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SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

Moderator: DENNIS L. STANLEY
Panelists: JOHN C. R. HELE
CRAIG RODBY
JOSEPH H. TAN
Recorder: KATHERINE G. EDWARDS

- o Scope of SOP analysis
- o Applications
 - Pricing/repricing analysis
 - Strategic planning
 - Performance review
- o Comparisons to other financial measures

MR. CRAIG RODBY: My role is to put things in perspective; my presentation is not numbers-oriented. The source-of-profit (SOP) kind of analysis will come in play throughout my talk, but I will digress, then I'll bring it back and show you where SOPs come in.

Let's begin with some definitions. First, I will use gain-and-loss analysis and SOP analysis interchangeably. Secondly, I will use SOP in two different contexts, which I will refer to as an absolute sense and a relative sense. In the absolute sense, it is similar to what I learned when I took actuarial exams. The second sense of SOP is one I call a relative sense in which you do the absolute analysis, but you compare results to something. For example, you compare them to a plan, to last quarter, or a similar quarter last year. The absolute sense is oftentimes used by accountants and financial people to get a sense of reasonableness of numbers. If you can reformulate earnings into the underlying components, and you don't have a big spare number that is unexplained, you've probably got some pretty stable results.

Management uses the relative sense in the decision process. SOP analysis gives management people a sense of where they are relative to their plan.

There are two reasons we are discussing SOP:

1. SOP is very important from a financial actuary's sense. It is one of the few times that you can provide direct, meaningful information to senior management. It's in a very succinct form and it's usable.
2. Under the new Financial Accounting Standard (FAS) 97 rules for GAAP, and usually this kind of analysis makes the most sense for GAAP, there's a different process you go through to get the numbers. Instead of beginning with earnings and breaking out the sources, you assemble the financials from the components. FAS 97 has its own set of complications, but at least the components are more available to you.

The remainder of my presentation will be devoted to the applicability of SOP analysis to strategic planning, forming a consensus, and finally, in providing a focus. When you think about it from the top management standpoint, these are really leadership issues.

When we talk about strategic planning, the mind conjures up things like computers, high-tech, "star wars," command central. In a sense, the war model is a good model, but the real question is, "What kind of war?" I would offer that we are not dealing with "star wars" here, we're dealing with a guerrilla war. The life insurance business, particularly individual life, is a very fragmented business. I saw a study once where the top 100 companies did not control 80% of the market. That's not characteristic of a very high-tech kind of business. That's not characteristic of a company winning the market-share war. Just looking at the number of companies, it's

PANEL DISCUSSION

difficult to see how this is a very high-tech battle. The other observation I would make is that there is a very strong commitment on the part of the players in this market, and that is also characteristic of a guerrilla-warfare model. So the kind of strategic planning I'm talking about is one of timing, one of developing a skill within the organization so that you can do things just a little bit better. You're not going to kill the competition, you're just going to beat them in critical areas, and that's where SOP makes some sense.

Woody Allen used to tell a story about alien life forms taking over the world. He said, "It wouldn't be so bad if alien life forms took over the world, but what would be frustrating is if there was an alien life form that could look, talk and walk just like us, and be just like us in every respect except they would know everything five minutes before the rest of the world." Now when you think about it, you're at a horse track and you know the results five minutes before everyone else. Or you're in the stock market on October 19 and knew what was going to happen five minutes before everyone else. And that's the sense I'm trying to provide here in the strategic planning context is that knowing where your margins are is an advantage.

Let's bring in SOP, and I think you can see how SOP works in this kind of a context. You take the problem, and you break it down into the pieces so you can provide a margin, a competitive edge. That is a kind of strategic planning that I'm talking about. And SOP analysis is a quite interesting type of analysis for this kind of a strategic planning model.

The other thing is evaluating the market. A lot of times I look at my competitors and make sure that they're making a profit. I can deal with tough competitors. I can't deal with competitors that are committing hari-kari. They can spoil the whole market. And you can't get that kind of information very easily. The information that you can get easily is information on interest crediting rates, spreads, mortality charges, etc. Again, gain-and-loss analysis helps you break the thing into pieces.

Forming a consensus is the second part of what I think is important in this, what I call a larger problem. About 20 years ago a guy by the name of Irving Janis wrote a book called *Group Think*, and he discussed what went into good decisions and bad decisions. Bad decisions are characterized by a kind of superior mentality that we've got some kind of an edge, that people don't understand what we know. In his model, he compared the Bay of Pigs invasion, which he considered a bad decision process, where everybody felt that there was a superior strength of the U.S., to the same people involved in the process of the Cuban missile crisis, where there was lots of discussion, lots of anxiety, and also some good decisions.

We use return on equity as a primary measure in my company. When you explain return on equity, many people do not understand what you're talking about. They don't understand the numerator, they don't understand the denominator, but more importantly, they don't understand how they can affect the result. It is important to break it into pieces so that the salespeople can see how their doing well in the sales process is good.

I mentioned before about using GAAP instead of statutory, and one of the reasons I say that is when you're talking to salespeople, and that's where a lot of my efforts seem to be going these days, it's very important that when they do well they can see the results. One of the problems with statutory is when you're doing well, statutory earnings go down because of the conservative nature. Then, when you're not doing well, and sales are not going well, and there are thoughts about, "Gee, we could increase the crediting rates"; all of sudden you're reporting good profits. So I focus on GAAP, and I use statutory as a constraint. That's the way I refer to it when I'm talking to people. I think gain-and-loss analysis really does provide the bridge. It provides the connection by which people can make a good decision.

My next topic is called "Providing a Focus." This is a more difficult one to talk about, but one of the things I think is important in this larger problem is to provide any kind of a picture of what it is you're trying to accomplish. I call it the vision department; the psychologist Carl Jung talked about people forming pictures of reality, and groups forming pictures of reality, and tending to defend reality. So if they're doing better than reality, they tend to correct for that. If they're doing worse than reality, they tend to correct for that as well.

One time I read about a guy who does consulting for professional tennis players. He studies what players do between sets -- how they wipe their hands off, if they sit down, what they look at, what

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

they're thinking about -- just by observing. He could tell when someone was going to lose an advantage just by what he was doing with his hands and motions between serves. And I think again it's the kind of thing where you correct for reality.

One of the most important uses of sources of gain and loss is what you do to correct what you do to get to the higher level. So breaking the problem into pieces and concentrating on the places that you can affect is very, very important. This is a difficult concept for me, but I think it's very important. The other thing here is timing. A lot of times you don't get a chance to influence things but once a year. We set crediting rates at Northern once a year, then we guarantee them for the next year. And it's very important that you take advantage of timing opportunities. Know what you're going to do before you do it. And again, SOP makes a difference.

In conclusion, I say we can only manage what we know, and the SOP analysis is a very important piece of this. This is one area, and there may be others, but this is a very important area that the financial actuary can influence. And then with change comes opportunity. This is an interesting subject. FAS 97 has turned an actuarial problem into an accounting problem. And again, you look at the pieces of things, and there's much more of ticking and tying, and much more balancing to accumulation values, and so on. And this FAS 97 allows us to make some additional analysis; it puts more rigor in our analysis.

Let me talk about the SOP items that we look at. This does not represent truth, it represents what we at Northwestern National and Northern look at. Instead of going into detail, let me just touch on some of the points.

The first is "In force." You're talking about things in a relative sense, so you've got to scale it. If you're comparing your plan, you've got to compare the assets and information from your plan and scale everything. If your assets are higher just because you sold a lot, they may not be much help in terms of interest spread. It just means that you've got more investment income because you've got more assets, and so you've got to scale things. We have techniques of scaling our in-force business and comparing to our plan. What we do is multiply all the numbers in our plan, but with the in-force business that we have. So we use the assumptions in our plan, but with the in-force business we have, to come out with a scaled figure of our plan.

"New issues" is fairly straightforward. Gain from termination, or gain from surrender, was a big factor in the Financial Accounting Standards Board discussions, whether or not that was going to be included in the profit stream, and it is.

Let me just speak to two other ones, and that's interest rate spread and expenses. Interest rate spread is very, very tricky. This is a plug for the consulting groups, but I think it's a very valid one. A number of the consulting firms have models. This might be a 20-step process, with the consultant leading from step 1 to step 18, and then 18-20. This process forces you to make decisions about what you're going to include in the asset base on a particular line of business, and what is surplus for that line. Those decisions are needed, or the SOP analysis really does not work out very well. In other words, if you have more assets assigned to a line of business than liabilities, you're going to see a good gain from interest just because you put a lot of assets in the business. That needs to be corrected. You need to allow for that.

A similar kind of thing goes on in expenses. The allocation of expenses becomes a very critical factor in looking at SOPs.

In summary, an SOP lets the actuary add value, in direct and succinct ways. And it is a very useful process.

MR. JOHN C. R. HELE: *Imagine coming into work and receiving a little letter on your desk. You know the small type that comes in not quite 8.5 x 11, and it always comes with a little embossed company logo on the top. You open the envelope and find a very special letter. "Good morning, Mr. Chief Actuary. The Board of Directors have been questioning the firm over the trends and magnitude of our profit. Although they receive the usual package of management information outlining mortality experience, interest earnings, sales and persistency, they want to understand more. They want to understand more than historical performance. In particular, our new outside director of the firm, Mr. Tough as Nails, President and CEO of Big Industries, Inc., wants to understand why profit changes in our business, and what contributes to profit in each quarter. I*

PANEL DISCUSSION

need your help. As you know, sales performance and asset growth have been spectacular. However, profit has been level if we take away capital gains, taxes and the usual items. We have to understand why. I cannot stress the importance of getting to meaningful information. Your job is to present the sources of profits in a meaningful, timely and informative way."

Well, that's what you could get some day, and I'm quite confident that you will. What you have to understand is that information is the most important management tool. Craig outlined some great reasons why. I'm going to try to take you through a way to make it happen. At my prior company, Crown Life, we spent years trying to get to meaningful SOP management information, and I think we came a long way, and I'm going to tell you how we went about it.

Useful management information invokes action. Nothing invokes action more than profit. But not just the SOP, that's just the title, it's really far more than that. It's the amount of profit that's happening, the relative magnitude, and the trend. But you can only have actions if you know this by product line. In fact, you should really have this by product. Then you can take action, then you can make results happen.

To maximize profit, which is the key goal, you have to understand all points of profit. You have to understand the good profit, the bad profit, and the real ugly profit, the things that nobody really wants to look at. Ignorance is not really bliss. Just because you're making money doesn't mean it's always going to happen. Your mission is to make it meaningful, timely, and result in action.

You always need a plan to go about doing anything. Plans never work out the way you plan them, so you have suspense along the way. But first let's get to the plan. In any good plan, you've got to have what call "the heavies." You have to have senior management commitment. If you don't, it's not really worthwhile. It's the most absolutely necessary part of the whole process. Certainly from this letter that you received, you have their attention. The information that you give hopefully will be used for our purpose. And you need a deadline. And you need a presentation to make sure it's going to be communicative throughout the business.

There's a great thing that you can try sometime when you're producing all these reports that everybody has to produce on a regular basis. You should try once not producing the report. Don't send it out. See if you get any comments back. We tried that once. One person phoned back, said he liked the report. He was the president, so we continued the report. But you can try it on a smaller scale. Try to change the information around. Present it in a different way. Put an appendix on the back. Put forth the most important information. Target your audience. Once you have the commitment you've got to set up a unit to get the job done. One person cannot go about analyzing SOP in any meaningful way.

Let's now discuss the reality of this task. Getting reliable data does not just happen.

When you are quite desperate for data, you can always improvise. One trick that we tried was to go right to the source. We would manually record what was coming in on a daily or weekly basis. We'd have a clerk in the administrative area count how the premiums were distributed by product. We would count the claims going out. Because there wasn't any computer system anywhere, and we couldn't go back and redo it, we would use that record of the claims being paid. That's very helpful, and it's quite surprising sometimes, so I really encourage you to try that.

There's a great 80/20 rule. You're probably going to spend 80% of your time gathering and checking data, and 20% analyzing. Sometimes it may be 90% or 95% adding up and checking the data. Once you have good data, the analyzing is a lot easier. It's when you can't get the data that it's quite difficult. I would encourage everyone on your team never to say, "It can't be done." That's a standard response, and because it hasn't been done you've got to really push for it.

The last thing that's quite important, and it always keeps the suspense going, is you really have to seek 80% solution. If you're analyzing the profit of your company, which may be \$40 million, you don't have to worry about \$100,000 items. If one product line is making \$2 or \$3 million, set your rounding limit so that you don't spend too much time getting too exact. If you have 80% of the reason why, that's a meaningful story to tell.

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

We came up with some theories as we were doing all of our work. I call them the false theories of the unknown SOPs, when you're trying to balance the sources and they don't quite add up. Of course this always happens the closer you get to your deadline. I have developed some axioms that aren't quite right, but are frequently believed throughout an insurance company.

Axiom #1: If you are making money, it's got to be right. You'd better understand why you're making money. Don't accept it as always having been that way, because there may be some trends and some offsetting things going on that really are changing what's going on. Perhaps that block of business that's given you all sorts of profit is lapsing at 20% a year.

Axiom #2: The administration department always knows what the systems department is doing. It never works, or rarely works. There are all sorts of examples where you've put on a new product with all sorts of systems programming that doesn't get done in time, or you get double revenue booking, or the reserves aren't set up quite right if it's brand new, and it really throws things off. That's why it's so critical to have the administration person and the systems person on your team. Involve them in the process, and it's amazing what happens.

Axiom #3: They're always right. If you think of the number of calculations in an insurance company, it's just mind-boggling. I saw some consultants do a survey, and they did this chart up on the screen of all the systems that are in an insurance company. I think it's 265 or 300 systems. There can be a time when mistakes are made. A good check is to go and pull some policies out of that product and check the calculations on those policies. If it's not adding up and you can narrow it down to one product, go in and do it by hand. Pull out some actual extracts. You can sometimes find a million dollars that way.

Axiom #4: If systems says it can't be done, it can't. Well, you've got to remember where they're coming from. You probably have a project manager who manages 30 people, and they're implementing a \$2 million computer system. You say you want to understand profit by product and SOP, and they're going to try to build you an on-line system that's going to give you real time profit analysis right to the president's desk. It's only going to take three years and cost you about \$2 million. Force the systems department to scale down their effort. Give them the budget, tell them what you need, and give them a deadline and hold them to that deadline. It's amazing how creative people can be when they're forced up against deadlines.

Perhaps one of the most amazing things is trying to get everyone in the company to understand how he or she impacts profit. Sometimes the most important person to you in analyzing the SOPs on a regular basis could be that clerk who's incorrectly coding some claim form. It can really wreak havoc in your system. So you've got to make sure that everyone who's putting numbers in the system really understands how he or she impacts. You can't just let that extra zero sit on the master record indefinitely on that \$1 million policy which is really only a \$100,000 policy.

During the analysis phase of SOP, we came up finally with some major theories. We came up with about five major theories that you may encounter when you're trying to analyze profit. This is one of my favorites. Within an insurance company, and within most large financial organizations, there's an equilibrium. There's an offsetting equal number of errors. In analyzing profit, you're probably going to find an error somewhere along the line and then think there's not an equilibrium anymore. You can't explain what's going on. What you have to do then is spend an unbelievable amount of time trying to find that other offsetting error. What usually happens is you stop the moment you've got everything balancing again, and you go on happily until the next month when you have to analyze it again.

The too-big-to-believe theory: It is really amazing when you dig in and discover where profit is coming from. In my experience, people are usually amazed when they see where the profit is coming from. Which underwriting class is really making you money? It's so big sometimes that you really can't believe it. Not just making your money, but losing your money. Lines of business or sales that may have happened years ago may be really bleeding your profit picture. It's really hard for people to understand. So recognize this fact and make sure your data are good when they seem really great, because management may not believe it.

The more-time-needed theory: You're always running up against the deadline, and there's always going to be an unexplained portion. I believe you're better off to go in and say, "This part is unexplained," than to try to make it up and re-fudge the numbers to balance. If you do that, the

PANEL DISCUSSION

next time you go in your credibility is going to be shot out the window. So again, go for that 80% solution, explain at least 80% of it that you're sure of, and don't go in just trying to make it balance for balancing sake.

The next-quarter-knowledge theory: This is the next step to number three -- you can always explain what happened last quarter this quarter, but you can never figure out what's going on this quarter. That's because of wonderful things, such as two tapes were run, so your revenue is more than what you thought it was. And you don't find out until the next month that somebody actually put two tapes on. Or somebody forgot to set up a month-end liability. Universal life has wreaked havoc within most insurance companies because the systems are not fully developed.

Last but certainly not least, it's the shoot-the-messenger theory: I mention this one because I think you really have to be wary of it, not in a negative sense, but make sure when you find the too-big-to-believe that you approach it in the right terms. Probably someone in your management team actually was responsible at some point in his or her career for what you've now uncovered. So show people a way out. Don't hide the real issue, but give them some options.

Well, in any good story there's always a hero. And I think the hero can be the information actuary, because actuaries are uniquely positioned through their professional training to really understand all the components as to what's going on. The trick, though, is to clearly communicate. Put yourself in the president's shoes and understand his background and communicate in terms that he can understand.

Present the most important information first. Always do a one-page executive summary, then perhaps a three- or four-page findings analysis, then throw all that detail in the back of the appendices. The problem is the president will probably never read all that; he wants to know what it means to him.

The third point is to project assuming no action. Don't just show historical performance, but try to say, "If these trends continue, this is what could happen to your profit." That's how you can get action.

I always show some options and implications and maybe even some recommendations as to what can be done to change the profit. Be tough. Be professional. Remember that every piece of information that you give should result in decisive management action. That action may be not to make a decision, but make sure that is the real decision being made. That they decide that you're going to continue the current course because the profits are happening in a way that is expected. Always relate it back to what you had assumed in pricing, because perhaps things should be changed as you go along. I think in my experience, in my professional career, doing this was really one of the most exciting times I ever had. It was one of the most frustrating experiences I ever had, one of the greatest challenges, but the rewards are fabulous. If you can explain what's going on, why it's going on, to the senior management of your firm, you will really be a valuable person. It can make a big difference, and I'm sure all of you can do it, too.

MR. JOSEPH H. TAN: We are discussing how you slice your earnings pie. What you do is divide your profit into several pieces and try to see if you can understand them. Let's start with an overview of what you do when you analyze earnings. What you do is simply break up your profit into subparts so that you can better understand what's going on. You can compare the components to various measures or standards.

So what are the purposes for doing such an exercise? We want to identify some errors or omissions. For instance, by doing the SOP analysis you may find out that the reserve is overstated. Somehow you could not reconcile the bottom line. You can better understand and manage your results -- this has been emphasized quite a lot; this is probably the main purpose of doing an SOP analysis -- you can pinpoint any profit improvement areas.

Can we increase the credited rate? You can better price or reprice your product. To look at SOP analysis you probably need to look at what is the actual and from there you can better say, "Maybe we should reprice this product if we're not making the bottom line we intended."

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

There are different methods of analyzing earnings, and SOP is only one of them. Look at the different ways. You can look at what I call an operational analysis. Somehow when you try to look at the total picture you might find that something's incomplete, or maybe the numbers that got reported this quarter really belong to last quarter. You can look at various trends and ratios. You can compare those trends and ratios to the industry average. Or look at historical results. Last year you only made \$1 million and suddenly this year you make \$20 million, then maybe there's something wrong.

The third way is to just chuck it out into various breakdowns that we can understand. We can divide it up into different lines of business, by product, by issue year, by agency, etc. The thing to remember here is that the breakdown should have some management implication. You should either be able to price or reprice those policies or maybe to pinpoint the areas in which you can improve. There's no point in breaking it down into so many pieces if you cannot act on them.

The next is what I call analysis versus plan of projection. This is probably the one that most people do. You try to project the next year and then try to analyze whether you're off from the plan. Normally, people do this by simply comparing the actual to planned, but they only look at the various income statement items. For instance they will say, "the reason why my bottom line is low this year is because I have two million additional claims this year." But we know that does not really tell you what you're supposed to do. You don't really know the total picture of what's the effect on the bottom line. But this does have some benefit: you can identify errors, and you can also pinpoint some management action.

The last method of analyzing earnings is the SOP, and we're going to focus on this one. What you do is analyze the components of profit such as interest, mortality, withdrawal, expense, and taxes. In SOP analysis, there are several ways to do this. The first one is similar to what Craig called the absolute analysis. For instance, you can see what is the earned rate versus the credited rate and what's the effect of that on the bottom line, or what we charge versus what we pay out in expenses.

The second is an actual-to-expected analysis. The expected here is normally based on GAAP reserving methodology. What you do is try to break up the actual into a piece called "expected," meaning that if the assumptions were realized, this is what I expected. And then from there you can see the extent that the actual deviates from expected. What are the different reasons why the bottom line is off? For instance, if the interest rate earned is higher, then you have an additional profit.

The third is you can break up actual into planned and then actual versus planned by source. This is similar to what I talked about earlier about actual versus planned, but in this case we're looking at the various sources of mortality, interest, withdrawals, and so on. One thing to note here is that the third method is really the same as the second one, because you can actually derive actual minus planned into two pieces; that's actual minus expected plus planned versus expected. So in a sense you can do this in two ways. First, do an actual versus expected and, second planned versus expected. Then when you take the difference of the two, you have an actual versus planned analysis.

Let's go on with real examples and how to do these things. Start out with the basic one. A one-year GIC. Interest gain is simply the interest credited subtracted from the earned interest. What expense gain do we have? What do we charge versus what do we pay out in expenses? This is real simple because it doesn't have any mortality or withdrawal components. And the other reason why it's real simple is that the reserve is zero. The most difficult part in doing an SOP is the reserve component, but you have to break that piece up.

Now we do a non-one-year life product. We are familiar with profit equals gross premiums plus investment income less expenses less death benefit less withdrawal benefit less increase in reserve. Now to do an SOP you simply need to unbundle the increase in reserve and assign that to various components of the cash flow. You break it up into premium, interest, mortality, expense, and so on, and pair those with the corresponding cash-flow components and then see where you're off. This is similar to the analysis of increase in reserve or page 6 of the annual statement. You just break up the increase-in-reserve component.

PANEL DISCUSSION

As an example, let's take a look at a statutory source-of-earnings analysis, where the statutory reserve is equal to the account balance. This is particularly true for front-end-loaded universal life (UL) wherein because the Commissioners Reserve Valuation Method (CRVM) reserve turns out to be less than the account balance, you end up holding the account balance as your reserve. So you get nice-looking source-of-earnings-analysis pieces. You've got interest gain, which is just interest you earned less the credited interest. You've got expense gain, which is just charges less expense that you incur. And you've got mortality gains, which is the mortality charges less the benefit less account balance payout. Now this is real simple because the reserve happens to be equal to account balance.

For a back-end-loaded UL, the exercise is not as easy. What you can do there is to note that the guaranteed rate is not better than the valuation rate. Then you can show that the CRVM reserve is equal to the account balance less the unamortized CRVM allowance. To do that type of SOP, you do your account balance piece just like this and treat the unamortized CRVM expense allowance piece separately.

All of us are familiar with the FAS 60 reserve, or the traditional whole life reserve, wherein we know that the profit could be broken up into five pieces: the loading gain, the expense gain, the withdrawal gain, the mortality gain, and the interest gain. What you do is you sort of break up the increase in reserve and juggle things up, pair them with the corresponding cash-flow component, and here you have all the five pieces. I won't talk too much about this. I just want to point out that the loading gain is one minus the net gross ratio times the gross premium. This is the percent of premium profit. And you have the other pieces of expense, mortality, withdrawal, and interest. For instance, withdrawal gain is simply the expected withdrawal rate minus actual withdrawal rate times the surrender charge times the cash surrender value less reserve released at surrender. Let's talk about the FAS 97 GAAP model. I will assume that most people at least have heard or smelled FAS 97 before and have a little idea of how FAS 97 works. Under FAS 97, profit is composed of various components. You've got mortality charges, surrender charges, administrative charges, amortization of your first-year charge (or what FAS 97 calls unearned revenue). FAS 97 says you use the same amortization schedule as for amortizing your debt to amortize your first-year charge or unearned revenue. You've got earned interest. You've got all the revenue items.

For expense items you have death benefits less account balance release, administrative expense, first-year expense less deferred expense, those that meet the deferrable criteria, credited interest and amortization of deferred expenses. There are formulas to show that mortality charges are whatever you collected; surrender charge would be the withdrawal rate times the surrender charge collected as surrender. You've got administrative charges, amortization of first-year charge, earned interest on the reserve plus gross premium less expenses. So you earned interest on the net GAAP reserve plus the cash flow for the year. You've got a death benefit minus account balance on the mortality rate. You've got administrative expenses, the first-year expense less deferred expense, and the credited rate. The credited rate is on the account balance and the changes in account balance in the year which is gross premium less expense charges and mortality charges. Lastly, you have amortization of deferred expense.

To do a source-of-earnings analysis, first we need to know the expected profit under FAS 97. Amortize according to present value of estimated gross profits, or the familiar EGP. The various components of EGPs are an EGP from mortality, an EGP from withdrawal, an EGP from expense, and an EGP from interest. You compute your EGP from mortality as simply the mortality charge you collected less the payout, which is death benefit less the account value. You've got withdrawal, which you collect surrender charge on. You've got expenses, which are the charges you collected less expense payout. And then you've got EGP from interest, the estimated gross profit from interest.

It can be shown, and this is shown in my paper, that the expected profit is equal to $(1 - a) \times \text{EGP}$ minus the interest spread on deferred acquisition cost (DAC). In other words, what you do is compute the amortization rate for DAC, at issue. That simply equals the deferred expense less first-year charge divided by the present value of EGP at issue. So you've got a fixed ratio of DAC at issue to the present value of EGP. And one minus that percentage times the EGP will be the expected profit for that year. One minus a percentage of EGP, and then you've got a little piece of the interest spread on DAC, which also emerges when actual equals expected assumptions.

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

But for year 1, additional loss of first-year expense less deferred expense also emerges. This is the non-deferrable expense that flows through during the first year. Some people call this the acquisition loss. Those are the expenses that you're not allowed to defer which flow directly into your bottom line.

So expected profit is one minus a percentage of that year's EGP minus the interest spread on DAC. Let's contrast this with the FAS 60 traditional life reserve. Under FAS 60, the profit emerges as the percent of gross premium profit, or one minus net-to-gross ratio times gross premium plus the emergence of adverse deviation provision. For instance, if you have adverse deviation provision on your interest rate, then those things emerge over time. The expected profit under FAS 97 emerges as another ratio, a ratio of EGP. It's one minus the amortization rate on DAC times the EGP, and then the interest spread, which is the earned rate minus credited rate on DAC. That piece also emerges as expected profit when actual experience equals expected assumptions.

If we look at the formulas we see that the revenue base is different between the two FASBs. Under FAS 60, premium is revenue, so profit emerges as a percent of premium. Under FAS 97, the revenue is EGP, or estimated gross profit, so profit emerges as a percentage of the EGP. Plus under FAS 60, you get an adverse deviation provision which gets released over time. Under FAS 97 you do not have such things because FAS 97 says you use the best estimate without any adverse deviation provision. However, you have an interest spread on DAC that emerges because FAS 97 says the discount rate you use to compute your DAC amortization is the credited rate. Well we know we earned the earned rate. So that difference emerges over time.

Now let's try to see what source-of-earnings-analysis formulas will look like under FAS 97. FAS 97 says you need to unlock your assumptions, but let's assume that you haven't unlocked. You haven't revised your EGP. You haven't revised your DAC schedule. It can be shown that the actual profit can be broken up into three pieces: the expected profit (so this is the actual versus expected analysis), which if you recall is the percent of EGP minus the interest spread on DAC, plus variations in EGP due to those four components of mortality, interest, withdrawal and expense. And the last piece, which is the actual earned rate minus the expected earned rate on DAC. We're going to go through these pieces later, so just keep in mind that this is an actual-to-expected analysis. Actual profit is equal to expected under FAS 97 assumptions plus variations in EGP and variation in interest earned on DAC.

What are the different pieces of the variations in EGP? You've got variation in EGP due to expenses, that's easy, that's actual minus expected expense charges that you've collected less expense that you've paid out. Now we know that expense charges are according to contract specifications, so normally those things do not vary as much. So the actual charges less expected charges is a small item in the analysis. The biggest piece will be the actual versus expected expense.

Variations in EGP due to mortality: Again, it's simple, it's actual mortality gain less expected mortality gain. What's the actual gain? It's the mortality charge you collected less the death benefit less account balance payout. Again, unless the COI or cost-of-insurance rate is changed, the mortality charge difference between actual and expected is going to be small. So the main difference is the mortality rate. If your mortality rate for that year is quite high compared to what you expected, then this piece is going to show quite a big loss.

Variation in EGP due to withdrawal: Again, it's actual less expected surrender charge you collected. What's the actual charge you collected? It's the actual withdrawal rate times account balance less cash surrender value less the corresponding expected pieces. All of us know that if the account balance is different from projected, the surrender charge we actually collected could be different. So that could be a source of variation in EGP due to withdrawal. However, the main reason again is the withdrawal rate. If you expected a withdrawal rate of 5% and your actual is 10%, then you're going to show a big loss that year.

Variations in EGP due to interest: Again, this is straightforward. It is actual less expected earned interest less credited interest. You earn it on account balance plus the cash flow, and you credit interest on your account balance plus the change in account balance during the year. Except for early durations, the major factor in this variation would be the interest spread on account balance because that's the biggest piece. The cash flow during the year is relatively small. Now in practice, the credited rate of most companies is declared monthly or quarterly. This formula can

PANEL DISCUSSION

be used to solve for what should be the ideal credited rate so you can balance things out. If you want a zero variation in EGP due to interest, then you just set the equation to zero and solve for the actual R.

The last piece here is variation due to interest earnings on DAC. The reason why this arises is because the net invested asset is the net GAAP reserve, or the account balance less DAC. To the extent that your actual earned rate is different from your assumed earned rate, this interest earning on DAC is a source of profit and loss. And this difference will show up in what I call variation due to interest earnings on DAC.

To summarize, if you don't revise your DAC schedule, if your EGP has not been revised, the actual profit is equal to a percent of EGP minus the interest spread on DAC. This is the expected profit plus the variations. You have variations in EGP due to expense, mortality, withdrawal and interest, and you also have variations due to interest earned on DAC. The last two terms are the variations in actual versus expected. These two terms will increase when your GAAP assumptions become outdated; that is, your actual is deviating from your expected. This will signal that you should revise your GAAP assumptions and maybe your DAC schedule. However, FAS 97 prescribes that we should use the unlocking principle. That is, from time to time, you need to look at your actual experience and see whether you need to revise your DAC schedule. If you revise your schedule at year-end, then you have an additional source that comes out, which is just the difference between the new revised DAC and the previous DAC. Once you do that, starting the next year you can apply the same SOP procedure again. And actual profit will be equal to the new revised percent of EGP minus the revised earned spread on DAC, plus various variations again, all based on the revised assumptions.

Our formulas can be expanded upon. For instance, the formula can be expanded if your invested asset is not the net GAAP reserve but instead the full statutory asset which normally for that line of business would be equal to statutory reserve plus required surplus. If that is so, then you clearly have an additional SOP that emerges, which is the interest on GAAP surplus.

You can also look at the difference between the fixed and variable expenses. The formulas we have with most of the pricing assume that variable expense is used throughout, but we know that in real life there are a lot of big pieces of fixed expenses. To the extent that your actual versus expected sales differ, you're going to have a really big negative bottom line. So you might want to look at that separately. You might want to look at overhead expense and development expense separately.

You might want to reflect replacements; this is quite similar to the way you reflect withdrawal. You can also reflect policyholder dividends by breaking them up into various pieces. New business and in-force business normally are quite different in terms of bottom-line contribution, mainly because of the non-deferrable acquisition cost. So you might want to look at those differently. You can also look at reinsurance profit. You can look at variations due to taxes. There are two pieces here: there's the tax rate difference and the taxable income difference.

Lastly, and this is the ideal situation, you might want to reflect the present value of future profits. This is normally done in the value-added statement. All of us are familiar that the statutory statement is no good because it shows profit when someone surrenders, and GAAP does a better job, at least it shows losses when someone surrenders. However, the main reason for that loss that arises is due to the DAC write-off. But we do know that the DAC does not represent the entire present value of future profits. So to the extent that someone surrenders, what you're really giving up is all future profits. You might want to try to reflect that in your bottom line.

Just as a final note, the SOP procedure is not a cookbook recipe. The difficult task is to unbundle the increase in reserve. Once you get that piece done, normally things will fall into pieces and you can see the bottom line pretty well.

The next point: SOP is useful only if management intends to use the result -- to plan, to manage, to control, or to price and reprice. Otherwise, it merely represents another breakdown of the same profit number. The important thing to note here is that it has to be used, and all of us are familiar with writing long memos explaining profits, analyzing the profit to death, only to find that the memos get filed and are not being used. So to note here is that when we do all this analysis, make sure the management people understand, and they use it to manage the business.

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

MR. BRUCE E. NICKERSON: In the old days before universal life we used to try to figure out why profits were what they were and this had to do with the mix of business that we were getting. Universal life itself spans, in effect, the entire range from annually renewable term to single premium endowment and, given in most of its variations the lack of required premium payments, it also includes what we used to consider to be extended term. It would seem to me that with the theme of trying to use SOP analysis as a guide to management action, that determining, or at least investigating, the degree to which within a UL policy your mix of business is not what was involved in your initial assumptions might be an extremely important activity.

MR. HELE: Absolutely. You have to go beyond just a product. You've got to understand who it's being sold to, how it's being sold, and then which distribution system. So if it's being used more for term, that will have different characteristics than if it is used as a whole life policy. A lot of times it may depend upon the agent or the office who's selling it. One agency will really have a certain niche cut out for a product and may use UL as a term replacement. Their profit dynamics may be vastly different from those of another office. Ideally, you should be able to not only get it by product but by office. I don't think it's there yet. A lot of people have tried it. But to show you a standard that I try to work toward, Proctor & Gamble can tell you in a region whether or not the sale they had for four weeks on one brand of Crest was a profit or a loss right away. And then they can fine-tune their pricing and their sales to match that. That's literally what I think we're going to be coming to over the next few years.

MR. DENNIS L. STANLEY: Just to add to those comments; I do a fair amount of product development work. When we develop products, we use sensitivity analysis to understand the niches in the product design where the profitability can be eroded. Oftentimes, companies are optimistic that a dump-in or some other profitable feature is going to be heavily utilized. I definitely agree with you; it is very important as you gather experience to see if what you've been assuming in the underlying profitability of the product can be verified in some way.

The other comment I want to add is I think a lot of companies are really struggling at the moment just to know what their in-force business is, let alone to know what their experience is by use of their various products.

MR. ROBBY: I think there are two separate problems here. One is a problem that I think is one that actuaries face all the time, where you get a conflict between the sales department and the actuarial department. What happens is that you price for one kind of situation or you price, say, on a marginal basis on a particular product line. And that becomes the standard product to which everybody recruits. So you get a lot of sales and a lot of recruiting on that particular product line or that particular niche market. And then you start to see the results come in, and now you've got to fix it. Now you've got to fix it on the product that everybody's likes, that everybody thinks is the best product you've got. And so what you've done is you've created a situation that's going to emerge into a conflict because you didn't want to face the problem in the first place.

From a SOP analysis, and this is the second part of this, a lot of what I talk about in scaling, in looking at this in-force section, is effectively taking the model numbers or some of your FAS 97 numbers, and multiplying them by the in-force business you have -- the categories and the valuation cells you have. You can get a feel for the changing of your mix of business in that area. In effect what you're doing is multiplying the factors to various valuation-cell mixes.

MR. NICKERSON: Perhaps some of the responses weren't quite what I had hoped. The point that I was really thinking of was that I could have a five-year renewable term policy, I could have a whole life policy, I could have a 20-year endowment policy and a number of plans in between. If I had suggested in these pre-universal days, to my boss, that all I really needed to do was average them all out and do my SOP analysis on a single plan representing our entire line of business, he would have looked at me as if I had gone crazy! And yet, I suspect from what I haven't heard that within a given UL plan, people are not running multiple cells, saying that this is a group of universals that are paying low premiums, and this is another within the same plan of insurance. You've got all of these different plans. Does it really make sense to do what my boss would have said I was crazy to do back in the early 1970s, which is say it's all one account balance, all one amount at risk for a cell?

PANEL DISCUSSION

MR. TAN: Yes, I guess under UL we show that the profit does not emerge according to the premium piece. In other words, even though you collect \$10 million of premium, it does not really add to your bottom line as much. The different pieces that contributed are the charges (you collected less than what you paid out) and the interest spread that you earned. So it does not really matter whether it's how much premium you collected or whether the changes are different in various ways, just as long as you have all these pieces together. Under the old days, profit under FAS 60 emerged as a percent of premium, and we do know that the term "percent of premium profit" is probably quite different from the whole life. So you cannot mix things up too well.

I also would say that you can make this problem just as complicated as you want. You can go from a very whole picture to an extremely fine breakdown. It is difficult for me to imagine exactly how you get that breakdown that you're talking about by different premium types, especially under FAS 97 when you define your blocks of business in determining amortization factors in the first place. I imagine there would be some way to get that. The question is, is it worth all the extra work? At some point you've got to decide between what's practical and what's useful.

MR. GARY CORBETT: I'd like to follow up on one thing that Bruce said, and then connect it to something else. Maybe I'll try to do the connection first, and that is, try to distinguish between, perhaps, sources of profit and causes of profit. Terms are what you make them (what they mean to you), but let me illustrate that first of all. Craig got at this a little with the scaling problem. So many differences that might be reflected in changes in death benefits less reserve released, and so on, are not necessarily a factor of mortality changing, it's a factor of it being applied to a different in-force business. When you've got a plan at the beginning of the year, you've assumed that a certain is in-force business going to be there and of course anything can happen between plan date and the end-of-the-year date that can cause that to be different. It affects investment income very much, too. There's always been this problem with sources of earnings when you have the hierarchy which you use to do that. For instance, if you get high termination rates in a year, you have a lower block to expose to mortality. Then if you pay out lower death benefits, it seems the systems you're suggesting would actually attribute that to lower mortality or would give the source of earnings as lower mortality, whereas really the true cause of that lower mortality was terminations.

Picking up on what Bruce said, it seems to me one of the causes of earnings today, the base causes with UL, is different premium pay-ins. It almost seems to me that has to be analyzed as a different source today. When we design a UL, we assume certain ratios of total to target premium, and so on, and rarely do we get those, and that in and of itself, I believe, becomes a cause of profit.

But the main question I want to ask is: How do you handle this problem of one factor, particularly terminations, being different than expected, then affecting interest earnings because it affects the base, then affecting death benefits? I'm concerned that what I've heard would put those things in death benefits or interest when really the cause is different terminations.

MR. TAN: As you know, on the UL, all we earn is the interest spread and maybe mortality gains and expense gains. So it doesn't show up in this year's bottom line if you don't collect enough premium as long as you have enough account balance out there to continue your charges. This year's profit will still show a good bottom line. Now what you do lose though is that if you don't collect enough premium, maybe the policy will not last for another 10 years. It only lasts for two years. Then it will show up two years down the line. However, under FAS 97, if you truly reflect your actual experience and redo your amortization schedule truthfully, you're going to end up amortizing a bigger piece of that, which will also show up as losses this year.

MR. NICKERSON: I guess I'd also say that that's one of the reasons I like to look at things relative to a plan, or relative to prior quarter, a lot of that effect gets factored out. I'd also offer that FAS 97, as Joe said, is a much better process. Anybody who has tried to do SOP analysis under FAS 60 knows that what Joe has said is only the tip of the iceberg. Oftentimes you have to deal with due and deferred premiums and how they broke into the assets side as part of an expense premium, the liability side as part of the benefit premium, and the cost of collection. You've got a lot of things going on that don't really go on as much anymore under FAS 97. It's not to say that problems like premium persistency are going to all of a sudden pop up, but it does

SOURCE OF PROFITS ANALYSIS FOR MANAGEMENT INFORMATION

suggest that the process by which you put the numbers together is different and premium persistency isn't directly affecting that.

MR. TAN: Of course, the ideal case is to go to a value-added statement so that if you don't collect enough premiums, then your future profits decline, which will also show up in this year's bottom line, so the management can better appreciate what is the total impact, as opposed to a sin that's committed and the penalty shows up 10 years later.

MR. STANLEY: Gary, I think that's really the way I like to approach the lapse situation. You can get really tripped up on how you want to allocate the lapses in the current year's earnings and how it affects it. I like to focus on the present value of profits you lost because of the absolute level of lapses or the excess lapses, so you can bring future reality into today, as far as the discussion is concerned.

MR. NICKERSON: When you talk about premium persistency, too, what's really going on there is change in plan designs, kind of on the fly. That was a big problem for us in using GAPP FAS 60, how to adjust for, in effect, changes in plan design because the guy decided not to pay premium this year and all of a sudden you're got a term plan. And I think what Joe and Denny are saying is that when you change a plan, you've got a different present value of profits. If you've got a term plan, you've got a different present value of profits.

