

How Individuals Purchase Insurance

Going Beyond Expected Utility Theory

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Today's Presentation

How Individuals Purchase Insurance: Going Beyond Expected Utility Theory

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Motivation

- Long-run success of insurers depends on their being able to sustainably put forward an attractive value proposition
- Insureds are the main contributors to insurer capital, through reserves and underwriting profit
- Sustainable profitable growth is key whether an insurer grows organically or grows by acquisition
- Better understanding of insureds leads to improved product design, marketing and pricing

Value to the Practicing Actuary

- Improved predictions of the effects of supply policy changes, like rate changes
- If insurance consumer behavior was entirely determined by context specific elements, then the actuary would be left doing guesswork when preparing forecasts of the effects of supply policy changes
- A better working understanding of insurance consumer behavior can lead to better anticipation of the effects of supply policy changes

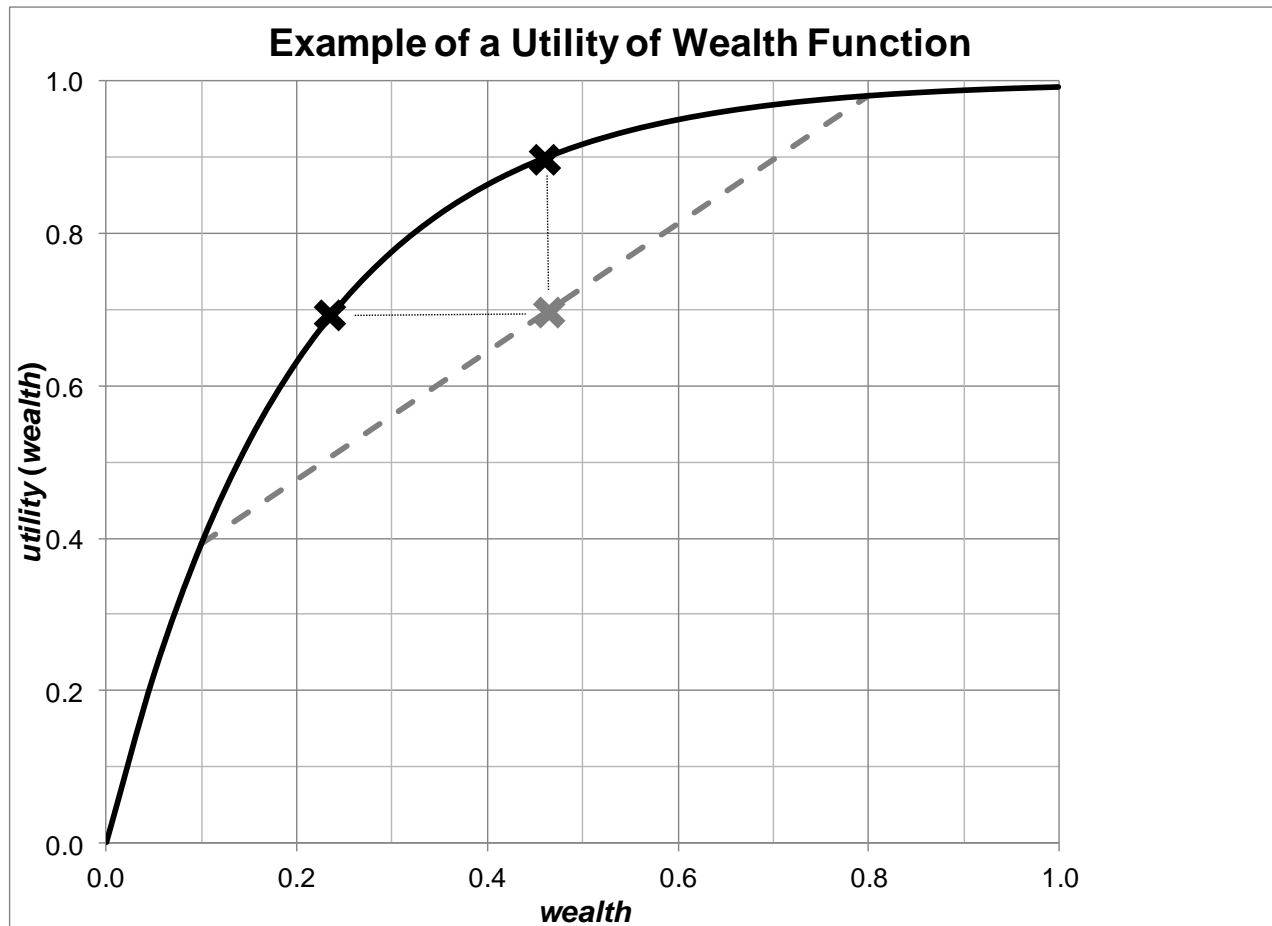
Presentation Plan

- **Risk Transfer and Prospective Pricing**
 - The ‘traditional’ argument for the value of insurance
- **Why We Need to Go Beyond the Traditional Theory**
 - Evidence from P/C insurance that does not make sense using the ‘traditional’ arguments
- **Consumption Commitments and the Magnifying Effect**
 - An attempt to make sense of the success of credit scoring
- **Loss Aversion and Small Scale Insurance Purchasing**
 - “A Bird in the Hand is Worth Two in the Bush”
 - Decision Weights as Opposed to Probabilities
 - Diminishing Sensitivity to Losses
 - Not All Money Spent is Perceived as a Loss
- **The Consolation Hypothesis**
 - Increased willingness to pay to insure ‘objects’ we like
- **Coverage Inter-dependence**
 - How the risk premium for different coverages are correlated together

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Risk Transfer and Prospective Pricing I



Risk Transfer and Prospective Pricing II

- This helps rationalize the demand for insurance for 'catastrophic' events
- Identified key factors for the demand for insurance:
 - Initial wealth: richer people are potentially more risk tolerant
 - Frequency and severity of the loss: the more likely or more severe the loss, the more valuable the coverage
 - Risk aversion: the more risk averse the person, the more valuable the coverage

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Needing to Go Beyond the Above Theory

- If you had to guess, for a ‘typical’ homeowners insurance portfolio
 - What premium are people willing to pay to move from a 1 000\$ deductible to a 500\$ deductible?
 - What do you think is the associated loss cost associated with the lowering of the deductible?
- Compare the layer loss ratio you obtain to the all layers combined loss ratio of a ‘typical’ homeowner’s policy. Who thinks the all layer loss ratio is higher? lower?

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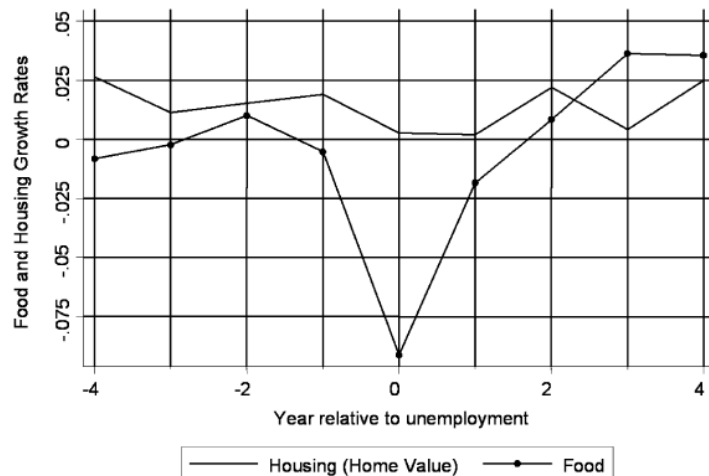
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Consumption Commitments: Magnifying Effect I

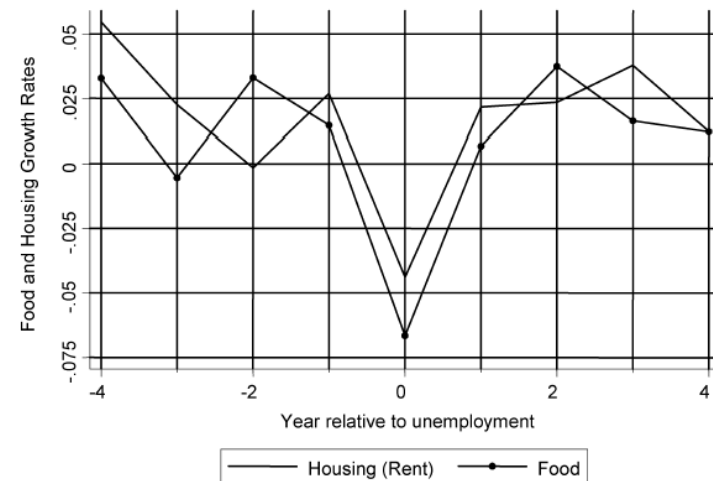
- What are common examples of consumption commitments?
 - What are the **impacts** of commitments?
- What are common examples of non-committed consumption?
- What happens if a person does not have **access to credit** to smooth out adverse income shocks?
- In short, consumption commitments **increase measured risk aversion** for moderate downside risk

Illustration of Consumption Adjustments

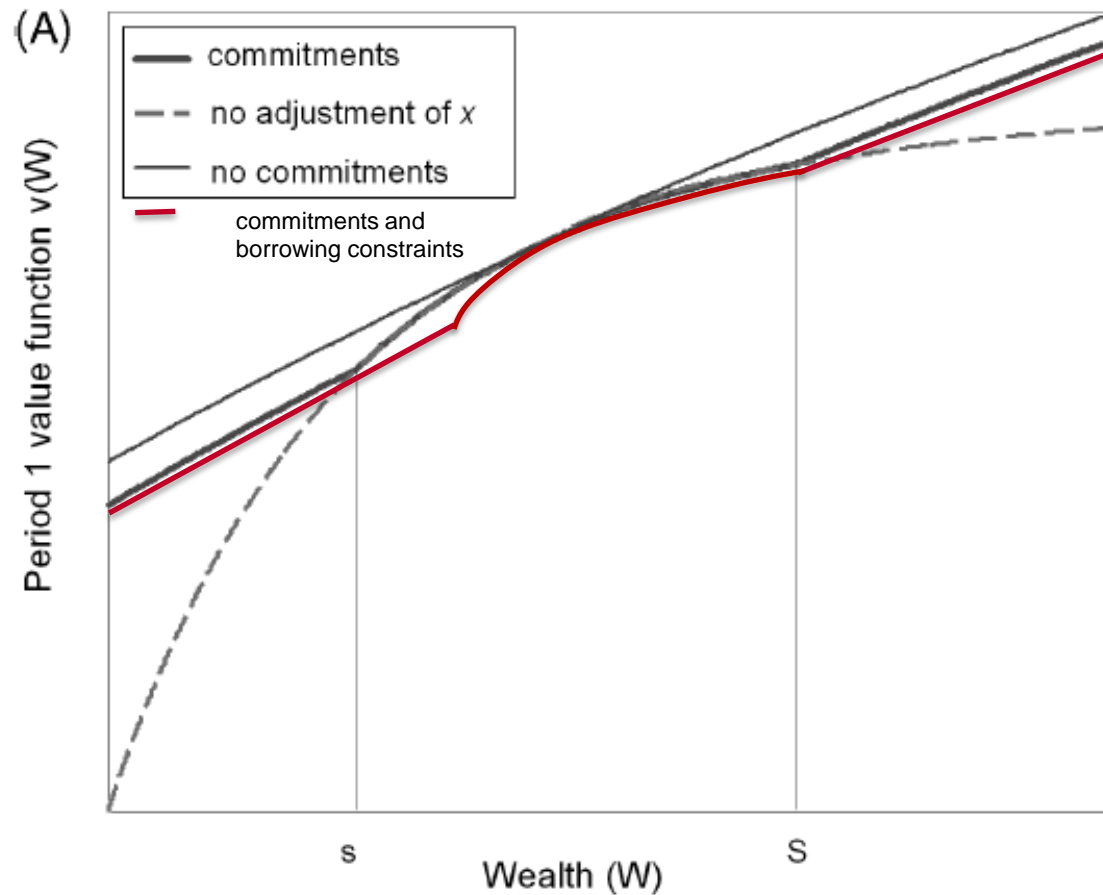
(b) Homeowners



(a) Renters



Utility Function with Commitments



Consumption Commitments: Magnifying Effect II

- An attempt at understanding why credit scoring works:
 - Assume that an individual is risk averse in the sense defined above
 - Look at the difference in incentives for a committed *versus* an uncommitted individual
 - **Careful**: Having an incentive to be cautious is not the same as being cautious
- Sub-portfolio Profitability Predictions
 - According to the theory, starting from the ‘traditional’ theory first explored, which coverage should see a greater risk premium that insureds are willing to pay:
 1. theft or water damage coverage, or
 2. fire insurance coverage?

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“A Bird in the Hand is Worth Two in the Bush”

- Asset integration
 - Do we always look at prospects in terms of terminal wealth or from a gain/loss perspective? (*i.e.* the endowment effect)
- Relative sensitivity to losses compared to gains
 - When we think in terms of gain/loss, just how much more do we care about losses?
- Product Design Prediction:
 - How do insureds think of the deductible payment when they suffer a loss?
 - What is the anticipated reaction of insureds to a mandatory increase in their deductibles?

Utility Function under Loss Aversion I

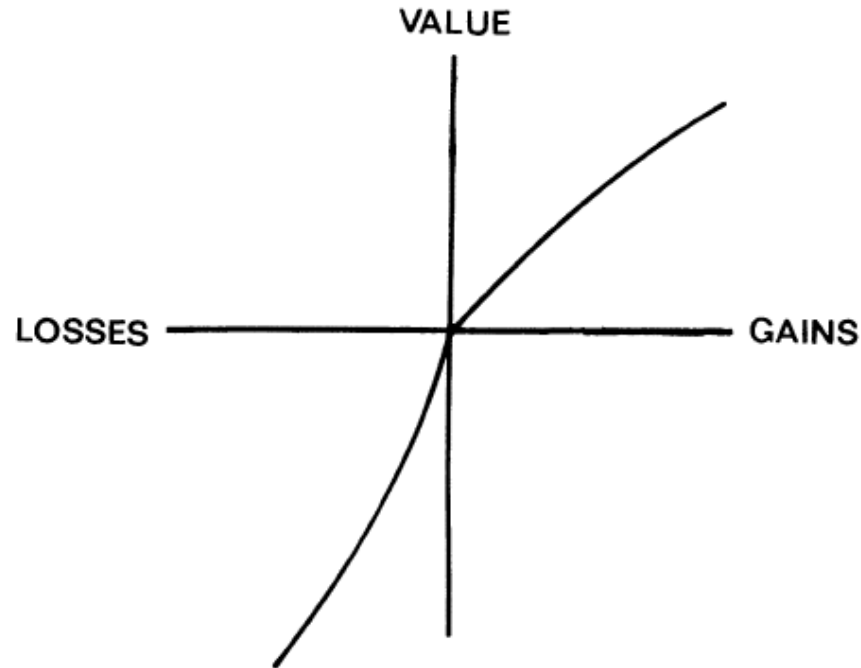


FIGURE 3.—A hypothetical value function.

Decision Weights as Opposed to Probabilities I

- ‘Traditional’ expected utility theory makes use of probabilities to weight together utility of outcomes
 - But, individuals tend to attach **greater than probability decision weights when the probabilities are small**
 - *Vice versa* when the probabilities are big
- Sub-portfolio Profitability Prediction:
 - Which coverage should see a larger willingness to pay than would have been predicted so far?
 - Fire coverage, or
 - Auto collision coverage?

Decision Weight Function

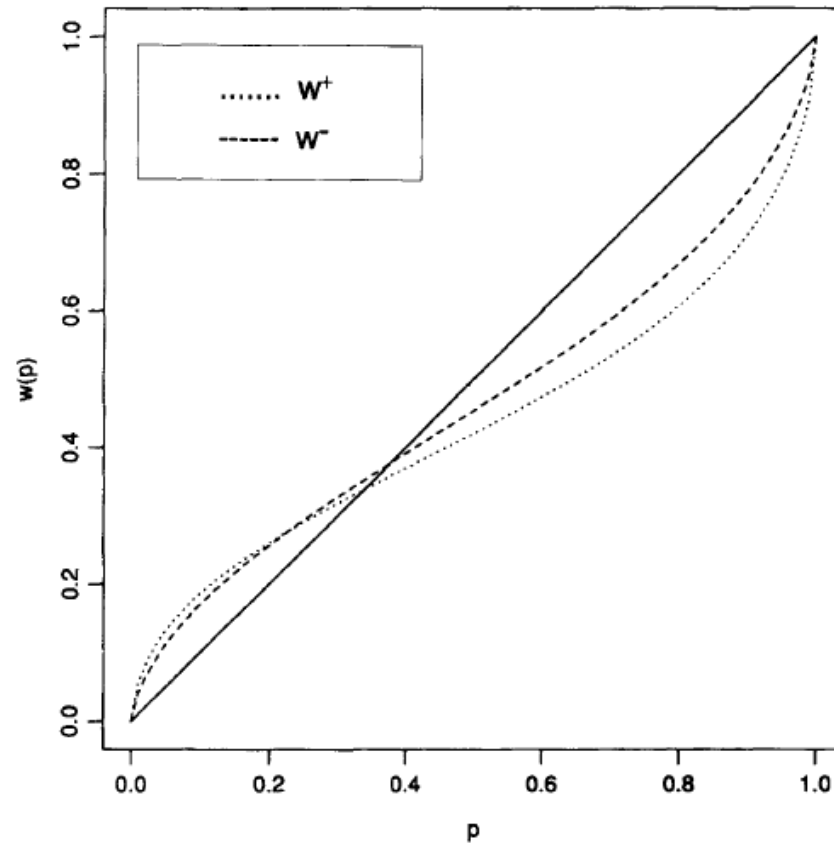


Figure 3. Weighting functions for gains (w^+) and for losses (w^-) based on median estimates of γ and δ in equation (12).

Decision Weights as Opposed to Probabilities II

- Distinguish decision weights from probability mis-estimation
 - As humans are limited capacity information processors, they tend to revert to the use of heuristics that can lead them astray
 - Have you ever heard an actuary say the following?
 - “That insured is due to have a loss: it’s been so long since the last claim.”
 - Probabilistically, if we have evidence that claim inter-arrival times are memoryless, that statement has to be false
- Take-up Rate Prediction:
 - Do you think take-up rates for flood coverage increase, remain the same, or decrease after a flood?

Diminishing Sensitivity to Losses I

- Do you recognize yourself in the following situation?
 - Jane and Melody frequently play chess together and to make it interesting, they sometimes play for money
 - They just had a 100\$ bet on a chess game and Jane lost and is now reeling from the fact that she just lost 100\$
 - Assume that Jane is using her morning wealth as a reference no gain/no loss point
 - Even though Jane usually only wins one game out of three against Melody, she takes a double-or-nothing bet
 - Why would that bet be attractive to her?

Utility Function under Loss Aversion II

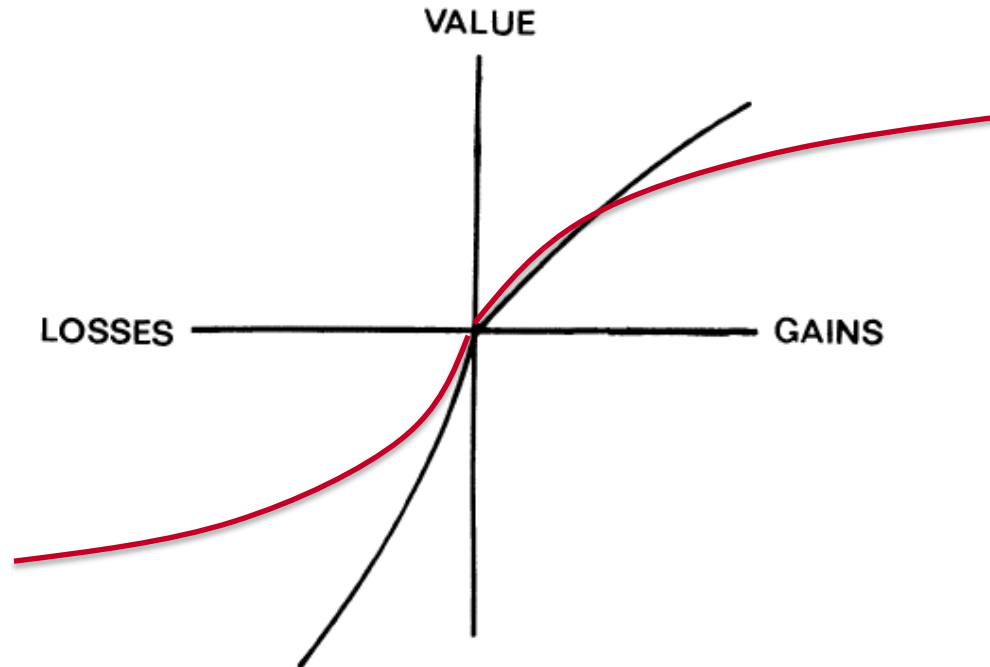


FIGURE 3.—A hypothetical value function.

Diminishing Sensitivity to Losses II

- Individuals' perception of gains and losses is not entirely different from our senses:
 - As magnitudes increase, our sensitivity to magnitudes decreases
 - In the preceding case, even though a 200\$ loss is worse than a 100\$ loss, it is not twice as bad
 - Therefore, the attractiveness of finishing the day with no loss is more attractive than finishing the day with a 200\$, taking into account the odds
- Insurance Take-Up Prediction:
 - Individuals that have recently become poorer may not be attracted by small/medium scale insurance, even if the price is favorable to them

Not All Money Spent is Perceived as a Loss

- Let's discuss how the 0 (no loss/no gain) point is formed.
- Do you think you would react the same way in all the following situations? In what situation is your willingness to pay greatest?
 - Imagine the case of small scale insurance, say for your cell phone, for rented skis, for your e-tablet, *etc.*
 - When you get to the store, you discover that insurance coverage is available and you have to purchase on the spot
 - You are actively shopping for coverage that you are aware already exists
 - You are wondering whether or not to maintain coverage that they already have

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The Consolation Hypothesis I

- Factors other than money can affect our insurance purchasing behavior, our claiming behavior, and our reaction to advertising
 - Chief among those non-monetary factors are the attachments that we feel for the ‘objects’ we insure
 - The consolation hypothesis says that we are more likely to claim and have higher willingness to pay for insurance for ‘objects’ we like
 - Contrast this with the reprisal motive for claiming: individuals that feel they have been wronged by a party are more likely to pursue indemnification from that party

The Consolation Hypothesis II

- Claiming Behavior Predictions:
 - Under the reprisal motive for claiming, insureds that had bad experiences with insurers are more likely to claim and inflate their claims
 - Under the consolation hypothesis, individuals that felt more attached to the damaged ‘objects’ are more likely to file a claim ‘just above’ the deductible
- Sub-Portfolio Profitability Prediction:
 - If the insurer is able to identify ‘objects’ that the insured feels greater attachment to, the insurer will be able to charge a higher premium for the coverage of those ‘objects’

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Coverage Inter-dependence

- Assume that, as an insurer, you already have access to a fully functional client database
 - Do you think the relative profitability of insureds is connected across lines of business?
 - In a non-P/C study (Einav *et al*, 2010), it was found that “one’s choices in other insurance domains are substantially more predictive of one’s choice in a given insurance domain than one’s detailed demographic or one’s claim experience in that domain”.
 - While I am not aware of any public study confirming or refuting this in the P/C world, it is likely to apply there too

If We Have Time

Appendix: Private Research I

Objectives of R&D must be clearly defined:

- Is it to determine an initial pricing structure for a new product or refine an existing pricing structure for current products?

Type of data:

- Quantitative vs. Qualitative
- Direct (from consumers) vs. Indirect (from operations, agents, brokers, etc.)
- Small sample vs. At large sampling
- In-house vs. Outsourced

Appendix: Private Research II

- When analyzing retention/new business/closing ratios and/or quote activity, it is important to isolate the appropriate effects:
 - when looking at the effect of a marketing campaign, **how much activity would there have been without the campaign?**
 - **is the customer leaving because** they have ceased to exist, they do not have an insurable interest anymore, they lost access to their agent/broker, the product/ service/ experience does not meet their need/expectation, the price is too high?

Appendix: Private Research III

- When analyzing retention / new business / closing ratios and / or quote activity, it is important to isolate the appropriate effects:
 - are there **seasonal effects**?
 - what is the appropriate **stability / responsiveness** balance? (length of time of data, credibility, credibility complement)
 - when do **apparent trends** become credible?
 - what would have had happened **if the quoted price had been different**?

Appendix: Private Research IV

- Who's the client? Who decides? Who pays? Who influences the client?
- What is the customer's level of risk aversion?
- Is the customer 'naturally' price sensitive?
- What are the insurance alternatives available to the customer? What are the substitutes to insuring with you available to the client?
- Is the decision emotional? automatic? rational?
- How valuable are services, extra protection, *etc.* to the customer? Is the comparison of value between your products / services / experiences and those of alternatives difficult to do for the client?
- Are there signs that the client sees great lifetime value in its relationship with the insurer? How long has the client been with the insurer? What are the costs for the client to switch insurers?
- How much money is the client already spending with you (in \$ or in %)?
- Does your pricing appear fair to the client?