VERSICHERUNGS-
WIRTSCHAFT UND
SOZIALSYSTEME

Paying for a Refund
Return-of-Premium Contracts in Insurance

Florian Englmaier
Jörg Schiller
Frauke von Bieberstein

Berlin
March 2013

Agenda

1. Introduction
2. How not to explain premium returns
   - Risk aversion (Expected Utility Theory)
   - Reference dependence
3. Explanations for the use of premium returns
   - Regret
   - Supply-side factors
   - Customer confusion
   - Time inconsistency
4. Conclusion

Motivation

- Real world contracts and choices are sometimes difficult to reconcile with standard preferences and beliefs.
  - DellaVigna and Malmendier (2006) show that contract choices for gym memberships are inconsistent with a standard rational preferences.

    → Explanation: Hyperbolic consumer preferences.
  - Sydnor (2010) shows that homeowners often purchase insurance contracts with low deductibles at prices significantly above the expected value.

    → Explanation: Overweighting of probabilities and loss aversion
  - Many people prefer a tax return at the end of the year to higher monthly income, although the IRA does not pay interest on the return.

- We take a closer look at insurance contracts that entail different kinds of ex-post payments usually labeled as "premium returns".

Premium returns

- In insurance markets two types of return-of-premium contracts can be observed.
  - **Contingent premium returns:** Are contingent on the fact that a specific policyholder has not filed a claim during a given time period.
    - Incentive device e.g. in health insurance (substitute for deductibles)
    - In disability and casualty insurance incentive problems are less prevalent, but return-of-premium contracts can be observed.
  - **Unconditional premium returns:** Refund independent of claiming behavior.
    - Combination of a traditional insurance contract with an additional saving component that guarantees an unconditional payment at the end of the contract.

      → Rates of return for these contracts are well below easily achievable market returns.

Risk aversion (Expected Utility Theory)

Standard model

- Risk-averse consumer with utility function u(), u‘ > 0, u´´ < 0 and an initial wealth w_0
- Loss L occurs with probability π
- Interest rate is zero
- Insurance contract (one period) consists of
  - a coinsurance rate α and
  - a premium $P_0 = \alpha\lambda\pi L$ ($\lambda \geq 1$ loading factor)
- Maximization problem

$$\max_{\alpha} E[u(\alpha)] = (1-\pi)\cdot u(w_0 - P_0) + \pi \cdot u(w_0 - P_0 - (1-\alpha)L)$$

- Mossin’s Theorem (1968):

$$\alpha^* = 1 \quad \text{if} \quad \lambda = 1$$
$$\alpha^* < 1 \quad \text{if} \quad \lambda > 1$$

Risk aversion (Expected Utility Theory)

Conditional premium return

- The absolute amount B ≥ 0 is paid at the end of period in the case of no loss.

$$\max_{\alpha,B} E[u(\alpha,B)] = (1-\pi)\cdot u(w_0 - P_0 - (1-\pi)B + B) + \pi \cdot u(w_0 - P_0 - (1-\pi)B - (1-\alpha)L)$$

- Since:

$$\left.\frac{\partial E[u(\alpha,B)]}{\partial B}\right|_{B=0} = (1-\pi)\cdot\pi\cdot(u'(w_0 - P_0) - u'(w_0 - P_0 - (1-\alpha)L)) \leq 0 \;\forall \alpha \in [0,1]$$

→ Any conditional premium return B > 0 weakly decreases expected utility of the risk-averse consumer.

Risk aversion (Expected Utility Theory)

Unconditional premium return

- The amount B ≥ 0 is paid at the end of period irrespective of the loss realization.

$$E[u(\alpha,B)] = (1-\pi)\cdot u\left(w_0 - P_0 - \frac{B}{1-\tau} + B\right) + \pi\cdot u\left(w_0 - P_0 - \frac{B}{1-\tau} - (1-\alpha)L + B\right)$$

- The unconditional premium return does not entail any risk transfer.
- It just affects the certain level of final wealth.

→ The unconditional premium return will be purchased (B > 0) if the rate of return (τ) is above the interest rate (τ > 0).

Reference dependence

- Köszegi and Rabin (2006, 2007) developed a theory of reference-dependent utility that incorporates loss aversion.
- Utility is derived from two sources:
  - Standard consumption utility depending on wealth level w
  - Loss-gain utility from comparing the final wealth in different states with a reference point (r)

$$E[u(w,r)] = u(w) + \mu(u(w) - u(r))$$

- Assumptions regarding μ:
  - μ‘(x) > 0 (weakly increasing)
  - If y > x ≥ 0, then μ(y) + μ(-y) < μ(x) + μ(-x) (loss aversion for large stakes)
  - μ‘‘(x) ≤ 0 for x > 0 and μ‘‘(x) ≥ 0 for x < 0 (diminishing sensitivity)
  - Loss aversion for small stakes

Reference dependence

- The reference point is the full distribution of recent expectations.

  → There is not one, there are many reference points (every possible outcome)

- We consider the CPE-equilibrium ("choice acclimating personal equilibrium") where the decision maker affects his reference point by his choice.
- Consider the loss distribution $\tilde{x} = (-100\,€; 0.5; 0\,€)$ and assume an individual can buy full-coverage insurance for 55 €.

  → If the individual chooses full insurance, r = -55. Otherwise, r(no loss) = 0 and r(loss) = -100.

- An individual prefers the full insurance contract to no insurance if

$$w - 55 + 0 \geq 0.5\underbrace{\left(w + 0.5\mu(-100)\right)}_{\text{no loss}} + 0.5\underbrace{\left(w - 100 + 0.5\mu(100)\right)}_{\text{loss}}$$

$$-5 \geq 0.25\left(\mu(100) + \mu(-100)\right)$$

- Given this approach, the insurance premium cannot be considered as a loss.

Reference dependence

Unconditional premium return

- In the model of Köszegi and Rabin a sure gain and an equally sized sure loss will cancel each other out.

→ The unconditional premium return is equivalent to a standard insurance contract.

Conditional premium return

- Due to loss aversion, even a risk-neutral individual prefers to buy insurance (Köszegi and Rabin, 2007)
- However, due to loss aversion, the optimal insurance contract entails full coverage $\alpha^* = 1$ but no conditional premium return ($B^* = 0$), as the latter increases risk.

Regret

- A regret averse individual experiences a disutility ex-post when his ex-ante decision leads to a suboptimal result.
- In line with Braun and Mürmann (2004) regret can be incorporated into a Bernoulli utility function in the following way:

$$RTEU = E\left[u(w) - k \cdot g\left(u\left(w^{max}\right) - u(w)\right)\right] \quad \text{with } k > 0$$

- The individual is maximizing his expected utility that depends on two components:
  - the utility of final wealth $u(\cdot)$ with $u'>0$, $u''<0$, and
  - the disutility from regret.
- Disutility $g(\cdot)$ is convex with $g(0)=0, g'>0$, and $g''>0$ and the factor k measures the extent of regret aversion.

Regret

- Braun and Mürmann (2004) show for standard insurance contracts that regret averse individuals purchase partial insurance ($\alpha^* < 1$) even at a fairly priced premium ($\lambda = 1$).

Unconditional premium return

- An unconditional premium return only affects the sure wealth level w.

  → Regret preferences cannot explain the demand for unconditional premium returns.

Regret

Conditional premium returns

- Final wealth levels:

	No loss (1-π)	Loss (π)
No insurance (α=0)	w_0	w_0 - L
Insurance (α,B)	w_0 - P_0 - (1-π)B + B	W -P_0 - (1-π)B - (1-α)L

$$\begin{aligned}RTEU[\alpha,B] = &(1-\pi)\cdot\left[u(w_0-P_0+\pi B)-k\cdot g(u(w_0)-u(w_0-P_0+\pi B))\right]\\ &+\pi\cdot\left[u(w_0-P_0-(1-\pi)B-(1-\alpha)L)-k\cdot g(u(w_0-P_0)-u(w_0-P_0-(1-\pi)B-(1-\alpha)L))\right]\end{aligned}$$

- Increasing the premium return above B = 0 is increasing RTEU for a given level α if

$$k > \frac{u'(w_0-P_0-(1-\alpha)L)-u'(w_0-P_0)}{g'_{NL}+g'_L}$$

→ A regret averse individual prefers a strictly positive premium return (B* > 0) if regret aversion (k) is sufficiently high.

Alternative explanations

- Why do consumers buy insurance contracts with unconditional premium returns?

Supply-side factors

- Due to higher premium payments, return-of-premium contracts usually entail higher commissions, which might give higher selling incentives for agents (irrespective of higher loadings).
- People buying these contracts might be better risks, therefore premiums might be very attractive (advantageous selection).

Consumer confusion

- Consumers might be willing to buy contracts if they misjudge the desirability of the savings component embedded into a return-of-premium contracts.
- Insurance companies go to great length in depicting these return-of-premium contracts as highly desirable, and hence, might succeed in obfuscating their factual sub-par return properties.

Alternative explanations

Time inconsistency problems

- Many state that they save too little. Their stated interest often is to increase their savings but they "never get around" to doing so (Thaler and Sunstein, 2008).

  → Consumers might suffer from time inconsistency problems caused by some form of hyperbolic discounting (Laibson, 1997).

- If they had access to a commitment device, they would be willing to pay a premium for this (Ashraf et al., 2006).

- Insurance products might be such a commitment vehicle.
  - Hyperbolically discounting (but sophisticated) consumers will realize this and be desperate to commit to increase their savings.
  - Sophisticated consumers correctly predict that they will not purchase these superior alternatives.

Conclusion

- For a set of important insurance products it is common that contracts entail a return-of-premium components although incentive problems are from minor importance.
- Conditional premium returns can be explained by regret preferences.
- Unconditional premium returns are not easily reconcilable with standard models. Consumers:
  - might be confused about the actual desirability of the savings product embedded into the return of premium contract or
  - buy the inferior saving component in order to avoid a time inconsistency problem.
- The main motivation for buying the contracts may have policy implications. If consumers
  - are confused and mistakenly take up inferior savings vehicles, just forbidding return-of-premium contracts would improve efficiency.
  - have time inconsistency problems, efficiency can be improved by additional saving components (unconditional premium returns).