Return-of-Premium Endorsements for Living-Benefits Insurance Policies: Rational or Irrational?

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Abstract:

Insurance companies selling *Critical Illness*, *Disability*, and *Long-Term Care* insurance policies typically offer consumers the option to purchase an endorsement that returns the nominal value of all premiums paid (over the life of the policy) if the policy is not used during the policy term. The endorsement costs the policyholder extra money. Simple calculations show that it is *prima facie irrational* to purchase the endorsement since the *conditional* implied rate-of-return on the asset (return-of-premium endorsement) is almost twice as worse as a market index; the *unconditional* rate of return is even worse. Behavioral explanations for the purchase of these otherwise irrational endorsements are considered.

Keywords: Behavioral Economics, Insurance, Critical Illness Insurance, Disability Insurance, Long-Term Care Insurance

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Introduction

As of 2005, the Canadian market for additional health and disability insurance products (*critical illness, disability*, and *long-term care* insurance) was $21.9 billion in annual premiums[2]. These policies are an important segment of the Canadian and the worldwide insurance market; however, many of the endorsements that are offered with these policies appear irrational. This paper considers some behavioral explanations for why consumers purchase some unique endorsements related to these policies.

These special insurance policies provide an important way that people can reduce the risk in their lives and is an integral part of a modern economy. While life insurance itself is fairly straightforward and well understood by the majority of the population, these *living-benefit* policies are more complicated. *Living-benefit* policies provide indemnity to the consumer for health problems and needs, rather than life insurance which provides indemnity for loss of life. These *living-benefit* policies can play an important role in mitigating consumer's personal financial risks as a result of health problems.

In the event of a disability, *disability insurance* replaces a pre-determined portion of an insured's income if the insured is unable to work. The typical policy replaces 75% of an insured's income on a tax-free basis. *Disability insurance* policies differ from company to company with respect to the definition of what constitutes a disabled person. They also differ in whether they indemnify a person because that person can't work at his "chosen profession"[3] or whether a person can't work at "any occupation." If a person purchases a disability insurance policy that only pays in the event that the individual can't do his/ her own occupation, the policy will cost more money. If the policy only pays out if the person can't work at any job, the policy costs less money.

While *disability insurance* policies differ in their definitions of disability and the threshold at which they pay-out, they all have similarities. The consumer pays a monthly or annual premium and is covered at that premium for a term of five years, ten years, or up until the age of 65 or 75 (depending on the policy purchased). The longer the coverage term, the more expensive the monthly policy premium is (as the extra/ higher risk in the older years of life is evened over all years of the policy). After the insurance broker computes the cost of the policy, the consumer is given the choice of buying various endorsements, including the chance to purchase a return-of-premium endorsement, the endorsement considered here in this paper.

[2] Canadian Life and Health Insurance Association Key Statistics

[3] Also known as: own occupation, often abbreviated to "own occ."

A return-of-premium endorsement provides the consumer with an incentive not to make claims. If the consumer does not make any claims during the policy term, the consumer receives a refund on the nominal value of all of premiums paid. The return-of-premium endorsement is, essentially, a contingent commodity/ asset which pays-out only in the case of NO claims (the reverse of an insurance policy). In the event that a claim is made, the consumer loses the value of the asset.

Other Policies That Also Have Return-Of-Premium Endorsements

While *disability insurance* is the most widely-sold of the *living-benefit* insurance policies, *critical-illness* and *long-term care* insurance also have an optional return-of-premium endorsement that the consumer can purchase.

Critical illness insurance provides an insured with a lump sum payment if he becomes diagnosed with a terminal or dreaded disease (the eligible diseases are listed in the policy). *Critical illness* is less popular than *disability insurance* because *disability insurance* is generally the first living-health benefit that consumers purchase. Consumers often purchase *disability insurance* before they purchase *critical illness* insurance because *disability insurance* protects them for a broader range of ailments—disability can be caused by any number of reasons, including a critical illness whereas a critical illness is only caused BY a critical illness. *Critical illness* insurance is valued by consumers because it provides a person who may soon die with a large amount of cash to spend on assisted-living or the fulfillment of a life-long dream before dying.

Critical illness policies typically pay a lump-sum of $50,000 or higher (depending on how much coverage the person purchases) if the person is diagnosed with a critical illness. Like *disability insurance* policies, they can be purchased for short terms of five or ten years or for longer terms up to the age of 75. *Critical illness* insurance is similar to *disability insurance* in that the return-of-premium endorsement refunds the policyholder the nominal value of all premiums paid if no claim is made on the policy during the policy term. Like *disability insurance*, the return-of-premium endorsement on *critical illness* policies also costs the policyholder extra money. Again, note that the critical illness insurance endorsement is essentially a contingent commodity/ asset which refunds ALL premiums paid (not just the premiums paid on the endorsement, but the premiums paid on the endorsement AND the policy) if the policyholder does not make any claims.

Lastly, *long-term care insurance,* another of the living-benefit policies, provides money to pay for assisted-living (an in-home nurse or placement in a nursing home), if the insured develops an illness that requires long-term care. The policy then pays for the assisted-living costs until the insured person dies. Like *disability* and *critical illness* insurance, the return-of-premium endorsement for *long-term care insurance* refunds the policyholder the nominal value of ALL premiums paid if the policy is not used; also, the return-of-premium endorsement costs

extra money. The long-term care insurance policy may expire at a certain age (75 for example) or it may end because the insured person dies suddenly and does not require assisted-living.

It should be noted that there are actually two types of return-of-premium endorsements on all three of these policy types. There is a return-of-premium endorsement for policy expiration, and there is a return-of-premium endorsement for an unused policy upon death. This paper only analyzes the return-of-premium endorsement for policy expiration because it is more straightforward to interpret this endorsement as the policyholder who receives a nominal refund of all premiums paid receives direct utility from the money himself, instead of his estate. If this paper was to analyze the return-of-premium endorsement for an unused policy upon death, an unnecessarily more-complex utility function would have to be built in which the individual would receive utility from efficiently organizing his estate for someone else to inherit. Although such a utility function could be built, the return-of-premium endorsement, in general, can be easily analyzed without loss of generality by simply analyzing the return-of-premium endorsement for policy expiration.

Table 1 provides four sample critical illness insurance policy quotes from four different Canadian companies for a hypothetical individual consumer. The *critical illness* insurance policy has been chosen as the living-health benefit insurance policy to analyze (even though *disability insurance* is a larger market) because the indemnity is a pre-determined constant, unlike *disability insurance* and *long-term care insurance* in which the indemnity is a percentage of the most recent income of the insured (*disability insurance*) or based on proven need (*long-term care insurance*). Again, although these more-complex scenarios could be analyzed, there is no loss in generality by simply analyzing the one specific endorsement with a fixed and pre-determined payment, *critical illness* insurance.

Table 1 shows four *critical-illness insurance* quotes (for $50,000 in coverage) from four companies for the same hypothetical individual: an average-health 38 year-old male, non-smoker in Canada.[4]

Table 1 is explained in detail[5]: the four companies (company names suppressed and replaced with Company 1,2,3,&4) appear across the top row; Row A is the baseline annual cost of the policy in Canadian dollars, Row B is the annual cost of the return-of-premium endorsement for policy expiration; Row C is the total cost of purchasing the basic policy with the extra endorsement; Row D is the nominal value of all premiums paid (Row C) multiplied by 37 years (from age 38 to 75/ the total length of the policy term); Row E is the implied interest rate on purchasing the return-of-premium endorsement—if the policy is unused (a conditional expectation, a conditional implied interest rate), then the annual "investment" (the endorsement cost, Row B) would need to earn the interest rate in Row E in order to return the amount in Row D after 37 years. If the consumer can earn any nominal interest rate higher than

[4] These quotes were received in October, 2007.

[5] Calculations appear in the appendix.

the implied interest rate in Row E, it would be irrational for the consumer to purchase the return-of-premium endorsement.[6]

For comparison, consider that the Dow Jones Industrial Average index has historically earned a nominal rate-of-return of 12%, far higher than any of the implied interest rates in Row E (almost twice as much). Note also that compounded rates of return do not increase monotonically; in Table 1, an interest rate of approximately twice the magnitude (12% vs. 6.79%) has a future value of more than three times the size ($102,610 vs. $28,869).

[6] Note that the same argument can be made, but at a lower threshold, by analyzing the individual's own unique propensity for a loss and then factoring in that propensity/ probability as the condition upon which the insured would not receive any refund at all. This is done in Table 2.

Table 1, *Critical Illness Insurance* Policies for a hypothetical 38 Year-old male, non-smoker, average health, $50,000 benefit, coverage to Age 75					
		Company 1	Company 2	Company 3	Company 4
A	Total Premium Without Endorsement (including fees)	591.48	610	573.5	571.5
B	"Return of Premium" on Policy Expiration Endorsement	188.76	188.49	173.5	142.21
C	Total Premium With Endorsement	780.24	798.49	747	713.71
D	Nominal Value of All Premiums Paid With Endorsement	$28,869	$29,544	$27,639	$26,407
E	Implied Interest Rate on Endorsement Premium "Asset" (contingent on not becoming critically-ill)	6.79%	6.90%	6.97%	7.62%
F	Expected FV (at age 75) of endorsement premiums if invested in DJIA index over 37 years, 12% nominal average return	$102,610	$102,463	$94,314	$77,305
G	Expected FV (at age 75) of endorsement premiums if invested in S&P500 index over 37 years, 12.45% nominal average return	$114,961	$114,797	$105,667	$86,611
H	Expected FV of endorsement premiums if invested in 30 Year US Treasury Bonds, 4.44% yield (Nov. 2007)	$16,962	$16,937	$15,590	$12,779
	Yahoo Finance, all averages retrieved November 24, 2007 from: http://finance.yahoo.com				

In addition to the Dow Jones Industrial Average shown in Row F, the historical S&P 500 index rate-of-return is also shown, 12.45% (Row G). While it is straightforward that historical stock returns do not imply or guarantee future results, the average returns for the two stock market indexes are much higher than the implied interest rates for the return-of-premium endorsement option. Note that in Row H, the US 30 Year Treasury Bond interest rate has been used to calculate the future value of the return-of-premium endorsement if invested in US 30 Year Treasury Bonds and held until maturity. While it is straightforward that even the US 30 Year Treasury Bonds would have some uncertainty in them (as the rate of return over the individual's next 37 years would have some variance), the US 30 Year Treasury Bond has less variance for the consumer than the stock market. However, as time approaches infinity, the expected value of the stock market should converge to a more certain annual return (just as it should become more certain over the 37 years of the policy term).

Although Table 1 shows the implied rate-of-return on the Endorsement Premium (Row E), that premium is only earned if the individual does not become critically ill. With the low implied rate-of-return, it could be argued that new firms should enter in order to take advantage of this economic rent; this microeconomic/ industrial organization theory is not considered in this paper.

If we assume that companies must at least break even, the rational consumer who does not know anything about his own probability of a critical illness should be able to infer an

upper-bound on the annualized probability of a critical illness from the offered prices that firms make. For example, consider the case of Company 1, with a total premium for the basic policy equal to $591.48, and assuming that the firm must earn at least $50,000 over the course of the policy term in order to break even, we can calculate by simple financial mathematics that the implied probability of a critical illness can not be higher than 4.158% per year on average[7]. Assuming that all critical illnesses occurred on the very last day of the policy term, this would be the implied maximum annualized probability of a disability. Without knowing the distribution, we can not know for certain what the expected risk would be, but we do know that this is an upper bound. We know this is an upper bound because if more probability weight fell earlier than the last day of the policy term, the company would need to pay out claim-money earlier (on an expected basis), by paying out the same nominal amount an earlier point in time, the company would either (1) need to collect more in premiums or (2) know that the annualized probability of a claim is lower than that stated, 4.158%. Because the company is not increasing the premium, we know that the annualized expected probability of a claim is no higher than 4.158% per year. A rational consumer should then be able to use this boundary figure to calculate an unconditional implied rate of return (i.e., one that takes into account the probability that the consumer will become critically ill, use the policy, and lose all premiums paid.)

Using the conditional probability of a claim, we can generate Table 2 which is otherwise the same as Table 1 except it has an additional row for the unconditional implied interest rate for the return-of-premium endorsement.

Row D' is the consumer's unconditional expected future value of all premiums paid; it is unconditional on not using the policy to make a claim. The unconditional expected future value of all premiums paid is arrived at by multiplying Row D by the implied probability of not making a claim in any of the 37 years of this individual's policy.

[7] The implied probability of a claim is calculated by using the "future value of an annuity formula" shown in the appendix. By re-arranging that formula, we can estimate the implied probability of a claim in each year (annualized average). Note that this approach does not consider the time value of money as the company may earn interest on premiums held.

Table 2, *Critical Illness Insurance* Policies for a hypothetical 38 Year-old male, non-smoker, average health, $50,000 benefit, coverage to Age 75					
		Company 1	Company 2	Company 3	Company 4
A	Total Premium Without Endorsement (including fees)	591.48	610	573.5	571.5
B	"Return of Premium" on Policy Expiration Endorsement	188.76	188.49	173.5	142.21
C	Total Premium With Endorsement	780.24	798.49	747	713.71
D	Nominal Value of All Premiums Paid With Endorsement	$28,869	$29,544	$27,639	$26,407
D′	Unconditional Expected FV of Return of Premiums (after considering probability of not making a claim	$5,993	$6,474	$5,436	$5,153
E	Implied Interest Rate on Endorsement Premium "Asset" (contingent on not becoming critically-ill)	6.79%	6.90%	6.97%	7.62%
E′	Implied Interest Rate on Endorsement Premium "Asset" (unconditional upon becoming critically-ill)	2.63%	2.88%	2.67%	3.30%
F	Expected FV (at age 75) of endorsement premiums if invested in DJIA index over 37 years, 12% nominal average return	$102,610	$102,463	$94,314	$77,305
G	Expected FV (at age 75) of endorsement premiums if invested in S&P500 index over 37 years, 12.45% nominal average return	$114,961	$114,797	$105,667	$86,611
H	Expected FV of endorsement premiums if invested in 30 Year US Treasury Bonds, 4.44% yield (Nov. 2007)	$16,962	$16,937	$15,590	$12,779
	Yahoo Finance, all averages retrieved November 24, 2007 from: http://finance.yahoo.com				

Given that the consumer can expect to earn a higher rate of interest from almost any investment besides the return-of-premium endorsement option, it would appear to be irrational for the consumer to purchase the endorsement. By purchasing the endorsement, the consumer lowers his future wealth (at the age of 75) by almost three times ($102,610 vs. $28,869)… and that is *contingent upon* not becoming critically-ill. If he becomes critically ill and uses his policy, then he only receives the indemnity and loses the nominal value in Row D as he cannot receive a refund on his policy. Given that the return in Row D is conditional on *not* becoming ill, it would make much more sense, *prima facie*, to only purchase the baseline policy without the return-of-premium endorsement and then invest the money saved from not purchasing it into almost any other investment. By doing so, the consumer would be guaranteed to receive the $50,000 indemnity if he becomes ill, and he would be nearly-guaranteed to earn an amount close to that in Row F or G.

Note also that the unconditional implied interest rate is, at most, only 3.3% (nominal interest rate) per year. If the consumer was perfectly rational he would not purchase the

return-of-premium endorsement as he could earn a higher rate with the 30 Year US Treasury Bond which is risk-free.[8]

For the remainder of this paper, the return-of-premium endorsement upon policy expiration is modeled so that it could be applied to any of the three different types of policies: *critical illness*, *disability*, and *long-term care* insurance. The most straightforward application is to *critical illness*, for reasons already mentioned having to-do with the certain indemnity (as opposed to the *disability* and *long-term care* policies which are based on earned income and need, respectively). In order to apply the models presented in the next few sections to the *disability* and *long-term care* policies in an empirical setting, the expected income or expected need would have to be first calculated and then used as the expected indemnity.

Introduction to Behavioral Explanations

There are many different explanations that could be used for why the consumer makes, what appears to be, an irrational purchase. The most straightforward explanation and most readily understood by most economists, is that the consumer is risk-averse and might consider the return-of-premium endorsement a safer investment, conditional on his probability of a loss, than any other investment. Consider, for example, Wakker, Thaler and Tversky (1997), in which individuals must be compensated at an exceptionally high rate for default risk on the part of an insurer for what they term "probabilistic insurance." This explanation does not suffice, however, since the certain 30 Year Treasury Bond returns a higher expected return (with certainty) than the uncertain endorsement expected return.

Other explanations for the purchase of these investments could involve bounded rationality, mental accounting, reference dependency, prospect theory, and commitment devices. Broadly speaking, all of these theories can be interpreted as bounded rationality if we take the view that rational expectations are correctly predicting future outcomes and behavior. If an individual cannot correctly predict his behavior, or if he can predict his behavior but desires the result from a different behavior, he may benefit from a commitment device that increases the cost of the undesired behavior and/ or increases the benefit of the desired behavior.

Shefrin and Thaler (1988) incorporate mental accounting into economic theory. Essentially, the creating of mental accounts for various activities/ behaviors/ decisions simplifies the individual's decisions but can have important consequences on individual's

[8] Note that the asset value of the investments has not been considered, as it often is for other assets in other research papers, over time as time changes. This is because this paper assumes that the policyholder purchases the investment and holds it until maturity, earning the initial interest rate (guaranteed if a US 30 Year Treasury Bond). For this paper, it suffices to only consider this as we are comparing certain results (the 4.44% certain return on the US 30 Year Treasury Bond) versus the uncertain (but expected) return of a maximum of 3.30% on the return-of-premium endorsement.

choices and the corresponding outcomes. For example, consider an individual who borrows money for one thing, perhaps a car, at an interest rate of x%, and then also invests money into a savings plan for retirement which only pays y% where x%>y%. Mental accounting, as explained by Shefrin and Thaler, can explain this phenomenon. In applying mental accounting to living-benefits insurance policies, we might consider that a consumer keeps a special "mental account" on which one side of the account is all premiums paid to an insurer and on the other side is all payments received from the insurer (even though the indemnities would have replaced some loss that the consumer experienced and the time-value of money may not be considered—a case of bounded rationality.)

If the consumer keeps a mental account of payments to and from an insurer, the purchase of a return-of-premium endorsement could be justified. The return-of-premium endorsement would allow the consumer the chance to "even" or "balance-out" his mental account with the insurance company. Note, however, that this theory implicitly assumes that the consumer ignores the discounted value of receiving the premiums in only a nominal value, again relying on bounded rationality. This theory also ignores the value from the reduction in risk that the insurance affords the consumer. This mental accounting explanation could work if the consumer ignored the time-value of money.

Although the mental accounting theory is different than the boundedly rational explanation, they are closely related. Furthermore, the concept of prospect theory is also related to boundedly rational behavior. In the prospect theory of Kahneman and Tversky (1979), the individual engages in two stages, editing and evaluation. In the editing stage, the individual edits the lottery outcomes or probabilities into a more simplified structure that is easier for him to understand. In the evaluation stage, the consumer then chooses over the lottery in order to maximize his value function (related to utility, but again, like mental accounting, the curve is s-shaped in two quadrants of the graph representing gains and losses. The editing stage of prospect theory could be undertaken because of a consumer's bounded rationality.

Returning to self control issues, consumers may be unable to control their behavior, even though they may desire to effect a change that they are unable to control. This self-control issue can take two dimensions: pure lack of self-control and lack of ability to correctly predict future behavior. If the individual cannot control himself, he may increase the cost of the behavior that he does not like and/ or increase the benefit of the behavior that he does like. On the other hand, if he cannot correctly predict his behavior in the future (given a set of possible effort levels and payoffs), he may chose a commitment device which increases the cost of the low-effort behavior or increases the benefits of high-cost behavior, but over time.

The next section presents theoretical models for each of the various explanations for why a consumer might purchase this product that appears to be irrational.

Standard Expected Utility Model, Intransitive Preferences

The consumer's decision to purchase a return-of-premium endorsement could be a reflection of risk aversion or could be an observation of intransitive preferences. Although we might like to say that it is risk aversion which causes the consumer to purchase the return-of-premium endorsement, this would not suffice without intransitivity over preferences and risk. If the consumer prefers the return of premium endorsement over a stock market index, for example, with a higher expected return but higher variance, then it should also be the case that the consumer prefers the 30-year US Treasury Bond which provides a higher expected return with zero risk. As such, the intransitivity in preferences over risk would need to hold for the consumer's behavior to purchase the endorsement to be explained by the standard expected utility model.

Contrarily, the consumer may place great weight on the relatively small chance that he never needs to use his policy at all in any year up until the age of 75. Given that the policy covers a period of time up to the age of 75, there could actually be a small chance that he ever needs to use the policy, implying that he will likely use the policy at least for a short period of time during his lifetime. This notion of placing extra weight on small probability, high payoff outcomes is discussed, for example, in Kahneman, Slovic and Tversky (1990). A similar idea is also discussed in Kunreuther, Novemsky, and Kahneman (2001).

Bounded Rationality and Prospect Theory

Consider now the case of bounded rationality and the prospect theory proposed by Kahneman and Tversky (1979). With bounded rationality, an individual is unable to correctly calculate the optimal behavior for all lotteries.

Bounded rationality can be arrived at by at least two scenarios. In the first, a person may be boundedly rational in and of themselves, implying, essentially, that he does not have the intelligence to calculate what is in his best interest in a complex problem or challenge. In the second case, a person may be constrained in the amount of time that he has to solve the problem. In either case, the problem is essentially the same, the person cannot calculate his optimal decision quickly enough if ever. If an individual purchases a return-of-premium endorsement for a living-benefits insurance policy, he may be bounded in his rationality. If a person is bounded in his rationality, he may simply not do what is in his best interest because he cannot determine what that is. Nevertheless, a person would likely try to calculate what is in his best interest.

When Kahneman and Tversky first proposed prospect theory, they suggested that individuals behave in two stages of decision making. In the first stage, they propose, individuals engage in editing the problem. In the second stage, individuals are assumed to then evaluate the edited problem and arrive at their optimal choice. In the editing stage, individuals may round probabilities and outcomes and engage in canceling-out similar choices that do not appear to be too different from each other. Through this editing process, important elements could be lost from the lottery problem. If a person purchased a return-of-premium endorsement when purchasing a living-benefits insurance policy, the person may have done so because they engaged in an editing stage that eliminated some of the important details of the problem. Prospect theory, a form of bounded rationality, may explain how and why consumers purchase return-of premium endorsements.

The use of framing to alter behavior, as discussed in Kahneman and Tversky (1986) is also a possible explanation for the purchase of a return-of-premium endorsement. For example, the insurance broker may have broken-down the annual cost into a monthly cost (most policies are paid monthly)[9], and then framed the cost of the extra endorsement in terms of a proportion relative to the annual amount or in relation to something else that the consumer may heuristically think is small (eg. Broker: “For only the cost of a cup of coffee, you’ll get this extra endorsement that will refund all the premiums if you never use the policy”). By

[9] With the example shown in Table 1, Company 3’s premium is only $51.61 per month and the extra endorsement return-of-premium endorsement would be an extra $15.62 per month. By breaking the extra premium down into smaller absolute numbers, the consumer may rationalize the cost as “small.”

relating the cost to some heuristic, the insurance broker can actually use that heuristic reference point to frame the cost of the policy.

Reference Dependence and Mental Accounting

Reference dependency is the idea that people make their decisions in relation not to their overall situation (e.g., overall wealth), but in relation to some heuristic reference point. Tversky and Kahneman (1991) showed that an individual's choice often depends on a reference point, implying that gains and losses of one magnitude at one reference point are viewed differently at another reference point. An example of reference dependence is encapsulated in mental accounting. In mental accounting, the individual keeps separate mental accounts for various transactions. If an individual purchases a return-of-premium endorsement, it may be that the individual is engaging in mental accounting with the insurance firm in which he keeps a mental account of money paid to the insurer, and money received back from the insurer. The consumer may receive utility from maximizing this account to his favor— even if there are negative externalities from the transaction (i.e., missed opportunities in the form of higher potential overall returns).

Closely related to mental accounting is the idea that people may value fairness and may consider it fair that they are refunded their policy premiums if they do not "use" the policy. In a somewhat boundedly-rational model, the consumer may consider it fair that he receives his premiums refunded back to him if he doesn't "use" the policy. This notion, for example, is discussed in Kahneman, Knetsch and Thaler (1986).

Self Control and Commitment Devices

With self control issues, the consumer is perceived to be rational if he can correctly predict future outcomes and behavior. If the individual is unable to control his behavior in the current time period, it is likely that the consumer will not be able to "control" his behavior in the future as well. By increasing the cost of the undesired behavior and/ or increasing the benefit of the desired behavior, the individual may be able to alter his behavior and gain his desired outcome even though it is not efficient as he may encounter a sunk cost in altering the costs/ benefits. If the consumer purchases a return-of-premium endorsement, it may be the case that he does so because he does not have the self control to save for his future. By placing his savings in the return-of-premium endorsement option, the consumer increases the cost of failing to save… if the consumer decides to stop saving, he will lose his disability insurance policy as a non-payment on the return-of-premium endorsement will be considered a non-payment on his living-benefits policy itself.

Further to that self control issue, the consumer may purchase the return-of-premium endorsement option because he sees it as a way to increase the benefit of healthy lifestyle choices. If a consumer purchases the return-of-premium endorsement on a living-benefits policy and if the probability of a loss λ is not completely independent of his behavior, it may be the case that he bought the policy in-order to increase the benefit of making healthy lifestyle choices. By altering his lifestyle choices, not only will he be healthier, but he may also get a "reward" of the return of his nominal premiums. Although part of the probability of a loss may always be independent, he increases his odds of receiving a cash "reward" if he makes healthy choices.

The two scenarios discussed here are jointly related, by choosing the return-of-premium endorsement, the consumer may be committing himself to both saving more money and living more healthily.

The Equity-Premium Puzzle

The equity-premium puzzle is a puzzle in finance which largely explores why equity appears to have an exceptionally-higher rate-of-return than debt, essentially, it explores why unsafe investments seem to yield much higher than expected returns relative to safer investments over time. This problem was investigated by Siegel and Thaler (1997) when they explored the differences in rates of return on a $1000 investment in a stock portfolio investment over seventy years from 1925 to 1995 and the same period of time for returns in Treasury Bonds. The returns are startling, $12,720 vs. $842,000, 66 times larger. Typical explanations of the equity-premium puzzle are that (1) consumers are actually very risk-averse and that they live in a high amount of fear regarding the future, (2) that the theoretical utility models typically used need to be functionally adjusted to be more realistic, and (3) consumers

invest more in safer investments out of myopia or boundedly-rational behavior. Any of these explanations may explain the current anomaly of return-of-premium endorsements.

Conclusion

This paper has identified that, *prima facie,* consumers appear to be irrational when it comes to the purchase of living-benefits insurance policy endorsements on *disability*, *critical illness*, as well as *long-term care insurance* policies. If a consumer purchases a return-of-premium endorsement, he is refunded the nominal value of all premiums paid over the term of the policy (including the return-of-premium endorsement premium) if he does not make a claim. Simple future-value calculations reveal that the consumer would most certainly be better off financially to invest the cost of the extra endorsement into a stock-market index. By investing the difference into a market index (Dow Jones Industrial Average or S&P 500 index) the consumer would find himself (on an expected basis), almost four times better off (conditional upon not having to make a claim). When we consider that the probability of making a claim is positive, the unconditional implied interest rate must be even lower.

This paper has proposed various behavioral explanations for why a consumer may purchase the return-of-premium endorsement. A consumer may purchase such an endorsement because of some form of bounded-rationality, mental accounting, prospect theory, or as a commitment device to make healthy choices (to increase the potential payoffs of living healthy). Risk-aversion does not seem like a strong explanation since there is a better alternative that provides both a higher expected return and a lower variance of uncertainty (zero uncertainty).

The most compelling explanations for the purchase of these otherwise irrational products are bounded rationality and purchase as a commitment device to both save more money and live healthier. If the probability of a claimable loss was completely independent of the consumer's actions, this explanation would not make sense. However, it is straightforward that consumers do have some control over their health and that less healthy people are more prone to disability and illness than relatively more-healthy people. If consumers are assumed to know this axiomatic fact but lack the self-discipline to exercise, be healthy, and save money for the future, the purchase of the endorsement may increase the cost to neglecting health and failing to save. If the consumer misses a monthly premium (fails to save), he loses the money already saved (a commitment device to save). Further, if the consumer doesn't live healthy, he is more likely to lose the money spent on his policy and the additional endorsement because he is more likely to become disabled or ill.

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Appendix

The future value of an annuity is calculated as follows:

FV(A)=A{[(1+i)^n-1]/i }

That is, the future value of an annuity, A, is the value of the annuity each time period, A, multiplied by: one plus the interest rate each time period, i, raised to the power of n, the number of time periods, minus one, divided by i, the interest rate. By using this formula, we can estimate the future value of all the endorsement premiums (an annuity) invested at different interest rates (DOW JONES or S&P 500). Also, we can use this same formula and the given annuity value (ALL premiums paid including the base and the endorsement premium) along with the given future value, the return of nominal premiums (all premiums in all years, nominally) to calculate the implied interest rate for the return-of-premium endorsement.

The unconditional upper-bound probability of making a claim was estimated by using the future-value equation above and solving for the interest rate when the future value was $50,000, the present value was set at 0, and the periodic payment (annuity) was set at $591.48 (the annual premium). Using this estimated upper bound estimate of the average annualized probability of making a claim (4.158%), we can calculate the probability of not making a claim in any of the 37 years of the policy by this formula: (1-0.04158)^37=0.2077 => that there is approximately no more than a 79.23% chance of having a claim in the 37 years of the policy.

The unconditional expected return on the policy is then estimated by multiplying 0.2077 times the value in Row D ($28,869), to arrive at the unconditional expected return in Row D'.