1995 VALUATION ACTUARY SYMPOSIUM PROCEEDINGS

SESSION 6

Financial Projections

Meredith A. Ratajczak

Douglas J. Knowling

FINANCIAL PROJECTIONS

MS. MEREDITH A. RATAJCZAK: I work in the Philadelphia office of Milliman & Robertson. Assisting me today on the panel is Doug Knowling from the St. Louis office of Tillinghast. Doug is going to talk about the general concept of financial projections. He will talk about them in terms of being a management tool, and the ways in which you use the different types of models and projections in your company to put them to best use. I'll talk about what I consider the tough issues or questions that you may face in the course of any financial projection work that you might be doing.

MR. DOUGLAS J. KNOWLING: When I saw the list of topics for this year's Valuation Actuary Symposium, this one jumped out at me as something I've been interested in for some time: how can cash-flow-testing models be used to provide management information, and go beyond regulatory compliance? For many companies, the results of asset adequacy analysis are, let's say, comfortably positive. Consequently, management may view the whole process as an exercise for regulatory compliance, and have limited interest and/or understanding of valuation actuary work in general, and cash-flow-testing models specifically. Ironically, significant resources of both time and money are spent developing and maintaining these models. And as resources become more scarce and the business becomes more complex, it becomes important to coordinate financial projections and eliminate duplication of efforts to maximize the benefits of model development. While we are seeing that many companies are making better use of the models they have in place, I think there's room for improvement at many others.

Before we discuss coordination of the various types of financial projections, let's take a step back. What do we mean by financial projections? Financial projections generate future cash flows, income statements, and balance sheets. Now, notice I didn't say the word statutory or GAAP or anything like that. Again, we're talking in general terms about cash flows, income statements, and balance sheets. By taking this simplistic viewpoint, it becomes easier to see the similarities among various types of financial projections that may be needed throughout an organization. Certainly, the details of exactly

what is being projected and how it's used differ, but the basic desired result is the same. The coordination of financial projections should be straightforward, and certainly achievable.

The evolution of financial projections begins with momentum models, represented by a columnar pad, or maybe the back of an envelope or maybe an electronic spreadsheet. Those are financial projections developed through trend analysis, where you examine items such as premium income and expenses, look at the historical patterns, and project them forward. Now, these kinds of projections have been in use for a long time, and are usually pretty accurate in the short term. In the middle of the evolutionary chain, we have cellular liability models, where we're projecting individual model points, model plans, and we're going to project them out using actuarial assumptions like mortality and lapsation. We're going to use a static interest rate environment and project out a single set of projections. Now, at the high end of the chain, we have a total company asset/liability model, represented by, say, the latest and greatest Pentium. This is a full-blown asset/liability model. We're doing all the liabilities of the company. We're going to project target surplus, represented as a percentage of risk-based capital requirements. We're going to do free surplus and the assets backing them. We're going to have all the dynamic assumptions built in there, as far as interest-sensitive lapsation and asset prepayments. We may have our investment strategies change with the interest environment. The interest scenarios are created with stochastic processes. They are very sophisticated models. While at first this may look like a history of where we've been and where we're going, that's not necessarily true, because all these types of projections are currently in use, to varying degrees, by the range of individuals who do financial projections. So, viewed in this light, coordination just became a lot more complex. It's hard to tie in trend analysis on the back of an envelope to an option-adjusted duration analysis in a sophisticated computer model.

So, what is the best way to coordinate various projections to maximize resources? My answer is, use the same basic models and systems, and I'd further say, leverage off of models developed for valuation actuary work. That may be an easy statement to make at a symposium for valuation actuaries, but it makes sense for a couple of reasons. These models have generally been developed to project all lines of business over a long-term horizon. They include many, if not all, of the components needed to perform asset/liability management. And finally, it's a requirement that they

be updated and validated on an annual basis. So, by starting with such a broad model, adjustments could be made to perform tasks while still maintaining the underlying consistency throughout.

If we're going to use cash-flow-testing models as our basis for other types of financial projections, it's worthwhile to consider first the focus and purpose of these models so that, when they are used for projections other than cash-flow testing, we know what adjustments might be needed. We begin with the focus, specifically, that cash-flow-testing models are designed to provide the valuation actuary with asset adequacy analysis. This is a pass-fail kind of test. As we project out our liabilities and the assets backing them, is there enough money to fulfill our obligations? Perhaps there could even be a bit of conservatism built in, in that, if you can pass a more difficult test, certainly you will pass on more realistic assumptions. The business being modeled is, of course, the vast majority of your liabilities rather than the assets backing them, but we're not looking at new business. We're not looking at surplus, either free surplus or target surplus. And, while we're looking at multiple scenarios, basically we're looking at sets of deterministic scenarios. Perhaps there's a view of stochastically generated scenarios, but the deterministic is generally the key for whether you pass or fail. And when I talk about the accuracy required, and I say that it needs to be relatively high, by that I mean, certainly you want models that are representative, that validate well, but the exact timing of when things occur is of a little bit lesser importance, in that if a cash flow happens in November versus December in a certain year, that really isn't probably going to affect overall results. However, for other types of projections, those circumstances may be important.

With that as a lead-in, what are the other types of financial projections that we're talking about? Budgeting and planning is one of the original financial projections that have been performed. We're looking to project out expected results over a short-term horizon. GAAP projections may tie into that, we want to see what GAAP results may be, over that same horizon. But also, with GAAP projections, we may be looking at unlocking kinds of questions. With asset/ liability management, we're doing a couple of things. One is to develop strategies, either in the investment of assets or in development of crediting strategies. Also, we want to monitor how well we're doing, using, perhaps, option-adjusted duration and convexity, for example. While dynamic solvency testing has been a hot issue, it currently isn't required in the U.S. as it is in Canada. But it is a natural extension of cash-flow

testing in that, to take a really simplistic viewpoint, you're adding in new business, and surplus, and projecting out your business plan. Regarding imbedded value analysis, certainly if you're doing actuarial appraisals of lines of business or entire companies, you need to determine a price or a value of that. An extension of that would be value-added reporting. I've separated capital budgeting off from budgeting and planning, in that I view it as maybe a little bit longer term than the basic budgeting and planning process. And the focus is more on a high-level strategic end.

As we compare the requirements of financial projection models, what are some things that we need to consider, as far as the different requirements? I think we need to look at the focus. In other words, what is the purpose of the projection, what's it going to be used for? Over what time horizon are we looking? And that often ties into how much accuracy is needed. What business are we going to model? Is it a single line of business? Is it the whole company? Are we including new business? Are we including surplus? And then finally, what assumptions are we going to use? If we look a little more closely at what the focus of budgeting and planning is, again, it's to provide a detailed and accurate projection so that cash-flow needs can be estimated and the planned results can be projected out for comparison to actual throughout the period. We want to project the GAAP income and balance sheets while looking at things like return on equity. Again, unlocking might be something that's a focus of that type of projection. In asset/liability modeling, the focus is to develop these strategies and to monitor our results. We're looking at a broad-based relative answer: is this strategy better than that strategy, as opposed to, what's the exact strategy? Dynamic solvency testing involves testing out business plans over a range of assumptions to determine if we're going to be able to remain solvent. So, again, it's a pass-fail type of test. In embedded value analysis, we're going to, first of all, determine what is the embedded value, and then perhaps go on and monitor it. And for capital budgeting, we want to be able to support high-level strategic planning for senior management. So, we want some sort of projection that gives management quick answers, but yet on a relatively accurate basis.

Now, what kind of time horizon are we looking at? Well, it goes from short term to long term, where budgeting and planning may be a one-year or upwards to a three-year process. GAAP projections might be somewhat longer, certainly if you're doing unlocking. In asset/liability management, maybe

you're projecting out a ten- to 20-year period, so that you can test out the results of what happens when some of these assets mature or become called.

For dynamic solvency testing, generally the talk has been in a five-year kind of horizon, the length of a business plan. In embedded value analysis, you're often looking at something like a 30-year time horizon, something like a pricing horizon. Capital budgeting may be a five- to ten-year horizon, depending on the circumstances of the exact project. Given these different time horizons, the accuracy takes on different levels of importance. I generally would split that accuracy up into two camps: high accuracy, and somewhat less high accuracy. In the high accuracy, we're looking to make sure that we can get items like cash flows, income items, and expense items, to occur, if not in the exact month that we expect them, certainly in the exact quarter that we expect them. Projections like budgeting and planning, and GAAP projections would require the high-end accuracy. One might also argue that embedded value analysis would require high-end accuracy, in that, if you're doing it to determine the price of a business, you want it to be as accurate as possible. On the less high, which means still accurate, but maybe the exact timing's not as important because you're looking for a relative answer, would be asset/liability modeling, cash-flow testing, and dynamic solvency testing. Capital budgeting may fall in either camp. As far as the business being modeled, maybe you're looking at a projection on just a single line of business, or the whole company. But you also need to consider, are you going to project that new business, and how many years of new business are you going to project? Generally, you want to be able to project out target surplus, such as a percent of risk-based capital requirements. What are you going to do with your assets? Those are different items that could be modeled under different kinds of financial projections.

I said the best way to coordinate projections was to use the same models, the same systems. The second best way may be to try to tie assumptions as much as possible; using the same assumption base so that everybody is working under the same rules. Generally, you'd want those to be the best-estimate assumptions, but you probably want to look at the same kinds of sensitivity tests. By doing this, I think it's easier to tie one projection to the other, and understand the differences between them.

So I would suggest that you have two basic models. Again, I would say a detailed model, and what I would call a less detailed model. The detailed model has more model points, in other words, more issue months, more premium modes. The reason for that is, it should give you more accurate timing. Things like monthly premium income should occur in the appropriate timing in the projection. With the less detailed model, the purpose for having a less detailed model is that you're going to get faster run times from it. If what you're looking for is a relative answer, and let's say you're projecting out assets and liabilities over multiple scenarios, perhaps over multiple sets of assumptions and/or strategies, suddenly you're looking at a lot of projections, and run time becomes more important. So by having this less detailed model, it allows you to do the projection work more quickly and have more time for analysis of results. I've included new business and surplus. It's not really a third model, but I think you need to consider them separately. Which of the two basic models you use depends on the accuracy requirement. Generally, for the shorter-term horizon, with maybe a single set of assumptions, you want the most detailed model you can get. And, as you look at more strategic answers, the less detailed model gives you better run times so that you can look at more options. One might ask how is a detailed statutory model going to be used to project GAAP? And the answer is by the same model; I mean the same model plans, the same model ages, and issue dates, and so on. Certainly, your reserves and your deferred acquisition cost (DAC) are on a GAAP basis. But the basic structure of the model is the same. Further, by automating the model-building process, it's relatively easy to maintain two sets of models, if you use the same basic components, but just a different number of model points.

Now, development of big models is a natural thing to do. Bigger is better, right? If seriatim models were practical, maybe a lot of us would use them. That doesn't necessarily provide a better model, as far as the kind of answers you're trying to look for. But, the bigger model generally will improve the timing of models during the projection. By bigger model, again, I mean more frequent issue months, issuing more than once a year when you set your model up, having more premium modes, and so on. Let's assume we have this big model created with thousands of cells, and it gives us a really nice one-year financial projection. How do we take that model, then, and consolidate it down for a smaller model? There are a few ways to do that. First of all, you can consolidate issue months and premium modes, for example. If in the big model you projected out quarterly issues, and for the

small model you squeezed it all down to an average issue month, you've just cut your model size by one-fourth the original size. Your model will generally validate as well; but it might not provide exact timing during specific quarters. I would suggest consolidating issue years, for the older plans. The older the plan, the more years that can be grouped together. As an example, all the business that was issued in the 1940s could be grouped into a single year. As you get closer to the present, you want to do less and less of that issue-year grouping. Some model plan consolidation is possible. If you have model plans in your big model that represent a small portion of the business, you may be able to eliminate them or group them into other models, but I think you want to be careful by doing that too much. Generally, I would suggest using the same model ages you have set up in the bigger models. Often, we like to use three model ages when we develop our models, where we have a third of the business represented by each age. If you try to squeeze that down into, say, a single age for your small model, chances are pretty good that the average age you need is not one of the three ages you have, so that would then require you to do more maintenance on your model. If the idea is to avoid duplication of efforts, that's not a good place to attack the problem.

If we're going to create these big models and these small models, what' is the schedule of when we create them? If possible, these models should be created on a quarterly basis. It's a natural extension of some of the quarterly work, and it allows you to monitor your results. It also allows you to have up-to-date models, if management suddenly says, can you run this projection for me? You have the business as up-to-date as you can, on a quarterly basis. While all the models should be developed quarterly, I would suggest a thorough review on an annual basis. For the more detailed model, I do a thorough review at midyear. Oftentimes, the work load's a little bit lighter in the summer. You may have summer students on hand to help out. And more important, the budgeting and planning process often occurs in something like August and September, so the most up-to-date model you can have for that process is going to give you the most accurate results. For the less detailed model, I would suggest doing the thorough review at third quarter. The third-quarter is the most common starting point for cash-flow testing. Therefore, again, you want to have the most accurate model you can. New business should be updated as necessary. Certainly as business plans come out, you want to incorporate whatever the plan is for new business into that. If you have new products developed during the year, you want to pull those in, as you know about them.

Assuming multiple-purpose models have been developed, how are we going to put them to use for multiple users in multiple functions? There are a few considerations when you're attempting to coordinate among multiple users. The more centralized the financial projection and modeling functions are, the easier it is to coordinate their use. There are fewer parties involved, fewer issues to deal with. But, if modeling and financial projections are split out by line of business or by function, there's a better chance that you're going to have different methods being used, different assumptions being used. So the challenge is to bring these users together, using some kind of common methodology and common assumptions. Again, the focus of the projections, or the focus of the users can have an impact on coordination, in that the market value of surplus projected out 20 years probably isn't that important to somebody doing annual budgeting and planning. So you want multipurpose models, but they need to be able to meet specific needs of all the individual users. Finally, the backgrounds and the priorities of the users are important to consider. Someone who has historically projected with trend analysis may not understand or care about collateralized mortgage Obligation (CMO) modeling. So, you have to focus in. You have a basic model, but you need to be able to focus in to the specific items that all the individual users are interested in. The different users may have a different understanding of modeling, in general, and cash-flow-testing models often could appear to be this big black box. So there's a definite communication and education requirement involved to bring everybody together to use the same models.

There are a few roadblocks to coordination, and protection of turf may be one of the biggest ones. This may be as simple as company politics or egos. But it also could be just a general reluctance to change. People are comfortable doing the things they've always done before, and may not see the advantages of doing something different. There's also a control issue, in that if somebody's responsible for producing certain financial projections, they want to do it their own way; they don't want to rely on somebody else's models. If there are different systems and methods out there, that definitely puts a roadblock in coordination. If someone says this trend analysis has always worked fine for me in the past, why do I want to use some other model, that definitely makes it difficult to tie things together. And different lines of business may use different types of projections or at least different assumptions, which may be appropriate at the line of business level, but if you try to tie it together into a total company model, the pieces may not fit well together. Finally, the more highly

decentralized all the different projection functions are, the tougher it's going to be to coordinate. You have everybody doing their own thing, there may be no common leadership or no dictate from the top that this is the way things will be done.

Again, how do you go about coordinating financial projections? Use the same systems and basic models. These models may be developed and maintained by different groups, and used by another. Perhaps they're created at the line of business level, but they're pulled back up for review at the corporate level to make sure that there's consistency among the models, as far as the assumptions that are being used, and the level of validation that the models have. But by using the same models and the same assumptions, you have a common thread that ties everything together. By having some sort of centralized oversight on the financial projections, even if you have a decentralized functionality, having this centralized oversight, maybe by committee, will help keep everyone talking together, and keep things consistent. Oftentimes, for something like that to work, though, there needs to be support from the top, making sure that everybody buys into the process. The best way to get buy-in from everyone is to have models that validate well, i.e., historically proven models against actual results. So you have this cash-flow-testing model, and it's all wonderful for doing your asset adequacy analysis. Why does somebody doing budgeting and planning want to use that model? Well, you need to first prove to that person that you can reproduce results as well as that person's trend analysis or whatever method he or she may be using. Historical validation helps get that buy-in. Finally, if you take the time to do the historical validation, not just the validation at the start and a reasonableness check, but actually see that your moving parts are being projected out appropriately, that's going to, in the end, improve your modeling and improve your valuation actuary work.

Why do we care about coordination of financial projections? What are the benefits to us? Well, the obvious answer is to conserve resources. There's a bigger and bigger pinch now to do more with less. But also, there is this issue of improving the accuracy. By bringing in a range of backgrounds of people, a range of priorities. You end up improving the quality of the models, improving the quality of your projections, and effectively giving management better information. Having the financial projections coordinated helps promote communication between various areas, so that everybody's not off doing their own thing, coordination will tie the various functions together. Having a

consistent approach, i.e., using the same assumptions and methods, also helps tie things together, particularly if you're going from pricing to planning to reporting. If you're using the same models, and same assumptions, that eliminates one potential deviation that you might recognize otherwise. And probably most important, this coordination gives you more time for analysis. If the structure is in place for coordination of all the different financial projections, the development and maintenance will take less time and give you more time to look at the results and understand what's going on. I would suggest that the valuation actuary is in the best position to take the lead in the coordination of financial projections. Many of us have been working for several years now with these models. We're familiar with all facets of the business being projected. The models have been around long enough that they should have significant credibility by now. So by sharing our expertise and our models, I think valuation actuaries can promote themselves and the profession as providers of information to management.

MS. RATAJCZAK: I think it's clear, from Doug's discussion, that in the course of the work that you do, whether you're the valuation actuary or pricing actuary, at some point in your career you're going to be doing a lot of financial projections. For this discussion, I will refer to the tough issues or questions that may arise in the course of the financial projection work that you're doing. The tough issues or questions that you may be asking yourself at some point in time might include first what is a useful scenario? This would be in terms of sensitivity testing, or the type of testing and assumptions you may use in the course of financial projection work.

The second tough question is, how can I get a reality check on the work that I'm doing? Doug just mentioned the validation process. How can you, as a user of financial projections, and the person who may be presenting the results to senior management people get comfortable with the numbers that you're showing them?

The third tough issue is, I have assets that are liabilities. With the extension of the standard valuation law and consequently to cover all types of business, all type of assets, for the first time, you may be faced with coming up with models and assumptions for projecting out cash flows for problem assets or nontraditional assets that you've never had to think about before.

The fourth tough issue is, I have liabilities that are really liabilities. This is the flip side to the asset issue. Up until the revisions to the standard valuation law, you might have been doing true, full-blown projection work on just your interest-sensitive business and possibly your fixed-annuity business. Now, you might be looking at traditional business, your health business or other types of liabilities, which in the past, you have considered nonmodeled business.

The fifth item is, how can I keep my projections current with regulatory changes? I think the challenge for all of us these days is keeping up with the mountain of information that we get regarding proposed changes to standards and regulations that will impact the financial projection work that we're doing.

And the last item is, how can I incorporate fixed items into a variable system? Many of you are using commercial projection systems that may not lend themselves very easily to including fixed overhead expenses or other fixed-type assumptions that you want to layer in on a global basis.

I'll try to address each of these in a little bit more detail. What is a useful what-if scenario? I think that is a truly loaded question. What is useful to me is not going to be useful to Doug or to other people. So, a useful what-if scenario is certainly in the eyes of the beholder. Answering the question is dependent on several items. What is the purpose for your projection? Some people might be doing pricing work, appraisals, cash-flow testing. All of those have different purposes, and what is a useful what-if scenario in one case may not necessarily provide any additional information in another case.

What assets are you including in the projection? If you're doing a projection associated with pricing, and you have an all cash model on the asset side, doing multiple interest scenarios may not be as useful as going in and varying the assumptions associated with the pricing risk. On the liability side, if you're projecting noninterest-sensitive business, doing multiple interest scenarios may not be very beneficial to you. And the last is certainly, and it might be the most important, who is your ultimate audience for these projections? If you are doing the projection in response to a regulatory question, the useful what-if scenarios might be dictated by what they want to see. If you are presenting information to a nontechnical senior management group of people, showing them the results from a

thousand stochastic interest scenarios may not be very informative to them. Each of the different type of financial projections that Doug talked about do have their own specific purposes. Certainly for, statutory and GAAP projections, you're doing the same type of work, but in one case, you are looking at reserve adequacy from a statutory basis. On the GAAP side, you may be looking at "more likely" assumptions. Stress testing has a different purpose altogether. You may be doing it to give yourself a sense as to where you have the most exposure in terms of the types of assets or the types of liabilities that you have. Pricing and cash-flow testing would focus on different end products. In the case of pricing, a useful what-if scenario might be, what happens if I do runs with different mortality or cost of insurance charges? However, in the case of cash-flow testing, varying your interest rate scenario certainly serves a different purpose and useful what-if scenarios may be interest rate driven.

In the case of having assets that are really liabilities to you, useful what-if scenarios or sensitivity testing for assets are certainly going to depend on the type of assets that you have in your portfolio. Before the valuation actuary concept really started, and really got into testing all lines of business, you could say, I'm going to take these things that I've really never modeled before and allocate them to my nonmodeled business, or surplus. Well, that's not an appropriate solution these days if, in fact, you need to look at all of your liabilities in your portfolio. In the case of assets, you must consider such features as bond calls, what's triggering the bond calls and prepayments for mortgages. Default assumptions, depending on the type of projection that you're using, assuming a constant default assumption for assets is probably appropriate. If in fact you have an exposure because you have some noninvestment-grade assets in your portfolio, then it might be more appropriate to do testing that takes into consideration multipliers on those defaults costs.

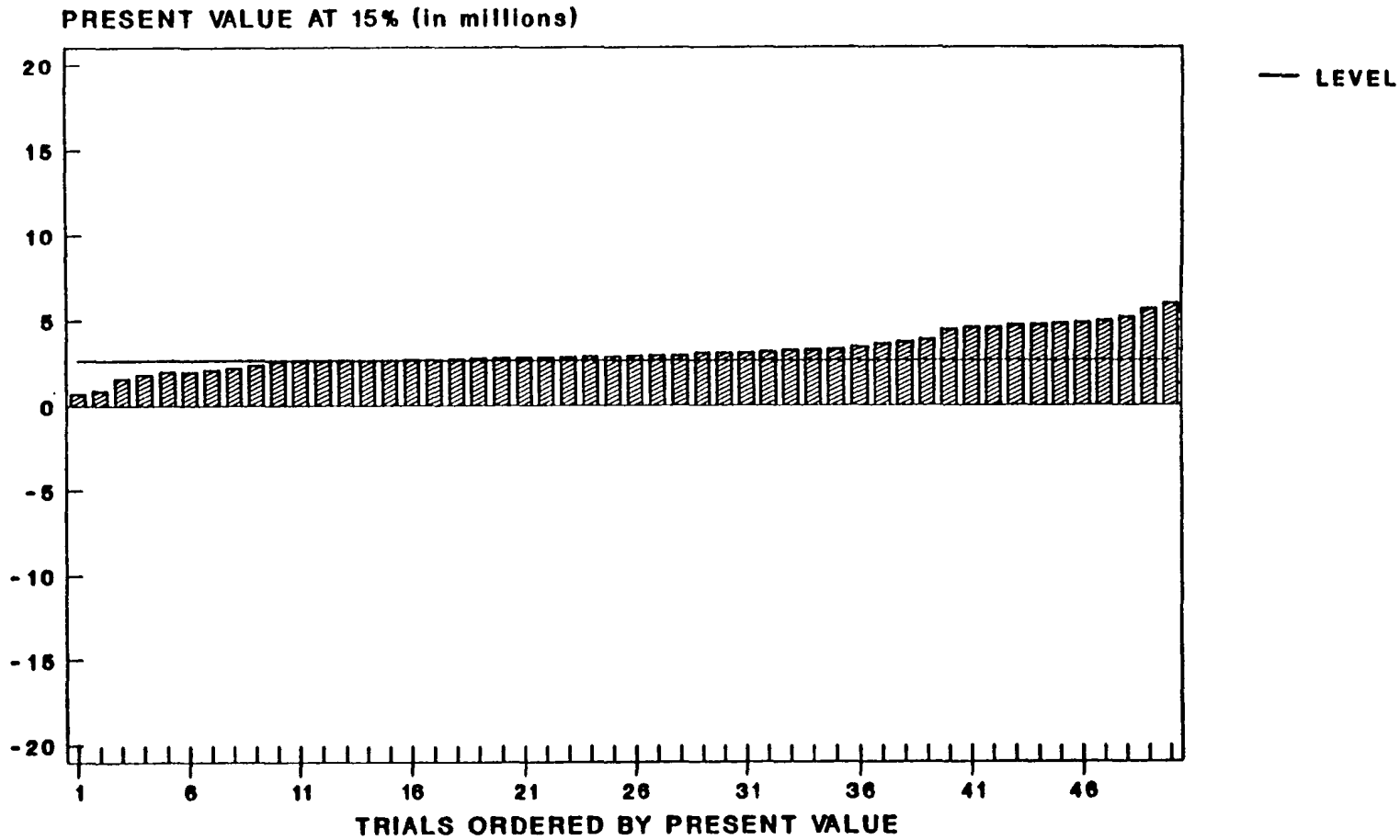
Modeling the expected return on equities might be an area where you have exposure. Of course, coming up with the appropriate assumptions for this class of assets is also one of the problems that you'll be facing going forward. Modifying the interest rate scenario would test things such as call triggers and prepayment assumptions, but as I mentioned, if you are trying to project how equity returns change, they are not necessarily correlated to how the interest rate environment moves. As an example of sensitivity to interest rate change consider an example of mortgages pass-throughs

specifically. This is a case where we looked at a portfolio of mortgage pass-through securities and we assumed no prepayments. We had a nice steady stream of cash flows. If in fact that assumption changes -- let's say your formula for mortgage prepayments is dependent on your interest scenario, and the formula produces a 6% annual prepayment rate -- the cash flows are steeped at the beginning of the projection for a shorter duration. I think this extremely simple example shows that somebody with a portfolio of noncallable bonds, primarily, would not necessarily get the same type of information as somebody who has a portfolio that has callable bonds and mortgage pass-through securities when they run multiple interest scenarios. So, given the makeup of the asset portfolio, depending on the inherent risks of their asset portfolio, a useful what-if scenario would be modifying the interest rate environment. If you have a plain vanilla portfolio of noncallable bonds, varying your interest scenario is not necessarily going to tell you a whole lot.

Turning to the liability side, we all know we have traditional business that comes in many flavors: term, permanent, participating, and nonparticipating. You have the interest-sensitive liabilities in terms of life insurance and annuities. You have liabilities such as structured settlement business that are not necessarily interest sensitive, but you do know what happens when the interest scenario that you're testing goes down. If people don't tell you that they have participating or nonparticipating business, it's not necessarily clear where the risk areas lie in order to determine what the appropriate what-if scenario for the liability side of the projection. On the liability side, I'd like to look at another simple example. We did a projection of 50 random scenarios with a very vanilla traditional participating product -- and we looked at it two different ways (Chart 1). We looked at it in terms of a calculated dividend scale, where the interest component was a function of an underlying dividend rate, and an earned rate on the portfolio. Then we also did the same type of projections, assuming that the current dividend scale on the projection date did not change (Chart 2). We did not include any additional lapse sensitivity for the interest rate changes. Chart 1 shows you 50 scenarios where we're actually reflecting the fact that dividends would be dynamic under different interest environments. As you can see, there are some results above the line, some below the line. But there's not a lot of deviation in the high and low values.

CHART 1

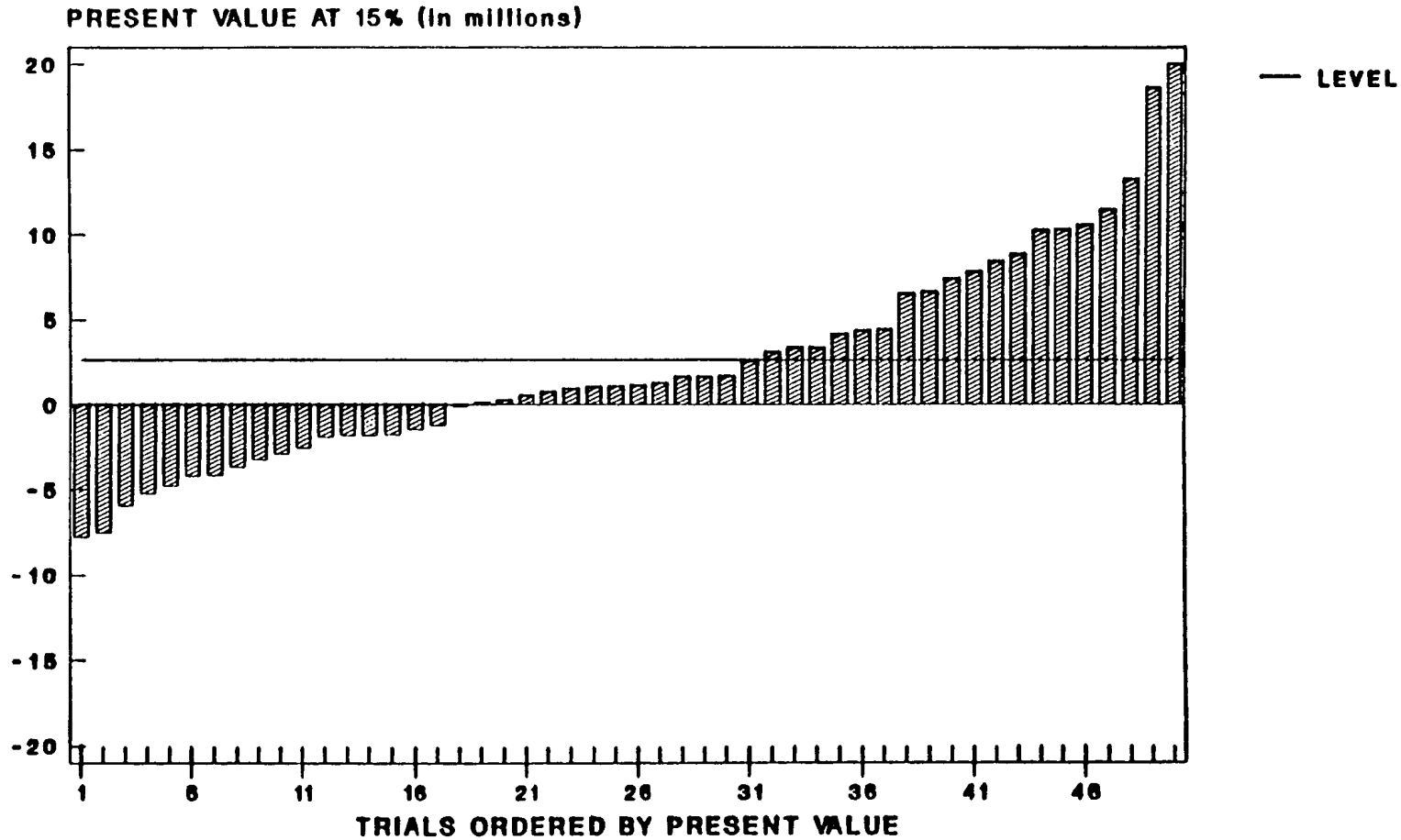
Sample Participating Whole Life Product
Calculated Dividend Scale
No Lapse Sensitivity



EXISTING BUSINESS PROJECTION

CHART 2

Sample Participating Whole Life Product
Fixed Dividend Scale
No Lapse Sensitivity



EXISTING BUSINESS PROJECTION

In Chart 2, we have assumed that our dividend scale never changes. The same 50 interest scenarios produce much more variability. If, in fact, you're aggregating your business, and you are including your traditional surpluses to go against your interest-sensitive liabilities, whatever assumption you are using for modeling your dividend scale might give you totally different results. Now, keep in mind these two charts are the extremes. If you do this type of testing and you take into consideration the dynamic nature of dividend scales, you will probably do something in between these extremes.

The audience for the type of projections that you're doing probably has its own idea about what constitutes a useful what-if scenario. As I mentioned, in some cases, your audience may dictate what the useful scenario is. Those persons or that person may say, I want to look at lapse rates increased at 150%, and I want the default assumptions to be increased by 150%. Each audiences --regulators, a potential buyer, senior management, both technical and nontechnical, and auditors -- are going to have their own preconceived notion as to what a useful what-if scenario is. I think the key to this discussion is, I can't answer the question of what a useful what-if scenario is, and you can't answer that question without knowing what the purpose is, who your audience is, what type of assets you're including, and what type of liabilities you're including. What you need to do, at the minimum, is once you get a handle on those items, find out where your stress areas are or where your risks are, and that will point you in the direction as to answering the question of what a useful what-if scenario is.

How do you validate, or get comfort in the results of the projections that you're doing? It's not an easy process, and depending on the type of system that you're using, it's not easy to construct reports to give you that information, or even to get out of your system the type of information that you need to determine whether your models are valid or your assumptions are valid. I have a couple of suggestions for you. Depending on the type of system that you're using, you may be able to back project. See what your model would give you for the current calendar year that you're working on.

We've also used some reporting tools that will provide us with a nice little schedule of projected lapse rates, credited rates, and earned rates for the models that we're doing. The other type of report we've come up with is a sources of profit report, which is presented on a basis-point basis. This report allows you to compare your projected spreads to your assumed pricing spreads. The other exercise

you could go through is to look at what has happened in the interest environment over the past year. If it has remained relatively level, then, all things being equal, you should be able to look at your first year of this year's projection, compare it to last year's level scenario in the second projection year, and see if things line up. So what you're doing is, you're trying to look at historical patterns looking at your prior projections to see if your numbers make sense. The last thing you always have available, if in fact you have the information available, is to compare to historical experience. In the case of bond calls, if you have a portfolio of bonds that have call provisions in them, if your investment department keeps track of historical bond call experience, you could determine if your call trigger assumptions are replicating actual experience. You could also do that with mortgage prepayment experience.

Assets being liabilities and liabilities being liabilities have certainly magnified with the additional financial projection work that I'm certain most of you have been doing. As I said, allocating the bad assets or the assets you really don't want to touch from a modeling perspective to surplus and non-modeled lines certainly won't work any more. There are questions you need to ask yourself regarding problem assets and liabilities. Are they material? If they are not material, you may be able to get away with using some simplifying assumptions, or looking at the behavior of these problem assets or liabilities and equating them to some other type of asset. That assumes that they are not material, or if they are material, your ultimate end user would not have a problem with you using some sort of simplifying assumption. You can also look to external sources of information about possibly modeling or coming up with assumptions for this category of assets or liabilities. I know, based on looking at the practice notes for 1995, that there are practice notes on CMOs, default assumptions for commercial mortgages, and private placements. So you can go to industry information and historical information on default assumptions to give you some sort of guidance if you really don't have any sense for how you should be setting up assumptions or models for these items. The other thing you need to do is possibly see, if in fact, you're going to be modeling certain items, is there a good external source to generate cash flows for you? Certainly, in the case of CMOs, there are vendors out there that, if you give them your CUSIPs and you give them the interest rate assumptions that you're using, they can generate a set of cash flows for you. And I know a number of our clients do that, and I think most of the systems will handle the fixed cash flows from assets. With these

assets, the other thing you have to think about is, can you define the behavior of this class of asset and liability by formula? If you can do that, then you can go in, set up a model, and set up formulas that will allow you to do a decent job modeling these assets.

Keeping ourselves current in terms of standard changes and regulation changes is not an easy task these days, judging from the amount of paper that comes across my desk. We get things such as exposure drafts of standards and regulations, so that is the first step to providing us with information ahead of time as to where regulatory changes might go. The problem with that is, there isn't a lot of guidance as to the timing on the new standards or the regulations actually being adopted, so I suggest anticipating those changes ahead of time, considering how you might deal with the changes if, in fact, they are going to impact how you do financial projections. So you need to anticipate. Certainly, doing your projection work on a preliminary basis, and trying to incorporate those items that may impact your calculations will not only give you an opportunity to determine what type of additional information you're going to need to satisfy those standards, but also it will give you a sense for, how is this change going to impact my numbers? You can determine if the information is going to be favorable or nonfavorable, so you can plan for that ahead of time. One of the primary problems with dealing with these regulatory changes is, many people use commercial systems for doing their projection work. So, in some cases, you are at the mercy of your vendor for getting these changes made on a timely basis. So you may or may not have 100% control over that if, in fact, you're having your vendor make your changes for you.

As you can see, I don't have any easy answers for you, as far as defining appropriate what-if scenarios or sensitivity testing. I can only give you my thoughts in terms of the type of work that I have done. I think what you need to do is, in the financial projection process, consider the purpose for your projection, and the audience, and the ultimate end product and who it is going to be presented to, to determine how detailed your models have to be, how you are going to deal with items such as problem assets or problem liabilities, or just how much detail you have to go into, even on the sensitivity testing side.

MR. STEVEN A. SMITH: I have a couple of observations, I guess, as opposed to a question. I thought I would pass on just one thing that I have found useful in trying to coordinate these different things. We do cash-flow testing based on statutory reserves and some form of allocation of Interest maintenance reserve (IMR) or asset valuation reserve (AVR). We would like to do GAAP projections with reserves. Let me just start back at the beginning here. To do GAAP projections, one of the things I'd like to know is, is my DAC recoverable? And so, if I can allocate the assets that I have to each individual line of business, where assets are equal to the net GAAP reserves at the start, then if I were able to do multiple scenarios, I could then form an opinion about the recoverability of my DAC asset. That would be equivalent to a gross premium valuation with your net GAAP reserves. If I add additional assets to that, which are the excess of statutory over net GAAP reserves, then I have the total asset base up to statutory. And if I add, also, either the IMR or some form of allocation of capital gains, then I have the kind of asset base -- I'm tagging assets equal to net GAAP reserves, so now I have some additional tagged assets -- to bring the total up to what I would use for cash-flow testing in a statutory environment. So that's what I use for valuation actuary memorandum type testing. I've simply tagged some surplus assets above net GAAP reserves. If I then go one step further and tag some additional surplus assets that are equal to, say, risk-based capital times two, or to bring it up to the level of capital that we have decided, in our company, that is needed for us to maintain our ratings, then if I do the asset and liability projections with all of those assets, I have a line of business type of report. And I guess that's sort of what I meant by above the line and below the line bullet. And then you can look and see if you have any leftover assets, which would imply whether the company as a whole is over or undercapitalized. Instead of just doing cash-flow projections, I can add in my GAAP or statutory reserves and tax reserves into the process, so that I don't just project cash flows miraculously on an additional page out of my form, that is, the output. I have GAAP or statutory income statements. And the tough part is bringing those last little bits of assets or liabilities that are tough to model or you haven't modeled, and to get to total company types of projections.