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### **Session 7PD**

## **Asset Valuation Methods: Smoothing Out the Ride**

**Track:** Pension  
**Key words:** Defined-Benefit Pension Plan, Funding of Pension Plans, Valuation of Assets

**Panelists:** ROBERT L. SCHMIDT  
MATTHEW T. SLOAN  
**Recorder:** MATTHEW T. SLOAN

*Summary: The panel leads the attendees through a review of:*

- *what methods are being used*
- *the pros/cons of each method*
- *how to relate with actuarial assumption and solvency position*
- *how well the tracking is with market value*
- *how to deal with new asset categories*

**Mr. Matthew T. Sloan:** Robert Schmidt will begin today's session. Robert is a consulting actuary with the Boise, Idaho satellite office of Milliman & Robertson in Seattle. He's worked for M&R since 1987 specializing in employee benefits consulting with a focus on retirement plans. Robert works with a variety of employers, from less than 100 employees to over 50,000, encompassing both the private and public sector. Robert has a B.S. in applied mathematics from Walla Walla College. He is a Fellow with the Society of Actuaries (FSA), a member of the American Academy of Actuaries (MAAA), and an Enrolled Actuary (EA).

**Mr. Robert L. Schmidt:** We're here to talk about actuarial asset valuation methods. This session has another title, "Smoothing the Ride." Matt and I are going to explore when smoothing's appropriate, and when it's not. We'll also talk about what kinds of smoothing methods are out there, and what attributes those smoothing methods ought to have. As I introduce the topic, I'll talk a bit

about that, and then we'll get into theoretical considerations. We'll also get into some practical considerations. Matt will explore the practical considerations even further. We'll be talking primarily about private defined benefit plans. I'm going to concentrate on pension funding and expense, and I'm going to talk a bit about public plans because I have some involvement in the public sector as well, but the focus is going to be private plans.

I don't know if very many of you have ever tried to find much information on asset valuation methods, but it is quite limited. Probably the most definitive paper on this issue is the 1968 Jackson and Hamilton paper in Volume XX of the *Transactions* of the Society of Actuaries ("The Valuation of Pension Fund Assets," p. 386). There's also chapter 2 in Bob Berin's book on Pension Mathematics, (*Fundamentals of Pension Mathematics*, by Barnet N. Berin, 1978). Tom Bleakney's book, *Retirement Systems for Public Employees* (Pension Research Council of the Wharton School of the University of Pennsylvania, 1972) covers asset valuation methods on page 125.

The Anderson book, *Pension Mathematics for Actuaries* (The Windsor Press, Inc., 1985) also touches on asset valuation methods in chapter 5. There's also some much-needed Society of Actuaries research that's being done currently. In fact, the Society sent out a Request for Proposal on Asset Valuation Methods a couple of months ago. Evidently, the project hasn't been awarded yet, but there are two finalists. I'm sure that project will help us all out in doing our work. In addition, there are some actuarial standards that are in the process of being revised that will influence asset valuation methods.

As we move into the idea of asset smoothing, we might ask, why would we want to have asset smoothing in the first place? Maybe it's an easy question, but I can think of three reasons why we ought to have asset smoothing or would want to have it. One reason would be stability. Many of you probably have clients who have not necessarily adopted a defined benefit plan because they don't want variable costs, even though that's part of having a defined benefit plan. Stability, though, is important, and as actuaries we often want to try and smooth the costs as much as we can within the parameters. Having an asset smoothing method can help us do that. It can help us smooth the contributions. It can help us smooth the pension expense under FAS 87. And for some larger clients who may have under funded defined benefit plans, it can help smooth the Pension Benefit Guaranty Corporation (PBGC) variable premiums because they are based on actuarial assets.

A second reason to have asset smoothing might be to ease an investment transition. Many plan sponsors in the past have invested significantly in stable investments in their pension plans, and they may be thinking now about moving into more

aggressive investments, such as equities and fixed income. A way to ease that transition and be shielded from volatility would be to adopt an asset smoothing method. A third reason to have an asset smoothing method might be to reduce the incentive for the actuary to compensate with other assumptions. Now that the actuarial standards are moving towards individually reasonable assumptions and methods, our asset valuation method must also be individually reasonable.

What are some of the attributes that an asset valuation method could have? The first one that's very important to think about in choosing an asset valuation method is stability. How stable should the asset valuation method be? There should be a balance between stability and the conditions that are being reflected in the securities market. An asset valuation method that totally smooths out both the hills and the valley is very stable. You have to think about whether your objective is to obtain this kind of a result or whether you want to have a bit more responsiveness to the market.

The first consideration regarding stability is how market cycles correlate to your client's business results. For instance, a large client's business may well be cyclical. It's good to think about how that business tends to correlate with market cycles. If the asset valuation method provides large asset gains (and thus low contributions) during boom times for the client, then the low contributions might be nice, but it might be better to try to structure the actuarial methods and assumptions to produce lower contributions when the client's business is not doing well. Matt's going to talk more about that later. The second consideration regarding stability is, how much responsiveness to the market cycles is the client willing to handle? If a client isn't concerned about access to cash when times are tough, then it may be alright to have a little instability in contributions and expense. On the other hand, they may not want to have much of that, so it's important to understand the client's business. Another area I've seen where this is important is in the public sector. I work with a public plan that grants discretionary cost-of-living adjustments (COLAs) every year to its members, and it's somewhat hard to justify COLAs if things are happening in the market that aren't consistent with granting them. So this particular client actually didn't want a smoothing method because when markets did well everybody knew about it, and they expected a COLA. When markets didn't do well they didn't expect a COLA or they might understand if a COLA hadn't been awarded. So a smoothing method would almost go against that concept, and that's why it's important to take that into consideration as well.

A third attribute of a smoothing method is whether it complies with the actuarial standards. Obviously, as actuaries, it's important that we comply with the actuarial standards, and also there are regulatory standards both in the accounting and the funding of our plans. So it's important that we consider them as well. Another

useful attribute of a smoothing method, because we do much of our work for clients who don't quite understand things the same way we do, is simplicity. If you work with a very sophisticated client, this might not be that important. However, for unsophisticated clients, you need to have a method that you can easily describe to them. If they can't understand what you're giving them, then it can be difficult to justify your existence. In addition, you ought to be aware of who you are explaining the asset valuation method to. It could be a company officer, an auditor, a plan participant, or a collective bargaining group.

Another consideration in this is that methods may or may not be costly to operate. I've seen methods in the past where there's a considerable amount of math used to come up with a smoothed asset value. It's very costly and often hard to describe to the client. So, if that's the case, sometimes it's difficult to justify and possibly more expensive than it needs to be. If you have two methods that seem to yield roughly the same results, it's probably better to choose the one that's less costly.

Another attribute of an asset valuation method to think about is its influence on investment decisions. A few years ago we were doing a study for a client and they told me that the thing they didn't like about their current asset valuation method was that the way it was structured, they could make investment decisions that would unduly influence the asset valuation method. They could buy or sell at a certain time and effectively change what the actuarial assets would be without changing the market value. An example of this would be if you had a method that was somehow linked to cost value. You could sell bonds or equities and realize all the appreciation on the day before the valuation date. Then you could convert them back to bonds or equities the next day without substantially changing the asset allocation. It might be good to be careful of this, or if you do have attributes in your asset valuation method that do influence investment decisions, make sure that people are aware of it and that they're not gaming the system in order to encourage one type of gain over another. What we're really talking about here is treating gains and losses equally, whether they be realized, unrealized, or interest and dividends.

Another attribute of an asset valuation method is how it relates to market value. My impression is that book value was more prevalent as an asset valuation method in the 1960s. However, I think people are tending to stray away from methods that recognize book value now. Maybe I'll get some input from you later on how prevalent different methods are. An attribute to consider is whether the actuarial method should try to mimic or follow market value or whether it should tend to lag or lead market value. A conservative method tends to lag market value over the long term.

An asset valuation method's relationship to market value may depend on the investment return assumption as well. In other words, if you have an asset valuation method that depends on an expected rate of return and then maybe averages gains and losses around that, and your expected rate of return is conservatively low, then your method may look like it's lagging or leading the market. Even though it's not necessarily the intent of the method, it's really the return assumption that's affecting it. That's why I say it may depend on the investment return assumption as well.

Another important attribute of a method is, how does it relate to the client's funding or expense policy? As I alluded to earlier, a funding policy may be stable or, on the other hand, it may be driven by the market. Asset valuation methods need to be considered in that context, whether the policy is stable or driven by the market. Another important consideration that I talked about earlier is the professional regulatory guidance on asset valuation methods. We have Actuarial Standard of Practice 4. We have Section 412 and the regulations from the Internal Revenue Code, and we also have *FAS 87*.

Let's talk first about Actuarial Standard of Practice 4. One of the basic purposes of this standard is that we consider our asset valuation method in conjunction with all our other methods and assumptions. The most important ones to consider in conjunction with the asset method are the investment return assumptions, how we determine our actuarial present values, and the intended use of our calculations. In particular, our asset valuation method should somehow reflect a function of market value. We leave it open as to how we do that to a degree, but we should reflect some function of market value. In addition, we ought to disclose what method we're using in our communication to our clients. We should also describe our treatment of certain types of thinly traded securities.

The standard also does mention that it may be appropriate, in some cases to have an amortized cost value for fixed-income investments. It may also be appropriate to relate our actuarial value of assets to the investment return assumption. In addition, the objective of smoothing out short-term volatility is appropriate under the standard.

The Internal Revenue Code, Section 412(c)(2) talks about asset valuation. Essentially, it says that we can use any reasonable method as long as we consider market value and satisfy the regulations. I will go through the regulations in just a minute, but Section 412 itself really doesn't say much. It does mention, though, that you can use an amortized basis for bonds. It used to be that all private plans could do this, but now it's just multi-employer plans that can do this after the Omnibus Budget Reconciliation Act of 1987.

**From the Floor:** Do you think it's still alright to use the amortized value for bonds as long as you meet the 80-120% corridor mentioned in the regulations?

**Mr. Schmidt:** Where I work we've interpreted it to be no, you can't do that for private single employer plans. That may be a more strict way to interpret than some others are using. Is anyone still using the amortization or the amortized bond or discounted cash flow for private plans. I don't see anybody that's doing that.

**From the Floor:** Maybe the question also could be, has anybody interpreted it that way?

**Mr. Schmidt:** Yes. I would throw that question to the room as well. Has anybody interpreted it that way?

**From the Floor:** I don't think the corridor has anything to do with the fact that they've disallowed amortized value for bonds. The corridor's just the basis of making sure you're not too far off from market value.

**Mr. Schmidt:** Let's move on to the regulations because we've jumped into some things that are talked about in Regulation 1.412(c)(2). First of all, we ought to use a consistent basis, and if we change the basis, then that is a funding method change. I'll talk a bit about funding method changes later. We also ought to describe the method we use in our actuary's report so that a layman or another actuary can understand it. We also ought to use consistent valuation dates. It doesn't have to be the same date as our liability valuation, but at least it needs to be consistent.

We also ought to reflect fair market value in some way, and we shouldn't be consistently above or below fair market value. The regulation says that the method should not be designed to yield a value that would consistently be above or below fair market value. That's important because if you have a method that has an expected return and that's your actuarial assumption, and then you smooth variations around that expected return, that method may lag market value, as I said earlier, but it's only because returns have been much higher than the actuarial assumption. That method is not necessarily designed to lag or lead market value. The actuarial investment return assumption may be more conservative. In addition, as someone just mentioned, after all's said and done, you still have to be in the 80-120% corridor around market value.

Regarding funding method changes, there is an IRS procedure that came out in 1995. It's 95-51. It gives us automatic approval for a change to market value or a change to what's called IRS average value with or without a phase-in. Prior to that we had approval to move to any acceptable valuation method. I guess there was

about a year-long period where we didn't have any automatic approval, but prior to that, under Revenue Procedure 85-29, we could move to any acceptable method. So it is a little more restrictive now, and I guess I'd be curious to know if anyone has filed for a change in asset method that does not comply with one of the safe harbors in Revenue Procedure 95-51. Let's see a show of hands. Several? Have you found that the IRS has been pretty reasonable with you or have you any problems? Any problems, raise your hand. I'd just be curious to know what the nature of the problem might have been.

**From the Floor:** It's too hard to explain. It's a long story.

**Mr. Schmidt:** Okay. I saw in the program there's another session on method changes, so maybe there'll be a more heated discussion there about it. But it is comforting to know that the IRS has approved some other methods because I don't know how many people are clamoring to use IRS average value right now.

Moving on to the accounting side, we have *FAS 87* governing the expensing of pension obligations. Market value is prescribed to be used for several measures under *FAS 87*. First of all, you have to use market value to determine whether there's a minimum liability to be disclosed on the client's balance sheet. In addition, market value is what is disclosed in the annual report footnote. Actuarial value or a market-related value isn't disclosed there. In addition, market value is used to determine the actual return on the assets for the year.

Market-related value is also mentioned in *FAS 87*. Market-related value is used for expected return on assets. You can also use a market value if you want to, but if you do use a smooth value, you must recognize changes in market value in a systematic way. In addition, you can smooth any deviations from market value for up to five years. It's a bit more restrictive than the IRS guidance. Methods may differ by asset type as well. For instance, you may have a different method for thinly traded securities that you can't value very well.

*FAS 87* also mentions that you could use discounted cash flows if you have certain assets that are not readily marketable, but you do have to use a consistent application under the *FAS* as well, and any change becomes a change in accounting method. So the auditors would help you decide whether or not that's a disclosable event.

What I'd like to do now is shift a bit and talk about several asset valuation methods that I've seen that are in use to see how these methods compare with all of our attributes that we went through earlier. We went through six attributes. First, I'd

like to talk about market value. It's really not a smooth method, but I suspect there are a lot of plans out there that are using market value in one way or another.

How does market value measure up to the stable values criteria? Well, I guess it depends where your investments are. If you're investing in CDs, for instance, I think your values are probably going to be stable, even if you use market value. However, many plans are invested in stocks and bonds, so market value is not going to give you a very stable value for the assets. However, market value does comply with the IRS standard. It also complies with the FASB standard. In addition, market value is simple to explain to a client. Additionally, it probably doesn't influence investment decisions because the client or the investment manager wants to maximize value.

So having an asset valuation method called market value doesn't impose what the actuary does on the investment people and, of course, market value doesn't lag or lead itself. Therefore market value meets many of the attributes of an asset valuation method. However, we came here to talk about smoothing. So let's talk about some other methods. In order to compare those methods to market value I constructed an example for a ten-year period where we have a fluctuating return. I constructed the example so the ten-year compounded annual return would be 8%, but it moves around so much. Under this example our asset value goes up over the long term, but it does have some fluctuations, for instance, where it decreases from one year to the next.

The first method I'm going to compare to market value is really a method that probably isn't used a lot, but I want to use it to illustrate a point. That's the method that would take the average of the cost value and the market value.

Now, this method might have values that are a little more stable than market, but they're not a whole lot more stable, so I didn't call it a method with stable values. In addition, I don't think this method would comply with the IRS. I suppose if you had the 80–120% around it, that might be alright, but I think this method is probably going to chronically lag market value because it would not realize the unrealized gains. As long as you have unrealized gains, it would lag market value. It probably does not comply with the *FAS 87* either because at any one point in time you may have gains and losses from more than five years ago that haven't yet been reflected in market-related value. It's a simple method, though, to describe. It's just the average of two values. However, because it does reflect cost value in some way, it can influence investment decisions because the buying or selling of an asset can, in and of itself, affect actuarial value without affecting market value. In addition, as I said earlier, it does tend to lag market value.

So, what does this method do to the return? When constructing this example I had to make an assumption as to how much of the return was realized, unrealized, and how much was interest and dividends. This is somewhat dependent on that, but it smoothed out the returns a bit, but not a whole lot. Also, the asset values are a little smoother, but not much, and they do lag market value persistently over the projection period.

The next method is the IRS average-value method. How many of you have plans that use IRS average value? I see two people. This method obviously isn't very common, but it is one of the methods you can move to with automatic approval. In my example, I'm using a three-year IRS average value. What this method essentially does is delay recognition of the realized and unrealized gains over three years. In addition, it doesn't treat all types of gains equally, but it does tend to smooth things out.

With this method I used a phased-in approach where I started with market value as of January 1, 1996 and then phased in the three years of smoothing over the ten-year period. This method yielded stable values. It does comply with the IRS because it's mentioned in the regulation. I think it probably complies with *FAS 87* because it does try to recognize that changes in market value are systemic and rational under five years. It may be a little harder to describe to the client than some other methods because of the inconsistent treatment. If you read the formula in the regulations, you might scratch your head for a while to figure out what it's really doing. You might find that it's simpler than it's made out to be, but it is somewhat hard to describe. It can influence your investment decisions because it doesn't treat all types of gains equally.

So it favors some types of gains over others or smooths certain gains and doesn't smooth others. It does tend to lag market value a little bit, at least in my example, because at any given point in time you've never realized all of your unrealized and realized gains. If you tend to have realized and unrealized gains over time, you're always going to be a bit behind, but some clients don't mind that. Maybe in some situations a conservative approach like this is better.

Let's look at the return and the asset values that are generated from using IRS average value. First, the return does get much more stable over time. The asset values are also very stable as they go out, and as I said, it does tend to lag market value a little bit. The IRS said that you shouldn't design your method to lag or lead market value, but then it gave us the average value method, which seems to me does lag.

**Mr. Sloan:** Robert, I think that's right. The IRS seems to be taking the position that gains or losses are not expected. What that means is the expected return on equities would be the dividend yield of about 2%. Most rational investors would anticipate that there is a gain component to the expected return for equities. If not, then I don't think very many investors would be clamoring for that 2% dividend yield.

**Mr. Schmidt:** I'd like to move now to a class of methods that seems to me to be more common, and these are the income smoothing methods. There are variations on these methods and variations on the type of income smoothed, whether you smooth interest and dividends and realized and unrealized gains or you smooth some of them. There are variations in the portion of the income that's smoothed. In other words, do you smooth all of the income or do you smooth the difference between actual income and expected income based on some kind of assumption? In addition, it's possible to smooth amounts of income in a different way. If you have a great deal of income, you may smooth it differently than if you don't have much income in a given method. In addition, the smoothing period is a way to vary these methods, and I'm going to illustrate a three-year smoothing method.

In this three-year smoothing method I calculate the gain or loss each year versus the expected return on the assets; then I average those differences from expected in a simple average over three years. I start with market value as of January 1, 1996. It seems to me that this method has many things going for it. The values are stable. It does comply with the requirements of our regulatory entities, the IRS and the FASB. It's fairly simple because all we're really doing is averaging out unexpected gains and losses over three years. It doesn't really influence our investment decisions because it treats all types of gains and losses the same, and it doesn't tend to chronically lag or lead market value by design.

As in the bull markets that we have had the last 10 or 15 years, it will probably lag market value, but that doesn't mean our return assumption is bad just because it's a longer term assumption. This method does smooth the return quite nicely. It's somewhat responsive to the market but not overly responsive. You can actually vary how responsive it is by varying that smoothing period or varying the way you smooth the amount of income outside of the expectation. So, as you can see, this is probably the only method I've got here that is not consistently lagging or leading the market based on our 8% return over that period.

**From the Floor:** Is the method you just showed on smoothing unexpected gains and losses under automatic approval?

**Mr. Schmidt:** No, I don't think it is. As far as I know, there are only two methods that are mentioned. One is smoothing the market value. One is moving to IRS average value, which doesn't smooth things in the same way as in the example here. In this write-up method, all we're doing is guaranteeing ourselves a return every year for our actuarial assets of, essentially, 8%. That's our actuarial assumption. And if we're lucky, and over the long period assets do return 8%, we're alright.

The problem you can run into with write-up methods is that after a while you might stray too far from market value, and you may have to devise a way of adjusting your method so that you get back in line, so to speak. The description of write-up methods in the Jackson and Hamilton paper is fairly detailed. Suffice it to say that these methods probably aren't as popular as they used to be. They do give you stable values, though. I think they probably comply with the IRS. I can't see anything that would forbid us from using that for funding purposes.

**From the Floor:** Do you think the write-up method really satisfies the IRS because of lagging or leading the market value or not really recognizing market value?

**Mr. Schmidt:** If your return assumption is somehow related to market value maybe that could be your way of saying you do, but I agree that it is a little more tenuous.

**From the Floor:** What about the examples in the regulation?

**Mr. Schmidt:** I think you're right. I think there are some examples in the regulations where they used some interesting methods. There was one that was sort of a hybrid write-up method, so that's a good point. If you look at the examples in there they look complicated, and probably are not very easy to explain to your client. I don't think the write-up method would comply with *FAS 87*, because there's no guarantee that you're smoothing your gains and losses in under five years. Actually, I should have checked simplicity, but I didn't. I guess the reason I didn't is because it's hard to know what to do if this method gets too far away from the market. It might be a little hard to explain. This method probably doesn't influence your investment decisions a whole lot because you're just writing your assets up. If the return assumption is reasonable, maybe it doesn't lag or lead the market, but we probably don't all have perfect information about the future. I didn't check on that point.

**From the Floor:** Bob, if you were using an 8% write-up method and you changed your actuarial assumption to 9%, would that be a change in funding method?

**Mr. Schmidt:** Assuming you went to a 9% write-up?

**Mr. Sloan:** I'd vote no. I'd say that your method is to use the valuation assumption as the write-up percentage. So I wouldn't file that as a method change.

**Mr. Schmidt:** I'll side with Matt on that. Of course, I'm not the IRS.

To close I want to talk a bit about present value methods. The present value methods are probably not as common as they used to be. They were used mainly with bonds that were held to maturity. This is key, because if you have a bond portfolio that's actively traded, I'm not sure it makes much sense to use a present value method. These methods generally start with initial book value (in other words, the initial purchase price). Then, in the future years there are a couple of options. You can amortize the value smoothly to the maturity value of the bond, or you could somehow discount the cash flows at the valuation rate. I've seen it done both ways. As far as the attributes of these methods, they do tend to have stable values. I think they were used a great deal when interest rates were higher and clients were trying to lock in those high returns in the markets. I don't see them as much now. They don't seem to make as much sense when interest rates are low. As far as complying with the IRS, I mentioned earlier that they only work for multiemployer plans.

For *FAS 87*, they only work in a very limited circumstance. When you have assets that aren't readily marketable, you could use a discounted cash-flow method. In terms of simplicity, they're difficult to understand. I suppose if you were really good, you could explain them easily to a client. As far as influencing investment decisions, I think they don't, as long as your policy is to hold your bonds to maturity. If you were actively trading bonds, I don't think this method makes sense at all to begin with. Regarding lagging or leading market value, these bonds are often purchased to try and take advantage of something that will keep them higher than market value over a period of time.

**From the Floor:** If you value the bond at an interest rate that is different than your liability discount rate, wouldn't you get a difference right away?

**Mr. Schmidt:** I think you're probably right. I'd have to think about that a little more, but I guess the discount rate on your bonds could influence decisions. I guess you have a choice on the yield rates of the bonds, but yield and risk are correlated, so I'm not sure you really do have a choice on the yield of your bond, but that's more of an esoteric issue. But that is a good point. In summary, present value methods are used somewhat in the multiemployer plan arena, or perhaps in public plans (because there aren't as many restrictions there) and, to a limited extent, in *FAS 87*. Keep in mind that there are a variety of methods that we can use in the methods I've discussed. Some of them we can use for both expense and

funding; and some we can't. I tried to explore some of the more common methods. In my opinion smoothing all types of gains and losses on a consistent basis is probably preferable, and I guess we've talked a bit about the methods in use out there, but I hope I've touched on most of the ones that you are familiar with.

I'd like to introduce our next speaker. Matthew Sloan is a founding partner at the firm of Davis Conder Enderle & Sloan in Chicago. Prior to that he was a Consulting Actuary at Towers Perrin, where he served in a national role, specializing in asset/liability management. He's the Enrolled Actuary for several large clients at his firm and is a frequent speaker and author on pension financing and design topics. Matt received his undergraduate degree in actuarial science from Drake University and an MBA from Harvard. He is an Associate of the Society of Actuaries (ASA), and a Member of the American Academy of Actuaries (MAAA).

**Mr. Sloan:** Robert summarized the types of asset valuation methods and described their key characteristics. I want to discuss how the choice of the asset valuation method fits with the other choices that the actuary makes, and how the entire package of actuarial methods and assumptions fits with the needs of clients.

Let's step back from the detail of the methods and discuss how the choice of the asset valuation method fits within the pension financing decision process. The role of asset smoothing is not to change the underlying economics of the plan. The assets are going to return what the assets are going to return. The asset valuation method stabilizes asset measurements, which affects the timing of costs, both cash contributions and reported expense. Asset smoothing can affect timing in two ways. We focused so far on how it can smooth variation. In other words, during periods where costs would be high, using a smoothing method will mean that costs won't be quite as high; or in periods where costs would be low, using a smoothing method would mean that costs would not be quite as low.

The other way that asset smoothing can affect variation is to steer cost recognition to a different time period. This suggests an important question for us to consider today. Can volatility in pension expense be a good thing? The answer to that question can be yes. The key is whether or not the variation in contributions or cost is hedging any other kind of variation within the client's business. To begin addressing this question, we're going to discuss where specific decisions regarding cost management fit into the overall financial management program for a company.

We will consider two critical dimensions of financial management. First is the role that decisions about pension funding play in the capital structure of the company sponsoring the plan. Second, how should costs be managed, particularly the variability of annual contributions and reported expense? There are several

questions that the plan sponsor has to ask about the level of resources (or capital) committed to pension funding. The question—is pension funding a good use of corporate capital?—must be addressed by every company. With recent changes in the regulatory environment, are there other benefits of funding? For example, with notices for underfunding and higher variable premiums, the trade-offs involved in this decision are shifting. We won't go into great detail here, but understanding these fundamental tradeoffs and how important they are can affect some of the decisions we make about actuarial assumptions and methods—like asset smoothing.

The decision on how much to commit to funding has two aspects to it. A question that gets a great deal of attention is how to manage the assets once they're in the fund; this deals with the appropriate investment policy for the assets. An even more fundamental question is, how much should be in the fund in the first place? These two questions are interrelated. The question on how much should be in the fund (the funding target) is partially dependent upon the investment policy. In other words, doesn't a heavy dose of equity mean that the actuary should (or may) use a higher expected return assumption (discount rate) for calculating the funding liability? If this is appropriate, then higher equity exposure means a lower funding target.

Related to that question is how much financing risk does the company want to take with the pension plan. A company's basic capital structure decisions involve deciding how much equity financing and debt financing to have. This basic, corporate financing decision involves assessing how much risk the company is willing to take. Pension financing decisions—setting the funding target and investment policy—require the same type of risk assessment.

In describing the sponsor's approach to determining the pension plan's role in the capital structure, there are some simple characterizations that can apply to the approach followed. What if the plan has a high funding target, let's call that plan sponsor a saver. A saver would be a plan with a conservative investment policy, conservative actuarial assumptions, and a conservative funding method (including the asset valuation method). The idea is to put a great deal of money into the pension fund where it gets advantageous tax treatment. The other extreme—sponsors setting a low funding target—could be characterized as financiers. Financiers are those willing to operate a little bit more on the edge, and not commit any more dollars to pension funding than is absolutely necessary. I want to emphasize that the funding target decision can be critically important, possibly as important from a financial perspective as any other aspect of plan financing.

To illustrate this, consider the example shown in Table 1. Let's define the example by looking at a balance sheet that represents market value measurements for both the company and the pension plan. This illustrative company has pension assets equal to the pension liability, each has \$200 million. The company has other corporate assets of \$800 million. Those corporate assets are financed equally by equity and debt, \$400 million each. In the examples that follow we will assume the cost of debt is 8% (pre-tax). The cost of equity (or the required return that investors expect on equity) is 12%.

TABLE 1  
ILLUSTRATION OF BALANCE SHEET

Assets (\$ millions)		Liabilities (\$ millions)	
Pension assets	\$200	Pension Liability	\$200
		Corporate Debt	400
Corporate assets	<u>800</u>	Corporate Equity	<u>400</u>
	\$1,000		\$1,000

In our next example, Table 2, the income statement reflects those assumptions and the balance sheet from the previous example. The revenue for this business is assumed to be \$1 billion. The operating expense is \$888 million, including a pension expense of \$10 million. The results in earnings before interest and taxes (EBIT) are \$112 million. Interest of 8% on the \$400 million is \$32 million. This leaves \$80 million of earnings before taxes. Taxes at 40% is another \$32 million, leaving earnings of \$48 million. This is a return on equity of 12%, 48 divided by the \$400 million market value of equity.

TABLE 2  
ILLUSTRATION OF INCOME STATEMENT (\$ MILLIONS)

Revenue	\$1,000	
Expenses	<u>888</u>	=>(includes pension cost of \$10)
EBIT	112	
Interest	32	
Taxes	<u>32</u>	
Earnings	48	
ROE	12% (48/400)	

Next let's assume that the plan sponsor is looking to be more aggressive regarding the pension plan. To accomplish this the exposure to equities is increased. The result is an expected improvement in return on assets of 1.5%. Let's also assume that this extra return gets reflected in the pension expense and pension contributions. The extra 1.5% on \$200 million of assets nets an extra \$3 million in return each year that lowers the annual cost by \$3 million as well. The operating cost is now \$885 million (\$3 million less than our previous example). Following

through the rest of the income statement leads to \$50 million in earnings (see Table 3). That \$50 million in earnings is still on the \$400 million in market value of equity. That's a 12.5% return on equity. This is a substantial improvement, 50 basis points, and is certainly something worth working very hard for.

TABLE 3  
IMPACT OF +1.5% RETURN (\$ MILLIONS)

Revenue	\$1,000
Expenses	<u>885</u> => (reflects reduction in pension cost of \$3)
EBIT	115
Interest	32
Taxes	<u>33</u>
Earnings	50
ROE	12.5% => (4% improvement)

The next thing to consider is the role that the funding target can play in the value equation. If the higher expected earnings means the actuary can or should reflect the higher earning potential in his or her discount rate, the pension liability measurement will be lower. Assume the discount rate is raised 1.5%. This may lower the liability to \$150 million from \$200 million (see Table 4). The actuarial liability is the funding target. If it is reduced by \$50 million, then (over some time period) the assets that would be required to fund the plan would be reduced by \$50 million as well. The effect would be that \$50 million of assets would become available for corporate purposes over some time period. The next example assumes that the \$50 million would be used to pay down debt and to repurchase equity on a pro-rata basis (\$25 million each).

TABLE 4  
INCREASE OF 1.5% IN PENSION FINANCING

Assets (\$ millions)		Liabilities (\$ millions)	
Pension assets	\$150	Pension liability	\$150
		Phantom liability?	50
		Corporate debt	375
	<u>800</u>	Corporate equity	<u>375</u>
Corporate Assets	\$950		\$950

I am showing a "phantom liability" on this balance sheet to reflect the fact that the pension promise has not changed—only its financing has changed. There is another school of thought that would suggest the business should be worth a full \$50 million more. After all, the business is operating with less financing needs. This change actually provided an injection of cash that's a one-time addition to value, and it should improve the market value by \$50 million. I am not making this claim in this example, but have also not seen any persuasive arguments to refute such a

claim. What we can do is see how the lower financing need plays out on the income statement side.

In the next example (Table 5) we still have the \$3 million savings in operating costs. We still have the same earnings before interest and taxes. But now we have less debt outstanding. So our interest costs are a bit less. That means we pay a little more in taxes because we don't get the deduction for those interest payments, but the net effect is that our earnings are a bit higher—\$51 million. In addition, these higher earnings are on a smaller base of equity, \$375 million instead of the \$400 million in the previous examples. The net effect is that the ROE is up to 13.6%. Coordinating the setting of the funding target with the changes in investment policy increases the improvement in ROE by three times the impact of the investment policy changes alone!

TABLE 5  
INCREASE OF 1.5% IN PENSION FUNDING

Revenue	\$1,000	
Expenses	<u>885</u>	=> (reflects reduction in pension cost of \$3)
EBIT	115	
Interest	30	
Taxes	<u>34</u>	
Earnings	51	
ROE	13.6%	=> (13% improvement)

The reason I wanted to go through this example is to illustrate the impact that pension plan financing decisions can have. The example also highlights the importance of coordinating asset and liability management.

**From the Floor:** You showed pension assets going down by \$50 million. With restrictions on reversions, would that be possible?

**Mr. Sloan:** There is a time frame issue because you can't recapture surplus (economically, at least). So that's right; the example is a theoretical comparison. But it is still relevant because the plan assets can be "recaptured" over time through a contribution holiday.

**From the Floor:** How long would it take?

**Mr. Sloan:** If the cost is about \$10 million a year (as shown in this example), it would take about five years.

**From the Floor:** If I look at the company funding aggressively, I would view it as a much riskier investment.

**Mr. Sloan:** If we had two identical companies, except that one had \$50 million less in its pension plan, they might have a small difference in the required return on equity due to perceived risk differences. However, a "saver" company might be conservative in all things they do, and a "financier" company might be risky in all things they do. If this were the case, investors might place a much higher risk premium on the latter company. The purpose of the example is to show the role that pension financing has in the context of its broader corporate financial implications. We are not trying to hypothesize about other aspects of the company's business.

**From the Floor:** What about the SEC requirement to reflect current yields on investment-quality bonds? Am I correct in assuming it has no relationship at all to your expected return assumption for funding purposes?

**Mr. Sloan:** Right. Your comment relates to the SEC position on the discount rate for *FAS 87*. You are correct that the SEC has taken the position that the *FAS 87* discount rate should reflect current yields on high-quality bonds. I am focusing on funding requirements in this example. The discount rate used for funding is the ERISA discount rate, and it is intended to be an assumption that reflects the expected long-term return on assets.

**From the Floor:** You said you are focusing on cash funding instead of reported expense, but don't financial statements reflect reported expense?

**Mr. Sloan:** Yes, the accounting statements of most companies reflect GAAP, which governs the reporting of pension obligations under *FAS 87*. In these examples we are focusing on market value financial statements, and ultimately market value is simply the present value of cash flows. We're dealing with market value of equity, market value of debt, market value of corporate assets. The same applies to the pension side.

The point to take from this analysis is when decisions are made about where to deploy corporate capital (and corporate capital is used to fund the pension plan), it's not reported expense numbers that matter but cash-funding requirements. Reported expense is just a number that an accountant writes down.

Now that we have laid some of the groundwork, let's compare some of the characteristics of the two groups we discussed earlier—savers and financiers. Savers typically take a mainstream approach on investment policy, and are maybe even a little conservative. There may be a conservative reflection of the investment policy by the actuary (meaning he or she only partially reflects the earning power of the assets in the funding rate assumption). The result is a funding target that is high

relative to the investment policy. Financiers tend to be a little more aggressive. They might be more aggressive on the investment policy, or use other "radical" approaches to achieve financing objectives.

In the 1980s it was fashionable to use immunization or dedication strategies to "match" assets and liabilities. This could actually result in a large reduction in expected return from a balanced portfolio. Oftentimes one of the key objectives was to encourage the actuary to better reflect the investment policy in his return assumption. When the investment team could come in with a cash-matched portfolio that yielded 11%, for example, it was hard for the actuary to say no to an 11% expected return assumption. What this example highlights is that many finance experts recognized the importance of the funding target and how that target was managed overtime. Today, financiers would probably tend toward being aggressive on the investment policy side as a way to reduce long-term costs.

The goals are different between the savers and financiers. The approach of savers is more of a traditional approach. The idea of minimizing the risk of a shortfall was typical in the 1970s, resulting in a bias toward conservative actuarial assumptions. Financiers are more like those folks in the 1980s that were looking for ways to recapture surplus or to turn off the pension funding spigot. Cost management implications are also different. If a plan sponsor is a saver and is funding conservatively, this promotes stability in cost measurements. Costs may be at a higher level, but they're stable and predictable.

Financiers tend to push the edge a bit. When pushing the edge and being aggressive, there is more of a need to move with market conditions. Because market expectations have been used as a justification for being aggressive market moves must be reflected. So, financiers would tend to be closer to market measurements for both assets and liabilities. This can produce lower costs but at the price of higher volatility.

One of the tools for controlling volatility is the asset valuation method. If we wanted to summarize the key pension financing strategies, we might take the two dimensions of financing decisions (funding target level and how costs are managed over time) and plot them in what I've called the pension financing map (see Chart 1). The ideas reflect what we have already discussed.

CHART 1  
PENSION FINANCING MAP

	Fixed Measurements	??	Market Measurements
<b>High Funding Target</b>	Savers	<b>Risk Managers</b>	
<b>Low Funding Target</b>			Financiers

If the plan has a high funding target and uses very stable measurements for assets and liabilities, the plan is up in the saver box. A low funding target may put the plan in the financier box. Of course, not all plans fit nicely into one of these two boxes. In fact, most sponsors are really torn by attempting to get the best of both worlds. They want the stability and the solid foundation that is achievable by using fixed, stable measurements. But they also want the cost savings of the more aggressive approach of financiers. The result of this is the need to manage tradeoffs. The management of these tradeoffs could be described as risk management, and sponsors that fall into this middle ground might be described as risk managers.

Today, most plans fall in the risk manager camp. There has not been a strategic decision to be conservative or aggressive, but there is a desire to be opportunistic and do what makes sense for the company at any particular time. One of the challenges that this creates is that it's a difficult process to manage. It is extremely hard to turn down good news.

Let's consider an example that illustrates this. Here is the situation. The plan is using a stable set of assumptions (not changing assumptions from year to year), interest rates are falling, and this has contributed to healthy returns for both equities and bonds. Pension assets go up. Expenses or contributions go down. Maybe the plan goes into full funding. That may be moderately good news. The company is not likely to say, "Don't use last year's assumptions," because the result is a pleasant surprise.

On the other side of the ticket, if everything sours and the reverse situation occurs, interest rates go way up, both equity and bond markets fall, and therefore pension assets tank, and suddenly the plan comes out of full funding. Consider the potential response from the CFO—this is a bad business environment for him. Remember, interest rates are high, so his borrowing costs are high. This may mean inflation is also above expectations, driving his costs up and profits down. In addition, if the company stock has been hammered along with the rest of the market, it is not an

ideal time to raise capital through an equity offering. On top of all this, if the actuary marches in and says the contribution holiday is over, the CFO may start looking for another actuary. Or he may start looking for a way to keep the plan in full funding a little longer.

This can create a tendency in times of financial strain to change assumptions in order to ease the pain. Unfortunately, there is no equally powerful impetus to move assumptions back when there's no pain. This imbalance may have contributed to the migration from very conservative assumptions, relative to investment policy in the 1970s and early 1980s, to less conservative assumptions relative to investment policy today. To illustrate the process, a risk manager follows between being aggressive and conservative (in other words, moving between being a financier and a saver); let's make some simplifying assumptions. We will make some generalizations about how to manage liability measurements and how to manage asset measurements (see Table 6).

TABLE 6  
COST MANAGEMENT ALTERNATIVES

	<b>Assets</b>	<b>Liabilities</b>
Savers	Fixed	Fixed
?	Market	Fixed
?	Fixed	Market
Financiers	Market	Market

On the asset side, let's assume there are two choices—measure the assets at market or use some kind of smoothing to achieve a relatively "fixed" measurement. Similarly, on the liability side we have the same two alternatives—change assumptions each year to reflect a "market" measurement each year, or keep assumptions as stable as possible, resulting in "fixed" liability measurements. For discussion purposes, we will focus on the funding discount rate as the key liability driver. Remember, savers tend to want stable measurements and financiers would tend toward market measurements because they are more aggressive. Risk managers can move from being savers to financiers and back again. They may also pursue the two "middle ground" strategies from time to time (market asset measurements and fixed-liability measurements, as well as fixed asset measurements and market liability measurements).

It is interesting to think about an approach that has become common over the years, which I sometimes refer to as the convenient approach to risk management. It has been fairly common for liability measurements to be relatively fixed. The idea is to start with the prior year's assumptions and change only if change is required. It is an easy approach. It is easier to explain results to clients if assumptions are

unchanged. It's easier to explain to auditors. There are no changes to report on filings. The result, however, is that, depending on market conditions, the plan might be in a conservative position, an aggressive position, or somewhere in between. There has been no conscious, carefully thought out decision to change the risk posture of the plan. But a significant shift may have occurred, driven by the simple inertia and convenience of maintaining past assumptions.

On the asset side, both market and smoothed (or fixed) measurements are common. In any event, there is some degree of market reflected in asset measurements, even if an asset smoothing method is being used. So, for this illustration, let's characterize the typical approach as somewhat more of a market measurement on assets than liabilities. So, assume the common approach is a market orientation toward assets and a fixed orientation toward liabilities (as seen in line 2 of Table 2). Let's discuss the implications of this approach by revisiting the two scenarios we discussed a few minutes ago.

Scenario 1 is a period of falling interest rates, and Scenario 2 is a period of rising interest rates. Falling interest rates are going to boost capital asset values. So both equities and bonds would tend to do better in that environment. If the liability assumptions are unchanged, the liabilities are going to be relatively unchanged. The effect is to get actuarial gains, which could lower contributions and possibly send the plan into full funding. That's not bad news that the company wouldn't want, but we need to put it in context. For the company, interest rates are low. So the company's borrowing cost is low. Inflation is probably low. Costs may be rising more slowly than the company expected. The overall effect is probably that the company is doing quite well. This may be an environment where the company's stock is doing well.

Company executives are feeling good about what they're accomplishing. They're beating targets. They may be generating cash. In fact, they may be raising more cash because rates are low, and they may want to stockpile cash. Even if they are not generating extra cash, it is cheap to raise capital in the current environment because rates are so low. If equity valuations are high, the company could raise additional capital by issuing equity. So, in general, it would not be a bad time to put more into the pension fund. This is the environment where the company can afford to fund more.

Let's consider the second scenario—rising interest rates. If interest rates are rising, asset values may go down. Liabilities will stay the same (under the fixed liability approach). This creates actuarial losses that will either raise contributions or, if there haven't been any contributions lately, could pull the plan out of full funding. The timing for this is awful. Companies are having to refinance debt at higher costs

than they anticipated. Inflation is high. The company's suppliers may be raising prices. The effect may be that company profits are down and there is pressure to avoid going to market to raise capital. Frankly, the CFO might seem unwise if he issued debt at 9% if eight months earlier he could have issued it at 7%. For the company, this may be a bad environment to have cash outflow requirements, and a bad environment to have pension contributions.

Following the common or convenient approach to asset and liability measurements tends to produce good news when good news is not very valuable and bad news when it hurts the most. It creates a problem where, as the messenger, the actuary takes a great deal of heat. There is little credit given for the fact that contributions are better in a good news environment, but there is tremendous pressure in the bad news environment to make things better.

Let's consider an alternative approach. Smooth the assets as much as possible, and then let the liabilities vary by moving the funding discount rate based on movements in market interest rates. The theoretical justification for this is that if the risk-free rate changes, the expectation for long-term future returns changes as well. The result is just the opposite of the prior example. When interest rates fall, contributions may increase because the change in assets won't be fully reflected, because the asset smoothing method will have smoothed out most of the gains. However, changes in liabilities will be reflected. This will tend to increase contributions in this low-interest-rate environment. This is a time where higher contributions are affordable; the company may be trying to figure out what to do with all the extra cash being generated. So funding can be thought of as saving for a rainy day. In the event that the "rainy day" comes to pass and interest rates do rise, and if the plan has been funded conservatively during the good times, the pension contribution is likely to go down. The asset losses are going to be deferred. Liability measurements will go down.

This "good news" on pension funding and expense may be the single bright spot in what's otherwise a pretty bleak picture from the company's perspective. This hedging value of the pension plan is seen fairly widely with *FAS 87* expense, in part due to the forced market measurement of liabilities under *FAS 87*. The same hedging value is available on the funding side as well. In fact, it is probably more important on the funding side because we are talking about real dollars—cash. Even though moving funding liability measurements with the market may not be the most convenient or common approach, it is an area where the actuary can help the sponsor manage the plan in a more cost-effective way.

By making the plan more affordable and the variation in costs and contributions less painful, sponsors can feel better about their plans. Actuaries can play a role in

easing some of the negative feelings that sponsors have toward defined-benefit plans because of the surprises they've been hit with in the past on both the funding and expense side.

Effective risk management is not easy. It's not easy to break away from tradition. If today's economic environment is characterized as a low-interest-rate environment, it may be challenging to suggest to clients that lowering the funding discount rate by 100 basis points (for example) is appropriate. The client may look at recent returns (and actual returns have been great), and wonder, why change the assumption when the fund is actually beating the current funding assumption? The intuitive result may be to raise the return assumption.

There is also added scrutiny when changing assumptions. Several third parties are interested in changes, including the PBGC, the IRS, and both the plan and corporate auditors. Even though a change may be advantageous, having to report the change and justify it involves added effort. We have taken a broad view of where the asset valuation method fits in the broader context of pension financial management decision making. The key observation is that asset smoothing generally makes a great deal of sense. Usually the question is not whether to smooth the assets, it's when to start.

There is a one-time "option" to switch from market to asset smoothing. Timing the "exercise" of the option (when to switch) is a valuable risk management tool. Asset smoothing is an effective tool, but it is also an approximate tool (because the method is set in place once, and then the plan is subject to whatever pattern emerges). Measuring liabilities on an approximate market basis is a year-to-year discretionary decision. This makes it a more precise tool for controlling variation. In combination, a smoothing method to dampen asset fluctuations, along with a discretionary policy of at least partially reflecting market movements in liabilities, creates a powerful and effective approach to risk management.

It is critically important for actuaries to be actively involved in the thought process of how companies think about funding and committing capital to pension funding. The actuarial methods and assumptions play a key role in this process and in the annual process of managing variation in pension costs and contributions.