 2001) and follow principles of Prospect Theory (Schoemaker and Kunreuther, 1979) in their insurance decisions. Hogarth and Kunreuther (1985) demonstrate that ambiguity in probabilities of risks may lead to large differences between the minimum premiums that firms were prepared to charge and the maximum premiums that consumers were ready to pay. Di-Mauro and Maffioletti (2001) show that uncertainty about the probability of potential loss has a weak affect on valuation of an insurance contract by subjects. These studies, however, deal with the *insurance decision* or the valuation of insurance contracts; we are not aware of preceding experimental studies of the insurance *claiming decision*. The results collected in our survey demonstrate that general principles of Prospect Theory apply to claiming decisions on existing insurance policies. The consistency of our empirical estimates of standard probability weighting functions with the estimates obtained in many other studies seems noteworthy. If probability weighting takes similar forms in various applications, then the common curvature may be used for optimal lottery design (Quiggin, 1991), optimal insurance contracting (Ryan and Vaithianathan, 2003), and other applications.[16] In particular, it seems challenging to examine the impact of probability weighting on the tradeoff between deductibles and premiums, and on the effective screening of insurance consumers.

APPENDIX

Car Insurance Questionnaire[17]

Part *(a)*

Assume the following data on your car insurance policy:

—The annual premium is paid cash at the beginning of each year

—The amount of annual premium depends on the number of claims made over the last three years:

- If you did not claim, you pay 3000 NIS
- If you claimed once, you pay 4500 NIS
- If you claimed twice or more, you pay 7000 NIS

—There is a fixed deductible of 1200 NIS for each claim (*e.g.*, if you place a claim with the insurance company for damage of 10000 NIS, you would receive only 8800 NIS)

Additional assumptions:

- Your vehicle was involved in an accident this morning
- You are currently waiting for a professional damage estimate
- Your annual premium was paid yesterday
- Since you did not claim damage over the last three years, you paid 3000 NIS
- You plan to renew the current policy in each of the next three years
- No changes are anticipated in the policy terms

Remember that you are currently waiting for the professional damage estimate. After receiving the estimate you will have to decide whether to make a claim from the insurance company. We now ask you to state the minimal damage amount for which you would make a claim.

Note: If the damage is lower than the deductible, there's clearly no point to claim damage. Moreover, when claiming damage, you increase the insurance premiums for the next three years. Thus, you should not claim damage when the amount of damage is "relatively low." However, you should obviously claim damage when the level of damage is "high enough."

Final comment: Your response depends on your personal preferences. Please give us your independent answer without consulting your colleagues.

The minimal damage for which I will make a claim from the insurance company is: ___________________________________.

Would you wish to receive additional information before determining the minimal claim-level? YES/NO _______ (if your answer is positive, please outline the additional information that you would ask for) ____________________________________.

Part *(b)*
Recall the car insurance data provided in part (a)
(The data were reproduced in smaller letters)

Additional information
We now wish to draw your attention to additional information that was provided by an independent appraiser.

Here is the additional information as provided by the appraiser:
"The fact that your vehicle was involved in an accident this morning suggests that there is a 25% chance that it will be involved in another accident this year. That is, 1 of each 4 vehicles (similar to the one in your possession) that were involved in an accident would be involved in another accident in the same year. The average damage-level in such recurrent accidents is 15000 NIS."

- Assume that the information described above is reliable and applies to your case
- Remember that you are waiting for a professional estimate of the damage made in the current accident. After receiving the estimate

you will have to decide whether to claim damage from the insurance company.

Does the "additional information" provided above change your decision about the minimal damage level for which you will claim the insurance company?
YES/NO________________________.

Given the additional information above, what is the minimal damage level for which you will claim damage from the insurance company?
___________________________________.

Did you take into consideration the possibility of additional accidents (that may increase your annual premium to 7000 if you claim damage twice) in answering the parallel question in part *(a)*? YES/NO _________________.

NOTES

[1] Specifically, Dionne and Ghali (2005) demonstrate that the introduction of a bonus-malus system in Tunisia significantly decreased the frequency of reported accidents among "good risks," but did not significantly affect the frequency of claiming for "bad risks" (policyholders were classified as "good risks" when the insurance period covered more than five years).

[2] In the United States, drivers are obliged by law to report all accidents where the property damage exceeds some minimum amount; in Israel, and many countries in Europe, reporting is not mandatory for accidents with no injuries.

[3] Premiums and damages were denominated in New Israeli Shekels; the exchange rate at the time of the experiment was about 4.5 NIS for 1 US dollar.

[4] Car insurance in Israel is divided between "compulsory" and "comprehensive." Compulsory insurance premiums are fixed by law and intended to cover physical damage in case of accidents. The comprehensive (property) insurance market is competitive. The data quoted in our car insurance scenario refer to comprehensive insurance rates for a car valued at 100000 NIS (the recurrence data were collected from company's officials; the statistics are not publicly available).

[5] The market for dental insurance policies in Israel is thin and diverse. Most of the population either pay for private dental services or use dental services that are provided by general health insurance companies. Policies for specific dental insurance are diverse in terms and conditions. We therefore built a simple hypothetical policy for the experiment.

[6] Some of the subjects that decreased their *CDL* explained that the additional information drove them to "earlier" claiming for the first damage since repeated claiming is 25% likely. These subjects seem to ignore the effect of repeated claiming on annual premiums.

[7] The sample size for the dental insurance case is 68, since six subjects did not complete both parts of the questionnaire for this scenario. The car insurance statistics for these 68 subjects are similar to those reported in Table 2.

[8] Only 12 of 74 subjects (16.2%) asked for information on the possibility of recurrent claiming in part (a) of the car insurance questionnaire, while 14 of 68 subjects (20.6%) asked for such information in part (a) of the dental insurance questionnaire.

[9] The assumption builds on the fact that less than 20% of subjects asked for additional information in part (a) of the survey. Note, however, that estimation of generalized specifications that allow for "subjective" consideration of damage recurrence before the disclosure of recurrence probability did not produce significant coefficients (see discussion).

[10] This assumption is justified by the large figures of expected second damage disclosed in part (b): 15000 for the car insurance scenario and 20000 for the dental insurance case (see Table 1).

[11] Equations (2) and (4) assume that subjects cancel the recurrent damage deductible in comparing the claim/no-claim alternatives (see Kahneman and Tversky (1979) for a discussion of the *cancellation heuristic*). Estimation of an alternative formulation that takes into account the deductible paid (in both alternatives) in case of a recurrent damage gave similar results.

[12] The numeric solutions and the SUR estimations were run on SAS v.9.1 using the MODEL procedure. The results reported in Table 3 are robust with respect to the initial parameter values assumed in the estimation.

[13] The parameter γ determines the shape of the probability weighting function; $\gamma = 1$ represents the special case where $w(p) = p$ for every probability p.

[14] Note also that second/third recurrences would have a similar effect on payoffs independently of the decision whether to file or not file a claim for the current damage (in both cases premiums would increase to the maximal level). Thus, "subjective" consideration of such repetitions should not affect the cutoff levels for current claiming. The cancellation of these secondary affects is also implied by Kahneman and Tversky's (1979) *cancellation heuristic*.

[15] To encourage subjects' participation we randomly selected 10 participants to receive a check in the amount of 100 NIS for their participation. Since the decisions that are made in the survey affect payoffs in three successive years, devising an incentive scheme where subjects actually receive a payoff that depends on their decision is complicated. Anderhub et al. (2001), for example, use "differed checks" to postpone payoffs to subjects in a simpler discounting experiment. We do not believe that such direct incentives would significantly affect our results.

[16] See also the literature on the reflection of probability weighting in betting or gambling decisions (e.g., Ziegelmeyer et al., 2004).

[17] The questionnaire for the dental insurance case was similarly formulated and is available at www2.colman.ac.il/business/doron

REFERENCES

Abdellaoui, M. (2000) "Parameter-Free Elicitation of Utilities and Probability Weighting Functions," *Management Science*, 46, 1497–1512.

Anderhub, V., W. Güth, W. Müller, and M. Strobel (2000) "An Experimental Analysis of Intertemporal Allocation Behavior," *Experimental Economics*, 3(2), 137–152.

Anderhub, V., U. Gneezy, W. Güth, and D. Sonsino (2001) "On the Interaction of Risk and Uncertainty—An Experimental Study," *German Economic Review*, 2, 483–491.

Camerer, C. F. and T. H. Ho (1994) "Violations of the Betweenness Axiom and Nonlinearity in Probability," *Journal of Risk and Uncertainty*, 8, 167–196.

Carbone, E. and J. D. Hey (2001) "A Test of the Principle of Optimality," *Theory and Decision*, 50(3), 263–281.

De Pril, N. (1979) "Optimal Claim Decisions for a Bonus-Malus System: A Continuous Approach," *The Astin Bulletin*, 10, 215–222.

Dellaert, N. P., J. B. G. Frenk, and L. P. van Rijsoort (1993) "Optimal Claim Behavior for Vehicle Damage Insurance," *Insurance: Mathematics and Economics,* 12(3), 225–244.

Di-Mauro, C. and A. Maffioletti (2001) "The Valuation of Insurance under Uncertainty: Does Information about Probability Matter?," *Geneva Papers on Risk and Insurance Theory*, 26(3), 195–224.

Dionne, G. and O. Ghali (2005) "The (1992) Bonus-Malus System in Tunisia: An Empirical Evaluation," *Journal of Risk and Insurance*, 72(4), 609–633.

Hey, J. D. and V. Dardanoni (1988) "A Large-Scale Experimental Investigation into Optimal Consumption under Uncertainty," *The Economic Journal*, 98(2), 105–116.

Hogarth, R. M. and H. C. Kunreuther (1985) "Ambiguity and Insurance Decisions," *American Economic Review*, 75, 386–390.

Kahneman, D. and A. Tversky (1979) "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, 47, 363–391.

Prelec, D. (1998) "The Probability Weighting Function," *Econometrica*, 66, 497–528.

Quiggin, J. (1991) "On the Optimal Design of Lotteries," *Economica*, 58, 1–16.

Ryan, M. J. and R. Vaithianathan (2003) "Medical Insurance with Rank Dependent Utility," *Economic Theory*, 22, 689–698.

Schoemaker, P. J. H. and H. C. Kunreuther (1979) "An Experimental Study of Insurance Decisions," *Journal of Risk and Insurance,* 46, 603–618.

Siegel, S. and N. J. Castellan (1988) *Nonparametric Statistics for the Behavioral Sciences.* New York: McGraw-Hill International Editions.

Tversky, A. and D. Kahneman (1992) "Advances in Prospect Theory: Cumulative Representation of Uncertainty," *Journal of Risk and Uncertainty*, 5, 297–323.

Venezia, I. and H. Levy (1980) "Optimal Claims in Automobile Insurance," *Review of Economic Studies,* 47, 539–549.

Venezia, I. (1984) "Aspects of Optimal Automobile Insurance," *Journal of Risk and Insurance*, 51, 63–79.

Watt R., F. J. Vazquez, and I. Moreno (2001) "An Experiment on Rational Insurance Decisions," *Theory and Decision*, 51, 247–296.

Wu, G. and R. Gonzalez (1996) "Curvature of the Probability Weighting Function," *Management Science,* 42, 1676–1690.

Zellner, A. (1962) "An Efficient Method for Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias," *Journal of the American Statistical Association,* 57, 348–368.

Ziegelmeyer, A., M. H. Broihanne, and F. Koessler (2004) "Sequential Parimutuel Betting in the Laboratory," *Journal of Risk and Uncertainty*, 28(2), 165–186.