



# theactuary

the newsletter of the Society of Actuaries

## Variable annuity guarantees: more than just acronyms

by Rob Stone

It seems fairly safe to say the equity markets were in a bit of a funk for the years 2001 and 2002. (At the time this article is being written, only a stellar fourth quarter can save 2002.) The effect of these market woes on the insurance industry tends to focus on separate account products—that is, variable life insurance and variable annuities (VAs).

The very nature of these products, namely the existence of the separate account features embedded in them, “spares” an insurance company the portion of the investment risk associated with the separate account balances. As is being experienced today, however, the lack of investment risk in the separate accounts doesn’t immunize a company from the risk of lost profits due to depressed account value bases generating less fund-based income, the mortality and expense charges and fund revenue sharing central to these products’ profitability.

Further complicating the situation for companies is the performance of guarantees built into variable products or offered as elective benefits. The volatile equity environment is bringing these guarantees into play to a degree not considered likely at the time of product pricing. This article will outline the issues surrounding

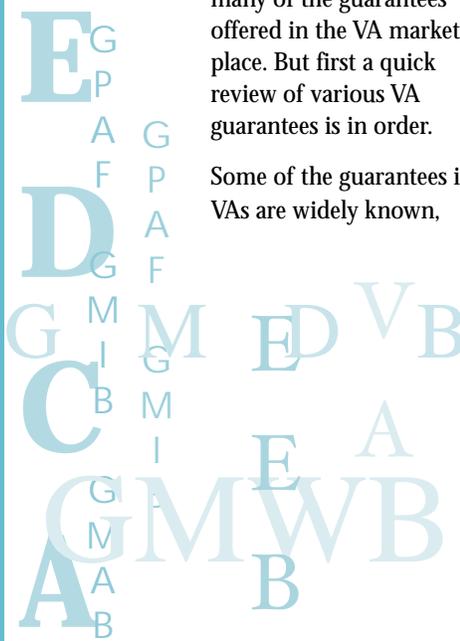
especially guaranteed minimum death benefits (GMDBs) and guaranteed minimum income benefits (GMIBs). Others, like guaranteed minimum accumulation benefits (GMABs), enhanced earnings benefits (EEBs), guaranteed minimum withdrawal benefits (GMWBs) and guaranteed payout annuity floors (GPAFs), might not be as widely recognized.

Still other features of VAs on the market are rarely lumped into discussions of guarantees. These include enhanced dollar cost averaging (EDCA), free partial withdrawals, premium bonuses or the virtually unlimited ability to switch account funds among various account types. Depending on contract structures, all of these items can adversely affect company financials.

GMDBs received considerable attention in 2002, especially with the well-publicized reserve increase announced by CIGNA due to the runoff of existing GMDB liabilities. Simply put, a GMDB guarantees a minimum benefit to the contract holder upon death, usually on death prior to a maximum attained age. This benefit can be a mere return of premium, but can also be in the form of a periodic reset to the account value (up or down), a periodic high-water mark or ratcheting benefit or an accumulation of the premiums at a contractual percentage (usually called a “rollup”).

many of the guarantees offered in the VA marketplace. But first a quick review of various VA guarantees is in order.

Some of the guarantees in VAs are widely known,



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# Fallout of tough economic markets

by Godfrey Perrott

Three separate, but interrelated, shocks have hit the economy over the last two years:

1. The run-up of the equity markets and their subsequent collapse, which was driven by the bursting of the "dotcom" bubble in early 2000.
2. The terrorist attacks on Sept. 11, 2001 (9/11), and all of the ramifications of those attacks.
3. A string of events—bankruptcies, restatements and prosecutions— involving major corporations such as Global Crossing, Enron, WorldCom, Adelphia, Tyco and ImClone, that have made many investors question corporate honesty.

The combined effect of these events on the financial markets and on insurance companies and pension funds has been huge:

- Many life insurance companies have become largely spread businesses structurally similar to mutual funds. Their major revenue stream is a spread they can earn on assets under management. This was wonderful during the stock market run-up, but is less than wonderful when the Standard & Poor's 500 index is down 45 percent and the NASDAQ index (which is more heavily weighted toward high-tech stocks) is down over 70 percent from their highs. Managers accustomed to the predictable income streams of general account products need a whole different outlook to deal with variable products.
- This is compounded in the United States by the interactions of FAS 97 with investment returns. FAS 97 allows acquisition costs to be deferred and amortized in proportion to expected profits. When the expected profits are not realized, the

amortization must be redone from issue. This turns out to have a multiplicative effect on the volatility of company earnings, forcing deferred acquisition cost write offs at the same time that assets under management, and hence spreads, are declining.

- Pensions have come under far more scrutiny as a result of many employees of bankrupt companies losing virtually all of their pension savings (which were invested in the company's stock). At the same time, defined benefit pension plans, which have become accustomed to being supported by the run-up in the equities market (and, hence, recording no expense and needing to make no contributions), are abruptly facing expense and contributions.
- Property and casualty (P&C) insurers have been hit hard by the fallout from 9/11, by the directors' and officers' claims from the corporate bankruptcies and from various forms of litigation (especially product liability and environmental).

I am including the impact of the turbulent times on P&C markets in this editorial because I was unsuccessful in recruiting an author and regard these markets as important. The major effects are quite different for insurance consumers and insurance companies. This editorial focuses on the commercial insurance market (insuring businesses) rather than on the personal lines market that insures us as individuals.

The P&C insurance market has always been cyclical. Losses do not occur predictably. The marketplace seems to fluctuate between periods of "soft" and "hard" markets. When the market is soft, there is excess capacity and insurance companies are chasing clients, resulting in general availability of coverage and low premiums. When the market is hard, there is a lack of capacity and clients are chasing insurance

## Variable annuity guarantees: more than just acronyms *continued from page 1*

Combinations of ratchets and rollups are also offered in the VA market. Some such guarantees can even be passed on to spousal beneficiaries planning to maintain the contract rather than take the cash benefit. GMDBs can be embedded in a contract or are offered as elective benefits with an associated extra mortality and expense charge to the policyholder.

EEBs have a payoff structure opposite the GMDB. At policyholder death, the EEB pays an extra benefit equal to a designated percentage of any policyholder gains. Benefits range anywhere from 15 to 70 percent of contract gain, often with percentages varying by issue age and with total payouts capped at a maximum percentage of net considerations. The extra death benefit is meant to cover income tax on contract gains that do not pass tax-free to an annuity beneficiary. EEBs are normally elective benefits requiring an additional mortality and expense charge to the policyholder.

GMIBs provide a minimum payout to the policyholder. After a mandatory waiting period, usually seven to 10 years, and subject to minimum and maximum attained age requirements, a policyholder can choose between a guaranteed accumulation applied to contractually

guaranteed annuitization rates and the actual accumulation value applied to current annuitization rates. The guaranteed rates are generally calculated under conservative assumptions, so a higher guaranteed accumulation may not provide a higher annuity payout than the accumulation value applied to current rates.

Like GMDBs, there are several GMIBs offered in the

market. Rollups provide a return of net considerations paid by a policyholder accumulated at a contractual percentage, often capped at a multiple of the net considerations. Ratchets, like those for GMDBs, guarantee a high water mark on account values at specified points during the waiting period.

*continued on page 4*



## Fallout of tough economic markets *continued from page 2*

companies, resulting in limited availability of coverage and high premiums.

Just before 9/11, it appeared that the soft market that had persisted for several years was starting to harden. The terrorist attacks of 9/11 had a huge cost for the P&C insurers and their reinsurers (estimated to be as much as \$50 billion) but also accelerated the hardening of the market. The three largest insured P&C

losses before 9/11 were: Hurricane Andrew (\$15 billion), the Northridge earthquake in suburban Los Angeles (\$12 billion) and Hurricane Hugo (\$4 billion).

This had mixed effects on the insurance companies and particularly on the reinsurers. The hardening of the market has increased prices and reduced capacity. This has been beneficial to insurance companies and detrimental to insurance

consumers. However, there has been a significant second-order effect in that a large amount of capital is coming into the market attracted by the high prices and potentially high returns. This may reverse the market trend faster than people expect.

I would like to close by thanking Rob Stone, Gordon Latter and Bob Thomas for contributing articles to this issue. □

# variable annuities

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Combination benefits, such as the maximum of a rollup and ratchet exist as well. GMABs and GMWBs are other guaranteed living benefits, like GMIBs. GMABs guarantee a specific account value, often a return of one-, two- or three-times premium, after a designated waiting period. GMWBs, in contrast, guarantee a future percent of premium partial withdrawal until the sum of paid premiums has been exhausted.

Both GMABs and GMWBs are almost always elective benefits with an extra policyholder mortality and expense charge. A few GMABs in the market actually monitor policyholder fund balances and automatically adjust investment weights among fixed and separate accounts according to where the combined balances are in relation to the guarantee.

GPAFs, also guaranteed living benefits, are a little different, in that the guarantee applies after annuitization. The GPAF is elected in variable payout situations to ensure an annuitant's periodic payment does not fall below a minimum, such as 75 percent or 90 percent of the original annuity payment, while not hindering the upside growth potential of variable payments. Charges to the policyholder for a GPAF can come in the form of a percent of the amount to be annuitized or as a percent per year of the remaining annuity reserve.

of the policyholder. GMABs, GMWBs and GPAFs also provide puts but, with these the policyholder can elect the timing of benefit payment.

Granting options to policyholders is not new in the insurance industry. Life insurers have provided policyholders with interest rate options for years, often without considering the costs or ramifications of the options granted. Over time, however, the industry has developed asset/liability management techniques for interest rate risk. Today, this translates to investment in interest rate caps and floors and to matching of asset and liability interest rate sensitivities.

These advancements in actuarial practice with respect to managing interest rate risk have not been universally extended to the equity-based options discussed in this article. Yet these policyholder options do have a value that can be measured.

For pricing the equity options manifest in these benefits, the potential future movement of the bond and equity markets must be taken into account to gauge the value of the options granted. Thus, some sort of market return model must be employed, requiring input such as average return and volatility measurements. Deriving these parameters necessitates looking to current market conditions or historical data for direction. There is discussion in the industry as to which of

Design features in the form of benefit caps, issue age and attained age limits, and the setting of an adequate mortality and expense charge, are examples of easy and inexpensive forms of risk management a company can practice.

Other risk management practices, such as hedging and reinsurance, can prove expensive, complicated or both. Reinsurance of guarantees, in particular, has been tricky, as the reinsurance marketplace has all but dried up. Companies currently providing quotes on the business are quoting much higher premiums than in the past.

Product features mentioned with the other VA guarantees at the opening of this article—EDCA, free partial withdrawals, premium bonuses and the ability to transfer funds among fixed and separate accounts—all contribute to the need for risk management to some degree.

EDCAs, for instance, allow policyholders to deposit funds in a vehicle guaranteeing a high (7 percent or more) credited rate, from which the funds will be systematically withdrawn and invested in policyholder-chosen separate accounts. Since it is likely that the crediting rate in the EDCA outstrips what can be earned by any assets backing the guarantee, other aspects of the benefit design or product management must be in place to ensure adequate profitability.

EDCAs are not available on every contract (the most conservative risk management tool is not offering a feature to begin with), but almost all VA contracts permit some sort of free partial withdrawal, allowing the policyholder to withdraw a small percentage (e.g., 10 percent) of funds without incurring a surrender charge. Recent VA contracts reduce GMDBs on a proportional basis to the amount taken via free partial withdrawal.

Any contracts that merely reduce the GMDB on a dollar-for-dollar basis, however, run the risk of having in-force death benefits associated with minimal

## ***Benefit-pricing and modeling of the financial markets are critical issues in VA risk management.***

A central issue to the guarantees described thus far is that the pricing exercise cannot be “best estimate” but, instead, must account for the tail region of each benefit's distribution of future payoffs. The insurance company is, in effect, writing an option to the policyholder. For GMDBs and EEBs, the options are puts and calls, respectively, with payoff only at the death

these sources provides the most reasonable basis for such models.

Benefit-pricing and modeling of the financial markets are critical issues in VA risk management. As with all insurance products, there is no better point in the life of a VA to manage risk than at the product development and pricing stage.

account values, from which few meaningful fees can be collected. This is a good example where a beneficial change in product design, incorporating proportional reductions to GMDBs, has reduced GMDB risks due to partial withdrawal utilization.

Premium bonuses are offered on some VAs as an attractive, easily understood incentive to consumers. These simply increase the starting deposit several percent (sometimes as much as 5-7 percent). Companies sometimes recoup

*The upside of VA guarantees and other features is that they allow companies to differentiate their products from competitor products.*

the cost of premium bonuses by increasing the mortality and expense fees in the early years of the contract. Unless otherwise accounted for, however, these companies run the risk of a down market in those key policy years depleting the ability to regain the granted funds.

The ability to transfer funds among separate account options or to the fixed account is nearly taken for granted as a VA feature. Actuarial Guideline 34 (AG34), however, having prescribed drop and recovery rates that vary by fund type, can generate unexpected results for contracts that are "deep in the money" on their GMDB, meaning the account value is well below the contractual death benefit. In cases like these, companies can experience an increase in AG34 reserves merely by having more policyholder money move to funds with lower AG34 recovery rates than move to funds with higher recovery rates.

AG34 reserves deserve mention aside from policyholder behavior issues. Many companies ignore reserves and model only net cash flows when it comes to VA guarantees. For contracts issued with GMDBs, however, reserve increases resulting from a combination of AG34 mechanics and a down market can leave companies in a financially uncomfortable (or worse) position.

While AG34 focuses on reserving for GMDBs, Draft Actuarial Guideline MMMM covers reserving for VAs with guaranteed living benefits, including GMIBs, GMABs, GMWBs and GPAFs. This guideline is expected to be effective Dec. 31, 2002, and applies to contracts issued on or after Jan. 1, 1981. Although it is considered a temporary directive, all product development and ongoing management of VAs containing guaranteed living benefits will need to include reserves calculated on the basis outlined in the guideline.

Draft AG MMMM and AG34 cover statutory reserving for VA guarantees. The AICPA, however, has produced a proposed statement of position (SOP) that will affect GAAP financials of companies offering GMDBs. Under the SOP, companies would be required to set up a liability for GMDBs in addition to account value. The provisions require use of "a range of reasonable scenarios" in determining this liability. Also included is FAS 97 unlocking of assumptions annually.

Proposed risk-based capital (RBC) guidelines for VA guarantees are an additional consideration for companies. The current proposal will require additional scenario

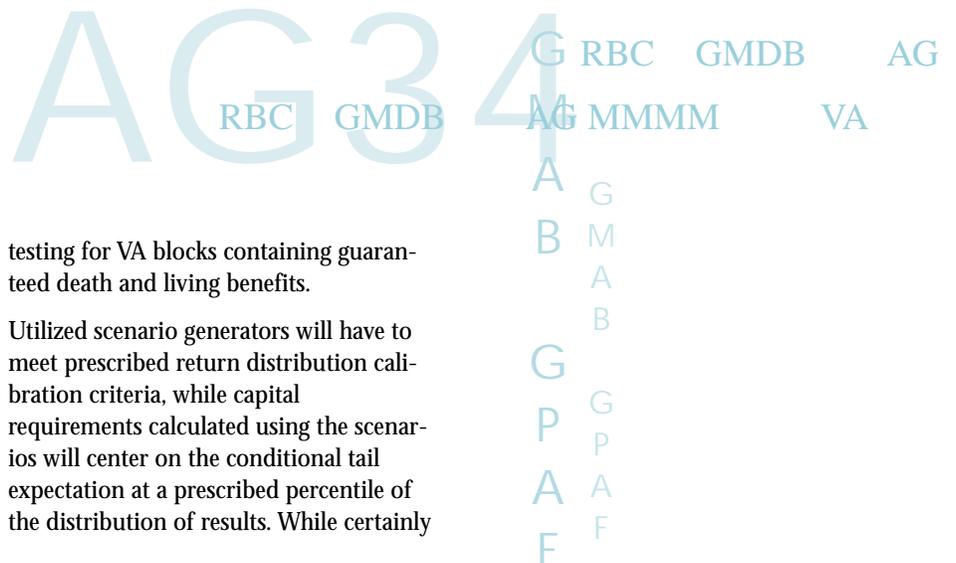
testing for VA blocks containing guaranteed death and living benefits.

Utilized scenario generators will have to meet prescribed return distribution calibration criteria, while capital requirements calculated using the scenarios will center on the conditional tail expectation at a prescribed percentile of the distribution of results. While certainly

adding to the complexity of VA analysis, the new guidelines may dramatically increase capital levels.

Not to unduly focus on risks and regulation, the upside of VA guarantees and other features is that they allow companies to differentiate their products from competitor products. And the presence of some of the guarantees/features discussed here may be what is keeping consumer interest in VAs at a reasonably high level, even in the face of dismal equity markets. The key for companies, then, is to generate VA sales under the umbrella of good risk management, via solid product design and awareness of the environment in which the products perform. □

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# Defined benefit pension plans in the post-bubble era

by Gordon Latter

*"Whenever you find that you are on the side of the majority, it is time to reform."*  
—Mark Twain

In the last decade, we have witnessed extreme highs and lows in the stock market. Over the past three years, poor investment returns, coupled with declining interest rates, have placed U.S. defined benefit (DB) pension plans under the microscope.

In this article, I will first briefly summarize how these prolonged volatile markets, coupled with tremendous asset-liability mismatches, negatively affected the funded status of DB plans. Second, I will discuss the unrealistic growth expectations and opaque accounting requirements that caused investors to focus on the companies that sponsored these arrangements. Finally, I will question the role actuaries will play in this post-bubble era of lower anticipated returns and burgeoning liabilities.

## When the "tails" wag the dog

Cumulative Standard & Poor's (S&P) returns over the five-year period 1995-1999 were a whopping 251 percent. The roaring '90s resulted in contribution holidays (which, for some companies, had actually lasted more than a decade), trivial pension expense figures and a buildup of prepaid pension assets on the balance sheet. In essence, companies that sponsored DB pension plans had the good fortune of running highly leveraged, lucrative investment subsidiaries. For some companies, pension "expense" was actually income, and, in extreme cases, the largest item on the income statement. The expected return on pension plan assets boosted annual operating income of S&P 500 companies by as much as \$100 billion.

Cumulative S&P returns over the three-year period 2000-2002 (year-to-date Oct. 31) were a disappointing -37 percent.

*In addition to this decline in equity markets, companies that sponsor DB plans have also seen pension liabilities increase...*

Greenwich Associates reported median corporate pension plan returns of 1.3 percent, -3.9 percent and -15.0 percent for 2000, 2001 and 2002 (year-to-date Sept. 30), respectively. (*This article was drafted in early November.*) In the absence of significant gains in the latter part of 2002, this would represent the worst three-year period since the early part of the Great Depression.

In addition to this decline in equity markets, companies that sponsor DB plans have also seen pension liabilities increase due to a record low interest rate environment. As a result of this asset-liability mismatch, the combined funded percentage of S&P 500 companies that sponsor a DB plan has dropped from a healthy 125 percent, at the beginning of 2000, to a forecasted end of 2002 funded ratio of 80 percent<sup>1</sup>. When we include other postemployment benefits (OPEB) such as health care (i.e., OPEB liabilities), this funded ratio drops to 65 percent.

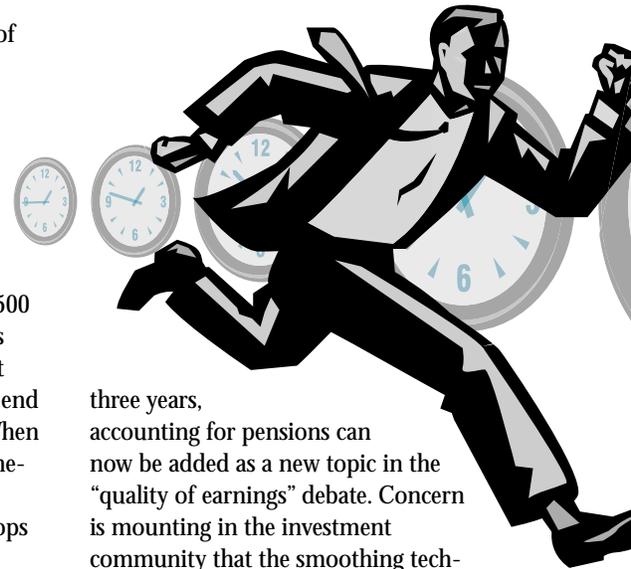
## The accounting state of the nation

Recent publicity surrounding accounting fraud, executive excesses and questionable business ethics led to unthinkable collapses such as WorldCom, Enron and Arthur Andersen. This has focused the spotlight on corporate governance and the role of the FASB in the United States. As a result, there is heightened demand for greater "transparency" in company

financial statement reporting. Areas that have been addressed or are currently being debated, to name a few, include

accounting for goodwill, treatment of Special Purpose Entities, the highly visible debate on stock option expensing and the treatment of derivatives.

With assets and liabilities heading in opposite directions in the past



three years, accounting for pensions can now be added as a new topic in the "quality of earnings" debate. Concern is mounting in the investment community that the smoothing techniques incorporated in pension accounting rules (FAS 87), originally intended to mitigate expense volatility, has instead contributed to misleading financial statements.

As investors, analysts, shareholders, CEOs and participants struggle to understand these accounting standards, they are exposed to a world of strange terminology such as "unrecognized gains and losses," "corridors," "curtailments," "additional liability" and "other comprehensive

income" (OCI) charges. Limited information in the notes to the financial statements, coupled with complicated ERISA funding rules, adds to the confusion. With all of this, determining the extent a company is exposed to shareholder, balance sheet, earnings and cash flow risk by sponsoring a DB plan is extremely difficult.

Although a detailed analysis of the flaws within the pension accounting rules is well beyond the scope of this article, a few points should be made. As of late, much has been written and discussed about the FAS 87 asset return assumption. For years, this long-term rate of return assumption on pension plan assets was the primary contributor to pension income. Pension expense figures could be artificially suppressed by selecting a higher assumed rate. Actual shortfalls in return do not need to be "trued up" in the particular year in which they occur. Instead, investment losses in any one year

are partially reflected (i.e., amortized) in future years. In many cases, the deferral of these losses can extend for decades.

In light of the factors listed above, Corporate America is beginning to make adjustments. For 2003, it is expected that, on average, S&P 500 companies will decrease this assumed rate by more than 100 basis points, from average 2002 levels of 9.3 percent to 8.0 percent. The anticipated annual profit and loss (P&L) impact (pre-tax) of this change alone is potentially in the neighborhood of \$20 billion per year; that is, the pension credit could fall by this amount.

On the other hand, very little has been written about the balance sheet impact of accounting for pension costs. A vast number of S&P 500 companies are at risk of facing an OCI charge if action is not taken prior to year-end. Several companies have already announced fourth-quarter OCI charges in the billions. Although OCI

charges do not impact P&L, they typically impact credit ratings and debt covenants such that, in extreme scenarios, some companies could be forced into bankruptcy. Ironically, a charge to owners' equity misleadingly improves ROE by reducing the denominator of the ratio without any adjustments to the numerator.

Accounting rules presently afford plan sponsors the one-way choice to change their policies to reflect pension plan financial performance more quickly. Mechanisms such as shorter amortization periods, smaller corridors and the choice to use market (versus market-related) value are available under GAAP accounting today. The smoothing-transparency gap would narrow if companies exercised their right to use these options.

As the debate continues for the "right" balance between smoothing and transparency, companies will feel some pressure to include new information in the annual statements (10-Ks) they release at year-end. However, it is more likely that the market will reflect only a small portion of this information in corporate valuations until the accounting rules are changed to make it a requirement.

### The new millennium actuary

In an era of lower anticipated returns, misunderstood liabilities and more demanding and sophisticated investors, opportunities for actuaries to add value (in virtually all practice areas) are limitless. Unfortunately, the antiquated and burdensome rules surrounding the design, compliance and valuation of DB pension plans create a poor image for DB plans in the media and with the public.

In the next few years we need to ask ourselves, as the preeminent experts in these areas, some difficult questions: Have we pension actuaries also been lulled into a false sense of security? Do we tend to accept that the complex rules have accomplished what was intended?

I believe we share some of the enormous challenges that face the accounting community in the coming years as we strive to redefine our goals and reestablish credibility. It is reassuring that few have ever questioned our professional integrity.

However, we do need to examine changes to pension accounting rules critically, endeavor to simplify the myriad of funding and compliance rules and champion the cause for reform. For example, actuaries could take the lead by advising plan sponsors on issues such as:

- Accelerated recognition of pension plan financial performance.
- Restructuring pension expense into its operational and financial components.
- Greater disclosure of future funding requirements.

To ensure a promising future, we must raise our visibility and strengthen our public image as professionals uniquely trained and fully conversant in matters related to business, finance and risk management. □

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<sup>1</sup>The majority of figures used in preparing this article were extracted from a comprehensive report of S&P 500 companies issued by Merrill Lynch's Global Analytic & Thematic Research Group. Forecasted year-end figures are highly dependent on a vast number of assumptions made. Thus, the figures should be taken in the context of identifying trends and not be relied on as absolute.



# Effect of investment earnings volatility on FAS 97 unlocking for variable products

by Bob Thomas

Variable insurance and annuity products have the potential for tremendous volatility in investment returns, as we have seen in the last several years. The effect of this volatility can create a dilemma for companies in determining how to unlock FAS 97 deferred acquisition cost (DAC) assumptions.

Companies within the industry currently are using a number of approaches. The resulting DAC amortization pattern can be materially different, depending on the approach (and assumptions) used.

This article will briefly review FAS 97 DAC unlocking requirements, discuss what is different about variable products and review the general industry approaches to FAS 97 DAC unlocking (related to investment return volatility).

## FAS 97 unlocking requirements

FAS 97 requires that assumptions used in amortizing DAC be “evaluated regularly” and unlocked on a dynamic basis. Because of the tremendous volatility in the equity markets during the last several years, much

## *The future investment return assumption should be reasonable and based on best-estimate assumptions.*

of the variable life and annuity industry has been reevaluating how to deal with significant variations (both up and down) in investment return in amortizing DAC on its variable products.

Although there is much diversity with respect to the details of determining DAC amortization for variable products, all companies are required to follow the basic tenets of FAS 97. These include DAC amortization over the life of a block of

policies in relation to the present value of estimated gross profits (EGPs), which are based on management’s “best estimates” without provision for adverse deviation.

The mechanics involved in developing DAC amortization for FAS 97 products vary, but typically involve an actuarial model that projects EGPs for a plan (or group of similar plans), usually by year of issue. An amortization rate (often called a K factor) is calculated as the deferrable acquisition costs, divided by the present value of the EGP stream, with the discount rate equal to the credited rate.

## Variable product differences

Obviously, there are numerous differences between variable products (both annuities and life insurance) and more traditional fixed annuities and universal life products. The primary difference, as discussed here, is the investment volatility that variable products have.

For fixed-rate products, the rate credited to the policyholder (as well as the investment

earnings rate, from which the credited rate is determined) typically does not vary materially from period to period. As a result, the unlocking adjustments, related to changes in investment earnings, are usually relatively minimal.

For variable products, however, where investment returns are based on the actual performance of the underlying pool of assets (usually with a high equity component), large swings not only are

theoretically possible, but they have occurred in recent years, with returns ranging from large negatives to large positives.

FAS 97 does not explicitly address how to deal with the large investment volatility that can be experienced by variable products. The key assumption, which must be addressed, is what future earnings rates will be. The only guidance provided by FAS 97 (in paragraph 23) states that “Estimated gross profits .... shall be determined based on the best estimate of that individual element over the life of the book of contracts without a provision for adverse deviation...”

Actuarial Standard of Practice (ASOP) No. 10, Methods and Assumptions for Use in Life Insurance Company Financial Statements Prepared in Accordance With GAAP, ASOP No. 10 requires “best-estimate” assumptions, which should be reasonable.

Thus, the future investment return assumption should be reasonable and based on best-estimate assumptions. Management’s view of future growth rates is not only required in the assumption-setting process, but (at least theoretically) should influence the unlocking approach utilized, since the various approaches imply different assumptions regarding future investment growth rates.

## Investment return volatility unlocking approaches

Although several approaches are being utilized in the unlocking process related to investment return volatility for variable products, they can be summarized into two broad categories: (1) the mean reversion approach and (2) all other approaches.

All of the approaches make an assumption about expected long-term investment returns, as of the policy issue date. Differing levels of expected returns may be appropriate for different types of equity funds (e.g., aggressive growth fund vs. value fund). The future investment return assumption, after actual returns have deviated from expected, is what separates the various approaches. There may be much variation in terms of the assumptions and mechanics involved.

### Mean reversion approach

Some variation of the mean reversion approach is the most commonly used method. This method involves modifying future investment return assumptions so that future assumed returns, combined with actual historical returns to date, will return the projected fund to its originally assumed level at some future date. Variations of the mean reversion method include:

- Lifetime adjustment period.
- X-year adjustment period (e.g., five or 10 years).
- Cap or floor during adjustment period of Y percent (e.g., +5 percent and -5 percent).

An inherent assumption of the mean reversion approach is that the originally assumed investment return was correct, and that any deviation from that assumption is only temporary. The variations of this general methodology differ in the way that the accumulated fund reverts to the mean (or assumed return).

The lifetime-adjustment-period methodology assumes that the initially assumed investment return will be realized by the end of the DAC amortization period. As an example, assume a DAC amortization period of 30 years and an initial investment return

assumption of 9 percent. If the actual return was 9 percent in year one and -20 percent in year two, the return assumption (*i*) for years 3-30 would be 10.21 percent ( $((1.09)^{30} = (1.09) \cdot (.8) \cdot (1 + i)^{28})$ ).

For each year that the actual return deviates from the then-expected return, a revised expected return is calculated for the remainder of the DAC amortization period. This example has used annual periods. In practice, these calculations would be done for each accounting period (i.e., quarterly).

The X-year-adjustment-period methodology assumes that the initially assumed investment return will be realized by the end of a specified number of years. This could be as few as one to three years or as many as 10 years or more. Using the example above and a five-year adjustment period, the return assumption for years three through seven would be 15.96 percent and 9 percent thereafter ( $((1.09)^{30} = (1.09) \cdot (.8)^5 \cdot (1 + i)^{5*} \cdot (1.09)^{23})$ ). As with the lifetime-adjustment-period methodology, any deviation from the newly expected return will require a recalculation of the expected return for the next X-year period.

The cap or floor adjustment methodology assumes that the return for years after a deviation from the initial assumed rate will be limited by the initial return assumption plus (or minus) the cap (or floor) until the projected fund returns to its originally assumed level. A cap or floor in the 5-percent range is not uncommon. Using the example above and a 5-percent cap, the return assumption for years three through eight would be 14 percent (9 percent + 5 percent),

13.47 percent for year nine, and 9 percent thereafter ( $((1.09)^{30} = (1.09) \cdot (.8)^6 \cdot (1.14)^6 \cdot (1.1347)^6 \cdot (1.09)^{21}$ ).

The cap (or floor) rate is used for as many years as is necessary (six in this case), together with a residual rate, if necessary (13.47 percent in this example), to return the fund value to its originally assumed level. As with the other variations of the mean reversion methodology, continual recalculations of future return expectations are necessary as each period's actual return becomes known (assuming that it differs from what had been assumed).

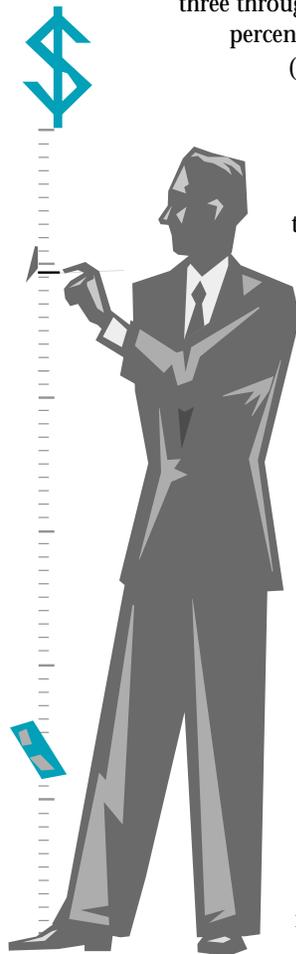
One of the strengths of the mean reversion methodology is that it is easy to understand. In addition, it is easy to explain and seems intuitively reasonable. This methodology appears to be consistent with FAS 97 and ASOP No.10 requirements, assuming that management still believes that its original investment return assumption is correct over the life of the block of business in question.

One possible criticism of this method is that the same pool of assets (i.e., the fund underlying the variable product) is inherently assumed to earn different future rates of return for different years of issue. Care must also be taken near the end of the amortization period to avoid strange amortization results.

### Other approaches

There are a number of other methods in use, two of which will be mentioned here: the credibility factor approach and the stochastic approach. The credibility factor approach has at least two variations that are in use. The underlying investment return assumption under the credibility factor approach is that the expected future return is always equal to the original long-term investment assumption, regardless of what historical returns have been.

This assumption means that, whenever there is a deviation from the original return assumption, the original long-term assumption was wrong. Rather than giving immediate full credibility to the



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## Effect of investment earnings volatility on Fas 97 *continued from page 9*

actual investment return deviation, however, this methodology grades in the credibility over a period of time. One variation of this approach grades in the K factor over time, whereas another variation grades in the EGP.

The premise of this methodology is that, when there is a deviation from the originally expected investment return, that deviation is evidence, perhaps, that the return assumption should be altered.

Rather than give full credibility to the actual deviation immediately, however, this methodology only gives limited recognition to the actual deviation. Each additional quarter's actual investment return receives a similar weighting, so that, over time, the actual returns gain in importance, relative to the original assumption.

The net effect of this approach is that the effective investment return, utilized in the determination of EGPs, grades toward the actual return over time.

The stochastic approach to dealing with DAC unlocking for variable products was developed in response to some of the perceived weaknesses of the other methodologies in use, particularly the possibility of manipulating assumptions to avoid large swings in DAC amortization.

This methodology is relatively new and not currently in widespread use. It utilizes stochastic projections to develop EGPs for a large number of scenarios. From the various EGP streams, K factors are developed for each scenario, and a distribution of DAC balances is determined. A corridor is determined for the DAC balances between predetermined percentiles.

The current DAC balance (calculated deterministically, using current assumptions) is compared with the distribution of stochastically produced DAC balances.

If the current DAC is within the corridor, no adjustment to the DAC is deemed necessary. If the DAC balance falls outside the corridor, an adjustment to the current DAC is necessary to bring it within the DAC corridor.

This approach is fully explained in "Stochastic DAC Unlocking for Variable

*Bob Thomas, FSA, MAAA, is a consulting actuary with Milliman USA in Dallas. He can be reached at bob.thomas@milliman.com.*

### *The choice of methodology and assumptions should be guided by management's view of future investment returns.*

Annuity Products," an article by Alastair Longley-Cook, Dick Shaw, Mike Sherrill and Jay Vadiveloo, in the March 2001 issue of *The Financial Reporter* newsletter.

### Conclusions

There are a number of approaches and variations to those approaches in use, including some that were not mentioned here. The choice of methodology can have a significant effect on the incidence of DAC amortization and GAAP earnings.

To be consistent with the requirements of FAS 97 and ASOP No. 10, the future assumptions must be based on management's best estimates and must be reasonable. For some of the methods and assumptions in use, these requirements may be difficult to satisfy. The choice of methodology and assumptions should be guided by management's view of future investment returns.

Even though accounting for variable products is governed by FAS 97, the standard was not drafted to deal effectively with the inherent volatility of such products. Because of the lack of specific guidance in dealing with DAC unlocking for variable products, and the great diversity of practice, it would not be surprising to see the FASB eventually issue explicit guidelines. □



# SOA offers new insurance coverage to members

by Meredith Lego, SOA marketing manager

**W**e are pleased to announce that the Society of Actuaries is offering new insurance coverage products to its members to be administered through Marsh Affinity Group Services.

By purchasing insurance programs through SOA, members can take advantage of a wide variety of benefits. These programs have been researched by the SOA and have been proven to be an excellent source of protection for members. Also, with the mass-purchasing power of the SOA, members can benefit from the group rates offered.

Insurance plans currently being made available to SOA members will be launched throughout 2003 and include:

- Professional Liability Insurance
- Disability Income Insurance
- Term Life Insurance
- 10-Year Term Life Insurance
- Catastrophe Major Medical Insurance
- Major Medical Market Basket

Marsh is a full-service insurance broker and administrator for affinity groups. A pioneer in the concept of association-sponsored insurance plans since 1949, Marsh Affinity Group Services has earned a reputation for the innovative design and administration of a wide range of insurance and financial products, and has become a leading provider of insurance

program management and underwriting services in North America. Marsh Affinity Group Services is a part of Marsh & McLennan Companies, a multinational corporation and one of the world's foremost leaders in insurance administration.

Look for more information in future communications as the programs become available. Members who have any questions, or who would like more information, may contact the insurance administrator:

Marsh Affinity Group Services  
a service of Seabury & Smith  
1.800.503.9230  
[www.seaburychicago.com](http://www.seaburychicago.com)

# Consumerism among key issues addressed at Chief Health Actuaries Forum in Boston

by Kara Clark, SOA health staff Fellow

**W**hat did one chief health actuary say to another? "You should have been at the SOA's Chief Health Actuaries Forum!"

In conjunction with SOA's annual meeting this year in Boston, several chief health actuaries from both large and small companies gathered to discuss key issues, to network and to share ideas with peers as they each work to address the challenges facing their companies in light of today's dynamic health care environment.

Among the important issues discussed were consumerism and medical trends. Discussion around consumerism issues included a focus on the current and future

impact that defined contribution plans could have on various stakeholders in the health care industry.

A dialog around medical trends identified several key drivers of these trends and highlighted where experience differs by plan. Participants offered varying perspectives on the split between utilization and cost trends. Attendees walked away with a better understanding of how companies have been affected differently by various aspects of medical trends, a greater awareness of the causes of the trends and, most important, a more defined path toward addressing these issues in their own

companies by identifying areas for further investigation.

One participant asserted the value of exchanging information with others in a similar role at other companies: "I really enjoyed the opportunity to learn from other top health actuaries." The interaction also provided new perspectives and solutions for yet another participant, who emphasized that "this forum definitely helped me in my daily work."

The next Chief Health Actuaries Forum will be held in conjunction with the SOA's spring health meeting in Vancouver, B.C., to be held June 2003.



## Life Insurance Conference convenes March 12-14 in Orlando

The SOA is teaming up with the Life Office Management Associations (LOMA) and the Life Insurance Marketing and Research Association (LIMRA) to bring you the "Life Insurance Conference: Strategies for Product Design, Distribution and Administration," to be held March 12-14, 2003, at the Hilton in the Walt Disney World Resort in Orlando, Fla.

Edward J. Zore, president and chief executive officer of Northwestern Mutual, will discuss "Insights and Opportunities: A Look at the Life Insurance Industry" during the opening keynote address on Thursday, March 13.

Zore joined Northwestern Mutual's Investment Department in 1969 and held various investment positions over the next 28 years. His roles have included chief investment officer, chief financial officer and head of the company's life and disability income insurance operations. He was elected to the company's board of trustees and became the 16th president in the history of Northwestern Mutual in 2000. He became chief executive officer in 2001. Zore is an active board member for many organizations including American Council of Life Insurers, the Frank Russell Company and Manpower Inc.

The life insurance industry is facing changes in regulation, distribution,

competition and investments that are bringing challenges that we have never seen before. But it's also a time of great opportunity. Drawing on over 30 years of experience, Zore will share his take on today's environment, as well as the time-tested strategy and values Northwestern Mutual relies upon to maintain its leadership position through the changing environment.

Next, Hank George, editor-in-chief of *On The Risk* journal, will speak on "Of Myths and Men: A Radical View of Our Future." George, FALU, CLU, FLMI, is a consultant, writer and speaker. His focus is risk management strategies, especially teleunderwriting. He spent 15 years with Northwestern Mutual and has been in life/health underwriting for 30 years. George is chair of LOMA's International Underwriting Congress, chair of five industry study groups, and has addressed hundreds of insurance conferences worldwide, including two appearances on the main stage at the Million Dollar Round Table. Become inspired when you hear some unconventional solutions to how we may expand upon this industry's "Greatest Hits of the Late 20th Century."

There will also be six groups of concurrent sessions on March 13 and 14.

### Thursday, March 13

10:15-11:30 a.m.

#### Concurrent Session 1A

"Maximizing Growth in the Middle Market"

Rusty Hendren, FSA, FLMI, director, Life & Annuity Product Management, State Farm Insurance

Pete Jacques, Ph.D., associate scientist, LIMRA International

Additional Speaker TBA, New York Life

#### Concurrent Session 1B

"Technology Innovations for Serving the Field"

Lynda Bilo, assistant director, Contracts & Licensing, SAFECO

Mike Cather, manager, Agency Computer Services, Modern Woodmen of America

Sue Schmiedel, senior agency operating consultant, Northwestern Mutual

#### Concurrent Session 1C

"Term Insurance: How to Compete in the Current Environment"

Marianne Purushotham, FSA, research actuary, LIMRA International

Mark Smith, life product manager, Zurich Life

Additional Speaker TBA, Reinsurance

1:00-2:00 p.m.

#### Concurrent Session 2A

"Estate Planning Opportunities"

Dennis A. Catanzano, CLU, CPA, MBA, ChFC, vice president, business development, Lincoln National Insurance Company

Additional Speaker TBA

#### Concurrent Session 2B

"2001 CSO Table"

Chris DesRochers, FSA, senior vice president, Aon Consulting

#### Concurrent Session 2C

"Improving Underwriting and Policy Issue Turnaround Times"

Maria Thomson, managing principal, Thomson Management Solutions, Inc.

2:15-3:15 p.m.

#### Concurrent Session 3A

"Trends in Life Insurance Industry Regulations: How Compliance Impacts the Way You Do Business"

Speakers TBA

#### Concurrent Session 3B

"Catch the Tide - Now is the Time To Sell Life Insurance"

David F. Woods, CLU, ChFC, president, LIFE Foundation

#### Concurrent Session 3C

"Reinsurance"

Arnold Dicke, senior vice president and chief actuary, ING Re

3:30-4:30 p.m.

**Concurrent Session 4A**

“VUL vs. UL—Which Way To Go?”

Michael Burns, vice president, product management, Jefferson-Pilot Financial

Additional Speaker TBA

**Concurrent Session 4B**

“Trends in Distribution”

Tim Tongson, FSA, consulting actuary, Milliman USA

**Concurrent Session 4C**

“Issues of Financial Rating in a Down Economy”

Speaker TBA

**Friday, March 14th**

8:15-9:15 a.m.

**Concurrent Session 5A**

“The Product Development Process—A Business Model”

Ann T. Dehner, vice president, marketing operations, National Life Insurance Company

Gregory A. Linde, FLMI, LLIF, vice president, product management and service, Principal Financial Group

**Concurrent Session 5B**

“Distribution of Life Insurance Through Broker/Dealers”

Lisa Hoyne, CFP, vice president, marketing, Sammons Securities (Midland Life)

Gregory E. Smith, CFA, president, Sunset Financial Services

**Concurrent Session 5C**

Donald Pond, FSA, CLU, national director, life actuarial services, Deloitte & Touche, LLP

9:30-10:30 a.m.

**Concurrent Session 6A**

“Trends in Product Design—What’s Hot and Why”

Mary Bahna-Nolan, vice president, NACOLAH (North American Company for Life and Health)

Narayan Shankar, staff actuary, SOA

**Concurrent Session 6B**

“Suitability: More Than Just a Matter of Compliance”

Speakers TBA

**Concurrent Session 6C**

“Bank Distribution of Life Products”

Dr. Kenneth Kehrer, president, Kenneth Kehrer Associates

The closing session on March 14, “Leadership, Disney Style,” is specially designed to fit the environment in which the conference is being held. Learn how to make “magic” in your world by exploring Disney’s leadership model, including the history and legacy of Walt Disney World. Discover how every leader is telling a story about what he or she values, the role vision plays in inspiring people to action and how to create a supportive work environment that encourages involvement. Revealed will be leadership strategies to transfer power and

decision-making authority, the elements of leadership accountability, the cycle of organizational change, and the qualities of a learning team. Fascinating business insights come to life as a member of the Walt Disney World management team delivers an engaging overview of the successful model that Disney uses. □

For more information about the conference and for registration, go to [www.loma.org](http://www.loma.org).

Study manuals available for May 2003 exams

Study manuals for Courses 1, 2, 3, 4, 6, EA-1 and EA-2B are now available from Actuarial Study Materials (ASM). For more information, visit the ASM Web site at [www.studymanuals.com](http://www.studymanuals.com).



# Message from Enrolled Actuaries Meeting Committee

The 2003 Enrolled Actuaries Meeting is just around the corner—March 17-19, at the Marriott Wardman Park Hotel in Washington, D.C. As always, you will be able to satisfy half of your EA continuing education requirements for this three-year cycle by attending this one meeting.

Panelists at the 2003 General Sessions will explore how actuaries can and should

protect themselves from liability, the new paradigm in setting actuarial assumptions for determining pension liabilities and the impending retirement crisis in the United States. A strong slate of concurrent sessions, including sessions on any new legislation that might become law prior to the meeting, is planned, and of course the IRS and PBGC are well represented.

We are pleased to have Mark Shields, a nationally known political commentator (CNN's "The Capital Gang") and columnist (*The Washington Post*) as our Monday luncheon speaker.

Register early, and come to D.C. in March to hear how other pension professionals are handling the issues we must all address in our actuarial practices. 

## Society member reprimanded

On July 21, 2000, the Committee on Discipline determined that W. Duncan MacKeen, FSA, had violated Precepts 7 and 8 of the Society's code of conduct and should accordingly receive a public reprimand. This determination was appealed and on July 20, 2001 an Appellate Tribunal of the Society heard and considered the appeal. Subsequently, the Tribunal affirmed the disciplinary determination of the Committee on Discipline in part.

It was determined that Mr. MacKeen violated Precept 7 of the Society's code of conduct when, in assisting with the acquisition of a block of insurance business in 1992, he failed to disclose, in a timely fashion to the relevant parties, compensation paid to him by a broker.

## 2001 NAAJ annual prize co-winners announced

The *North American Actuarial Journal (NAAJ)* is proud to announce the co-winners of the Annual Prize for the best papers published in 2001:

- Mary R. Hardy, ASA, FIA, PhD, for "A Regime-Switching Model of Long-Term Stock Returns," Vol. 5, No 2.
- Phelim P. Boyle, FIA, FCIA, PhD, Adam Kolkiewicz, PhD, and Ken Seng Tan, ASA, PhD, for "Valuation of the Reset Options Embedded in Some Equity-Linked Insurance Products," Vol. 5, No 3.

Congratulations to the authors for their fine contribution to the body of actuarial literature.

## Call for papers issued on applications of intelligent systems in insurance

A call for papers has been issued for an invited session on Applications of Intelligent Systems in Insurance to be held in conjunction with the 7th International Conference on Knowledge-Based Intelligent Information & Engineering Systems. The conference will be held Sept. 3-5, 2003, at St. Anne's College, University of Oxford, in the United Kingdom.

Both theoretical and practical papers are welcome. The deadline for submission intention is Feb. 25, 2003. For more information, contact Ian Duncan, FSA, FIA, FCIA, MAAA, at 212.529-8600 phone; 212.529.6297 fax; e-mail: [Iduncan@lotteract.com](mailto:Iduncan@lotteract.com). Or visit the Web site [www.lotteract.com](http://www.lotteract.com).

## How old is too old?

by Harry Panjer

*Editor's note: This is the first in a series of columns in which SOA President Harry Panjer addresses issues of significance to members and the actuarial profession at large.*

I'm writing this while riding on the Bullet train from Tokyo to Kyoto. The discussion (actuarial, naturally!) is about Japanese longevity and diet and, specifically, the role of the antioxidants in green tea in preventing various cancers, the potential impact of the invasion of Starbucks and the quality of life at very advanced ages. How old is too old?

Longevity may become a blessing or a curse; but, death is the terminal life event that worries us all—although it does provide work for life insurance actuaries.

Further discussion revolves around other life events such as the age of retirement and the role of the combination of increased longevity (drink more green tea and eat less red meat), lower participation rates in the labor force by persons over age 55 (in France well below 50 percent compared to over 90 percent in the United States), low birth rates (below replacement in most advanced countries) and immigration (almost none in Japan, while close to 1 percent in Canada) on national social security systems.

However, one of the most common questions (besides the relative merits of Australian, South African, French and Californian wines) with leaders of actuarial associations around the world is how old is "old" when it comes to professional qualification (i.e., attainment of FSA for the SOA).

At two recent Fellowship Admission Courses, I calculated the ages of new

Fellows: youngest (age 24 in both cases), oldest (well over age 40, and congratulations for perseverance to those) and an average of just under age 33 in both cases. I was rather shocked when I saw this average. Recently, the outgoing president of the Institute of Actuaries, Peter Clark, reported that the Institute had been successful in reducing the average time to qualification to about five years, down from six in recent years. This is likely equivalent to an age of about 28 or 29. The Institute would like to get the number down even more.

For actuaries, then, how old is too old? Should we be putting actuaries through such a long process? Will students continue to be attracted to the profession in light of the many alternatives for persons with strong quantitative skills? Will more students or ASAs drop out of our exam process with high-market-value alternatives such as CFA? Is there really any significant market value in a longer-to-obtain FSA?

Recent analysis has shown that potential candidates already interested in the actuarial profession are first attracted to the high

### *Will students continue to be attracted to the profession in light of the many alternatives for persons with strong quantitative skills?*

compensation levels one can attain. But did you know that financial engineers and risk managers, some of whom have CFAs and MBAs, are compensated equally, if not better, than FSAs? This presents a challenge for the actuarial profession to continually attract and retain the best and the brightest candidates.

These are serious questions. They trigger the more operational questions of how much material, and at what level of detail should we expect in our exams. These are difficult questions for your Board of Governors. In fact, the BOG spent the full

day on Sept. 28 discussing these issues and will continue to do so at upcoming meetings. But they will need to be addressed in directing any revisions of our FSA qualification process as well as in continuing education, where the lifelong learning process occurs.

Personally, I think age 33 is way too old. The average age has gone up from historic levels of ages 28 or 29 from the 1920s to the 1980s (after adjustment for delays caused by military service) to over age 32 recently. I favor finding ways to have our candidates become FSAs at ages similar to those at which persons become accountants, lawyers or MBAs, even on a part-time basis.

This can mean reducing content of exams, holding more frequent exams, having exams-on-demand or even reducing the number of exams. It has been easy to expand the exams by including new content—and difficult to remove materials.

I'm interested in your views. My email address is [hpanjer@soa.org](mailto:hpanjer@soa.org). Or better yet, the "Chat with the President" discussion forum on the SOA Web site will allow all to hear (or read, at least) your views. Let's start a discussion. □



Harry Panjer