The Messenger

Transamerica Reinsurance Risk Management Newsletter

Term Life Pricing and Design: A New Day?

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Life insurers have been taking small steps to address the performance of their term life portfolios for the past few years. They have been tightening underwriting guidelines, raising rates in specific pricing cells and, more recently, increasing policy fees. But as a whole, they have avoided the big steps that would signal an end to the era of cheap term life insurance. Not anymore, it seems. Recent rate increases suggest the beginning of a new era for term life. This article looks at some of the driving forces behind the movement.

Change agents. Mortality and lapse assumptions may be the primary considerations when pricing a term portfolio, but other forces also influence pricing decisions – namely XXX reserve financing costs and investment returns. For the past decade or so market competition has continuously pushed down premium rates, sometimes to levels below target returns on investment (ROI). Gaps in ROI were filled in with low reserve financing costs and favorable investment performance. However, with the downturn in financial markets – and a concern that current conditions may be with us for some time – many term life insurers are revisiting their pricing and product design strategies.

Today we are seeing a significant level of activity around term portfolios. For example, some companies have halted sales of 30-year products or are looking at alternatives to guaranteed level premium term. Others are raising premiums on their longer duration products and raising premiums on 10-year products by much greater amounts. Perhaps the most significant movement underway is the suspension of cross cell subsidization, which may explain the amount of rate increase we're seeing in 10-year level term.

Impact of Financial Markets

Life insurers are preparing for the possibility that capital scarcity and low current yields may be with us for some time. (See article on page 3.) These conditions have greater impact on the performance of 20- and 30-year products with their larger XXX reserve requirements. However, to the extent that these longer duration products have been subsidizing the 10-year product, anything that alters their performance will, by extension, affect 10-year term as well.

Interest Rates. Reserve capital does not sit idle. Companies invest mostly in fixed income assets priced at a spread to Treasury rates to reflect their relative risk. The better the asset yield, the less additional capital which companies must allocate to support reserves. In the third quarter of 2007, the market peak, 10-year Treasury yields averaged 4.73 percent. In the first quarter of 2009, the average yield was 2.71 percent.

Lower interest rates mean that carriers must now set aside more capital to cover policy

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risks, and the larger reserves of longer-term products are most affected. A one percent decline in the discount rate can generate a three percent increase in the net present value (NPV) of reserves for 20-year policies, and a six percent increase in NPV for 30-year term. This is just the change in reserve expense. The impact of interest rates on profitability is even greater.

Cost of Capital. At the same time that term writers are setting aside more reserves, they are dealing with declining asset portfolio results and competition for increasingly limited external financing. In the past, many companies relied on financing arrangements (some with effective funding costs of zero percent and less) to maintain competitive pricing of their term products. These deals are nowhere to be found today. Due to uncertainty in the capital markets, banks remain hesitant to enter into collateralized financing deals; 700 basis point counterparty risk spreads are not unheard of. Reinsurers, who face the same capital challenges as direct writers, are managing their capacity more closely as well.

Lapse Risk. Rising premiums may also reflect emerging lapse experience, which has been trending lower for some time. Lower than expected lapse can be helpful in recouping commissions and other acquisition costs in early policy years, but in later durations it means higher-than-expected mortality expenses. Underestimating lapse can be a reserving issue, too. If lapse rates come in less than expected, insurers may need to top off their reserves.

Lapse rates have more of an impact on longer-duration policies. A one percent drop in actual experience from the expected ultimate lapse rate will barely affect the ROI on a 10-year product. However, a one-point difference can cost seven to eight percent ROI on 30-year term.

In the past, it was considered prudent to assume a four or five percent ultimate lapse on a 30-year term product. Emerging experience suggests it may be more appropriate to assume two or three percent ultimate lapse rates.

Cross Cell Subsidization

Overall, we are seeing rate increases of about five-15 percent, but these changes are unevenly distributed across cells (Chart 1). This pattern may reflect a move away from cross cell subsidization, especially for 10-year term. Insurers may no longer be able to subsidize 10-year term and conserve the viability of their 20- and 30-year products at the same time.

Chart 1: Sample Pattern of Recent Price Changes

	Class			
Duration	Pref Plus NT	Pref NT	Std Plus NT	Std NT
10 yrs	27%	25%	18%	11%
20 yrs	16%	11%	9%	5%
30 yrs	8%	8%	4%	3%

This chart is based on the average increase for a sample of five large term writers (age 35, nonsmoker, $500K face).

Loss Leader Strategy. Ten-year term is often the product that first-time policyholders buy. If there is a product that life insurers are willing to sell as a loss leader, it is 10-year term. However, the margins that once helped support this strategic play are no longer available as they are needed to support increased reserve requirements (where companies choose to continue selling longer-term issues) or are no longer available (where companies choose to stop selling longer-term issues).

Preferred Risk Class. As companies revise their pricing across all cells for stand-alone profitability, they are addressing other weaknesses as well. Insurers are tightening preferred criteria such as blood pressure and cholesterol count. In the past, margins on standard and substandard risks subsidized pricing strategies for preferred and preferred plus risks. As these subsidies are removed, preferred premiums are being raised significantly.

Face Amount Band. Mortality rates for face amounts under $250 thousand can be as

much as 40 percent higher than for face amounts greater than $1 million. More stringent underwriting accounts for much but not all of this difference. "Observations on Mortality by Band," in the October 2007 issue of *The Messenger*, addresses factors that appear to contribute to these higher mortality rates. As companies improve their understanding of this experience, some are using relatively higher mortality assumptions when pricing these bands.

Anti-selection. Technology has also undermined the strategy of cross cell subsidization. This practice began when distributors were still using rate cards. Because finding the lowest rate for every sales opportunity was practically impossible, insurers could be very competitive in a few cells and still have good performance on the block overall. With today's technology and quote services, agents can instantaneously find the cheapest rates across the board. Moreover, agents can match applicant data to qualification criteria to obtain the most favorable underwriting classification for their clients. Life insurers who have incorporated significant cross-subsidies into their term portfolios can find themselves overweighted in their least profitable cells.

Conclusion

A year ago, many life insurers were employing aggressive pricing assumptions in order to compete with the top tier term writers. Today, instead of letting the marketplace set premium rates, we are starting to see a return to the practice of developing prudent assumptions and then solving for rates. Companies are factoring in the true cost of capital and getting out of the cell subsidy game. All this adds up to one thing – rising premium rates.

If your company is repricing and redesigning your term portfolio to operate in today's environment, consider the insight and expertise of the Transamerica Reinsurance team. We can help you manage through the current challenges and take your risk management to a higher level of effectiveness.

Preparing for the Low Interest Rate Scenario

A wise actuary told me that we spend much more time on risks that we understand than on risks we're not comfortable with. For example, actuaries spend hours calculating mortality and lapse rates, but we typically treat interest rates as a "standard assumption." After all, interest rates are environmental factors outside of our control and difficult to predict.

Given the current financial environment, this approach is no longer sufficient. If we begin with the hypothesis that interest rates will remain low for a sustained period, what are the implications for products on the drawing board today or for business on our books?

Term with Guaranteed Level Premiums. Interest rates are invisible to term life policyholders but play a critical role in the profitability of term life blocks. The decline in investment yields since 2007 is having an impact on the performance of this life insurance segment.

Level premiums in early durations pay for higher mortality in later durations, in effect prefunding mortality. If companies start to lower their interest rate assumptions, this would mean

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Lapse Rates: Focus of More Attention

By David Wylde, FSA, MAAA, CLU, ChFC
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Lapse rates play an important role in the profitability of a guaranteed level premium term insurance portfolio. A new study from Transamerica Reinsurance shows that the downward trend in early duration term lapse rates that the industry has been experiencing since the turn of the millennium is continuing unabated.

In a 2007 Report, LIMRA indicated that annual face amount lapse rates for term insurance decreased from 10.3 percent during calendar years 2001-02 to 6.2 percent during 2003-04. Transamerica's early duration experience for its block of reinsured level premium term supports this trend with an overall annual lapse rate of 5.8 percent for 2004-05 and 5.2 percent for 2006-07.

Dissecting the Transamerica Experience

The Transamerica study covers exposure periods 2004-05 and 2006-07 and focuses on 10-, 15-, 20-, and 30-year guaranteed level premium term plans. Additional filters on the data include:

- Original ceded face amounts of $100,000 and over
- Issue ages 18-72
- Standard risks only (no table or flat extra ratings)
- Policy years 1-9

Chart 1: Face Amount Lapse Rates by Plan

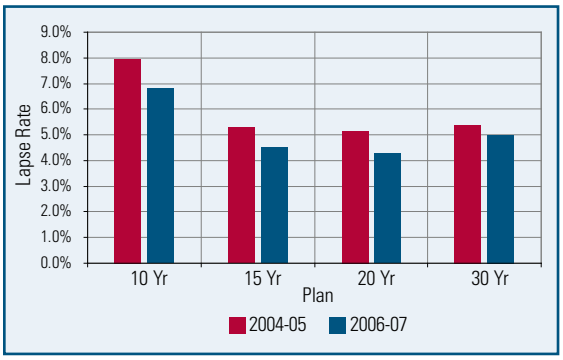
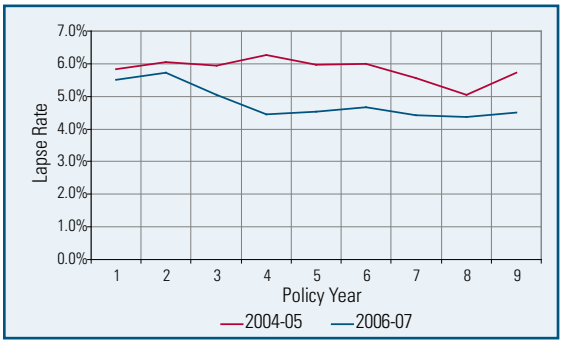


Chart 2: Face Amount Lapse Rates by Policy Year



While there was additional experience beyond policy year nine, the study did not want to skew any combined results with the high tenth year "shock" lapse coming from the 10-year term.

Lapse Rates by Level Premium Plan

Chart 1 contrasts the lapse rates for the two exposure periods for each of the level premium plans. The 10-year plan has historically exhibited higher lapses compared to the other plans, and recent experience continues to validate this relationship. Note that each plan shows a marked decrease in early duration lapses from 2004-05 to 2006-07, with only the 30-year perhaps indicating a modest slowdown.

Lapse Rates by Policy Year

In previous eras, early duration lapse rates were reasonably flat, as illustrated by the Transamerica 2004-05 experience depicted in Chart 2. The most recent study period implies, however, that while very early duration rates (policy years one and two) remain close to this level, they quickly drop to around 4.5 percent during policy years three through nine

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Lapse Rates by Issue Age Group

The decrease in lapse rates from 2004-05 to 2006-07 occurred consistently across nearly all issue age ranges. It is also interesting to note in Chart 3 that the pattern of higher lapses at the youngest and oldest issue ages remains intact. This makes some intuitive sense. In both age

groups, the perceived cost of term insurance is high relative to net income and the perceived need for term insurance is low, which results in higher lapses.

Lapse Rates by Smoking Status

Chart 4 presents face amount lapses by smoking status. The two-to-one relationship between early duration rates for smokers and nonsmokers continues a trend that has been observed for many years.

Additional analysis by policy year shows that the ratio of smoker to nonsmoker lapse rates starts out at about 250 percent in duration one and linearly decreases to 150 percent by duration seven and remains level until duration nine (the self-imposed last duration of the study).

Lapse Rates by Gender

During the current decade, term lapse rates have been almost the same for both females and males. As Chart 5 indicates, this relationship continues even as overall rates decrease. The 2003-04 LIMRA experience validated the early duration equivalence for both 10- and 20- year term plans.

Lapse Rates by Policy Size

Chart 6 compares lapse rates by original policy size (not of the size of the reinsurance cession). Current term insurance lapse rates are about one percentage point higher for policies with face amounts of $100,000 to $249,000 compared to policies of $250,000 and over. This difference is not due to a skewing of issue ages, as all three size groups have an average issue age of around 40. Nor is it due solely to large differences in the percentage of smokers by policy size, as less than 10 percent of the policies within each group are smokers. Finally, it is not due to a preponderance of 10-year term in the $100,000 to $249,999 group, as about 25 percent of the exposure in each size group is from this plan. One possible explanation for this difference is the general socio-economic position of policyholders purchasing lower face amount term insurance.

Summary

Getting the lapse rate assumption correct on a portfolio of term insurance is one significant key to successfully modeling financial performance. As most pricing actuaries know, lower-than-expected lapse rates can actually have a negative impact on the profitability of an inforce block. For this reason, the continuing downward trend may be a little disconcerting to those who had priced their term products during an era of higher lapse rates.■

Chart 3: Face Amount Lapse Rates by Issue Age Group

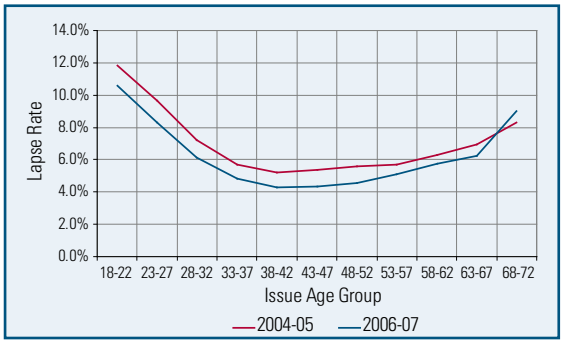


Chart 4: Face Amount Lapse Rates by Smoking Status

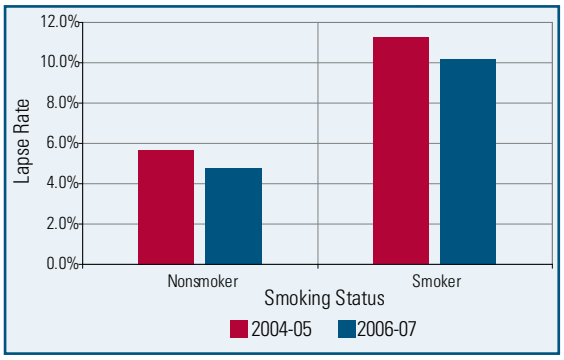


Chart 5: Face Amount Lapse Rates by Gender

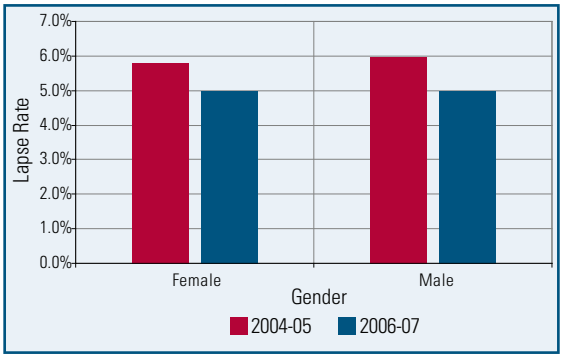
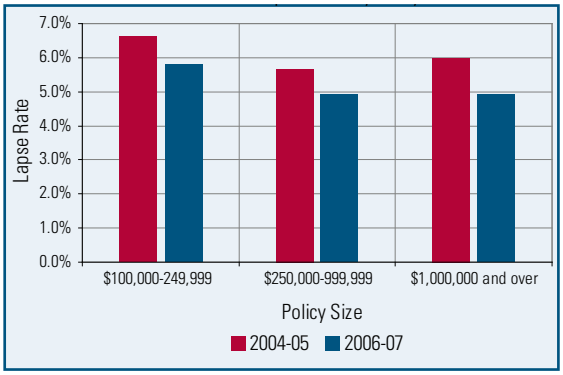


Chart 6: Face Amount Lapse Rates by Policy Size



Over-Using Life Expectancy

By Dr. David Wesley, MD
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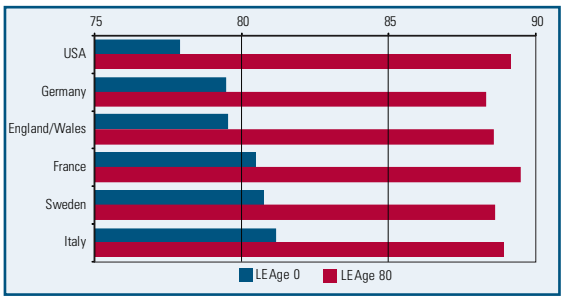
This is the second part of a series on the uses and misuses of mortality metrics. Life table construction is beyond the scope of this article, but the reader will need some familiarity with life tables in order to understand the issues. Documents on our web site (www.TransamericaReinsurance.com) illustrate life table construction and the calculation of life expectancy.

Individual life insurance is a voluntary purchase decision and for it to remain a viable product, insureds must pay premiums commensurate with their risks. While premiums fund most of the cost of life claims, the balance comes from return on investments, so the timing of claims is very important.

Life expectancy (LE or e_x) as a summary statistic for mortality gained popularity because it is a single number that seems to capture what one needs to know about mortality. Popular in the press and with the government agencies charged with health policy decisions, LE has long been used as the measure of expected survival in structured settlements. More recently, life expectancy has been used as a measure of expected mortality in viaticals and life settlements and as a measure of comparative mortality in the medical literature.

Chart 1: At Birth vs. Attained Age Life Expectancy



LE can be a misleading measure of mortality. LE at birth and LE at Age 80 paint two very different pictures of mortality and survivorship. [*Human Mortality Database. University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org or www.humanmortality.de (data downloaded on May 27, 2009).*]

Professor C.L. Chiang defines life expectancy as "the number of years, on average, yet to be lived by a person of age x," represented symbolically as:

$$e_x = \frac{T_x}{l_x}, x = 0,1,\ldots, w$$

where T_x "is the total number of years of life remaining to the l_x individuals" alive at age x and w is the final age interval for a life table. He adds: "Each e_x summarizes the mortality experience of persons beyond age x in the population under consideration, making this column the most important in the life table." I must disagree with Professor Chiang. The probability that a life aged exactly *x* will die before attaining exact age *x*+1 (represented by q_x) is the most important column in a life table. It is the quantity that is derived from experience, and it is the basis for all the other columns, including e_x. It is also my opinion that life expectancy is frequently misused and misunderstood.

"At Birth" vs. "Attained Age" Life Expectancy

A common oversight in the use of life expectancy is failure to state the attained age for which the LE applies. Generally, total life expectancy (LE plus attained age) increases with age. Critics of the U.S. health care system like to highlight unfavorable comparisons of LE for the U.S. versus other developed nations. What they leave unsaid is that they are using "at birth" LE's, which can be misleading (see Chart 1). For a variety of reasons, the U.S. experiences higher infant mortality. As an arithmetic mean, LE is overly influenced by outliers; a relatively small number of extremely short life spans have a large influence on the LE. What receives less publicity is that the LE gap between U.S. and other developed Western nations closes at older ages, and 80-year old Americans have a longer LE than their foreign counterparts.

Another cause of misunderstanding in the use of life expectancy stems from the fact that

it is calculated using age-specific q_x's from a period life table. This is a snapshot of mortality rates and probabilities from a specified period of calendar time. But persons aged 20 during the period of the life table are not likely, 40 years later, to experience the 60-year-old q_x from that same table, but the LE is calculated as if they would. The q_x's are very real and exactly what they purport to be, but life expectancy is an abstraction.

Life expectancy is the "coin of the realm" for the life settlement industry. "LE estimators" evaluate medical evidence, determine a mortality ratio (MR), multiply the q_x's from a mortality table by the MR and then calculate an LE which is quoted to their client. This is a competitive business. The mortality tables used and the exact methodology are usually proprietary.

As a summary statistic, life expectancy hides details about the expected mortality, notably when claims are expected to occur. The life settlement investor must translate the LE back into a vector of q_x's in order to model the expected cost and revenue streams. Since the estimator's mortality table is proprietary, the back-calculation is often done using a different table yielding variable results.

Mortality tables are period life tables from experience studies. Their q_x's rarely incorporate mortality improvement. Some LE estimators incorporate mortality improvement in their LE calculation, but improvement factors are always cause for debate.

How does one incorporate excess mortality into the calculation of a life expectancy? Traditionally, one takes a given mortality ratio (e.g., 200 percent), multiplies all the future q_x's for an individual by that ratio and then calculates the LE. Actually, the excess mortality for a particular impairment is unlikely to follow such a pattern. Many impairments exhibit a permanent flat extra (FE) pattern while others will follow a temporary FE or perhaps a combination of MR and FE. This is especially true at older ages with their high baseline q_x's.

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Mortality vs. Survival

Another basic issue with LE is that it is more directly related to survival (p_x) than mortality (q_x), although the two quantities are complementary as seen in the formula:

$$p_x = 1 - q_x$$

The mortality rates that we deal with generally are very small (e.g., 0.00136 for 20-year-old U.S. male, 2005). This leads to a problem very much like that seen in relative survival: relatively large changes in the q_x will cause relatively little change in the survival and in life expectancy. For example, if the q_x of 0.00136 is doubled to 0.00272, the change in p_x is only a tenth of a percent (from 0.99864 to 0.99728). In the case of LE, doubling present and future mortality for a 20-year-old male (U.S. general population, 2005) will decrease his LE by only 15 percent. A five-fold increase in mortality is required for the LE to decrease 33 percent.

Life expectancy can be a misleading measure of mortality. Personally, I would rather work with a vector of q_x's or even a matrix of q_x's, selection factors and improvement factors. Unfortunately, the public's need for a simple, single-number summary statistic for mortality means that life expectancy is likely to remain in common use.■

1. *Chiang CL. The Life Table and Its Applications. Malabar, FL: Krieger; 1984.*
2. *Wesley D. Mis-Measures of Mortality*
3. *The Antiviral Therapy Cohort Collaboration. Life expectancy of individuals on combination antiretroviral therapy in high income countries: a collaborative analysis of 14 cohort studies. Lancet 2008; 372:293-99.*

The Messenger

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Preparing for the Low Interest Rate Scenario (cont.)

higher premiums on new business. Carriers may also need to adjust performance expectations on existing business if early duration premiums fail to generate the necessary funds to cover future claims. To cover mortality expenses, companies would need to tap into surplus or other funds to make up the difference.

Companies post reserves assuming that the interest on those funds will generate at least a portion of their own future requirements, and XXX-related level premium term reserves increase rapidly over the first half of the policy's duration. A one percent decline in interest rates can mean as high as a six percent increase in reserving costs on 30-year policies. As rates remain low, companies may need to strengthen their reserves.

Cash Value Products. Interest rate guarantees on permanent products are either implicit (e.g., cash value of whole life) or explicit (e.g., minimum crediting rates in a UL fund). In either case, changes in interest rates have a significant impact on product performance. It would appear that cash value policies priced with traditional interest rate assumptions may need to be repriced.

Permanent products priced in the previous higher interest rate environment will be more valuable to policyholders, which should increase persistency. These policies could become even more attractive to the secondary market, further increasing persistency. If low interest rates continue, companies may find earnings compressed as they are required to provide more capital for guarantees and cash values and, ultimately, claims.

It is uncertain how long current market conditions will last – and there are no easy answers. The choice for many carriers is to charge higher premiums on new business, reduce policy performance or accept smaller profits on the business (or a mix of the three). Ignoring the situation and using the standard assumption is the least acceptable.

In working with a reinsurance partner, direct writers may be able to mitigate the impact of this new environment on new and in-force business. No one can create earnings from an underpriced block, but Transamerica Reinsurance has the product development and reinsurance expertise that can help carriers make the most of this situation.■

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