The Constancy of Collaboration

Life reinsurance often brings to mind new business initiatives. Companies may want to offer a more competitive product or attract new customers from a segment not reachable in the past. They may want to strengthen their reputation as a provider of choice or shed an image as an impairment shop. In many cases the life company wants to take advantage of cost differentials or financial solutions to increase profitability.

As a life reinsurer, we help our clients market more competitive products, but we also work to help clients optimize existing business. In certain situations, the performance of inforce books may not be meeting expectations, yet substantial value is locked up in the duration of the business. Monetizing these values today and mitigating future risks are options that Scott Boug writes about in this issue of The Messenger. He observes the appointment of “inforce managers” at a number of companies and the strategic role these focused experts are playing on company leadership teams.

Another issue receiving needed attention involves blocks of level term life business that are reaching the post-level term (PLT) period. Companies have serious choices to make in determining their future pricing strategies. The wild card is human behavior – how consumers will respond when faced with substantial rate increases. Many of these policies will lapse, but enticing the policy owner to retain coverage for additional years could increase profitability. George Hrischenko reviews several PLT approaches.

Relationships often require looking at the present to understand the future. David Wylde and Mike Failor extend their discussion on stochastic modeling, a fundamental component of any principles-based approach. PBA and the required stochastic modeling will have potentially serious implications for a company’s inforce and future product development plans. Terry Feeney provides advice on potentially better methods to approach weight-mortality assessment beyond BMI preferred knock-out programs.

When we say we want to be a “reinsurance partner,” we envision a relationship that allows us to collaborate with client companies, understand distinct business strategies and objectives and offer solutions that can improve results, either in the performance of new business or existing inforce blocks. We have made inroads in building productive relationships with many of our clients. We look forward to continuing these efforts with each company we are privileged to do business with. ∞
Discussions around financial solutions usually involve programs to manage peak redundant reserves associated with XXX/AXXX compliance. Financial reinsurance is an effective tool that helps carriers manage both the mortality risk of the portfolio and the statutory reserves and capital that arise from regulations such as XXX. But reinsurance solutions also help carriers manage other areas of their business.

XXX and AXXX solutions involve addressing challenges associated with strain created by statutory accounting principles. The use of financial solutions can extend into a company’s GAAP accounting obligations as well. Many companies today are looking to manage their inforce blocks more actively. Today it is quite common for us to interact with company executives with “inforce management” in their titles. Many of these executives were present at the latest ReFocus conference.

One area of concern for companies reporting on a GAAP basis is in managing a predictable unlocking of deferred acquisition costs (DAC).

Pressing market and business considerations are driving inforce managers to consider their reserve and DAC management strategies:

• Interest rate assumptions are falling short as Treasury rates remain at record-low levels. The challenge is aggravated by statutory requirements to hold reserves and capital in highly liquid assets (e.g., bonds and other cash equivalents), whose yields create increased strain
• The post-level term shock lapse associated with level premium term so far has exceeded many companies’ expectations. In addition to potentially losing a larger share of the better risks than anticipated, this higher lapse rate also reduces the aggregate profits associated with this business. Fewer policies inforce means fewer policies on which to make a profit (Figure 1)
• In contrast to the shock lapse rate, mortality experience for many companies appears to be holding steady, creating a profit stream which would make a financial solution more feasible to execute

**DAC, Unlock and Its Effect on Earnings**

Often left unaddressed is the effect of these issues on the unlock of deferred acquisition costs (DAC).

DAC is an asset that life insurers who report earnings on a GAAP basis carry on their books and amortize as an expense over a set schedule. As companies unlock DAC, the value of the asset declines. Companies model their amortization pattern to 1) attempt to coincide with change in the business to which it is tied and 2) to try to create some certainty around the release. Even small changes such as variance in expected lapse or actual-to-expected mortality (A/E) can cause significant changes in the pattern and materially affect a company’s reported earnings.

Actuaries can implement DAC to a block of business in several ways. The most common approach attaches DAC to a policy based on the policy’s size, using constant (“unitized”) assumptions across the block. The accountant or actuary can quickly determine how changes to the policy (lapse, conversion, claim, etc.) affect DAC.

The shock lapse has a profound impact on DAC, which can create substantial earnings volatility and short-term deterioration. As DAC is usually determined using the unitized approach, any increase in the number of lapses requires a proportionate decrease in DAC. As the shock lapse usually results in a dramatic reduction of inforce policies, the DAC released can be material.

If a company's lapse and mortality experience follow its assumptions, a stock company can forewarn and explain such volatility in its quarterly reports. However, we have observed a “perfect storm” for DAC, which can exacerbate the shock lapse effect. Specifically, lapse
experience over the level period has been lower than expected (more policies remaining in force). As a result, we have not seen the level of amortization that many companies expected. This creates a swell in the DAC asset until the end of the level period. The shock lapse, which is higher than expected, then forces the company to write off far more of the DAC asset at a point in time than originally anticipated. The result is a much bigger loss in the DAC asset than was expected (Figure 2).

**Options to Address DAC Volatility**

Overall, once carriers decide on a DAC approach they must adhere to that approach even if the effects create choppy releases.

But an insurer does have options. Perhaps the simplest, but by no means necessarily the ideal, alternative is to sell the block. The buyer assumes any assumption risk, and the insurer eliminates the potential volatility associated with the block. Of course, the insurer is also selling any future profit streams, which could be quite accretive.

A potentially better alternative is to enter a coinsurance agreement whereby the insurer cedes 51 percent or more of the business to a reinsurer. Under GAAP terms, this would constitute a “sale,” providing all the benefits of a divestiture while still allowing the insurer to participate in future profits.

**DAC Must Be Amortized**

Regardless of the three approaches mentioned above (retention, sale, reinsurance), we still must note that the DAC asset needs to be released eventually. If a company retains the business, the write-down likely will be a slow bleed, potentially creating earnings volatility for the foreseeable future. As we all know, the investment community dislikes earnings uncertainty and volatility. Purely from this perspective, then, this is the least appealing option.

A sale generally results in an immediate unlock of all residual DAC attributed to the block: the insurer should not be able to carry deferred expenses related to a business it no longer owns. From an earnings perspective, this can be quite painful to the bottom line. However, experience indicates that, if properly explained and made transparent to stakeholders, such an approach actually can benefit the carrier in the long term. Volatility and uncertainty have been eliminated.

The coinsurance approach may provide a life insurer with more flexibility in scheduling the release. The degree to which the carrier can more effectively manage DAC volatility likely will be determined by the treaty terms.

SCOR has collaborated with a number of clients in developing solutions to help manage the financial challenges of writing new business and managing inforce. This becomes especially important to insurers when market forces alter the assumptions under which the products originally were designed. If you would like to explore options available for more effective inforce management, please feel free to contact your account executive or me.
A popular topic at industry meetings is how companies can best manage the post-level term (PLT) for level premium term life. Many of us started this discussion in our own companies a few years ago as the first wave of 10-year level term life policies were about to enter the PLT.

In this article I provide background on the traditional approach to PLT and touch upon two alternatives that companies have implemented. I also examine the latest idea to improve short-term PLT profitability, building off of experience learned from earlier attempts.

**Background**

The traditional approach to PLT pricing involved collapsing risk classes into aggregates (male/female smoker/nonsmoker). The company “shocks” the premium rates with rate increases of up to 20 times (Figure 1). The expected result is the “shock lapse,” where virtually all policy owners lapse, either because they can obtain the same coverage at a better rate with a new policy or because the rate increases are too high for all but the most impaired risks to persist.

Fast forward to the 2010s: Life insurers struggle to generate new business as the effects of the financial crisis continue. Moreover, pricing and product actuaries estimate that a lower shock lapse may create additional profit in the first few years following the PLT. The Society of Actuaries publishes a report that concludes that the size of the shock rate directly correlates to resulting mortality from the block.

We begin to change our mind about our PLT approach.

**New Approaches to Managing Post-Level Term**

Many companies are attempting to increase early PLT duration persistency. In an earlier *Messenger* article (“The EOLP Balancing Act,” December 2010), I examined a graded pricing approach to the shock. PLT rates increase at much smaller increments until a future anniversary (e.g., duration 15). Rates then jump at the end of this graded period (Figure 2).

Other companies have modified the rate increase based on the insured’s select risk class (Figure 3). Rates increase and move to a YRT schedule for all policy owners, but the jump’s size depends on the insured’s select risk. Preferred risks experience the lowest increases, with rates converging gradually to an ultimate rate.

Each approach has advantages and disadvantages. The traditional shock-rate approach punishes the best risks, causing a higher and faster lapse rate. The graded approach appears successful in retaining better risks, which helps the block’s mortality and profitability. However, many of these structures still aggregate risk classes, again penalizing the best risks. The select underwriting approach seems the most equitable and induces more of the worst risks to lapse (due to the much higher increase). However, individuals’ risk profiles can change over time. All choices still contain significant selection risk.

**The Latest Concept – Simplified**

A few companies are trying to manage selection risk.
by offering a single guaranteed YRT rate schedule similar to the shock rate, which serves as a maximum rate increase. At a policy owner’s PLT anniversary, the insured may choose to answer a simplified underwriting questionnaire. The carrier uses these answers to determine the insured’s PLT risk class. Those who decline to reply jump to the guaranteed rate (Figure 4).

The simplified underwriting approach has a number of advantages over the other options. First, it is less arbitrary. Even with a simplified questionnaire, the carrier can learn much about the insured’s current mortality profile. This is new territory for life insurers, as companies usually underwrite only at the point of original sale. However, the underwriting optionality and the resulting rate schedule may appeal to customers and regulators alike. And as with the risk-class option, the PLT underwriting approach seems fairer to the consumer. A better-than-average risk should not be charged an aggregate rate if we can identify them successfully.

Challenges Remain
Offering the insured the option to undergo simplified underwriting has some advantages, but the approach needs to address several challenges. Experience demonstrates that many preferred term policies stay inforce for a short time in the PLT because it takes policy owners a while to recognize the rate increase. Offering the simple questionnaire before the PLT anniversary may remind the policy owner of the premium jump and cause the preferred policy owner to lapse. Conversely, it may lead less healthy policy owners to take advantage of conversion provisions to lock in low rates.

Regulatory hurdles also may exist. Carriers are permitted to underwrite once. Despite the optionality in this approach, regulators may question the effect on risk transfer. If they approve the forms, regulators may restrict the approach to new business only.

Perhaps the greatest challenge lies in implementation. How will the insurer communicate this offer? What information will the insurer seek? How will the insurer ask the questions and collect the answers? What will the insurer do with incomplete questionnaires? How can the insurer encourage a high response rate and in the process increase credibility?

Using a postcard with “YES/NO” questions and an authorization to examine pharmaceutical and driving histories may be the simplest solution. Recruiting agents to assist is unlikely, but call centers may be useful. Carriers with an automated simplified issue engine may be able to implement this option quickly. Current clients of SCOR’s Velogica® solution, for example, may find the algorithm’s use especially helpful in this regard.

Conclusion
Ten to 15 years ago, PLT term pricing was a distant and seemingly inconsequential issue. Today, as carriers seek profitability, the shock-rate approach appears more harmful than originally envisioned. Companies are searching for new PLT retention ideas.

SCOR maintains one of the largest mortality and lapse databases in the industry. As you consider your PLT strategy, we are happy to consult with you to help determine which approach may be most suitable for your company.

Stochastic Modeling Is on the Rise
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Editor’s Note: In the last issue of The Messenger David Wylde and Michael Failor examined “why” companies are designing and implementing stochastic models to project death claims. Now they turn to the “how’s,” by examining closely one modeling approach. For more details in this article, visit www.scor.com.

Determining the Stochastic Method
As we begin a stochastic modeling endeavor to project death claims from a fully underwritten term life insurance portfolio, we first must determine the stochastic method and its components.

Stochastic models typically incorporate Monte Carlo simulation as the method to reflect complex stochastic variable interactions in which alternative analytic approaches would be either unworkable or untenable at best. For the illustrative projection discussed in this article, we developed a Monte Carlo simulation model to stochastically project 30 years of annual claims on a large fully underwritten term life insurance portfolio.

We implemented the process in four high-level steps:

1. Input variable analysis and specification
2. Random sampling of input stochastic variables
3. Computation of death benefit projections
4. Aggregation and analysis of results

Input Variable Specification
We define input variables as either stochastic or deterministic. Deterministic variables are assigned a predetermined fixed value or may be the result of a fixed non-random formula. Stochastic input variables are assigned statistical distributions and may correlate with other stochastic variables.

In our model, we defined three stochastic input variables: base mortality rate, mortality improvement rate and catastrophic mortality rate. We also defined one deterministic variable: policy lapse rate.

Deterministic Policy Lapse Rate Variable
We could have modeled policy lapse rates stochastically based upon some real-world model of policyholder behavior. However, determining appropriate statistical distributions and correlations for our particular project proved to be difficult: the policyholder’s decision to lapse term insurance typically is not driven by external fluctuating forces such as interest rates or stock market indices, but by other less tractable criteria. We chose instead to use predetermined best-estimate lapse rates in the Monte Carlo simulation to lapse individual policies randomly (see “Lapse Rates in a Principles-Based World.” The Messenger, June 2007.)

Stochastic Base Mortality Variable
This stochastic variable reflects the uncertainty in determining an underlying best-estimate mortality assumption for our portfolio. For this exercise, we referenced a recent mortality experience study for the portfolio. We can think of a mortality study as one random sample from the portfolio’s “true” mortality. Just as with any random sample, uncertainty exists as to whether the sample is a good representation of the population. The uncertainty about a particular study’s credibility is a function of the expected claim count, with uncertainty decreasing as the count increases.

We can model this uncertainty stochastically. With mortality as a binomial process, the experience study’s overall mortality is our mean assumption and \( \frac{1}{\sqrt{\#\text{claims}}} \) is an approximation of its standard deviation. Then, for a given stochastic iteration, we used the Normal approximation to the Binomial to randomly select a base mortality assumption for that iteration (see “Credibility Analysis for Mortality Experience Studies – Part 1,” The Messenger, March 2008).

Stochastic Mortality Improvement Rate Variable
In our model, mortality improves as we project our portfolio into the future. However, just as with base mortality, uncertainty surrounds the rate at which this improvement will occur. We calculated long-term mean improvement rates, along with corresponding standard deviations, based upon an analysis of US population mortality. We reviewed historical trends over the past 20-30 years to select appropriate periods for the analysis (Figure 1). A significant and seemingly permanent change in mortality patterns occurred around 1982, so we used data from only 1982 to 2007 in our analysis. For this period, we determined that trended mortality had an annualized mean improvement rate of 0.8 percent with a standard deviation of approximately 0.4 percent.

Mortality improvement rates vary significantly by attained age, so we created a vector of improvement assumptions by age group. Recognizing that mortality improvement is correlated among age groups, we also
determined a correlation matrix reflecting historical correlations in improvement rates.

Using US population data, we determined that a Normal distribution best represented the fluctuation of improvement rates around the long-term mean. Given the mean and standard deviation parameters, we stochastically generated 10,000 mortality improvement rate scenarios by attained-age group across the projection horizon. We then randomly selected a single scenario from these 10,000 scenarios for application in a single stochastic projection iteration of the portfolio.

**Stochastic Catastrophic Mortality Variable**

Unlike the property/casualty sector, we are concerned only about catastrophes that result in significant loss of life. Natural disasters were less impactful than pandemics and other disasters which have the potential for loss of life in far greater numbers. Our model includes a stochastic variable representing additional lives lost in a given calendar year from three types of disasters: pandemics, earthquakes, and terrorist attacks. From third-party data sources we developed frequency and severity distributions for each of these types of disasters and randomly sampled these distributions for each projection year (Figure 2).

For each projection year, we randomly sampled the additional catastrophic mortality rate and added this rate to the base mortality of each individual life.

In the next issue we will show how these variables are used and how to analyze the results.

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**Fat, BMI and Preferred Programs – A Good Mix?**

*By Terry Feeney, FALU, FLMI, ACS*

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Good news, USA: the US recently lost its #1 position as the “fattest” major nation. However, while Mexico takes over the lead, nearly a third of the population of each nation still falls into the obese category, with significant impacts to morbidity and mortality.

Life insurers adopted the Body Mass Index (BMI) in the 1980s to help determine an applicant’s weight class. According to the World Health Organization, an individual with a BMI of 30 or more is obese; if their BMI is over 40, the person is morbidly obese.

**Drawbacks**

BMI was not designed to approximate body fat, but it is a convenient, quick approximation. As we know, BMI has limitations as a fat-measurement tool:

- BMI does not differentiate well between fat and muscle or bone, both of which have greater mass than fat. “Big boned” or muscular individuals may be miscategorized as overweight or obese.
- BMI can exaggerate thinness in short people and fatness in tall people. For example, males on average are taller than females. A unisex approach to underwriting (required in some states) may be too favorable to women who are overweight/obese.
- BMI cannot account for body shape or build, a primary indicator of mortality.
Fat, BMI and Preferred Programs – A Good Mix? (cont.)

The Industry’s Response
The industry recognizes some of these limitations. Companies commonly examine BMI history – plotting current BMI against the applicant’s historical average – to identify patterns that may signal concern. This includes erratic readings across medical reports as well as “application BMIs” lower than historical averages.

Many carriers incorporate BMI as one factor in their (super) preferred knock-out system. This is likely more rigidly enforced at lower face amounts. For applications exceeding $3-$5 million, underwriters may feel pressure to make business decisions, tainting the risk pool. Business decisions (for BMI and other underwriting factors) may be a major contributor to deteriorating mortality in higher face amount bands.

Assessing Options
Alternatives to BMI exist, but industry use has been limited. Many epidemiologists have stressed the use of identifying Metabolic Syndrome in applicants. This incorporates five factors: waist circumference, triglyceride levels, HDL cholesterol, blood pressure and fasting glucose readings.

Related to waist circumference, waist-to-height ratio can help underwriters quickly assess body shape. Individuals with gynoid (“pear”) figures bear most of their fat on the hips, thighs and buttocks, which are primarily muscle. In contrast, android (“apple”) body shapes have more fat above the waist around vital organs and therefore are associated with higher mortality risk. Waist size is directly correlated to diabetes risk.

A key challenge to any waist-related measurements is consistency. The waist lies above the hips, where most people will naturally take measurements. Insurers should provide clear instruction to examiners on how to properly measure the waist. Other similar tools may help underwriters define body shape as well. Our online underwriting manual, SOLEM Americas, offers several suggestions.

Conclusion
Weight and its attendant metrics can provide important insights into the underlying risk profile of an applicant. The trick is in conducting enough analysis to identify variances, investigate those variances and make a judgment on how the changes affect the applicant’s mortality profile – if at all. Our experienced team of facultative underwriters is available to assist clients in these sometimes challenging cases.