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**MEASURING INTEREST MARGINS --  
PART 2 -- MEASURING INVESTMENT RESULTS**

Moderator: ROGER W. SMITH  
Panelists: THOMAS M. GLEESON  
THOMAS M. KYLE\*  
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Recorder: ROGER W. SMITH

- o What information on current segment performance is available to the actuary?
  - Investment income?
  - Investment expenses?
  - Default costs?
  - Market values of assets?
- o Fixed income assets?
- o Equity holdings?
- o What information on future segment performance is available to the actuary, and what is the source?
  - Maturity structure?
  - Asset quality evaluations?
  - Anticipated yields on future acquisitions?
- o Committed?
- o Not yet committed?
- o How timely is the information provided?
- o How finely are data subdivided to be attributed to different blocks of business supported by a segment?

MR. ROGER W. SMITH: The printed program promises you Tom Herget as a moderator. For those of you who don't recognize Tom Herget and who can't distinguish between Roger Smith and Tom Herget, I'd like to borrow some money if I could after this session. My name is Roger Smith. I work with Tom Herget at PolySystems in Chicago, and I am a guest moderator, which is really an easy job to do since Tom has done such a fine job at preparing an excellent panel. This is the second part of a three-part interest rate margin trilogy. We will have the concluding part to finish the series.

We will talk about measuring interest margins and measuring investment results. We have compiled a panel of two guest speakers who work actively in the investment arena and a company actuary who spends a great deal of time working with setting interest rates. Our first speaker, Peter Mavrogenes, is with an investment management firm,

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\*\* Mr. Mavrogenes, not a member of the sponsoring organizations, is Senior Portfolio Manager of Asset Allocation & Management Company in Chicago, Illinois.

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Asset Allocation & Management in Chicago. Peter advises insurance company clients and actually performs investment functions for them. Peter will be going over and reviewing the sources of data available to the investment process. Peter is from the University of Chicago. Our second speaker, Tom Kyle, is with First Boston Asset Management. Tom has been with them since October 1989. Prior to joining First Boston, Tom spent six years with Integrated Resources and sometime prior to that with New England Mutual. And Tom, I understand, is a Harvard man. Our third speaker, Tom Gleeson, is an actuary with the Washington National Insurance Company. He works in the annuity area in setting interest rates and managing the information needed to set the interest rates.

**MR. PETER S. MAVROGENES:** I've got the easy part of the panel, talking about sources of data, what we use in our arena, and our daily functioning as a money management firm. As Roger mentioned, we're a firm that's been in business for eight years. We advise approximately 75 companies around the country. I've had 10 years of experience in handling money management for insurance clients in all lines of business.

The challenges are many, but here I have the topic of talking about where we find information and how we use that information. We are, as Roger mentioned, affiliated with PolySystems and have been so for the past year.

I'm going to touch on three general areas. First is a broad background on markets: how they operate, how they function, why equity markets are different from fixed income markets. Second, I will look at the type of data that's available from a pricing perspective, as well data available from a characteristic perspective and how to differentiate between those two concepts.

Last, I thought I'd broadly describe how an investment manager such as Asset Allocation views the decision-making process that is implicit in everything we do on a daily basis: what we buy, what we sell, why we swap, and how we can use these data for our clients.

Let's start with the equity markets. They are obviously a very well-published and publicized marketplace. There are quotes and data available from many sources on a real time continuous basis; Telerate, Quotron, and Bloomberg are three computer sources that provide us with data on equity trades. At any minute any money manager can punch up any stock to look at and find the bid/ask spread as set by the specialists on the floor of the exchange. These specialists provide the liquidity for the marketplace, generally speaking. It used to be absolutely the case, but over the last 10 years, there have been second- and third-tier marketplaces that have evolved that basically handle on a negotiated basis transactions between two parties, particularly, when large blocks of stock are traded.

A specialist might make a market 5,000 shares bid and 10,000 shares offered. If you're a substantial holder of XYZ company's counter stock and you're trying to sell five million shares, the exchange system breaks down. But everything ultimately is printed on the exchange and so you know where the markets are on a given day. At a given point in time, you can retrieve those data very easily from any number of sources. I want to

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leave you with the understanding that the equity markets are very well defined, they're very well published, and they're easily accessible.

And I've started that just to contrast that with fixed income markets. Tom Kyle will mention the explosion of products in the fixed income market over the past decade or so. In the fixed income market, there really is no exchange. There are Futures exchanges, primarily in Chicago, but they branch out across the country. These Futures exchanges provide a very good benchmark and a reference point for where the bond market or the treasury bond market is. In the fixed income markets we look at, as a benchmark and a guideline, the treasury yield curve. Now, the treasury yield curve is a very well-published source of data. You find it on Telerate, where live treasury markets are made. Telerate provides the gauge for which everything in the taxable, particularly, fixed income markets is compared to and it's judged against. A major difference of the fixed income markets from the equity markets is that the street dealers provide liquidity. There are no such things as specialists, technically speaking.

Firms such as First Boston had a whole host of fixed income traders take firm capital and put that at risk on a daily basis; they make markets. That market might not be very similar, depending on the marketplace we're talking about. In the treasury market with the published market all the markets will be very similar to each other, but not as you get further and further removed from the treasury market as in the case of the junk bond market, for instance.

Markets can vary dramatically from dealer to dealer. So in contrast to the equity markets, there are a broad diversity and a wide array of markets that are made on a continual basis by a trader where trades are negotiated between buyers and sellers.

So there's no centralization in the fixed income markets. This illustrates part of the problem for data gathering that given a lack of centralization, it's very difficult to state with any certainty or high degree of certainty as in the equity markets what the market is for anything but treasury bonds at a given point in time. As I mentioned, the treasury market provides our basis for trading everything.

I should explain some terminology. I'll be speaking later about how bonds are quoted between dealers and market makers on either side of the market. And in the mortgage backed market or in the corporate bond market, things are quoted on a spread basis to the treasury yield curve. This is how we use the treasury yield curve. A corporate bond might be offered at 75 basis points off, we say, the 10-year treasury bond. That means that the bond at that point will be priced to yield 75 basis points or .75% more than the 10-year treasury as it's trading at that moment. So that's really how markets are made in terms of bid and offer. A trader might offer a bond at 75 off and I might bid back 80 off; we negotiate some place in between.

Treasury bonds can be found. Data are very accessible on a daily basis. You can look in the newspaper and find out where the markets closed the day before. On a real time basis one can look at Telerate and/or Bloomberg as major sources of data. Telerate provides a lot of information. In real time markets Bloomberg can give us historical data as to where the treasury markets have been. If I wanted to look at the 10-year

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treasury bond, the generic treasury bond for a five-year period, I could punch it up on Bloomberg. In addition, all the major street dealers compile these data and some of your companies might also as well. Investment departments compile historical treasury data as a benchmark and a gauge for the fixed income markets in general.

That was the easy part. Now we move to corporate bonds which begin to get a little bit more removed. As you get more removed from the treasury market, things get a lot fuzzier and more difficult to discern; data become less reliable and much more difficult to obtain.

Issue characteristics can be found. Things such as any kind of call features, any kind of sinking fund characteristics, maturity ex, maturity dates, payable dates, anything of that nature can be found in a number of sources. Moody's Bond Survey is a very comprehensive but not dynamic source.

We find prospectuses to always be the most basic form of data. If you ever have a question on the actual terms of a particular security, the place to go is the prospectus for the final say. That is where when a company brings a security to marketplace they're required to publish any terms and conditions of the bond so that the bondholder has in his hand at the original issue date a complete set of all the characteristics of a security.

Bloomberg and other computerized services can also provide these data. Additionally, a number of the rating agencies can also publish some or all of the data, Standard and Poor's, Fitches, just to name a few other sources. These are all very important from the perspective of pricing on corporate bonds.

If the corporate bond has to have the 10% coupon or 8% coupon and if both bonds are callable, I should add, those features have a very dramatic effect on pricing.

It's very important to know the characteristics. The 10% bond that is callable in one year will trade to a one-to-one-year call price and on a yield for that basis, whereas, an 8% bond that is callable in the year will trade to maturity, because that bond is at a discount and will not likely be called.

We need to know as investment managers, and your investment departments need to know as well, exactly what all the terms of the bonds are before accurately putting a price on those bonds. Without those data the price can be very erroneous. Pricing information can be gathered from a number of sources. The newspaper is one, albeit poor, gauge but it does exist. Bloomberg and other computerized services can provide pricing information on corporate bonds. That's a particular dealer's, in this case, Merrill Lynch's, markets that they're making for corporate bonds on a minute-by-minute basis.

The exchanges also deal with primarily odd lot corporate bonds. One reason that I alluded to the newspaper being a poor source of price information for corporate bonds is that the exchanges deal with odd lot trades, particularly, and they account for less than 1% of the total volume of corporate trades on an annual basis. So a problem that we always have with a number of our clients is we might trade a block of five million AT&T bonds, long telephone bonds and our client will look in the paper at a price of let's say

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90. Our client will look in the paper the next day and see that a block of bonds traded at 70 and they'll want to know why they paid 90 when the day before the paper said the bonds traded at 70.

Well, that difference can be accounted for by the fact that most likely that bond traded in the paper on the exchange with a block of a very few thousand par and was purchased by a broker from an individual who didn't know where the round lot institutional markets are. It's very difficult also for the large dealers to position small blocks of bonds and provide liquidity in the odd lot market. So the paper really isn't a very good source of data for corporate bonds for that purpose because the data they have is from exchanges; exchanges can be very inaccurate.

Another source, albeit not too dynamic, is the NAIC manual. We found similar sorts of problems with the NAIC manual as exists for the quotes in the paper from the exchanges. Often they're accurate but often they're inaccurate for the same sorts of reason as I discussed for the exchanges.

The best way that we know to price corporate bonds is just to go to dealers and find out where the markets are being made at that particular point in time. To call up First Boston and ask them what's the market on Telephone eight of 2008 and they'll quote you a market on the bonds. If you want to know whichever side of the market, that's what they're there for. We readily have had ourselves as a source of data for our corporate bonds.

There are pricing services I mentioned with Bloomberg. Others might be Merrill Lynch. IBS also has a corporate bond pricing service. I think we have in our inventory 10,000 different instruments of which probably four or five thousand are corporate bonds. So it's a cumbersome process. Any large insurance company would have probably similar problems pricing their corporate bonds. One could do it with a matrix but we found that to be inaccurate. So these are where we find most of our data on corporate bonds.

The next category of assets that I'm going to talk about is mortgage-backed securities, which is an area we're much more active in than corporate bonds. These are securities that are enjoying a surging popularity and liquidity because of the problems associated with some other markets, namely, the junk bond market. However, I would argue that in this market, even more so, characteristics of the security are more important than they are even in the investment grade corporate market because they vary security by security. They're much more diverse and they're much more difficult to adequately capture the status.

For pool characteristics we use Bloomberg as a source of some of the data that we look at. One must focus on such features as the gross weighted average coupon on a pool, the net weighted average coupon of a pool, the weighted maturity of a pool, and any kind of prepayment data.

Bloomberg gives us these data in a very accessible fashion. Freddie Mac and Fannie Mae also publish handbooks, that's of the bond buyer, on their securities. They publish it

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either in hard copy or in computer form that you can use to access the characteristics of any pool of mortgage past or securities that you may own.

I've alluded to some of the data that we use to look at mortgage-backed securities. Obviously, they have a very dramatic effect on pricing. Two identical securities, two identical Freddie Mac pools with an 8% coupon at 20-year weighted average maturity but with different prepayment characteristics, could vary dramatically in price. So there are many items that one wants to capture and be aware of with a view towards pricing mortgage-backed securities. Pricing can be found on Bloomberg and Bond Buyer for the past. We've found the best source to be dealer quotes. If we're ever in the marketplace or we're on a daily basis, looking to do swaps or investing cash flow, before proceeding we always get two or three quotes from dealers just to know exactly where the markets are. I might know that a five-year vanilla collateralized mortgage obligation (CMO) is offered at 105 off the five year but, nevertheless, I'll go to the marketplace to get bids on that type of security just to get a handle on exactly where they're trading on a daily basis. So here again dealer quotes in the fixed income markets provide the most reliable source of good pricing data.

I'm sure many of you are confronted with problems and with the growing problem of CMOs. I don't mean to belittle CMOs or speak badly of CMOs. We buy a lot of CMOs, but they are very complex structures. They are very, very difficult to analyze and very difficult to price constantly. Bloomberg publishes rather all the characteristics of CMOs. Many of the major dealers publish books that very concisely describe the structure of a CMO. We get them from all the street dealers as well as all the agencies. Freddie Mac, Fannie Mae, and Ginnie Mae publish data on the characteristics of the CMOs that they issue directly.

Obviously, all these sources of data are very important from a pricing perspective. Treff and Company is a New York based firm that publishes, on a daily basis, prices for CMOs.

We like CMOs as an investment vehicle. We've struggled with the issue of modeling them, pricing them, and accurately reflecting them in portfolio reports. It's a very difficult problem because every CMO is different. You can't make generalizations about the marketplace. Structure is critical. Things such as collateral, cash flow, structure of the CMO itself, who has the claim to prepayments first, who has the subordinated interest in those prepayments, are there any floaters, are there any residuals, are there any Z bonds. To price any particular CMO tranche you have to know the characteristics of the entire CMO deal as how it was structured on Wall Street. For that reason, the deal characteristics in CMOs particularly are as important as any other market that I know.

Other types of securities that we and many insurance companies are involved with are junk bonds. Many sources are similar for junk bonds as they are for corporate bonds. A few differences would be in the credit area. Fitch, McCarthy, and Crosanity and Zade are three services that provide on-line credit information if you're ever interested in the prospects for any particular bond that you might find in one of your segmented

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portfolios. A good source would be one of these three services for credit information. It's becoming more and more topical, obviously, as more and more companies are experiencing problems.

In addition to this, the Street also publishes credit research on junk as well as investment grade. We find that we prefer the independent sources of credit research firms. I don't mean to be speaking of First Boston, but we prefer the independent credit research from the dealer credit research because often there may exist a conflict of interest on the part of the dealer, particularly, in this day and age for junk bonds.

This is one market, however, that's very difficult to react to changing credit news. Unlike the corporate bond market where you might want to assess the performance and the long-term prospects for any bond in a portfolio, it's much more difficult to do that in this low grade than it is in the high grade. Everything is very fluid and very dynamic right now. Things change on a daily basis so it's very hard to make generalizations in a junk bond market. But those are sources you could look at to use to give you a better handle on the prospects for any particular bond.

Private placement securities are much more problematic. I've started from the very easy to deal with and am gradually moving in to the much more progressive end of the market, the more difficult arenas. Private placements are very difficult. There's obviously, by virtue of their very nature, no published market for private placements.

Let me back up a minute on junk bonds. Pricing information is very difficult to come by. I would argue that there really aren't liquid markets being made in junk bonds. There hasn't been for the past six months. That may be changing now. There was a recent article in the newspaper on a new service that will be offered to institutional investors. It's called Mysack; it's going to be a weekly blind option of junk bonds which the seller who's starting this hopes will provide a liquidity. That would be accessible also off of Bloomberg's system. So, if you want to try to market some of your junk bonds, or low grade, or noninvestment grade, shall we say, bonds in your portfolio, that may be a good source for data on pricing for junk bonds. It's too early to say. The first auction will be held soon and we just don't know how that's going to resolve.

Private placement securities are, by their nature, much more difficult to get information on. The financial market is changing. They are becoming more liquid and more actively traded as time goes on. However, data are very hard to come by. Really, the best source of information here is the private placement member. You'll need to get annual reports. In many cases the companies may not have outstanding public debt. So, they may not be followed by some of the major grading agencies; data are more difficult to come by. There are no published pricing sources that I know of. If we need quotes on some of more actively traded, we'll go to again to street dealers such as First Boston and Merrill Lynch and look for prices. It is becoming more actively traded.

Real estate is kind of a world unto its own. I would argue -- Tom Kyle and I have discussed this -- that real estate really doesn't belong in many interest-sensitive portfolios. It's really a very problematic type of investment. Although it is a prevalent type of investment, it's very difficult, in a portfolio, to project, to look at, to model, and to

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ascertain what one can expect from a piece of real estate. It's really not the kind of asset that we put in portfolios. I mean it's anybody's guess as to what the piece of property is worth. I would tend to look at appraisals with a grain of salt. As I'm sure you're all aware, appraisers can appraise anything in any fashion. So there's really no market or no easy way to judge the value of real estate. That becomes a problem as we move to what Tom Kyle's going to discuss, how do you measure investment performance. It's really difficult to do that with real estate.

Next I'd like to discuss how we or your investment departments look at the world of investments and how we make our decisions. We at Asset Allocation start first by looking at the economy. We try to get our arms around what the economy is doing. In addition to forming our own opinion, we look for a consensus. We try to get a consensus from among economists around the country, from banks, from econometric firms, from the Street, and from the Federal Reserve. What are the forecasts out there?

We start from the basis of where the economy is today, where we think it's going, and then evolve into what the implications of that forecast or those thoughts have on the world of fixed income and equity investment.

Regarding life companies and intrasensitive products, duration is pretty fixed. I mean it's within a range. This is probably not the audience to say this to, but I've always been a little skeptical about duration and I think we in the investment world mean one very specific thing on duration. I think actuaries speak of duration and use the same word but mean something different from what we use in investment world. We use typically modified duration.

Credit is obviously very dependent on our economic thoughts. We don't want to buy low-grade securities if we believe that the economy is slowing down. Liquidity is the concept of the cost of trading and actively engaging in trades in a marketplace, as well as how much other particular types of securities can be sold and liquidated at any one time. Both of these concepts intertwine. They form the constant of liquidity.

So liquidity's very important. You're paid to take less liquidity. The less liquid a security is, everything else being equal, the more you can expect to earn in yield. That's what's called the liquidity premium. You don't want to construct a portfolio, obviously, that is completely illiquid. But you don't want to construct a portfolio either that is completely liquid. You wouldn't want to put all current coupon treasury bonds in a portfolio because you'd be sacrificing so much yield or a certain amount of yield that you may need to credit in the form of dividends.

Convexity is a risk that we're very comfortable with today. Convexity is sort of intuitively cash flow uncertainty. Negative convexity is a characteristic of callable bonds of which almost all mortgage-backed securities fall into. Negative convexity is the concept as interest rates decline the average life of a bond or the duration of the bond will shorten, which is just counter to what you want. As rates decline you want to buy. You want to extend to get more volatility rather than less volatility to participate in the rising fixed income markets.



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Conversely, as rates rise, a bond with negative convexity duration will lengthen. So you get the wrong characteristic, the wrong volatility characteristic in the wrong kind of marketplace. Positive convexity is just the opposite.

Duration is the fourth risk. We like to look at the decision as being that we need to take some or all of these risks in some proportion, some degree to turn anything more to the federal funds rate, the risk free overnight rate of interest.

Last, we look at pricing. We look at where the markets are. We look at any kind of security. Your investment departments, I'm sure, do the same sort of thing. We look at performance over type of interest rate shifts and over types of volatility shifts. We also look at a way to gauge the relative value in a particular marketplace today, be it corporate bonds, or mortgaged-backed securities, or junk bonds, or private placements. We look at spread relationships, today and historical, like duration treasury security. We'll look at an average in wide plan and their point and try to decide. With an eye towards that, we try to determine where spreads are going. You want to buy securities whose spreads you think will tighten and sell those whose spreads you think will widen.

**MR. THOMAS M. KYLE:** I'm currently with First Boston Asset Management Corp, which is a subsidiary of First Boston. We manage about \$5 billion worth of investments, similar to Peter's firm.

Peter's right about what he says about Wall Street. Just as an aside, Wall Street is what we call the sell side of the business. They're in the business of selling investments to buyers. Peter's firm and my firm happen to be on the buy side of the business as are most insurance companies, except possibly for Metropolitan. They're currently in the business of also issuing securities in terms of doing their own private corporate bond deals and avoiding the Street all together. But we won't get into that.

My background is a little bit different than most. I'm in the operations side of the business of asset management. The responsibilities I have are calculating performance for our client portfolios, accounting, data processing, and compliance. We have pension clients, insurance company clients, and corporate clients. I've been with First Boston Asset Management since October 1989. Prior to that I was with Integrated Resources, in charge of strategic planning and asset-liability management. What I'm going to do is integrate those two experiences here and describe for you what we did at Integrated. Also, I will talk about what happens when we looked at the different ways of measuring performance and how it really affected what we were trying to do.

So let's set the background. We're going to look at segmentation of life insurance companies. It will be really brief because I know you took a look at John Hancock and some other companies. Then we're going to take a look at three methodologies that we used at Integrated and what their advantages and limitations were. One of the things that Wall Street would like you to believe is that total return is the way to measure performance for a life insurance company. I used to be convinced of that. I'm not so sure that I'm convinced any longer. I'm not sure what is the best way, but I'm pretty sure that total return isn't.

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We'll look at book yields and a modified version of book yield to take into some of the limitations of book yields. Next, something called cash flow and duration. It's not quite the cash flow and duration that you as actuaries know where you project out cash flow over 20 years and you discount it back at present value and take a look at pricing, etc. This really is going to refer to projecting out cash flow for the next year or two or the time horizon over which you're crediting interest rates and taking a look at what happens in that kind of scenario.

That was the last thing that we got into with Integrated and I'll describe that. Integrated was a relatively small company. It started out about \$500 million when I started there in 1983. It grew to about \$5 billion in 1989 before it disintegrated or got bought out by everybody as the case may be. There were a lot of impacts and things that we had to do to even segment the portfolios and do this process, so I'd like to go over that a little bit. I'm going to also set Tom up here so we can give a real good discussion about Washington National, what happens when you apply book yields and study current interest rates. So we'll see if I can accomplish that.

The first thing that we did was segment the general account. Basically, the company at that time had tax-sheltered annuity and interest-sensitive life products. There was a large coinsurance block that contained universal life business as well. There was pool business, reinsurance residual pool business, wonderful business. Lost money every year. There was purchase business, which was business we acquired where we purchased other companies. The little annuity general account business grew to be a \$1.5 billion block. Plus, the corporate line of business, which to us meant unallocated surplus.

One of the things that we did when we segmented was to set up separate custody accounts at our bank. We had separate systems within the general ledger that recorded all transactions on a segment basis. There were some other things that were done in the course of time.

Our goals were really interesting. The person who happened to be in charge of the company at that time also was an investment officer and chief financial officer. He said, "Look, I've seen this thing called effective duration. I like it. I want to run our portfolios on that basis." So starting June 1984, we calculated effective duration on the assets. We managed the portfolios on an effective duration basis. For those of you who don't know what effective duration is, I'll define it. The first type of duration was McAuley's duration, which is discounted time weighted cash flows. Real straightforward. Everybody knows it.

The second type of duration was modified duration where you wanted to know, if interest changes by 100 basis points, what percentage change will I have in my portfolio that was modified. Those two methods had a problem in that they didn't take into account the value of the options embedded in the assets. And effective duration essentially is a process whereby you use Black-Scholes or some other method and value the embedded options in the asset, be them call options on bonds, or put options on bonds, extendable options, reset features and floating rate features, all those kind of features get sort of melded into the concept called effective duration. We used the system from Capital Management Sciences to do that.

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The other problem that we had was we wanted to determine what our monthly new and renewal interest rates should be. We changed them pretty much every month. We had to find a methodology whereby we could allocate the assets and set those rates. That's basically what we did.

Some of the implementation decisions that we made and, obviously, there's really no best way to do this, was to have separate custody accounts. We decided to allow transfer between segments but we forced it to be at book so that we would not have to calculate an amount for capital gains that occurred in one segment. You want to leave them there and then move it over to another segment and credit the new segment with any gains since the move. We said that's too much work. We can't do it. So we didn't do it.

One of the reasons we allowed transfers was transaction costs. What we found was when we took a look at going into the marketplace and running these segments as separate businesses, your transaction costs eat you alive. You'll see that a little bit later. We allocated cash to segments as it was received or disbursed. The policy management system was modified to feed the general ledger on a segment basis. The investment accounting system was modified so it fed the general ledger on a segment basis. The general ledger was modified to have all of the detail in it. Every piece of information regarding a policy and investment was all in the general ledger database, which is very different from most companies.

We made the decision that keeping the redundant data was absolutely essential to provide the required reports. That may or may not have been a wise decision but that's what we did. We wouldn't allow coupon stripping. That's the concept whereby you take an asset and strip off interest or principal and allocate it to a segment. That again was too complex for us to handle so we didn't. We made all investment decisions on a yield or a duration basis. It's real funny because you'd like to say, as the analytic guy, you really should be deciding on an effective duration basis. The problem is in the real world when the chairman of the board looks at junk bonds and sees that he can get 700 basis points over treasuries, he's going to buy it because he knows he's going to credit 500 basis points less than that and thinks he's made a lot of money.

It took us a long time to convince the chairman that was not the case. And I think many of you are aware that Integrated was one of the big high-yield bond investors among insurance companies. For those of you who haven't figured it out, I don't recommend such a large investment, but, again, it's your choice. Investment income and other flows remained with the segment, so we really didn't do cross segment funding or anything like that. We just automatically credited and we built an in-house portfolio management and accounting system to do it.

We went out in the marketplace to find a vendor system. We did not find one that worked well enough to manage the segments, so we built one in house. We did it in a year with three people using a fourth-generation language from Control Data called XL, for those of you who get technical. It's also doable but it had problems, which we'll discuss later. We purchased outside vendor analytic systems and software. We decided as a firm that this business was too complex for us to keep current. That is to say the numbers and types of fixed income securities and their characteristics were such that

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keeping current with all of those features and all of those analytics were beyond the capacity of our staff. We made a conscious business decision to look to an outside vendor for support.

Then we calculated liability durations by taking the 20- or 30-year cash flows produced by the actuaries, converting them into pseudoassets, and running them through the vendor's analytic system. This turned out to give a pretty good model of the effective duration of our liabilities. It wasn't perfect but it worked. That's basically what we did.

Let's talk about the results. As a result of doing it, we did make some decent investment decisions like getting out of callable bonds in March 1985, before interest rates dropped and those bonds were called. One of the things that was interesting was we started out running our asset/liability reporting on a quarterly basis. As Integrated grew, we found that we really couldn't run it quarterly; we reverted to semi-annually and finally to annually. The reason for that was that the segmentation system was great but all the peripheral systems that we either acquired from other companies or had gone on and developed and put in place really could not support what should have been done. This was monthly resegmenting or monthly calculation of durations.

Financial reporting systems, including the general ledger and all the valuation systems, all had problems. I mean every time a new product would come out, the last thing that got done was the valuation system. I'm sure you're all aware of that. At least at Integrated that was the case. It was really bad because those valuation systems had information in them that was absolutely critical for doing segmentation and measuring the investment performance.

The last thing that we had difficulty doing was selling senior management. The one champion within the firm really believed in asset-liability management. As we grew and senior management became bigger, it became much more difficult to explain the value of the money, time, and effort that got put into segmentation. That's a process that I am sure some of you are going to be familiar with and encounter all the time. It is not intuitively obvious to senior management why effective duration is the thing to do or why segmentation is the thing to do. And that's something that we had to overcome.

Let's talk about the methodologies that we used. One of the things that we thought early on was that if you marked the assets to market and you looked at the change in market value, you really got a good feel for what's going on in your portfolio. You could measure your investment results this way. So the first thing we used was a closed formula for performance. What that is is the ending market value minus beginning market value, minus your cash flows, plus accrued interest divided by beginning market value, plus time weighted cash flow. This formula is essentially a modification of the Dietz's method of performance measurement. It's very close to the Bank Administration Institute (BAI) methodology and produces almost the same results, but you don't have to go through iterative solutions to solve for it, which is nice provided you can determine those numbers.

Cash flows were the critical item. We know we get interest on a bond and I've got a cash flow. Well, that's really not the case because if I got interest on a bond and I

## MEASURING INTEREST MARGINS -- PART 2

reinvested it, then that interest is in my ending market value. So in reality, a cash flow has to be external to the segment. A premium comes in, a surrender goes out, a general expense gets allocated, etc. These are external cash flows.

Fundamentally you have to determine the external cash flows and the timing of those cash flows. We did total return on a monthly basis which meant we determined daily cash flows. The denominator in the performance formula had what's called the time weighted cash flow in it. This essentially was the day weight of all the cash flows in the month. You can assume mid-month; you can assume end of month, but it really does matter. We found that due to the fluctuations in our business, daily time weighted cash flows gave the most meaningful number.

The last thing in there is accrued interest. Accrued interest one would think is easy to calculate until we took a look at portfolios and found things like floating rate securities. What's the accrued interest on a floating rate security? You don't know what it's going to be until after the fact or some funds that are pay in kind bonds (PIK bonds), where instead of getting interest you get another bond and you have to determine the value of the bond. Do you allocate original cost or not? More importantly, do you include that in accrued interest or not and how to you account for it?

So we had a lot of issues involving our portfolio as time went on and it became harder to define those components.

One of the things that happened to us as we got into this is we found that total return really implied a lot of things. One of them was that you can determine a price for every security that accurately reflects the realistic sales price. If I go into the market today and try and sell the security, the implication is it will be at the price that I put in my portfolio. Well, that really wasn't the case. Let's take a look at why that wasn't the case.

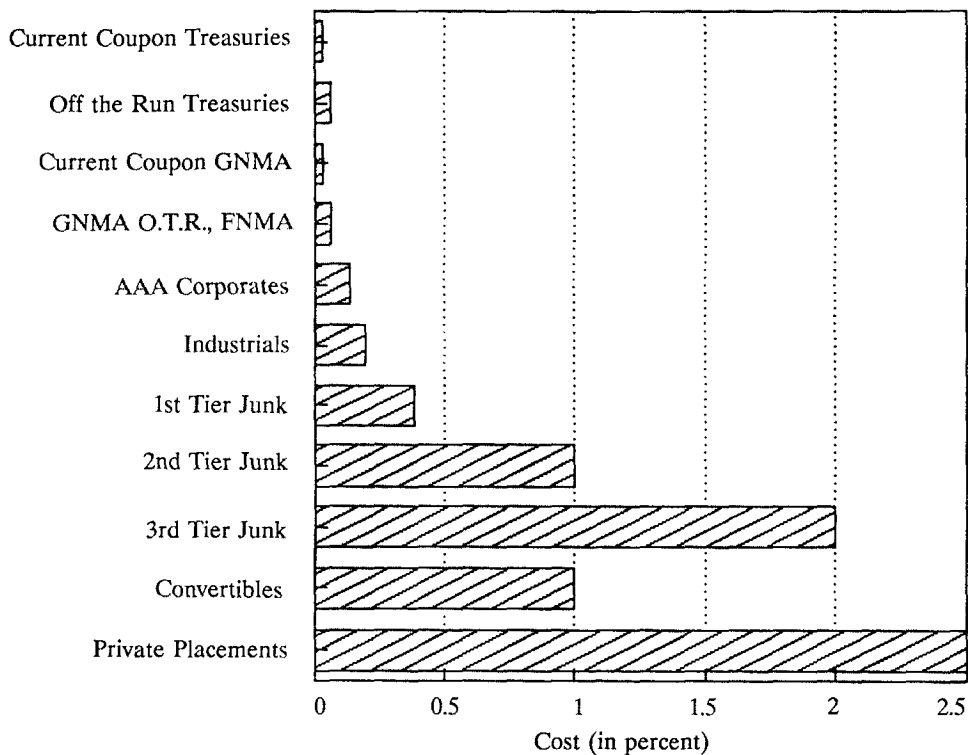
Chart 1 is the round trip recent cost for fixed income securities in terms of either percentage or basis points: what it costs you to do a round trip buy and sell of the same security that day. Current coupon treasuries, that is, current treasury, on the run treasuries, we're about a 32nd or a .03%. Off the run treasuries cost you two 32nds. Still not bad. Current coupon Ginnie Maes were the same as on the run treasuries which is also nice since we do a lot of those in our business. Off the run Ginne Maes, and Fannie Maes, and Freddie Macs, again, were a little bit higher, a couple 32nds.

Then you start getting into what's really in an insurance company portfolio. Triple A corporates were back. An eighth to a quarter. Industrials got a little bit more. First-tier junk bonds, that is to say, slightly below investment grade, could cost you up to three eighths or almost .5%. Second-tier junk bonds cost you almost 1% round trip. Say you thought you have second tier-junk bonds spread 5-600 basis points over treasuries, and you buy and sell them in the same day. You've lost 100 of your 500 basis points just to trade them. Your third-tier junk bonds go all the way up to 2,005 and that's for the tradeable ones. There are some where if you go and call a broker's junk desk, you can buy them basically at 700 off the treasury and they will go back to you at 500, or 300, or 400 off the treasury. There's a 300 basis points spread on some junk bond issues.

PANEL DISCUSSION

CHART 1

### Round Trip Costs Fixed Income Securities



## MEASURING INTEREST MARGINS -- PART 2

Now I used to think that convertible securities were really good. Here I've got a bond that's convertible into stock. It pays a 7% yield and I get some upside participation in the equity. That has a 1% roundtrip spread. Private placements are off the charts. It could cost you 2.5% or more to buy and sell a private. Now, some of that's going to change with Rule 144 but as of right now that's about what it's like. So when you talk about total return and say that you have a market price you don't. And anyone that tells you otherwise is not telling the whole truth in my view, just part of the truth depending on where you are in the spectrum.

The second assumption was that pricing errors that do occur won't be significant. It turns out that based on the previous chart we've just found that the composition of your portfolio will determine whether the pricing errors are significant or not. The other thing that total return assumed was that you could identify cash flows by segment as to amount and time of receipts during the period. This includes certain things like premiums, surrenders, and death benefits.

How about talking about things like general expenses and federal income taxes and all of the other cash outflows that a company has that you really have difficulty identifying by segment. You end up allocating in some methodology. That was a problem for us. We then found that you had to determine all of the above on a monthly basis which when we first started doing at integrated, we weren't even doing monthly statutory let alone this. We eventually got the monthly statutory done. It took a while but we did it.

We then realized that total return also assumed that we could accurately calculate accrued interest for every security. That turned out to be sort of true if you make some assumptions, but not always. Given those assumptions and given the round trip costs, the next thing we looked at was what's happened to the fixed income market. Insurance companies have to invest in this marketplace to credit the interest rates they've got in their product. One of the things that we found was a significant increase in the number of different types of fixed income taxable securities in the marketplace from 1975 to this past year. And we believe there are two more in 1990, so it's now 42. It has actually doubled, just the types (Chart 2).

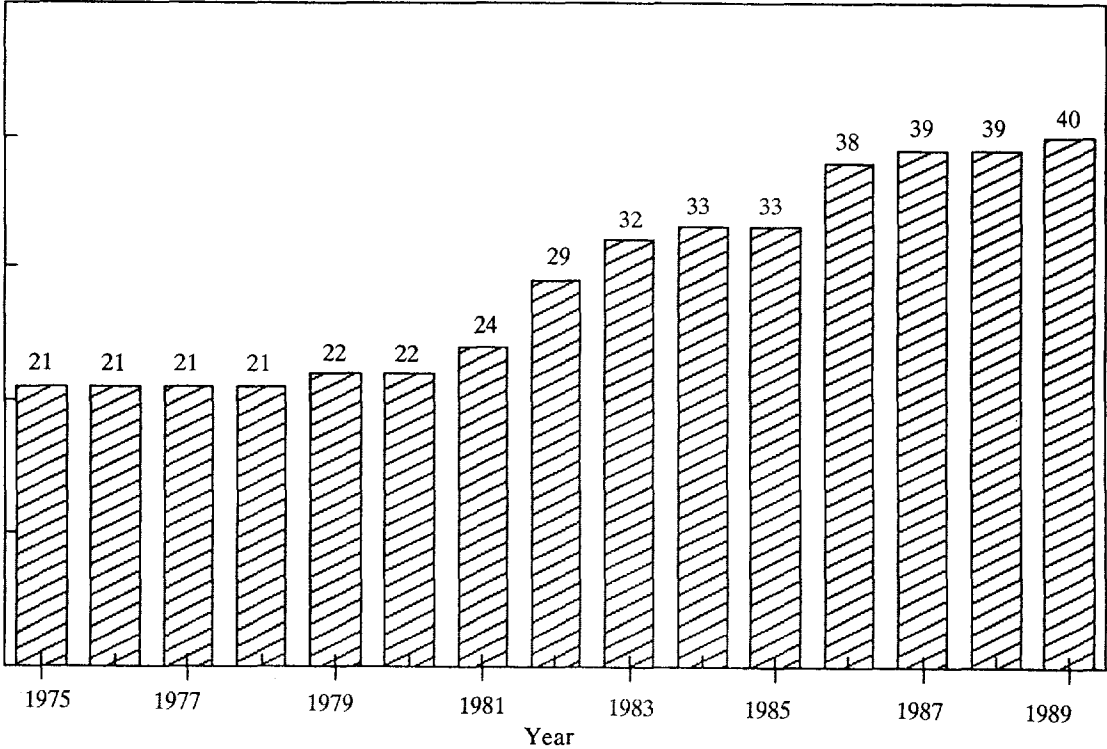
There weren't CMOs, there weren't interest only pieces (IOs) and principal only pieces (POs), and there weren't reset notes and extendable notes, and PIK bonds and all of the other things that now exist today. The problem with that is that all of your systems, all of your procedures, all of your methodologies and concepts have to keep track and current with a changing marketplace. That's very, very hard to do. You end up making decisions that may not be the best decision simply because you don't know that you're not current with that marketplace.

The best example of that is based on the chart before with the transaction cost. It turns out that companies that don't understand those transaction costs basically give up a lot of yield when you actively manage a portfolio and incur those kinds of costs, particularly when your systems can't measure them.

Now, advantages of total return. Well, there is one. Despite all of the things that we talked about, it does give you the total change in the portfolio's value. This means it

# Growth of the Securities Market

Types of Securities



PANEL DISCUSSION  
CHART 2



## MEASURING INTEREST MARGINS -- PART 2

calculates the unrealized gain and loss and attributes it to the segment. That may or may not be good but it does do that. You don't have to identify individual segment cash flows. You don't care about the internal segment cash flows. Interest on bonds in the segment, all of that doesn't matter. We can use total return to determine income, including realized and unrealized losses, that will be allocated to the segment by taking the weighted average return times the weighted average monthly portfolio value. So you can get a dollar cash number that gives you the total.

Let's talk about some of the disadvantages. First thing that we found with total return is it told us what has happened, not what will happen. We were much more interested in determining what interest rate we were going to credit as opposed to what happened in the past. It turns out the method really didn't lend itself to that very well. It includes unrealized gains which is a noncash item. Now, what's interesting is as I've said in a lot of SOA seminars, I've attended Morgan Stanley seminars, and Goldman Sachs and so forth and they all want you to use total return. They all want you to talk about unrealized gain. One of the things that we found was, how do you allocate unrealized gain to a policyholder? I mean what do you do? We couldn't come up with something to do.

So one of the reasons that we decided that total return probably wasn't appropriate was because it really didn't match how we were running the company. We weren't taking losses on the portfolio to minimize losses on a total return basis. We were investing for yield and duration and trying to manage risk. And total return doesn't always do that.

Which gets to the next point. Total return wasn't consistent with the way new management insurance company's portfolios are reported. Insurance companies fundamentally have an advantage in the marketplace. Your accounting regulations, requirements, and standards let you hold bonds at cost. That is a competitive advantage to insurance companies. It might change and there are a lot of proposals to change it. I'm not sure why it should but that's not a question here. But the point is today if I'm running an insurance company portfolio and I call up the president of the company and say to him, "Look, you're sitting on a \$2 million loss in your 11% Ginnie Maes that because of changes in rates it's going to go to a \$4 million loss, let me sell it." He's going to say, "What are you nuts? You're going to take a \$2 million loss in the portfolio?" He's not going to let me do it.

And that's really the point. Total return is for when I can take gains and losses independent of the strategy of the company managing that portfolio.

The last problem that we found with total return was there was a large segment of our portfolio that we couldn't price. I mean Integrated had, at one point, 40% junk bonds in the portfolio. You'd go out to Drexel, Merrill, Salomon, and First Boston. You could get prices that were three, four, and five points variance at times. One of the nice things now is we at First Boston take advantage of that. We'll call up Merrill and get a price, call Goldman and we'll just sort of swap for them. Our client will get the money which is kind of nice. But there's a lot of inefficiency in the marketplace. Trying to figure out where to price is very difficult.

## PANEL DISCUSSION

The last and I think the most important thing is total return doesn't identify the source of the gain or change in the portfolio, and it is highly volatile. You don't know whether you went too far out on the curve and had interest rate risk, or whether you have a credit risk in your portfolio, or whether you've got an event risk in your portfolio. All the things that you'd really want to know as a company in terms of setting your strategy on interest rates you don't know with total return. The company's management and your company's business, like foreign exchange currency traders in Japan, will affect the price of your portfolio. It may not have any bearing on economic reality of your company and how it will do.

So let's go on. We got through total return. By the way, it took us two years to get through it. Then we went back to something called book yield, which we used for another two years. I think it worked pretty well. Let's talk about what it is.

Book yield is the actual income we got in the portfolio, realized gain plus income, plus the accrued interest, same as total return, plus the amortization on the bonds which we included as income, divided by original cost. So if you bought a bond at a discount you'll amortize it to par. If you bought it at a premium you'll amortize it down, all divided by original cost. Now, one of the problems with the book yield formula that we found was it doesn't take into account cash flows, which can vastly distort the yield on the portfolios. We started setting credited interest rates using this method and then looked at what really happened in a segment versus what we thought would happen. One of the things that we found was that the cash flows dramatically affected what our true profits were. So we modified the formula after about six months to be the following formula, which is almost the same as the total return formula: ending book value minus beginning book value minus cash flow plus accrued interest all divided by beginning book value plus time weighted cash flow.

All we've done is substitute book value for market value, recognizing that the book value includes amortization already. So we didn't even have to calculate that. And the cash flow and accrued interest were the same. So that's what we said book yield was.

Let's talk about the advantages of this. The first thing that happened was it was a better indicator of funds available for segment participants, because it would tell us what the yield was at any point in time on the assets we had at that time and, therefore, for the next time period became a very good indicator of what we had available to credit.

We think book yield is more appropriate for insurance company portfolios than total return. Basically, it is a methodology that let us try to manage our profits from investment income which was fairly good. It was less volatile. It wasn't subject to the changes in interest rates and so forth. It was, however, very susceptible to cash flows and it turned out to be more accurate.

When we were using this method for setting interest rate margins we found that what actually happened the next month and what we thought would happen the next month were closer, not always on the money, but much closer than the total return way.

## MEASURING INTEREST MARGINS -- PART 2

Now to disadvantages. One of the things that we found was when you go to book yield methodology, you're focusing on current income, that is, the yield today. You're making a decision as to how much of that you're going to credit the policyholder and you're ignoring the reinvestment risk. So one of the things that we found was we were saying, great, we're getting 12% today, we can afford to give the guy 10%, not recognizing we would rather have given him 9.5% and kept the extra 50 basis points for when we have to give him 11.5 or 11 to keep the business.

Implicit within the interest rate setting argument or process is a view that we took which was you should set your interest rate margins not just for the profits you want to make this month, but for the profits you want to make this year and next year and the year after. And at most took a three-year time horizon.

It doesn't address the treatment of realized capital gains. Now, this was where there was a lot of dispute within Integrated of over what a capital gain was. There was one theory that held there is no real capital gain. All that happened when you have a capital gain on a fixed income security is you realize income today that you would have gotten later. So when interest rates came down and prices of securities went up, the change there was attributable to the change in interest rates.

I didn't subscribe to that view and, in fact, based on what I now know, I'm fairly certain that a large portion of capital gains is attributable to that. Call it 60%. But there's another section that isn't, another 40%. And the question you have to ask is do you allocate it to the participants in the segment, or do you send it back to corporate? The other thing that book yield doesn't do (and the same problem with total return) is it tells you where you have been and where you might be for the next month, but it is not a very good predictor over the next year. So this month's book yield was not a good predictor of future profits or income, if you will, on the portfolio at all. And it doesn't account for future asset sales to meet segment cash needs.

It was great when we looked at the segment and had a 12% yield except that when the segment was short of cash, the first assets we sold were the ones that didn't have losses. This dramatically ratcheted down book yield much faster than one would have otherwise expected. The book yield had some limitations there.

We said that all these assets, regardless of type, have cash flow. There are analytic systems out there that can give us the cash flows on those assets taking into account all of the risks. They can tell us what our prepayments are going to be on mortgages based on the pricing assumptions. They can tell us what our calls are going to be, what the sinking fund payments are going to be. We can get the real dollar cash flow on every asset that we own, particularly, on a fairly accurate basis over the next year, less accurate thereafter, depending on how interest rates change. One of the interesting things we found was that security features such as a call don't always get exercised. One would think that, at the point in time where it's in the best interest of the corporate treasurer to refinance that bond he's going to do it. It turns out that's not the case. It's the same as a surrender on a policy. If interest rates go up, it's in the best interest of your policyholders, all of them, to surrender.

## PANEL DISCUSSION

But invariably what happens is about 40% don't. They're what I would call a dead head. They're not here. The same happens in the bond market. A lot of corporate treasurers, even though it's in their best interest to refinance, don't. You have to model that, because it really does affect the cash flows. If you assume all your bonds are going to be called and you sell them on that basis then you've got a problem because a lot of those bonds aren't going to be called. We came up with some models that looked at the incidence in the past of bonds have been called. It looked at how likely were those companies to refinance. A concept called crossover yield and crossover duration got developed to determine at what midpoint or point that would occur.

But in any event we said, okay, we're going to project out the cash flows. We're going to do it on two bases. We want to look at our principal cash flows, that is all cash flows from the principal portion of the asset, maturities, prepayments, principal, amortization of bonds, sinking funds, calls, whatever. We wanted to look at our income cash flow and we purposely separate it out for two reasons.

One of the things we found with book yield, particularly regarding mortgages, was we were crediting to the policyholder or including within our book yield calculation the yield associated with the prepayment on a mortgage and, in fact, it inflated the yield of the portfolio. We really had less money there than we thought we had because we were giving principal back to the policyholder in the form of interest which was a problem.

It took us a year to figure that problem out. So we split it up. The principal component we went over. The other thing that we put in the principal component though was pieces for default losses on junk bonds. All of the asset models are really quite capable of projecting this. In fact, if you go out on the Street, that's what they really do when they're pricing a bond. It turns out that they do all these cash flows and discount them back based on risk or whatever. So you've got the numbers.

You can take in to account things such as event risk, credit risk, or whatever. You really have a mechanism here on a real dollar basis to take into account all of the risk you've got on the investment side.

The next thing we said was the income component of this would consist of projected interest income, including consideration for changes in principal. When a mortgage is prepaid and the principal amount goes down, my future interest income is going to go down because I've less principal there. Changes in your principal cash flow over the next year will affect your income cash flow. What was interesting about that was we didn't quite realize early on how dramatic that could be, but it turns out to be fairly significant, particularly on CMO tranches and some other assets where the potential for prepayments and the actual prepayments are very high.

At one time, Integrated owned 16% Alaska housing bonds and they prepaid in eight months. It was incredible. But in any event we got the income complement. Then we said, okay, now we'll go to the actuaries and get the projected liability cash flows for that segment for the next year and subtract them from the principal portion.

## MEASURING INTEREST MARGINS -- PART 2

Now, we did that because we said the principal portion should really fund all of the cash flows and not the income portion. And for most of the segments that worked. However, in some segments we were short of cash. It then became a management decision whether to sell assets to fund the segment or do it on some other basis, like take it out of income. It really didn't matter. We always ended up selling assets. We then subtracted the cash flows of the securities sold and came up with a net cash flow.

Now, all of a sudden, we have a real dollar amount number to manage. In Integrated's case in 1989, that was \$176 million divided up over all the segments. What we wanted to do was we said, we have the cash flow from investment income now we've got a problem. We need to take into account the reinvestment of both the principal cash flows and the income cash flows. And all we did there was we said, okay, what's the duration of our portfolio and we assumed a reinvestment at the equivalent rate on the treasury curve.

It was a little conservative in the sense that we assumed a reinvestment rate a little lower, but we added the reinvestment back in to the portfolios on a monthly basis. So January was reinvested in February for the rest of the year. And what we said was let's take all of these cash flows each month. We know what the portfolio will look like each month. Now let's determine our book yield, which is simply the income that we've got divided by the portfolio.

All of a sudden, what we found was we had a much better way of taking a look at how we should set our interest rate margins because we had projected out for the next year what everything would be.

Let's take a look at why we thought this would be a little better way. First of all, it more accurately accounts for available cash. When we did yield-based calculations, we credited the policyholder too much interest because we included principal reductions in the income number. We avoided a lot of those problems. We had it separated out to solve that problem. It used existing asset pricing methodologies. We could get on the phone to our vendor or get on the phone to the Street and say give me the cash flows on this security given current interest rates over the next whatever and we got those numbers real quick.

So we didn't have to do very much work to get it. The last thing we did was to facilitate active management of interest margins. We could now look at what would it take to credit the policyholder more money or for us to make more profits or whatever on a real cash dollar basis. Thus, you could tie the effects of your measurement technique to your bottom line on a statutory or, in our case, a GAAP basis, which turned out to be pretty good.

The disadvantages. We still didn't solve the long-term reinvestment risk problem. That is to say did we want to reserve or reduce today's margins to cover the fact that we might have less margins in the future. We didn't properly set aside future defaults of credit losses. This was a conscious decision of the firm. It involved using default loss rates that were less than historical rates but were equal to our personal historical experience which turned out to have been a mistake. To do timely reporting requires a lot of very sophisticated systems.

## PANEL DISCUSSION

The last problem we ran into was everybody wanted to micro manage it. Let me tweak it a little here and tweak it a little bit there to see if I get what I want. Different people manage each segment. The manager in charge of the annuity segment really wanted to increase profits because his compensation was tied to that. What he wanted to do and what was in the best interest of the firm weren't always the same.

What are the implications for your financial reporting systems? What does it take in terms of that environment to get the job done? The first thing that we concluded was your portfolio management and investment accounting system have to be the same. Your investment people know where the assets are every day. They know what they own. They know why they own it. They know the interest, the characteristics, and all that. There is no reason for your investment accounting system to take three months or two months, or one month to figure it out. We made them the same. We also decided that the analytic systems had to be separate. You had to have upload and download capabilities for them. Our asset analytic systems were acquired or developed to be separate from the day-to-day portfolio management systems. That became a real critical item.

We also had to tag cash flows by segment at the point of data entry. We went into the policy management system which was Cybertek and tagged segments right at the point of entry or generation for all transactions going into the general ledger.

Instead of trying to do it after the fact and allocate, we did it right on the front end. That turns out to have been a little bit timely in terms of its cost. It took a year to get done, but when it got done it turned out it had been much better than the allocation process that we were using. We had to get a monthly financial reporting on a statutory and GAAP basis. Now, a lot of companies are already there. Integrated wasn't at the time. You need to be.

We also found that liability cash flows had to be done at least twice a year. At that time they were being done once a year or once every two years or at the time when a new product was priced. This really wasn't very effective for what we wanted to do. The other thing which wasn't obvious at the time but turned out to be very true was the system that we used to set the interest rates was at one time part of the whole mainframe system. The problem that we had with that was it was highly inflexible. I had to call up Data Processing and say I need this changed and they would say, well, six months maybe. We moved it down to a workstation PC and downloaded data. It turned out that the PC was very good just in terms of our ability to respond to change. So when we bought a CMO we could deal with it. When we bought a PIK bond we could deal with it. We weren't stuck in the mainframe environment.

MR. THOMAS M. GLEESON: I am going to review some investment basics and provide a simplified example to illustrate some practical observations regarding investment returns and their measurement, and hopefully I will elaborate on some of the points that were brought out earlier by Tom Kyle.

## MEASURING INTEREST MARGINS -- PART 2

First of all, why are actuaries interested in measuring investment results? An actuary needs to be able to measure investment results as a key step in performing many aspects of his job. Included among these are the following:

1. **Pricing:** Investment results are a key source for covering expenses as well as for earning your desired profit margin.
2. **Valuation:** Determining interest margins in defining the FASB 97 gross profit stream.
3. **Asset/Liability Matching.**
4. **Interest Rate Setting:** An actuary needs to monitor his interest spread to determine as best he can the "correct" interest rate to credit on his interest-sensitive products.

One must be very careful, however, when discussing a term like "Interest Rate" as there are many types of interest rate calculations and because, as pointed out by both Peter and Tom, nomenclature is often used inconsistently among various professions. For instance, an often-used convention in determining a bond equivalent yield is to simply double the semiannual coupon rate. However, ignoring the effect of compounding can have a dramatic effect on a yield measure, especially in today's environment when interest margins are very narrow.

It is instructive to review various yield calculation methodologies as yield rates are the most often used measure of investment results.

There are three potential sources of income to an investor who holds a bond: (1) coupon payments, (2) income from reinvestment of these periodic interest payments, and (3) capital gain/loss. The following four yield measures consider one or more of these sources in arriving at an investor's return on investment.

1. **Current Yield:** This is simply the ratio of annual dollar coupon interest to market price, and as a result does not consider income from reinvestment or capital gain. Current Yield is the yield rate you will find in the exchange traded bond listings of *The Wall Street Journal*.
2. **Yield-to-Maturity:** Yield-to-maturity considers capital gains and reinvestment of coupon payments; however, it implicitly assumes that these payments are reinvested at the yield-to-maturity throughout the investment horizon. This is the rate that equates the present value of a bond's cash flows with the market value.
3. **Yield-to-Call:** Yield-to-call assumes coupon interest payments received prior to call will be reinvested at a rate to the yield-to-call. Also, comparison with a yield-to-maturity is inappropriate since the yield-to-call reflects a potentially shorter commitment period and does not recognize what will happen after call.

## PANEL DISCUSSION

4. **Realized Compound Yield:** This is the rate of interest that equates the actual accumulated value at the end of the investment horizon with the amount of the original investment. It reflects actual reinvestment rates in the interest-on-interest component of return.

Realized company yield will be between the yield-to-maturity and the reinvestment rate. The longer the term of the bond, the more significant the interest-on-interest component of return and consequently, the closer its realized compound yield will be to the reinvestment rate. The lower the coupon rate, the less significant this component. Therefore, the realized compound yield will be closer to the yield-to-maturity the lower the coupon rate (or the deeper the discount). A zero coupon security is the extreme case whereby the realized compound yield equals the yield-to-maturity.

### **MEASURING INVESTMENT RESULTS AS A STARTING POINT IN ANNUITY RENEWAL RATE SETTING**

Let's look at a practical application that hinges on proper measurement of investment results -- namely, renewal rate setting on deferred annuity products. For the examples that follow, it is assumed that the company has a targeted profit margin that it wishes to receive and that it is content to receive exactly its pricing spread. Pricing an annuity product is an ongoing process; that is, one manages the interest spread via the renewal rate setting process.

The Washington National Annuity Management Information System for renewal rate setting uses a "Book Value" annual effective yield rate calculation in determining the earned rate of the segmented asset portfolio supporting its deferred annuity products. A book yield rate calculation has the advantage of stability between periods as book value, unlike market value, is immune to changes in market interest rates. This "book yield" reflects items such as Coupon Income Received, period changes in Accrued Interest (not yet due), period changes in Due But Not Received amounts, and amortization of premium/discount.

Capital Gains and Losses are not directly reflected in the yield calculation in the period they are realized, as that would result in a very volatile and relatively meaningless pattern of yield rates depending on the actual timing and amount of realized capital gains. This is so because the realized gain or loss is not truly "earned" in the period in which it is realized. Instead, it can be interpreted as the present value of an interest differential that is forgone over the future investment horizon.

The approach that is taken includes realized capital gains and losses as part of the segregated asset balance and assumes reinvestment in securities at the current market yield. This, in essence, results in a "smoothing" of realized gains/losses over future periods in a manner consistent with original yield. The process is accomplished with a segregated portfolio of assets or by some method of internally "tagging" assets as belonging to a particular portfolio.

The pricing spread is removed from the asset portfolio on a regular basis and is transferred to the company's General Account. The resulting segmented asset balances, liability balances, and earned/credited rates are managed in order that investment results



## MEASURING INTEREST MARGINS -- PART 2

are distributed equitably via the credited rates, and that sufficient assets remain to cover withdrawals.

This brings us to what is perhaps the most important characteristic to remember about investment yield rates for rate setting. That is -- any "rate of return" on your investments, by itself, is not significant unless used in conjunction with the underlying asset balance (which includes cumulative realized net capital gains). One may decide, in an environment when interest rates are low, to take capital gains. These gains will presumably be reinvested at the currently lower market yield rates, thereby lowering the yield rate on your investment portfolio.

But what has happened? Have you really reduced your earned spread? No, you are simply earning a lower rate of interest on a larger asset base. Your total dollars of interest earned over your investment horizon should not have changed. The cash versus accrual versus capital gain/loss component mix will change depending on how the proceeds are reinvested. For example, reinvestment into deep discount bonds will have a larger portion of its return consisting of a noncash accrual element. Such a strategy will provide a realized compound yield closer to the promised yield-to-maturity in exchange for less current cash flow due to the low coupon (zero-coupon bonds being the extreme case). Reinvestment into a bond at or near par will be relatively more dependent on future unknown interest rates in determining the ultimate realized yield. However, one will be in a more advantageous position should future interest rates move upward.

The approach used to set interest rates is a straightforward, practical one that considers some very basic information on the portfolio of assets, including the following:

1. **Book Value and Market Value.** An aggregate market value less than book value indicates that, in general, yields have moved upwards since the time assets were purchased. It might also indicate that the market assessment of credit quality of the securities held has declined.
2. **Long-Term Versus Short-Term Allocation of Assets.** Long versus short mix of assets should be analyzed to provide an indication of the extent of higher yields being earned as a result of longer-term investment in a positive, upward sloping yield curve environment. Longer-term investments, while providing higher returns, reduce the liquidity of the portfolio. On the other hand, short-term investments require consideration of unknown future reinvestment rates.
3. **Cash Flow Characteristics.** Consider the pattern of cash flows represented by your various investments (Bonds, Mortgages, Zeros . . .). This includes interest and principal repayments as well as any call provisions on your bonds or pattern of prepayment on your mortgages and mortgage backed securities. This provides an indication of the level and timing of the regular cash flow stream spun off by your current investment mix.
4. **Quality of Assets.** A higher yield may be obtainable with poorer quality assets, but at the expense of added risk. The portfolio yield should be considered in light of

## PANEL DISCUSSION

the risk assumed, which in turn should be consistent with that established under your company's investment strategy.

Similarly, basic information required for the liabilities is as follows:

1. **Account Balance.**
2. **Average Credited Rates.** A history of rates by investment year will be required if you are crediting interest by the Investment Year Method.

As mentioned previously, the basic premise behind the renewal rate setting methodology is that one can manage the realized Investment Spread via the Renewal Rate Setting mechanism. This mechanism involves analysis of the interrelationship between the priced-for spread, the actual earned versus credited rate, the book value of assets versus liabilities, and the cash flow and liquidity characteristics of your portfolio.

Consider the following simplified example. You receive a \$100,000 deposit under a Single Premium Deferred Annuity contract. You've anticipated in your pricing that you need to earn a spread of 200 basis points for this product. Your Investment Department tells you that it can earn an annual effective rate of 10% after investment expenses, considering the types of investments appropriate for this particular portfolio. You then decide to credit the contract with an annual effective rate of 8%, guaranteed for one year. You will reset credited rate at the beginning of each contract year. Note that the investment spread is paid from this segregated account.

Assume the investment is a five-year, \$100,000, annual payment security purchased at par and yielding 10% annually. Payments are received at the end of each year and can be reinvested for one year also at a rate of 10% (that is, we are assuming a stable, flat yield curve). If market yield remains at 10% throughout the five-year period, results will look like those shown in Table 1. You will earn your 200 basis point spread by crediting 8%, and assets will equal liabilities throughout the five-year period.

The end of year 2, market interest rates drop to 8% and remain at that level for the next 3 years. Your \$100,000 book value security will have a market value of \$105,154 due to the change in interest rates. But now, any reinvestments will have to be made at 8%.

You may hold onto your bond and continue to receive the 10% coupon, with this and all prior interest earnings being reinvested at the lower market rate of 8%. We can now calculate an expected "realized compound yield" for each of years 3-5 that takes into account this lower reinvestment rate. The results are shown in Table 2. You credit interest such that you earn your spread, with resulting assets equal to liabilities.

Alternatively, you can sell your bond, realize the \$5,154 capital gain (end of Table 3) and reinvest the entire proceeds at 8%. In this instance, your portfolio yield has now been reduced to 8%. You have higher book value of assets with a lower yield. You must be careful in setting your credited rate in the year following the realization of the gain, because the capital gain that was realized was not "earned" during the year. In effect, it represents a present value of interest that will be lost over the remaining investment

TABLE 1

Deposit = \$100,000

Initial Earned Rate = 10%

Desired Spread = 200 basis points

Initial Credited Rate = 8%

Year	Asset Book Value BY	Earned Rate %	Asset BV YE Before Spread Deduction	Dollar Spread	Asset BV YE EY	Liability YE	Growth Rate %
1	100,000	10	110,000	2,000	108,000	108,000	8.00
2	108,000	10	118,800	2,160	116,640	116,640	8.00
3	116,640	10	128,304	2,333	125,971	125,971	8.00
4	125,971	10	138,568	2,519	136,049	136,049	8.00
5	136,049	10	149,654	2,271	146,933	146,933	8.00

Deposit = \$100,000

Initial Earned Rate = 10%

Desired Spread = 200 basis points

Initial Credited Rate = 8%

Market Yield Drops to 8% @ End of Year 2

HOLD Bond

Year	Asset Book Value BY	Earned Rate %	Asset BV YE Before Spread Deduction	Dollar Spread	Asset BV YE	Liability YE	Liability Growth Rate %
1	100,000	10.00	110,000	2,000	108,000	108,000	8.00
2	108,000	10.00	118,800	2,160	116,640	116,640	8.00
3	116,640	9.71	128,971	2,333	125,638	125,638	7.71
4	125,638	9.59	137,689	2,513	135,176	135,176	7.59
5	135,176	9.48	147,990	2,704	145,287	145,287	7.48

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TABLE 2

Deposit = \$100,000

Initial Earned Rate = 10%

Desired Spread = 200 Basis Points

Initial Credited Rate = 8%

Market Yield Drops to 8% @ End of Year 2

SELL Bond (realize Capital Gain)

Year	Asset Book Value BY	Earned Rate %	Asset BV YE Before Spread Deduction	Dollar Spread	Asset BV YE	Liability YE	Liability Growth Rate %
1	100,000	10	110,000	2,000	108,000	108,000	8.00
2	108,000	10	118,800	2,160	116,640	116,640	8.00
3	116,640	8	131,538	2,333	129,205	125,638	7.71
4	129,205	8	139,541	2,513	137,029	135,177	7.59
5	137,029	8	147,991	2,704	145,287	145,287	7.48

TABLE 3

MEASURING INTEREST MARGINS -- PART 2

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At end of Year 2:

$$P + 10,000 a_{3,0.08} + 100,000 (1.08)^{-3} = \$105,154$$

PANEL DISCUSSION

horizon, as a result of the sale of your higher-yielding 10% security. If the entire amount is reflected in the yield, you will end up crediting too high a rate in that year, only to find yourself having to drastically reduce the rate in the following year. You may also get into questions of equity in this type of situation.

Rather, a more appropriate situation, and one which is more consistent with the "hold" strategy of the earlier example, is shown in Table 3. You credit the same rate as the hold example, and remove the same dollar spread as before. As you can see, the earned versus credited rate comparison shows a differential much less than the priced-for spread although the actual dollar spread is the same as in our "hold" example. Also, the asset/liability comparison shows assets in excess of liabilities as of the end of year 2 and beyond (you took a \$5,154 gain at the end of year 2). At the end of the original five-year investment horizon, the dollar spread has been realized throughout (though not necessarily the rate spread) and the assets exactly equal the liabilities.

A comparison of these situations illustrates that although the earned versus credited rates might seem to indicate that a pricing spread was not attained, in fact the dollars of anticipated spread did result. Also, a smooth pattern of credited rates resulted from using the asset balances as a type of "buffer" to spread any realized capital gains over the future investment horizon. The steady pattern of credited rates in a falling interest rate environment aids in persistency of the business as well.

Ignoring for the moment the possibility of realized gains, we see that positive asset balances are built up when credited rates are set lower to provide more than the pricing spread. This can most easily be done at a time when market rates have moved downward while you are still invested at higher rates. Table 4 illustrates the situation if rates were to decrease to 8% at the end of year 2.

TABLE 4  
Market Yield Drops to 8% @ End of Year 2  
HOLD Bond

Year	Earned Rate	Credited Rate	Rate Spread	YE Excess of Assets-Liabilities	Dollar Spread
1	10.00%	8.00%	2.00%	\$ 0	\$2,000
2	10.00	8.00	2.00	0	2,160
3	9.71	7.71	2.00	0	2,333
4	9.59	7.59	2.00	0	2,513
5	9.48	7.48	2.00	0	2,704
SELL Bond (realize Capital Gain)					
1	10.00%	8.00%	2.00%	\$ 0	\$2,000
2	10.00	8.00	2.00	5,154	2,160
3	8.00	7.71	0.29	3,567	2,333
4	8.00	7.59	0.41	1,852	2,513
5	8.00	7.48	0.52	0	2,704

2,000  $a_{3,0.08} = 5,154$     2,000  $a_{2,0.08} = 3,567$     2,000  $a_{1,0.08} = 1,852$

## MEASURING INTEREST MARGINS -- PART 2

Such surplus will then allow for credited rates somewhat in excess of those realistically supportable (given your pricing spread) for a short while if market rates move upward. Or, it might even be suggested that your desired spread should be modified. However, one of the purposes of your spread is to recover upfront expenses, so it seems a fallacy to now reduce your desired spread so that you can say you're earning your spread.

Table 5 shows the same hold versus sell strategy results if interest rates were to increase from 10-12% at the end of year 2. For the sell strategy, the rate spread is greater than 200 basis points while the assets are below the liabilities. Companies will often be reluctant to realize capital losses (ignoring possible tax reasons), but they may be forced to take losses if cash flow and liquidity positions are unfavorable. Credited rates shown are the limit the company can credit and still realize its spread. Higher credited rates will result in assets below liabilities unless an intentionally lower realized spread is taken.

TABLE 5

Market Yield Increases to 12% at End of Year 2  
HOLD Bond

Year	Earned Rate	Credited Rate	Rate Spread	YE Excess of Assets-Liabilities	Dollar Spread
1	10.00%	8.00%	2.00%	\$ 0	\$2,000
2	10.00	8.00	2.00	0	2,160
3	10.28	8.28	2.00	0	2,333
4	10.41	8.41	2.00	0	2,526
5	10.54	8.54	2.00	0	2,739
<b>SELL Bond (realize Capital Gain)</b>					
1	10.00%	8.00%	2.00%	\$ 0	\$2,000
2	10.00	8.00	2.00	(4,804)	2,160
3	12.00	8.28	3.72	(3,380)	2,333
4	12.00	8.41	3.59	(1,786)	2,526
5	12.00	8.54	3.46	0	2,739

$$2,000 a_{3,12} = 4,804$$

$$2,000 a_{2,12} = 3,380$$

$$2,000 a_{1,12} = 1,786$$

In addition to analyzing earned versus credited rate comparisons and asset and liability balances, cash flow, liquidity, and market value also play key roles in the rate setting process.

1. **Cash Flow.** An analysis of your cash flow patterns and the extent of your cash flow matching provides an indication of the continued availability of cash as it's needed to cover the potential demand for withdrawals. High excess positive cash flow may indicate that you might be able to pick up yield by locking up funds for a longer

## PANEL DISCUSSION

time if higher withdrawals in the near future are not imminent. Negative cash flow will cause you to turn your attention to your liquidity position.

2. **Liquidity.** What is meant by liquidity is the amount that you've got invested short term, for example, in money market funds and commercial paper. If cash flow is negative and is expected to be so for some time, you need to be concerned with the adequacy of your short-term balances (money market funds or commercial paper balances) to weather any adverse "run on the money." One should target a short-term balance sufficient to cover a plausible level of surrenders/withdrawals over "regular" positive cash flow for a given time. If you find yourself with prolonged negative cash flows and insufficient short-term balances to cover the outflow, you need to be concerned with the market value of your portfolio.
3. **Market Value.** If you have insufficient cash flow, and short-term balances appear inadequate, a market value below book value could spell trouble. This is when you ultimately are forced to realize actual dollar losses as a result of having to sell your assets below book value to satisfy your cash needs. Remember that we're only discussing renewal interest rate setting here, and you might have some internal arrangement with other segmented portfolios for borrowing company assets rather than having to sell your particular portfolio's assets outright. But there is a cost to borrowing.

For rate setting purposes we used as our basis book value of the portfolio. However, market value of the portfolio gains importance as cash flow and liquidity positions deteriorate.

Note that in each of the examples provided that there are sufficient assets available, after removal of the pricing spread each period, to cover the liability balances at the end of the five-year investment horizon. This is a major consideration in the asset/liability, cash flow matching approach -- that is, to manage your assets such that you will have the funds available to pay the last dollar of benefit as it goes off the books.

It is the interrelationship among all these elements (realized earned versus credited spread, asset versus liability balances, cash flow matching, long-term versus short-term investment balances, and book versus market value comparison) that forms the basis of a practical renewal interest rate setting process.

In reality, actual portfolios are considerably more complex than our given "single asset, single liability" portfolio used in the examples. Additionally, if you credit interest under the investment year method, after arriving at a total amount of interest to be credited, you would then have to equitably allocate the interest among the various generations of contract holders. What we have illustrated thus far is the average portfolio rate to be credited across the entire portfolio of liabilities. A suggested approach in arriving at investment year credited rates is to analyze the cash flow/turnover of your asset portfolio to find the percentage turnover of the portfolio that must be reinvested at current rates throughout the period. Then the new credited rate might be the weighted average of the existing credited rate and the average new money reinvestment rate (less the spread), with the weight of the reinvestment rate equal to the portfolio turnover rate. The



## MEASURING INTEREST MARGINS -- PART 2

actuary should verify that the aggregate spread is being maintained. Marketing considerations have also played a key role in the renewal rate setting process.

What are the problems you are likely to encounter while attempting to measure your investment results? It's true that any asset/liability study you are going to perform will only be as good as the output from your investment accounting system. Two areas to consider are (1) the accuracy and consistency of information from period to period, and (2) the lag in information availability. These two considerations may be somewhat opposed to each other as there always seem to be tradeoffs between timeliness and increased accuracy. You may wish to delay reporting for one period if you find that investment accounting errors are generally discovered and corrected in the following period. This would improve the accuracy and integrity of your reports. If it is more important that reports be timely, be sure you are aware of how reversals are to be handled and how they will be reflected in the current and prior period reported results.

In our previous examples, we attempted to match assets and liabilities after removing our spread from the asset portfolio. If our portfolio were to include high-yield investments, the higher yield cannot be passed along by way of higher credited rates without some provision for possible future defaults. This can be accomplished by building up and maintaining a default reserve over and above the liability balance that remains within the assets, unlike the pricing spread that is removed and transferred to your General Account. A "pay-as-you-go" approach can potentially lead to inequity in the event of default. Estimation of the appropriate default reserve should consider the proportion of high-yield securities within the portfolio in conjunction with a study of "mortality rate" of securities such as that produced by Edward Altman a few years back.

Market values of certain investments (for example, direct placement bonds and mortgages) may not be available. And market values for those securities for which such information is available might not be as accurate or as up-to-date as desired. For rate setting purposes, as stated earlier, market value becomes more of a concern when there is insufficient cash flow or short-term funds to cover a sustained long-term "run on the money" and, as a result, the likelihood of disintermediation and asset liquidations is greater.

Finally, it is best to work out an understanding beforehand of procedures that should be followed if certain events should arise. Among the possibilities are the following:

1. **Mortgage Foreclosure.** Your portfolio may include direct mortgage investments for the cash flow characteristics and higher yield; real estate, however, may not be desirable as an investment for an annuity portfolio. But that is exactly what the portfolio ends up with in the event of a default and foreclosure. A procedure should be established to transfer the property to your company's real estate portfolio for fair compensation or to otherwise handle disposal of the property. Any risks of mortgage ownership, as for high-yield securities, should be "reserved" for with higher asset balances resulting from lower credited rates.
2. **Intersegment Borrowings.** The General Account or other segmented accounts may be in need of cash and wish to "borrow" for a short time from the annuity segment.

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In such an event, it might be arranged that any borrowed funds are to be replaced with interest at the current portfolio earned rate.

3. **Accounting System Changes.** If the investment accounting area decides to change systems, hopefully you will be involved at least to assure that the information that you need for rate setting will continue to be provided with little disruption.
4. **Support of Corporation.** The segmented portfolio may be called on to support a company's desire to accumulate liquid, short-term funds and cash equivalents. A short-term discontinuity in earned rate as a result of the greater mix of liquid funds than deemed necessary by the segment's investment strategy may then be experienced.

In summary, any measurement of investment results is dependent on an understanding of various interest rate measures and the impact on return of such items as "coupon, maturity, and quality." Interrelationships between portfolio yield rate and the asset balance that rate is applied against are key in measuring attainment of desired pricing spreads. And most basically, the integrity of your measured results is going to be dependent on the quality of the investment accounting information with which you have to work.

MR. SMITH: Are there any questions?

MR. SHRIRAM MULGUND: There was a mention made about the call options. It was said that in theory it might turn out that the call option might be exercised, but in practice the call option is not exercised, so the percentage may not be 100%. Have there been any studies in terms of what proportion of bonds might be called when they should have been called?

MR. KYLE: Yes, There have been several analyses done, one that we did, and what we found was that public utility bonds and bonds of large industrial companies tended to have their call rights exercised much more frequently than smaller-issue bonds so that the frequency with which a bond is called varies with the size of the issue and the sophistication of the company. A good proxy for that was one, size of the issue and the second good proxy for that was a market capital company. You can rest assured if you own GE Capital Credit Corp bonds and they can call it and make money or save interest they will do it. On the other hand, Arizona may or may not do it and that's something that you have to take into consideration. The best source for that and what we used to do is simply call up the broker and say, hey, look, we own the Arizona Power. It was 13 of 96. What do you think they're going to be called on and they'd tell us. But in general it really did vary dramatically and I don't know of any explicit study that states this percentage or that percentage was actually exercised. Ultimately, they all were. I mean at some point you have to realize that Wall Street makes its money from reissuing these bonds, so some broker or investment banker somewhere is going to figure out, well, holy smokes, we can save this guy 50 basis points and they'll get to it. But there is a definite lag time. It's not as discrete a time period as I had once thought anyway.

## MEASURING INTEREST MARGINS -- PART 2

MR. MAVROGENES: There's a phenomenon very similar to what Tom Kyle mentioned earlier that occurs in the mortgage market. The questions always surfaced as to why there are still Ginnie 15, and 16, and 14 still outstanding when anybody could refinance and it's a constant that has to be built in the models. A few years ago the thought was very similar that there is some sort of burn-out component and then once you've gone a number of interest rate cycles and rates have cycled up and then cycled back down and gone back up again you tend to weed out the people who are sophisticated enough or able to prepay. And in a lot of cases they're not credit worthy enough to reissue or to take the mortgage again, to refinance the mortgage. And some of the work that we've done recently has shown that actually a lot of that, particularly, in regard to Ginnie Maes, has not been irrational behavior. There are a couple government programs, Section 235 in particular, that actually subsidize high coupon mortgage bonds and not all the mortgages and then say full of Ginnie 15 were issued under the same type of structure and so that there were those mortgage holders who did not have a subsidized rate and they tended to prepay. But those who stayed with the Ginnie 15 weren't actually paying 15 plus some servicing rates. They're actually paying a rate, say 10.5, 11% and they were behaving rationally. But as Tom Kyle mentioned, ultimately, this thing catches them particularly in regard to corporate bonds, because it's just a large vested interest from the point of view of investment bankers to get these refinanced because that's how they make their money. But I also know of no study that actually has looked at and measured precisely this tendency.

MR. JONATHAN E. MILLER: To follow that up a little bit, especially, with your answer about capitalization, it seems likely to me that a lot of this is, in fact, rational behavior because a lot of your registration costs for publicly issued securities are essentially fixed. So a small company is going to have a lot harder time absorbing those costs than a larger one is and clearly the case that seems to agree with our experience at AUL.

MR. KYLE: I agree with that. There's no question about it.

MR. MAVROGENES: Also, the consideration should be made to not just the coupon rate versus the prevailing rate of interest because that may or may not be an appropriate measure. Company A that issued bonds three or four years ago at 150 off the treasury code may not be able to refinance at that kind of rate of interest today. They might have to go to the market and issue bonds at 350 off the curve. And so it doesn't really make sense. I think I agree with you that there is some rationale here in addition to refinancing costs that can't come into play and can explain a lot of the behavior.

MR. MILLER: And, again, there's something on the flipside, too. We had a company that called its 4% bonds in 1983 because the purchaser didn't like some of the restrictive covenants in the indenture. They wanted to get rid of that more than they wanted to save their interest.

MR. MAVROGENES: It might be the case that those covenants were so expensive from a flexibility point of view that they outweighed the actual dollars and cents component of the coupon, of the arbitrage.

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MR. STEVEN A. SMITH: We've got a couple of fellas up there from the Street and the subject seems to be bond calls right now. I wonder what anyone might have to say about the subject of bonds that are not supposed to be callable but seem to get called one way or another. Two years ago we had -- I can't remember the exact percentage but I'm guessing at like 10 or 20% or a significant portion, at any rate, of our bonds that were actually called but in theory were not callable.

We're actively searching for some situations or cases where we could perhaps get together with other companies and perhaps even sue to try and enforce the covenants which said they weren't callable. They were calling the bond. They were supposed to do that with refinancing. Three or six months later you discover that they had refinanced in effect and so when you're thinking in terms of cash flow projections or just about call protection in general, what is call protection really getting to be worth these days and is the situation worsening or just what?

MR. KYLE: Well, let me try and address that because we've got the same problem in managing assets. The first is to recognize that prospectuses are written by lawyers and there's a reason that lawyers are highly paid and that is they write a lot. Unfortunately, what we found is in looking at prospectuses that bonds that we really thought, as you say, weren't callable had, in fact, been written into the prospectus in the fine print, situations that either one could say the bonds could be called or worse were situations that allowed them to be called, but the probability is such an event was so low in the view of the Street that they were called noncallable bonds. The term for that is some version of event risk. What we found is there's no substitute for reading the prospectus and, unfortunately, most buyers of assets in this country do not read the prospectus. And what we do is require the broker (and we deal with all the Street) to send us the prospectus on any issue that we don't have. We have a bunch of credit people. There's four who read prospectuses. That's all they do in life. I don't know how they do it, but that's what they do. We have a database on our system that allows us to identify features of a security's wording in a prospectus that may not be wording that has been priced; we keep track of that. So there's a little not just the call, dates, and prices, but there's a little comment section where we track that in the event that plant blows up, this bond can be called. With regards to buyers getting together, that's clearly happening in the marketplace.

MR. SMITH: Have there been any successes yet?

MR. KYLE: Yes, there have been a couple. I would not want to be part of American Brands right now. I believe the E-2 holders have a good case. That's where essentially E-2 was the situation where the bonds came to market and six months later the assets backing those bonds were sold out from under the company and the bond holders got left in a subordinated position to a bunch of senior debt of a parent firm that was not willing to guarantee the subordinated debt. And they took a big hit. I think it was like 20 points or something on the price of bonds.

MR. MAVROGENES: We've also come across it in collateralized issues, particularly, over the past few years we bought a number of preferred stocks. So then we collateralized with, oh, government securities, treasury bonds, Ginnie Maes, Fannie Maes, and

## MEASURING INTEREST MARGINS -- PART 2

issues by savings and loans or subsidiaries of savings and loans (S&Ls). And as these S&Ls have gradually financially weakened, we've mysteriously gotten phone calls from them saying, "Well, this is a bankruptcy remote trust that these have been placed into and technically FISLIC can't attach these assets, but you never know what's going to happen if we slip into receivership here and do you really want to go through that?" We'll buy the bonds back at 50 or whatever the dollar price is and as often as not our clients will, in fact, sometimes we'll even recommend that because I mean it's just basically extortion, but if you don't want to go through FISLIC's reorganization and there are in the mortgage bond market there are also similar types of securities. In fact, some zero coupon Franklin bonds recently liquidated at their amortized value instead of their true created market value of the collateral. And because Franklin has been taken into receivership and, actually, even disregarding the explicit terms and conditions of the bonds they were just called at their created value and many people lost quite a bit of money in that.

MR. KYLE: One other comment I'd like to make is part of the issue of what's going on is 25 years ago the marketplace was just not this complex. As the number of securities and types of securities grow, there's a greater ability on the part of firms to manipulate the market, to do things that, while not in the advantage of the owners of the bonds, certainly are in favor of the issuers of those bonds. And, frankly, the issuer has a lot of leverage. I mean he knows who all the owners are and all the owners don't know each other in general. And I think you're going to see more of that. I really believe that the diversification in the marketplace and the vast variety of types of fixed income securities means that those companies that have to invest in them as a part of their business, one of the costs of doing that business is dealing with that complexity and the "inefficiencies" of the marketplace.

MR. GERALD A. LOCKWOOD: Tom, you mentioned in taking capital gains at roughly 60% of it I think was future investment income or the present value of future investment income that was being taken in advance. What do you think the other 40% is?

MR. KYLE: Well, that was real interesting. What led to this, by the way, was sort of something similar to what Tom's been through which was the view was held that the capital gains were all attributable to interest. So I asked the following question. Well, great, if I take the market price at which I sold that asset at and take into account the change in interest rates from the time I bought it to the time it's sold what should the implicit "Street price" have been and we did that. We found that the price that we sold at was often very different from the implied street price simply from the change of interest rates. So we had empirical evidence and, in fact, the gain was a real gain of some sort. And when we looked back at it and tried to take a look at things like, well, did the change in credit, did the credit on this bond change? And what we found in some cases was, yes, but in other cases, no. And finally we got the idea well, gee, the broker did it so let's call the broker and what did he have to say? And one of the strangest things I heard, it was an interesting conversation, he said, well, you know on that particular bond it turns out that we had this buyer out in California who had borrowed those bonds and sold them short in essence and he really need to cover it. And so what he did was there was a dislocation in the supply in the marketplace and this

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guy paid up to cover his short on those bonds, okay. And so I said to guy, well, are you telling me that if people are covering short bonds I can make some money by selling in to that? He said, oh, yeah, that's how we do our trading. And I said, well, yeah, okay, that's interesting. So I got the bright idea, I said, well, gee, what other reasons are there besides changes in supply and it turns out that even though a credit rating hasn't changed there are changes in the marketplace's perception of a company's credit rating. For example, Citibank; Citibank just had their commercial paper downgraded recently. Well, it turns out the market had anticipated that awhile back and basically had adjusted the prices of Citibank's commercial paper or interest rates, take your pick, to reflect that. And it turns out the market is pretty good in ferreting out what I would call nonquantifiable events. That is to say changes in a securities price should be made because of events that really aren't related to interest changes or whatever. So it was a real interesting phenomenon.

MR. MAVROGENES: If I could just add here that mortgage backed securities, for instance, are very volatile. The spread of the curve is very dependent on volatility, for instance. So if you're at a position where you have a 90% long bond but you've gone through a very high stroke of volatility, the spread of the mortgage backed security will reflect that. I mean there are embedded in that security options and those options become more costly as rates are volatile. So if you look at a time in which interest rates have not changed at all but have been constant for say a 12-month period, you'll find that the mortgage backed security will appreciate in value because the spread has just tightened due to the fact that there has been reduced volatility in the marketplace. So there is a pure case where the entire capital gain is attributable to features other than interest rate changes.