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**IMMEDIATE ANNUITIES --  
PRODUCT DEVELOPMENT CONSIDERATIONS**

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Panelists: DONNA R. CLAIRE  
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RICHARD A. SWIFT  
Recorder: GREGORY J. CARNEY

- o Mortality assumptions
  - Projections of mortality
  - Substandard mortality
- o Investment strategy
- o Expenses
- o Structured settlements
- o Valuation problems

MR. GREGORY J. CARNEY: This session is sponsored by the Product Development Section. Dick Swift, a principal of Tillinghast in their Minneapolis office, has been a life insurance company consultant for the past 17 years. His consulting work includes life and annuity product development, actuarial appraisals for acquisitions, and financial planning and projection. Dick is an FSA, a Fellow of the Canadian Institute of Actuaries (FCIA), and a member of the American Academy of Actuaries (AAA). He was also a founding member of the Product Development Section and a member of its first Section Council. Dick will be discussing the mortality and valuation topics.

Richard Sega is 2nd Vice President, Asset Liability Management, in the Investment Department at Phoenix Mutual in Hartford. His responsibilities include futures, options, and swaps, market hedging strategies, mortgage-backed securities, analysis of immunized portfolios, and the development of new investment techniques to apply to the problems of asset and liability coordination. Prior to joining Phoenix he held positions as pension actuary, portfolio manager, and options futures trader at the Travelers Insurance Company. Rich has a BA in math from Fordham and an MA in statistics from Columbia. He is a Fellow of the Society and a member of the AAA. Rich is going to be talking about investment strategy.

Donna Claire is the Assistant Vice President and Actuary at the Equitable. She works as investment and insurance liaison in the Asset and Liability Management Department. Currently Donna is a member of the Individual Life and Annuity Product Development Section, and she has chaired several industry advisory groups on New York Regulation 126.

MR. RICHARD A. SWIFT: My presentation will provide a general background on immediate annuities and similar types of annuities. In addition, I will discuss mortality and valuation issues for these plans.

## PANEL DISCUSSION

Single premium immediate annuities (SPIAs) provide periodic payments to the annuitant. Typically, these payments are made monthly over the lifetime of the annuitant in exchange for a single premium paid to the insurance company. Benefits remaining after the annuitant dies depend on the guarantee option chosen by the annuitant when the SPIA is issued. SPIA plans can also be issued on an annuity-certain basis, with payments made for a specified period of time.

A lifetime-only option is appropriate when an annuitant is not concerned with providing benefits to survivors. Life incomes with 10 years, 20 years or installment refund guarantees are popular options. Other guarantees are also available, including various joint and survivor options in which all or a portion of the periodic payments will continue as long as either of the annuitants is living.

Competition for SPIAs centers on the price, since the product design and benefits are very much standardized from company to company. Thus, shopping for the best annuity rates is quite easy as the prospect need only to compare one number. The other consideration in purchasing an SPIA is financial strength of the insurance company, often overlooked by the prospect.

The market for SPIAs has a tremendous potential for expansion in the future, as most individuals near retirement and can choose to annuitize their IRAs and other funds. The majority of existing IRA funds are held in financial institutions that cannot offer annuitization options. Companies offering SPIAs should be looking into ways of tapping this marketplace.

Currently, the biggest market for SPIAs is for structured settlements, which Ms. Claire will be addressing. There are also considerable sales in the group pension market, where annuities are purchased at retirement or at the time an existing pension plan is terminated.

Next, I will discuss some pricing considerations. SPIA plans are issued without cash values. Thus, the product is free from any policy lapsation risk. Typically, premium rates will reflect current investment income rates for long-term investments such as bonds. The interest rates used in pricing will typically be the earned interest rate, less a margin to cover expenses and profit. Mr. Sega will be addressing investment strategies and risks later.

Commission rates of 2-4% of the single premium are typically paid on SPIAs in the individual marketplace. Administrative expenses also need to be included in the pricing. This would include expenses relating to policy issue, making the annuity payments, calculation of reserves, financial statements and monitoring of experience. Premium taxes are also payable in some states, and they are often deducted directly from the single premium rather than being an expense covered by the interest rate spread.

Mortality assumptions used in pricing SPIAs will depend on the type of product. For annuities sold to individuals for retirement purposes, the 1983 Table A (Male and Female tables) are often used. These tables use experience, centering around the year 1973, combined with projected mortality improvements, based on population statistics, to represent annuity mortality experience for 1983. A 10% loading factor was included to provide for possible mortality fluctuations making the table appropriate for valuation purposes.

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While it is certainly important to project the appropriate level of mortality in pricing SPIAs, it should be noted that the premium rates are considerably less sensitive to mortality assumption than to the interest rates assumed. This is particularly true for life annuities with certain periods or those issued at common retirement ages, or at the younger ages where mortality is low anyway.

Given that the 1983 Table a provides a reasonable level of mortality to be expected by individuals purchasing annuity benefits for retirement, the use of this table, combined with a reasonable projection of future mortality decreases, is appropriate for pricing regular individual annuities. The committee that developed the 1983 Table a concluded that:

1. It should be assumed that mortality at most ages will continue to improve due to continuing medical advances.
2. No significant improvement is expected in the teen years or in the twenties because of the effect of life-style.
3. Improvements at other ages may be less than that of the 1970s.

For most ages, mortality improvements under schedule G, which is a projection schedule used, are less than those used to construct the 1983 Table a. It has been suggested that projection Table G would be appropriate at least to the year 2000. This table can be used with 1983 Table a mortality rates for pricing purposes. Exhibit 1 illustrates the annual mortality improvements assumed under Table G compared with those used for construction of the 1983 Tables.

EXHIBIT 1  
PROJECTED ANNUAL IMPROVEMENT

Age	Project Scale G		Used For 1983 Table a
	Male	Female	
7	1.50%	1.50%	2.00%
27	.10	.75	0.00
47	1.75	2.00	2.25
67	1.50	1.75	2.25
87	1.25	1.50	1.50

For structured settlements, substandard mortality assumptions can be used for pricing. Often the annuitants have suffered severe injuries leaving them incapacitated in many cases. Typically, an underwriter or medical director will review each individual case and make a determination of the life expectancy of the applicant. The actuaries often convert that life expectancy to a rated-up age with mortality rates equivalent to that of the substandard annuitant. The considerations involved in determining mortality rates for pricing are similar to those used for reserving. However, margins may differ between mortality used for pricing versus that used for reserve purposes.

Reserves are also a very important consideration in the pricing process. Surplus strain at issue is highly dependent on the level of reserves being held. Obviously, life insurance companies would like to keep surplus strain as low as possible so that the company can issue the product without impairing its surplus position. Reserves for individual regular annuities typically use the 1983 Table a and the maximum interest rates prescribed under the valuation law.

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Choosing a mortality assumption for reserves on structured settlements is more difficult. Tillinghast recently conducted a survey of 12 companies issuing SPIAs to sample the mortality assumptions methods currently used for statutory reserves on structured settlement annuities. The results can be summarized as follows:

- o Two companies write only standard business.
- o Six companies use a rate-up in age method or a flat percentage of the standard mortality at the true age.
- o Two companies hold standard reserves on substandard annuities. One of these may change due to the large statutory surplus strain.
- o Two companies use the standard mortality at the true age plus a uniform number of extra deaths per 1,000. One of these companies grades the substandard reserve at duration 10 to the standard reserve at duration 20.

A recent paper authored by Abraham Gootzeit, FSA, regarding mortality assumptions for reserves on structured settlements concluded the following:

1. Life expectancies assumed for reserves and pricing for cases written by a company may be aggressive in aggregate.
2. The overall projected life expectancy for particular injuries has improved in recent years. This is particularly true for spinal cord injuries.
3. The projected life expectancy may be dependent upon the length of time between the injury and the issue date. (Immediately following the injury, the life expectancy is quite low. But, as the injured person increases the length of time since the injury, he/she has a much better likelihood of living a more normal life expectancy.)
4. Socioeconomic factors and access to medical attention and rehabilitation facilities may have a significant impact on life expectancy.
5. For certain injuries, e.g., spinal cord, substandard extra mortality declines over time from the onset of the injury.
6. The two methods of determining substandard extra mortality (rate-up in age or percentage of standard mortality) assume that substandard extra mortality increases over time. Thus, reserves calculated on this basis become inadequate over time. The utilization of a mortality assumption equal to standard mortality plus a uniform number of extra deaths per 1,000 may be a more appropriate reserving method. Of the 12 companies surveyed, only two companies were reserving in that manner.

Statutory valuation interest rates are determined each year for various categories of annuities. Deferred annuities are classified as to type (A, B, or C) and by guaranteed duration. For structured settlements and similar plans that are classified as deferred, guaranteed duration is the number of years from the issue date to the date payments commence. For 1988 issues, the maximum rate for SPIAs is 8.75%. The maximum rate for Type A deferred annuities is also 8.75% if the deferred period is 5 years or less. This interest rate is lower for longer deferred periods. For example, it is 6.25% for 20 years or longer. Deferred annuities that have planned periodic payments and no cash values, such as structured settlements, are usually reserved as Type A plans.

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The current actuarial guideline for SPIAs (Guideline IX) provides guidance for determining what qualifies as an immediate annuity. It does not indicate how contracts failing to meet the test for SPIAs should be treated for reserving purposes. Guideline IX requirements for immediate annuities are as follows:

1. The first annuity payments must be due within 13 months of the issue date.
2. Renewal annuity payments must be due no less frequently than annually.
3. Guaranteed payments in any contract year are not greater than 115% of the prior years.

Many structured settlements do not meet the Guideline IX tests. The NAIC Life and Health Actuarial Task Force has developed proposed actuarial Guideline IX B for valuation of structured settlements and similar annuities. The proposed guideline provides two options for reserves on these contracts. The first option splits the contract into two components. The portion of the payments meeting the annuity test is valued using immediate or Type A deferred annuity interest rates. Any excess payments are reserved using the valuation interest rates applicable for the deferred period to the first payment. The second option is a graded interest rate approach in which benefit payments are valued using interest rates that reduce at duration 20. There is some disagreement among the regulators and insurance companies on this proposed guideline. Items in question include whether excess payments should be reserved using Type A or Type B interest rates and what interest rates are appropriate for the graded approach.

Proposed Guideline IX B is intended to take effect for 1990 and later issues by 1990, and for all in force by the 1993 year-end valuation.

The proposed guideline suggests that the state examiner request that the insurance company demonstrate assets are sufficient for the liabilities by cash flow projections under various interest rate scenarios. The proposed guideline is intended to be temporary until new valuation laws are passed.

There is also a proposed actuarial guideline regarding the use of substandard mortality tables for valuing impaired lives under structured settlements. A substandard table may be used where the annuitant is the injured person and there is written testimony by a medical doctor regarding the person's impaired health. The statutory annuity table may be modified to reflect the reduced longevity expected by the doctor. This modification may be done by one of three methods: (1) a percentage of the standard mortality, (2) a specified number of extra deaths, or (3) a combination of the two methods.

However, the substandard mortality reserves must grade into standard reserves by the end of 20 years. Thus, the use of those three methods might not always be the easiest and most workable. Using extra deaths is probably the easiest method to grade into the reserves at the end of 20 years. Also, the insurance company must monitor actual-to-expected experience in the future to test the appropriateness of the assumptions used under this proposed guideline. There is also some controversy regarding this proposed guideline, so we don't know at this time when these guidelines will be passed.

MR. RICHARD L. SEGA: I have an 8-year-old daughter, and sometimes she asks what I do when I go to work. She does know, at least at some level, that I'm an actuary working in investments. Now that's enough to confuse even the unlettered mind of an 8 year old.

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She can read fairly well now, and recently after poking around in my briefcase, she asked me what "asset/liability matching" meant. So I told her that assets were all the stuff where people owe me money, and liabilities were all the stuff where I owe somebody else money, and I just try to keep the two lined up. She thought for a second or two and then said, "Hey Daddy, why don't you tell all the people who owe you money just to pay those people that you owe, and you could come home early tomorrow?"

Now, if I could just teach her to take a quarter point out of the middle of that, I know there's a job waiting for her in Salomon Brothers' arbitrage department! I just wish that everyone I ran into had so pristine and clear a picture of asset/liability management. And the best part was that at the end she didn't ask, "Well fine, but what's the rate?"

### STRATEGY

We're going to discuss product development considerations, in particular for immediate annuities. First, let's talk strategic issues, i.e., global kinds of things that are driven less by a specific product and more by the character and strengths of your firm. I mean questions like: active versus passive management; quality versus credit intermediation; and degree of market exposure. One of my mottos is, "Find out what you don't do well, then don't do it." Specifically, don't design a product or strategy which depends on excellent trading results if yours is not an excellent trading firm. If your expertise is hedging and arbitrage, don't rely on a junk bond yield strategy. This almost seems self-evident.

Another strategic area of endeavor is your company's theology about risk assumption and measurement. I call it "theology" because it is based more on beliefs and convictions than on any really compelling scientific process. I am speaking of things like benchmark returns on capital and maximum ruin probabilities, if you even use ruin probabilities. An investment manager needs to know what are good and bad results. Good definitions for risk and return, and the utility preference to trade them off, are important to making good portfolio management decisions.

My third consideration for strategy, though some might stick it in with the tactical details, is information. How good and how timely are your investment and product information systems? A strategy which depends on nightly rebalancings or immediate cash flow hedging just won't work if the basic data can be reliably reported out only weekly or monthly. Even if you only do quarterly rebalancings, you can suffer serious losses if the data aren't available reasonably soon after the reporting date and the market moves in the interim.

So strategically, we need to be concerned with our firm's management strengths, risk appetite, and data.

### TACTICS

Let's assume some things so we can talk about tactics. Let's say we're credit risk takers. That is, we believe our franchise advantage is issue selection and credit risk management, and we choose to take as little market risk as possible. We will use futures to hedge cash flows, and good data are available weekly. Our product is a non-par SPIA with no refund. As insurance company investment problems go, this is not a bad one. The liability is not laden with options such as book value withdrawal rights or fixed rate loan provisions. There is in the mortality component an alternate source of profit besides investment income,

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unlike the case of this product's cousin, the Single Premium Deferred Annuity (SPDA).

We can try to "immunize" this product. By this we mean that we will try to match the "price sensitivity" with respect to interest rate moves of our assets to the SPIA liabilities. The annuities will probably have a duration of around 6-8 years.

Just an aside here -- it's both a good and a bad thing that "duration" and "convexity" have become so much in vogue lately. It's good that a more sound and scientific approach to valuation has broken out of academia and actuarial research departments and gotten into the hands of practitioners. It's bad that the simplicity and appeal of these two parameters has caused them to become so trendy that they have themselves become the object of so much attention that we've begun to lose sight of what is really important here. It almost reached the point that regulators were going to mandate a particular duration profile for assets supporting certain insurance reserves. Thankfully, it is defused for now. What's really important is the value curve with respect to changes in interest rates. Duration and convexity are only the first- and second-order components of a smooth curve approximation to that value curve. You might remember second-order or "parabolic" approximations from physics and calculus. They only work well under ideal conditions, like shooting perfectly aerodynamic cannon balls or driving frictionless cars, with constant accelerators, up perfectly angled hills. Throw in some wind or friction or lumpy terrain, and the model starts not to work so well. Throw in real markets, and duration and convexity are useful but limited tools. It pays to know what those limitations are.

So with a duration of around 6-8 years, we shouldn't have a great deal of trouble duration-matching the flows. However, the liabilities do have a fairly wide dispersion. If liability dispersion of cash flows is greater than that of the assets, the liabilities will have more convexity, and this puts us at risk to non-parallel shifts in the yield curve.

There are some operating issues to discuss. How tightly to rebalance? How much liquidity? What about yield?

The absolute difference in overall duration you're willing to live with depends on your philosophy about taking risk as I mentioned earlier. There are other things too that can affect it. If you have good information about cash flows, at least weekly, then you can rebalance in full quarterly and match up the weekly flows marginally. Any small discrepancies can be fixed with futures. If you have daily data and keep the portfolio in balance that way, quarterlies aren't even necessary. If your data are refreshed less often than weekly, I'd be concerned about getting way out of balance, and do a full one whenever I could.

Liquidity management is important regardless of theory. While the academics say that a duration- and convexity-matched portfolio should be able to provide for all the liability flows, in practice there could be problems. Locally weak markets and wide bid-offer spreads can cut significantly into the profit margin even in a tightly run portfolio. Further, the apparent liquidity need is a function of the product manager's ability to project cash flows. There are several features of annuities, especially structured settlement annuities, that as a result of mortality fluctuations make such projections uncertain and, thus, introduce liquidity risk:

o refund versus non-refund;

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- o certain periods versus life only;
- o qualified versus nonqualified;
- o relative paucity of data.

It is important to keep in mind what I think most people mean when they say "liquidity." I think they really mean "marketability" as in "the U.S. Treasury market is liquid." Marketability is the ability to get out; liquidity is the ability to get out at par. The fact that a market trades well enough that a market maker does not need a large spread to cover his position risk means that you can get into and out of a position at near the same levels at the same point in time. It does not mean that you could sell your position in the face of a large market move and raise enough cash to meet your obligations.

If when you get done with all this you find that you don't have enough yield to be competitive, there are several instruments which might help. If you have the expertise for analysis and the back-office capabilities, mortgage-backed securities and collateralized mortgage obligations (CMOs), particularly Z-bonds, have long durations and high nominal yields. CMO residuals are quite risky, but carry very high yields and can fix convexity mismatches. Futures options and interest rate swaps all can help adjust the asset-liability mix in a portfolio, and coupon-stripping can help give a good cash flow match.

There are several side issues that ought to be considered. If you're working in a New York-licensed company, you must be mindful of Regulation 126. Actions taken in the portfolio have implications for the Valuation Actuary's certification work.

Claims-paying ratings have become quite important to a firm's ability to sell business. Rating agencies look at leverage so strain is important, but they also look at required capital based on their perception of C-1, C-2, and C-3 risk. The structure of the portfolio bears directly on the levels of these risks.

There may be synergies with other lines of business that could help the investment manager in the job. SPDAs or Guaranteed Investment Contracts (GICs) might be combined with SPIAs with offsetting risks and cash flows which are more easily matched with fixed income investments than either line would be separately.

MS. DONNA R. CLAIRE: There is growth potential in the market. Some states are considering laws requiring structured settlements on big payouts so the claimant wouldn't get the money in a lump sum, spend it, and be left with the state supporting that person.

Structured settlements are typically settlements due to court cases on liability. It is a big market -- last year it was estimated that there was \$4 billion of structured settlement business issued by insurance companies. The pricing in the market is extremely competitive and dominated by 10-15 companies. It is not a market for the fainthearted.

Greg Carney probably asked me to talk to you about structured settlements because of my one major qualification -- I work for a company that is not in the structured settlement market. More precisely, my company was in the market for two years, sold about \$500 million in considerations, and got out, so I do have strong opinions on the subject.



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The reasons for leaving the business were that it was capital intensive and was not a product the majority of the agency force was involved in.

### "TYPICAL" STRUCTURED SETTLEMENT CASE

There is no such thing as a typical structured settlement case. However, some broad averages are as follows:

Average Issue Age:	35 (range from 0-80+)
Average Amount:	\$150,000 (range from \$5,000-10,000,000+)
Typical Payouts:	Life with 20-year certain -- e.g., \$1,000 a month (range from life to 5-year certain period)
Lump Sums:	About 30% of the cases also have lump sums -- e.g., + an extra payment of \$100,000 at the end of every 5 years for equipment replacement for disabled people.
Substandard:	About 15% of business is issued substandard.
Cost of Living Increases:	On about 10% of the cases -- typically for 3-6%.

Note: Many of these figures were obtained by a survey of structured settlement writers by Naftali Teitelbaum done a year or so ago. They will be published in the *TSA XL*, Part II (1988):653-838. Another source of information on structured settlements is study note 441-28-88, called "Structured Settlements," by Roger Harbin.

### EXPENSES

Structured settlements are typically sold through brokers who specialize in this market. Commissions are normally a flat percentage of the considerations, e.g., 4%, although some companies and brokers may have a scale that grades down for large cases.

Another expense is state premium taxes. About 14 states charge taxes on structured settlement considerations.

Computer costs are another expense item that must be considered. Most companies have to either buy or develop systems to handle structured settlement illustrations, payments and valuation, and this cost should be factored in.

Another cost is the personnel needed to handle structured settlements. There is normally at least one person mainly responsible for structured settlements responding to brokers' questions, expediting bidding, and issuing cases. Also, if handling cases which may be substandard, doctor's fees for medical underwriting should be considered. Various types of corporate overhead may be included in the expenses.

In summary, the expenses may be something like the following:

### INSURANCE EXPENSES FOR STRUCTURED SETTLEMENTS

Commissions:	4%
Other Acquisition Cost:	\$500
Maintenance Costs:	\$75 annually

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Note: Companies may charge a policy fee to cover all or part of the expenses.

### **Mortality**

Most companies used something like the 1980 U.S. population table as a basis for their mortality assumptions. This is logical, considering that annuitants will generally be people in average to below-average health. Some companies, however, are using the 1980 U.S. population table without any adjustments for people living longer in the future. This is a questionable practice. Although the improvements in mortality have slowed down in recent years, it may not be good practice to assume that 1980 mortality data will be good through the 21st century. I would strongly recommend some sort of modification to the 1980 data to project future improvements.

Substandard mortality for structured settlements can be treated similarly to that for immediate annuities as Dick Swift mentioned. The most popular option in the survey Naftali Teitelbaum did a year ago is age rated up. This may be okay for some cases, but with some types of substandard cases, such as paraplegia and quadriplegia, the expected mortality may start approaching standard mortality after a number of years. One should be aware of the risks one is taking on with age rate up. I saw one case where a 4 year old was age rated up to a 65 year old. The case was for \$10,000 a month with a 6% cost of living adjustment. If she winds up living a relatively normal life, the extra cost could be millions. One suggestion is to grade the age-rated table into a standard mortality table after 20 years.

### **Federal Income Tax**

The taxes for structured settlements involving life contingencies are at the greater of the federal funds rate or the statutory reserve interest rate. In most cases, the statutory interest rate will be higher. For annuity-certain contracts, one must calculate the implicit pricing interest rate. If that is higher than the federal funds rate, it must be used. For contracts that are life contingent but may have non-life contingent lump sums, I would recommend getting the advice of a lawyer as to how they should be treated. My personal opinion is that they must be treated as two separate contracts, one life contingent and one not.

### **Valuation**

There can be significant surplus strain for structured settlements. This can be the effect of several items. There may be mortality strain if a company is using an unadjusted 1980 U.S. population table since the mortality table for reserves, the 1983 Table a, is more conservative. This mortality strain may range from under 1% at age 20 for a 20-year certain and life case to over 15% for an age 60 life-only case, i.e., the present value of reserves exceed the net premiums by 1-15%.

There can be interest rate strain if the rates used for pricing are higher than those used for reserving. A 1% higher pricing versus valuation interest rate produces a 6-7% reserve strain.

The third type of strain is due to lump sums. In states other than New York, aggregate payments over 15% of the prior year's reserve must be treated as Type B annuities. This means that lump sums, especially at the end of 20 years or more, may have significant extra strain. In New York, this excess must be treated as a Type A annuity reserve which can cause even more strain. For example, if one priced a lump sum of \$10,000 due in 25 years and assumed it

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earned 9%, the cost would be \$1,160. However, the first-year reserve set up in New York would be \$2,622, or more than double the consideration.

For companies concerned about the surplus they have, structured settlements may not be a great product.

### **Reinsurance**

For those who are concerned about the strain of structured settlements, there are various kinds of reinsurance available.

One type of reinsurance is surplus relief reinsurance. In order to qualify as acceptable reinsurance in New York, some of the investment risk must be transferred to the reinsurer. I would suggest you read the reinsurance agreement carefully to make sure it will produce the type of relief you are looking for.

Another possible type of reinsurance is tranche reinsurance. I first heard the term "tranche" applied to CMOs, where the CMOs are separated into payments expected in the first 5 years, in the second 5 years, etc. It is the same for tranche reinsurance -- a reinsurer can bid on a portion or all payments expected in the first 10 years, etc. This would be full coinsurance; the reinsurer would own the business and have its own assets.

### **Interest Rate Setting**

Richard Sega has discussed investments for these products. I'd like to emphasize that these are long-term commitments, and callable bonds or Government National Mortgage Associations (GNMAs) can be disastrous if used for this product. Also, it is impossible to get investments which are long enough to immunize the portfolio since the average issue age is 35, and a 35 year old can hang around for 50 years or more.

For pricing I would recommend considering using a higher interest rate assumption for a period that one is investing for, such as 20 years, and follow that by a lower assumed earned rate, such as 6% or 7%, in order to cover the possibility of lower interest payments.

The interest rate margin must cover several items. One is any expenses which are not covered in the policy fee. A second item, if applicable, is investment expenses (some companies have investment rates quoted net of investment expenses). A third item may be a charge for hedging the money once the case is sold but before the money is invested. A fourth item to consider is the cost of reinvesting in a down interest rate environment. A fifth item is profit. A really informal survey put the average hold back at about 100 basis points. I think, this in general, is probably too thin, but the actual hold back would depend on company investment posture and profit goals.

The interest rate market is very volatile. I would recommend that any price quoted, especially on big deals, on the structured settlement be good for as short a period as possible. Some companies give brokers two weeks' notice of change in rates. Others have any price quotes, especially on big deals, good for 24 hours or less, whichever is safer.

### **Cash Flow Testing**

I am a great fan for cash flow testing in product pricing. Doing cash flow testing on structured settlements can be a real eye opener. Because of the long tail on the payouts, the potential profitability can be quite volatile. Cash flow

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testing can be used to determine ways to minimize the volatility. It can also show the potential for loss, so a company can decide if it is willing to take on the risk.

In New York, of course, cash flow testing is required by structured settlement reserves under Regulation 126. The New York Insurance Department is very concerned and requires further cash flow testing to assure adequacy of the reserves. Some changes were made to New York Regulation 126 in the structured settlement area for 1988, so I would recommend that you read this section very carefully if you are in the business.

### Niche Markets

Some companies have chosen to operate in just a portion of the structured settlement market or to be very competitive in just a portion of the market. Some of these niches are as follows:

- o Substandard: If a company feels they can accurately predict mortality, this is the market for them.
- o Cases Under \$250,000: This market reduces the impact of guessing wrong on a large case.
- o Annuity Certain Only: This market reduces the reinvestment problem from the long payout tail.
- o No Lump Sum Payouts: This eliminates the surplus strain caused by the lower valuation reserve rate on lump sums.

### SUMMARY

This is a big market with potential for growth. Right now, though, I think there is a lot of mispricing going on. I think the product development actuary must be aware of the risks associated with this market and price for them, or else be responsible for the structured settlement product that may help cause the next Baldwin United.

**MR. JAMES R. THOMPSON:** We sell a little of the structured settlement business, and nobody here mentioned the transfer of liabilities. Our agents give us the impression that it is needed to make a sale. Also, what are the technologies people use to estimate calculability risk?

**MS. CLAIRE:** You are right. In order to get the case, a lot of companies, in effect, have to transfer the risk to one company and actually issue the policy through another. The way most companies get around that is they'll have a subsidiary either be the issuer of the policy or the one that takes up the risk. In terms of the calculability, I think a lot more work has to be done on that, but there are some numbers that have been published. The valuation actuary symposium is one source; the *Valuation Actuary Handbook*, I believe, also has some information on that.

**MR. SEGA:** I'd like to follow up a little bit on the calculability statement. There are two ways to reflect call risk. One is the method that essentially takes a guess at the cash flow under a particular scenario approach that's in the *Valuation Actuary Handbook*. Another one is to put callable bonds in at what is not their nominal spread in the marketplace, but in an option-adjusted, so-called spread to Treasuries that reflects the option premium based on some option model and some assumptions about interest rate volatility in the marketplace. One advantage this approach has is that you can adjust those parameters for the ability of a firm to call, regardless of economic conditions. Some firms just don't

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have the money, and that's what I meant when I said you should do some studies and make some estimates as to the value of calls in your portfolio. A call is not worth anything to a firm who can't exercise it, regardless of where interest rates are. You may have a lot of confidence that it's a good investment. Based on the other approach, it's going to go by formula, and you'll get a different result. Many of the street firms are prepared to do extensive analysis of issuing companies' balance sheets and give you opinions as to how likely they are to call a particular issue. There may be a good reason to call a 10% issue, but there may be \$150 million of a 15% outstanding, and they're not going to get to all of it. So you can make judgments like that.

MR. ROBERT B. LIKINS: Ms. Claire mentioned that for particularly long liabilities, like over 20 or 30 years, companies are getting investments out there to really match up the assets and liabilities, and I wonder if Mr. Sega could follow up on that comment and tell us whether he really thinks you can immunize things like a 40-year certain period or a 20- or 30-year certain period for a very young issue age where they're going to be getting payments for 40, 50, and even 60 years into the future. Then, I wonder if Mr. Swift could comment on Ms. Claire's statement regarding the usage of 9% for 20 years and 6% thereafter isn't a reasonable thing to do pricing-wise.

MR. SEGA: There's a difference between defeasance of a set of cash flows and immunization of the portfolio. You can be immunized if, in general, the value of your assets will change very much like the value of your liabilities, and that I have no doubt can be done regardless of how long your certain period is. Via the futures market and some residuals, you can get effectively infinite durations in theory although you probably can't buy that much of the asset with the dollars you have in your firm. But you can immunize, that is match durations, on any consecutive stream of cash flows. What you can't do is buy cash flows that are going to occur at the same point in time as one on the liability side if it's longer than 30 years. You can buy low-coupon telephone bonds that run for 40 or 50 years, but you probably can't get enough of them to defease an entire portfolio. So you probably can't cash match and be confident that you'll always have a dollar from this particular set of assets coming out at the right time, but you can structure a portfolio whose surplus is relatively immune to changes in interest rates. As time goes on you'll have to roll those assets continually and rebalance. That doesn't say you're not immunized; it only says you can't actually defease or cash match this kind of portfolio. The other thing is I think you must pick your own poison, either you don't sell this business, or you take some credit risk, or you take some C-3 risk. You can't buy bonds at 150 over Treasuries so you buy this. The only way you can do the things is to take some risks, or you don't do the business at all. I understand that junk is a problem; I understand that call is a problem. Those are problems that I think we have to take a practical look at and balance. I wouldn't be any happier about a default in my GIC portfolio than I would be here, but I don't think they're any more onerous than structured settlement portfolios than any other portfolios that I manage. I don't want to see any default, anytime.

MR. SWIFT: I agree with Ms. Claire's comment on using the dual interest rate pricing. It's particularly effective if you are pricing an increasing type annuity or an annuity with large lump sums that are out a fair number of durations away. The difficult thing is choosing what that interest rate should be after say the 20th year, whether it should be 5%, 6%, 7%. It's a very difficult call as to what interest rates are going to be after your initial reinvestment after that period of time. But I do think dual interest rates help alleviate some of the

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potential problems. Obviously, you've got to be competitive, too, so you can't be too low on that ultimate interest rate.

MS. CLAIRE: I definitely agree with what both of them said, although I have not been able to find enough more than 20-year bonds that I would feel comfortable with in my portfolio.