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**IMMEDIATE ANNUITIES –
PRODUCT DEVELOPMENT CONSIDERATIONS**

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- Design and pricing of immediate annuities
- Reserving issues
- Asset strategies
- Asset/liability matching
- Reinsurance considerations
- NAIC Guidelines IX-A and IX-B

MR. ALLAN W. RYAN: In this session we will discuss issues related to the design and development of immediate annuities and structured settlements, touching on asset strategy, reserving issues, asset/liability matching, and reinsurance considerations.

I'm a consulting actuary with Deloitte & Touche. My consulting work is in the life insurance financial area, and I also do work in support of life insurance company audits. As this has been listed as a product development/investment topic, we are going to try and keep the emphasis that way, but the nature of the topic is such that financial reporting is clearly important with these types of products. Asset strategy, asset/liability matching, and the need for cash-flow testing in both pricing and in reserving are clearly of importance with these products, more so than with other types of insurance products. Likewise, the statutory reserve valuation requirements are a critical part of the pricing or product development process.

In one sense, the product design is relatively straightforward. There are various markets that these types of annuities are sold in, but compared, for example, to universal life, there's not much you can do to jazz it up. You receive a premium up front and you know from there that if you didn't do it right, you've got problems. Investment, reinvestment and pricing risks are all very significant.

GAAP issues are not a major focus of this session. If somebody can come up with some GAAP issue that relates to product development, that's fine. I think maybe it's important in the sense that when you develop a product like this, your product development process should be an integrated one. You should look at your administrative systems – the systems that are going to value the product as well as monitor it and so forth. So in that sense, you should make decisions up front, if you are subject to GAAP reporting or if you're a mutual company that does some type of "GAAP for mutuals" financial reporting. There is also the question of investment product versus limited pay under GAAP, depending on the mortality element. Typically, you'll find that earnings will emerge roughly in the same manner, under either model, since both are predicated on no gain at issue.

I'd like to introduce the panelists. John Santoloci is a Fellow of the Society and Member of the Academy. John holds the position of actuary at Metropolitan Life and

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is responsible for the pricing and valuation of payout annuities. John is also the chief actuary for MetLife Security, a subsidiary that came about as part of the Charter Life Companies which were acquired by Metropolitan. John will speak on the marketplace, types of products, pricing considerations, asset/liability management, and then talk about something that perhaps is a little bit unique to Metropolitan, their cost-of-funds approach.

The second panelist is Bob Maull. Bob also is a Fellow of the Society and a Member of the Academy. Bob is senior vice president and corporate actuary at Mutual of America and is responsible for statutory financial reporting. He also has had some involvement with product development. Bob also is a member of the life committee of the Actuarial Standards Board. Bob will talk about NAIC Guidelines IX-A and IX-B, Regulation 126 and about reinsurance considerations in the product development process.

MR. JOHN L. SANTOLOCI: Before I get into my presentation, I'd like to tell you just a little bit about the way we're organized at MetLife. Our life and health lines of business, both group and individual, follow one line of reporting, and the group pensions and personal annuities follow another. Personal annuities are managed by the MetLife Pension & Savings Center of which I'm a part. The Pension & Savings Center (PSC) manages all of Met's individual annuities and some of its group annuities as well. Within PSC, we divide our businesses into two parts. There are accumulation products, which are largely deposit instruments with embedded options, and payout annuities, which are straight (noncallable) bond-like financial instruments.

We also maintain separate asset segments accordingly, and further divide our segments for regulatory reporting, between group and individual. The two pools that constitute our immediate annuities right now total around \$5 billion.

Virtually all immediate annuities sold are single premium products. They guarantee periodic income payments, usually monthly, for a certain period of time or for life of the annuitant.

In the case of a joint contract, it is a guarantee for as long as one of the annuitants remains alive. The income payments usually begin immediately. However, some forms of the product provide for the annuity to commence only after a certain period of time has elapsed or upon attainment of a certain age, in which case they are "deferred immediates." The highest amounts of immediate income per dollar of premium is obviously obtained with a life only option. As payment guarantees are added to the benefit structure, for example, 10 years certain, the amount of income payable becomes less.

Availability of the refund option introduces a death benefit feature to the immediate annuity, which further reduces the living benefits available and where annuity payments are initially deferred, the usual practice is to provide for a death benefit to a designated beneficiary during the deferral period, and sometimes a cash surrender option as well.

Income escalation options are available as a hedge against inflation. Such options provide for guaranteed income payments that increase by a certain percentage each

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year for life up to 7% per year or more. Sometimes we find cost-of-living adjustments (COLAs) that vary with the CPI, and these can be rather risky. Other custom features may be provided where permitted by law. Lump sum payments, for example, are commonly found in structured settlement annuities but are not generally otherwise permitted.

The maximum issue age permitted for immediate annuities tends to be around age 90, although some companies will issue them at even higher ages. Such annuities warrant extra underwriting considerations, and special rates should apply. While there are usually no minimum age restrictions, it is rather unusual to find many annuities issued below age 50. Structured settlement annuities are an important exception. An average issue age of 25 is not uncommon for companies offering this line of business.

Annuities certainly form a rather special set of products. They can be used to provide a guaranteed fixed income for a limited period, to fund an endowment program, or as a gift annuity. Funding agreements which are not actually annuities at all have been used to fund environmental cleanups, as security for certain lending programs, and in a number of other specialized applications as financial instruments.

The marketplace for immediate annuities is now very broad. New product applications seem to evolve regularly. The traditional use of immediate annuities was to fund retirement benefits. The income options available were relatively uncomplicated. In recent years, however, there has been a proliferation of new markets for these products. Product applications seem limited only by our creative abilities in finding new ways to fit these financial instruments to the needs of the modern business world. Like the carpenter armed only with a hammer, who sees everything as a nail, we can see in nearly every flow of funds, an annuity in the making.

Qualified markets include the immediate annuities purchased for retiring participants in employer sponsored pension plans, as well as deferred income annuities purchased for vested participants who are terminating from these plans. More recently, qualified domestic relations orders (QDROs) have resulted in the purchase of individual annuities by pension plans, as settlement for a divorced spouse's share of vested pension benefits, and even to secure alimony or support payments. Nonqualified deferred compensation plans which are used by individuals to reduce current income taxes, as well as to provide for retirement, utilize annuities to convert these savings into income.

Supplemental retirement plans provide executives with postretirement benefits through annuities from their employers. Discriminatory benefits not permitted under qualified plans may also be funded in this way. Savings programs which have flourished during the past two decades or so should at some point produce a tremendous market for immediate annuities. IRAs, CDs and other asset accumulations will eventually be paid out in some form. At the same time, it has become more widely recognized that supplemental income sources will be required to provide for more comfortable retirement. It should be an important goal for us to develop annuity products that custom fit income streams to meet the special payout needs of these individual savers.

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A number of specialty markets have also developed. The most significant of these currently is the structured settlement marketplace, which now produces annuity sales of around \$3 billion annually. These contracts, which arise out of litigation settlements of personal injury claims, have very customized benefit structures, commonly featuring large lump sums payable at certain future dates. Substandard mortality is used in price setting, based on individual medical underwriting data. Other specialty markets include state lotteries which are typically 20- or 25-year annuities certain (although there are some lifetime benefits as well), sweepstakes placed by bid, gift annuities placed through charitable institutions, and reverse mortgage annuities sold in connection with residential real estate loans.

Reverse mortgages through several major financial institutions seem to generate a fair amount of interest among the elderly, who often find themselves to be asset rich but cash poor. The problem with such programs is that the individual could outlive the equity payout. The recent downturn in residential real estate values has also hurt such programs and has made them more difficult to capitalize. The latest version of such a program now features the use of an annuity to provide for lifetime income, purchased using residential real estate.

Although there is a wide variety of product applications for immediate annuities, the pricing form has remained basically the same for all. The benefit cash flows are projected over the future lifetime of the contract and then discounted for interest back to the single premium due date. Commissions, premium taxes, expense charges are then added, and these are usually front-ended, but they can also be spread out over future years.

Mortality assumptions are used to project the cash flows. For individual and immediate annuities, the 1983 Table A, with the appropriate adjustment for mortality improvement from 1983 to the current date, is the table of choice for base mortality. This Table should be used in combination with a projection scale such as Projection Scale G, to reflect future mortality improvements.

For certain group applications, the 1983 GAM basic table is used with Projection Scale H. The annuitants covered here are somewhat more selective than the typical group pensioner covered by an employer sponsored plan. The purchase of these annuities is still event driven, so group rates should still apply.

Structured settlement annuitants are assumed typically to follow the mortality experience of the U.S. population. The usual mortality assumption applied currently is based on the 1980 U.S. Population Table with projections for mortality improvement. Substandard mortality is generally reflected in pricing by rating up age to reflect the actual life expectancy indicated by the underwriting data. While this method seems to work reasonably well within limits, there are some concerns. In the first place, rated up mortality produces the undesirable effect of increasing the level of assumed mortality by duration, whereas, for many impairments, expected mortality will actually improve over time. Also, the U.S. Population Table includes all lives, whether healthy or severely impaired, while substandard underwriting separates out the most impaired risks. This seems to suggest that the standard risk structured settlement annuitants may actually be healthier than the mortality tables assume. Recent experience appears to be consistent with this.

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Sex distinct mortality rates are used, except that unisex must be used for qualified annuities of the defined contribution type, and for any annuities issued to residents of Massachusetts or Montana. In developing unisex rates, it is recommended that each company develop a blend to fit the mix of its own annuity business. Commission rates generally fall into the range of 2-4%. Premium taxes are assessed presently in 13 states. Administrative service charges can be assessed per life per year in the pricing, with \$50 per year a typical charge. These can also be expressed as a percentage of the net consideration in the pricing formula.

Federal income taxes should also be considered in the pricing structure. Effective October 1990, nonqualified annuities are now subject to a deferred acquisition cost (DAC) tax. Under the Revenue Reconciliation Act of 1990, 1.75% of all annuity considerations (nonqualified business only, net of reinsurance considerations) are to be capitalized as a DAC each year and will be amortized on a straight line basis over 10 years (for most business). While there is a number of other qualifications, special rules, etc., this amounts to an extra cost for nonqualified annuity products equivalent to about 0.25% on a present value basis, which should be reflected in your pricing.

Another impact of federal tax law which bears some analysis on pricing is the use of a reserve basis for tax reporting that produces lower reserves than those held for statutory purposes. Profitability studies can be significantly altered by inclusion of federal income taxes in your modelling.

Last, but certainly not least, in terms of its impact on pricing is the interest rate assumption. Traditionally, when pricing immediate annuities, a long-term investment rate was chosen and used to discount the liabilities. Later, this led to the use of two or more rates in producing a somewhat crude emulation of the investment yield curve. More recently, a spot rate curve has been used to discount benefits at each duration, with a constant rate used for discounting liability cash flows beyond the last available spot rate (usually after the 25th or 30th year). In all of these variations, margins are subtracted from the gross investment rates for investment management, risk, and profit.

There is another approach which I will call the cost-of-funds pricing method. The previously described approach might be called a "top down" method (i.e., gross investment rate less margins), whereas, this one would be a "bottom up" method (i.e., cost of funds rate, no margins).

To understand how the method works, consider the case of a one year bullet GIC, which promises to pay \$1,000 at maturity. Assume we're able to price this product to sell at a discount rate equal to the one-year Treasury spot rate plus 50 basis points. Assume further that there are no other costs to cover and that the product has no other loads. Then our "cost of funds" on this product is equal to the discount cost at the one year spot rate plus the 50-basis-point spread constant. In real terms, the 50-basis-point spread represents a premium that we've offered to our customers in order to secure new business on this product.

We've not yet said anything concerning our investments. The presumption here is that the investment department can at least match and hopefully exceed our targeted cost-of-funds rate with its total return on investments for this product. Our ultimate

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profitability and the amount of value added by this process will be determined by the investment department's performance. At the end of one year, we can compare the market value of the assets generated by the investment process with the \$1,000 maturity value then due, and the difference is our gain from this bullet GIC product.

We can expand our product definition to a whole series of periodic cash flows, and we will associate each payment with its own cost of funds discount rate. The discount rate structure will be taken from the Treasury spot rate curve, plus a constant spread. Cash flows extending beyond the 30th year, for which no spot rates are available, are discounted back to the 30th year at some relatively conservative rate such as 6%, then discounted back to the present date, using the 30th year cost of funds rate. With this expansion, we now have the ability to set the price for virtually any annuity income stream without requiring any assumptions to be made concerning the current investment returns achievable by our investment department. These net rates will be loaded for expenses, commissions, and for taxes to produce the final gross annuity considerations.

All premium receipts will be turned over to our portfolio manager for investment, together with a projection of the annuity cash flows on this business which will be used for investment analysis. The actual cash flows may vary a bit due to emerging mortality experience, but otherwise they remain fixed, since these products are virtually option-free. What we have done is to set up a fixed target for the portfolio manager to work against, using the funds generated from product sales and his investment skills to "beat the liabilities" on a total return basis.

Total return has been chosen as our portfolio performance measurement because:

- It provides the most meaningful measurement of real economic value.
- It accounts for asset risk through the market-value mechanism.
- It is consistent with the way professional investment managers operate.
- With these particular liabilities, it is a fairly straightforward process to create a market based liability index, against which to measure investment performance.

Setting the target spread is an important decision to be made jointly between the product actuary and the portfolio manager. That decision needs to balance our desire for competitiveness with a level of investment risk that we are willing to take on. Our own company's relative credit-worthiness will also influence the level of target spread acceptable to us.

One of the interesting applications of this method, and in my view, a real dividend, is that we can use our cost of funds target to help manage the sales process. Just as we have challenged the investment department to beat our target spread with their investment performance, we can challenge the sales department now to beat our bogey, by bringing in new business at the lowest cost of funds possible. By beating the target spread on the down side, they will be actually creating value for the

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business. Those results should be quantified in present dollar terms and recognized as gains from sales.

Rate resetting remains an important activity for actuarial, which must be done frequently if rates are to be at the market and within the target spread. In fact, at our company, we review the Treasury spot rate curves on a daily basis, together with the implied target rate spread. Actuarial should also be credited with adding value through the underwriting process, which implies careful selection of mortality standards, especially for substandard, and sound expense analysis (if I may include that as part of the underwriting process). However, the greatest impact is still, of course, the gain from investments, and market value analysis is the method of choice for monitoring the financial performance of long-term products like immediate annuities.

I now have some examples that illustrate some of the points I've been discussing. Table 1 depicts the market value analysis process. At the top, surplus change is equal to the change in market value of assets less the change in market value of liabilities. We could instead take the market value of our assets and solve for the required spread on assets implied by our liability cash flows, then compare that to our target spread for review over time to see whether that spread is growing or shrinking. Shrinkage implies that we're making progress and adding value.

TABLE 1
Market Value Analysis

Surplus Change = Change in MVA less Change in MVL	
<ul style="list-style-type: none"> ● New Business Premiums ● Benefits/Expenses Paid ● Yield Curve Shifts ● Investment Earnings <ul style="list-style-type: none"> – Cash Earnings – Accrued Income ● Fixed Income <ul style="list-style-type: none"> – Portfolio Composition – Credit Quality – Asset Liquidity ● Other Market Factors <ul style="list-style-type: none"> – Change in Sector – Spreads – Cost of Options ● Equities 	<ul style="list-style-type: none"> ● Target New Business Premiums ● Benefits/Expenses Paid ● Yield Curve Shifts ● Required Interest ● Gain/Loss from Underwriting ● Gain/Loss from Sales

The target new business premiums are what our neutral pricing measurement is. We take our actual premiums, less our targets, and if we've done our job well, there will be a positive difference which we attribute as the gain from sales.

The next line isolates the combined impacts of asset/liability mismatch and shifts in the yield curve. Investment earnings are what we always thought they were. They're yields on a book basis. The counterpart on the other side is required interest. Gains from underwriting are what we discussed earlier. Actual versus expected

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reserves released upon death gives us one source of gain. Actual versus expected expenses will be another source.

Back to the asset side again, the fixed income portfolio component is the shifts in our portfolio for such things as credit quality and liquidity position. Other market factors that might contribute to the change in the market value of assets could include changes in sector spreads, option values and so forth. Lastly, we have equities. For a long-term liability like this one, we believe that equities are appropriate in the right proportion, because over the long-term, historically, equities have outperformed the bond market. What we try to do is match the interest rate sensitivity of our fixed-income portfolio to the liabilities, and once we're matched in that respect to interest rate changes, we count on the equities to perform over the long term to give us added value.

Chart 1 illustrates our plain vanilla immediate annuity portfolio. What you see there is about \$4 or \$5 billion dollars of undiscounted cash flows. You'll notice that it peaks at the beginning, then very quickly tails off.

Chart 2 shows our book of structured settlement annuities. This business has a far different pattern and is much riskier and much more volatile. The top slice is the substandard cash flows that we never priced for. If we end up having to pay out those cash flows, we have probably lost some money in our underwriting. This particular portfolio amounts to approximately \$14 billion dollars worth of expected future cash flows.

About a year ago, we would probably have been talking about effective duration and convexity. But effective duration and convexity live in the world of parallel yield curve shifts which virtually never take place in real life. Tom Ho of Global Advanced Technology in New York has developed a new concept that breaks down the effective duration into components known as key rate durations. Two portfolios with the same effective duration can have markedly different interest rate risk exposures and effective duration just doesn't do the job for us. So what we've done is to divide up the interest rate exposure into 11 key rate durations.

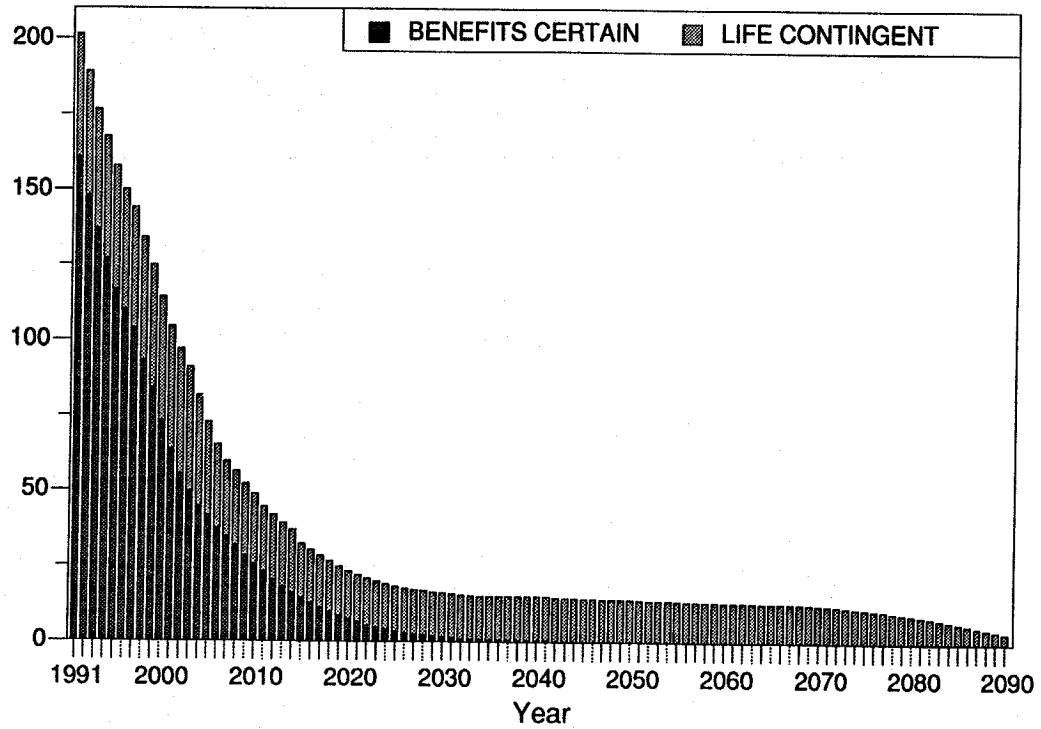
The key rates are the Treasury spot rates at those key durations. What we do is shock each of the key rates separately to measure the amount of sensitivity in our asset portfolio and in our liability portfolio.

Chart 3 shows the key rate duration profiles for our structured settlement portfolio. If you add all the pieces up going across, you would end up with an effective duration of for the liabilities of about nine years. In this particular portfolio, the assets presently are a bit shorter than that. But you can gain a sense as to where on the spot curve our mismatch is. This is how we keep our interest rate sensitivity under control.

There is also another level of market value analysis which we are about to undertake, which in effect, tries to qualitatively evaluate how well we've "beaten" our liabilities. We could, for example, measure our investment manager's performance relative to some public index like Standard & Poor's 500 for equities, or the Shearson Bond Index for fixed-income investments.

Immediate Annuities

Projected Cash Flows



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CHART 1

Structured Settlements

Projected Cash Flows

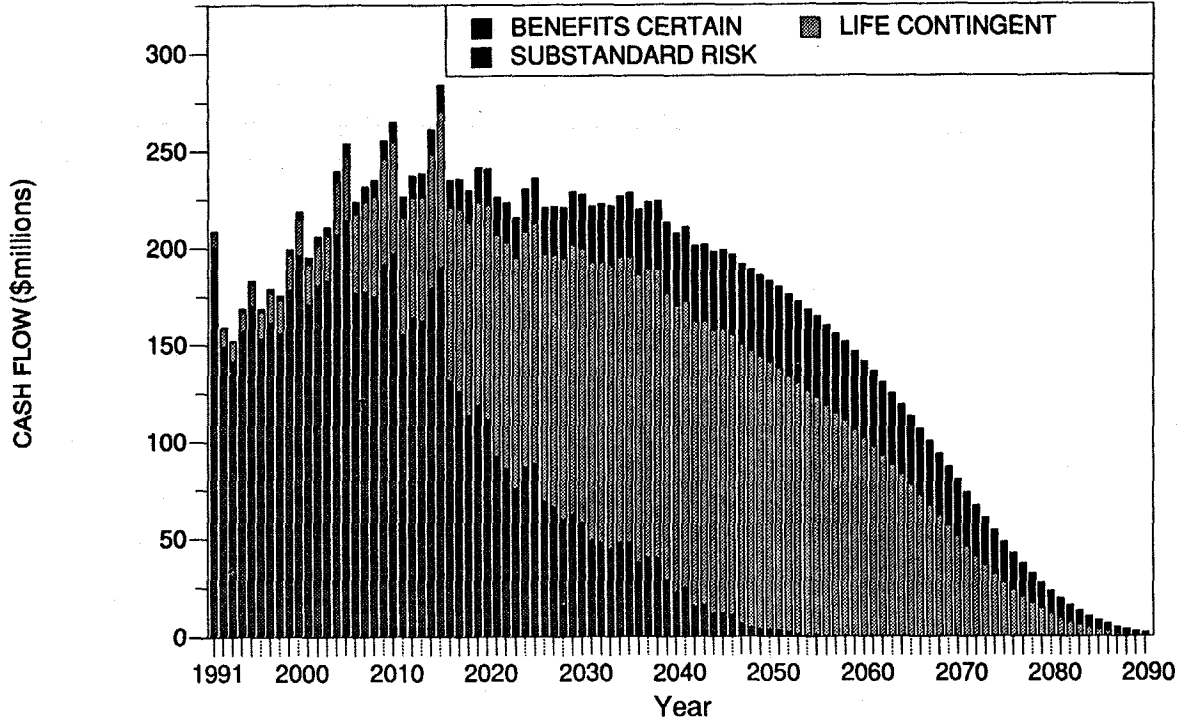
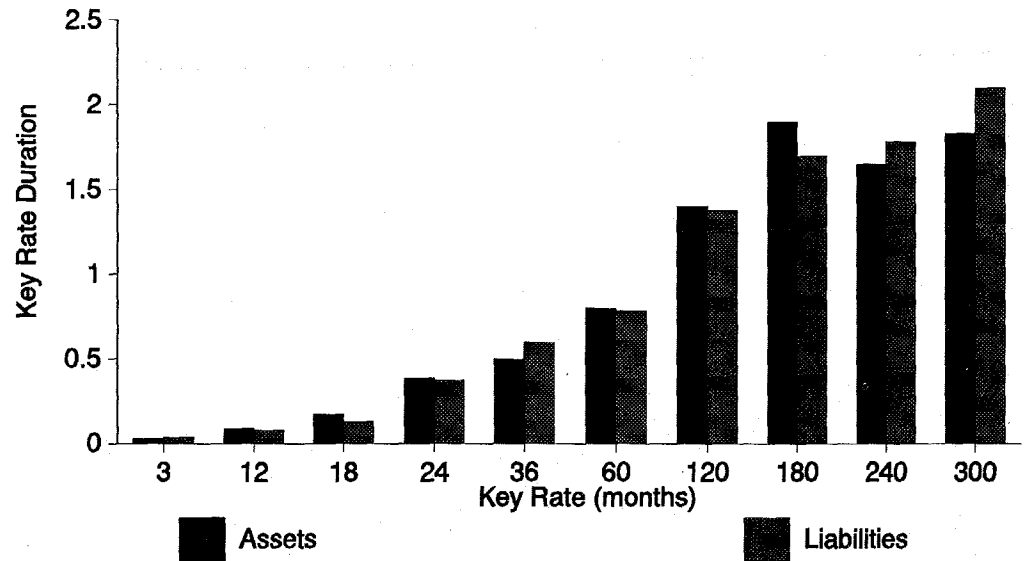


CHART 3

Interest Rate Risk Exposure

Asset/Liability Profile



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This whole process enables the asset and liability sides to concentrate on which each does best. On the liability side, we assess mortality risks. We evaluate expenses. We work with the sales process. But, we don't need to consult with the investment department once we've set our target spread as to how and when to set rates. We can determine that simply by looking at what the treasury spot rate curve is for today or this week or this month. At the same time, the portfolio manager has a total return goal and a clear objective to beat the liabilities. It gets us away from book-basis accounting and we think it's definitely the way to go for the future.

We are still tightly bound by statutory and GAAP reporting and our statutory reserves are set rather conservatively. We don't mind being aggressive as long as we are adequately reserved. We hold our statutory reserves without substandard mortality and neither do we try to use the 110% or 115% rule for any lump sums. A lump sum is valued separately as a Type B "GIC," as required by New York State. Our GAAP reserves do reflect substandard mortality on the rated-age basis.

MR. ROBERT W. MAULL: As part of the pricing process, the pricing actuary must keep a number of valuation considerations in mind. This applies whether you're talking about use of surplus, return on investment or, more simply, just maintaining a surplus strain budget. I want to deal with a few of the statutory valuation issues impacting on the work of the immediate annuity pricing actuary. The first of these issues is NAIC Guidelines IX-A and IX-B. For New York companies, the counterparts are found in Section 95.12(f) of Regulation 126. With a couple of exceptions, which I will identify, the provisions are identical.

The guidelines begin with a definition of an immediate annuity – payments not less frequently than annually, beginning within 13 months of issue, and lasting for at least five years. Guideline IX-B adds to this the requirement that, to qualify as an immediate annuity for valuation purposes, benefits in any year may not exceed those of the prior year by 15%. If a contract fails this test, but is part of a block of contracts in which the benefits in any year do not exceed those of the prior year by more than 10%, then all contracts within that block may be valued as immediate annuities.

This, obviously, is desirable when compared with the alternative. Guideline IX-B provides that any benefits not satisfying this 15% rule (or the 10% alternative rule) must be valued as deferred lump sums using Plan Type A deferred annuity valuation interest rates. The problem is even worse for New York companies because Plan Type B is specified for deferred lump sums. In both versions, however, it is not the entire annuity which must be valued as a deferred annuity; rather, it is just those benefits which do not satisfy the rule.

Guideline IX-A allows the use of a substandard mortality table to reflect a doctor's written evaluation of the life expectancy of an annuitant. The minimum reserve basis is that obtained by making a constant addition to the mortality rates of the applicable table such that the expectation of life at issue on the adjusted table at least equals the average of the expectations of life obtained from the information given by the company's medical directors during the underwriting process.

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If an insurer uses a modified mortality basis for valuation of impaired lives under structured settlements, it must maintain records of actual to expected mortality to monitor the appropriateness of the substandard mortality basis.

Guidelines IX-A and IX-B became effective for issues of 1990 and subsequent as of year-end 1990. It is effective for prior years' issues as of year-end 1993. The corresponding provisions of New York's Regulation 126 are effective for all issue years as of year-end 1990.

Cash-flow testing, in one form or another, frequently plays a significant role in the pricing of immediate annuities nowadays. While my comments concerning cash-flow testing arise primarily from my experience as a valuation actuary, most are equally appropriate on the pricing side.

I have found immediate annuities to be one of the easiest annuity products on which to do cash-flow testing. Once the effect of inflation has been recognized on your expenses, your liability cash flows are fixed. You don't have to worry about interest crediting philosophies or interest-sensitive withdrawal rates.

At the same time, a number of companies have recently had a very difficult time producing satisfactory results from the cash-flow testing of immediate annuities. While there are other contributing causes, one of the primary culprits for these difficulties can be seen on Table 2.

TABLE 2
Immediate Annuities
Maximum Valuation Interest Rates

Issue Year	Interest Rate
1983	11.25%
1984	11.25
1985	11.00
1986	9.25
1987	8.00
1988	8.75
1989	8.75
1990	8.25

Whatever happened to all those securities yielding 12-13% or so that we purchased in the early-to-mid-1980s? If your company was like a lot of the rest of the insurance industry, you were selling those assets in recent years, reaping some very nice capital gains, and improving surplus ratios. This leaves the valuation actuary with the task of trying to match those liabilities with assets yielding no more than 9.5% or so. One obvious solution is reserve strengthening. This, however, may be politically unpopular since it negates much of the effect of the increase in surplus achieved through the sale of those high yielding assets.

With no interest crediting strategy available to work with, the development of an investment (and reinvestment) strategy is of paramount importance to achieve

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satisfactory results, when performing cash-flow testing for immediate annuities. Some of the more common debt instruments in the market today follow.

The first one is callable bonds. Unless you enjoy seeing negative numbers for falling interest rate scenarios, the typical long utility bond with five years' call protection does not belong in this portfolio. Lengthening the period of call protection makes the callable bond more attractive. Ginnie Mae's probably fall within this same category.

The next category is noncallable bonds. This is probably the mainstay of the portfolio for those looking to cash-flow-match immediate annuities as closely as possible. The primary drawback to noncallable bonds is the fact that you pay a price for your call protection, in the form of lower yields. Furthermore, if you're looking at longer maturities, probably over 15 years or so, you may find a limited supply of such securities available.

The third category is collateralized mortgage obligations (CMOs), etc. Principal payments on these mortgage-backed securities are determined by sequential order of the tranche relative to other tranches. Thus, by varying the tranche, you can target a range of calendar years over which you'll receive principal payments. This range of years will vary by interest rate scenario, but the variation will not be as great as it would be if you had a proportionate share of the entire mortgage portfolio. You have to be very careful though, because not all tranches are created equal; some are much more sensitive to interest rate change than others. Scenario testing is necessary to assess this sensitivity. Most of these securities that we have been seeing in the last year or two carry very high credit ratings and relatively attractive yields.

Zero coupons can be purchased outright or achieved through internal coupon stripping. They're ideal for filling in holes in your cash-flow projections.

Lastly, there are bonds with put options. These bonds offer some protection in rising interest rate environments by giving you the right to put the bond back to the issuer at par. Normally this right is available to you over a very limited time period, perhaps a month, at some specific month in the future. The presence of the put option also results in a reduced yield, often 25 basis points or more.

The above list of types of securities should not be considered to be all inclusive, whether for pricing purposes or for valuation purposes. I have heard of a new type of security which could be attractive for immediate annuities, called a debt warrant, and it provides a hedge against falling interest rates. Using illustrative numbers, for a cost of \$350,000, you buy the warrant today. This warrant provides that at any time between April 1, 1993, and April 1, 1998, you can purchase at par, from the issuer, \$25 million of an 8% noncallable bond of the issuer, maturing in April 2010. This bond even contains a provision allowing you to put it back to the issuer at par on the date which is five years after the date you exercised the warrant to purchase the bond.

I am not certain that such a debt warrant could be used by the immediate annuity pricing actuary. Depending on your particular circumstance, it certainly could be attractive to the valuation actuary. More importantly, however, this illustrates that we are not really restricted to a static inventory of investment vehicles. Wall Street is

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constantly developing new, innovative investments, and we owe it to ourselves to keep informed as to what is available.

I want to talk a little bit about reinsurance as it applies here. Insurance companies do not usually reinsure annuity business to the same extent as they do life or disability insurance. Yet for various reasons, a number of companies do reinsure annuities. The presence of reinsurance on a product, no matter what the product, presents some very challenging cash-flow testing issues with which the valuation actuary must be prepared to deal. There is little published guidance on incorporating reinsurance into your cash-flow projections. New York's Regulation 126 in Section 95.9(f) states: "The actuary of the ceding company must evaluate the risks retained and the actuary of the assuming company must evaluate the risks assumed." The rest of the paragraph is primarily concerned with the transfer of investment risk in the reinsurance agreement. The regulation does not tell the ceding company's valuation actuary whether, in evaluating the risks retained, he should be looking only at the retained risks or if he should work with gross risks with appropriate offsets for risks assumed by the reinsurer. Based on my own experience, there can be some very substantial differences depending on which approach you take. In my opinion, two situations in which you would definitely want to test gross liabilities less credit for reinsurance ceded are surplus relief reinsurance and experience refund coinsurance.

One very basic issue concerning reinsurance is that the amount of reserves being tested is the net retained reserves. That is, gross reserves less the credit for reinsurance ceded. With that concept in mind, your beginning assets, for cash-flow testing purposes, cannot be greater than your net retained reserves. It would be improper to start with assets equal to your gross reserves.

One approach to incorporate reinsurance into cash-flow testing, is to test using full liabilities as if there were no reinsurance, but with starting assets equal to net retained reserves. On a year by year basis, you then overlay on top of this a cash-flow projection of the operation of the particular reinsurance treaty. When looked at in this manner, your anticipated recoveries from your reinsurer become asset cash flows in your overall projections.

This approach causes you to have to deal with such interesting issues as evaluating the credit-worthiness of your reinsurer, just as you would for the issuer of any other asset in your projection. I don't want to go any further into the subject of incorporating reinsurance into your cash-flow projections at this time. As a practicing valuation actuary, I have found it to be a most challenging endeavor.

I want to conclude with a few remarks now about surplus relief reinsurance. As with reinsurance in general, surplus relief reinsurance is less common on annuities than on other business, but it can be done, even if you are a New York company. I know of one New York company which has received approval (technically the language used is "not violative of a Department Regulation 102 at this time") of a surplus relief agreement covering annuity business from the New York Insurance Department. Two of the key issues, when dealing with the New York Insurance Department, but certainly not the only ones, which must be dealt with are transfer of risk and the requirement by the Insurance Department that the reinsurer not retrocede any part of the reinsurance.

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A final thought on surplus relief reinsurance is that when subjected to cash-flow testing, you may well find that the surplus relief is worth a lot less than you thought. I call it the "Case of the Disappearing Profit Margins." Consider the situation of a block of business with \$300 million of gross reserves and surplus relief reinsurance of \$20 million dollars, leaving net retained reserves of \$280 million. This means you can only use \$280 million of assets in your cash-flow testing for a block of business whose present value on your reserve basis is \$300 million. Then to put the icing on the cake, in your liability cash flow, you should include the cost of carrying the reinsurance.

I do want to bring up one more issue and it happens to be relative to surplus relief reinsurance. I heard last week that there have been some stirrings in the California Insurance Department relative to the status of some surplus relief reinsurance and the continuing ability of companies doing business in California to take reserve credit on surplus relief reinsurance. I haven't seen anything concrete and if someone in the audience can shed some light, I'd be most appreciative.

MR. ALAN J. ROUTHENSTEIN: With regard to your cost-of-funds approach on structured settlements, have you attempted to extend that approach to other insurance products?

MR. SANTOLOCI: This may be extended to other pension lines, but I'm not so sure we'd want to do this with the single premium deferred annuities (SPDAs), if that's where you're headed.

MR. ROUTHENSTEIN: One of the concerns at many insurance companies is comparing the costs of these liabilities as opposed to just issuing debt. For example, a company with a AAA rating could pretty easily determine at what rate it could issue debt. The idea would be to compare the costs of funds for different lines of liabilities relative to the cost of funds for issuing debt. There are of course some other statutory and rating agency implications, but from a perspective of market value of surplus, if you can issue debt less expensively than you can by selling structured settlements, it doesn't necessarily make sense to be in the structured settlement business.

MR. SANTOLOCI: Except that we are in the long-term insurance risk business, and therefore, it would seem appropriate for us to be in structured settlement business, regardless of the cost of just issuing debt.

MR. ROUTHENSTEIN: With regard to the key rate durations, what do you do when you determine that there is a problem with a specific key rate duration?

MR. SANTOLOCI: On the liability side, we obviously can try to bring in new liabilities by adjusting our premiums to make certain liabilities relatively more attractive. But probably we would go to the asset side and try to find some securities that will compensate for where that problem is.

MR. ROUTHENSTEIN: With regard to the debt warrants, it should be pointed out that these types of structures are very flexible. They don't come out that often, but they've been as long tailed as a 30-year American option to purchase at par a

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30-year fixed-income debt. So you potentially are extending out much further than you can with any other fixed-income-type instrument. There is also something called an inverse floater, which is a fixed-income instrument with a floating coupon and a maturity that could be anywhere from 10-20 years. They are also available for much shorter portfolios. With an inverse floating rate note, when interest rates drop, you would receive higher coupons, to help compensate for your reinvestment risk.

MR. MICHAEL P. HEALY: John, you made a statement that you found recent experience suggested structured settlement mortality may be better than U.S. population. Is that Metropolitan's experience?

MR. SANTOLOCI: Actually our most recent experience will soon be measured in conjunction with the Society study. It's our feeling from talking to people about the industry that you're actually seeing some selection here. I'm not exactly sure why, but that seems to be one source.

MR. HEALY: I also wanted to comment on the idea of these options to purchase 8% debt at par. If a company is giving somebody the right to buy a bond at 8% 30 years from now, say a 20-year bond, then that company is projecting out 50 years and I'd have questions about the wisdom of that company selling such an instrument or a life insurance company buying such an instrument.

MR. PETER J. BONDY: On mortality, John, I would say that the market is very efficient. We've looked at our underwriting and looked at our procedures and over time, they've obviously changed. When you tighten down on your underwriting, you tend to go to more certain only benefits. When you're a little bit more liberal, you tend to get more life contingent benefits. So as a rule, I would say that the market is going to go against you, and as such, your mortality will be better probably than population mortality. I've also got a question for you. Do you keep life contingent reserves for substandard cases based on standard mortality?

MR. SANTOLOCI: That's correct.

MR. BONDY: What do you do for tax reserves?

MR. SANTOLOCI: We hold standard mortality reserves for tax purposes as well.

MR. BONDY: What about on your lump sums. Do you use your Type B GIC reserves for tax reserves?

MR. SANTOLOCI: We basically apply the Applicable Federal Interest Rate (AFIR) to the lump sums as well.

MR. BONDY: Are you grading your interest rates for statutory, going to a low ultimate rate?

MR. SANTOLOCI: For statutory purposes, we use the dynamic rates throughout. Once set, those rates remain constant for the entire lifetime of each contract.

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MR. BONDY: Going back to the nonlump payments, are you using your AFIR for the first 20 years on the application of IX-B? We're using reserves that are not higher than those that would be based on the AFIR as a level rate. We've heard comments about some companies potentially using the AFIR rate for their grading process which would produce higher reserves than if you based it on the AFIR alone.

MR. SANTOLOCI: We use Type A rates for all but lump sum, subject to the AFIR when greater. We do not employ the graded method for statutory or tax reserves. For certain-only benefits, including lump sums, it is also required in determining your tax reserves that you test against your pricing basis as well to obtain the lowest value.

MR. RYAN: I think there are a lot of unanswered questions on how you calculate tax reserves with structured settlements. I think you've got to take a reasonable position. The law isn't that clear on exactly what to do. But clearly, tax is something that you have to take into account in the pricing or product development process.

MR. ROUTHENSTEIN: I wanted to make one quick response to the comment with regard to the credit risk on debt warrants. There is no question whenever you buy any security that is not issued by the United States government, you're taking on a credit risk and it wouldn't be the actuary's job to evaluate the credit risk. It normally would be that of the credit analysts within the investment department. So that has to be taken into consideration, as with any long-term security or really short-term security too. The interesting point is, some insurance companies are currently using these types of securities as part of their asset/liability approach for managing their structured settlement or immediate annuity portfolio.

MR. MELVILLE J. YOUNG: Bob asked a question earlier concerning California, and a letter that some of us received that has been an indication that California is thinking about amending Bulletin 89-3, which was their reinsurance regulation as it applied to combined coinsurance/modified coinsurance (co-modco) agreements. I think that they've stated that letter was in reaction to something just eluded to as well, and that is this fairly uncomfortable situation for them right now. I think it is unfortunate to link the two, because for Executive Life, if one lists the reasons why they are in an uncomfortable financial situation, reinsurance might end up as item 83, but as a reaction to what has happened there, California has announced that they're thinking about amending 89-3 to no longer approve combination co-modco type arrangement. I don't think they have come up with what they ultimately will issue, but it's just a warning that they're thinking about it. One of the things to consider is that Bulletin 89-3 only applies to companies whose home states have not approved the Model Regulation for reinsurance. So if the form ultimately is an amendment of 89-3, if you're in a state that has passed that version, presumably, it wouldn't apply to you and New York was the first state to pass a version of that Model Regulation in New York Model 2. But my own opinion is that reinsurance would be taking an unfair blame for the problems of Executive Life if this is a result, and another thing is that when one buys reinsurance, one should see who the reinsurer is. Executive Life didn't always use household name reinsurers, and there is a way to make sure that you buy reinsurance from a company that is going to be there if needed. Certainly, if California is trying to address that problem, I think that's a legitimate problem to address.

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MR. MAULL: Mel, do you have any feeling or specific knowledge as to why they are picking on co-modco?

MR. YOUNG: That happens to be the version that generally Executive Life used.

MR. PETER M. WILSON*: I think you should add that is also the form that California preferred for all companies, not just for Executive Life. So that it is sort of a Catch-22, to give you the form to use and then disapprove it.

MR. RYAN: I'd just like to make one quick comment in closing. Cash-flow testing obviously is critical for analysis of your liabilities and assets. As you now know, actuarial standards require that the actuary do cash-flow testing or at least take it into consideration in coming to any opinion about reserve adequacy and when doing pricing studies. You may use different criteria when you do the cash-flow testing from a pricing perspective and a reserving perspective, but I would think that if you had a problem shortly after issue with statutory reserves from cash-flow testing, there is a good chance that you probably had a problem when you did the pricing. I think people are seeing that where you do a static type of pricing with an assumed spread, everything looks great, but when you look at some variations in interest rates, suddenly you don't have profits any more.

* Mr. Wilson, not a member of the sponsoring organizations, is Vice President of Mystic Insurance Intermediaries in Ridgefield, Connecticut.

