**1992 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 11

Defaults and the Asset Valuation Reserve (AVR)/
Interest Maintenance Reserve (IMR)

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DEFAULTS AND THE ASSET VALUATION RESERVE (AVR)/
INTEREST MAINTENANCE RESERVE (IMR)

MR. JAMES F. REISKYTL: Gery J. Barry, who is vice president of the Aetna, heads its benefit plan services business. Previously he had been Aetna's vice president of investment risk management for its pension investment business. Gery currently chairs the Society of Actuaries' research study of the credit risk of commercial mortgages and private placement bonds. He will lead off our discussion by describing the goals, purposes, and current status of this research. Joseph L. Dunn, actuary at Metropolitan Life, is responsible for the risk analysis and management areas of the actuarial department. He is chairman of the Actuarial Subcommittee of the Industry Advisory Committee to the NAIC on the AVR/IMR. As such he is one of the primary architects of these two new reserves and will describe the theory behind them as well as how they function. Frank S. Irish, senior vice president and corporate actuary of John Hancock Mutual Life Insurance Company will continue the description and describe their use from the valuation actuary's perspective -- including possible future changes to these reserves. Frank is responsible for the corporate overview of valuation, pricing, dividends, and surplus management. Previously he headed John Hancock's corporate planning area. Frank is also a key member of the Industry Advisory Committee to the NAIC. Joseph J. Buff is a Tillinghast principal and its national practice leader for asset liability management. His areas of expertise include investment goal setting and performance measurement and New York 126 filings. He has served on several industry committees on statutory valuation and investment risk. Joe will discuss the potential impact the AVR/IMR may have on investing and accounting decisions.

DEFAULTS AND THE ASSET VALUATION RESERVE (AVR)/
INTEREST MAINTENANCE RESERVE (IMR)

MR. GERY J. BARRY: I'm happy to have the opportunity to talk to you about the joint effort of the Society of Actuaries and the ACLI Investment Committee to get a handle on intercompany default experience on private placement bonds and commercial mortgages. We've been at this effort over three years now, even longer for those of us who were involved in trying to get this effort going, and it is gratifying that we are now starting to see at least a hint of what those data are going to look like. I will share with you what I can, which I'll warn you up-front, is not very much, but we are getting the data that will be useful to all of us down the road, and you can expect to be seeing that over the next several months.

Why did we get this effort started especially when we expected it to be so difficult? And it was difficult as some of you are aware because your companies participate or you serve on various committees within the Society. It involved the investment professionals as well as actuaries. It involved a large number of companies, and it involved the ACLI, the Society of Actuaries, MIB (Medical Information Bureau) and so on. Yes, we knew that it was going to be a major undertaking. The reason that we were able to get the support for this project is that the industry has about $0.5 trillion of exposure in private placement bonds and commercial mortgages, and there has never been a study of these asset classes except perhaps individual insurance companies doing it themselves. And these assets represent, depending upon how you count, approximately 40% of the insurance industry's assets. And so it did seem appropriate back in 1988 and 1989 to get this study underway even before we had started to see such compelling evidence of some problems in those asset classes especially the commercial mortgages.

Many of us felt that public bond studies provided little insight into the default characteristics of these other asset classes for a variety of reasons. One of the reasons that we'll talk about a little bit later is that the concept of default is probably too narrow and the public studies look at outright default which is a legal activity. Also, the way that those studies quantify the losses

from default is to look at the loss of principal. We took a somewhat different approach as you'll see. More specifically for the purposes of the companies themselves we felt that this research, if properly conducted, would help actuaries evaluate risk that would in turn help them in pricing and also in setting reserves. The research would also help investment professionals select investments and establish portfolio strategies. So there was a large need that seemed to be broadly felt by people throughout the industry and our group.

One of the first things was to decide specifically what was our group going to do -- this group is made up of actuaries and investment professionals. And so the goals of the credit-risk research project were, first, to establish a sound, standardized framework for describing and quantifying what we call credit-risk losses. Any of you who are involved in studies within your own company and who have looked at past studies would probably share our feeling that it is difficult to get some common definitions around what you mean by a credit-risk loss. I think there have been inconsistencies within companies' own internal studies depending upon when they were done as to what was meant by a credit-risk event or a default and how those losses were quantified and how they were compared to the exposure. And we certainly as a group of people representing different companies found that there were significant issues to be overcome in establishing some common methodology.

We did achieve that, and it will all be documented in our final report. We were all satisfied with the methodology we developed, and I think that that degree of consensus is meaningful, but I would certainly hope that others continue to evaluate and reevaluate the work that was done because there certainly are many opportunities for refinement on something like this. We do think we came up with two breakthrough ideas. One is to talk about or examine "credit-risk events" rather than strictly defaults, and the second is to look at an actuarial valuation of loss rather than simply looking at loss of principal. This is particularly important on the particular asset classes that we were studying, for there is no true market value at time of default because of the nature of the private placement bonds and commercial mortgages. That is, there's no clear market for those assets either before or after they run into credit problems.

So establishing the conceptual framework was our first task. Once we had that we decided to try a pilot study of experience for the 1986 to 1989 calendar years, and this is nearing completion at last. As I said, I have only a glimpse of the data to talk about, but we do expect to see the results published at least on the private placement side within the next several weeks. Also, keep in mind that a four-year period is actually a fairly small period to study for a risk like this. One key objective of the pilot study was to set the stage for being able to collect data annually as an ongoing project, that is, to get the companies to line up their data structures and get the processes in place so that they can feed data into MIB, which is collating the experience and actually grinding through all of the numbers. Indeed, the most useful part of the pilot study was to establish this process for collecting data on an ongoing basis, and we feel very happy about having accomplished that.

Let's talk a little bit about this notion of looking beyond strict defaults. In anything that you might have read or will read about our study, you will see that we studiously avoided the use of the word *default*. Instead, we refer to *credit risk events*, which is a bit cumbersome. The reason for doing so can be illustrated in Table 1 which shows four different bonds that started out looking identical to one another. It's a simple five-year bond, annual coupons at 9% that was the prevailing interest rate when the bond was issued. Bond one is the base case. It was acquired for $100 with annual coupons of $9 over the intervening four years and then at the end of the fifth year the repayment of the $100 of principal plus the $9 of interest. That is what we want to have happen with all of our bonds. Bond two is where we have an outright default, so it starts out at a $100, pays interest for a couple of years at $9. It then defaults on that third interest payment, and it finally settles out in year five for 80 cents on a dollar. And so the loss on a nondiscounted basis is $47 according to the way that we would look at it because there were three years of missed interest and $20 of lost principal.

Now, we found in private placement bonds, and even more so in commercial mortgages, that, when assets run into problems, they often don't immediately go into default. Rather, there may be a negotiated restructure. And in the case of bond three, it pays its interest at 9% for the

TABLE 1

Simple Illustration of
Credit-Risk Events in Addition to Default

Year Since Issue	Prevailing Interest Rate	Actual Cash Flows			
		Bond 1: Base Case	Bond 2: Default	Bond 3: Restructure	Bond 4: Sale
0	9%	$(100)	$(100)	$(100)	$(100)
1	9	9	9	9	9
2	9	9	9	9	9
3	9	9	0	4	85
4	9	9	0	4	0
5	9	109	80	104	0
Cumulative Loss (Undiscounted)		$0	$47	$15	$15

Notes:
Bond 1 remains a health bond throughout.
Bond 2 defaults in year 3 and settles for 80 cents on the dollar in year 5.
Bond 3 is restructured in year 3 to pay interest at the reduced rate of 4%, but still matures in par in year 5.
Bond 4 is sold in year 3 for 85 cents on the dollar.

first two years, and then there was a restructure, where it had interest payments of only $4 rather than $9 over the following three years and it still matured for $100.

In our study, we include this kind of a restructure as a credit-risk event. There are definitional questions because, if you look at certain bonds, some companies will say that their bonds were restructured but on fully economic terms. So, to determine whether or not they should be regarded as credit-risk events, one has to determine whether the terms are indeed on a fully economic basis, given the "prevailing interest rates." Definitional issues arise from the subjectivity associated with trying to determine what these prevailing interest rates are for these asset classes at the time of restructure.

The last bond that we have is one that is sold prior to maturity and it also starts out at $100, pays interest at 9%, and then at the beginning of year three is sold for 85 cents on the dollar.

Given that we have a prevailing interest rate that was unchanged over this period, we would expect it to have sold for 100 cents on the dollar. Again, this ignores the yield curve and other things. But if you sold it for 85 cents on the dollar, then we would have a loss of 15 cents. Now, this kind of loss would not necessarily show up in other studies because the bond didn't actually default. Rather, there was simply credit deterioration, and the bond was sold and eliminated from the portfolio. In our study, there was a loss due to deteriorated credit that the company realized on a cash-flow basis -- it should have received a 100, it only received 85 -- so we treat it as a credit-risk event. So, as you can see, we use a fairly expansive definition, and we wanted it to be expansive. One of the issues that arises from this expansive definition of credit-risk event is that, if you sell an asset and the prevailing interest environment is changing, you have a definitional issue as to what part of the difference from the original value is due to interest rate movement as opposed to credit deterioration.

Our other breakthrough idea was to make a full, economic evaluation of the level of loss once there is a credit-risk event. The essence of our approach is to look at the actual, or realized, cash flows on that asset relative to what would have happened if that bond had matured in accordance with its contractual terms. This is actually a fairly simple formula. You begin by taking the present value of the cash flows that were originally expected. You'll note that these cash flows do not necessarily distinguish between interest and principal; they simply represent a cash-flow stream that was originally expected. To calculate the loss, we subtract from the present value of expected cash flows the present value of the cash flows that were actually received. This is a very familiar valuation formula. The biggest question here is, what interest rate does one use to discount? I won't get into all of the different arguments around that issue, but the interest rates we used and their rationale will be documented in the final report of the study.

Now the above formula works if the asset is fully settled. In doing a historical study you're left with a lot of assets that are problem assets that have not yet fully settled, and it's still pretty speculative as to what your cash flows are going to be. And that is particularly true on the commercial mortgage side where there is a lot of foreclosed property still held in the

portfolio. In many cases it's anybody's guess as to what those future cash flows will be. So I would caution you, when looking at something like a 1986-89 study, any quantification of those results is still highly dependent upon the ultimate resolution of those problem assets. Four years is too short a period of time to get much of a feel as to what has really happened. And, of course, the longer you wait to build up a lot of experience, the less relevant that experience becomes, so there is a dilemma there. But what we decided to do in terms of assets not yet fully settled is to try the same cash-flow approach, but we are left with having to project the remaining cash flows on settled assets as of the cutoff time of the study. And for purposes of the historical study we have taken the insurance companies' projections at face value, so that's a very important assumption and one that everybody should be clear on as you start to review the results of the study when they do get published.

Now let's talk just a little bit about what we have done with the 1986-89 study. We have on the private placement side 12 companies that have participated, and those are listed in Table 2. Most of these companies are also participating in the commercial mortgage study. And so I think we have, if you count them out, 13 on the commercial mortgage side, 12 on the private placement side. We believe that we're capturing about 35% of the industry exposure on private placements. That's approximately $70 million of exposure in the 1989 year. And on the commercial mortgage side we're around 40 to 50% of the industry exposure, which is close to $100 million of exposure per year.

The number of bonds included in our study is about 10,000. If you think about it and compare it to a mortality experience study, that's a very small number. And the number of credit-risk events over this four-year period for these companies on these 10,000 bonds is approximately 180. These are preliminary data, and I've been cautioned by people to make sure that I disclose them as preliminary data. Now, not all 10,000 of these bonds were included every year. Some companies started contributing in the middle of the study period, and so there are a lot of issues that one needs to look at in evaluating these results.

TABLE 2

Contributing Companies

Company Name	Private Placement	Commercial Mortgage
Prudential	Yes	Yes
Metropolitan	Yes	Yes
Aetna	Yes	Yes
TIAA/CREF	Yes	Yes
John Hancock	Yes	Yes
Sun Life	Yes	Yes
Penn Mutual	Yes	Yes
The New England	Yes	Yes
Principal Financial Group	Yes	Yes
SAFECO	Yes	Yes
Nationwide Insurance	Yes	Yes
Travelers	No	Yes
Washington Square Capital	Yes	No
Western & Southern Life	No	Yes

The last thing that I would say pertains to the loss per credit-risk event. The preliminary result is that, even though we are doing a fully economic evaluation of the loss, we are seeing that the losses on private placement bonds for those that do get into trouble have more than 50% recovery, on a present-value basis, relative to their originally expected cash flows. I think that is attributable to our expansive definition of credit-risk event, where we've included restructures with some fairly modest losses. So we should expect to see that the economic loss suffered per troubled asset is less than what you see in public bond studies.

DEFAULTS AND THE ASSET VALUATION RESERVE (AVR)/
INTEREST MAINTENANCE RESERVE (IMR)

MR. JOSEPH J. BUFF: The previous speakers have talked about some of the mechanics of the AVR/IMR, so I will assume you have some understanding of how they work. I will talk briefly about the possible effects of the AVR/IMR changes (relative to the MSVR) on insurance company investment strategies and accounting decisions. This is really just an overview. Some of my remarks are based on opinions expressed by some people in insurance companies who have been thinking about this topic, and some are based on my own interpretations of the section on the AVR and IMR, Section 5B, from the "Purposes and Procedures of the Securities Valuation Office of the National Association of Insurance Commissioners" for 1992, kindly given to me by Bill Smythe of the SVO. You should keep in mind that opinions may vary. Certainly we will all know more on this topic a year from now!

The IMR requires that fixed-income realized gains and losses be amortized over the remaining life of the investment. This means that the effects of active trading on managing statutory surplus will be different than under the old MSVR approach. This is particularly an issue when analyses are performed of "adjusted surplus," such as is done by some public rating agencies. Typically, adjusted surplus has been calculated by adding the MSVR back to free surplus. When the IMR is treated as a reserve, and not added to "adjusted surplus," the difference in treatment between the old and the new approaches is marked.

In spite of this difference, companies are not per se discouraged from active trading when this has economic value to the company. Trades that enhance return can be expected to add to net worth. Under the IMR, this addition to net worth is smoothed over time. (The smoothing would have relatively little effect in a company whose asset size and net realized gains/losses were stable over time.)

This smoothing process may in some ways clarify the effects of trading assets that back interest-sensitive liabilities. As you may know, a question arises as to "the adequacy of assets to back

liabilities" if for instance capital gains are taken when capital market interest rates decline. Unless the credited rates of the liabilities can be adjusted downward to a comparable magnitude, the capital gain may show up at once in adjusted surplus (or in free surplus if the MSVR had hit its maximum) while it is not really "profit" that can be "spent" right away. This is especially true for products like many general account GICs or immediate annuities where credited rates or pricing interest rates are fixed for the life of the contract.

Thus the IMR does not seem to discourage any active trading that makes economic sense, while perhaps somewhat rationalizing how the book-value-based statutory balance sheet reacts to interest-rate changes in the capital markets.

When hedging derivative securities, such as interest-rate caps or swaps, are used to hedge against interest-rate risk, the gains or losses on these instruments are to be amortized in the IMR over the life of the hedged asset.

There may be some ambiguity in determining exactly which assets were "hedged," in cases where the hedge was applied to a whole portfolio or line of business segment to control interest-rate risk. However, this is a practical question that surely has a practical answer.

The use of hedges, like the use of active trading, should not be materially impacted by the AVR/IMR mechanism, although the ways in which the effects of hedging show up on the balance sheet will of course differ from the old MSVR approach.

The amortization of hedged gains and losses may be another way in which the treatment of assets and liabilities are put on a reasonably consistent book-value-type basis by the IMR. If hedged securities are used to generate gains to offset realized losses on assets due to disintermediation, then the gains on the hedges and the losses on the assets are treated on a consistent, smoothed basis as seems quite appropriate. If hedges are used to generate gains to offset reinvestment losses, then again the net effect is a smoothed reporting of net worth.

The smoothing of hedged gains and losses is consistent for the most part with book-value accounting of liabilities. Those interested in option pricing theory may be interested to note that, if liabilities were to be marked-to-market, then derivatives would have to be treated on a market-value basis (along with other assets) to maintain reasonably consistent surplus numbers. But at least for now we have book-value accounting in the annual statement, and its basic tenets are certainly not the same as market-value accounting. The smoothing of derivative gains and losses by the IMR does not appear to impact on the effectiveness or appeal of such securities for purposes of hedging interest-rate risk. The benefits of such hedging certainly will be apparent over time in the statutory reporting process.

There are some interesting accounting questions regarding how callable and prepayable assets are to be handled in the AMR/IMR process. The call premium, when a bond is called, is to be amortized over time consistent with the loss of income on the bond that was called. Certain details, such as whether exact seriatim or approximate aggregate calculations are to be performed, are left up to the individual company based on practical administrative considerations. The aggregate approach is somewhat less precise and may produce minor unusual results, for instance for bonds that are actually called after their assumed "expected maturity date." The latter is probably not a significant issue so much as a bookkeeping quirk.

Certainly nothing in the AVR/IMR much changes the advantages and disadvantages of using callable and prepayable securities in an insurer's portfolio. Some of the financial impact of asset calls will be smoothed over time, avoiding discontinuity between when call premium is booked and when investment income reductions emerge.

The income lost when bonds or mortgages or mortgage-backed securities are called/prepayed is a fact of life that is not changed by the AVR/IMR. Option-pricing techniques and scenario simulations can be used to evaluate the relative merits of callable versus noncallable securities -- this applied equally well under the MSVR system and the AVR/IMR system.

Some people have commented that the accrual factors for different assets in the AVR, such as different quality class bonds, lead to certain minimum-yield differentials or sector spreads that need to be achieved for the different assets to have comparable impact on the trends of "free surplus" (that is, surplus after subtracting the AVR). In other words, a bond #1 (of low quality), with a higher AMR contribution rate than bond #2 (of high quality), needs a higher coupon for the financial benefit to free surplus (net investment income) to be comparable to bond #2. This is not really different from the MSVR approach, although the AVR covers a wider set of asset types.

We should remember that the AVR contributions are meant to provide for the very real risk of default and quality losses -- the contributions are not so much an "expense" as a wise example of "saving for a rainy day." It is to be expected that some or all of the contributions will be released eventually to cover actual losses, unless the contribution factors prove to be overly conservative. If default losses were steady from year to year and exactly equal to the annual contribution rates, we wouldn't need an MSVR or AVR. But we do need them.

Having said all that, it is tempting to figure out what sector spreads are needed to "break even" relative to the AVR contribution factors. This may have some effect on insurers' asset mixes. I think that the new NAIC risk-based-capital formula will have a similar effect, maybe more pronounced than for the AVR/IMR, of making people think about which assets are most "cost effective" to own. I hope we will not encounter many or any instances of the accounting rules discouraging companies from holding asset mixes that really are in their long-term economic benefit. I believe this question needs further study and observation.

It is interesting to think about whether the AVR/IMR formulas' impact might gradually encourage companies to shift their mix between bonds and mortgages. Of course, to the degree that mortgages are illiquid, rapid changes are harder to make. But the investing of positive cash flows can always be directed differently when companies seek to alter their portfolio makeup. Perhaps right now this is a somewhat academic question for many insurers, those that would like to reduce their mortgage holdings. But some companies are in fact purchasing mortgages

from other companies, and in the long run we may very well expect the insurance industry to continue to originate significant amounts of mortgage loans.

I think that some of the same comments apply to the asset-mix question "bonds versus mortgages" as apply to "what quality mix of bonds." Companies may want to develop some spreadsheets to see the net effect on yield net of contribution rate, and on ROE net-of-risk-based-capital requirements, of different asset mixes.

I would like to conclude by noting that there do not seem to be really significant investment strategy implications behind the AVR/IMR relative to the MSVR. Strategies that make economic sense in the long run are not, and should not be, discouraged by any sensible accounting system. Both statutory reporting and market-value accounting are in their own ways eminently sensible. Companies continue to need to balance good short-term financial reporting results with good long-term business performance. In a world of book-value accounting, the AVR/IMR does a good job of fine-tuning to account for quality/default risk, and to smooth investment income relative to the needs of the liabilities.

DEFAULTS AND THE ASSET VALUATION RESERVE (AVR)/
INTEREST MAINTENANCE RESERVE (IMR)

MR. JOSEPH L. DUNN: My portion of this discussion will describe the mechanics of the AVR and the IMR. I will also briefly touch upon some of the underlying theory but only insofar as it helps to clarify the mechanics. Be warned: I have omitted many of the details, and this talk is not a substitute for the actual instructions.

Introduction

Beginning with the annual statement to be filed at the end of 1992, the mandatory securities valuation reserve (MSVR) will be replaced by two new reserves, the AVR and the IMR (Chart 1).

This new structure was recommended by the Industry Advisory Committee in a report presented to the NAIC Study Group on the MSVR in December 1991. Some modifications have been made to the proposal since the advisory committee's initial report and the rules for 1992 were not finalized until the June 1992 meeting of the NAIC.

The Industry Advisory Committee views the 1992 changes as an interim step and has already placed on the blanks agenda a number of changes for 1993. Furthermore, there are still more changes contemplated for 1994.

The advisory committee has articulated a set of four objectives for the AVR/IMR process. According to the advisory committee this process should:
- assure that assets and liabilities are reported on both a consistent and practical basis,
- minimize the impact that gains and losses from interest-rate movements have upon provisions for credit losses,
- adequately provide for the volatile incidence of asset losses, and
- appropriately recognize the long-term-return expectations for equity investments.

CHART 1

Two Reserves Replace the MSVR
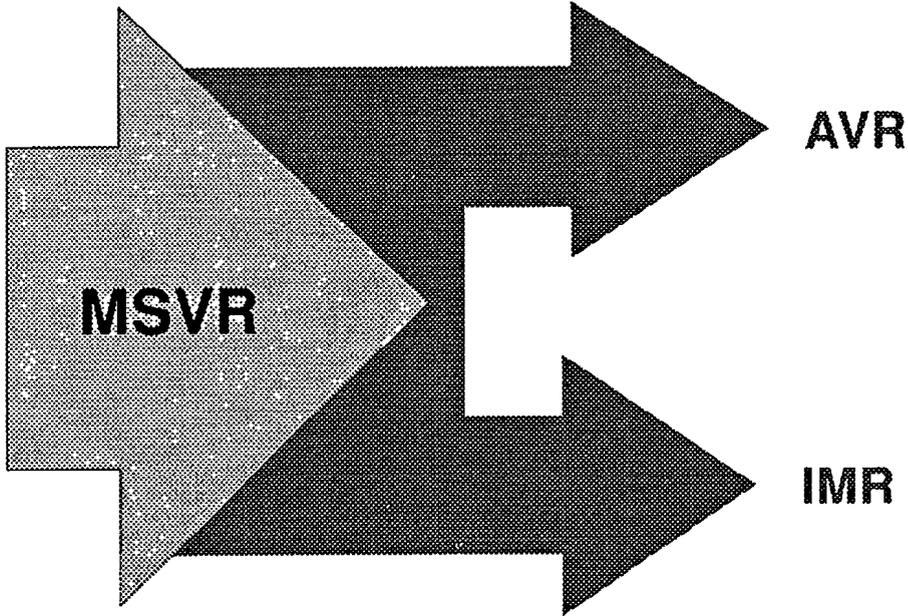
The committee also made certain key assumptions in making its recommendation:

- there would be no change in the current rules for valuing assets and liabilities,
- the proposed rules would apply only to life insurance companies,
- companies would be valued on a modified going-concern basis, and
- the annual statement would continue its current role in the determination of company solvency.

Interest-Rate Versus Credit Gains and Losses

A key feature of the new proposal is the subdivision of capital gains and losses on fixed-income investments into two types, interest rate versus credit.

Interest-rate gains and losses are those gains and losses that are primarily a result of changes in the general level of interest rates. Assuming a company maintains a reasonable match between its assets and liabilities, interest gains (losses) on the asset side of the balance sheet are offset by corresponding losses (gains) on the liability side. It is inappropriate to recognize the gain on the asset side if no such recognition occurs on the liability side. On the other hand, credit-related gains and losses are the result of the changed circumstances of a particular issuer, and there is no corresponding offset on the liability side.

In theory each and every capital gain or loss on fixed-income investments can be split into an interest-rate component and a credit component. Such a procedure was considered by the advisory committee and rejected as being impractical. Instead, the advisory committee recommended, and the NAIC adopted, rules whereby each realized gain or loss on a fixed-income investment is classified as being either wholly credit related or wholly interest-rate related. Write-downs and write-ups on fixed-income investments are always considered to be credit related.

Tables 1 and 2 describe the criteria by which the split is effected for corporate fixed-income securities (bonds and preferred stock) and mortgage loans.

TABLE 1

Method of Split
Bonds and Preferred Stock

Credit-Related Gain/Loss	● Write-downs
	● Realized gains or losses on securities that have defaulted or changed by two or more securities valuation office classes
Interest-Rate Gain/Loss	● All other realized gains or losses

TABLE 2

Method of Split
Mortgages

Credit-Related Gain/Loss	● Write-downs
	● Realized losses on loans more than 90 days overdue, in process of foreclosure or restructured in past two years
Interest-Rate Gain/Loss	● All other realized gains or losses

Interest-rate gains or losses are credited or charged to the IMR, and credit gains and losses are charged or credited to the appropriate subcomponent of the default component of the AVR (Chart 2).

For government securities there can be only interest-rate gains or losses and the advisory committee is proposing that all of these gains or losses be ultimately captured by the IMR.

However, since this is such a significant departure from the old MSVR system, a phase-in rule has been adopted whereby only 50% of the gains and losses on government securities are credited or charged to the IMR in 1992.

CHART 2
IMR/AVR Structure
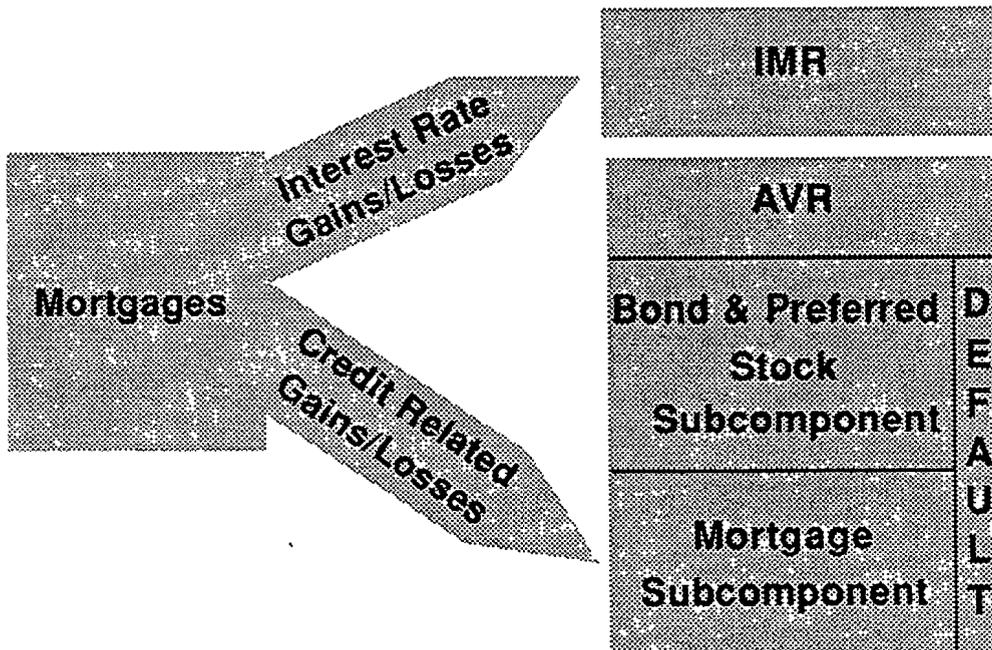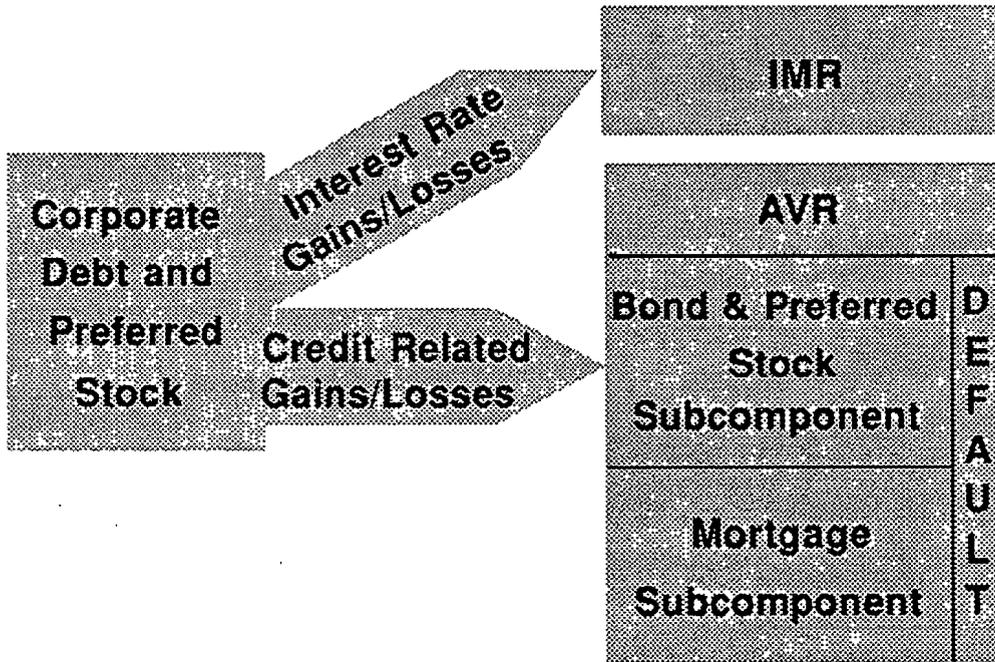
For equity investments no split of gains or losses is made. All of the gains or losses are credited or charged to the appropriate subcomponent of the AVR (Chart 3).

Note that both real estate and Schedule BA assets are included together in a single subcomponent of the equity component. Unfortunately, some of the annual statement worksheets might be misinterpreted as implying that there are separate subcomponents for these two categories.

Example of IMR Amortization

We will consider the case of a company with the following very brief balance sheet (Table 3):

<div align="center">

TABLE 3

ABC Life Company

	Par	Coupon	Years to Maturity
Assets	$1,000,000	10%	10
Liabilities	$1,000,000	5%	10

</div>

Both the asset and the liability pay interest currently and mature at the end of 10 years. The asset and liability cash flows are close to being mirror images (Chart 4).

And the net cash flow is barely discernible when graphed on the same scale (Chart 5). The net income is identical to the net cash flow and is 100 basis points of the outstanding liability.

We will now consider the following scenario:
- interest rates drop by 200 basis points, and
- the ABC Life Company sells and repurchases its 10-year bond.

Cash flows are unaffected by this transaction but, absent the IMR net income, would be dramatically accelerated over what would have been reported had there been no sale (Chart 6).

CHART 3

IMR/AVR Structure
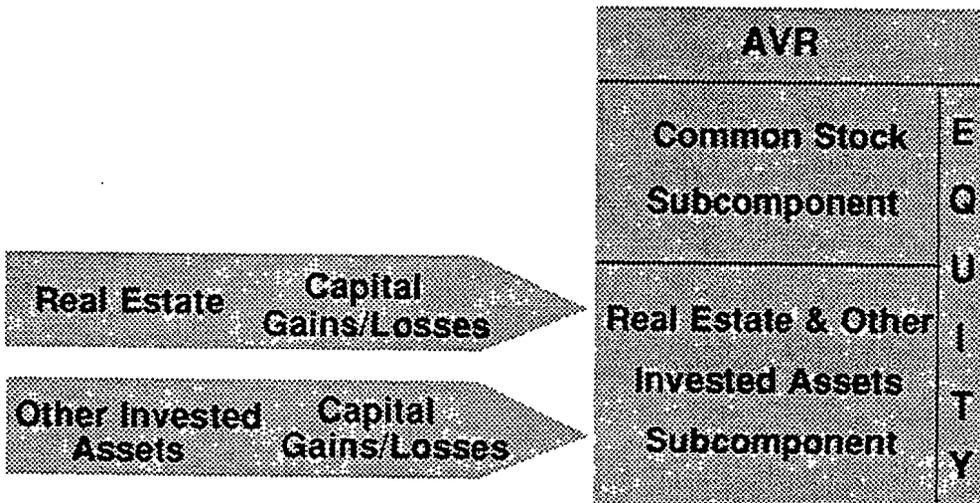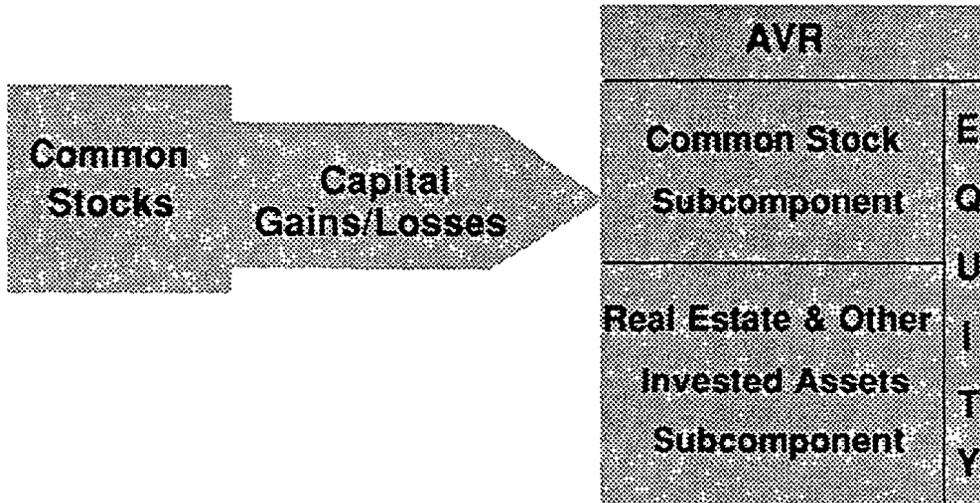
CHART 4

ABC Life Company
Asset and Liability Cash Flow

Asset Cash Flow

Thousands

Year

Liability Cash Flow

Thousands
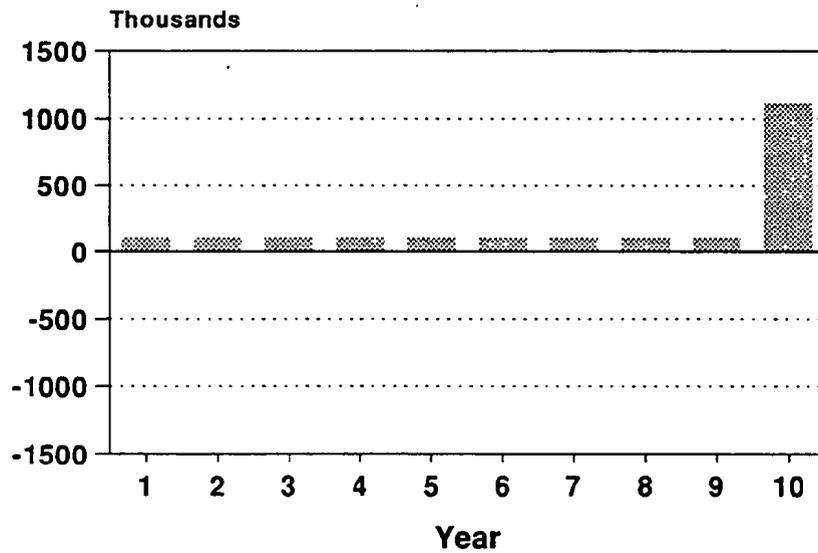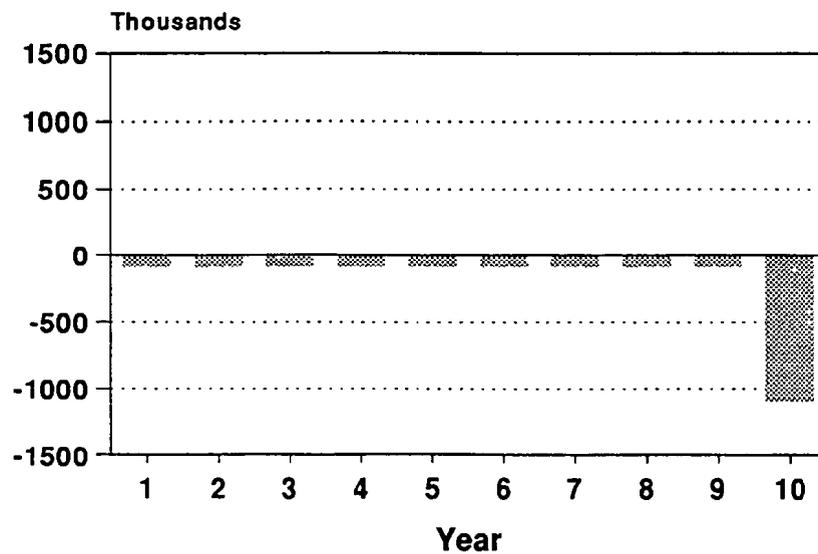
Year

CHART 5

ABC Life Company
Net Cash Flow and Net Income with No Sale

Net Cash Flow

Thousands

Year

Net Income With No Sale

Thousands
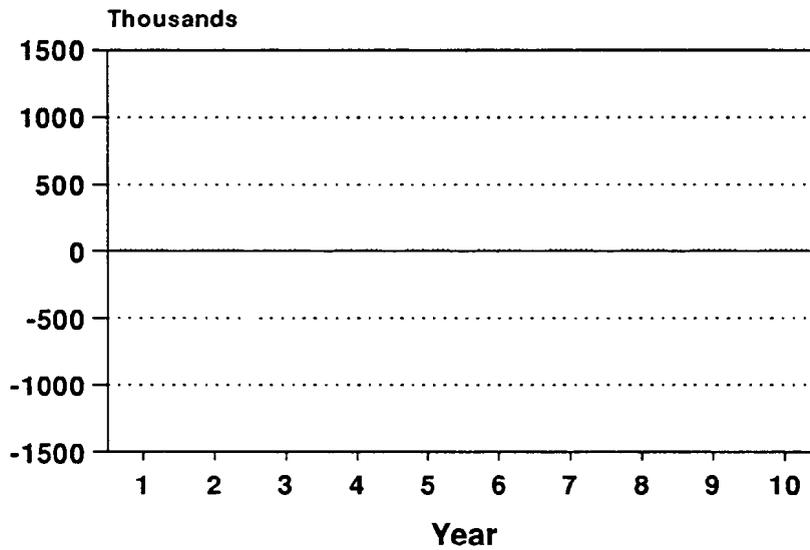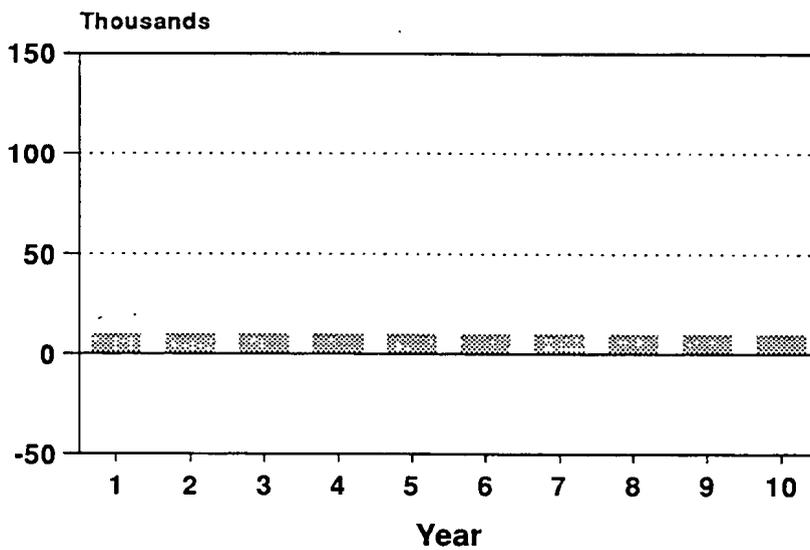
Year

CHART 6

ABC Life Company
Net Income After Sale

Thousands
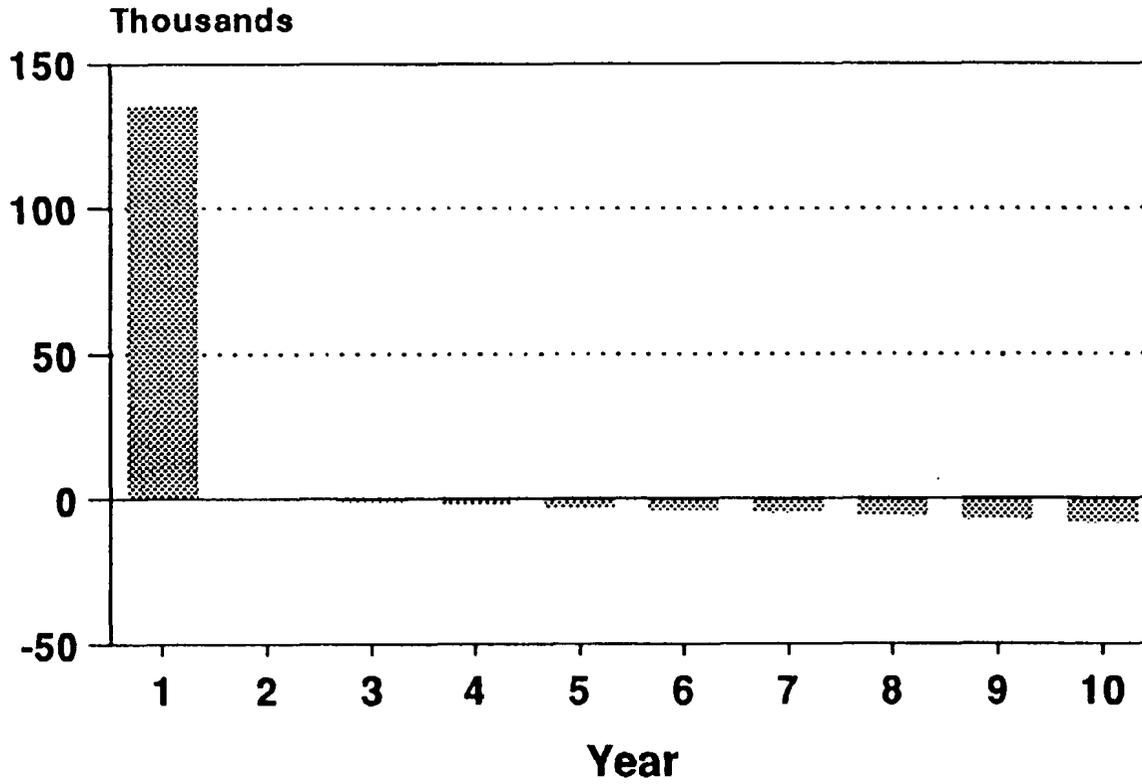
Year

By capturing the capital gain in the first year and amortizing it in later years, the IMR restores the original income stream. The following chart displays the IMR amortization that accomplishes this. This amortization method is described as the "seriatim method" in annual statement instructions (Chart 7).

The amortization is weighted toward the later years. This weighting is more pronounced the longer the period to maturity, and of course, the long assets tend to produce the largest capital gains. The net effect will be a substantial deferral of interest-rate gains and losses.

The instructions also allow the use of a simplified grouped method that achieves approximately the same effect.

AVR Maximums and Contributions

For 1992 the maximum balance of the AVR is equal to the sum of the maximum factor appropriate to each constituent asset type, times the book value of that asset type. At some point in the future, there may be a credit allowed for unrecognized gains in the portfolio.

For bonds, the current SVO categories and factors are carried over to the new AVR. Preferred stock will be classified into one of the bond categories and will have a maximum factor equal to the corresponding bond factor plus 2%.

For mortgage loans there will be a single factor applicable to all loans (3.5%) with an adjustment made by comparing the individual company's delinquency and foreclosure rate to that of the industry. This comparison will use the average delinquency and foreclosure rate over the last two years for both the company and the industry. In future years we expect that mortgage loans in good standing with restructured terms will be included in the adjustment process.

CHART 7

ABC Life Company
Capital Gains Amortization
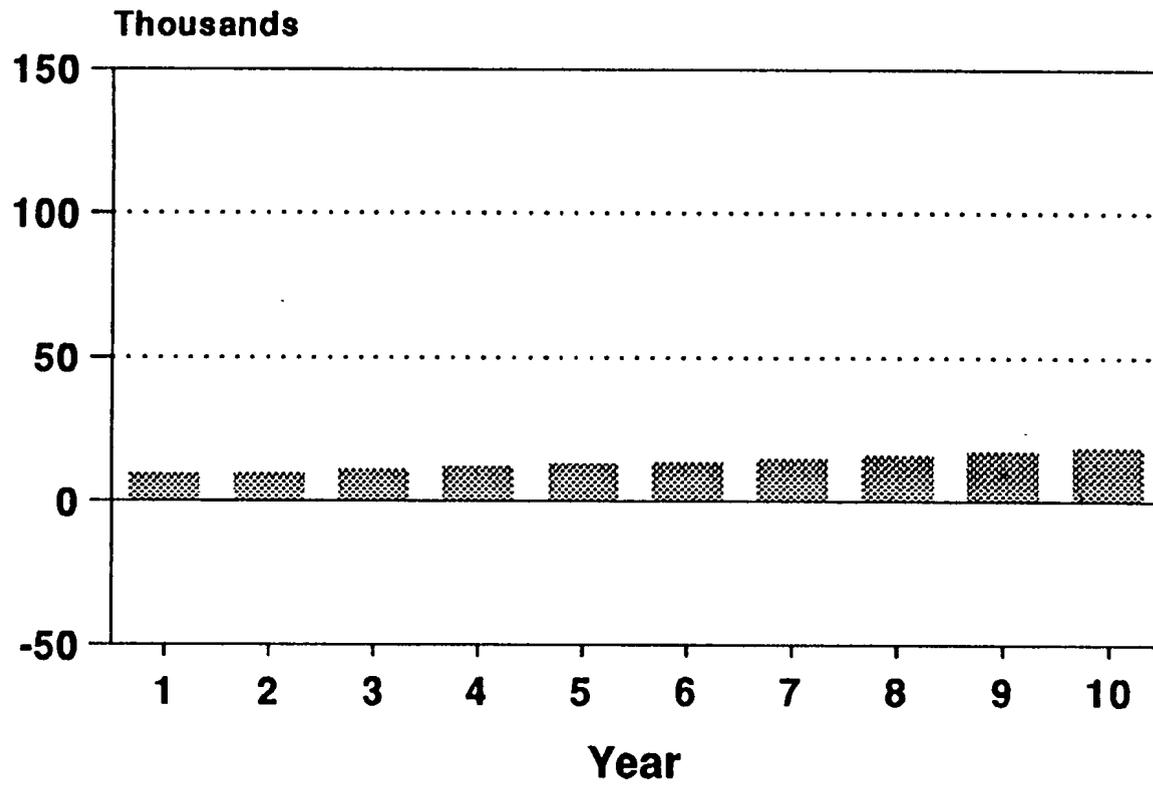
The procedure to calculate the maximum factor for common stock was revised just prior to its adoption at the NAIC meeting in June of 1992. For publicly traded common stock a factor of 20% will be used adjusted up or down by the average beta of the portfolio.

Companies wishing to forego a beta adjustment can use a 30% factor. Unaffiliated common stock that is not publicly traded will have a 25% factor, affiliated life insurance companies a 0% factor, and affiliated property and casualty and investment subsidiaries a 20% factor. All other affiliates will carry a 25% factor.

Real estate will have a 7.5% factor in 1992, and this factor will apply to the gross investment in real estate, that is, the book value plus any encumbrances. It is expected that the real estate factor will be increased to 10% at the same time that a credit for unrecognized gains is introduced into the formula for the maximum.

Generally, for other invested assets, in particular for partnership interests, there will be a "see through" to the nature of the underlying asset. In other words, a company would establish the same maximum whether it held the asset directly or indirectly through a partnership. Any asset that cannot be classified as being in the nature of one of the aforementioned categories (the so-called other-other category) will have a 20% factor.

Having computed the maximum, the contribution will equal the amortization factor, which is 10% in 1992, times the excess of the maximum reserve over the accumulated AVR balance. It is expected that the amortization factor will rise to 20% over the course of a phase-in period.

Charts 8 and 9 compare these contributions with the contributions that would be made under the MSVR rules that would otherwise have applied in 1992 and the MSVR rules that were expected to apply in 1995. The expected rate of loss of principal and interest is also displayed on these charts. At the moment only capital losses are chargeable to the reserve, but the advisory committee is working on a recommendation to identify and charge "lost interest" to the AVR also.

CHART 8

High-Quality Bond Contributions

Contribution as % of Stat. Value

- MSVR - 1992
- MSVR - 1995
- AVR - Ultimate
- AVR - 1992
- Expected Losses

Actual Balance as a % of Maximum Balance
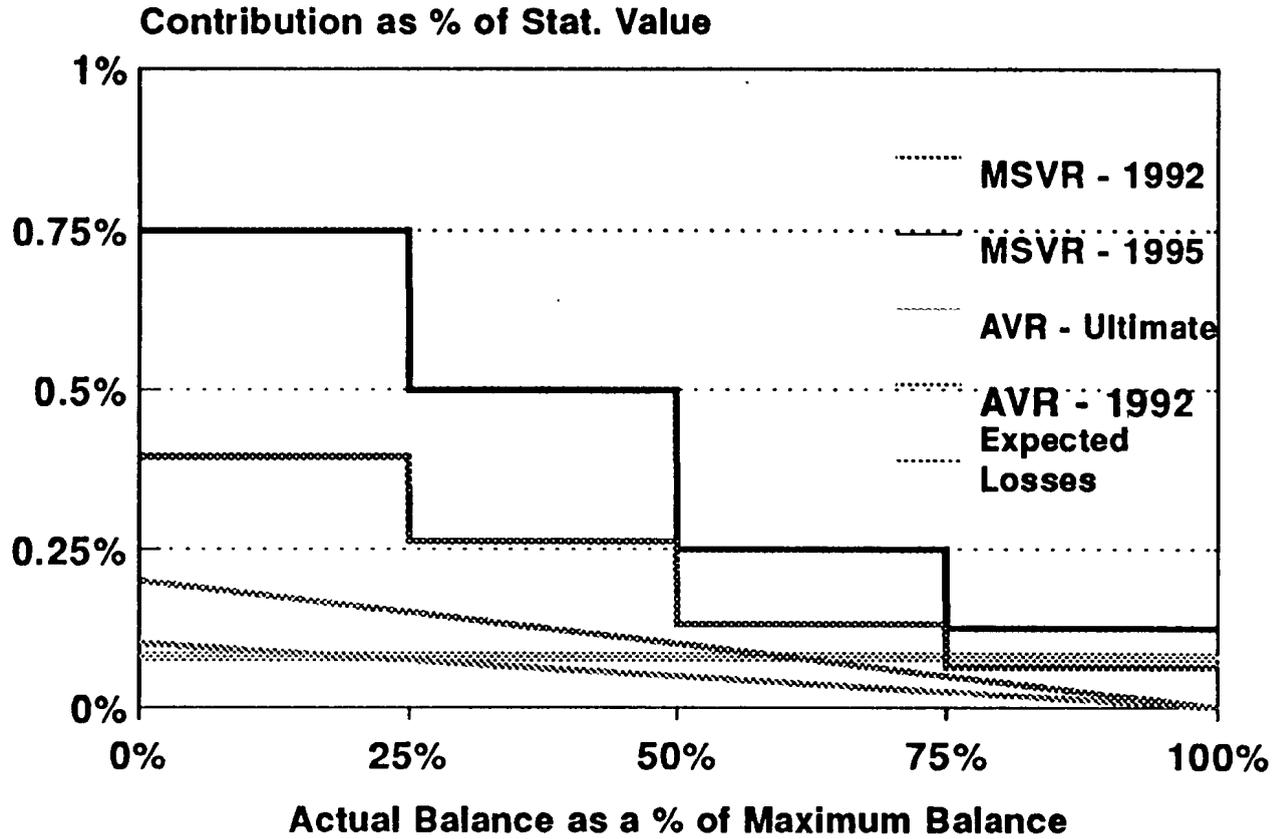
CHART 9

Junk Bond Contributions

Contribution as % of Stat. Value

MSVR - 1992

MSVR - 1995

AVR - Ultimate

AVR - 1992

Expected
Losses

Actual Balance as a % of Maximum Balance
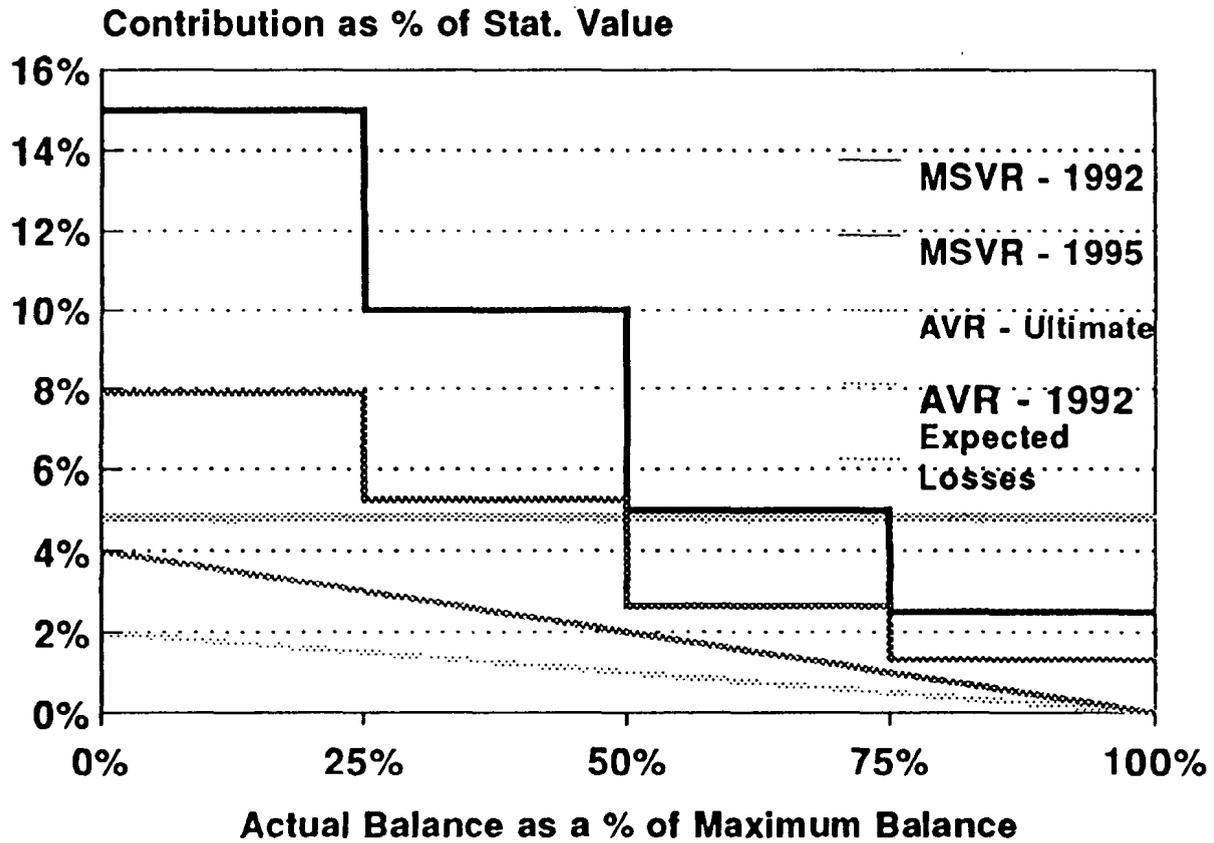
The stepped contribution formula of the MSVR system that specified that the contribution be 3, 2, 1 or .5 times the normal annual contribution has been replaced by a smoothly varying contribution to the AVR.

The AVR formula is somewhat more conservative than it appears, since (unlike the MSVR) it uses the balance after any losses have been charged to determine the size of the contribution. In 1992 this means that 10% of any loss in 1992 is immediately charged to surplus. Furthermore, interest-rate gains (which have been quite common this year) are now captured by the IMR and do not result in a decreased contribution to the AVR.

The AVR provisions for mortgage loans have no counterpart in the MSVR framework (Chart 10).

The expected losses for mortgage loans are the advisory committee's working estimate of the long-term-average loss. Current losses on commercial mortgage loans are considerably in excess of the long-term average.

For common stock the new formula varies the contribution based on the balance while the MSVR contribution was simply a flat 1% (Chart 11).

Real estate contributions are new to the AVR. The size of the contribution is proportional to the gross investment in real estate. The line labeled "AVR - Ultimate" is the contribution that would be made assuming no credit is taken for unrecognized gains (Chart 12).

Example of AVR Amortization

We consider the case of a company with only two credit-related losses over a 10-year period. One in year two and one in year five (Chart 13).

Chart 14 displays the manner in which the actual balance of the AVR evolves.

CHART 10

Mortgage Loan Contributions

Contribution as % of Stat. Value

Legend: AVR - Ultimate — AVR - 1992 — Expected Losses

Y-axis: 1%, 0.75%, 0.5%, 0.25%, 0%

X-axis: 0%, 25%, 50%, 75%, 100%

Actual Balance as a % of Maximum Balance
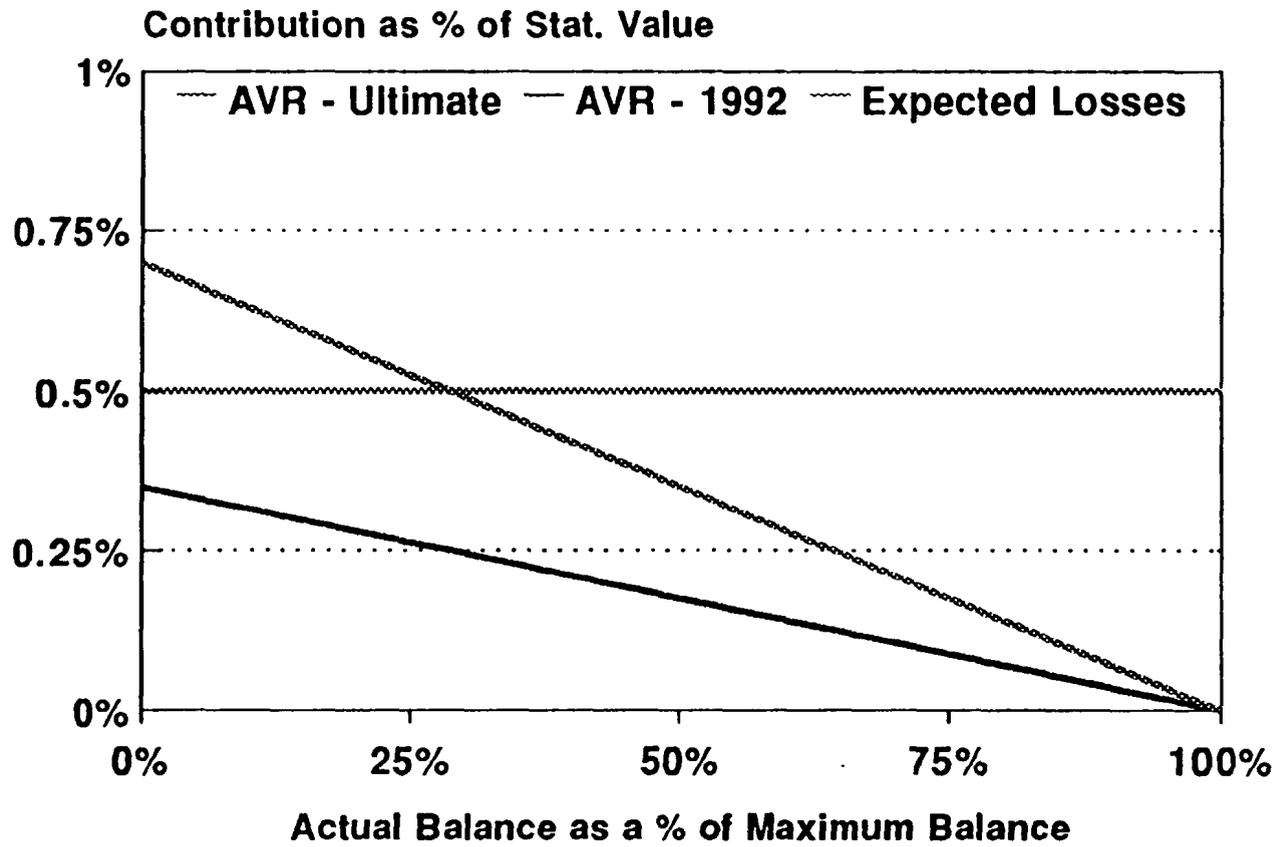
CHART 11

Stock Contributions

Contribution as % of Stat. Value

Actual Balance as a % of Statement Value

Legend: MSVR, AVR - Ultimate, AVR - 1992, (Expected Gain)
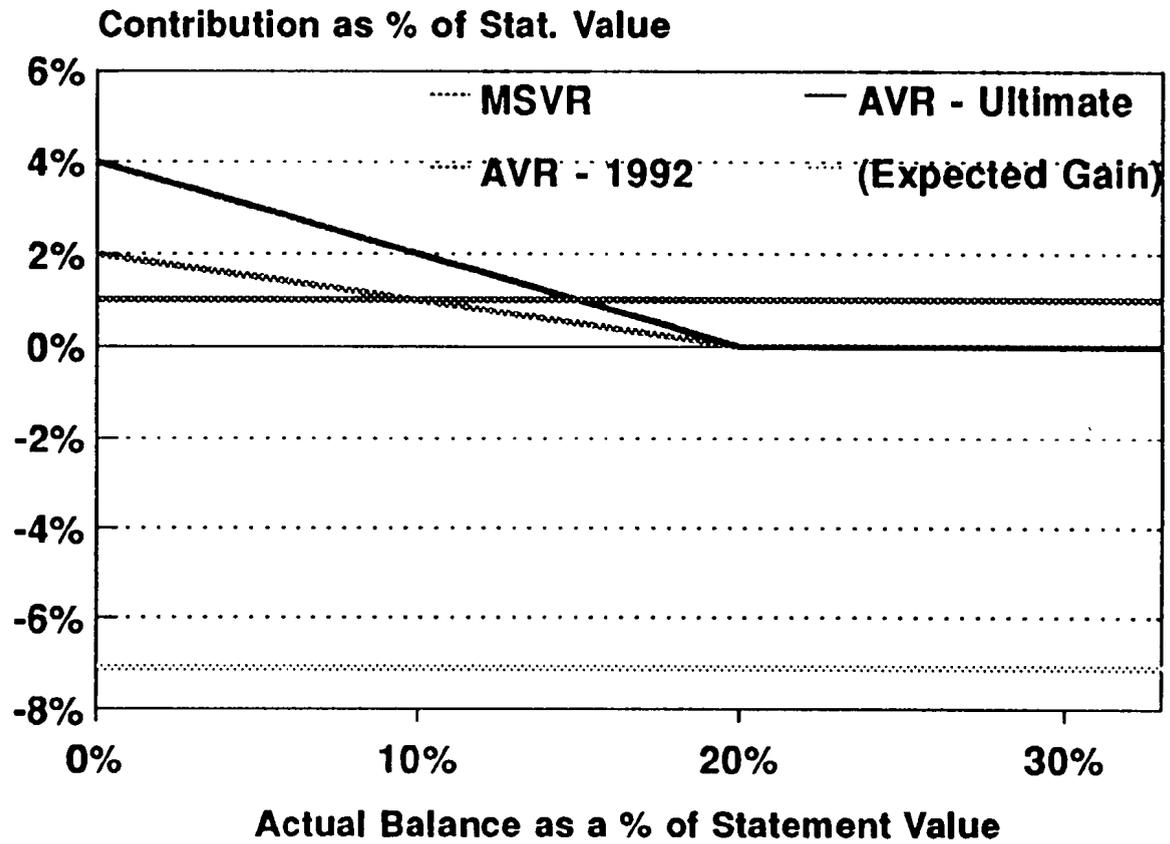
CHART 12

Real Estate Contributions

Contribution as % of Stat. Value & Encumbrances

Legend:
- AVR - Ultimate
- AVR - 1992

X-axis: **Actual Balance as a % of Maximum Balance** (0%, 25%, 50%, 75%, 100%)

Y-axis: 0%, 0.5%, 1%, 1.5%, 2%, 2.5%
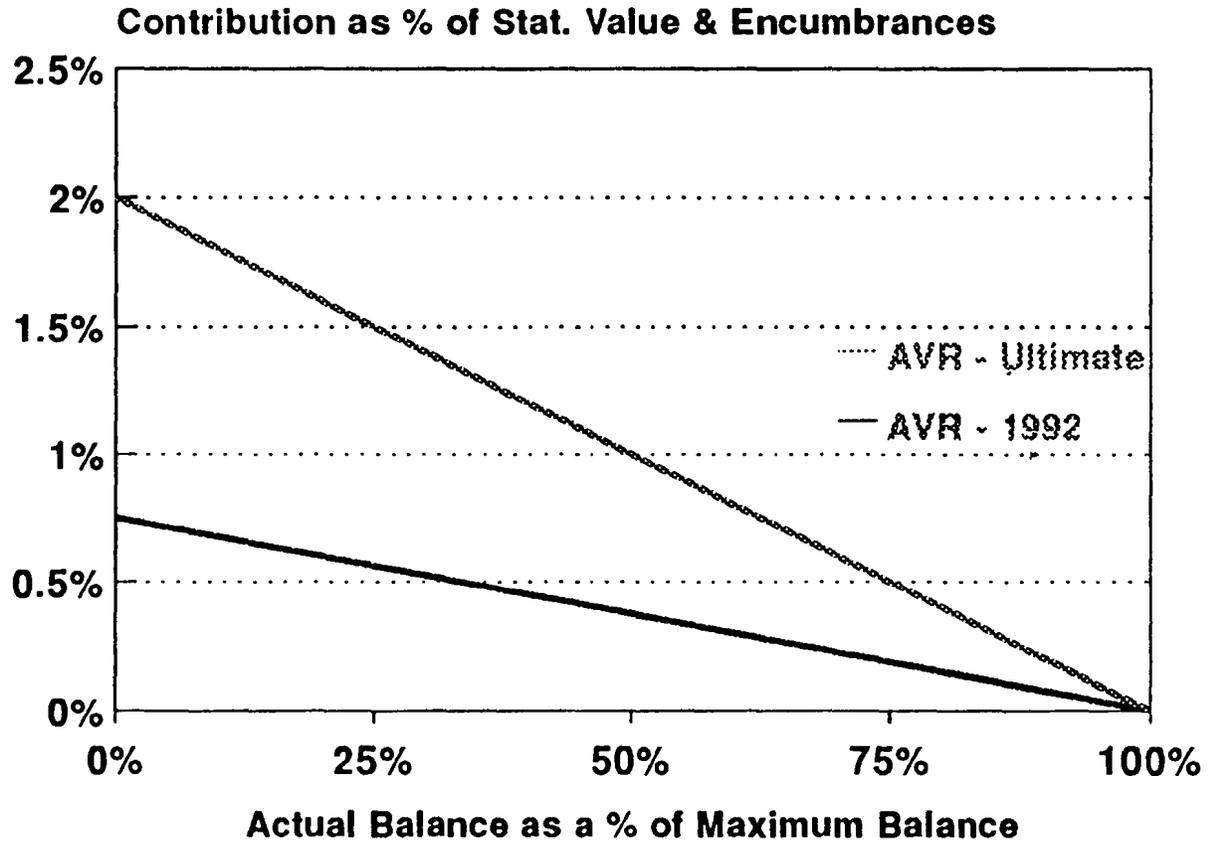
CHART 13

AVR Amortization
Gains and Losses Credited to AVR

Thousands
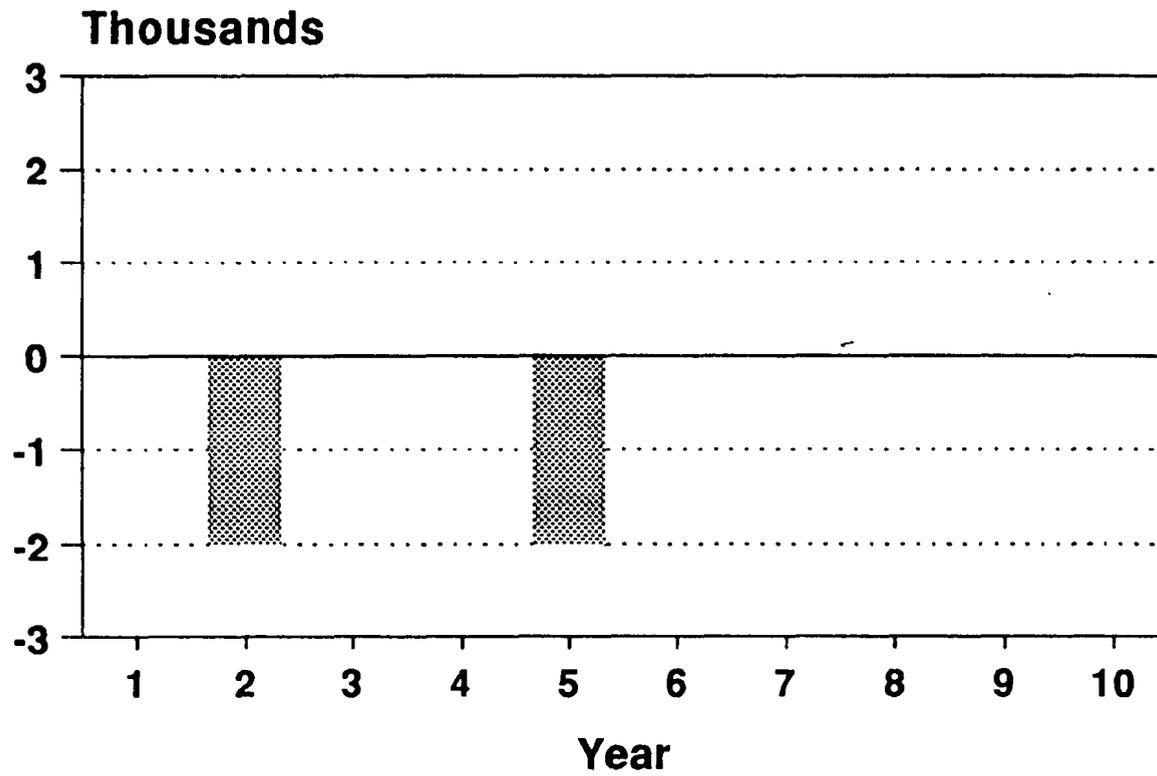
Year

CHART 14

AVR Amortization
Balance with Gains and Losses

Thousands
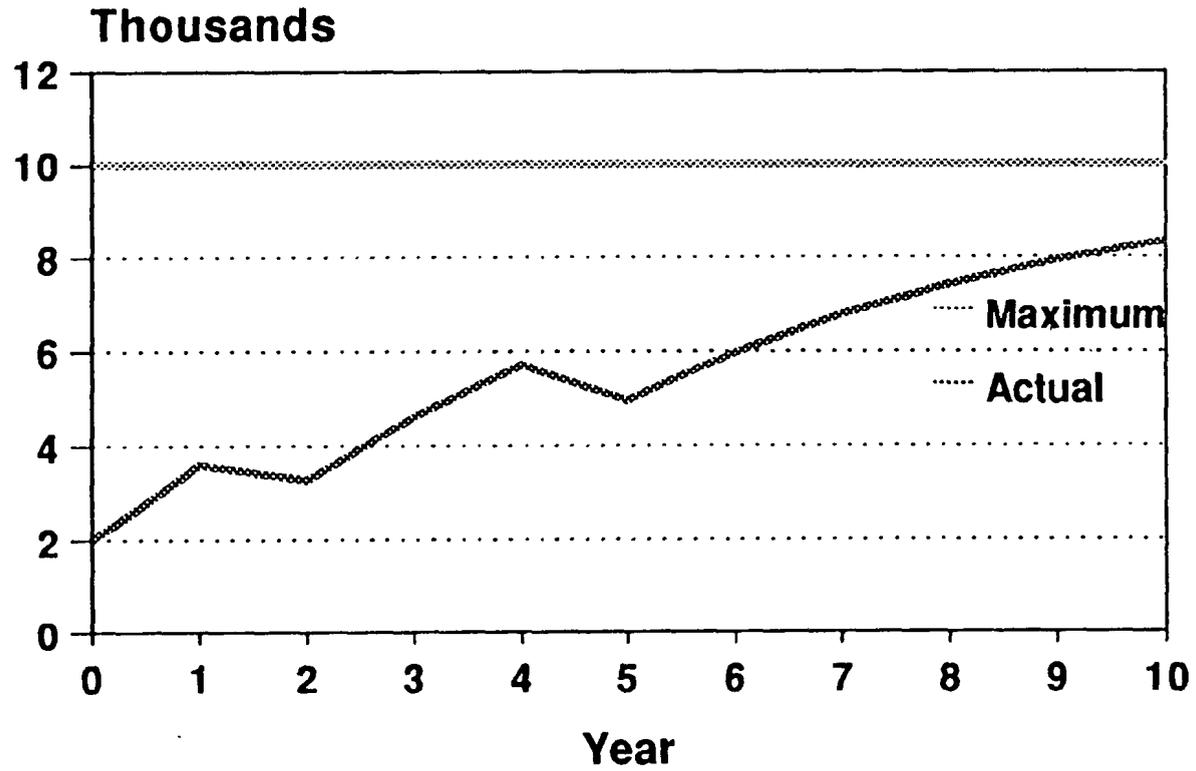
Year

······· Maximum

······· Actual

In the absence of losses the balance asymptotically approaches the maximum. Assuming losses occurred regularly each year, the actual balance will stabilize at a level where the actual losses equal the contribution.

Transition Arrangements

A number of rules have been specified pertaining to the transition from the MSVR to the AVR/IMR:

●   The initial balance in the AVR at the beginning of 1992 cannot be less than the December 31, 1991 MSVR.

●   The IMR at the beginning of 1992 will be zero.

●   Two options have been allowed for the allocation of the MSVR balance into the subcomponents of the AVR:

-    a pro-rata allocation based on the maximums of the respective subcomponents or,

-    a one-for-one allocation to specific components, (e.g., the MSVR common-stock component would go to the common-stock subcomponent of the AVR).

●   Any voluntary investment reserves, for example, reserves for mortgage loans and/or real estate, can be:

-    continued,

-    allocated to the AVR, or

-    discontinued.

DEFAULTS AND THE ASSET VALUATION RESERVE (AVR)/ INTEREST MAINTENANCE RESERVE (IMR)

MR. FRANK S. IRISH: I want to talk first about the IMR. The design of this reserve reflects a buy and hold philosophy, but this is not to say that trading before maturity is unwise or frowned upon. There are many cases where trading is a very legitimate part of asset management; for example, in a matched portfolio, trading may be necessary to rebalance the portfolio occasionally. I am going to give an example of rebalancing and how it affects the IMR. Trading might also be a legitimate result of a change in investment philosophy or simply a means of taking advantage of a particularly attractive investment opportunity.

The valuation actuary should be particularly receptive to the idea that trading gains and losses should not flow directly to surplus but should be reserved and amortized over a period of years. In theory the amortization period should be the remaining lifetime of the liabilities that are supported by the assets, but this has proved difficult to implement so that the system has been designed so that the gains are amortized over the remaining life of the original assets.

The IMR frequently operates to set up reserves in exactly the same kinds of situations that the valuation actuary might feel that additional reserves are necessary. In these days of declining interest rates, we should be particularly sensitive to the problems that can arise with maintaining adequate yields to support in-force business. If trading takes place in such an environment, it usually creates gains that come at the expense of future reduced yields, and it may be necessary for the actuary to recognize those reduced yields in reserving.

By way of creating an example to illustrate this, I have the following:

The company finds itself in a situation where it has GICs maturing in each of the next six years. I will assume, in this example, however, that the company has followed a barbell- type of policy in making its investments so that it has bonds maturing in years one, two, three, and then a large bond maturing in year seven. This will produce, assuming all of the bonds are at

9%, and that the current interest environment is also 9%, more than enough cash flow for the company to mature the first three GICs, but it has to be careful about the next three.

Incidentally, I have constructed this portfolio to be perfectly duration matched; that is, the duration of the assets is exactly equal to the duration of the liabilities. But as time goes by, it is clear that, because of the convexity of the portfolio, the duration match is going to deteriorate. One way that the company can meet this problem is to plan to sell off the long bond gradually and reinvest in shorter securities in the four-, five-, and six-year period.

I have assumed that at the end of years one, two, and three, the long bond is sold off in equal pieces; and the amounts are reinvested in three-year bonds, which will then fill in the gaps in years four, five, and six. This will tend to keep a pretty good duration match in the portfolio. Of course, as long as interest rates stay constant the emergence of surplus will not be affected by this type of activity. I have built in a 50-point profit margin into the example, and I would expect the profits to emerge in a regular fashion.

The valuation actuary would find it quite necessary to test this under varying interest scenarios. For example, under a 3% pop-down scenario when interest rates dropped suddenly to 6%, the rebalancing process, which involves gradual selling off of the long bond, produces large profits; and as a matter of fact, the actuary can project that under this scenario, and the emerging surplus will be more at year three than the ultimate profits; that is, it would have been more prior to the invention of the IMR. Should this scenario actually occur, we'd have to think very seriously about setting up extra reserves to forestall the decline in surplus that is foreseen in years four, five, and six; but the IMR does the job for the actuary by capturing these gains and amortizing. It produces the same kind of surplus pattern that would have resulted if interest rates had not moved.

Thus, I think a very strong case can be made for the actuarial appropriateness of the IMR in the case of positive interest-related gains arising in a declining interest market; but the same kind of logic leads one also to the conclusion that a negative IMR is appropriate in the opposite

case; that is, when interest rates are rising. This means that there are some situations where it is actuarially appropriate to hold reserves that are less than statutory minimums, and the negative IMR, in effect, permits the actuary to do this.

This turned out to be a sufficiently radical step so that it seemed appropriate to suggest that, if there is a negative IMR, the actuary must insert special wording in the actuarial opinion to the effect that the negative IMR has been examined and tested and is a sound reduction in the company's reserves. And also I must point out that the negative IMR is a sufficiently radical step that it introduced some concern on the part of the regulators who are still considering the appropriateness of this step. However, there are strong indications that the negative IMR will be allowed in 1993, even if it is not allowed in 1992. It's pretty much a moot point anyway, because it is unlikely that any company will develop a negative IMR in the interest-rate environment we currently are seeing.

Let me revert, therefore, to the previous example and show what happens to this rebalancing process when the interest rates are rising. I have assumed the same portfolio but tested under a scenario in which interest rates pop-up by 3% from 9% to 12%. Under such a scenario the required rebalancing produces losses for the company, and the actuary who knows that the ultimate gains are still going to be there, because the portfolio is maintaining a good duration match, feels that the surplus situation of the company is being misrepresented and would like to set up lower reserves. The IMR permits this and actually produces a positive flow of surplus not greatly different from the flow of surplus that would have occurred if interest rates had not moved.

Now that completes the example for how the IMR works in a matched portfolio. Other examples could be produced to show how it might work in unmatched portfolios and interest-sensitive products, but time does not permit exploration of all of this. I think it is more important to stop for a moment and reemphasize the arguments for the appropriateness of negative IMRs because this is still a subject that is under debate.

Much of the concern arises from the accounting profession, which apparently feels that the negative IMR is, in effect, the amortization of a loss, and basic accounting theory teaches us that losses should not be amortized.

But I think and many others think that what you call a loss here is really not a loss; it is a transaction in which the company sells securities for less than their carrying value and in doing so creates the opportunity in a high interest-rate environment to reinvest the proceeds at higher yields. In other words, it is a transaction in which higher future revenues can be expected. I think I could name several parallels in accounting theory in which amortization takes place, and one that comes to mind is the situation for goodwill. When one company buys another company for more than its book value, one could take the viewpoint that a loss should be recorded; but the accountants don't call it a loss, they call it goodwill and amortize it over a long period of years because the presumption is that the purchase created future revenue. The same thing happens here.

The loss, if you want to call it that, is purely transitory. Now one should not deny that C-3 risks often cause losses, either because of mismatch or because of interest sensitivity of the products. So the defense of the negative IMR does not involve the denial of the possibility of loss, it merely says that, if C-3 losses do occur, they arise as the result of particular asset liability conditions being subject to unfavorable interest-rate movements. The failure to manage assets and liabilities combined with the interest-rate movement, are the causes of the loss. Whether assets are actually traded before maturity or not has nothing to do with the loss, and our accounting systems should recognize this.

Let me summarize now the principal features of the IMR that I think are of most interest to the valuation actuary. First of all, it establishes reserves in many of the situations that the valuation actuary through cash-flow testing might decide that additional reserves are required; or for that matter, that in some cases negative reserves are appropriate. As a matter of fact, one can hope that the IMR will operate in such a fashion that the number of occasions that the valuation actuary will have to take special action will be greatly reduced.

Second, the IMR prevents manipulation of the balance sheet. It has been accepted practice for companies to trade before maturity in order to make the balance sheet look better. This is now no longer possible, at least with respect to interest-related gains and losses. And as a corollary to this, the investment people will be under less pressure to create gains when the best policy might be not to trade; or in other situations, when interest rates are rising and trading might cause losses, the investment people have the freedom to trade or not to trade without being concerned about the negative effect on the balance sheet. So the investment people are left free to focus on the basic objectives of policy without worrying about balance-sheet effects.

Now there is one more item that needs to be mentioned in connection with the IMR. The IMR actually assumes that the proceeds will be reinvested at the same duration as the original asset, which is frequently not the case; and so the IMR must be considered as only approximately meeting its theoretical goals. It was recognized that there are some cases where it is clear that the proceeds are not going to be reinvested; and in these cases, if sufficiently clear-cut, the company is allowed to exclude such gains from the IMR requirements. The two cases are a situation where assets are sold in connection with the sale of a block of business, and a situation where there is a sudden run-on-the-bank, withdrawal-type of scenario. In the latter case, the statement instructions will have fairly detailed criteria for deciding when withdrawal rates have reached 150% of previous levels, and the company is in a situation where it clearly needs to sell assets in order to meet the withdrawal demand.

Now most companies will be setting up IMRs in 1992; and the actuary who is doing cash-flow testing will have to deal with these reserves. The actuary will be required to recognize the IMR in doing cash-flow testing. In the case of most companies in 1992 where the IMRs are expected to be positive, the actuary's task is being made easier, because the actuary may assign assets that are equal in book value to the IMR in addition to the assets supporting the actuarial reserves when determining whether the assets are adequate to meet the obligations.

I should point out, however, that it will be necessary to go through some kind of allocation procedure in dealing with this. In most cases, cash-flow testing is done for one product or

product line within a company; and therefore the actuary may have to create some method to determine how much of the IMR may be allocated to that particular product in doing cash-flow testing. It is also clear that in the future when we get into situations where we have to deal with the existence of negative IMRs, that the actuary will have to take special precautions; because in such a case the book value of assets supporting the reserves will be less than the actuarial reserves themselves. In this case, it will be very important to realize that recognition of the IMR in cash-flow testing is mandatory; because of the negative IMR the actuary's job is made tougher than it was in the past; and also, as I have already said, one needs to recognize that the actuarial opinion should make special recognition of the fact that the negative IMR has been tested.

Let us move then to the AVR. The AVR is really the successor to the old MSVR, and the intent is that it capture credit-related gains and losses and set up a reserve that is adequate to provide for possible future losses. The reserve is gradually funded from its current levels to a level that does meet the test of adequacy. In a case of companies having large quantities of mortgages, for example, the AVR for mortgages may well start out at zero and build up only very slowly to its ultimate level. That ultimate level should be adequate, in the actuarial sense, of meeting the criterion of having a substantially better than even chance of covering the losses for which it was created.

The AVR will also be used in cash-flow testing; and since the AVR is always positive, this can be nothing but good for the actuary. However, there was regulatory concern expressed about the possibility of using the AVR to cover other than potential credit-related losses, such as even mortality losses, for example; and the need was felt to prevent this. The use of AVR in cash-flow testing is limited to the present value of future defaults in the scenario that the actuary is using.

Now when the committee was designing the new AVR, there were a lot of conflicting ideas as to how it should be structured and how large it should be. And I want to talk a little bit about where I think this process is headed; because although the AVR becomes a reality in

1992, there is still a lot of evolution ahead of us. By way of setting the stage for what I am going to say, let me point out that on a fixed-income security the total yield can be viewed as composed of three parts: the risk-free yield, a part that is there to provide for expected default losses, and then a risk premium to compensate the holder for the uncertainty of future returns. These last two components of yield are available, I should think, to fund the AVR; and therefore one would expect that the funding would provide for the contribution that is somewhat more than just the expected level of default losses.

To test how the current form of the AVR meets these criteria, I ran a few stochastic variations on the development of an AVR fund. For this purpose I assume that a company has concentrated all of its assets in category two bonds; and if you will remember, these bonds have a maximum factor of 2%. And I am using an amortization factor of 20% because that is the amortization that is ultimately expected, although in 1992 the amortization factor will only be 10%. In order to drive my model, I assume that the expected losses on this portfolio are 25 basis points per year, which I think is pretty much in line with actual experience; and I assume that the losses fit a probability distribution that is described by the gamma with the mean equal to the standard deviation. If we start with a reserve of zero, the AVR tends to develop over a period of years to a level that is about half of the maximum. The 20th and 80th percentiles of this distribution are fairly tightly concentrated around the mean, and only 29% of the runs failed, that is, fell to zero at any point, and most of those cases were in the first few years when the reserve was still quite low.

Using the same kind of test and starting with a reserve that is half the maximum, which is probably the level that most companies will be at either now or fairly soon in the future, it can be seen that the reserve tends to stay at about half the maximum. The 20th and 80th percentiles are again very tight and only 5% of the scenarios hit zero at any time during the 10-year projection period. This, I would say, is a fairly conclusive demonstration that the AVR is too large for category two bonds, that it is more than just adequate in the actuarial sense, and in fact meets almost all cases of loss even some extreme ones.

It is true, however, that on some other categories of assets the same kind of investigation can demonstrate that the AVR is too small. Therefore, the committee that recommends these things to the regulators is currently considering making major changes in the AVR; but it is not expected that such changes will be implemented prior to 1994. The proposed structure for that year envisions still using a 20% amortization factor, but instead of amortizing to the maximum, a target level for each asset class should be defined. In the prior example, it was clear that the reserve tended to about 1% for category two bonds; and that perhaps 0.5% might have been a more appropriate target level. Then the formula would be further modified by putting in an explicit contribution equal to the expected defaults so that the beginning of your reserve would be reduced by the actual defaults and increased by the expected defaults and then would be amortized by 20% toward the target level. Since the expected losses and the actual losses, over the long run, should be fairly close to equal, the reserve can be expected to approach the target level over the long run in just the way I described to you in the example. Then the task of the committee is defined in terms of setting the appropriate target level for each class of assets in view of the probability distribution of losses for that class. The maximum reserve would probably be set at twice the target level, although under this proposed arrangement the question of what the maximum should be is much less important. Well, that's something that is currently being considered for 1994.

There are other things that are also being considered for implementation in future years, either 1993 or 1994, and I just what to list them briefly for your information:

1. The negative IMR is a high priority for the advisory committee.
2. There are proposals for lengthening the phase-in period, (that is, the period before which we get to the ultimate 20% amortization factor) and perhaps making that four or five years instead of the currently proposed three years.
3. There is a proposal to use appraised values in calculating the real-estate reserves so that any excess of market over book in real estate could be used to offset the AVR for real estate.

4. The IMR exemptions that I spoke about need refinement, particularly in the case of a sale of a block of business where the current provision is one that really does not do the job that it was intended to do.

5. The committee wants to recognize market-value adjustments as being the same kind of gain or loss as interest-related gains or losses arising from the sale of an asset and make provision in the IMR to capture market-value adjustments that are really giving present value to future gains.

6. The need is there to deal with the separate accounts, some of which involve either AVR- or IMR-type of risks.

7. Restructuring of mortgages needs to be recognized in calculating the mortgage adjustment factor.

8. There are all kinds of new securities, derivatives, asset-backed securities, and collateral loans that need to be dealt with more specifically so that the appropriate AVR can be set up for them.

9. There is a need to allow transfer among subcomponents when one subcomponent becomes negative, because otherwise, we lose the combined effect of the AVR, which is what is desired. We should not have a situation where there is a lot of money in one subcomponent and the other subcomponent has run out of money. The AVR really should be available to meet all kinds of credit risks, and it is hoped that this will be provided for in some future years.

10. And finally there is a proposal to recognize lost interest in the AVR as well as the actual write-down that occurs at the time of default.

These are a few of the things that are on the plate of the committee and the regulators; and therefore, it is obvious that you should not think of the AVR and the IMR as cast in stone at this point.

With that I want to leave you with the message that the AVR and the IMR will both play important roles in the life of the valuation actuary. They will make the company's reserves more responsive to the kind of forces that the valuation actuary wants to recognize, but at the

same time they will complicate the life of the valuation actuary by requiring the actuary to take into account some new kinds of reserves that didn't exist before when doing cash-flow testing.