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DEALING WITH DIFFICULT ASSUMPTIONS

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This session will lead you through a case study that will require the development of various difficult assumptions where experience is limited. The panel will briefly discuss what the key issues are and how they would go about developing each assumption.

MS. RACHEL M. HANCOCK: Let me begin by telling you a little about the format of this session. This is not going to be the typical panel discussion where each speaker gets up and does a 40-minute formal presentation. Instead, we'll work together through three case studies. Each case study will begin with one of our speakers introducing the case study and talking about what the issues are in the case study and how he or she might go about dealing with those issues. After the introduction, you will then discuss the case study within your own groups before moving on to the next case study.

Let me introduce our speakers. The first case study will be introduced by Larry Stern. Larry is with Tillinghast in Hartford. His areas of expertise include product development and corporate and marketing strategies. He has been with Tillinghast three years, and prior to that he was chief actuary at United Presidential.

The second case study will be introduced by Doug George. Doug is with the Avon Consulting Group in Connecticut. Doug's experience is in asset/liability modeling and cash-flow testing. He's been with the Avon Consulting Group for one year, and prior to that he was with CHALKE Incorporated.

Finally, our third case study will be introduced by Jim Merwald. Jim is with Actuarial Resources Corporation, and his expertise includes financial reporting, cash-flow testing, and the valuation actuary issues. I'm with Tillinghast in the New York office, and I'll be moderating this session.

Let's move on now to what the case studies are going to be about. The topic is dealing with difficult assumptions. I think there are three main reasons as to why it's difficult to set assumptions. Obviously, the first one is when there is no experience to use, such as with a new product or a new market. That makes things difficult. A second reason is where there are several methodologies or approaches that one can take toward setting an assumption, and no one methodology or approach is clearly right or wrong. I think that makes things a little bit more difficult. And a third reason is when we have to try to predict such unknowns as policyholder behavior; what's happening to interest rates, asset performance, the regulatory environment, etc.

Having said that, let me introduce the first case study. The first case study is going to be about expense assumptions and expense allowances. I think this is a good case study to start with because it's one where there are different approaches that you can use. I think it'll be interesting to talk about what those approaches are and

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what the advantages and disadvantages are of each of them. In the group discussion, you will talk about what each of you use and why.

Larry will introduce this case study. Larry will talk about what the issues are in determining expense assumptions. After that, we'll leave time to discuss the case study in your own groups. Then you will have a chance for questions.

MR. LARRY N. STERN: The first case study deals with expense assumptions. All of you pricing actuaries have obviously come across situations in which you have expenses that must get allocated, either for a line of business or for the company as a whole, and you must get them factored into your product. So we've set up a very typical situation in which we have current allowances and projected expenses, but based upon the projected units of production, we're not going to be able to cover all of the expenses.

Now for all you pricing actuaries out there who have not had this kind of situation before, it might be interesting for you to go through this exercise, just in case you run across this kind of situation in the future. Some of you may be lucky in that your projection of production units does cover your allocated expenses or the expenses that are going to be allocated to your lines of business, and you don't have overruns that you have to worry about. For others, however, you will have to decide how you are going to get these expenses factored into the products that you're going to sell.

We have projected acquisition expenses of about \$9 million, maintenance expenses of about \$2.6 million, and the marketing people are telling you what the production units are going to be. And when you factor through your assumptions, you come up with over a \$3 million overrun. So we have to determine how we're going to handle the overrun. There are a number of different approaches that we can take.

Three main approaches for allocating expenses are (1) to fully allocate the expenses based upon projected sales and expenses; (2) to fully allocate them based upon current sales and expenses; and (3) to allocate variable costs only and then create a new business model and look at contribution to fixed expense and profit. You also have to consider which method is appropriate for your company, whether it's for a start-up company or a new line of business. One method may be more appropriate to use in that setting, versus the method that you would use for an ongoing company or an existing line of business.

So let's take a look at the first methodology, which would be to project expenses based upon a full allocation, but base it on some projection of sales going forward. Table 1 shows we're assuming that production is going to increase at 30% per year. You can see, from the bottom part, that at the end of that time period you've about eliminated the expense overrun from acquisition, and you're running at about half of the initial overrun from maintenance expenses.

What happens if the projection of business doesn't follow a 30% annual increase? What if it's only half of that? You can see in Table 2 that, at the end of the five-year period, you still have a sizeable overrun from acquisition, and the maintenance overrun has gone down a little but has not been eliminated.

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TABLE 1
DEALING WITH DIFFICULT ASSUMPTIONS
CASE STUDY I—EXPENSE ASSUMPTIONS
COMPANY XYZ PROJECTED OVERRUNS—BASED ON 30%
ANNUAL INCREASE IN SALES

Projected expenses (\$000s)					
Acquisition expenses	9,000	11,700	14,600	16,820	18,500
Maintenance expenses	2,600	2,700	2,850	3,000	3,350
Projected units					
New premium (\$000s) 20%	25,000	32,500	42,250	55,000	71,000
New policies \$300	5,000	6,500	8,500	11,000	14,300
In-force policies \$50	40,000	43,000	47,000	52,800	60,600
Projection allowances (\$000s)					
Acquisition allowances	6,500	8,450	11,000	14,300	18,490
Maintenance allowances	2,000	2,150	2,350	2,640	3,030
Expense overrun					
Acquisition overrun	2,500	3,250	3,600	2,520	10
Maintenance overrun	600	550	500	360	320

TABLE 2
DEALING WITH DIFFICULT ASSUMPTIONS
CASE STUDY I—EXPENSE ASSUMPTIONS
COMPANY XYZ PROJECTED OVERRUNS—BASED ON 15%
ANNUAL INCREASE IN SALES

Projected expenses (\$000s)					
Acquisition expenses	9,000	10,350	11,633	12,517	13,142
Maintenance expenses	2,600	2,690	2,800	2,950	3,200
Projected units					
New premium (\$000s) 20%	25,000	28,750	33,063	38,051	43,586
New policies \$300	5,000	5,750	6,635	7,610	8,752
In-force policies \$50	40,000	42,750	46,000	50,000	55,000
Projection allowances (\$000s)					
Acquisition allowances	6,500	7,475	8,603	9,893	11,343
Maintenance allowances	2,000	2,138	2,300	2,500	2,750
Expense overrun					
Acquisition overrun	2,500	2,875	3,030	2,624	1,799
Maintenance overrun	600	553	500	450	450

The second method was to fully allocate expenses based upon current production. So what we've done in Table 3 is increase the allowances in our pricing so that we fully eliminate the expense overrun. And when you do this, the question is, what is the downside result going to be on your production and your overall profitability?

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The third case is to have the allowances cover only variable costs—we're assuming that that's about 65% of the total—and do our expense analysis at a macro level by using a contribution-to-profit and fixed-expense approach. (See Table 4.)

TABLE 3
DEALING WITH DIFFICULT ASSUMPTIONS
CASE STUDY I—EXPENSE ASSUMPTIONS
COMPANY XYZ 1993 OVERRUN—FULLY ALLOCATED ALLOWANCES

Projected expenses (\$000s)		
Acquisition expenses		9,000
Maintenance expenses		2,600
Projected units		
New premium (\$000s)	28%	25,000
New policies	\$400	5,000
In-force policies	\$65	40,000
Projected allowances (\$000s)		
Acquisition allowances		9,000
Maintenance allowances		2,600
Expense overrun		
Acquisition overrun		0
Maintenance overrun		0

TABLE 4
DEALING WITH DIFFICULT ASSUMPTIONS
CASE STUDY I—EXPENSE ASSUMPTIONS
COMPANY XYZ 1993 OVERRUN—
ALLOWANCES TO COVER VARIABLE COSTS ONLY (65% OF TOTAL)

Projected expenses (\$000s)		
Acquisition expenses		9,000
Maintenance expenses		2,600
Projected units		
New premium (\$000s)	18%	25,000
New policies	\$275	5,000
In-force policies	\$45	40,000
Projected allowances (\$000s)		
Acquisition allowances		5,875
Maintenance allowances		1,800
Expense overrun		
Acquisition overrun		3,125
Maintenance overrun		800

Discuss among yourselves the methods you think would be appropriate for your organizations, keeping in mind whether it's a start-up company, a new line of business, an existing company, or an existing line of business. Let's try to come up

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with some solutions as to what you think the appropriate method should be and what effect that's going to have on production and overall profitability.

To help facilitate some of your discussions, you might want to consider these points. With the fully allocated based upon the projected sales, you may want to consider how reasonable it is that you're going to get a 30% increase in production. For the one where you've eliminated the expense overruns, you may want to consider what the pros and cons are of having increased your unit allocations to eliminate the overruns. What else have you done to profitability? And on the third approach, where you're looking at the variable expenses only, take a look at what the advantages or disadvantages are of doing it on that basis.

The main point with regard to the fully allocated method based upon a projection of sales and expenses is that we're not changing the price. The price is fixed. The marketing people have said we have to have that price because it's competitive in the marketplace. So if we don't change the price, how much production do we have to have for the overruns to disappear? And we've demonstrated that it's going to take at least a 30% increase per year for a five-year period to eliminate the acquisition overrun. And we still have a little bit of a maintenance overrun.

So I guess the question is, how realistic is the 30% production? Will the marketing people sign off on that? It can't be left on the shoulders of the pricing actuaries to say, "OK, we've priced it, we're going to get the profitability that the company wants, but only if we get this kind of production." It's not necessarily fair for the burden to be left on our shoulders, to be responsible for that level of production. We have to lay out the numbers for management. Show them what happens if we don't get the production. If we take a look at a 15% increase in production, we still have sizeable overruns. Do we still want to put the product out at that price?

FROM THE FLOOR: Looking at the assumptions, the fairly easy ones are figuring out what you have built in your product and figuring out what you have actually incurred in terms of expenses. But underlying all of this, the most difficult one seems to be the price demand trade-off; knowing exactly what kind of sales you'll get when you vary your price. What are people doing to address that? Do we default to the marketing department for their input, or are there any more rigorous economic types of modeling going on to see the variation in volume when you change the price?

One thing that we did when we came up with our latest product is we shot for it to be a first-quartile product. And marketing started hemming and hawing over the production. "OK, if this is the production you think you can get, this is the product we will deliver." And that turned out to be a third-quartile product. It turned out that they got their first-quartile product, but they had to agree to the first-quartile production as well. So it wasn't all that scientific, but at least they knew the difference.

Talking about the impact of price levels on your production, one of the things the industry doesn't have is published information on that type of market research, the type of market research you have in a mass marketing operation, where you run certain prices out on a mailing, and you can take a look at your returns from each. *With certain products, such as annuities, you may have a better opportunity to do that by testing what happens as you adjust your competitive position, seeing what*

your results are, and trying to analyze those on an ongoing basis. You could start to build a database of what happens to sales if we reduced the competitiveness by 25 points or increased the competitiveness by 25 points. Unless we, as actuaries, start looking at some of the techniques that are used on the mass marketing side and start to do this kind of market research, then we are basically shooting in the dark.

MS. HANCOCK: Let's move on now to the second case study. This next case study is going to be about determining the cost of C-3. How do we price for C-3 risk? I think you would all agree that that's a difficult assumption, and I think it's difficult for all of the reasons that I mentioned before. We don't have much experience on how today's products will act and work in a rising interest environment. There are differences in methodology for developing the cost of C-3 risk. How many scenarios do you need to run, what do you use as your risk measure, etc? Third reason that C-3 is difficult to quantify is that you have all these dynamic assumptions: what will be used for policyholder behavior, interest scenarios, asset behavior, etc. Doug will talk about his experience in trying to price C-3 risk, and then you'll have an informal discussion within your groups.

MR. DOUGLAS A. GEORGE: This second case study is about C-3 pricing. I'm the new pricing actuary for a company with a large annuity block, and I have to price the C-3 risk. I also want to look at different alternatives for going forward, how to manage that risk, how to hedge it, what kind of management strategies I can implement to better manage that risk going forward.

My first task is developing a tool to use. What are the tools that I have available to me? We have an asset/liability model that was used for cash-flow testing. The model's built on actuarial-type software, such as one of the commercial systems that's on the market. There are a few of them, and some people use internal systems. The actuarial software does a good job for the liabilities, but it seems to fall short on the assets. My portfolio has many collateralized mortgage obligations (CMOs). We also have derivatives, some asset-backed securities, and some mortgage-backed securities. They are complex assets, which is typical for a single premium deferred annuity (SPDA) portfolio.

In terms of developing my tool, I decided the best way to go is to connect my actuarial software with some of the asset modeling software, such as Global Advanced Technology (GAT) or Capital Management Services (CMS). This way I have the best quality system, in terms of modeling both your assets and liabilities. You're not trying to force-feed your asset modeling through your liability software, which doesn't do such a good job of it, especially with complex-type assets. It's also cost effective. I have the models built in the two systems already. My investment people are already using my asset modeling software. My actuaries have a model that they're using on the liability side. So I really don't need to re-create models.

Once I have my modeling tool in place, I need to think about assumptions. The most critical assumption is policyholder behavior. That is the assumption that has the most effect on the outcome of the results. It's also the one that we know the least about. We don't really have any statistics on policyholder behavior. I know it's a function of many things. It's a function of the type of product that I have, the features that are in it, the market that I'm in, the distribution system that sold the product. And it

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affects many different areas of my product. The most common is the lapse behavior, but there's also withdrawal behavior, premium flow for flexible premium products, and new business production. And all of these are affected by the decisions that I make in managing the product in terms of the credited rate.

So how do I determine this assumption? I look at my in-force block, and I see that there's limited information. We have some information as far as cash flows in and out, but we don't have a whole lot to go on. We don't have a real clear record of interest crediting, of what we see as being the competitor's rate versus the rate that we're crediting on products. Our management information systems don't provide all the cash-flow information that we want in order to really do a thorough analysis of policyholder behavior.

I can talk to the marketing people. I can ask them what they think will happen if our credited rate is like this. Is the market like this? What kinds of behaviors are likely in such situations? I can talk to a consultant. Consultants sometimes have answers, sometimes they take their best guess. They do have information on what other companies are doing. They do have connections and they are networked to see what other data might be out there or what other companies are doing in this area. Or finally, I can just use my own intuition.

Lets look at a couple of different models. I've seen two basic models used to model policyholder behavior. One is the exponential model. The exponential does a good job, but I'm not sure it gives me the fit that I want. The arctangent type of model (Chart 1) gives a better fit. It borrows a concept from the asset world, in terms of prepayment. You get an S-curve with an arctangent type of model. It says that as the credited rate moves further away from the competitor rate, policyholders will have increased sensitivity. But then you reach a point where that sensitivity will decrease. You've lapsed everyone who is going to lapse, and the people who are still around at that point don't exhibit much interest-sensitive behavior.

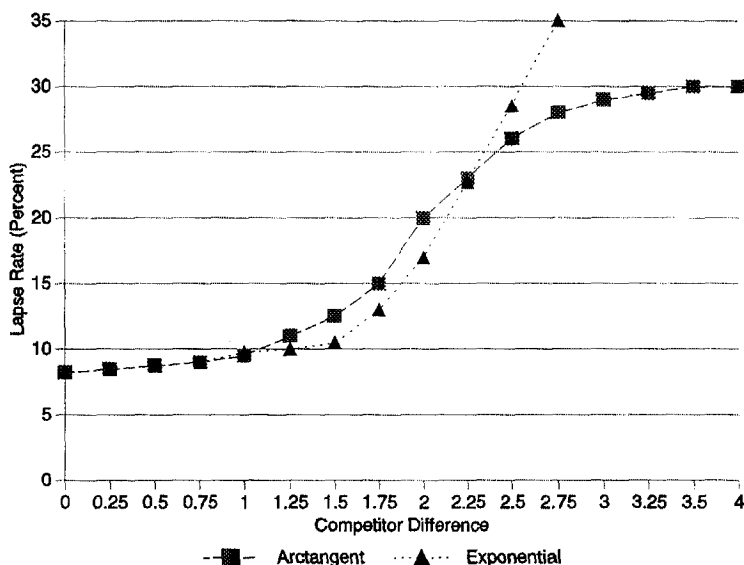
Once I determine my assumptions, the exercise becomes one of optimizing my strategies so that the marginal profit of increasing my credited rate, by say, one basis point, is the same as the marginal loss of the increased policyholder behavior due to that change in the credited rate. I want to find the point where I'm exactly even between changing my credited rate versus the increased cash-flow effects that result from it.

There are a few different ways to assess the C-3 risk. One is through option pricing; that is, the calculation of option-adjusted duration, option-adjusted convexity, and in a more comprehensive form, development of a price-behavior curve. I won't go into the details of creating a curve like this, because they're pretty complex. Essentially it provides you a picture of your C-3 risk. It becomes a good way to conceptualize your asset/liability risk in graphical form.

Chart 2 is an SPDA curve with a bail-out. The difference between the two curves is the cost of my bail-out feature. As interest rates increase and I move this way along the curve, I can see that the cost of the bail-out goes down. As interest rates decrease, the cost goes up. You can see how the cost increases quite a bit as interest rates go down.

When I apply this technique to my entire portfolio, I get a price behavior curve (Chart 3) of assets as well as liabilities. The duration of my assets and liabilities can be pictured as the slope of these curves. The convexity of my assets and liabilities can be seen by the curvature of the two curves. I can see how my assets have negative convexity because the curve is shaped down, whereas my liabilities have positive convexity where the curve is shaped up. This gives you a good picture. You can visualize your duration and convexity through curves like this. It becomes a good way to present results to management.

CHART 1
POLICYHOLDER BEHAVIOR

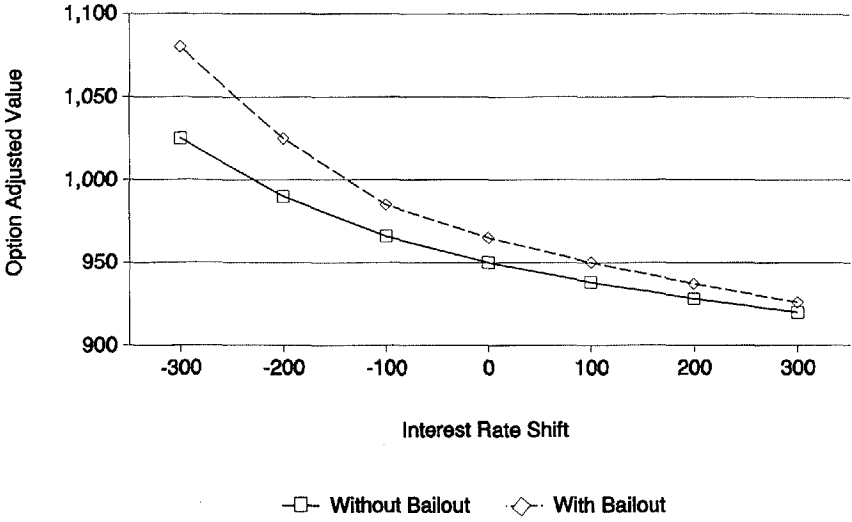


You can see how my curves are going to cross in the future, if interest rates go up, because of the negative and the positive convexity and the difference in the durations. The difference between the curves can be thought to be economic surplus. And of course, where the curves cross is where my economic surplus goes to zero and becomes negative.

I want to use price behavior curves to assess C-3 risk because they provide a good technique for hedging C-3 risk. When I look at the two curves in Chart 4, my liability curve is the same as the one I just showed you. But I've added a fixed-for-floating rate swap to my asset curve, which has helped to correct the duration of my assets to be more in line with my liabilities. I've also added an interest rate floor, and that has helped correct the convexity of my assets. That provides the increase in value to my assets as interest rates decrease. The general technique is to try to line up the curves. You can also do it through liability-type fixes. For example, you can increase the duration of liabilities by using investment-generation-type strategies, or even portfolio strategies, instead of market-based crediting strategies. However, this will depend on the policyholder behavior. If you move to a portfolio type of strategy, how much will lapses increase under adverse interest rate conditions?

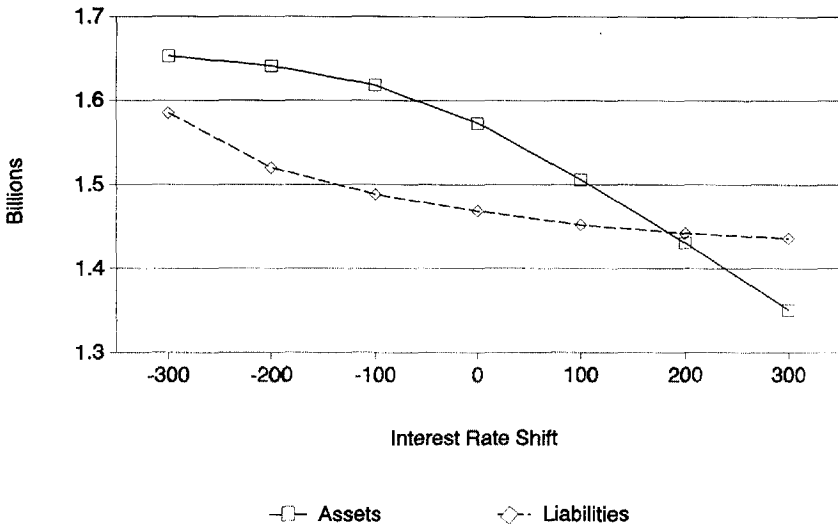
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CHART 2
SPDA PRICE BEHAVIOR CURVES



Rate Shift	No Bailout			Bailout		
	Value	Duration	Convexity	Value	Duration	Convexity
-300	1,025	3.4		1,080	5.1	
-200	990	2.4	1.11	1,025	3.9	1.46
-100	966	1.7	0.83	985	2.0	2.03
0	950	1.3	0.42	965	1.6	0.52
100	938	1.1	0.21	950	1.4	0.21
200	928	0.9	0.22	937	1.2	0.21
300	920			926		

CHART 3
PRICE BEHAVIOR CURVES

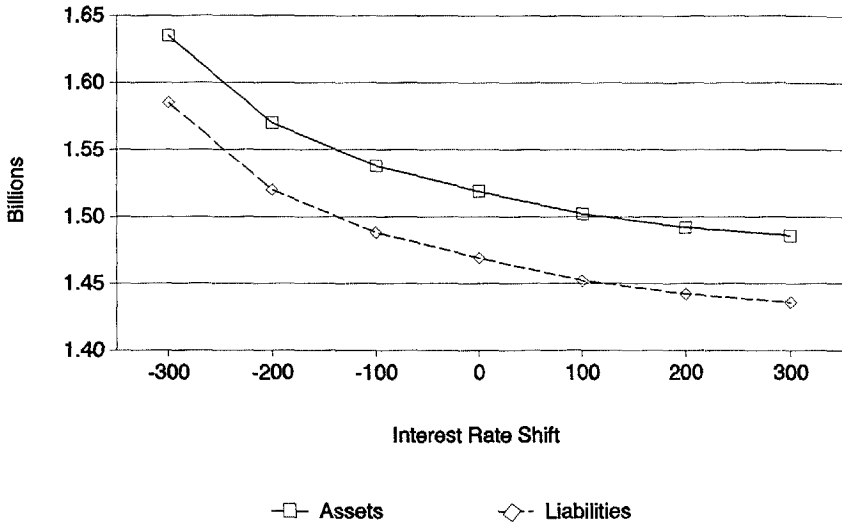


Rate Shift	Assets			Liabilities		
	Value	Duration	Convexity	Value	Duration	Convexity
-300	1.653	0.7		1.585	4.1	
-200	1.641	1.4	-0.67	1.520	2.1	2.21
-100	1.618	2.8	-1.36	1.488	1.3	0.82
0	1.573	4.3	-1.40	1.469	1.1	0.21
100	1.506	5.0	-0.53	1.452	0.7	0.42
200	1.431	5.6	-0.35	1.442	0.4	0.28
300	1.351			1.436		

The problem with the price behavior curves, or where they fall short, is they don't account for yield-curve risk. Chart 4 looks at parallel shifts in the yield curve. We're not looking at twists or tilts in the yield curve. So even though I line up my curves based on duration and convexity, they might not be lined up if the yield-curve shape changes. The other thing they don't take into account is the accounting method. Because we're using cash-flow measures, there are no statutory accounting numbers. You don't see the risk-return trade-off if policyholder behavior is a little bit different than what you thought, in terms of your statutory statements or your GAAP statements.

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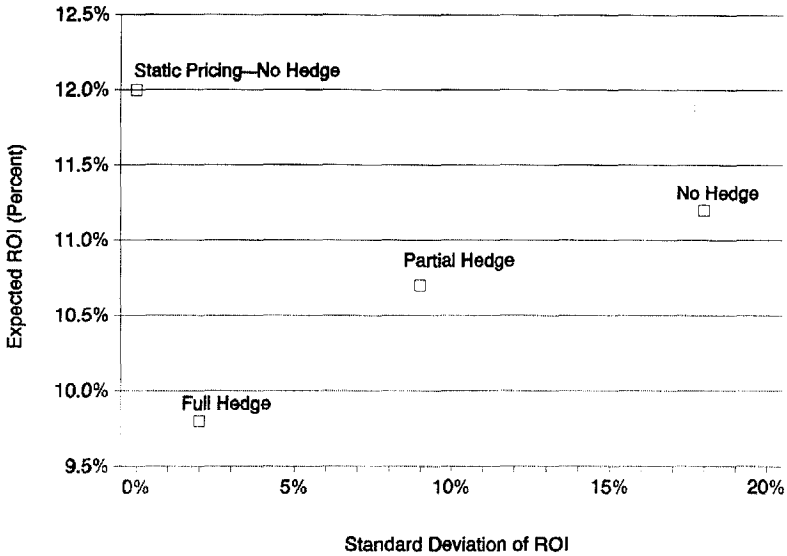
CHART 4 PRICE BEHAVIOR CURVES



Rate Shift	Assets			Liabilities		
	Value	Duration	Convexity	Value	Duration	Convexity
-300	1.653	4.0		1.585	4.1	
-200	1.570	2.0	2.14	1.520	2.1	2.21
-100	1.538	1.3	0.80	1.488	1.3	0.82
0	1.519	1.1	0.20	1.469	1.1	0.21
100	1.502	0.7	0.41	1.452	0.7	0.42
200	1.492	0.4	0.27	1.442	0.4	0.28
300	1.486			1.436		

So to account for that, I take the hedges that I developed based on my price-behavior curves, and I do an efficient frontier type of analysis (Chart 5). I do this through stochastic scenarios and through financial projections. I've shown what happens if we don't do stochastic scenario testing and instead do traditional, static, yield-curve testing, and I price for, say, a 12% return on my product. My expected ROI under the traditional method is 12%. But when I incorporate the stochastic scenario testing, I end up over at this other point, where my expected ROI has gone down, compared with what it was under traditional testing. I've also seen that there's quite a variance in my ROI returns under different stochastic scenarios. Then on the far left, I show the full hedge, which was based on the parallel price-behavior curves.

CHART 5
RISK/RETURN OPPORTUNITY SET



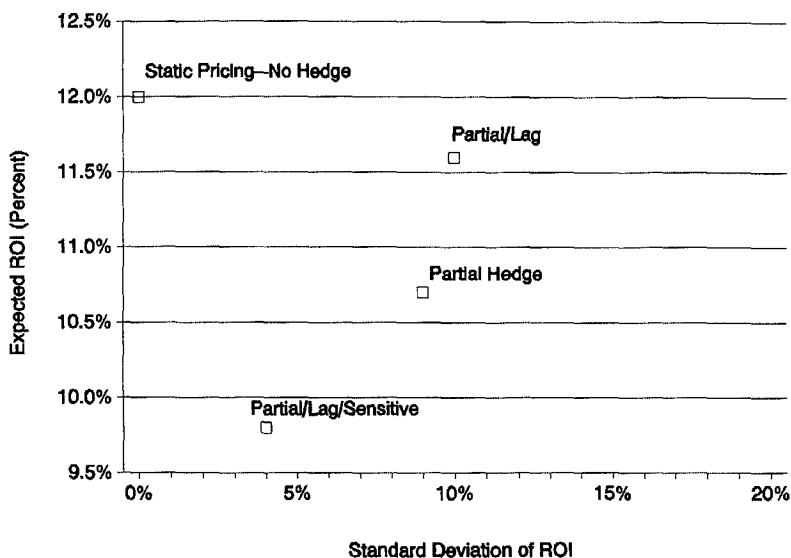
We've put our hedges in place on Chart 5, and they've affected our expected ROI by bringing it down, but we've also lowered our standard deviation, so we can be fairly sure that our ROI will fall in a certain area, although it will be expected to be less than without the hedge. I show a partial hedge in the middle. Finally, I have the partial hedge from before, but I add a lag to my crediting strategy, where I follow interest rates up more slowly than I follow interest rates down. And I can see that I can improve my ROI based on that, provided my policyholder behavior is as assumed.

Finally, Chart 6 shows that if I wasn't right on my assumption for policyholder sensitivity, the partial hedge with the lag crediting strategy actually gives me a lower expected ROI than without the lag. So this illustrates how important the policyholder behavior assumption is and how much it can affect your results.

To summarize, I know that policyholder behavior is a very important assumption. It's something I know very little about. I think I should create the information system going forward to be able to track liability cash-flow data, so that I can learn more about policyholder behavior. As I change my credited rate in relation to the competitor's rate, I want to learn more about how that affects the cash flows in and out of my product and the new business of my product. I also see that I want to do sensitivity testing. You don't want to just guess at a policyholder behavior assumption and determine what you think is the duration and convexity of your liabilities.

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CHART 6
RISK/RETURN OPPORTUNITY SET



I also want to try to develop strategies to minimize the risk of policyholder behavior. I want to develop interest-crediting strategies and investment strategies to minimize this risk, so that if my policyholder behavior is very different than I thought it was, my expected returns would still be about the same. Finally, I want to do option pricing as well as the scenario testing. Option pricing and the price-behavior curves provide a good technique for what to do about fixing your C-3 risk, in terms of the shape of the curves. The scenario testing gives me the financial results that I need. I can also incorporate utility theory of different trade-offs of different hedges or different crediting strategies or investment strategies.

With that, we are going to break back into our groups, so that you have a chance to hear what some of your colleagues are doing in terms of scenario pricing.

FROM THE FLOOR: One thing that made me feel a little uncomfortable is that there is a great deal of complex mathematics behind this material and assumptions that we're really not sure about. I get worried that doing something like this will give management a false sense of security that we know what we're doing, when there are real risks behind there that are not coming out.

MR. GEORGE: That's a good point. That's why I would recommend looking at ranges, and doing sensitivity-type analyses, especially on the policyholder behavior assumption, which I think is probably the most critical assumption, and the one that we know the least about. I would do the analysis by using several different assumptions and presenting it to management and show the differences. And I would use it to make a case for developing the information systems so that we can learn more about policyholder behavior going forward.

MS. HANCOCK: Just before we start the third case study, one comment that I heard around all of the tables was that it's very important to start validating some of these assumptions, now that we've had a 100-basis-point pop-up in rates. What did our crediting strategies and our cash-flow-testing models say would happen if interest rates went up a 100 basis points? And what did happen during the last six months? What have policyholders done? How have we managed the credited rate? And it's important to remember the asset side as well. What did our cash-flow-testing models say about prepayments, versus what actually happened in the first six months of this year? It's only a little bit of data, but with all these assumptions, we've got to keep looking back and comparing what actually happened to what these models said would happen.

For the final case study, we are going to look at a situation in which we have to develop some assumptions without having any experience to use. Our task is to do an appraisal of a mutual fund. And what this case study is intended to show is how you might try to draw from a product or market that you are familiar with, in trying to develop assumptions for a market that is similar, but with which you are not familiar. I understand that Jim has had some recent experience in this, so I'll let him tell you about it.

MR. JAMES M. MERWALD, JR.: To give you a little bit of background information, as Rachel alluded to, I have recently been involved in an appraisal of a mutual fund. The way it came about is there was a large, diversified financial services company that sold mutual funds, and it also had insurance operations. And it had one particular mutual fund that was sold through a particular distribution system. And for a variety of reasons, it decided to sell this mutual fund. So management interviewed several different investment bankers to work with them on the sale of it, and one of the investment bankers suggested that they use an actuarial approach to develop an appraisal value of the mutual fund.

This was a fairly unusual mutual fund in that the people who signed onto this were actually buying somewhat of a fixed-payment plan. They'd sign up for this plan, and they'd make regular monthly payments into the plan. They had the right to terminate their payments and leave the money in, but it was like an old fixed-premium annuity, where you made regular monthly payments and it accumulated. So there were many similarities between this type of fund and say a variable annuity, so I think an actuarial approach made sense. For the actuarial profession, this may be an opportunity for us to expand our horizons, because my understanding is that much of the time people just use rules of thumb, such as 2% or 3% of the assets.

There are, of course, several major differences between mutual funds and variable annuities. One is the taxation of the inside buildup. Unlike annuities, the person is taxed on any current income or dividends distributed with a mutual fund, and this can vary, obviously, depending on the type of mutual fund. If you have a municipal bond fund, you won't have to pay taxes on that, but there are some tax ramifications that could affect the behavior.

With your variable annuity, you have a minimum guaranteed death benefit and a cost associated with that. With the mutual funds you don't; so for comparable situations, you may be able to get by with a lower asset charge to generate the same

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profitability. And then finally, depending on how the products are sold, you may have different attitudes and objectives from the standpoint of the person putting the money into the mutual fund versus an annuity. With the mutual fund, they may look at it as being more liquid, and they may be more willing to pull money out or shift it into a different fund. With annuities, because of the tax consequences, they may be more willing to ride out some market corrections or falls in value than they would with the mutual funds. So again, this is another thing that I think you need to keep in mind in trying to come up with assumptions for valuing a mutual fund.

Now if we take a look at some of the assumptions that I've outlined here, you're going to find many similarities with your variable annuities. One of the key ones is your asset growth rate. This would be your total return that you're anticipating or that you want to project the assets out at. This is a critical assumption because most of your revenue is coming from asset charges. You might want to start with a baseline return and then look at some deviations in that return based on different scenarios or different levels of volatility in your total return.

Another critical assumption is going to be how big your account balances are. Some fixed expenses are going to be incurred in setting up and administering the mutual fund, and they're going to be the same whether you have \$3,000 or \$20,000 in the fund. Obviously, unless you have fixed expense charges that are going to cover that, your average size is going to dictate how large your asset charge needs to be.

Another assumption is persistency. Are people going to move the money out? On the one mutual fund I valued, we found that its withdrawal experience was fairly level across the board. It didn't vary a lot by policy year, unlike some annuities and life insurance products. It was fairly constant. But this is something you'll need to look at and probably test, because this is going to affect your asset growth. Also, are there going to be ongoing payments by people? Is this going to be a single-premium or a lump-sum deposit product, or are there going to be monthly contributions? Again, this is going to affect your asset buildup. We found that with the product we looked at, there were many ongoing payments, but there was some premium suspension or payment suspension that increased the longer the people had the contract.

There are a few other assumptions. What are the expenses of administering the business going to be? If you don't have any explicit administrative charges in the product, then you're going to have to cover your expenses with your asset charges. The asset charges may just be a given, or they may be something you need to solve for. It just depends on your situation. If you're looking at a current mutual fund, then the asset charges have been dictated. If you're developing a new one, you might have some flexibility. This is similar to the sales charges. Finally, we need to consider required surplus. When we do insurance products, we always build in the cost of maintaining some risk-based capital (RBC) or target surplus. With a mutual fund company, you'd anticipate that it is going to have to have some surplus to be able to continue to operate, so you might want to factor the cost of that into your calculations.

So these are some of the assumptions I came up with. In your discussion groups, you'll probably come up with some others. Where are you going to get the

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information to set these assumptions? In the work that we did, the mutual fund we were valuing had about ten years of history, so we got a lot of raw data and did our own crude persistency studies, payment-termination analyses, and withdrawal studies and used those to come up with some of the assumptions. If you don't have that to go from, you may be able to find comparable funds and use information from those.

You can draw from your variable annuity experience in some areas, particularly administrative expenses. I would guess that your administrative expenses for the mutual funds might actually be a little lower than your variable annuity expenses because you don't have to administer the insurance aspects of the product that you have with the variable annuity. On the other hand, many of the SEC reporting requirements are going to be similar, so you're going to need to factor that in. Your variable annuity persistency could be useful as a starting point for developing your mutual fund experience, especially if variable annuities are being sold by the same distribution system. Obviously, you have to take into account the differences, such as the taxation and how that might impact it. The same thing is true with the ongoing payment activity and average account size. You can look to your variable annuity experience as a starting point and try to build off that.

Finally, I'd just like to finish up by saying this is the type of thing where you have to do sensitivity or scenario tests on the key assumptions to show management what the variability in your profits is going to be, given different termination rates, expense rates, etc.

FROM THE FLOOR: On Jim's discussion of his assumptions on the mutual fund, what do you do about partial withdrawals? Can you tell us how you handled that?

MR. MERWALD: Well, I did factor that in. They did allow partial withdrawals, and we had some experience that showed the withdrawal activity. And that was another item that seemed to be relatively constant across the time period that we looked at, which was about ten years, so we were able to factor that in.