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Practical Considerations for Implementing the New Statement of Position for Long Duration Contracts and for Separate Accounts – Part II

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Editor's Note: The section's GAAP List Serve would be an appropriate forum for discussing the concepts of this article.

In Part I, which appeared in the November 2002 issue, we wrote about issues such as the initial classification of non-traditional long duration contracts (LDC), sales inducements and accrual of liabilities for persistency bonuses. In Part II, the topics are reinsurance, profits in early years and losses in subsequent years, discount rates for present value calculations and additional liabilities for various types of LDC. We also include an update on the SOP for internal replacements, suggested contract classification criteria, and numerical examples for the treatment of sales inducements.

(I) REINSURANCE

Besides affecting direct issuers of non-traditional LDC, SOP 03-1 also affects reinsurance enterprises that assume certain benefit features of non-traditional LDC. Paragraph 30 provides specific financial reporting guidance for reinsurance. The guidance is applicable to both reinsurance and retrocession reinsurance contracts. Key provisions for reinsurance include:

- The assuming enterprise should determine the classification of the reinsurance contract (insurance contract vs. investment contract) at the inception of the reinsurance contract.
- The significance of mortality and morbidity risks of an assumed insurance benefit feature:
 - (a) Should be assessed within the reinsurance contract according to the guidance in paragraphs 24 and 25 of the SOP, regardless of whether there is an account balance and

(b) Could be deemed other than nominal even if the ceding company did not determine the mortality or morbidity risks to be other than nominal and vice versa.

- There is a rebuttable presumption that a (reinsurance) contract has significant mortality risk if the additional insurance benefit would vary significantly in response to capital market's volatility.
- The assuming company should calculate a liability for the portion of collected reinsurance premiums that are expected to result in current profits and future losses from the assumed insurance benefits. The additional liability should be calculated using methodology described in paragraphs 26 through 28 of SOP 03-1.

Assuming Company

Due to the adverse equity returns in recent years, activities for reinsuring GMDBs, GMIBs and other variable annuity guarantees have slowed down significantly.

Under a coinsurance contract, contractual obligations are shared between the ceding and assuming enterprises. Accordingly, risks and rewards are also shared on a pro-rata basis. An indemnity reinsurance contract, on the other hand, identifies specific contractual obligations that the assuming enterprise must reimburse the ceding enterprise. Risks and rewards are not shared proportionally. Reinsurance for variable contracts and interest sensitive contracts is usually on an indemnity basis. As these indemnity-type reinsurance contracts usually cover only mortality or morbidity risks, the

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assuming enterprise should implement SOP 03-1 from its assumed risk profile, rather than from the risk profile of the underlying contracts.

As SOP 03-1 focuses on the incidence of profits and losses, this emphasis may have strong implications for assuming companies regarding the classification of contracts. For example, if reinsurance premiums vary with the account value, rather than the net amount at risk (NAR), it is possible that the assuming enterprise experiences current profits and future losses under adverse equity scenarios. As a result, the assuming enterprise may hold an additional reserve in accordance with guidance provided in paragraphs 26 through 28.

The reserve held by the assuming enterprise for the assumed risks needs not be the same as the reserve claimed by the ceding enterprise.

Ceding Company

There are many viewpoints on how reinsurance may affect the contract classification of the base non-traditional LDC. In many instances, the ceding enterprise cedes only the mortality or morbidity risks of the base non-traditional LDC to the assuming enterprise. Even though the ceding enterprise may consider the reinsurance contract as a shield, we believe this type of indemnity reinsurance contract, should not affect the classification of the base non-traditional LDC for the following reasons:

- The ceding enterprise is the primary party responsible for providing mortality and morbidity payments to the contract holder, even though the assuming enterprise reimburses the ceding enterprise for the benefit payments.
- The reinsurance contract may be terminated before its scheduled maturity date due to reasons such as financial hardship or downgrade of one of the assuming companies in the reinsurance pool. If the reinsurance contract is terminated, the ceding enterprise becomes the sole party responsible for future mortality and morbidity benefit payments.
- The ceding company may, if allowed

under certain conditions, recapture the ceded risk before the reinsurance contract's maturity date. If the ceding enterprise has already classified the base non-traditional LDC as investment contracts because of the indemnity reinsurance contract, the ceding company has forever lost the opportunity to classify the contracts as UL-type contracts when the mortality or morbidity risks, after the recapture, are other than nominal.

- SFAS 113, *Accounting and Reporting for Reinsurance of Short-Duration and Long-uration Contracts*, requires the ceding enterprise to calculate reserves for the base non-traditional LDC on both before- and after-reinsurance bases unless the base LDC is ceded with an assumption reinsurance contract.

The reserve held by the assuming enterprise for the assumed risks needs not be the same as the reserve credit claimed by the ceding enterprise. Differences between these two quantities may be due to factors such as different assumed investment yield rates, expense assumptions, other actuarial assumptions and definitions of total assessments. For the ceding company, to use the reserve held by the assuming enterprise as the reserve credit may not be an appropriate approach.

(II) PROFITS IN EARLY YEARS AND LOSSES IN SUBSEQUENT YEARS

Paragraph 26 of the SOP discusses the requirements and the calculation procedure to establish an additional reserve for UL-type LDC. In particular, paragraph 26 specifies that,

If the amounts assessed the contract holder each period for the insurance benefit feature are assessed in a manner that is expected to result in profits in earlier years and losses in subsequent years from the insurance benefit

function a liability should be established in addition to the accrual account balance, to recognize the portion of such assessments that compensates the insurance enterprise for benefits to be provided in future periods.

This “early profits and subsequent losses” issue deals with a particular insurance benefit function rather than the entire contract. Paragraphs A31 and A32 provide additional clarifications on this point. Per paragraph A32,

AcSEC also considered, but rejected, the view that an additional liability for expected losses on insurance benefit payments would only be established if all the margins of the product combined to create a premium deficiency... AcSEC rejected that view because such disproportionate assessments are made in part to compensate the insurance enterprise for the risk it assumed in future periods.

In other words, an insurance enterprise may need to establish an additional mortality reserve for a UL-type contract even when the contract’s aggregate margin is positive in all policy years. Although this “early profits and future losses” criterion may be originally specified for variable annuities with guaranteed benefits, this requirement may also affect many universal life products and variable life products.

Universal Life with No-Lapse Guarantee

There are many types of UL contracts with no-lapse secondary guarantee. Examples are UL contracts with catch-up provisions or UL contracts with shadow accounts. Contractual death benefits for these UL contracts remain effective as long as the policyholders fulfill certain contractual conditions, even when the contracts’ account balances are zero. At the time SFAS 97 was written, these types of UL contracts were not popular in the market place. SFAS 97 is silent about providing additional reserve guidance for UL

contracts with secondary guarantees except, to confirm that loss recognition is applicable to UL-type contracts.

The conditions for maintaining the secondary guarantee are sometimes specified in terms of a “stipulated premium” which may either remain as a level amount or increase with a very gradual schedule. A UL contract with secondary guarantees seldom has any significant account balance, and its annual investment margin is usually negligible. When the account balance is either equal to or marginally above zero, the stipulated premium effectively becomes the upper bound of collectible COI charges. As expected mortality costs increase with assumed mortality rates, while stipulated premiums remain level, it is possible that a UL contract with secondary guarantees exhibits profits in early years and losses in subsequent years. Accordingly, the insurance enterprise may be required to hold an additional mortality reserve for UL contracts with secondary guarantees in accordance with provisions in paragraphs 26 through 28 of the SOP.

This “early profits and subsequent losses” criterion also affects other UL contracts without secondary guarantees, if their profitability relies on the investment margin or expense margin, rather than the mortality margin. For example, single premium UL before TAMRA is a UL contract that was priced with zero or minimal COI charges but with heavy investment margins.

Other Universal Life Contracts

Most UL contracts are underwritten contracts, and the pricing mortality rates are usually based on select and ultimate rates such as the 1985-90 S&U mortality rates. The contract’s current COI charge rates, on the other hand, are usually expressed in an ultimate scale. It is possible that the mortality spreads between current COI rates and pricing mortality rates are positive in early policy years and negative in later policy years, say the 15th policy year and thereafter. The negative mortality margin is usually compensated by the positive investment margin in the

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later policy years, so that the contract exhibits positive margins in aggregate.

As mentioned earlier, the “early profits and subsequent losses” criterion focuses on an insurance benefit function rather than the entire contract. The positive mortality spreads in early policy years and negative spreads in future years may result in an additional mortality reserve. The net effect on income is that a portion of mortality margins in earlier policy years would be deferred into future policy years.

Variable Contracts

Deposits of a variable contract (variable universal life or variable annuity) are usually invested in equity funds. Its account balance and NAR vary in response to equity market volatility. If the COI charges of a VUL contract are based on NAR and are self-supporting, the collected COI charges should be proportional to the expected death benefits on NAR and the mortality margin should be positive in all policy years. The “current profits and future losses” criterion probably would not apply to this type of VUL contract.

Most variable annuity contracts do not have specific COI charges. The fee for providing death benefit in excess of the account value is usually expressed as a specified percentage, for example, 25 basis points, of the account value. The same situation may occur for some variable universal life contracts where the COI charge is expressed in terms of a contractual fixed mortality and expense (M&E) charge that is applicable to account balance rather than NAR. The collectible COI charges for this type of VUL contract are not proportional to the NAR. The combination of decreased COI charges and increased death benefit costs during a bear market may result in profits in early years and losses in subsequent years. Accordingly, the “early profits and subsequent losses” criterion may require the insurance enterprise to establish an additional mortality reserve for these VA and VUL contracts.

An associated practical difficulty of developing additional reserves for this

type of variable contract is the need to identify the fee for the GMDB, because the guidance in paragraphs 26 and A32 focuses only on an insurance benefit function rather than the entire contract. The identification exercise may be challenging for variable contracts that are using implicit, rather than explicit, fees for GMDBs.

This “early profits and subsequent losses” issue is likely to be an important issue when insurance enterprises implement SOP 03-1 for the first time in 2004. We recommend the valuation actuary obtain a clear understanding of various contracts’ profit and loss patterns for each insurance function before implementing the SOP.

(III) DISCOUNT RATES FOR PRESENT VALUE CALCULATIONS

The test of significance of mortality and morbidity risk and the benefit ratios are based on the present value of excess payments and the present value of total assessments during the accumulation phase of the contract. For annuitization benefits, the excess payment is the present value of annuity payments in excess of the accrual account balance at the actual date of annuitization. So, what are the appropriate discount rates for these present value calculations? Should the discount rates be the investment yield rates, the crediting rates or something else?

Excess Payments for Annuitization Benefit

Per paragraph 33 of the SOP on annuitization benefits,

Cumulative excess payments determined at annuitization should be calculated as the present value of expected annuity payments, and related claim adjustment expenses discounted at expected investment yields, minus the accrued account balance at the actual annuitization date.

Accordingly, the expected investment yields should be used as the discount rate

This “early profits and subsequent losses” issue is likely to be an important issue

to calculate the present value of the annuitization payments in excess of the accrual account balance. The application of this guidance, however, is limited to the calculation of excess annuitization payments.

Additional Liability for General Account Business

The calculation of benefit ratios and additional liabilities involves a completely different set of present values (the present value of excess payments and the present value of total assessments). SOP 03-1 is not very clear on the choice of the discount rate for the present value calculations. Paragraphs 26 and 31 of the SOP provide some hints on this issue and state that,

Assumptions used, such as the interest rate, discount rate, lapse rate, and mortality should be consistent with assumptions used in estimating gross profits for purposes of amortizing capitalized acquisition costs.

Paragraph A33 provides additional clarification of this issue by stating that the assumptions used to compute additional liability should be consistent with those used in estimating gross profits and “consequently the amortization of DAC.” Paragraphs 22 and 25 of SFAS 97 specify that the crediting rate should be used to discount Estimated Gross Profits (EGP) and deferrable acquisition expenses for UL-type contracts and that the discount rate should be used to compute accrued interest for unamortized DAC, respectively. Our interpretation of the guidance in paragraphs 26, 31, and A31 is that the crediting rate is a reasonable interest rate for (a) discounting expected excess payments and total assessments and (b) calculating the accreted interest on additional liability for the general account business.

Please note that SOP 03-1 only requires the assumptions used for the additional liability be consistent with, but not necessarily the same as, those used for amortization of deferrable expenses. Thus, the crediting rate is simply only one of

many possible choices, rather than being the only choice. It appears that an insurance enterprise may choose any reasonable discount rate as long as it is consistent with the crediting rate.

Paragraph 25 of SFAS 97 offers two choices of crediting rate for discounting: 1) the crediting rate in effect at the inception of the book of contracts, or 2) the latest revised crediting rate applied to the remaining benefit period. As crediting rates for general account contracts are non-negative and relatively stable, either approach would not produce materially different additional liabilities for the general account business.

Additional Liability for Separate Account Business

The situation becomes slightly more complicated for variable contracts, because crediting rates for variable contracts can be negative in a bear equity market. If an insurance enterprise has been using a locked-in and non-negative crediting rate that was in effect at the inception of a book of variable business for DAC amortization, the enterprise may continue to use this locked-in rate as the discount rate to calculate the present values of expected excess payments and total assessments. This would be appropriate because a non-negative rate would not produce negative accreted interest for the additional liability, a general account liability.

If an insurance enterprise has been using historic crediting rates and the latest revised crediting rate to perform amortization of DAC for in force business, the final discount rates (a possible composite of positive and negative interest rates) may produce results that require additional explanations. The discount rates used by the enterprise to calculate additional liabilities should nonetheless be consistent with those used for DAC amortization. For new business, the enterprise may consider

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using a locked-in crediting rate for DAC and additional reserve.

(IV) ASSUMPTIONS FOR ADDITIONAL LIABILITIES

Paragraphs 26 and 31 provide the following guidance about additional liabilities:

The insurance enterprise should calculate the present value of total expected excess payments and total assessments and investment margin, as applicable, based on expected experience.

Expected experience should be based on a range of scenarios rather than a single set of best estimate assumptions.

In calculating the additional liabilities for the insurance benefit feature, assumptions used, such as interest rate, discount rate, lapse rate, and mortality, should be consistent with assumptions used in estimating gross profits for purposes of amortizing capitalized acquisition costs.

There are many possible interpretations of the guidance in these three sentences. One may argue that the expected experience should be the median or a selected percentile, for example, the 83rd percentile, of the tested scenarios. Disadvantages of this approach include:

- The projected elements, for example, equity return, of these scenarios may be higher or lower than the projected elements of another scenario in different projection years. Due to this potential criss-crossing of projected elements among scenarios, there may not be a convenient way to rank them.
- If these scenarios are ranked using their associated benefit ratios or additional reserves, the chosen scenario may have widely fluctuating equity returns that are inconsistent with

those used for DAC amortization.

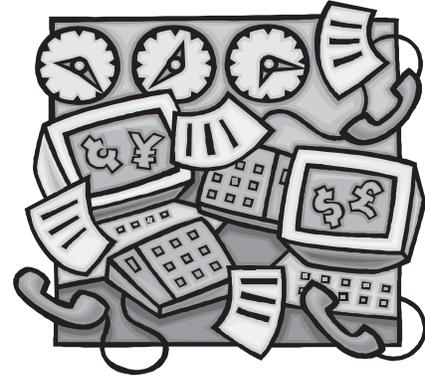
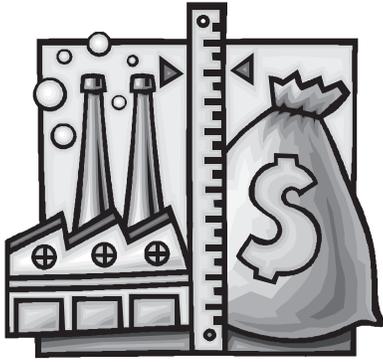
One may also argue for using the mean of the tested scenarios as the expected experience. Disadvantages of this approach include:

- If the tested scenarios are stochastically generated and the generated equity returns are based on an assumed annual return, taking the mean of the simulated equity returns neutralizes the random fluctuations in these scenarios and reproduce the assumed annual equity return. If the mean is used, one may not recognize the frequency and the severity of future benefits.
- If the mean is obtained by using the mean of the scenarios' associated benefit ratios or additional reserves, there is no guarantee that any one of the tested scenarios could provide the average benefit ratio or additional reserve. Even if there is a tested scenario that approximately produces the average benefit ratio or additional reserve, the underlying assumptions may be inconsistent with those for DAC amortization. If there isn't any one of the test scenarios that produces the benefit ratio or additional reserve, the actuary may need to derive a scenario producing such benefit ratio or additional reserve with underlying assumptions remaining consistent with those for DAC amortization. This scenario derivation process can be a very time-consuming exercise because it involves many trial-and-error runs.
- If there is more than one cohort under consideration, the actuary may need to explain the differences, if any, among these "mean expected experience" scenarios for various blocks of business.

Our interpretation of the guidance about additional liabilities is listed below:

1. Contrary to some prior practices, the actuary should not use a single set of subjective best estimates to quantify

If there isn't any one of the test scenarios that produces the benefit ratio or additional reserve, the actuary may need to derive a scenario producing such benefit ratio...



the inherent risks of the underlying LDC. For instance, an 8 percent per annum equity return should not be considered an appropriate assumption, because the projected contractual guarantees may never be “in-the-money.”

2. The actuary should carefully study the risk profile of the underlying non-traditional LDCs under a wide spectrum of equity and interest rate scenarios. The study may enhance the actuary’s objectivity in developing the expected experience.
3. After studying the results, the actuary may choose an expected experience to calculate the additional liabilities. The expected experience needs not be one of the tested scenarios. For instance, the actuary may select the expected equity experience as either (a) a long-term bull market with modest annual return or (b) a long-term bull market interrupted by several short-term bear markets.
4. The assumed equity returns should nevertheless be consistent with those used for DAC amortization. If the assumed equity returns for DAC amortization are 8 percent per annum, the assumed equity returns for additional liabilities should also show positive long-term investment returns. In our opinion, a modest positive per annum equity return or a long-term bull

market interrupted by short-term bear markets are reasonable equity return assumptions, as long as they are consistent with the assumed equity returns for DAC amortization.

5. In reality, there is only one set of actual equity returns. Unless there are strong and logical reasons to assume otherwise, we believe the assumed equity returns should be applied uniformly to all cohorts and guaranteed benefits to determine their additional liabilities.

Some insurance enterprises offer equity funds that are not broad market equity funds, such as the S&P 500 or Dow Jones Industrials. Generating equity returns for these special equity funds may present challenges such as a lack of credible historical statistics, for example, mean and standard deviation. We believe it is most convenient to generate broad market equity returns first and then derive the equity returns for these special equity funds, using their presumed correlation with the equity returns of a broad market.

It is possible that the additional reserve calculated under our suggested interpretation is not material when compared with the accrued account balance. As GAAP focuses on the best estimate and reasonableness, rather than conservatism, we believe reasonableness is far more important than the absolute magnitude of the

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reserves for insurance benefit functions such as GMDBs and GMIBs.

(V) AN UPDATE ABOUT THE SOP FOR INTERNAL REPLACEMENT

As discussed in Part I of this article, there is a proposed SOP regarding the accounting of unamortized DAC of insurance contracts involved in internal replacements. During September 2003, the proposed SOP on internal replacement was modified and the scope was expanded to include DAC-type assets for sales inducements. We believe the expanded scope and additional guidance on accounting for sales inducement assets are reasonable and logical. As the guidance of the revised SOP is not finalized, we will not discuss them here. We encourage interested readers to review the revised proposal for more details.

To enhance objectivity, actuaries should first obtain input from investment professionals to establish the initial equity assumptions.

(VI) SUGGESTED CONTRACT CLASSIFICATION CRITERION

A well-defined decision criterion enhances a person's objectivity in making a decision. The initial setting of a decision criterion, however, is still a subjective exercise. This blending of objectivity and subjectivity is equally applicable to the criteria for determining the significance of mortality and morbidity risks of LDCs, in order to classify them properly as investment contracts or UL-type contracts. According to paragraph 25, there is a rebuttable presumption that a contract has significant mortality risk, if the additional insurance benefit would vary significantly in response to capital market volatility. This guidance appears to advocate a null hypothesis that all variable contracts embedded with GMDBs are contracts with significant mortality risk. Based on the results of the analysis, actuaries may reject or do not reject the null hypothesis. This approach is slightly different from the prior approach for investment-oriented LDCs, where variable annuities and general account deferred annuities are generally considered investment contracts with insignificant or nominal mortality

risk, unless proven otherwise.

As noted in paragraph 25 of SOP 03-1, an insurance enterprise should consider both frequency and severity under a full range of scenarios. In our opinion, an insurance enterprise may, in theory, reject the null hypothesis, that the LDC has significant mortality risk, and consider the underlying LDC an investment contract, only when the results of the simulation analysis indicate that the excess mortality payments are both infrequent and not severe.

Both the frequency and severity of excess mortality payments depend on the assumed equity return and its standard deviation. To enhance objectivity, actuaries should first obtain input from investment professionals to establish the initial equity assumptions. Unless the assumed equity return is overwhelmingly greater than its standard deviation, it is very likely that most variable contracts with GMDBs would have positive present value of excess mortality payments for a significant number of equity scenarios. For instance, if the assumed equity return is 8 percent and the standard deviation is 15 percent, the probability of having a return of premium (ROP) GMDB in-the-money, in the first policy year, is approximately 30 percent. The situation becomes more acute when the GMDB provides roll-up or ratchet minimum death benefits. Our simulation analysis indicates that excess mortality payments for GMDBs are also significant under extreme adverse equity scenarios. We believe it is reasonable to classify all new issues of variable contracts as UL-type contracts if they are embedded with GMDB features.

The situation becomes a bit more complicated for in force LDCs because we should also consider their prior experience. For in force variable annuities with accrued account balance at least 30 percent higher than the ROP GMDB at the initial adoption date, the frequency of these contracts experiencing excess death benefit payments is relatively low. Even if excess death benefit payments are positive under a minority of generated equity scenarios, the present values of excess payments are likely to be moderate. We believe it is reasonable to

classify variable annuities with significant out-of-money ROP GMDB as investment contracts. For existing variable annuities with slightly out-of-money ROP GMDBs, in-depth simulation analysis is required to determine proper contract classification.

Our simulation analysis also suggests that roll-up and ratcheted GMDBs would eventually erode the margin that may exist between the accrued account balance and the GMDB at the initial adoption date under adverse equity scenarios. Unless most of the generated equity returns are positive, the number of scenarios with positive present value of excess mortality payments, for variable annuities with accrued account balance greater than roll-up or ratcheted GMDB, is at least 10 percent of all tested scenarios. The present values of excess mortality payments are also significant under adverse equity scenarios. Our simulation analysis suggests that it is reasonable to classify all variable annuities with roll-up, ratcheted or other types of competitive GMDBs that exist at the initial adoption date as UL-type contracts.

The SOP's guidance for determining the significance of mortality and morbidity risk appears to focus primarily on contracts that are tied to the capital markets. We believe the guidance is equally applicable to general account contracts that provide a death benefit or morbidity benefit in excess of the accrued account balance. An example is the two-tier general account deferred annuity that provides the upper-tier as a death benefit. As the upper-tier is usually greater than the accrued account balance, the death benefit is always in-the-money until the two tiers merge. The present value of excess death benefit payments, on the other hand, is likely to be mild, unless the upper-tier is significantly greater than the lower-tier for an extended period. From a frequency perspective, we believe these types of contracts should be classified as UL-type contracts even though the present value of excess mortality payments is relatively small when compared with the present value of total assessments.

(VII) NUMERICAL EXAMPLES FOR THE TREATMENT OF SALES INDUCEMENTS

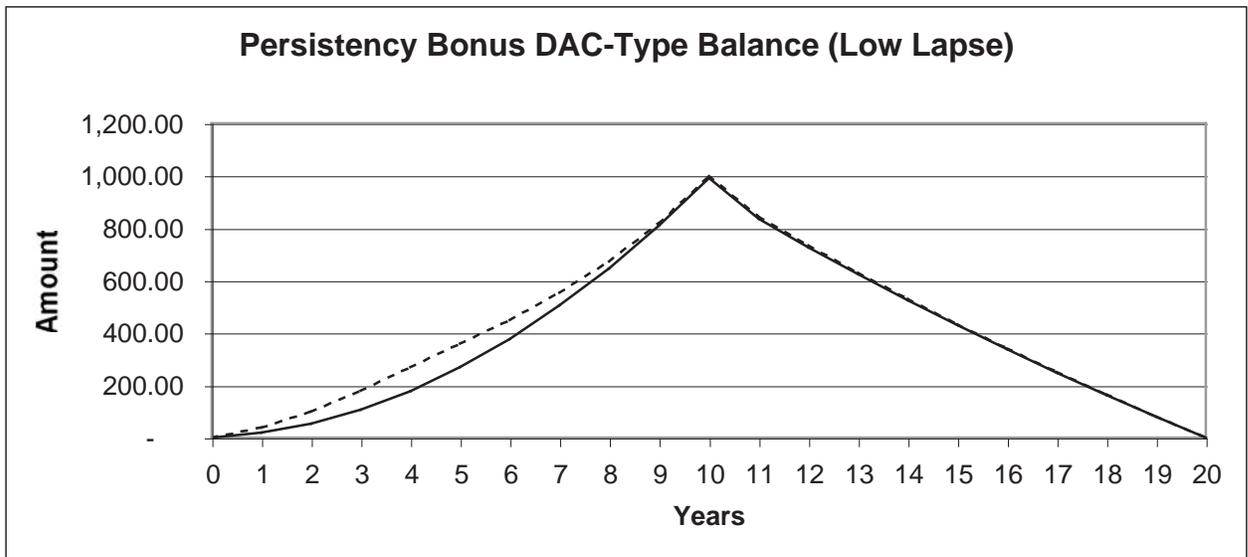
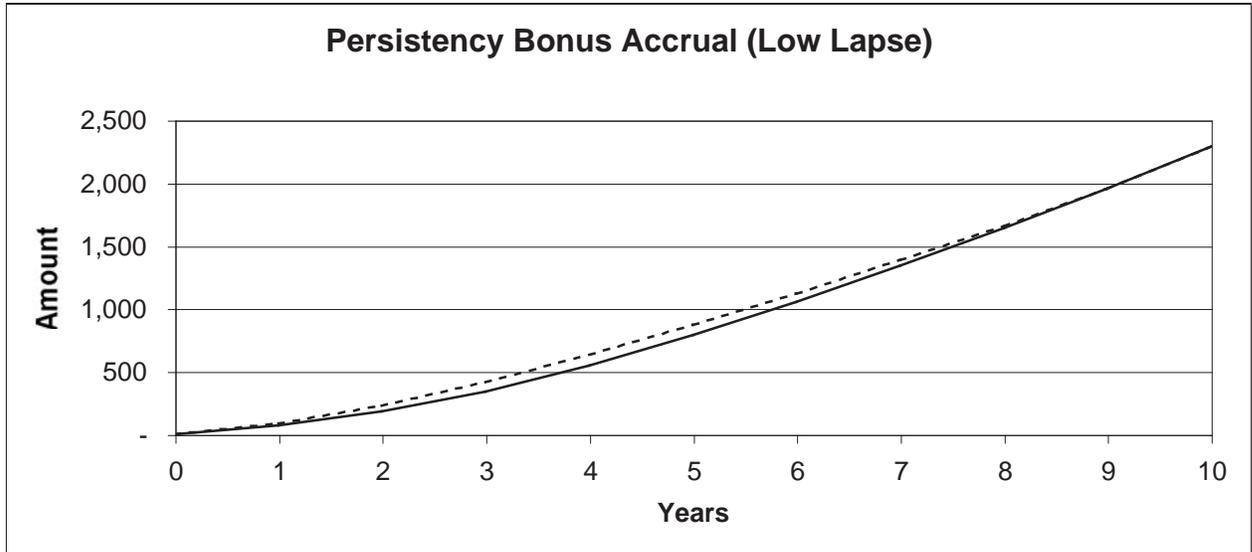
Before presenting and discussing numerical examples for the treatment of sales inducements, let's have a brief recap from Part I of this article, which appeared in the November 2003 issue. Insurance enterprises provide sale inducements to promote sales and persistency. SOP 03-1 provides financial reporting guidance for the three most commonly used sales inducements (immediate bonuses, persistency bonuses and enhanced yield). The new SOP's guidance about these sales inducements is also applicable to other possible types of sales inducements, for example, return of COI charges.

Paragraph 36 of the new SOP states that liabilities for sales inducements provided to the contract holder should be recognized over the period in which the contract must remain in force for the contract holder to qualify for the inducement, or until the credited date, if earlier. With respect to the pattern of accrual, paragraph D19 indicates that the liability for a persistency bonus should be accrued "ratably" over the vesting period. The word "ratably" is not defined by the SOP. According to *Random House Webster's College Dictionary*, the word "ratably" is the adverb of the word "ratable" which means (1) capable of being rated or appraised or (2) proportional.

According to paragraph 37, sales inducements should be deferred and amortized using the same methodology and assumptions used to amortize capitalized acquisition costs, if the sales inducements satisfy the following conditions:

- (a) They are recognized as a part of the liability under paragraph 36 of the SOP.
- (b) They are explicitly identified in the contract at inception.
- (c) The amounts of sales inducements are incremental to the amount that the enterprise credits on similar contracts, without sales inducements, and higher than the contract's expected on-going

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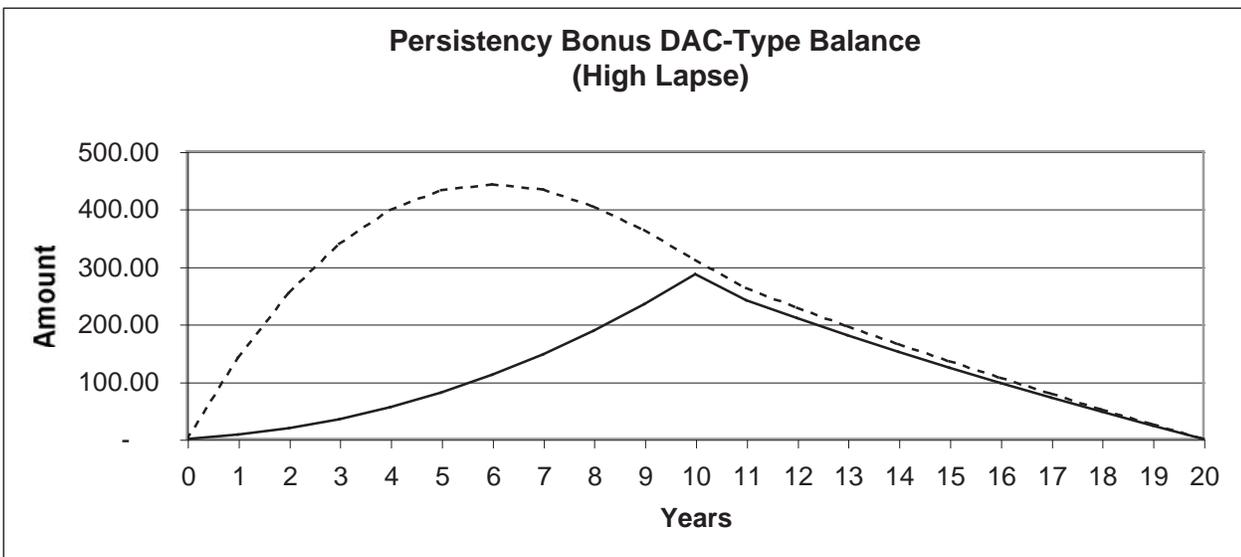
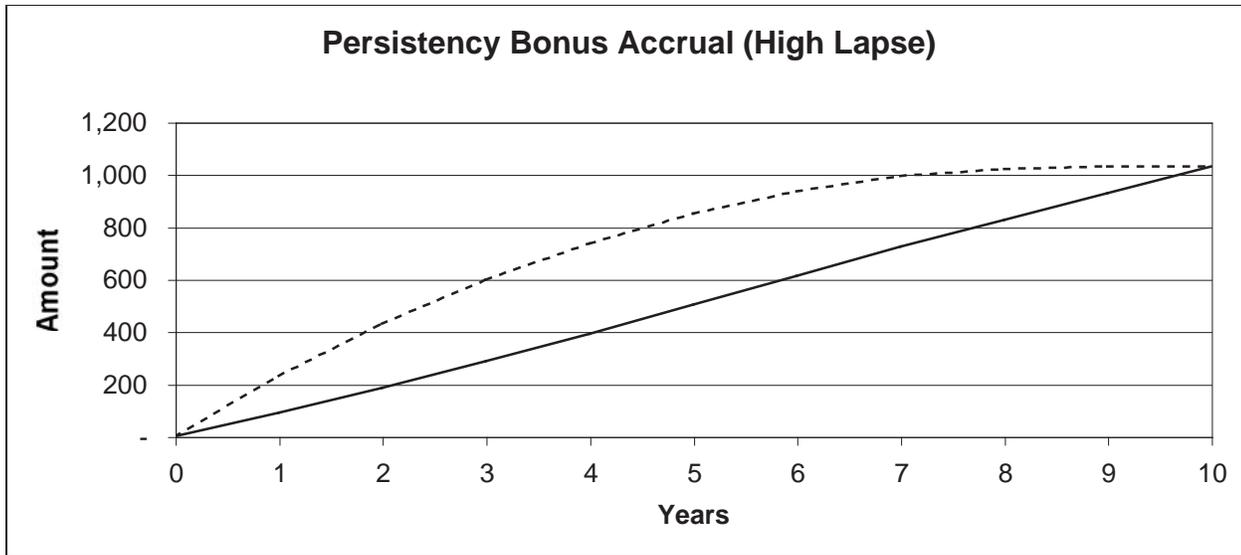
credited rates after the inducement.

Our numerical examples will focus on a persistency bonus (PB) rather than an immediate bonus or enhanced yield, because an immediate bonus is normally vested immediately and enhanced yields may be viewed as a series of persistency bonuses.

There are numerous possible patterns for accruing the PB over the vesting period. In our example, the pattern of accrual

and the recognition of the associated liability are determined in accordance with the contract's SFAS 97 EGP over the vesting period. In our opinion, using the SFAS 97 EGP as the revenue stream for the accrual process usually produces a better matching of revenues and expenses. Other simpler patterns of accrual are also viable choices.

Our numerical example is based on a single premium deferred annuity (SPDA) contract with a PB equal to 2 percent of the



account value at the end of the tenth policy year. The amortization periods for DAC and sales inducement DAC-type assets are 20 years. The assumed single premium is \$100,000, with acquisition expenses and commissions equal to 4 percent of premium. The assumed maintenance expense is \$36 per policy per year, and the surrender charges as a percent of account balance for the first seven policy years are 10, 9, 8, 7, 6, 4, 2 and 0, thereafter. The assumed credited rate is 4 percent per year and the

assumed interest spread between earned and credited rates is 2 percent.

As mentioned earlier, one purpose for offering sales inducements is to improve persistency. Thus, we initially assumed low lapse rates during the bonus accrual period. The lapse rates, which include mortality, as a percent of account balance for the first eleven policy years are 1, 2, 3,

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GAAP Pre-tax Income						
Year	Assumptions			Assumptions		
	Method 1	Low Lapse Method 2	Difference	Method 1	High Lapse Method 2	Difference
1	251	251	(0)	881	874	(7)
2	682	682	0	1,107	1,105	(2)
3	967	968	1	1,183	1,185	2
4	1,254	1,256	2	1,262	1,267	5
5	1,539	1,542	2	1,349	1,355	6
6	1,707	1,709	2	1,391	1,398	7
7	1,941	1,942	2	1,446	1,452	6
8	2,043	2,044	1	1,387	1,393	6
9	2,215	2,215	(0)	1,425	1,428	3
10	2,416	2,415	(1)	1,468	1,468	(0)
11	2,544	2,542	(1)	1,469	1,465	(4)
12	2,242	2,241	(1)	1,364	1,362	(3)
13	2,304	2,303	(1)	1,416	1,413	(3)
14	2,375	2,374	(1)	1,473	1,470	(3)
15	2,454	2,453	(1)	1,534	1,532	(2)
16	2,542	2,541	(1)	1,602	1,599	(2)
17	2,639	2,638	(1)	1,675	1,673	(2)
18	2,746	2,745	(1)	1,754	1,752	(2)
19	2,863	2,862	(1)	1,839	1,837	(2)
20	2,990	2,989	(1)	1,931	1,929	(2)



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4, 5, 4, 3, 2, 1, 0, 30 (shock lapse after bonus) and 10 thereafter.

There are numerous approaches available to project the amount of PB at the end of the tenth policy year. We will demonstrate two approaches. Our first approach (Method 1) is to project the account balance using the SFAS 97 GAAP assumptions for DAC. The projected persistency bonus is 2 percent of the projected account balance at the end of tenth policy year. We define the accrual factor as the ratio of a) over b); where a) is the present value of

the projected persistency bonus and b) is the present value of the SFAS 97 EGPs for the first ten policy years (which is the persistency bonus accrual period). We used the accrual factor to form the PB accrual pattern. The PB at time t equal the previous PB at time (t-1) accumulated at the crediting interest rate plus the accrual factor times the SFAS 97 EGP at time t.

Paragraph 36 of the SOP indicates that no adjustment should be made to reduce the liability related to the sales inducements for anticipated surrender

charges, persistency or early withdrawal contractual features. This guidance appears to indicate that the projected persistency bonus accrual should not be affected by future policy persistency. In our second approach (Method 2), we accrued the PB by multiplying the accrual scale at time *t*, developed under Method 1, by the in force account value at time *t*.

The patterns of accrual of the PB are shown in the Persistency Bonus Accrual (Low Lapse) graph. The solid line represents Method 1 and the dotted line represents Method 2.

When we assume low lapse rates, the two patterns of accrual are very similar. As the PB is based on the actual account value at the end of the tenth policy year, both methods produce the same PB. The unamortized DAC-type balances for these two methods are shown in the Persistency Bonus DAC-Type Balance (Low Lapse) graph. As the accrued PB under Method 1 and Method 2 are very similar, as a consequence, the unamortized DAC-type balances are also very similar between these two methods.

To illustrate the sensitivity of the patterns of accrual to the lapse assumption, we increase the lapse rates in years 1 through 10 to 10 percent per year. All other assumptions remain unchanged. The two high lapse graphs show the PB accrual and the associated DAC-type balance assuming a ten percent lapse rate.

The differences in accrued PB under Method 1 and Method 2 are much greater due to higher assumed lapse rates. Notice

that the accrual of PB is faster under Method 2 than Method 1. The accelerated accrual of PB has a negative impact on GAAP income. However, the effect on income is mitigated by a faster capitalization of sales inducement DAC-type asset. In summary, a higher persistency bonus liability and a higher DAC-type asset offset the impact of high lapses on GAAP income.

The GAAP Pre-tax Income chart compares the effects of sales inducements on GAAP pre-tax income between Method 1 and Method 2, under low and high lapse assumptions. Based on our example, it appears that the effects of PB on GAAP pre-tax income are similar under Method 1 and Method 2. Although both methods produce similar effects on GAAP pre-tax income in our example, we prefer Method 2 because it follows the guidance of paragraph 36. That is, sales inducements are not adjusted for anticipated surrender charges, persistency or early withdrawal contractual features.

(VIII) PART III

In Part III, we will discuss topics such as (a) differences between estimated gross profits and total assessments, (b) unlocking of benefit ratios, (c) interaction of benefit ratios when several guaranteed benefits exist for the same contract and (d) the choice of equity return models (Linear Lognormal Model versus Regime Switching Lognormal Model with 2 Regimes). ☒



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