

**RECORD OF SOCIETY OF ACTUARIES  
1987 VOL. 13 NO. 3**

**A CASE STUDY IN ASSET/LIABILITY MANAGEMENT**

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Panelists: DAVID R. GARDNER\*  
              GREGG HUEY\*\*  
Recorder: DEAN C. WILLMAN

- o An actual asset/liability management situation will be reviewed by the consulting actuary, the chief executive officer and the investment officer involved.
  - Discussion of asset/liability management issues
  - Profile of case study life insurance company
  - Discussion of cash flow analysis
    - Liability assumptions
    - Asset assumptions
  - Results of cash flow analysis

MR. GREGORY D. JACOBS: We will go through an asset/liability management project for Case Study Life Insurance Company. Helping me go through this study will be two individuals that work for a client of mine in Indianapolis. Even though this Case Study Life Insurance Company is not the company which employs these two individuals, we have gone through a similar process at their company. Hopefully the dialogue that takes place will be quite representative of what has to go on in an actual asset/liability management study.

The first gentleman on the panel is David Gardner, a CFA and Vice President/Director of Investments of Meridian Life Insurance Company and Executive Vice

\* Mr. Gardner, not a member of the Society, is Vice President of Meridian Life Insurance Company in Indianapolis, Indiana.

\*\* Mr. Huey, not a member of the Society, is Life Operations Manager of Meridian Life Insurance Company in Indianapolis, Indiana.

## PANEL DISCUSSION

President of Meridian Asset Advisors. The second gentleman is Gregg Huey, the Life Operations Manager at Meridian Life Insurance Company. I am a Consulting Actuary in the Indianapolis office of M&R.

The setup of this case study is that this particular company is facing problems that a lot of insurance companies face. That is, they have experienced relatively rapid growth and fairly good success in the past and their stockholders or their management is concerned that they are not able to sustain both the growth and the profitability. They look at their products, all of which are investment orientated products (universal life and annuities) and realize that they are (1) uncompetitive compared to their perception of the market and (2) unprofitable compared to their expectations. They wonder why and what can be done about it. That is the premise of this case study.

As you know it is a very volatile and hostile situation we in the insurance business are facing and I'd sure like to help see you guys through it. Let's talk a little bit about your company so we can begin to tackle some of the concerns you are facing.

MR. GREGG HUEY: As you know, this is a stock life insurance company. We sell all of our business through independent agents. Lately, the emphasis of our product line has been investment oriented products; we are not into variable products yet. What I mean by that is we sell products that are general account asset generating products: universal life (UL) products, both front-end and back-end, and flexible premium and single premium deferred annuities. We are very concerned with the single premium deferred annuity. We are thinking of cutting back sales on that line. We just don't see how we can make enough profit in that business. We are a top rated company as you know and we think we are reasonably well managed. In the past, we have concentrated more on being conservative than on being aggressive. We have not been one of the market leaders but when we get into the market, we think we do it quite well.

Table 1 shows our statutory balance sheet over the last 20 years. As you can see we started out as a reasonably small company with a pretty good surplus position. Our surplus was about 16% of assets. Over the next 10 years, we about doubled our size, doubled our assets, doubled our surplus. We were doing fairly well. During the late 1970s and early 1980s we had a dramatic

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

increase in business. Interest rates were going wild at the time, as you well know, and we really put a lot of business on the books. We increased our assets quite substantially even during the downturn of the interest rates. Lately we've slowed our pace a little bit, especially here in 1987, and we're really concerned that we're not selling as much as we would like. We wonder how the competition can be selling what they're selling at the rates they're selling at and still making the profits that they need.

TABLE 1  
CASE STUDY  
LIFE INSURANCE COMPANY

Year	Statutory Balance Sheet (in Millions)		
	Assets	Liabilities	Surplus
1966	\$ 35	\$ 30	\$ 5
1976	60	50	10
1982	200	175	25
1983	250	220	30
1984	350	315	35
1985	475	435	40
1986	600	555	45

MR. JACOBS: Let's see what your current block of in-force business looks like.

MR. HUEY: Table 2 shows the distribution of our 1986 business reserves relative to our 1976 business. As you can see, we have five major lines of business -- a big block of traditional permanent nonpar business, that used to be the big profit maker. Now it's going away faster than we care to think about.

TABLE 2  
DISTRIBUTION OF IN-FORCE

Line of Business	1986 Reserves	1976 Reserves
Traditional - Permanent - Nonpar	\$255	\$45
Universal Life - Front-End	50	0
Universal Life - Back-End	100	0
Flexible Premium Annuity	50	5
Single Premium Annuity	100	0
Total	\$555	\$50

The next two product lines are growing pretty well -- front-end load and back-end load universal life products. They're fairly typical products. The back-end load product has no expense loads and a run-of-the-mill surrender charge

## PANEL DISCUSSION

pattern. There's nothing real fancy about it. It just seems to be a real good solid product.

We also have two annuities on the books -- flexible premium annuity (it's a pure back-end product, no loads whatsoever) and single premium annuity (similar in structure to the flexible premium product).

As you can see, we've had a dramatic shift in our business since even 1976. Obviously, universal life was not in the picture back in those days. Ninety percent of our entire block of business, reserve-wise, came out of our traditional permanent business. That distribution has shifted significantly. As we look into the future, we see the traditional business even becoming a smaller and smaller portion of the total.

MR. JACOBS: What is the asset makeup of the company?

MR. DAVID R. GARDNER: Table 3 shows the assets as of 1986 and 1976. As you can see, right now we have \$600 million in assets. We put a lot of money to work in high-coupon bonds about four or five years ago when interest rates were 14, 15, and sometimes 16%. Unfortunately, there are not many corporations that want to pay 16% for their money, so most of those investments are leaving our portfolio very quickly. In order to counter the bonds being called, we have taken a look at mortgage-backed securities, mainly Government National Mortgage Association (GNMA). Initially we were buying paper in the 13% area, but currently we are lucky to get between 9.5% and 10.5%. We have a little block of direct mortgages; we think there are some opportunities there, so we're building on that because we are able to take both commitment fees and tailor the characteristics of the mortgages more directly. We can't control policy loans. We have \$50 million of policy loans outstanding and lately we've had some good fortune with interest rates being down. We have had some serious problems in that policy loan account back in the early 1980s. Right now we have cash and short-term assets of about \$10 million. That's probably a little bit higher than we would like. Back in 1976, we looked pretty much like a typical company. We had almost everything in bonds, with the exception of the policy loans. Back in those days, policy loans were not a serious problem for us.

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

TABLE 3  
DISTRIBUTION OF ASSETS

Type	1986 <u>Assets</u>	1976 <u>Assets</u>
Bonds	\$240	\$30
Mortgage Backed Securities	250	0
Direct Mortgages	50	20
Policy Loans	50	5
Cash	<u>10</u>	<u>5</u>
Total	\$600	\$60

MR. JACOBS: That shows us a good picture of what your current book of business looks like. What kinds of business are we looking at for future sales and how does it stack up profitwise and competitionwise?

MR. HUEY: Basically, we have four products. We've essentially ignored the traditional plan. It's still in the ratebook but we hardly sell any of it. Being a nonpar product, I'm sure you can imagine why. The first we have is a front-end universal life product. It's a fairly traditional front-end load product. Some of the problems we're having with it are that we're crediting a portfolio rate minus a spread and right now we're at 8%. Our marketing people have told us that our peer group of companies and alternative investments seems to be at about 8.5%, so we're lagging behind the market. At the same time, the profits on our product are only a 12% return on investment whereas we expected a 15% return on investment. We seem to be stuck on both ends and we're having a lot of trouble figuring out how we can fix this product.

The second major product that we sell is universal life back-end load. In fact, that's where most of our sales are coming from these days. Again, we're crediting on a portfolio minus a spread basis and we're crediting 7.5% right now. The market rate is up at the 8.5% level so we're really lagging behind there. We've found that we need a much bigger spread on the back-end load product than on the front-end load product. We can't get it and we're really hurting on the profit side. Right now, profits are only coming at a 10% return on investment. Once again, we expected a return on the order of 15%.

The two annuity products we're selling are a flex annuity and a single premium annuity. We're crediting the flex annuity 7.5% on a portfolio basis and the

## PANEL DISCUSSION

market rate seems to be around 8%; same situation, same problem. We have profits that seem to be in the 12% area and expected profits again were 15%.

As I said earlier, we're seriously contemplating dropping the single premium annuity product line. We are currently crediting 7.5% and the market seems to be at 8%. Everything we've looked at profitwise for this product seems to point to a return on investment of only 9% and again we were expecting 15%.

MR. JACOBS: Let me try to summarize what I think I heard you saying as you were describing some of the things going on at your company. (1) Your products aren't as competitive as you'd like them to be. (2) Your profits just aren't as high as you'd like them to be; therefore, you can't grow as quickly as you and certainly your stockholders would like, while earning the desired return on your investment. As I look at your products and your asset mix and some of the problems you're facing, I'd like to point out some of the areas that I think we can manage. If we do some analysis of each of these areas I think maybe we can find a way to address some of the concerns. Here are some of the areas that I think we as managers of the company can get a handle on.

First is the interest crediting strategy. What I'm talking about here is how we determine the interest we pay our policyholders. You are using a portfolio less a spread mechanism. That's very, very common in today's environment. One problem I see quite often with this sort of a method is that we price products with a spread. We try our hardest to keep that spread up, but over time the spread kind of erodes. We fool ourselves a little that we'll make it up in some other areas so we don't keep the spreads in there that we really think we need. To be honest I don't know if that's the situation at Case Study Life or not.

The second item is investment strategy and that's Dave's area. As actuaries, we're not going to come in and tell you what to do on investments. Hopefully, we can help you analyze it. We need to do some modeling, which you can help us create, to project out your assets. It's really critical that we know the cash needs of the insurance lines so that you know what to do with the money to get the best returns, while not compromising your standards of quality.

The next item is product design and that falls in the actuary's domain. What I mean by this is that it's quite possible that we have our products designed

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

incorrectly. It may be the way that our surrender charges are structured or the level of our cost of insurance. We may have an imbalance in our sources of profit. We're emphasizing one area over the other and in this particular environment that we're in today, we're getting hurt by it. So maybe what we need is some analysis of the product design.

The next item is product mix. By managing the product mix we can possibly bring together different lines of business that have offsetting investment risks. One area where I've seen this work is by structuring an insurance portfolio such that there is a balance of sorts between deferred annuities and payout annuity products, each of which have different investment risks associated with them. You could cancel out each of the risks and pretty much come up with an immunized portfolio that will be fairly safe when interest rates move up or down.

The final two areas certainly can be managed. They are fairly obvious ones of expenses/commissions and underwriting. Based on my prior discussions with you and the other people at Case Study Life, you have always kept your pencil sharp in this area and I'm sure that you're on top of all these. These areas are not really the areas of concern.

Looking at some of the areas that can be managed and matching them up against the concerns that I hear you talking about, I would recommend a cash flow analysis. I think that a cash flow analysis needs to be performed to evaluate the interest crediting strategies and the investment strategies. Also, we can look at what different product design features as well as different product mixes are going to do to your cash flow. And as you well know, cash flow is what drives the insurance company and if we can analyze that and manage the cash flow, then I think we can tackle or address a lot of the concerns that your company seems to be facing.

Before we get into some of the specifics of a cash flow analysis, let me give you a brief overview of what is involved. What we do is project the insurance and the asset cash flows under varying interest rates. I think that the problem we're facing here at Case Study Life is interest rate related. What I mean by that is we have a large block of assets backing up a large block of liabilities all of which are interest sensitive. For us to (1) analyze our risk, and (2) obtain the return we need while keeping ourselves in a competitive position, I think it

## PANEL DISCUSSION

is very critical that we analyze what happens to our cash flows when interest rates are moving. That way we can position ourselves to properly react when interest rates do in fact move.

Let's define what I mean by cash flows. Insurance cash flows are made up of the following items. The income item is premium income, the outgo items are basically made up of the benefit payments (death claims, dividends, annuity payments, and surrenders) and commissions, expenses and any taxes that we would have to pay. These are basically cash in and cash out items that arise from the insurance operations.

Looking at the asset cash flow, the income items are any scheduled maturities of assets that we have together with principal payments and prepayments. Principal payments come from the mortgages, prepayments come out of our calls and GNMA prepayments are hurting us all right now. The investment income is also an asset cash flow together with any liquidations. Borrowed funds are also in there as well as capital gains on sales. The outgo items that we have are increases in policy loans and any capital losses.

To perform a cash flow analysis, we have to start with some models. What we will want to do is take a model of your liabilities and assets. Modeling is fairly straightforward for actuaries; we spend a lot of time doing this. Dave, I presume you do quite a bit of modeling on the asset side. So, if we can bring both of these models together and integrate them as interest rates move, I think that we will be heading in the right direction. Looking at the liability model, I will break it into two sections: the existing business section and the new business section. The existing business is your traditional permanent, your UL plans, and your annuity plans. If I am not mistaken, Gregg, you said that the direction the company is heading is to concentrate on the back-end UL and the flexible premium annuity, so we will make that up as our new business. The modeling that we will go through is fairly typical; we will look at the issue ages and the duration of the business that you have in force and then again what you expect to sell. As far as the liability assumptions go, I would like to break them into two categories; the first one I will call standard and the implication there is that they are fairly simple. Some of these items are the plan design parameters and the guarantees (cost of insurance rates, expense loads, any kind



## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

of interest guarantees, and average premiums per \$1,000). Certainly we will need commission data and expense data and then any kind of experience mortality data. These should all be fairly easily obtainable.

There is a second set of liability assumptions that we need to pull together and I would like to call those the dynamic or the interest-sensitive assumptions, and I think we need to spend some time looking at each of these. The first one that I want to look at is some sort of definition of the competition or the market rate. If you will recall, one of the concerns that the company seems to be facing is that they just don't seem to be up with the competition or in the market. What we are trying to do in selecting this assumption is measure the competition so that as interest rates move through time, we see where we are in the market.

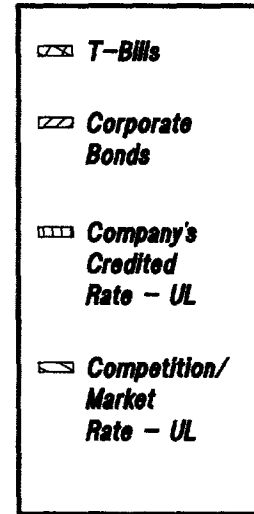
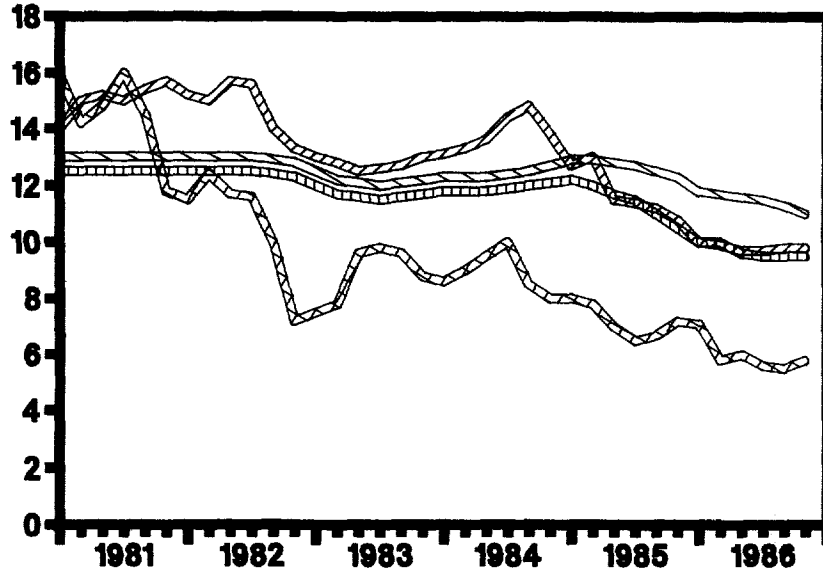
MR. HUEY: Graph 1 historically shows for our back-end load UL product what we have been crediting, what some of the outside indices have been and what we view the competition rate to have been. When we define the competition we need to factor in a couple areas: (1) What are our agents telling us their peer companies are offering? That is a tough one to call, because every week we seem to have a new company and a new hot product out there. After we sort through who the real players are and who are the flashes in the pan, we can come up with a fairly good rate for what we think the competition is. (2) Another way that we look at this is to realize that we are competing for the savings dollars with a lot of other organizations, banks and mutual funds. One key question in this area is what alternative investments other than the insurance product are offered at this particular time? This is not as strong a force in the UL marketplace as it is in the annuity marketplace because of the major insurance element. On the annuity side, there should be a fairly direct link between what the company is offering and what alternative investments may be available.

MR. JACOBS: Using this data, I have tried to model what the competition seems to be doing, assuming there is some rationale behind what they are doing. I define the competition as being the greater of two items: the first item is the short-term rate less 150 basis points. I came up with this standard by looking back to the late 1970s and early 1980s when we had our inverted yield curve. A lot of companies were basing their credited rates on the treasury's at that point in time. The second item is a five-year average of corporate long-term bonds.

# CASE STUDY LIFE INTEREST RATES

1456

Percent



GRAPH 1

PANEL DISCUSSION

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

I think that is where we are at in today's environment. I think that we should go into this cash flow analysis with this definition of the competition rate. The significance of the market rate is twofold: (1) it is going to drive our lapse rate formula that I will soon talk about, and (2) if at some point in our alternative testing we decide to credit the competition's rate or the market rate, then this will be the rate that we will be crediting our policies.

The next item that we need to talk about is lapse rates, because lapse rates are quite interest-sensitive. I really think that we need to break lapses into two measurements of lapse rates. The first lapse rate that I would like to talk about is the policy lapse rate. What I mean by that is we should look at the measurement of the policies either in force or not in force. I will call the measurement of that lapse rate, the policy lapse rate. We are not tying it into premium and we are not tying it into face amount, we are simply looking at whether the policy is there or whether the policy is gone.

MR. HUEY: Graph 2 shows what our policy lapse rates on UL products have historically been over a time. What we have done here is graph it against our credited rate and our perception of the market rate.

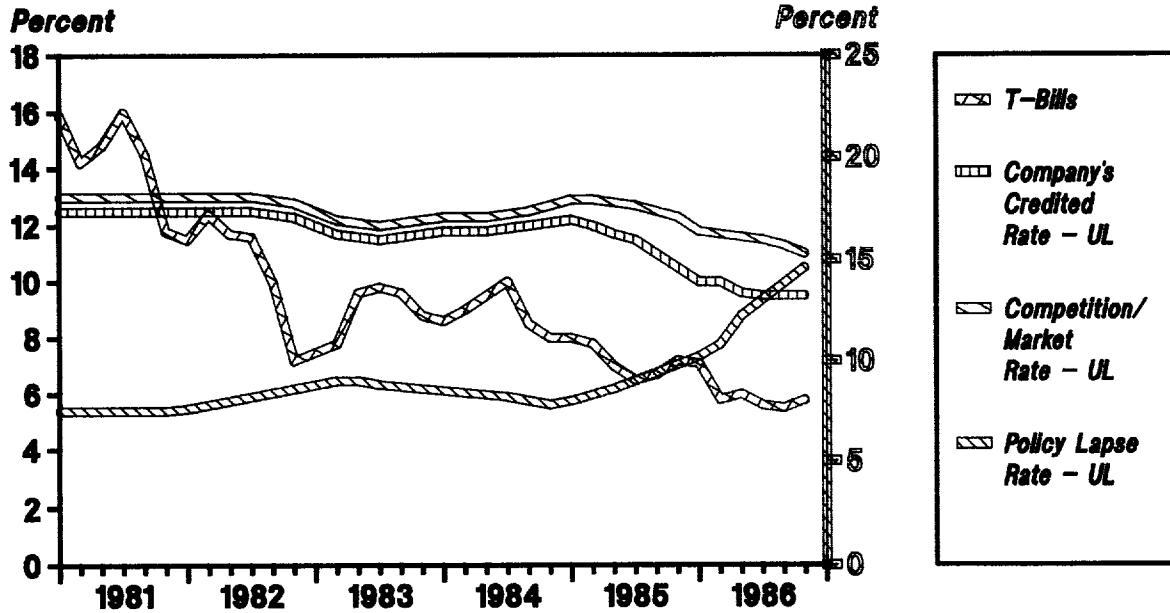
MR. JACOBS: This graph allows us to create a dynamic lapse rate assumption or formula where we can try to tie the policy lapses to the differential between where you are at and where the competition is at. The implication is if you are at the competition, then there is no particular incentive to lapse other than a base lapse rate. When your rate lags behind that of the competition, then we would expect lapses to increase and certainly yours have done that. If your rate is better than the competition, we would expect to see some sort of a dampening in lapse rates since they obviously can't get a better deal any place else.

Given this sort of information, what I have been able to do is do some analysis and create the following sort of a lapse formula which is shown in Graph 3. This policy lapse rate formula is made up of the market rate minus the credited rate to the 1.5 power, times two plus a base lapse rate of 4%. This is also shown graphically, with different market rate less credited rate combinations. This reasonably reflects what has happened at your company. The further away you are from the competition, the higher your lapse rates have been. The closer you have been, your lapse rates have hovered around the 4-5% area.

# CASE STUDY LIFE

## INTEREST RATES & POLICY LAPSE RATES

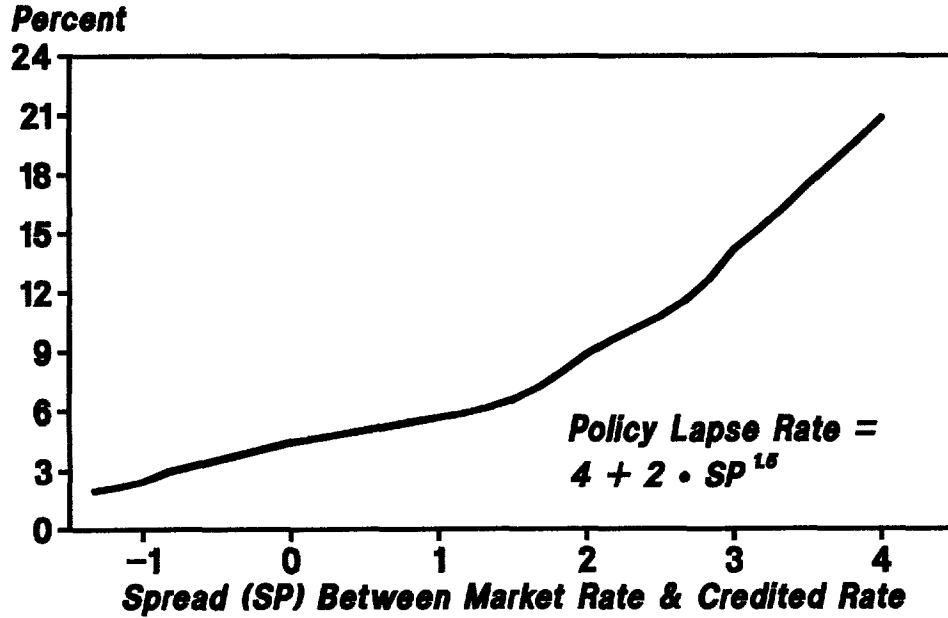
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GRAPH 2

PANEL DISCUSSION

# **CASE STUDY LIFE POLICY LAPSE RATE FORMULA**



A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 3

## PANEL DISCUSSION

The second area of lapse rates that I think is very, very critical to consider and is unique to flexible premium products is something I will call the premium lapse rate or premium suspension rate. The idea here is, with a flexible premium product, the policyholder has the option of paying a premium or some portion of the premium or possibly even putting in an extra premium depending on his own personal economic situation in combination with what your product looks like compared to the market. I have found in my testing that the premium suspension rate is a very critical determinant of the profits of a product.

MR. HUEY: Along this line, Graph 4 shows our credited rate relative to the market rate. Superimposed on this graph is one minus the ratio of the premiums we have collected in the second year as a percentage of the premiums we collected in the first year. In this analysis, we have ignored any dump-in premiums.

MR. JACOBS: With this information, I will be able to do a similar sort of analysis that I did on the policy lapse rates and create a formula or model for premium suspensions. For this particular product, a formula that we have come up with is shown in Graph 5.

This particular formula shows that the premium suspension rate has a base suspension rate of 9% plus the difference between the market rate and the credited rate to the 2.5 power. Again, this is also shown graphically. This Graph 5 is somewhat different than the previous policy lapse rate in two regards: (1) it is at a higher overall level which I think is quite interesting and (2) it is more volatile. I have not seen enough information in the industry or among my other clients to confirm that this is in fact fairly consistent with other companies. If you feel comfortable with what we are trying to do here with these lapse rates, (both policy and premium) and feel comfortable with the results of these formulas, I think we will go ahead and use these.

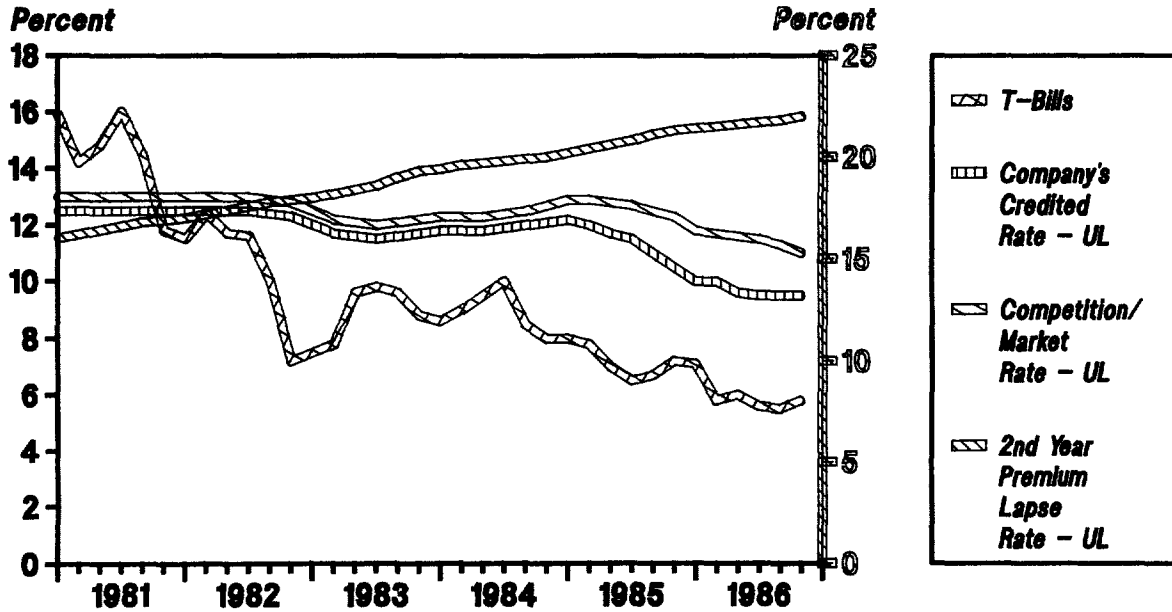
The next area that is a dynamic assumption is the policy loan utilization rate. To tackle this particular assumption we basically need two values. First is your policy loan interest rate, either fixed or variable. I believe in your particular situation we have a fixed rate, which makes you even more susceptible to some of the abuses that can occur in policy loans. The other is the policy loan utilization rate.

# CASE STUDY LIFE

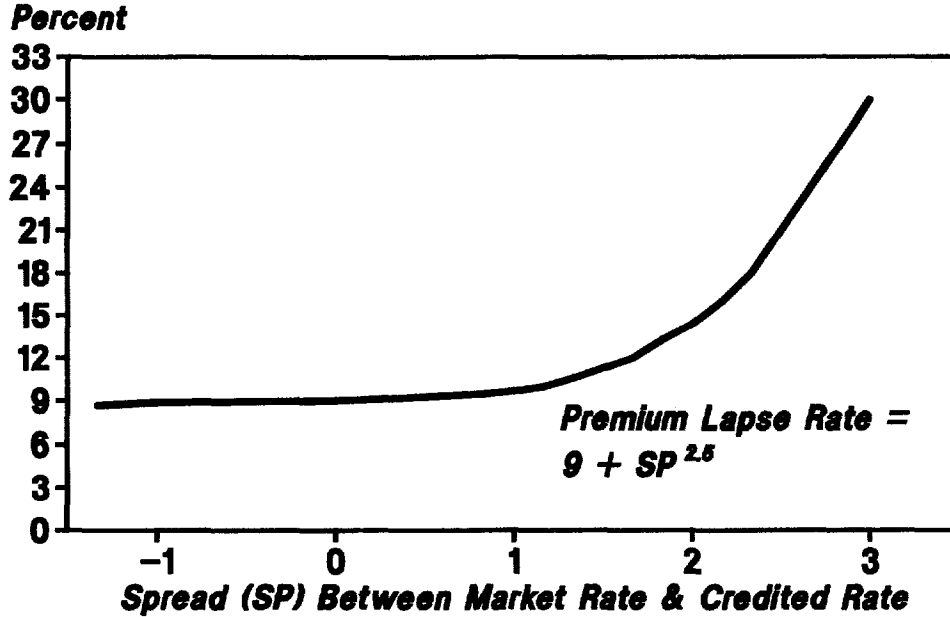
## INTEREST RATES & PREMIUM LAPSE RATES

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 4



# **CASE STUDY LIFE PREMIUM LAPSE RATE FORMULA**



1462

GRAPH 5

PANEL DISCUSSION



## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

MR. HUEY: Graph 6 shows the market rate for the last several years graphed against our policy loan rate, which as you can see is fixed over the same time period. The other item on the graph is our policy loan utilization rate.

MR. JACOBS: I commend you for having all of this information. What we will be able to do with this is create a formula that measures the policy loan utilization rate as a function of the difference between the market rate and your loan rate. For your particular block of business, the formula that I have come up with for the policy loan utilization rate is the difference between the market rate and the policy loan rate to the 1.8 power. That seems to fit what has happened historically at your company over the last few years.

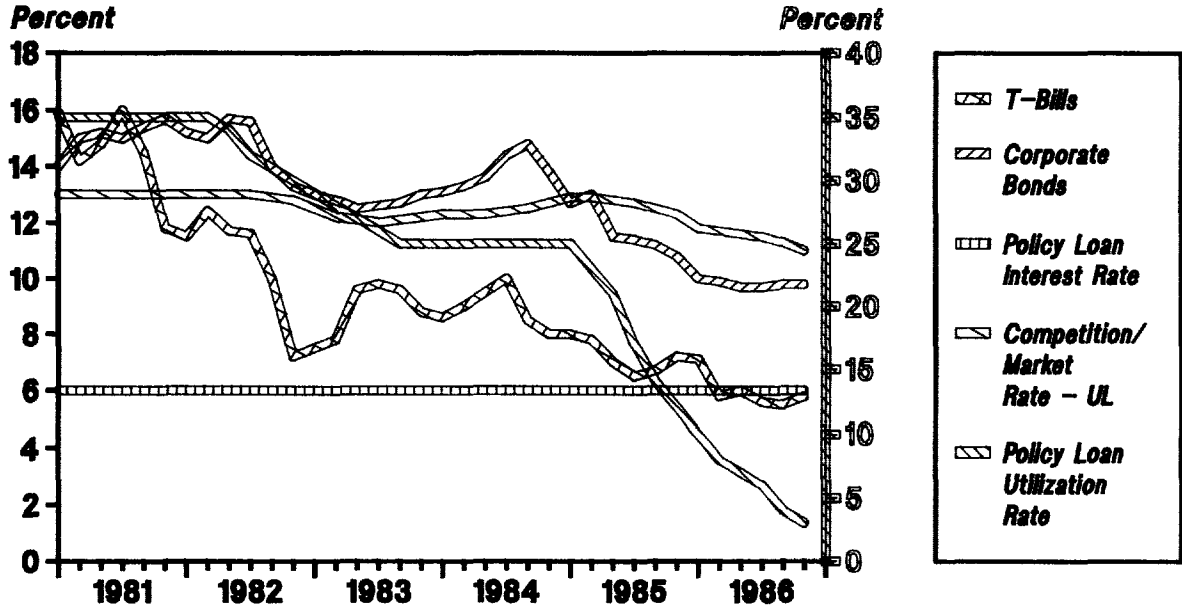
Another critical assumption that is extremely interest-sensitive is the interest crediting strategy. We discussed this a little earlier. Right now, your company follows a portfolio earnings rate less a spread. For these initial studies, we will make use of this crediting mechanism and make use of the spreads that you are currently using. Some of the alternative tests that we may look into are altering the spreads. It is possible that we can redesign the product to reemphasize or redistribute profits in other areas by moving the spread around. Another area that we might want to look at is crediting the market rate. In this interest crediting area, there really are as many possibilities as a creative individual's mind can come up with.

Finally, one of the dynamic assumptions on the liability side of the ledger is the production level for new business. In this area what we ought to do is talk to the marketing people and get some feel for the levels they think they can produce, given your current competitive position; and, as we move closer and closer to a more competitive position, what they think that they will be able to do on the production side. Another alternative would be if you had any sort of historical production data that shows what your production levels have been relative to where you are positioned in the market on new issues.

All these assumptions that we have talked about so far have basically been concentrating on the liability side and to be quite honest, they are ones that we actuaries have generally dealt with in all of the product pricing and projection work that we have done. We have certainly added some new wrinkles in the sense that we have introduced the dynamic nature of some of the assumptions

# CASE STUDY LIFE

## INTEREST RATES & POLICY LOANS



1464

PANEL DISCUSSION  
GRAPH 6

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

that heretofore have pretty much been ignored. We need to definitely recognize that the liabilities of an insurance company are not fixed liabilities, with the possible exception of payout annuities, structured settlements, and guaranteed investment contracts. The insurance product is nothing other than an investment from the insurer's point of view that is inundated with options. By introducing these dynamic assumptions, we are trying to evaluate and measure the inherent risk value of these options from the policyholder's point of view.

Not to forget you, Dave, we need to talk significantly about the asset side of the ledger and what we need to do to produce some asset cash flows. Following the similar pattern that Gregg and I just went through on the liability side, let's talk about what we need to do on the asset side. The first thing we need to do is create an asset model.

MR. GARDNER: It will be made up of two pieces, the first piece being the existing assets. What we need to do here is pull out all of the actual fixed income assets that are supporting the existing lines of business. These assets are going to be your bonds, your mortgages, and your policy loans. You probably do not consider them assets, but the NAIC does and we need to keep track of them because they have a definite impact on the asset cash flows. We talked briefly about the policy loan question earlier. For us in the investment area this can be a tremendously difficult problem to overcome. To go back to 1982, for example, when short-term rates were approaching 20% and people were looking at 6% policy loans, they were not a very good asset for us. We had the opportunity to put money to work at 18-20% on an overnight basis, but because of the loans we really didn't get much money invested. As soon as I turned to the marketing area to get this money, it had already gone back out in policy loans.

The second piece of the asset model is going to be new assets. We need to describe in fairly generic terms what sort of assets are currently available and may be available in the future. This will define the universe of future assets, where we are going to be investing our cash flows.

For these model assets, the type of data that will be needed is the principal payment structures for conventional mortgage, GNMA, bullet bonds, serial bonds, or private placements. We need to know the coupon rates, the current

## PANEL DISCUSSION

par value, the current book value, current market value, and any call or prepayment data on either a bond or a mortgage. Most of this data is readily available.

MR. JACOBS: In doing the asset cash flow, we will have to make some assumptions quite similar to what we have had to make on the liability side. This is an area that we actuaries are just getting to understand a little bit better and we need a lot of help from our investment friends on these issues.

MR. GARDNER: Here is the list that I have come up with that we need to talk about. The first item is a structure of the yield spreads. What I mean by that is we are going to base our future yield rates off of the treasury yield curve. This is a fairly common practice in the fixed income security area. We are looking for a spread relationship on a particular security over a treasury bill or bond of a similar duration.

Graph 7 is an example of some of the things we do in this area. This is a scatter diagram of the 10-year AA corporate bond yields for the last three years mapped against the comparable treasuries for the same time period. I really don't agree 100% with this graph. The  $R^2$  is something like .9982. Initially the marketplace is relatively efficient when these are priced, because that's the only way to get such a high correlation over a four-year period. It does not address the volatility after the new issues come to the marketplace and where they trade after issue. However, it is a good starting point.

Using this sort of scatter diagram and a linear regression formula, we have graphed a line through the diagram that takes the form of  $Y = A.X + B$ . In this particular formula, Y is the corporate yield, X is the treasury yield, A is the multiple and B is the constant. What we have come up with is that a 10-year corporate is 80% of the treasury yield plus 225 basis points. For each of the other securities that we have in our existing portfolio, we have similar sorts of scatter diagrams and similar regression analysis that defines what our yield spreads are expected to be.

The next area is to estimate transaction costs. That is the difference between the bid and the asked price. Generally, for the type of business that we deal in, we are going to be making use of 25 basis points as the transaction costs.

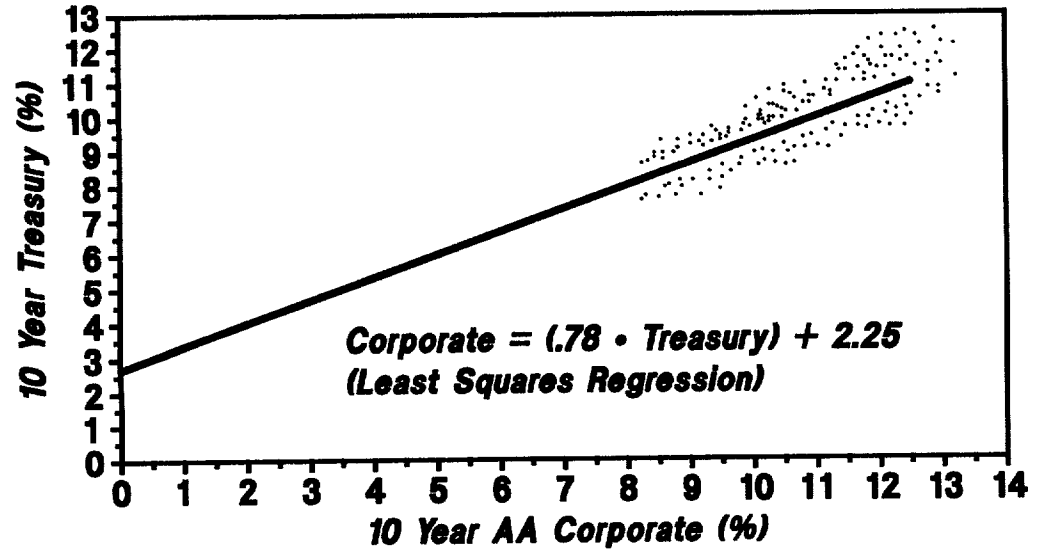
# **CASE STUDY LIFE**

## **CORPORATE vs. TREASURY YIELD SPREADS**

### **(FOR 1984, 1985, & 1986)**

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 7



## PANEL DISCUSSION

The next asset assumption we need to make is what we refer to as a call trigger. That is the amount by which the interest rates have to drop below the coupon rate on a particular bond for it to be called. For our particular portfolio model, we are going to be using a 200-basis-point call trigger.

MR. JACOBS: Another asset assumption is the mortgage or GNMA prepayment model. This gets into some of the interest-sensitivity of our assets. We have tried to model the prepayment rate in terms of the spread between the mortgage rate currently in effect and the mortgage rate then available on new mortgages.

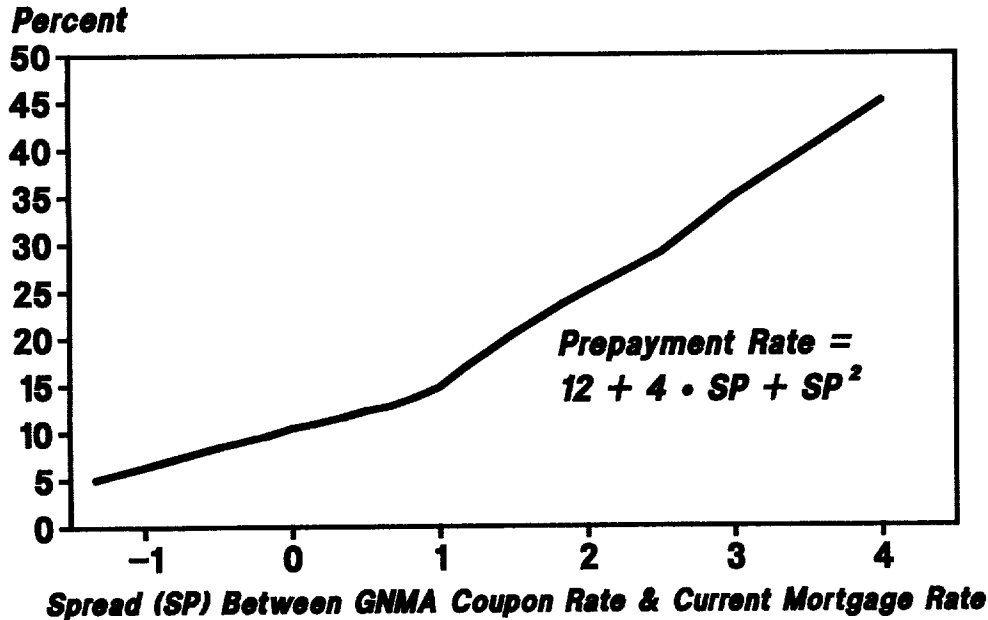
This formula and Graph 8 show the mortgage prepayment model that we have assumed. The prepayment rate is going to be a base rate of 12% plus four times the spread plus the spread squared. Looking at this graphically, we see that there is not much prepayment activity when the spreads are small and quite a bit of activity when spreads are large. When spreads are large, like they were in late 1986, we are looking at a prepayment rate of something on the order of 30-40%.

MR. GARDNER: Another asset assumption that we need to make some comment on is the default risk. This is a touchy subject and not very quantifiable. We have generally tried to keep with higher grade investment quality bonds and therefore we have pretty well minimized the default risk. Now if we were playing the junk bond game and trying to invest in junk bonds to get the returns, we would need to factor in what our real returns are going to be after we quantify defaults. For our particular portfolio, this is really not an issue, but I would certainly say that we need to consider this if we had some lower quality bonds in our portfolio.

MR. JACOBS: The last area that is an asset assumption is the investment strategy. It is really broken into two pieces: (1) How do we invest cash that is available from our insurance operations and existing assets? (2) What do we do with our existing assets? That is, do we follow a "buy and hold" strategy, play the interest rate movement game and actively get in and out of the market?

Exhibit 1 is a description of one possible investment strategy that we may use. Would you make some comments on this, Dave?

# **CASE STUDY LIFE GNMA PREPAYMENT RATES**



# **CASE STUDY LIFE INVESTMENT STRATEGY**

## ***Initial Strategy:***

<b>Bonds – 3-Year</b>	<b>0%</b>
<b>Bonds – 7-Year</b>	<b>5%</b>
<b>Bonds – 10-Year</b>	<b>5%</b>
<b>Bonds – 20-Year</b>	<b>30%</b>
<b>GNMA</b>	<b>50%</b>
<b>Mortgages</b>	<b>10%</b>

## ***Continued Strategy:***

**Invest "Off the Spread".**

**Invest in the security with the largest relative spread over treasury and the shortest duration.**

**Relative spread is determined by comparing actual spreads to benchmarks of:**

<b>7-Year Bond Relative to 3-Year Bond:</b>	<b>60 Basis Points</b>
<b>10-Year Bond Relative to 3-Year Bond:</b>	<b>85 Basis Points</b>
<b>20-Year Bond Relative to 3-Year Bond:</b>	<b>135 Basis Points</b>
<b>GNMA Relative to 3-Year Bond:</b>	<b>185 Basis Points</b>
<b>Mortgage Relative to 3-Year Bond:</b>	<b>210 Basis Points</b>



## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

MR. GARDNER: Well, this is a very simplistic approach, but I think it is a good start at coming up with some sort of a dynamic investment strategy. At Case Study Life we know it's very difficult to pin down the investment department as to its investment strategy. What we have tried to do is earn the highest rates off the treasury spread that we can. We're looking at what we call relative value. There are times when there is no justification, based on increased yield, to go out on the curve. That's where the investment department has got to be making decisions. We're always looking to pick up relative value given the asset/liability characteristics of the product lines we're trying to support.

I think this is the time to lay down one inherent rule from Case Study Life. That is, investments support the operations of the company. The operations of the company do not support the investment department. That's a very subtle difference for some, but a major difference for others. We're in business to do our best to support the characteristics of our products. We may not always be looking for the greatest available return because that investment may not have the characteristics we need to support our products. So what we're trying to do with this model is get the largest relative spread to support the characteristics of our products without extending the portfolio.

MR. JACOBS: Bringing all of this together, what we have done so far is develop a liability model and asset model which will allow us to project the cash flows out into the future. Now, one of the things that we want to do with this cash flow analysis is to look at our business under varying interest scenarios.

MR. GARDNER: We need to introduce the interest rate scenarios into this process. All the yields on assets are driven off of spreads over treasuries, so we define the treasury yield curve that we are at today (or year-end 1986). From that, we create a universe of the yield curves (some higher, some lower) that are representative of what we think may happen or what historically has happened in the past.

Table 4 shows a simple model of the yield curves. We have 31 yield curves that we are going to be using in this model, and we are currently at yield curve number 16. On the down side, we go down to as low as 50 basis points for short-term rates and a little over 200 basis points for long-term bonds. On the

PANEL DISCUSSION

TABLE 4

CASE STUDY LIFE  
YIELD CURVE UNIVERSE

<u>Curve #</u>	<u>Short-Term</u>	<u>1-Year</u>	<u>3-Year</u>	<u>7-Year</u>	<u>10-Year</u>	<u>20-Year</u>
1	.50%	.59%	.76%	1.11%	1.38%	2.25%
6	2.24	2.32	2.49	2.83	3.08	3.92
11	3.98	4.06	4.22	4.54	4.78	5.58
16*	5.72	5.80	5.95	6.26	6.49	7.25
21	8.72	8.95	9.44	9.95	10.38	11.28
26	14.22	14.27	14.44	14.64	14.77	15.31
31	22.22	21.92	21.32	20.13	19.24	16.25

\*Current Yield Curve

high side, we are looking at something on the order of 22% for short-term and 16% for long-term. The way we get volatility introduced into the projection or cash flow analysis is to define the probabilities of movement from one yield curve into the next.

Table 5 shows the probabilities that we are going to be using in this model. This basically says there is a 50% chance of staying where you are at in a particular yield curve and on each side there is a 20% chance that we are going to jump up or down one curve in any period and there is a 5% chance that we are going to jump up or down two curves. There is no chance that we are going to move three yield curves within any one time period. Putting these two items together (the yield curve universe and probability of movement) and making use of a random number generator, we can define our future yield curves as we move through a dynamic cash flow analysis. These two items that we have just looked at, the yield curves and the probabilities of movement, are by no means the final or the only answer. These were put together after many discussions that we had and we feel reasonably comfortable with them in today's environment.

TABLE 5

CASE STUDY LIFE  
YIELD CURVE MOVEMENT

<u>Probability of:</u>	<u>Probability</u>
Moving Down 2 Curves	5%
Moving Down 1 Curve	20
Staying Put	50
Moving Up 1 Curve	20
Moving Up 2 Curves	5

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

MR. JACOBS: When we make these assumptions, we have to keep a couple of concepts in mind. These concepts are the expectation of trend and the expectation of volatility. The expectation of trend that we assumed in this particular example is a reasonably steady state of interest rates. That is, there is as much probability of going up as there is to go down. That is noted by the symmetry of the probabilities of movement that we are using. To the extent that there is some bias, that we think we are at the low end of the yield environment and interest rates are in fact heading up, we could introduce some bias into our probability grid to move interest rates upward. The same comment applies if we believe that there is a downward trend. In this particular example, we have an unbiased position on the movement of interest rates.

The other item that we need to consider is the expectation of volatility. That is the distribution of this movement. As you can see from the probability distribution, it has a very low standard deviation, implying a very small amount of volatility. We could create a much wider dispersion with a larger standard deviation. This would bring in more volatility to our interest rate projection process.

The final area of consideration in developing the scenarios or interest rate scenarios is the number of trials that we should run. This turns out to be a statistical problem more than anything. First of all, I define a trial as one random walk through these interest rates where we let the dynamic nature of the liability and asset assumptions take over. We should not base any decisions or conclusions on any one particular trial. We should base our decisions or conclusions on a sufficient number of trials so that the results are statistically significant within a definite confidence interval. In this particular example, we have only looked at 20 trials. The standard deviation on a ten-trial run is significantly larger than that of a much larger trial, simply because of the way that the Central Limit Theorem works. In most situations, I would normally recommend something on the order of 50 trials. My experience has been that that produces very statistically credible results.

We should also do some alternative scenario testing, more along the lines of the traditional sort of scenario testing that actuaries have generally or should have been doing in pricing. What I mean by that is to test different interest crediting strategies, different investment strategies, different product design features

## PANEL DISCUSSION

and different production levels. These are tests that will allow us to answer the "what if" questions. What if we would have changed the way we did in our crediting? Or what if we changed the way we invested? In my opinion, this is really what pricing products is all about. Since we are in a dynamic product environment where we can change interest rates, and we can change cost of insurance rates, we can change product mix, we are forever in a pricing environment. I think that this process of scenario testing that we have just described is what we should be looking at when we are doing this continuing job of pricing.

At this point, I think what I need to do is go back to my office, bring together all of this information, and build our computer files that we need to run this cash flow analysis. I will do some testing and bring the results back at our next meeting.

That ends our first client meeting. The important thing that I wanted to stress in this part of the panel discussion is the process that we have just gone through. It must be a three-legged stool that we are working with, which includes the investment officer, the person (or persons) responsible for marketing, operations and the financial aspects of the company, and finally, the actuary. The next meeting that we are going to stage very briefly is my second meeting. We have run the analysis and I will present some of the initial results of our cash flow analysis.

Well, after our last meeting, I went back to the office and put together the cash flow analyses that we talked about at our last meeting. I have some of our initial results. I would certainly like to share them with you and get some of your reactions.

The first thing I would like to show you is what the cash flow analysis looks like in a static yield curve environment. This is a small step heading into our bigger step of some dynamic scenario testing in the interest rate environment. What I mean by a static yield curve environment is that we lock ourselves into today's yield curve and we keep it that way for the duration of our projection. This is quite similar to what we have traditionally done when we price products. We generally make use of a static interest rate environment. One of the real problems with this static interest rate environment is that we ignore the dynamic

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

nature of some of the liability cash flows and certainly some of the asset cash flows. If you will recall at our last discussion, we spent a great deal of time talking about some dynamic assumptions that we need to build into our modeling process to reflect changes in interest rates. Well, by doing a static yield curve projection, we have effectively disengaged all of the dynamic assumptions and done a static projection. What I have found and I think what you will see here is that we are looking at the best of all worlds. Let me explain that a little bit.

When interest rates move, there is an opportunity to either gain or to lose. The opportunity to gain is in your hands as company managers either by taking advantage of investment opportunities or by doing something to the product design on the liability side, either through interest crediting strategies or changes in product mix or whatever to take advantage of the particular opportunity. Now, the opportunities to lose are in the hands of other folks and that has always been called antiselection in our profession. I contend that when interest rates move around you have two different bodies of people that are going to select against you. The first potential source of antiselection is from the policyholder point of view; where you get hurt there is when interest rates are increasing over a time. At a company such as yours, where you are crediting on a portfolio rate basis, a sudden increase in interest rates (which happened back in the late 1970s and early 1980s) creates the classic disintermediation risk problem. This is where interest rates available outside are much higher than what you are currently paying and so you have the risk of either supporting a rate that you can't earn because of your portfolio or risk "a run on the bank." So when interest rates are rising, you have potential policyholder antiselection. On the reverse side of the coin, when interest rates are going down, the group of people that are going to select against you there are those that are responsible for your assets, either the issuers of the bond or your mortgageholders.

When interest rates drop, you are going to be exposed to mortgage prepayments or bond calls. This is the classic reinvestment risk problem. I think that is something a lot of insurance companies are facing today. I know talking to you, Dave, that's one that Case Study Life has gone through and you still have a little bit of exposure as long as interest rates stay down. So putting all of this in perspective, I think the largest profits we can expect are from our static yield curve environment where interest rates do not go up or down. On each

## PANEL DISCUSSION

side of this profit peak are lower profits that result from an increasing interest environment or a decreasing interest environment. So we are doing ourselves a disservice if we only show profits on a static yield curve environment. We have to start there because that is the bridge from the way we have historically looked at profits to the way we ought to be looking at profits (in a dynamic interest rate environment). Now let's look at some of the results.

Graph 9 is a graph of the cash flows coming out of our existing business. The items shown are asset cash flow, insurance cash flow and surplus cash flow (the sum of asset and insurance cash flows). These cash flows are quite expected. The negative insurance cash flows should not be alarming. Keep in mind that this is cash in and cash out projection. Not reflected here is any increase or decrease in the reserves. The important thing to get out of this is that our surplus cash flow is always positive. That means that under this set of assumptions, again a static interest rate environment, we never have a cash shortfall in any future year and that's good news for an insurance company.

Graphs 10 and 11 show the cash flows from the new business segment and for the total company.

Graph 12 shows exactly what we talked about in our last meeting -- your products are reasonably profitable. They do show some fairly good statutory gains over the next several years, but if you look at the return on the investment here, we are not getting our desired 15% return.

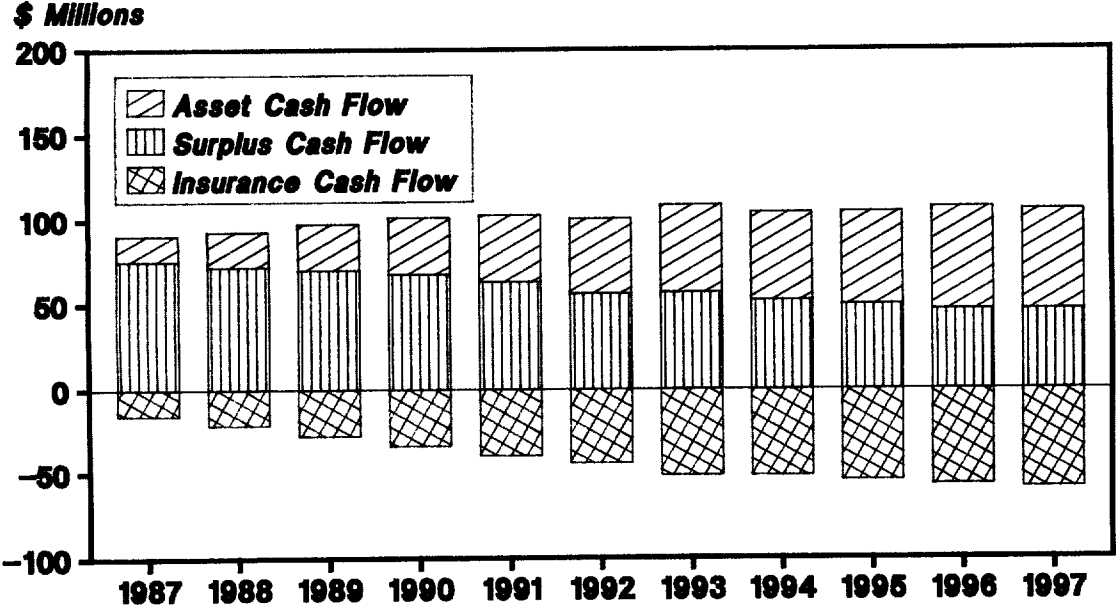
Let's take this cash flow analysis one step further. This is the quantum leap where we move into a dynamic interest rate environment. Again, referring back to our previous meeting, what we have done here is take in our yield curves and our probabilities of movement and we have randomly walked through our future interest rate scenarios. We have done 20 trials.

Graph 13 is the mean result of our 20 trials, together with the results of the static yield curve projection as well the cash flows from the worst case trial. This graph shows the surplus cash flows. As you can see, the mean surplus cash flow is significantly less than what we saw back in our static yield curve environment. We still should feel somewhat comfortable that it is not negative.

# CASE STUDY LIFE – EXISTING BUSINESS CASH FLOWS – STATIC INTEREST ENVIRONMENT

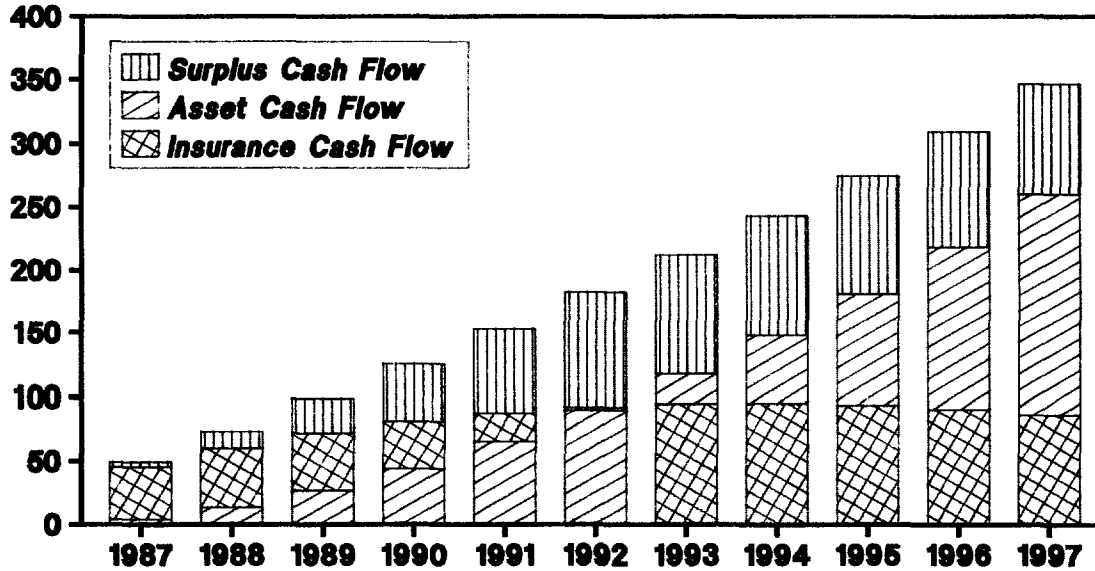
A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 9



# **CASE STUDY LIFE – NEW BUSINESS CASH FLOWS – STATIC INTEREST ENVIRONMENT**

**\$ Millions**



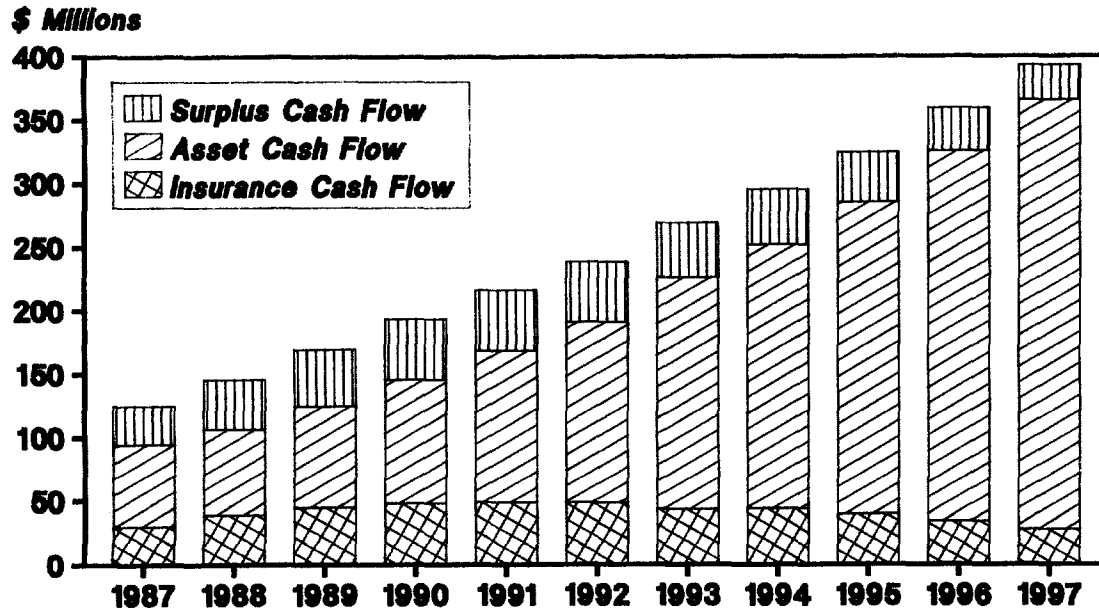
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GRAPH 10

PANEL DISCUSSION



# **CASE STUDY LIFE – TOTAL COMPANY CASH FLOWS – STATIC INTEREST ENVIRONMENT**

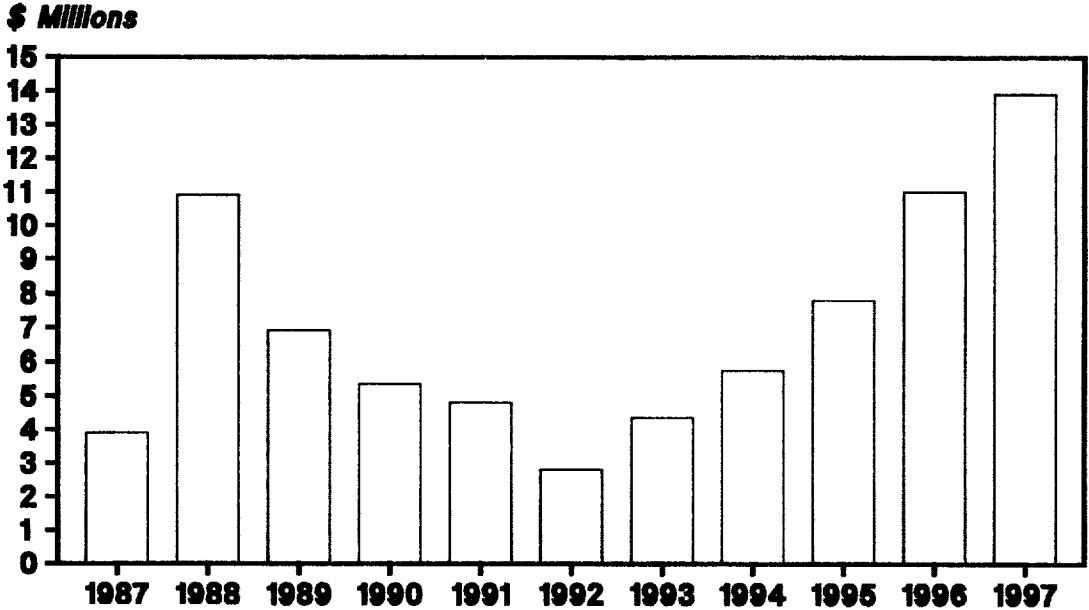


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A CASE STUDY IN ASSET/LIABILITY MANAGEMENT  
GRAPH 11

# **CASE STUDY LIFE – TOTAL COMPANY**

## **STATUTORY PROFITS – STATIC INTEREST ENVIRONMENT**



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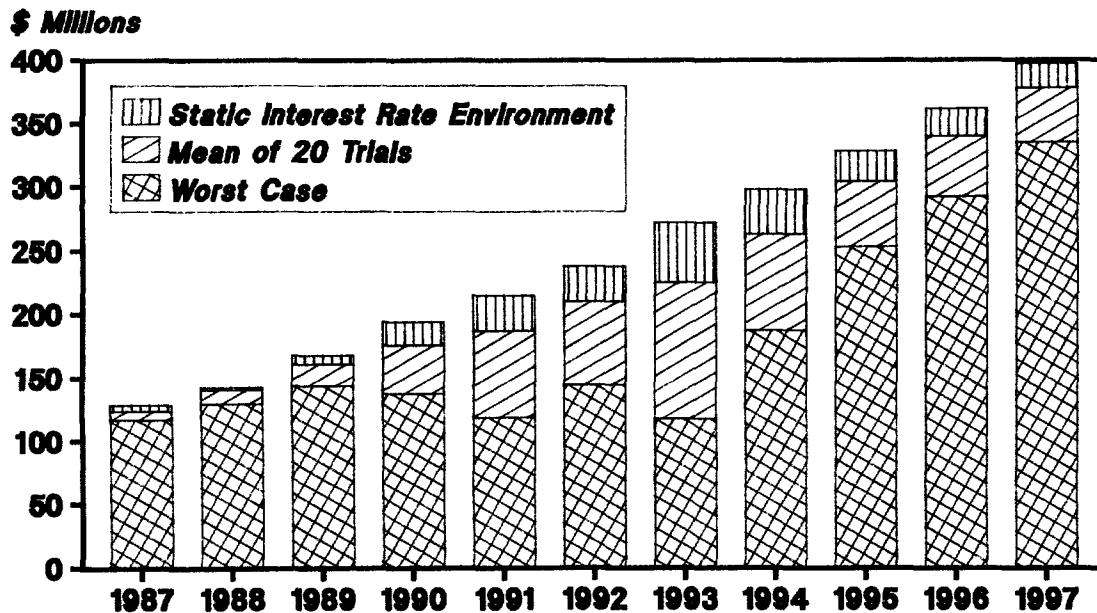
PANEL DISCUSSION  
GRAPH 12

# CASE STUDY LIFE – TOTAL COMPANY

## SURPLUS CASH FLOWS – DYNAMIC INTEREST RATE ENVIRONMENT

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 13



## PANEL DISCUSSION

Let's look at the worst case results. In this particular trial, the worst case was when interest rates increased fairly dramatically over our projection period. I am not surprised by this worst case, knowing what goes on at your company. What we have here is effectively a "run on the bank" where the market rates or the competition rates are higher than what you are crediting because of your portfolio lag. We have some serious cash-outs and get caught with a liquidity problem. That is the classic disintermediation risk problem.

Graph 14 shows the statutory profits for our 20 trials and the mean of the 20 trials. As expected, the mean is less than the static yield curve environment. Again, this points out the antiselection that I was mentioning earlier that takes place when interest rates are going up or going down. You are getting selected against and therefore your mean profits of the 20 trials are going to be less than the profits coming out of your static yield curve environment. The best case is trial 10. This trial happened to be a fairly steady state of interest rates; they move up a little bit, they move down a little bit, but over the long haul they are about where we started. Again, this goes back to my earlier thought that in a static environment we end up with the best results. The scary part about this is if I were a betting man, I would bet that interest rates are going to move, therefore I would not put a lot of faith in this best case scenario.

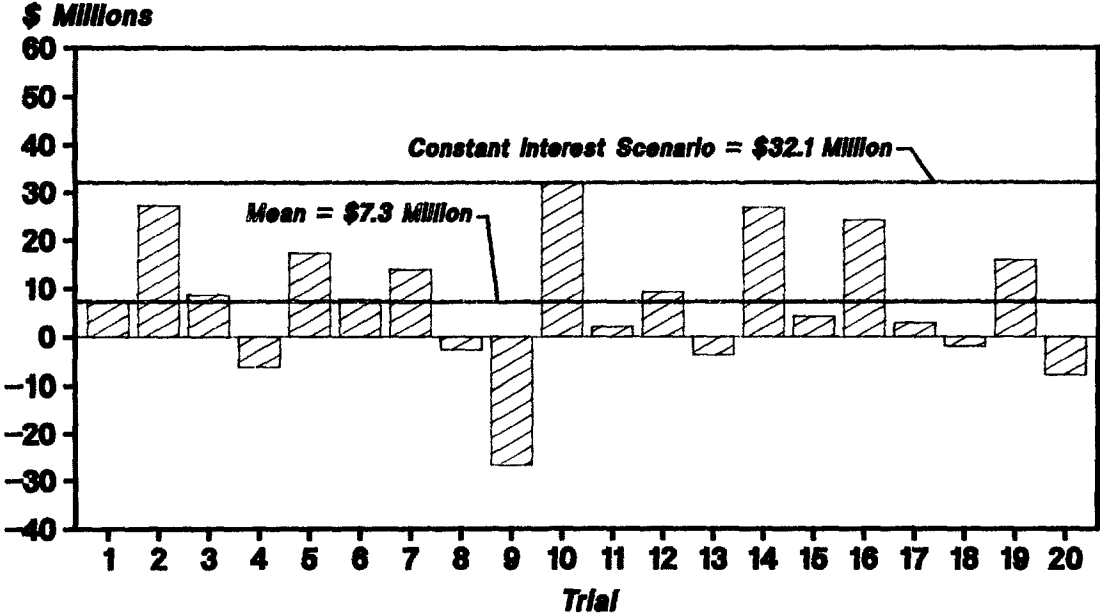
Up to this point, we have looked at your company doing the things that you are currently doing, with regard to your investment strategy and your interest crediting strategy and your product design and so on. Now that we see the results, both in a static and in a dynamic interest rate environment, we need to start asking the "what if" questions.

This is where I would like to end this panel discussion with the possibility of it being continued at some later date. The reason that I would like to end it here is because this is where each individual company has to get before they can start making some strategic planning decisions about competitive issues, product issues, and investment issues. The solutions and conclusions that come out of this initial analysis and all of the alternative testing that needs to be done are going to be unique for each company as they view their marketplace and as they see their own problems. So I feel that I would be doing you a disservice by

# CASE STUDY LIFE – TOTAL COMPANY P.V. OF STATUTORY PROFITS AT 15%

A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

GRAPH 14



## PANEL DISCUSSION

taking you down a particular path and leading you to believe that that's the only path to be taken. The possible "what ifs" that could be tested are limited only by the number of hours in the day and the creativity of the people involved in this process.

Trying to wrap everything up, the purpose of our discussion was to expose the process that should take place within a company when they are facing these concerns and are trying to tackle them or address them through some cash flow analysis. We did not get into the results very heavily because that was purposely not stressed. I wanted the results to show you the antiselection that comes about through the dynamic nature of the projections. I would now like to spend a little bit of time, as would Dave and Gregg, very briefly summarizing some of what I learned from this process of putting together a cash flow analysis.

From an actuarial angle, I have learned that we have really not done a very good job in the past analyzing and understanding the risks that we are undertaking in the insurance business. When we begin to analyze those risks and understand them, I think that we will soon realize that we have violated the classical risk/reward relationship -- the higher the risk, the higher the reward. It seems like we are increasing the risk with the types of products we are selling and the types of things we are doing, while at the same time decreasing our reward. That is not a good omen. By doing this sort of analysis, I think it may open some eyes and hopefully lead us down a more appropriate path. The second thing I learned is that it is so critical to have open dialogue within a company to address all of these issues. The actuaries cannot price products and the investment people cannot invest in a vacuum. Our friends in management and in marketing cannot do their thing in the vacuum. The world we live in is very complicated and interrelated and we need to have a collaborative effort to survive in such a world.

MR. HUEY: My background is one more of people management than life company or liability management and what I think we've dealt with here is a process of conflict resolution and trying to manage conflict; conflict between the objectives of asset management and liability management. My personal definition of that conflict deals in that whole context of a dynamic environment in which we're working. In order to manage conflict, there are several things that have to

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

happen. The parties are going to have to come to some type of agreed upon knowledge base, there has to be communication, understanding, and flexibility. The actuary can play an important role in developing the first three elements of that conflict resolution model. Research leads to assumptions and data. The data can be interpreted into models and the models help to develop knowledge. That shared knowledge enhances communication which in turn leads to greater understanding. Once taken to that point, it falls back upon management to take that shared understanding and find flexible solutions to resolve that conflict. I think the actuary can play the role of facilitator in helping to manage that conflict and I would urge the audience to look at what we've tried to accomplish here. Don't look to the results. We agreed that today's results weren't as important as the process. That process of conflict resolution is the role that actuary can play in the insurance industry.

MR. GARDNER: One thing that we want to be sure to leave with you is the fact that we're not up here proposing that assets and liabilities need to be perfectly matched. We think that's a less than dynamic approach to managing an organization. What we're trying to leave with you is the philosophy that if you don't know where you've been and you don't know what happens when you try to get some place else, how are you going to get there? That's one of the concepts that we think modeling gives you, a handle on the dynamics of the process. One thing that we feel very confident about when we do any modeling is that unless we have every conceivable scenario laid out, and you don't have enough computer time in the world to do that, generally the models you look at are the ones that will not occur. But by going through the dynamics of the process, we're able to be better equipped both on the investment side and the marketing side to react to the changes that we're seeing.

The last thing that I want to talk about is the default risk question in the investment area. This is a very interesting industry we're in, in which generally, errors by any one or series of companies are made up by the rest of the industry. There are not too many insurance companies that I know of that really go out of business. If you take Baldwin-United as the most classic example, it never really went out of business. It went out of business as Baldwin-United, but the rest of the industry after a few years is figuring out a way to pick up the pieces and make sure everybody's whole.

## PANEL DISCUSSION

Let's look at lower quality credits and an investment philosophy that advocates owning nothing but junk bonds or a very high percentage of junk bonds. There is a debate in the investment community as to the appropriateness of using those types of credits. I'm talking about below investment grade which is generally rated "BBB," "BB," "B," and "C;" that's where the big returns are. That's where you're getting 13% now, that's where you're getting 14% and that's a great temptation when the marketing people put the pressure on the company. How can XYZ company be paying 8.5% and you're only paying 8%? Well, one of the ways that you can pay 8.5% is to load up or start to increase your percentage of ownership of lower quality credits. Unless the people that you're working with have a very large investment staff that can follow those credits, I would argue that they're starting to look for real trouble.

You can run all sorts of analyses on what the spreads should be but that's based on the fact that nobody's defaulted. We've had 5 years of a relatively stable and good economic environment. We've had lower interest rates, lots of leverage buyouts (LBOs), companies have got 60-70% debt on their balance sheets, some of these LBOs that are issuing these "B" credits may have even higher percentages. What's going to happen to those credits if we get into a fairly good economic recession? Maybe we get into stagflation again; high inflation rates and no real economic growth. What happens to those credits? Then what do you do when you are out there certifying that there's enough reserves to meet the liability side and you start to have significant parts of the portfolio subject to default risk? People argue that they can always sell those credits. I would like to suggest that you will not always be able to sell those credits. If we get defaults of low quality credits and we're in a bad economic environment there will not be bids out there for low quality bonds. What happens if you are carrying them at 100 cents on the dollar and your bid is 50 cents on the dollar, if you can get a bid at all? I have been in the investment business for 20 years and I have lived through periods of time in which you go to sell paper and there are not any bids and you have to wait a fairly decent period of time, before someone's willing to make a reasonable bid. There's somebody who's willing to take you out, down 30 or 40 points on a bond, but that's not reasonable.

So my hat's off to Gregg, because he has taken the CFA exam and he is not trying to be an investment type in a sense of coming in and saying, "Dave, you should do this and you should do that." He respects the expertise that we



## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

bring into the work place on the investment side. But he's working very hard to understand the dynamics of the investment process and I would encourage all of you to spend some time with investment departments and do some reading to try to understand the dynamics of the investment process, because it is a critical part of your work.

MR. JACOBS: You have heard what we have all learned from this, you have seen the process that we have had to go through and you have gotten just a flavor of some of the results of such a process. I will end this panel discussion with a challenge for each of you to do a similar sort of analysis at your company.

MR. FRANK S. IRISH: Your presentation was very good, particularly on dynamic assumptions, but I would like to suggest another approach to your key variable. Lapses and production, you assume, would be a function of the gap between your credited rate and the average of the insurance company competition. I feel, however, that it is more important to look to the rate obtainable from alternative investments outside the insurance industry. Most companies price off a portfolio rate, and thus currently have rates that look very good relative to investments from other sources that tend to reflect the new money rate. This seems to be more important for lapse rates than how competitive you are against other insurance companies. In short, I would prefer to see the model based on the difference between the credited rate and the new money rate.

MR. JACOBS: That's a very good point and Gregg mentioned that a little bit in the definition of the competition. That personally is the toughest assumption that I have to deal with when I put this together because I have exactly your same concerns. You talk to the marketing people and the first thing that they say is who the competition, so we try to look at what they're doing and see if there is some sanity there. If we can create some sanity, we try to model it. I feel very strongly the way you do. We are not only competing against ourselves, but against other outside institutions. When I say competition/market rate, the implication is the competition among our industry, and market rate is what is currently available outside our industry and I think it's very critical that you realize that. Keep in mind that a life insurance product, or a universal life product is not the same thing as a demand deposit savings account. There are

## PANEL DISCUSSION

different elements involved, but when push comes to shove, it's not any different than a direct deposit demand account. So maybe we ought to be looking at it along those lines.

MR. GARDNER: I think it's also the worst case of the two. Right now, alternative investments are a lower return and so at that point in time, your lapse ratio and your premium is affected by what your competition's doing and then you get caught on the other side. If short-term rates would move up dramatically higher than the industry could effectively compete against, then the alternative investment vehicles are the ones that kick you out. We would like the industry, obviously industry is going to do what it wants to do, to start to look at its products as alternatives to certificates of deposit (CDs) at banks for example, which is more a typical investment tradeoff vehicle than just the rates that we're paying now. If the industry had done that in the last part of the cycle, all of us on the investment side would have had a much easier time of struggling through the spread differential between what you can get on new investments and what the marketing department feels they must pay to stay competitive.

MR. DENNIS MONTAGNA\*: I have a question on the default possibility that Mr. Gardner raised, which I agree with. If you want to keep competitive in the marketplace and you're looking to change the structure of your asset portfolio with some nonclassical assets, shouldn't the structure of your asset model then shift towards the market value being a resultant parameter rather than an input, specifically in light of the new valuation actuary requirements?

MR. JACOBS: One part of the output we get is the market value of the entire asset portfolio mapped against the liabilities. Granted, the liabilities are not market value adjusted. They're either statutory or GAAP or whatever basis we happen to be running. We don't do a gross premium valuation; we can introduce that, but we don't yet. We look at the unrealized gain and how far underwater the company is at a particular time by comparing the assets, the market value of assets to the liabilities and it's a very scary picture.

\* Mr. Montagna, not a member of the Society, is a Manager with Metropolitan Life Insurance Company in New York, New York.

## A CASE STUDY IN ASSET/LIABILITY MANAGEMENT

MR. GARDNER: When you do your actuarial assumptions on the bond portfolio, and you're looking at the risk of default on newly issued lower quality bonds, historical default rates are not appropriate. There is no recent data available on the default rates on newly issued lower quality bonds. The point I'm trying to make is that the historical default rates on low quality bonds are not justified to carry forward into the future to use as your default rates on your newly issued junk bonds. The characteristics of junk bonds 10 or 15 years ago are completely different than now. Those are generally bonds that started at "AA" and "A" and got themselves in trouble and moved down the quality scale. The new issues are huge, highly leveraged operations that start at "BB." There's a difference in the inherent default risk on newly issued low quality versus old bonds that have slipped because they ran into economic problems.

