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Anatomy of an Earned-Interest Rate

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Summary: In the product management process, the earned interest rate is often the starting point for determining and redetermining a credited rate.

This session addresses the complexities and timing issues involved in determining the “earned” rate. The days of the old “Exhibit 2” rate are long gone; an earned rate is a dynamic reflection of assets such as collateralized mortgage obligations (CMOs), derivatives, and convertible securities.

Panelists explain how an earned rate can be determined from a statutory, a GAAP, and a policyholder book’s perspective. Topics include interest maintenance reserve (IMR), asset valuation reserve (AVR), convexity charges, and investment expense determination. Also addressed is a means of determining whether the spread is falling to the bottom line.

Panelists include an accountant, an investment advisor, and a product manager. Attendees will gain an understanding of the relationship between the earned rate and the credited rate and will know how to avoid common pitfalls.

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Mr. R. Thomas Herget: Have you ever left an interest-crediting meeting aglow, knowing that you have preserved your target, a 150-basis-point spread? But perhaps, months later, you observe that only 40 basis points seem to be dropping through to the bottom line? Have you ever wondered what has happened to these points that you thought you were ushering down there?

Years and years ago, investment accounting was fairly straightforward. It was very consistent between statutory accounting principles (SAPs) and GAAP. Today, with complex and sophisticated investment vehicles, coupled with proactive accounting practices, it has become very subjective as to what exactly an earned interest rate is.

There are many ways earned interest can be intercepted and ambushed on its way to the bottom line. If you have ever had the experience of performing asset adequacy analysis, as well as being a key player in establishing crediting rates, you may have developed some insights into this process.

We have assembled a qualified panel to reflect on these issues head-on. Our first speaker will look at how purchased investments are accounted for both initially and subsequently. Our second speaker, an investment advisor, will reflect on assumptions and considerations in selecting vehicles appropriate for the product. Our third speaker is a product manager. He will simulate the actual interest-crediting process.

Let me present our panelists. I am an executive vice president at PolySystems, Inc., in Chicago, where I supervise our software installation and actuarial and systems consulting practices. I'm also the current vice-chairperson of the Life Insurance Company Financial Reporting Section as well as a member of several Academy task forces: the Task Force on State Variations in Standard Valuation Law and the Task Force on Valuation Law Task Force.

Tom Kochis is an assurance partner with the international professional accounting firm KPMG Peat Marwick in Kansas City. He has more than 20 years of insurance industry experience and represents a broad cross section of the industry. Tom was a member of the original industry group supporting the NAIC's initial statutory codification efforts. He was also a member of the NAIC task force that developed the statutory accounting model for CMOs.

Mr. Thomas R. Kochis: When I think back over my career and the 20 plus years that I've been associating myself with insurance companies and doing their audits, I think that I probably learned the most from actuaries. So, it's really an honor for me to be here addressing a group such as this. The brainpower in this room is exceptional, and, again, I hope to share some interesting thoughts with you.

This is an outline of what I'll cover. I will discuss the significant accounting conventions for the major asset classifications and the differences between statutory and GAAP. I will provide an overview of the AVR and the (IMR), and their impact, or lack of impact, on earnings. I will discuss allocation processes and the variables associated with investment expenses.

I thought I'd start out by discussing the conceptual framework between SAPs and GAAP and some of their differences. Under statutory, conservatism is one of the basic tenets. Some examples of this are nonadmitted assets and the AVR. GAAP is more focused on the matching of revenues and expenses. You're probably all familiar with the concept of deferred acquisition cost (DAC). SAPs are designed to assist regulators in performing their function of protecting the policyholders, whereas GAAP information is designed to provide useful information to various stakeholders, investors, creditors, and rating agencies. The overall summary is that for statutory the primary accounting concepts deal with balance sheet solvency, whereas for GAAP the focus is on the income statement.

What I will do now is discuss different asset classifications and where some of the statutory and GAAP accounting concepts differ. One of the things I want to point out is that this is based upon current accounting literature. Most of you are aware that there is a codification process for statutory accounting that will rewrite many of the statutory accounting rules. I'll try to touch on those as we go along. If, at the end, you have questions about other things or where the codification process might be going with respect to different asset classifications, I can try to address that for you.

With statutory, accounting bonds are carried at amortized cost. These are bonds other than CMOs or loan-backed or structured securities. For GAAP, the carrying value is dependent upon its classification under Statement of Financial Accounting Standards (*SFAS*) 115, which has three classifications: held to maturity, available for sale, and trading.

For a bond held to maturity, if a company buys a security and intends to never sell it before its maturity, then amortized cost is the accounting model. Bonds available for sale under GAAP utilize fair value, with changes in fair value being treated as unrealized gains and losses. For a trading portfolio it's fair value also, but the changes in that fair value are taken through the income statement rather than being treated as unrealized.

For basic fixed-maturity bonds there are really no significant differences in the income recognition except for the effects of IMR, which we will discuss later.

CMOs are the investment type that has probably gotten the most attention in recent years. There are two basic issues here. How do you amortize premium and discounts, and how do you recognize impairments for high-risk CMOs, such as residuals or interest-only tranches?

It seems as if that would be fairly simple, but it gets to be complex. There are some variables. Under statutory accounting, there is a choice of amortization methods. You can either use a prospective method or a retrospective method. In GAAP, it's specified for you if you're dealing with high-risk CMOs. High-risk CMOs generally are residuals or interest only (IO). Principal only (PO) can fall into that category if purchased at a premium. That means that there is a chance that you could lose what you paid for that investment. Other CMOs have essentially guaranteed return of principal, so there's not much risk of loss. Where there's not much risk of loss on getting the principal back, the accounting is retrospective. For high-risk CMOs, it's described and provided for under GAAP to be the prospective method.

Here is a description of those two methods. The prospective method says that when amortizing premiums or discounts, when you reach a certain point in time, for each valuation period, annually for most, there is a reassessment of what the cash flows from the CMOs will be. Originally when you bought it there was an assumption made as to prepayment speeds and what those cash flows would be. A year later, because of what could be a variety of factors, the prepayment assumptions may have changed. You may get more or less cash flows.

So, at a point in time, the future expected cash flows, as compared with the current book value, can generate a yield going forward. That's what you do under the prospective method. Under the retrospective method you go back to the date when you acquired the security. Given the subsequent knowledge of what the cash flows have been and what we now estimate them to be in the future, what would that yield have been if we had that knowledge on day one?

What would have been the yield, and where would our amortized value of the security be today? The difference between where that amortized value is today and where, with hindsight, it would be, is an adjustment that is taken through investment income. It is called a true-up adjustment, very similar to a FAS 97 type of concept for truing up DAC.

A key point here is that history may not be the best predictor for what the future yields may be. In other words, you may have significant true-up adjustments that have impacted investment income historically that may not be there in the future. Or, if you're using the prospective method, if the prepayment assumptions have

changed significantly, the historical yield may not be anything near what the future yield might be.

There are also some differences with respect to how impairments are indicated and measured between statutory and GAAP. Negative yields are the indicators of an impairment. If future cash flows are less than what you have recorded that investment to be on the books, you have a negative yield and your asset generally is impaired.

The write-downs are treated as realized losses and included in the IMR calculations for statutory accounting. It is the same for GAAP, except GAAP does not have an IMR concept. Back when this accounting was being developed, there was significant discussion as to whether these types of losses should be included in the IMR calculations because technically these changes in value were not directly tied to changes in interest rates.

The changes in value are generally tied to changes in prepayment assumptions, prepayment streams, and cash-flow streams that were possibly triggered by changes in interest rates. There was a lot of controversy, but it was decided that those impacts would be included in the IMR calculation.

For statutory, when the future cash flows on an undiscounted basis are less than the carrying value, that indicates that there's an impairment. The degree of impairment is also measured by the undiscounted cash flows. For GAAP, impairment is indicated by discounted cash flows at a risk-free rate of return.

If you have cash flows discounted at, say, a Treasury rate (which might be considered a risk-free rate), and, if those are less than the current book value, then that's indication of an impairment. The measurement of the impairment is fair value and that may be much less than the discounted cash flows at a risk-free rate of return. Once the write-down has been taken you have a new cost basis, and the accounting going forward for yield calculations is prospective in nature. There has been some debate in the drafting of the codification rules. As it stands now, the draft indicates that this concept of undiscounted cash flows would stay for statutory accounting. Industry observers and commentators on that are arguing that a discounted cash flow is a more realistic measure or indicator of impairment than undiscounted cash flows. Economically, you have to take into account the time value of money.

Probably the most significant difference for mortgage loans is the accrual of interest on loans in default. Statutory accounting provides for three methods. You can accrue interest but then charge operations for an uncollectible portion. The interest

income might still be recognized, but the charge-off may not flow through investment income. You can accrue the interest again, recognizing interest income and then nonadmit the balance that might be uncollectible, or simply stop accruing. That can have some different effects on the investment income line.

With GAAP, generally, once a loan is impaired, you just stop accruing the interest. GAAP doesn't have the nonadmit concept. These items are not that significant to the insurance companies (at least from what I've seen). They are prepayment penalty income items. There are loan origination fees and costs as well as commitment fees. These are all elements of revenue for an insurance company that has mortgage loan portfolios. Prepayment penalties are treated as capital gains or current investment income current. The codification process would have prepayment penalty revenue treated as investment income. The industry group is taking exception to that because they're they're not part of the yield. They're more of a capital gain concept.

The loan origination fees and costs are treated as an adjustment to yield. That's the same for GAAP. The codification process would take that deferral away and require expensing those items immediately.

Regarding commitment fees, if a loan is exercised, they're treated as a yield adjustment. If they're unexercised, they're reported as investment income when the commitment expires. In both cases the commitment fees are treated as investment income for statutory. For GAAP, the commitment fees are treated as investment income only if they are exercised. If they are unexercised, they're treated as service fee income and not included within investment income. But, again, these last three items, in my experience, are not a significant factor in determining investment income for a life insurance company.

Preferred stocks under a statutory accounting model are carried at cost. Under GAAP, preferred stocks that are basically fixed-maturity securities (again, the concepts of *FAS 115* come into play) are either classified as held to maturity or available for sale, or are part of a trading portfolio, along with the attendant rules. For the life insurance industry, common stocks are carried at market value.

Subsidiaries are carried at underlying book value, in the statutory equity method, whereas for GAAP they're consolidated. That can result in some significant differences for companies. Dividends are reported on the accrual basis. That's the same for statutory and GAAP. Dividends from subsidiaries for statutory accounting are treated as investment income, whereas for GAAP they are return of capital under the consolidation concepts.

Here's where the big difference comes in. Undistributed subsidiaries' earnings are treated as unrealized gains or losses, with some exceptions, and this is the exception I want to discuss. Current statutory accounting provides that a life insurance company can pick up its equity in insurance subsidiaries within investment income. If a subsidiary distributed all its earned income in the form of dividends, that would be treated as investment income under statutory accounting. For GAAP, because the results are consolidated, earnings of the subsidiaries, partially investment income, partially underwriting gain or loss, and perhaps other types of revenue and expense are not all investment income. Under statutory accounting, theoretically underwriting gains at a subsidiary level could be treated as investment income at a parent company level.

In real estate there are many different accounting concepts, especially under GAAP. That's where statutory basically is today; statutory and GAAP are about the same. Many nuances deal with gain and sale recognition rather than investment income recognition of rental income and rental expense. The difference, though, is in impairment. In GAAP, the impairments are recognized through a write-down and the establishment of a new cost basis. In statutory accounting, there are three options for write-downs. You can write the investment down, thus establishing a new cost basis. You can nonadmit the impaired value. You can establish a reserve. Those are the three options. The codification process would make statutory consistent with GAAP.

Statutory also has a concept of self-occupancy rent. I don't know how many of you are familiar with that, but basically if a company owns a building and uses it for its own operations, it needs to recognize investment income for the equivalent of a hypothetical rental income, as well as a rental expense that offsets that. It's really a grossing-up in the income statement. One goes through investment income; the other goes through expense.

With policy loans there are no significant differences in income recognition. It's really the accrual basis of accounting for interest income. There are no significant impairment issues because policy loans are generally secured by the cash value of the underlying policies.

For convertible bonds there is consistency between statutory and GAAP. The gain or loss on conversion is measured by the fair value of either the bond given up or the new security that you have, whichever is the most reliable. The basis of the new security is the fair value.

I understand that there is a session on derivatives at this meeting. There's absolutely no way that I can describe all the different variances and nuances on how a

company might use derivatives or the different accounting methods. Derivatives can be very complex. I think the thing to walk away with in understanding the effects of derivatives is that they have to be analyzed individually to make sure that you're applying the most appropriate accounting policy or evaluating that accounting policy's impact on the earnings.

Unfortunately, as I have said, for GAAP there's very little in the way of authoritative literature. Even today, after the big "D word" has been around for a long time, there is still not a good GAAP compendium of accounting guidance for derivatives. Probably the current guidance within statutory insurance accounting is the most comprehensive there is, and it's specific. It gives direction.

Basically, if a derivative is used as a hedge, you account for that derivative in the same manner that you would account for the item being hedged. If it's hedging an asset that's accounted for by using amortized cost, you would use amortized cost for that derivative. For many derivatives, the cost is zero so there's no reflection on the balance sheet for that derivative. However, the gain or loss on a subsequent disposition of that derivative would then be added or subtracted from the hedged item.

Statutory accounting provides that you can select from alternative accounting models. You can either account for derivatives as hedges or you can account for them at fair value mark-to-market accounting. It basically gives the company the option to pick and choose unless it is truly a hedge of an item that is an asset subject to the IMR. Then that hedge, that derivative, needs to be afforded hedge accounting treatment, and any gains or losses are subject to the IMR rules and calculations.

Generally, for derivatives that are not hedges and for those that are not matched, the amortization of premium and discount and the periodic cash flows are treated as investment income. They're accounted for generally at fair value, and the amortization and the accounting for the cash flows are consistent with the hedged item if they are hedged.

Let me give you an example of how two derivatives—the same derivative but used in a different fashion—can get you different answers. If you use an interest rate swap and you specify it as a hedge for a bond receivable, and that bond receivable is carried at amortized cost, then you would follow amortized cost. Cash flows associated with that would be treated as investment income, and gain or loss would be an adjustment to the basis.

But if that same interest rate swap is associated with a debt instrument, meaning a liability (a borrowing on the insurance company's books to somehow change it

from variable to fixed or fixed to variable), then the cash flows under that scenario would be treated as an adjustment of interest expense, not of interest income. So, you can have two instances that theoretically provide the same types of cash flows but have different accounting based upon the type of asset or liability that's being hedged.

I assume that most of you are aware of what the AVR and IMR are, but for those of you who do not, I'll try to give a brief overview. The AVR is funded by a prescribed annual provision that reserves through a formula calculation a provision for default in equity risks within a company's investment portfolio. It provides for a smoothing of the effects of gains or losses on a company's surplus.

Unrealized gains or losses and realized gains or losses are treated as adjustments to reserves except for interest-related gains or losses. Those are handled in the operation and in the mechanics of the IMR and not here, because that would result in a double counting.

Certain high-quality investments are excluded from the calculation because there's not much concern about gains or losses. These are governmental-type securities. The AVR has certain maximums by asset category. The important thing here, when we talk about earned rates, is that the AVR does not impact earnings. It is strictly a reserve that is charged or credited directly to surplus.

GAAP does not have an AVR. Again, this is a statutory, formula-driven reserve. GAAP would require separate analyses and assessments to determine whether an impairment and direct write-down would be required.

For the IMR, I'd like to give you my way of looking at what that really is. You have a bond with a stated interest rate. Let's say interest rates decline and the value of that bond rises. If you sell that bond and recognize that gain, you will have to reinvest those proceeds in something that yields less than the stated rate on the bond that you had before. In other words, you will forgo some future investment income because of that sale.

The IMR sets that gain aside and amortizes it into income over the remaining period had you held that bond to maturity. Therefore, it keeps that income stream the same as it was, or would have been, had you not sold the bond.

One of the differences, though, in statutory accounting is in the amortization of that reserve. In this case, where we had a gain, let's assume that the bond you sold had five years of remaining life. You will amortize that gain over the next five years, but the amortization of that gain does not go into investment income. It goes into a

separate line item called IMR amortization, and it's not part of Exhibit 2 investment income.

You can have a negative IMR balance. That IMR balance, though, is not treated as an admitted asset. If it ends up being a debit balance, it is nonadmitted. That is the concept of conservatism in statutory accounting at work.

GAAP specifically prohibits deferral of capital gains and losses. This is where GAAP and statutory may be 180 degrees apart. In GAAP you are not able to establish an IMR. You have to recognize all gains and losses currently.

I happen to think, though, (this is my own opinion, not KPMG's) that the IMR would be a good concept for GAAP. But that's not the rule, and I have to follow the rules.

Investment expenses is an area where there's probably the greatest subjectivity and variability because each company is unique. Most of the investment expenses are company-driven and based upon unique facts and circumstances. Therefore, it's hard to come up with a standard number of basis points for investment expenses. You have to understand your company and the process that goes into place in the allocation of expenses to investment income.

Generally, salaries are a key driver. Companies will allocate salaries based upon studies of where time is spent. Overhead and salary or payroll-related expenses are triggered off those same analyses, so the process that goes into that is key in whether there is a true reflection of salary cost. All those that are keyed off that are working their way into the investment expense line.

Certain expenses, though, have to be analyzed separately to make sure they are being properly allocated. Legal is a good example. There can be many legal expenses. Many of those relate to claims. But if you have problem investments, you may be spending a lot of money on attorneys trying to help you deal with creditor committees. Significant discretion is permitted.

This is not an area that gets much focus in regulatory examinations or external audits. We look at the expenses in total rather than from an audit perspective. I've never seen an insurance department examination that has made that a big point either. One of the factors influencing the cost is that some companies work somewhat harder at trying to allocate these costs to give it the most meaningful representation, whereas for others, it's less intensive.

There are other factors influencing investment cost. You can have a portfolio of vanilla bonds that don't require much accounting or systems expertise. Some sophisticated CMOs, however, require not only complex systems to handle the

amortization, but also more technically competent personnel to handle the amortization from an accounting finance standpoint.

Trading volume and transaction costs influence the investment expenses, as well as internal-versus-external investment management. You can probably do a much better job of identifying what your investment management expenses are if you write a check to an investment management company rather than handle them internally.

The expenses associated with a handful of problem investments can far exceed the other expenses that get allocated to the investment expense line.

History may not be the best predictor of future investment income or investment yields. It takes understanding of the variables that are out there, your own company's investment portfolio, the way investment expenses are calculated, and the continuous interaction among the investment function, the finance function, and the actuarial function. If you understand all the factors that go into that, you will have the best chance for the most meaningful analysis.

Mr. Herget: Tom has done an excellent job in presenting an overview of the differences between statutory and GAAP. These are the things you need to think about and know if you're going to start doing or continue doing internal analyses. Just what is happening with my investments? How are they being reported? How do the changes flow through income this past month? This past quarter?

Our next speaker is Larry Zeno. Larry is a portfolio manager with Asset Allocation in Chicago. He has been managing CMOs and asset-backed securities for the past five years. Larry attends monthly meetings with clients where they address investment performance, product characteristics, and new products. Larry works with about 20 clients and manages about \$3.5 billion for life and property and casualty companies.

Mr. Lawrence R. Zeno: I will discuss a few items that may be causing your yield to be somewhat higher or lower; in most cases, unfortunately, they have been lower. I want to go through some reasons why that may be and some things you might want to eliminate in the future.

I'm going to discuss investment expenses and some of the things for which you may or may not account. An example is an adjustment to earned yield for credit problems. You may be taking off three or four basis points based upon historical defaults for credit-sensitive securities. I recently had an experience with an inherited bond from the Life Office Management Association's Mortgage

Corporation. It recently went into default, and a million dollar investment was worth anywhere from zero to a couple hundred thousand dollars. That may override any adjustments you've made in your default assumptions. That's just one of the items that you really want to look at, especially if you have a particularly credit-sensitive portfolio.

I will talk about four things. The first is reinvestment risk. I will compare and contrast two different bonds. The second is how prepayment variability can affect the actual yield you'll be earning on a CMO or on any mortgage-backed security. The third will look at the bond with options (call and/or put) and how those affect yield. The last is a cost-of-carry analysis.

First I will compare two bonds. The first is a standard, semi-annual pay Treasury bond. You have two reinvestment decisions to make every year. I have varied the reinvestment rate from 7.5% all the way down to 0%. This bond was purchased at a yield of about 6.5%. The actual yield earned over the course of one year varies very little with the reinvestment rate. It will earn a 6.49% and a 6.47% return, varying the reinvestment rate from 7.5% to 0.0%. So, in this type of security, as with most corporate bonds, you have very little reinvestment risk.

The second bond is a CMO, which currently will only pay interest over the next year. The assumption in yield to maturity is that all your income is reinvested at that rate.

If you lower the reinvestment rate to 5.5%, this is about what you'd be earning on money market rates if you left it in your custody account. It would drop the yield down to about 7.45%. That is a fairly significant adjustment to the actual yield earned.

If you had an increase in insurance or annuity payouts and had to pull out all the interest you were earning, so you were earning nothing on it, your yield would drop all the way down to 7.3%. This is a significant, 20-basis-point drop in yield. With target spreads of 20 basis points, this is quite obviously a bit to give up.

You have to look at how much reinvestment risk you have in your investment portfolio. If this were a pass-through where you were receiving not only interest but principal, the lower reinvestment rates would have a harsher effect. That's one of the things to keep in mind when looking at the yield. This may be one of the reasons, especially in a declining rate environment, that you may not be getting all the yield that you thought you would get.

The second item I want to cover is a CMO that was issued in April 1993. I kept the dollar price constant just to make a point. There are four different PSA speeds. The first one is 180 PSA. That was the PSA at issue. That's where it was priced. You would have bought the CMO at issue using an assumption of 180 PSA, to yield 7.60%.

At the end of 1993 the assumed consensus prepayment rates (these are averages of all the dealer estimates) come from practically every dealer who has a prepayment model. This predicts what, over the long term, these tranches will pay at. This CMO is backed by Government National Mortgage Association (GNMA) 8%s, so these are GNMA-backed mortgages of about 8.5% mortgages on their homes. Ginny takes 50 basis points in a servicing fee so you can see how that affects the yield. It goes all the way from 7.6% to 8.2% when prepayments rise.

Obviously, you would have been amortizing the security up so it wouldn't be as dramatic, but I wanted to do it to make the point. Also, your average life shortens up from 6.5 to just over 4.25 years. It shortens up from June 2002 to June 2005, all the way to October 2000 to November 2002, so you've pushed all your principal payments into a couple years.

In 1994, rates rose about 250 basis points, and, with that prepayment, estimates came down. At the end of 1994 the consensus prepayment on this CMO was down to 125 PSA, obviously much lower than the end of 1993 and even slower than when issued in mid-1993.

We now have a bond longer than what we purchased. Our average life extends out to about eight years and the yield drops to 7.28%. You've written it up to an 8.20% from a 7.60%. Now you've had to rewrite it all the way back down to a 7.28%, and your principal has extended from May 2004 out to February 2008. To show you where we are, at the end of 1996 the prepayment estimate on this CMO was 175. After rewriting it up, then rewriting it back down, we're basically back where we started from.

The point I want to make is, depending on the type of CMOs you have in the portfolio, this may or may not make a big difference. I want to compare that one with a CMO issued at the same time, in March 1993. I would say the other CMO exhibits fairly market-like types of cash-flow volatility. It is, on average, what you would expect for a typical CMO. There are more volatile and less volatile CMOs.

Consider a much less volatile CMO. This is for two reasons: First, the CMO is backed by Fannie Mae 7%s. These mortgages are 100 basis points lower. Obviously, the incentive for prepaying or the incentive for refinancing on this is

much lower. The other factor that makes this a more stable bond is the PSA band or collar. That is a PSA area where the cash flow does not vary whatsoever.

So, anytime that this bond has paid in between these speeds it will have no effect (I'm using the same time horizons on all these). The yield has not changed based on consensus PSAs at those times. Our yield has not changed. Our average life has not changed. Our principal window has not changed either.

You could have written this up or written it down, and the yield would not have changed at all. With just a couple exceptions, they have prepaid within those bands.

Changing prepayment rates will have an effect on the average life and the duration. Obviously, the yield on the portfolio depends on what type of mortgage portfolio you own. That is another factor that goes into determining what you're actually going to be earning on a portfolio. The first CMO I talked to you about (with a little more cash-flow volatility) obviously trades at a higher yield in the marketplace, but you also pay for that in the form of convexity.

The third item I want to get into is comparing two bonds. One is a callable bond issued by the Federal Home Loan Bank. This structure has a 10-year maturity with a 5-year call provision. Five years after issuance they can call this at any time. One thing to keep note of is that Fannie and Federal Home Loan Bank, or Freddie Mac, are the most efficient issuers of securities out there. There's a reason they issue callable debt. If you look at the debt that they issue, especially during the past couple years, you find an increasing percentage of that being callable debt. If it makes financial sense by one basis point to call it, they will call the security.

They have the lowest option-adjusted spreads in the marketplace because they are more efficient than the corporate marketplace. A certain corporation may or may not have the financial wherewithal to call a bond when it is callable, so there you don't get penalized as heavily in the callable market.

The second bond is a Norfolk Southern. Both have just been issued in the past few months. This bond has a 40-year final maturity with an optional 10-year put. In 10 years you have a onetime put option. We can put this back to the issuer at par.

I want to go over the values of one versus the other. Right now you can buy the Freddie Mac to yield 7.15%. It's trading at a premium dollar price over par because the call price is at par, to 7.15%, to its June 2002 call date. Keep in mind this was issued at par at a 55-basis-point spread to the 10-year Treasury. You probably would have bought a 10-year Treasury at about a 6.95% yield.

This also came at par to the 10-year-Treasury, or you could buy this one at 6.80% to its May 2007 call date. Looking at the yield numbers, obviously you'd buy the Home Loan Bank note, but I want to look into it a little further. The Norfolk Southern Bond came at about a spread of about 40 basis points off the 10-year, so you'd have bought this at about 6.80%, 15 basis points lower than the callable Freddie Mac, at the time of issuance. I'm going to ignore credit considerations for a moment because this is a BBB-rated bond. On top is the puttable bond, the Norfolk Southern, and on the bottom is the Federal Home Loan Bank. This gets at the value, or the lack thereof, in each of the bonds. It looks at it on an option-adjusted spread (OAS) basis. It takes the value of the call or the put option in basis points, of a callable bond, and subtracts that from the nominal yield. You bought this to yield 6.95%. It is now worth something less than that on an OAS basis.

A put bond has an option that you own, so your OAS would be something higher. You bought this to yield 6.80%, but if you actually value that put option, it's something higher than that. This really gets to the heart of why one bond is more valuable than the other.

Let me start with the callable bond first. The OAS on this security is about 30 basis points. This issue came at 55 basis points off the 10-year Treasury, which means the call option is worth about 25 basis points. In effect, over a wide range of interest rates, you only would be earning 30 basis points over Treasuries instead of the original 55 basis points. But with the Norfolk Southern, you have an option-adjusted spread of almost 90 basis points, which means you bought this security at 40 basis points. That call option is actually worth 50 basis points, so that is a very good way to value corporate callable and/or puttable bonds.

Also, when you look at the book yield number on a Schedule D, you see one that's 6.80% versus 6.95%. But you're not going to be earning that. It's either something less or something more than that, depending on the call or put features we have in the bond.

One of the items that goes into the option valuation is volatility in the marketplace. There's been considerable corporate issuance in the puttable marketplace. We thought this sector has been extraordinarily cheap. You could not go out in the marketplace and buy, in this case, a 40-year bond with a 10-year put option at a cost of 40 basis points. If you were to buy a straight bond and a put on the 10-year Treasury, you would probably be paying something through Treasuries to get that trade done. We have found this just adds a lot of convexity for cheap. But you do get hesitant investors who say that they can buy this callable bond at 7% versus a puttable bond at 6.50%. This is a big reason why this marketplace has been so cheap. The insurance industry is a very spread-driven industry. It's been a hurdle

to get over, but now you've seen the value of these put options being realized in the marketplace, and they're getting issued at lower and lower spreads. We still think they're very attractive in the marketplace, though, and I want to emphasize that by looking at some total return numbers.

Consider a total return analysis using a six-month horizon. This one is the Federal Home Loan, the callable bond, and the other is the puttable bond, the Norfolk Southern. I've shifted interest rates down 150 and up 150 basis points. I've used a constant OAS so that basically it values the option wherever interest rates move.

It varies the value of that option to keep a constant OAS, and it also keeps volatility the same. If rates were to rise 150 basis points, we'd experience a negative 9% return over the course of six months. On the Norfolk Southern we'd be down 10%. The callable bond would outperform the puttable bond in a rising rate scenario slightly, but where the value really comes in is if rates were to fall. If rates fell 150 basis points, total return would be 21.7% on the callable bond. This compares with almost 39% in the puttable bond. The puttable bond performs far better under falling rates than when it underperforms in rising rates. The callable bond gets you the worst of both worlds. This one would give you the upside of a 5-year bond but the downside of a 10-year bond. That's a good rule-of-thumb definition for negative convexity, more downside than upside, and that's your experience on a callable bond.

With the puttable bond you have the upside of a 40-year bond and the downside of a 10-year bond. On the total return the callable bond's performance flattens out and the puttable bond becomes steeper. Because rates fall, duration increases. But on the callable bond, when rates fall duration decreases. Obviously, the duration is the percentage of price change over interest rates rising or falling. I just want to emphasize here that the callable bond market is probably not as attractive as it seems. One of the biggest problems that we have when dealing with some of our clients is of getting them over the yield-at-all-cost mentality. Structure in the long run, we found, has paid off nicely. We found that in the puttable bond market.

To give you an example, I called a client a number of weeks ago, Associates Corporation, a AA-rated subsidiary of Ford. It had a 40-year maturity and, put in 2 years, and it came at 27 basis points through the 2-year Treasury at about 5%. My client asked why they should buy a bond through Treasuries. They didn't understand that, so we ended up not buying the bond because they were adamant. I called him back the other week and mentioned to him that the bond was inexpensive at that time. It is now trading 45 basis points through the 2-year Treasuries. Basically it has appreciated almost 20 basis points since it came out,

and that is with rates fairly the same. That put option has been undervalued in the new issue marketplace.

Puttable bonds are an extraordinarily inexpensive way to add convexity to a portfolio. If you have a lot of negative convexity either in the form of callable corporate bonds or mortgage-backed bonds, it is a great way to hedge that negative convexity. If any of you are subject to Standard and Poor's (S&P) ratings, you now get charged for that negative convexity. We have found that even a small percentage of puttables in the portfolio can have a substantial effect. About 5% in puttables can offset most that negative convexity in the portfolio.

Table 1 shows why you may not be earning your spread. I have just gone through this problem with some companies. This probably affects smaller companies more than larger companies. This is based on a problem because of the levels of premium written.

You go into a product assuming 100 basis points, which is obviously low. I want to examine how having the money not invested for the full time affects your rate over the first year. Basically, you begin crediting the policy 6% in January for all of 1997. That premium may sit in a checking account for a few weeks where it accumulates with other premiums until it becomes large enough to transfer into the custodial account. Let's say it sits there for two weeks. You've earned zero for two weeks. You now transfer it to your custodian account where it begins at the money market rate, which is about 5.5%.

TABLE 1
COST OF CARRY
TARGET SPREAD ASSUMED TO BE 100 BASIS POINTS

	Date	Crediting Rate	Earned Rate
Policy Issued & Crediting Begins	01/01/97	6.00%	0%
Funds from Policy Received at Custodian	01/15/97	6.00	5.50
Investment Settles and Begins Earning Interest	01/31/97	6.00	7.0
Annual Total	12/31/97	6.00	6.65
Target Spread Shortfall			-35

Then, at the end of a month you finally get this invested. The bond has settled and now it begins earning interest at 7%, your initial target spread. Everybody's fine and

happy. But, really, you have lost so much yield in the interim that you're now on an annualized basis of only earning 6.65%. You've lost 35 basis points of yield over the course of that year. This is a semiannual number. If you were to annualize this number, it would probably be closer to 6.77%. You lost perhaps only 23 basis points. This is a big consideration. It's really difficult to get at unless you incorporate that into the pricing of your product.

On the investment side you have limited options, especially with smaller premium volume. Obviously, your ideal choice is to go out and buy your security at the time crediting begins for it to settle when the money arrives at the bank. That way you'd be perfectly hedged against this. The alternative is, when the money is received at the custodian, if there are no acceptable, long-term investments, you invest that in Treasuries until a long-term investment vehicle is ready. You would cut it probably down about 100 basis points or so, but this is not perfect. This is one of the reasons in that first year you may not be earning some of that yield that you had anticipated.

Mr. Herget: Our next speaker is Paul Hekman, an FSA and a member of the AAA. Paul is a vice president at PolySystems and has experience in product development, mergers and acquisitions, state policy filing, financial reporting, reinsurance administration, and cash-flow testing.

Paul has been a frequent speaker at continuing education meetings, seminars, and workshops of the SOA and the Chicago Actuarial Association, in addition to firm-sponsored meetings, workshops, and seminars. Paul is also the chairperson of the SOA's Committee on Finance Research.

He has the distinction of pioneering most of the industry techniques currently used for cash-flow testing. He also was one of the first to develop the target premium concept of agent compensation for flexible premium universal life insurance contracts. He has also been the project manager in *FAS 97* and *FAS 120* system installations. Paul's prior experience includes vice presidential and chief actuarial positions at The Capitol Life and at Integrated Resources Life. Paul will speak on how to manage for spreads, given the dynamics of the reported earned rate.

Mr. Paul A. Hekman: I want to cover several different methods of calculating an earned interest rate as quickly as possible. Why even bother to do the calculation in the first place? One of the reasons we can dispense with this quickly is general bragging. I once worked for an organization called Integrated Resources Life. One of the things that I remember from working with them is an obsessive attention to earned rates, so much so that when the people there discovered that another company not too far away from their location was picking up a higher rate than they

were, they actually tried to put together a coinsurance deal where the other company would do the investments and sell our products. So, there was this continual pressure to try to pick up an additional earned rate. When you're talking about bragging, however, any method will do. We can dispense with that one.

With product pricing, obviously, the product actuary will have to visit with the investment people from time to time. If you've been in product development, I'm sure that you've done this. You have had these kinds of meetings, and you want to know what to expect in terms of an earned rate. Finally there's the process of managing the credited rate as well; this is a subset of the pricing process where you're continuing to price a product year by year. The basic process is very simple. You calculate the earned rate. You subtract your spread. Voila! You have the credited rate. The key then is coming up with a good earned rate so that the spread drops through to the bottom line.

I guess I can add one more thought here. For those of you who are doing *FAS 97* and *FAS 120* reporting, you must have an earned rate as an input. So, there's an additional reason to do the calculation.

An intuitively simple method of doing this is to compute a yield to maturity weighted by the statement value. This has the advantage of simplicity because you can frequently get from your investment department a spreadsheet containing the portfolio. The yield rates and the book values or statement values are often included, so it's a relatively simple calculation. However, as we'll see here, this is not something that can be done uncritically because you have to make many adjustments. I think many of these will be fairly straightforward to you. Another part of the problem here is that the yield to maturity, as Larry Zeno and Tom Kochis mentioned, doesn't always drop directly to the bottom line. We'll talk about some of the reasons here.

As already mentioned, this method ignores the issue of credit quality. You can always expand your yield rate, of course, by going out on the risk rate curve. My personal exposure to this came shortly after I received my FSA. I was working for what I now call Troubled Company #2. One particular preferred stock was contributing nicely to our bottom line. I don't even remember the rate. It was somewhere in the teens. This happened in the early 1980s. But while driving to work one morning and listening to the car radio I discovered that a \$37.5 million book value that we had on that particular preferred stock had dropped to zero overnight. These things get your attention. I don't remember the rate, but I do remember to the dollar the amount of money we lost on the default.

Many companies deal with this by setting up some sort of an informal, internal AVR. They actually subtract a percentage from the stated yield rate and come up with an adjusted yield rate. Then they build up a reserve to cover some of these. You can do this in statutory, or you can actually use the one that's there. GAAP, of course, prevents you from doing this, so you may have to allow some extra earnings to float through to the bottom line and then pay for it later when the asset default occurs. There isn't much you can do about that in GAAP. It's one of the areas where I think statutory accounting is superior to GAAP. There are not many, but that's one of them.

The other inherent assumption, of course, in the yield rate is that you can continue to earn at the same rate. Depending on which way interest rates are going, this may or may not be true. In today's climate, if you're sitting on a portfolio of assets that you bought a number of years ago, your reinvestment is probably occurring at a lower rates than actual yield rates on many of those assets. As they mature, of course, your average earned rate gradually declines. There's really only one good way to adjust for this, which is to have a fairly accurate knowledge of the kinds of prepayments and maturities that are going on. Suddenly this apparently simple process of taking a snapshot of your yield rate becomes more complex because we're moving from static simplicity to dynamic complexity.

A related item is that the yield rate calculation ignores cash-flow volatility. As has already been discussed here, in 1993 many prepayments occurred, and that had two impacts on the bottom line. One is that a lot of those CMOs and mortgages that were prepaying at that time were purchased at a discount. These prepayments accelerated the amortization of those discounts, so this really jazzed up the bottom line even though the real underlying yield hadn't changed. It also accelerated the rate at which the reinvestment had to be made, with all these companies having all this cash coming in. I manage a small trust for my mother, and she had a CMO in the portfolio that paid down in that year. I ended up having to reinvest at almost 150 basis points lower than the CMO I'd originally had. This is always a nasty surprise. This is a subset of a larger issue because the yield rate, as Larry has pointed out, ignores the value of embedded options, such as calls or puts, that belong to the issuer.

If you're doing statutory accounting, the IMR is contributing to your bottom line. If you're only doing a straight yield rate calculation, of course, the IMR is not being considered. Overall, my experience has been that the weighted yield method tends to produce the most optimistic measure of the amount of earned interest that you're getting for all the reasons that have been stated, particularly if you ignore the IMR when doing a calculation.

I want to make a brief comment about pricing software. Pricing software has certain algorithms that make assumptions about how earned interest and credited interest is applied. I think it is important to be consistent in the way that you analyze earned versus credited in the actual company environment. Larry probably gave the best example I've seen of this because your pricing program may assume that all money is invested from day one, but I've discovered in practice that isn't always the case. Some of the money may come in late, and your company may have a practice of retaining money in short-term funds for some time before making a final investment. You'd be surprised sometimes what impact that can have on your ultimate earnings on the product.

Tom Kochis talked extensively about reinvestment expense or investment expenses. It's important that they be included. If they're in your generalized expenses, that's fine, but they have to be reflected in the calculation. Then there's the problem of short-term investments. I've seen corporate wars waged on this topic. Some people think that short-term investments belong to the line of business where they're occurring. Others think that this is a corporate philosophy and belongs in the company corporate account. It is something that has to be resolved.

Another method that I want to suggest is a backward look. You look at the prior year or the last several years and compute the ratio of recent investment income to the average statement value. Many of the same faults are present. Credit quality, of course, emerges slowly over a long period of time, but this is somewhat self-correcting. One thing that this does resolve is the reinvestment process. The reinvestment results are actually embedded in this. The embedded options often emerge as well.

IMR adjustments are also readily available to you. Reinvestment, already discussed, is included there. Capital gains and losses historically can come through your surplus accounts, so you can pick up those as well, buffered by the AVR. One thing that is difficult to apply in this method is cash-flow volatility. Again, 1993 is the best example. You wouldn't want to use 1993 as the model for 1994, because there were many prepayment events there. This is part of a larger problem—what to do about the discontinuities that occur from year to year? On the one hand one is tempted just to eliminate them, but there are always discontinuities that occur in any given year. The problem is that they frequently go in opposite directions from year to year, and it's hard to predict what will happen at any given point in time. But you have to take the discontinuities into account. I think that this is still a worthwhile exercise, particularly if you're relatively new to the financial reporting process. You can learn a lot by looking at your line-by-line financial reports and at how the investment income flows to the bottom line.

I remember at one point in my career I was asked to look at a block of business that had been consistently losing money. I noticed that the investment income seemed low. On further investigation into the methods being used by the corporate actuarial to allocate investment income, I discovered that because this was a relatively new line of business, they had used the accumulated asset approach. Basically what was coming into the line of business to start with were negative assets. This was being exacerbated by the fact that because it was a new line of business any expense that was not clearly allocated to some other line got thrown in there as well. The result was very predictable! I think this was probably the result of some corporate infighting, but it effectively served to make the line look extremely bad.

In summary, using this method is somewhat like driving your car while looking in your rearview mirror. It can be done but only if the road doesn't curve too much. As the road curves, just visualize trying to drive your car with the windshield covered and looking only in your rearview mirror. That gives you a picture of what this method is like.

I want to suggest one other method that I believe is worth looking at, and that is taking a ratio of expected investment income to average statement value. This is the most labor-intensive method and involves building a model of your asset portfolio and your liabilities as well. I think you can see where I'm going here—it provides a nice synergy with your cash-flow-testing process. I've talked to many actuaries who do cash-flow testing to meet regulatory requirements, and that's as far as it goes. I think that's a shame because it's a lot of work, and there's a lot of other value to be had out of the cash-flow-testing process. I think if we build an asset model with considerable care, we can use this synergistically to come up with a better approach to the earned rate. For one thing, it lends itself to scenario analysis, which I think is a plus here. If you have derivatives, calls, and puts in your portfolio, there's no way in the world that a static analysis will analyze their impact. The scenario analysis will allow you to measure the impact. If you have a market in which cash flows are volatile, this is another area that can be measured and quantified. As actuaries, we're always into quantification. Default risks can be explicitly modeled. As a concluding statement, I would avoid shortcuts. They always take too much time in the long run.