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**THE ACTUARIAL STANDARDS BOARD (ASB) PROPOSED  
STANDARD FOR PENSION ECONOMIC ASSUMPTIONS**

Moderator: RICHARD Q. WENDT  
Panelist: MARY HARDIMAN ADAMS  
Recorder: RICHARD Q. WENDT

- Latest status report
- What is the thinking of ASB?
- What are the implications for actuaries and small and large plans?
- How to use alternative approaches

MR. RICHARD Q. WENDT: I'm a member of the council for the Investment Section, which was how I was chosen to be moderator. We're very happy to have with us a member of the Pension Committee of the ASB, Mary Adams, and she has been chairperson of that committee for the last three years. Before 1992, she had been a consulting actuary with Buck Consultants for about 45 years.

I had a call from my daughter in college last week, and she is taking a business course at Washington University. She said her professor had a little story about actuaries that I thought was pertinent. There was a physicist, a chemist, and an actuary shipwrecked on a deserted island, and all they had as their full supplies was one can of stew, but they couldn't get it open. So, the physicist said, "Well, let's build a catapult. We're going to shoot this can in the air. It'll come down, hit a rock, and it'll burst open." The chemist said, "No, let's build a fire. We'll put the can in the fire. The gases will build up. The top of the can will pop off." The actuary said, "Let's assume we have a can opener." So, we're talking about making assumptions, and I think actuaries do tend to be quick to make assumptions, more than many other people.

Also, when Senator Rudman was talking, he mentioned the proverbial "rocket scientist," when they were dealing with all the health issues and their economics and actuarial committees. They referred to rocket scientists solving the problem, and that reminded me of the question: When they have the space conventions at NASA, who do the rocket scientists refer to? Do they refer to actuaries as the people who have all the difficult problems?

First, I will give a general introduction, then some details of the methods of choosing discount rates, which I consider to be the key setting for all the economic assumptions. We'll also talk about some subsidiary assumptions that tie into discount rates. Mary will give an update right from the committee and right up-to-date: what everybody is thinking about the status report, some major comments received during the commenting period, and some insights into what the ASB is thinking about currently.

Then I'd like to continue with a more subjective area, looking at what some standards have looked like in history. What have actuaries done in history? Then, I will discuss a financial viewpoint applied to economic assumptions, and end with some key questions, but not necessarily the answers, that should be considered.

The exposure draft was originally released in late July, early August 1992. I think most people received it around August. They had a fairly lengthy period of comments and hearings. The hearings were in October, coordinated with the Society of Actuaries' meetings, Conference of Actuaries, and the American Society of Pension Actuaries (ASPA) annual meetings. The comment period ended in the middle of December, and since then the ASB people have been analyzing and interpreting the comments.

What does it apply to? Basically, the proposed standard applies to defined-benefit pension plans' economic assumptions. It doesn't apply to defined-contribution plans, per se, and, also, where there are any conflicting statutory rules or regulations, those are thought to supersede any principles stated in the proposed standards. For instance, in *Financial Accounting Standard (FAS) 87*, presumably the plan sponsor is to choose the actuarial assumptions, and those principles may not apply.

Economic assumptions typically are thought to encompass inflation, the critical one of investment return or discount rate, the compensation scale or salary scale, and some others such as social security wage base, ad hoc cost-of-living adjustments (COLA), and other minor assumptions. Talking about discount rates, a key principle of the proposed standards is that there should be a general range of discount rates, and then the rate for a plan should be selected from within that range, and the writers suggest four methodologies for choosing discount rates. I'll cover two in a little bit of detail, and two I'll just mention briefly. The government securities method ties a discount rate to the current Treasury bond yield curves, and the standards suggest that method as an estimate of the bottom of the range. The building block method is very close to some traditional methods of choosing the discount rate. It breaks the discount rate into various components such as inflation and real returns. We'll look at those two more in a second. The probabilistic method is a type of forecast focusing on the assets, not including liabilities, and the probabilistic asset/liability method is a full-fledged forecast of both assets and liabilities and then backing into the rate that will provide the expected present value. There are also possible modifications of those using blended rates, select and ultimate rates, or other adjustments.

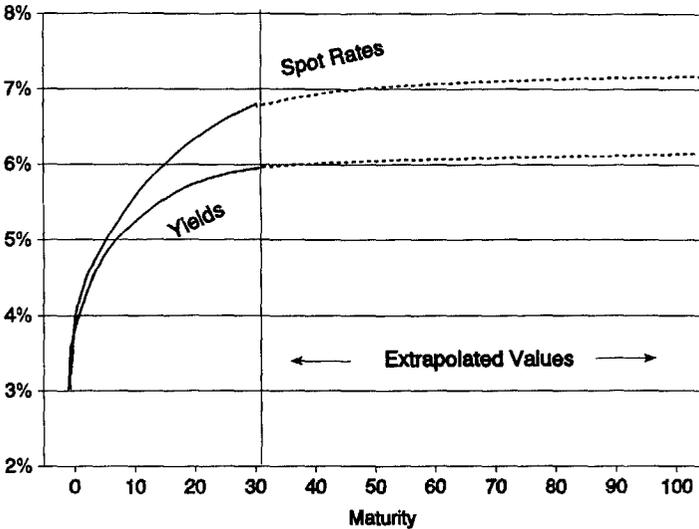
Just looking at the government yield curve, Chart 1 is our interpretation of how you might go about using the government yield curve, using actual data as of October. We at Towers Perrin have developed our model of the term structure of interest rates that starts with the yields, and the bottom line is the actual yield curve up to a 30-year maturity, and those are numbers that can be obtained from *The Wall Street Journal* at any particular date. Besides that, the top line is the spot rate curve. A spot rate is the rate for a zero-coupon bond that is consistent with the yields. There is a one-to-one correspondence between the theoretical spot rates and the yield curve. There is a mathematical formulation of that relationship. The right-hand part of that is to apply our model to the term structure of interest rates and extend that out to a hundred years. We had looked at a typical plan, and it was showing that the last cash-flow date was about 88 years into the future. Since there will be substantial cash flow way beyond the next 30 years, it is necessary to develop rates substantially beyond 30 years.

There has been a recent development from the SEC which has said to look at some rules in *FAS 106* in selecting the discount rates for *FAS 87*, and particularly the SEC

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has mentioned the idea of taking the expected returns on high quality corporate bonds, converting them to spot rates, and extrapolating them into the future and using that to discount the projected benefits to determine the present values. The method shown in Chart 1 is similar to what you will need to do to follow that method, although this is with Treasury bonds, and the yields and returns on high-quality corporate bonds would be perhaps 50-75 basis points higher.

CHART 1  
Term Structure of Treasury Interest Rates

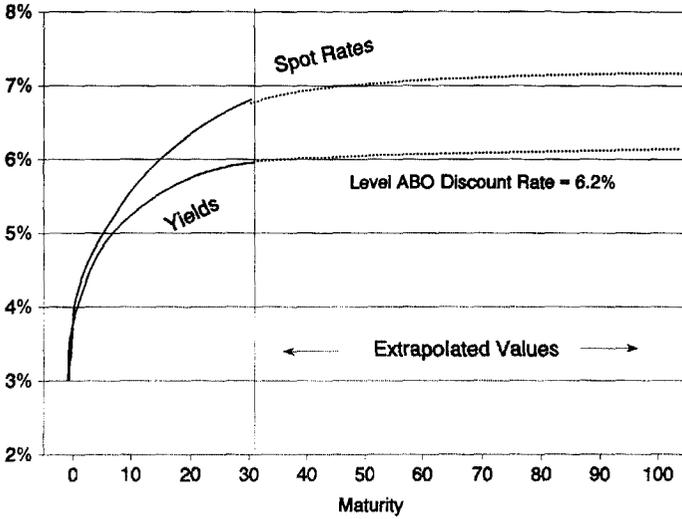


Using Towers Perrin model for term structure of interest rates as of October 1993

If we then apply that to a typical cash flow, and it does depend on the type of liability – for a typical accumulated benefit obligation (ABO) that we looked at, and applying the spot rates and discounting it backward, the level equivalent discount rate, and this is as of October, is 6.2%. (See Chart 2) That is slightly above the actual 30-year Treasury yield of about 6%, as of that date. So, those are the types of numbers you would get for an ABO-type discount. The projected benefit obligation (PBO), applying a PBO cash flow, might be slightly higher, since it has a longer duration.

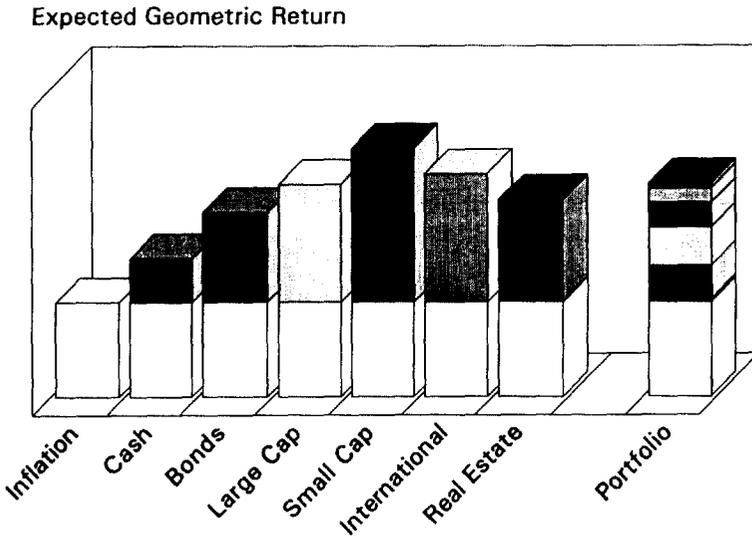
The building block approach (Chart 3) is more common for many actuaries, and it starts with an assumption of inflation as a starting point for each asset class and then develops assumptions for real returns for each asset class involved in the plan's asset policy. Taking a weighted average of the real returns plus inflation gives an expected portfolio return, and that could be used as the basis for the discount rate.

CHART 2  
Term Structure of Treasury Interest Rates



Using Towers Perrin model for term structure of interest rates as of October 1993

CHART 3  
Building-Block Method



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Now, in some of the language of the exposure draft, the writers do mention explicitly that they recommend a geometric return as opposed to an annual return, and there can be a big difference between a geometric return and an annual return. Depending on the volatility, the higher the volatility, the lower the geometric return will be relative to the annual return, and it is not necessarily a simple matter to calculate that. We'll get into the details a little bit later.

The other assumptions include inflation and salary scale. The message on inflation, as used for the salary scale and compensation scale, is that it should be consistent with the assumptions inherent in the discount rate. In fact, that is a theme of the whole exposure draft – all the assumptions not only should be explicit but also there should be consistency among all different pieces. The compensation scale would be broken down into the inflationary component, a productivity component, and merit-promotional component, which is not itself classified as an economic assumption.

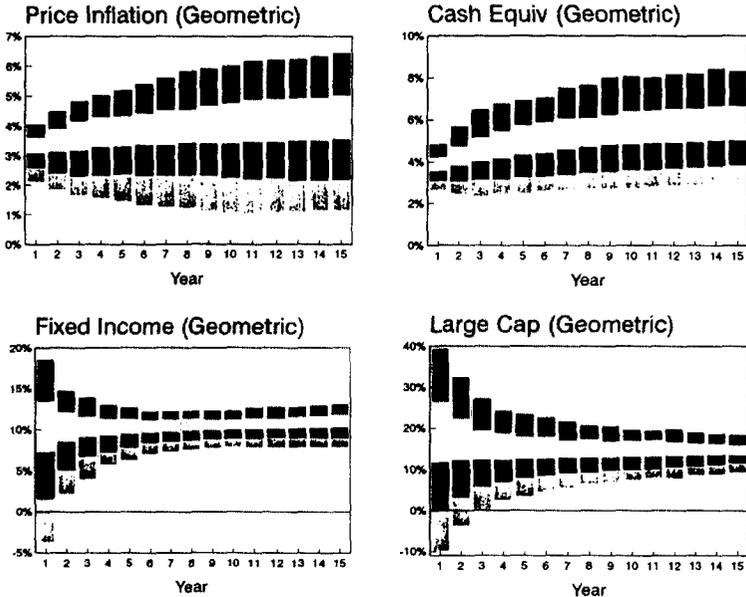
Active investment management was an interesting question. If a particular plan has used a certain investment manager, and it has had tremendous results, doing much better than the indices, should you take that into account in setting future assumptions for expected returns or discount rates? The writers have said, no, that it would be unduly optimistic to assume that the people would continue to perform much above average for the future. On the other hand, if the plan had worse performance than the index, the writers of the draft said you should not take that into account either because it would really imply that you should fire the plan managers and hire new investment managers.

Geometric rate of return is a key concept, (Chart 4) and you have to think of a long-time horizon to calculate the geometric rate of return. There are several formulas to do that, and they typically assume a lognormal distribution or, in other words, primarily that the results for any one year are independent of the other years. We don't think that is a valid assumption for the most part. Different asset classes will behave differently. Large cap stocks have what's typically shown as a funnel shape of how the annual returns will compress into a compound return of a much narrower distribution, and that is simply the annualized compound return or the geometric return. On the other hand, cash equivalents have much serial correlation and do not converge. In fact, the distribution of geometric returns widens over time, and for fixed-income classes it narrows for a while, and then it expands depending on the duration of that particular fixed-income class. So, depending on the composition of the portfolio or the asset class that is being studied, that typical assumption to calculate the geometric returns of saying it's a lognormal distribution may not be valid. It may require a more elaborate calculation. Sometimes, the combination of asset classes where some have negative serial correlations and some have positive, may allow you to use a simplified calculation for the whole portfolio.

Another controversial question is, "Should there be any margin for conservatism, particularly in the assumptions?" The exposure draft at this point suggests that there should not, and I understand that was a comment that many people responded to, and maybe Mary will have some points about that. The proposed standard also talks specifically about two types of reinvestment risk, the risk of investing the coupons on fixed income and the risk of a call provision being exercised and your bond being called away after ten years and needing to reinvest that money. It does not discuss

the risk of reinvesting for the 30 years, 50 years, 60 years in the future, which is a different type of risk than those two.

CHART 4  
Cannot Assume Log Normal Model for Geometric Returns



MS. MARY HARDIMAN ADAMS: Here is the status report. We're almost halfway there on a new draft. I really should let you know the kinds of things that have happened. When we started examining the material that came in response to the exposure draft, we were overjoyed because people really read the thing, and we had some 51 written comments. We had two hearings, and we probably accumulated another three or four sets of new comments, though there were some 20 people that appeared. Most of them had already submitted written comments. Yet, when we then started to work on those, we found that it was almost impossible. So, we had to paste-up electronically by sections. We had 90 pages of general comments and 100 pages of comments about specific sections of the draft. It turned out that we had about 240 specific comments, and these comments ranged from, "This is the greatest thing I've ever heard," to, "Trash it," on individual points. Just to give you an example, (this is one of my favorite things), we intended this to be a sanity test for looking at the inflation assumption, and we said in one sentence: "For purposes of testing the reasonableness of an inflation assumption the actuary may examine the current yields on U.S. Treasury Securities of various durations." Now, the nicest comment was, "You shouldn't say duration, it should be maturities." When the comments came in - there are seven pages of comments on that one sentence, and they ranged from, "Why do you just put it in so casually? This is the heart of the matter." Others said, "It's terrible." Most of them said, "I don't know what you're talking about." What we really meant was, as a sanity test, if you look at the yield on Treasuries for various durations, you get a feeling for an appropriate level. Now, we all know that, when you have a really high inflation, these things fall apart, and in

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different situations they fall apart, and all we meant it for was a sanity test. It really got people roused up, but at least they're reading it. I think so often we get frustrated because we think our stuff is not read.

I did want to comment on the sources of comment. Some were from individuals. Others were from the Pension Committee of the Society, from the Academy, from the Conference. They all prepared very good comments. We had comments by representatives of many of the major firms, and some of them were really just so well-done, they were really good, and then we had all the usual people who always write about things and complain. They complained, too. But it was good, a very rewarding experience.

Our current progress now is that we have made one trip through to see what we really think should be deleted. I hope we're going to improve on the writing, but there are sections that we're still working on, and we have a hard time coming to conclusions. Now, all I can say is I don't know if you all are pension actuaries that do regular valuations, but to get 12 people on a committee, all of whom are these regular valuation actuaries, to agree on anything is nothing short of a miracle, and a miracle hasn't occurred yet, but we're working on it, and some day soon we'll get it.

By the way, I wanted to make a note on geometric returns. We weren't thinking in terms of a geometric extension. You were comparing that to an annual rate. What we were saying was, if you have a basic cost of money of 3% and an inflation of 2%, that you shouldn't add them. You should use geometric. That was our sense of geometric, and I agree with you on what you said. So, our geometric was really just student-type geometric. That'll make it easier for you, right?

MR. WENDT: Yes, it would.

MS. ADAMS: There are divergent ideas not only within the committee but also among the responders, just tremendously different kinds of things. For example, you get people who would say the only way that you can get a reasonable discount rate is to go through a whole set of stochastic modeling. Even if we believed it, there is no way we could say that had to be a standard. We have people who have pension plans that have 1, 2, 10, 20, 100 employees. Now, there is no way you can model for a group like that. You wouldn't have enough assets. You wouldn't have enough asset classes to be able to do anything. So, you can't do that. There are some who will say the only way is the government security method. One person on our committee said that is the only way, and so to try to get him to allow us to put in other methods was very difficult.

I think one of the other issues, and I believe this is a communications problem, is that in talking about the components of the various economic assumptions and in talking about consistency, I think it was misinterpreted that we were pushing the building block method as superior to everything in this world. That wasn't our intention. It's just that it's an easy way to explain it. How you get to the individual part or how you get to a total and how you split it out is different, but it seems to me that talking about the individual parts is the only way you can make any sense of describing components. It's a communications problem, and we haven't solved it yet, but we're working on it, and I hope the next draft will be better.

What we hadn't covered was the margin for conservatism. I don't know of a pension actuary who wouldn't love to be able to tell every client that your pension is in such good shape, it's marvelous, and it's because we used an interest rate maybe 1% lower than what we really expected you were going to get. You can't do it. How do you put something in there that gives a reasonable feeling of security that this thing is really going to work? I jokingly said the other day that I thought that perhaps in the current environment, if we think in terms of the long term, and we really think that something like 6% or 8% is where interest rates will be, and we know that you're only earning 2% on a new portfolio of bonds right now, maybe this is where the select and ultimate comes in if you say, this year we know our money's only going to earn 2%, but after that it's going to be fine, it doesn't work. It really doesn't, but it's sort of fun to think about. Anyhow, we're really trying to cope with that because, after the exposure draft was issued, there were the decisions on the small plan cases, that a degree of conservatism is quite suitable, and then it's the actuary's discretion to do what he thinks is right with respect to those kinds of things. That was another set of comments that came in: "You've completely disregarded all of these decisions." We didn't disregard them. They weren't made until six weeks after the exposure draft was issued. So, we did not purposely disregard the decisions, and we are thinking very hard, and it's a very difficult thing. The IRS is going to read these regulations, too, and this lovely, little touch of conservatism that makes us sleep better at night really can't be too conservative.

We did not touch before on, when do you change the assumptions? We have a chap in our group who is the government securities person. He said you change it every year. Every time you do a valuation, you change the interest rate. You change it -- on and on and on, just change it, and he said in the long run it's fine, and I can tell you that I can't think in my 45 years of consulting where any client of mine would have been happy if we changed the interest rate every year because of some fluctuation. When do you change it? Is it your experience review? Is it the current forecasts? We're having a lively discussion on that. If most of you are investment people, you might come up and give us some guidance on that. We're always willing to listen to that kind of thing, but it is something that we have not come to a conclusion on, but at least we've made it to the discussion point.

The other element that is listed here is legislated assumptions. Some people, particularly those who have worked in governmental systems, find often it's a statute that says you're going to use 6% interest or you're going to use 8% interest or you're going to do something illegal. How do you cope with that? We really didn't touch on it, and it is something that we should cover. I think that it's there because the assumptions should be consistent, and you have to inform these legislatures through the administration of the funds that the outlook for the interest rate they're proposing is not very good.

Now, I think that is probably about where we are. Our optimistic timetable is to present the next exposure draft to the ASB at its April 1994 meeting. We would love to be optimistic and get it there for the January 1994 meeting, except that the January meeting is usually a planning meeting of the board. So, board members wouldn't be receptive to examining the exposure draft. I also would like a little more time so that it doesn't look like we rushed through it.

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The next thing I want to talk about is, what is the ASB's thinking? Well, the only real thinking we have is an article that Ed Burrows wrote for the December 1992 newsletter of the Conference of Consulting Actuaries, and the first thing that he covered is, why is the standard needed? We wouldn't have done it if the ASB didn't think we needed it, and the board members felt that there are many good actuaries who use the virgin practices, and rightfully so, but there are many who will sort of look around and say, "Well, I guess everybody else is using 8% this year, I'll use 8%," and think no more about it and have no notes or anything to that effect. It also brought up something that occurred back in the mid-1980s when we had some high-flying interest rates, and that was where clients would get projections of cash disbursements, particularly pension payrolls, so that they would have an ordered sequence of payouts, and they would say, "This thing is worth valuing at 16%." So, they valued this little piece of the benefits at 16%, and they cut their contributions. All they were really doing was lousing up their whole long-term portfolio performance, and Ed felt very strongly that was a very important thing to try to get away from, and it may be happening again. In the current market it won't happen, but it could happen if there should be a surge in interest rates again on bonds.

Now, the starting point is Actuarial Standard of Practice (ASP) No. 14 because that is what we had, and that standard is now being reformatted, just reformatted, not changed, into the format of all the other standards. I think it was the only one that hadn't been done; it's authorized for publication. So, it should come out maybe before the end of 1993 or early 1994, and the only change is to get away from the "implicit" approach and say that assumptions had to be explicitly reasonable on their own, but other than that, there is no change from the ASP No. 14.

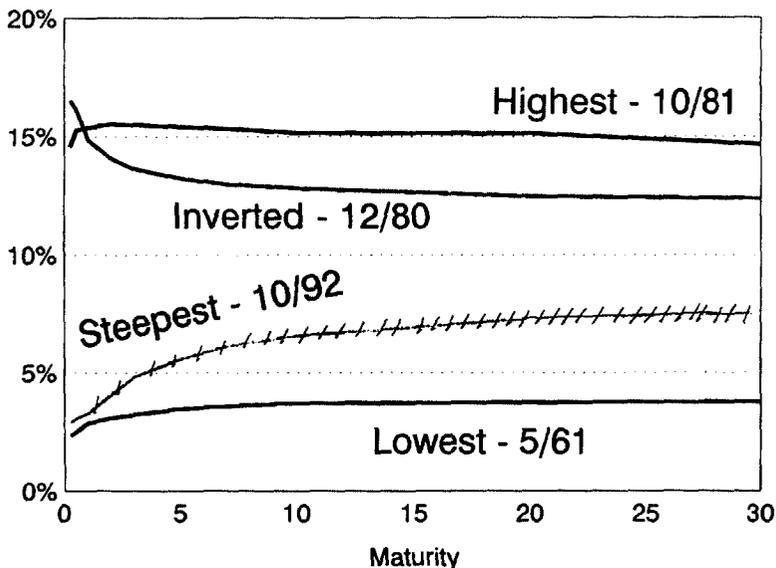
The ASB agreed with the committee's thinking of establishing a reasonable range, and this is consistent with the investment return assumption. I would almost guarantee that given a pension plan or a set of plans, no two of us in this room would choose the same rate. I mean they might be off by a tenth of a percent or something, but we can't say that you have to have one specific interest rate that is the correct interest rate. In general in a particular investment situation, you can look at average returns expected over a period of 30 years, and you can come up with a range that seems to be likely, and then from that range it's a matter of plan-specific items. You would come up with your determination of a rate that you would use for your valuation. Now, again, we had quite a list of specific situations, and I think that almost every actuary would look at different situations and come up with different conclusions about how they would affect the long-term rate of return. Having done that, many commenters added to the items that we should look at, and others said there is no reason in this world why any one actuary would use a different rate of interest for a different plan. Hey, come on. The investment strategy, the long-term objectives, the funding goals, the kind of population you have, they're all very important. It has to be different, and it has to be different for different plans. Anyhow, some comments said, "We shouldn't have to look at specific situations. There's the rate, and that's the rate." I can assure you that I would use a different rate for Ford Motor Company than I would for Dr. P.D.Q. and his two nurses down the street.

Then again, the commenters agreed with our use of explicit assumptions; the ASB had no problem with that, and the relationship to other assumptions where again I

said that this relationship is where you get into the building block idea, though that is not how you really build your assumptions. It's sort of there, and these are components, and you put them together. Again, we had no intention of pushing for the building block approach, per se.

MR. WENDT: One of the things I wanted to do was go back and look at history and say, "What would have happened in applying these rules in certain situations, and are they fully applicable to some of the unusual economic effects that we've had in the last 30 or 40 years?" Also, what have actuaries done? To my mind, when we're talking about proposed standards, there should be some reflection of what actuaries have actually done in the last couple of years. Looking at the first issue, going back to 1960, these are some of what I call "unusual" yield curves (Chart 5). For those of you who think that yields of 6% or so for long bonds are very low, in the mid-1960s, 30-year government bond yields were approximately 4%. So, historically they still have quite a way to drop. On the other hand, at the high end of the picture, in late 1981 we had some very high inflation, and the bond curves were at 15% yields. So, whatever proposal comes up really has to deal with the possibility of those situations occurring in the future.

CHART 5  
Unusual Yield Curves



Thinking back to 1981, I don't think there was any plan at that point that was picking a 15% discount rate. What they were doing was that some plans would set up immunized portfolios for the retired lives, and they would pick interest rates of 12-15% for the retired lives, but the rest of the group would have been maintained at a 7% or 8% or 9%, or even lower, discount rate. As Mary mentioned, that may be an example of the cart before the horse, that they're changing the asset strategy to

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justify changes in the actuarial assumptions, in the economic assumptions, which is not necessarily a valid approach.

MS. ADAMS: Yes, but also they got killed on it because many bonds got called, and so they never did get their 15% or 16%, and that is where some of them had a real bad time, when they were skimming, and the bonds got called halfway through to maturity.

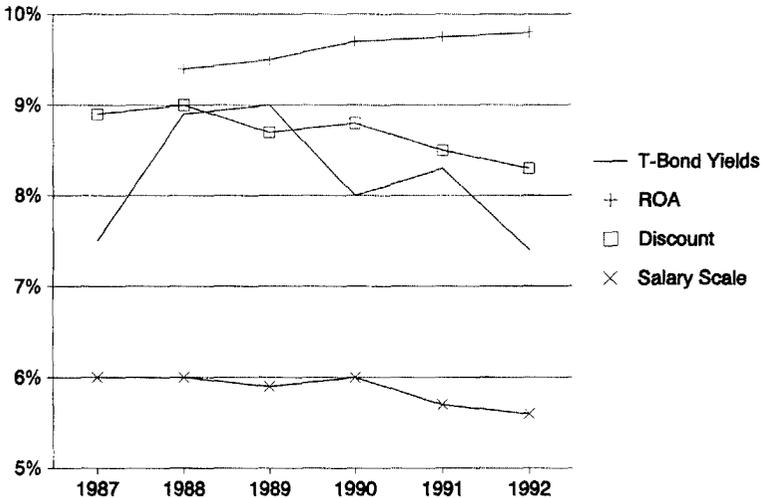
MR. WENDT: Actuaries tend to look at yields on bonds and say that the yield is going to be the return, and if you look closely at *FAS 87* and *FAS 106*, it talks about the expected returns on high quality corporate bonds. Many actuaries take that to be equivalent to taking the yields on those bonds; because of the call provisions and default risk, once you think about it, it's fairly obvious that the expected return on high-quality corporate bonds will be slightly or more than slightly below the actual yield. At the end of 1980, we had an inverted yield curve where the short rates were above 15%, and the long rates were around 12%. A typical inverted yield curve is sort of saying that the market believes that long-term expected inflation will be decreasing, and so the yields on long bonds will be less than the yields on the shorter-term bonds. If we had done a spot rate curve equivalent to that inverted yield curve, it would show the spot rates below the yields, and if you project that out for up to a hundred years, you'd be seeing that the spot rates would be substantially below the 12%, and probably even substantially below 10%, as you get out far into the future.

Last year, around October 1992, there was another unusual yield curve. It was one of the steepest yield curves in the sense of the differential between short Treasury bill yields and the 30-year bond yield, and that typically implies that the market believes that inflation will be increasing in the future. The interesting element is, whatever standard we come up with really has to deal with all these issues. As Mary points out, just because yields are high, the expected returns may not be high, and you can't superficially say that you can simply take the yield curve and back into the discount rate, even with the government yields, because there are some callable government bonds that are still outstanding. So, that is an issue that has to be considered, to have a wide ranging set of principles that covers that diversity of circumstances.

Looking to recent history about what actuaries have done, we will examine the pattern of *FAS 87* assumptions (Chart 6). *FAS 87* assumptions are not completely under the control of the actuary but are a plan sponsor responsibility; normally the actuary does have input. We're able to capture the annual report data for the Fortune 100, not all of them, but a large proportion of the 100 largest corporations, going back to 1987-92. The heaviest line is Treasury bond yields, which reached a peak in 1989 and then gradually dropped, ending 1992 around 7.4%. When you look at the other components that people are using for economic assumptions, the line with squares, which is the discount rate, showed a slight drop but did not drop as much as Treasury bond yields over that period showing that, for whatever reason, the plan sponsors were not fully considering the changes in the interest rate environment. The salary scale shows even less change. That is almost level from 1987-92, showing only a very small drop in the salary scale; sponsors are less likely, apparently, to change the salary scale. The return-on-assets assumption, which is the top line,

shows a slight increase over this period, although Treasury bond yields are diminishing. Now, one possible reason for that is that people were getting very good investment returns over this period. Well, the reason they were getting very good investment returns was probably related to the fact that Treasury bond yields were decreasing. It seems that the decreasing Treasury bond yield creates very good portfolio return, which gives credibility to keeping the expected return on assets high. Yet if the basic premise is that the returns are due to the drop in Treasury bond yields, not only is that not likely to continue in the future, but the Treasury bond yields may eventually reverse themselves. This argues for a lower return on assets rather than a higher return on assets. I've heard this mentioned by several actuaries: if the asset history were very positive, project that into the future. That is not a valid argument where the positive returns are due to the decrease in Treasury bond yields.

CHART 6  
*FAS 87 Assumptions*  
 Average for Fortune "100"



Source: Towers Perrin survey of annual reports

One thought is that the traditional actuarial methodology really has not been upgraded for quite a few years, and there are other developments in the U.K. and Australia and in the financial arena that are using new technology. The contingent cash-flow model is very popular for pricing mortgage-backed securities, all sorts of other types of complicated cash flows, whereas actuaries are using very simplified approaches that were originally developed in the early 20th century. A simple financial idea is, if you look at a fixed liability, if you have a liability to pay \$1,000 in ten years, what is the market price of that? The market price of a default-free, riskless payment of \$1,000 is strictly the price of a stripped government bond that you can look up in the paper. It's not based on how your portfolio is invested. It's not based on equity returns.

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You can look up in the paper what that fixed amount is. On the other hand, actuaries consider the liabilities to be fixed when they're not. You can make an argument that accrued benefits are fixed; they're the benefits earned to the date of valuation. There are some possible changes depending on future events, but basically they're fixed amounts. On the other hand, for projected benefits, actuaries tend to make an assumption for future inflation. Then, based on that assumption, the projected benefits in 25 years will be \$50,000, and we'll discount that back at some rate of return. In actuality, that projected benefit will vary with inflation and possibly several other factors. So, I don't think we're really considering the variability in the statistics that we're looking at.

Some new plans that have been developed have lump-sum benefits. Often, the lump-sum is based on a current interest rate, which takes away part of the risk. In other plans, there might be a lump-sum option where the lump-sum amount is based on a fixed interest rate as opposed to a future current rate. That creates an option, because if that fixed interest rate for the discounted lump-sum is lower than current interest rates, people will tend to choose the lump-sum. If it's higher than the current interest rate in the future, people will tend to choose the annuities. That creates a type of option, but as actuaries we ignore that. We typically say the assumed discount rate for lump-sum is X%. The assumed annuity value is Y%. Whichever is higher, we'll discount that back and take the present value. That completely ignores the option value that is applicable. Also, consider floors and caps. Many plans now have guaranteed benefits with some variability on the upside; some very complicated cash-balance-type plans have benefits based on equity portfolio returns with a floor; other plans impose a cap on the total benefit. These are forms of options that can have a significant effect on the present value, and, unfortunately, not only does the traditional methodology ignore that, but also the proposed standards for choosing assumptions don't include any discussion of the issue or any adjustments for the option values. Sometimes, and we'll show an example of that, the option value could be significant.

Inflation-linked benefits are variable, and they're not fixed amounts. You can't just say inflation is 4%, and, therefore, we're going to project everything forward at 4%. It's really not that simple, and there has to be some thought to how things vary and particularly how the assets will tend to vary with the liabilities because each asset class may respond differently to inflation. Cash follows the inflation experience very closely, whereas stock and equity returns have a negative effect from short-term inflation but follow long-term inflation very closely.

The exposure draft would lead you to say, let's invest our portfolio in venture capital, and, therefore, we can have a 15% expected return from venture capital, and therefore, choose our discount rate to be 15%. That would be a literal interpretation of the exposure draft, but that is really not a proper point of view for choosing a discount rate. It ignores the fact that venture capital is an asset class that would not move very well with the liabilities, that there is an awful lot of risk there, and it ignores the idea of margin to account for that risk.

I'd like to give a short example of option values and maybe it's a pitfall in current actuarial methodology. Where there is an embedded option, whether it is a floor benefit or some type of cap, under the traditional methodology actuaries calculate

each value with a specific assumption, and then the present value is simply based on the larger of the two. When you include some current ideas of volatility and apply option theory, the true value is even larger than the larger of the two expected values. For lump-sum benefits or for inflation-linked benefits, that can be significant.

Here is a numerical example. Assume a hypothetical benefit payable in ten years is the larger of \$100 or \$67 indexed with inflation  $(1 + \text{CPI})^{10}$ . The traditional methodology would be to make an assumption for inflation, say 4%, and calculate both those amounts. The \$67 indexed with that 4% inflation is less than \$100. So, therefore, take the present value of that \$100. If you bring in the volatility of inflation and say it has an expectation of 4%, but it could vary within typical historical boundaries, the true expected value of that benefit, which is the larger of the \$100 and the indexed \$67, would be approximately \$103, or in other words, the current traditional methodology understates the full value of the benefit by about 3%. Some may think that is a large amount, some may think that is a small amount, but if you're close to 100% funding, a 3% change in the liability values could have a significant impact on the plan.

Here are some closing thoughts, and these are really sort of questions looking for answers, and so we particularly ask for people in the audience to comment on some of these thoughts. Consider the discount rates for accrued and projected benefits. One question I have is whether you need to have the same discount rate or different discount rates. We know that the projected benefits typically extend way, way into the future, much further than accrued benefits, and, for the one plan we looked at, the accrued benefits had an average payment period of about 22 years, and projected benefits had an average payment period of 31 years. So, if you take that into account, and particularly if there is a steep yield curve, you can see that argues for possibly different rates for PBO-type benefits than for ABO, though practice is really to use the same discount rate for all the liabilities.

Going back to the example of history, suppose there are high bond yields in the market or low bond yields. Should you assume that they continue at that point or should you perhaps assume that there will be some reversion to the mean? Presumably taking the exposure draft and applying the government securities method implies that the discount rate should, as a floor, be at 15%. Some people may think that is reasonable. Some may believe that to be unreasonable. If there are low bond yields, that is the opposite question.

Let's discuss unusual plan benefits. Again, if there are floor benefits, embedded options, or lump-sums not at current rates, should they be accounted for in the valuation somehow? Now, most people tend to ignore the option price of those types of unusual features. Consider unusual asset strategies. If a plan has a very aggressive asset strategy, perhaps the plan managers are highly invested in foreign equities, maybe they're investing in futures and options, how do you deal with that? Should you just say, well, they have a higher expected return, therefore, we use a higher discount rate? I think that is what some people tend to argue, but it does ignore the risk, and there is a price of risk, and I believe that. That is our next topic, that really there has to be some coordination between the asset strategy and the liability, and to the extent that the assets move very well with the liabilities, it tends to minimize risk. To the extent that the assets diverge and have little correlation with

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the liabilities, it seems like there should be some adjustment for that risk in setting the discount rate.

The last question is time horizon. I've seen, for instance, one investment analyst who has said that for the next five years equity returns are expected to be below 5%. Other analysts have said they may be above 10% for that period. Should that short-term result be considered? Should the discount rate be based on as short as a five-year time horizon? Most people would say, no, it should be a longer horizon. Another argument that I've seen is to say it should be based on some type of equilibrium approach, completely ignoring the current day's economic conditions and saying, well, average inflation is expected to be 4-5%. Historical real returns on stocks have been 6%. So, therefore, a good assumption for stock returns for setting discount rates is about 10.5% or 11%. Again, the fallacy there is it does ignore the short-term effects of possibly pessimistic stock returns in the near future. So, I'd like to open it up for questions at this point. Mary, you said there will be another exposure draft.

MS. ADAMS: Oh, yes. It will not be a final draft, believe me.

MR. WENDT: So, do we have some questions or comments? Reactions? What are people planning to set for discount rates coming up for January 1, 1994 for either *FAS 87* or the funding assumptions? Any thoughts on that?

MR. EDWARD A. ECHEVERRIA: I just wanted to know your feeling on the impact of the pension benefit guaranty fund (PBGC) immediate rate, as far as using that for, say, *FAS 87* purposes or that rate with a percent, a percent-and-a-half, added versus the use of the bond rate.

MR. WENDT: I have not seen many people pay attention to that. Most people seem to look at bond yields specifically rather than the PBGC rates. What I see coming up in the future is some accord with this new letter recently published, and apparently the regulators intend to go farther with the issue that the discount rate should be tied to high-quality bond yields, which will be Double A or Triple A corporate bonds, and there has been much reaction to that in the last week or two, and this has just been a very recent development. So, I think a lot will depend on that.

MS. ADAMS: We should point out that in that letter the SEC did not talk about the idea of the settlement rate that was in *FAS 87*, and in *FAS 87* when it talked about the settlement rate one of the things the SEC did note was the PBGC rate could be used as a settlement rate, and that is not in the current letter.

MR. JOSE L. SALAS\*: We have now an accounting procedure just like the one you have, like the *FAS 87*, and some accountants in Mexico are asking us to prepare the valuations using real interest and real salary increase rates instead of nominal. What would your opinion be about this? Are you in the states using real or nominal interest rates and salary increases?

\* Mr. Salas, not a member of the Society of Actuaries, is Director with Consultores Asociacion de Mexico S.A. in Mexico.

MR. WENDT: That is a very good question. In Canada, for instance, we have seen real return bonds issued in Canada, but they are not available in the U.S. at this time.

If they were available on a general market basis, they could be a very good indicator of future expectations for inflation, and they could have some value for helping to set actuarial assumptions. Now, everything is based on nominal returns with some adjustment for inflationary expectations.

Let me pose this question: Have people talked to their clients about the possibility of substantially lower discount rates coming up for the next valuation, and has anybody had to deal with the client's reaction or explain new funding requirements or expense requirements?

MR. FREDERIC T. LHAMON: The answer to that question is, yes. I was intrigued with your Fortune 100 survey that indicated the rate at the end of 1992 of a little over 8% for a discount rate, and if you follow either the SEC idea or the basic Treasury bill rates, plus a small margin, you're going to be dropping that rate a couple percent this year, and that is going to cause a significant amount of aggravation. I've had the same problem with my large clients, and I'm tending to look at two items on this list that may give some relief. One is the unusually low bond yields in the current market and trying to build a case in that direction, and the other is unusual asset strategy. With respect to unusual asset strategy, I ask you a question. What kind of variety do you see in that? Mary, your comments disappointed me on the immunized and dedicated because we've had several situations where we had both immunized and dedicated bonds that were not callable and actually changed investment strategy for the good in those particular cases, but leaving that aside, what is a very aggressive strategy worth? I mean is it worth a half point or a point and a half? What kind of guidance can either of you share on that issue?

MR. WENDT: I guess I disagree with your premise because I think aggressiveness by itself should not necessarily increase your net return; I give the example of somebody who goes to the extreme and invests in venture capital to a predominant portion of the portfolio. I don't think I necessarily can argue for an increase in a discount rate because your venture capital does not move in any way close to your liabilities, and I think you have to have a reduction for that difference -- for the risk involved in the mismatch of assets and liabilities. I think if you take more notice of the connections between assets and liabilities and increase the expected return on your assets but attempt to match the liabilities closely, then I think you can start to argue that you can have a higher discount rate. Just increasing the risk of the portfolio by itself should not argue for a change in the discount rate. The Investment Section council did submit a comment letter, and that was a point we discussed, that the plan should not be able to, in effect, game the system by playing with the investment policy, thereby making it more aggressive and thereby increasing the discount rate. One person in our group made the comment that perhaps the discount rate should be based on some type of typical portfolio rather than an extreme portfolio. That was an attempt to deal with this issue of somebody saying we'll move more to equities and, therefore, justify the higher return when it may be increasing the risk for the plan and having a net negative effect.

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MR. JOHN M. BRAGG: I've been studying this subject of inflation for quite a long time, and I had a paper at Brighton, the Brighton applicable federal interest rate (AFIR) meeting, for example, on the subject of real interest rates, and I just thought you might like a few comments resulting from that work. I did try to measure what the real interest rate has been in the U.S. over the last hundred years, and the answer was 4.3%, this is after inflation, and it is based on a number of investment strategies, good, bad, and indifferent. For instance, all common stocks, all long-term Treasuries, all short-term bonds, that's three of them – a managed, balanced portfolio is another one, a fixed, balanced portfolio is another one – when you look at it every year back to 1890 year-by-year, it is possible to figure out what was the very worst thing you could do in every year. That's one of them. Another one, you can figure out what is the best thing you can do in every year in terms of investments. I have all of those averaged, and I take off the inflation geometrically, and you get to 4.3% as the long-term real interest rate. The actual long-term inflation over all that great, long period of years was 2.8%, and, Mary, I don't want to add my 2.8% and my 4.3%, and I don't have my calculator to do it geometrically, but it would turn out a little bit better than adding them. Having said all of that, I guess I have some questions. Another part of this work, by the way, is that you could raise your real yield from 4.3% to maybe around 7% if you did a really good job of asset allocation management, meaning you change it, you change your asset, your allocation, over the economic cycle. I think I can find you about a 7% if I do that in the best possible way. I guess I have a question to Mary, to the ASB and so on. Are they making provision for a higher discount assumption if you have a large, well-managed fund, as opposed to a two-life plan for a doctor down the street? Any way you can think. That's the question I have.

MS. ADAMS: The answer is, yes.

MR. BRAGG: The answer is, yes. Well, great. Well, I was happy to hear the gentleman from Mexico who's made very good comments at other meetings, too, mention that they are thinking of using real interest rates. I have tried to measure this in various other countries, too, and it always seems to come out to about the same 4.3%, which is amazing considering the different inflation climates. Anyway, I have one other comment, then I'll sit down. Yes, I do believe in the return to the norm. See, when I did all this at Brighton, I had it broken down by era, going all the way back to 1890, and they're just vastly different eras: the World War eras, the Great Depression and so on, and somebody in the back of the room said something like, well, the trouble with us actuaries is that we just keep on assuming that whatever is going on right now is always going to be that way. I think even in the early 1980s we almost fell into that trap, didn't we a little bit, Richard, the 15% yields and –

MR. WENDT: That's right. Right.

MR. BRAGG: It's always going to be like this, right? Now we're on the exact opposite story. They're way down. I don't think we're even earning that 4.3% yield right now, are we, after inflation? Close.

MR. WENDT: Well, large cap stocks are not doing so well, but people who are in small cap and international are very happy.

MR. BRAGG: Anyway, I just wanted to end with that comment. Don't assume that whatever is happening right now is going to keep on happening. It always seems to return to some kind of a norm. So, you mentioned that earlier when you were talking about the low/high-bond yields.

MR. WENDT: It seems that at any given time, for instance, interest rates around 6%, that half the market must believe it will go up, and half believe it will go down, and, of course, that diversity of opinion is what keeps it at its current level. If more people believe it would go up in the future, it probably would go up, just by the market beliefs, by the people buying and acting on that belief. So, at any given time it seems like half the people believe one side or the other.

MR. BRAGG: Right. I have a slight tendency to feel that it is the real interest rate that is being achieved that returns to the norm, and that's made up of several pieces.

MR. DANIEL H. KALISH\*: Would anybody care to comment or observe about the IRS's audit situation on small plans? We try to do our best estimates. We try to do a whole lot of things as actuaries, and the IRS comes along and says, you're wrong, and we're going to penalize your client. And as hindsight has shown, when we use conservative assumptions and get large contributions, we are more correct than any of the projections of the IRS. I guess it's not a question, but would anybody care to share some of his or her experience with these IRS audits? Because it makes the whole procedure that we're talking about look a little ridiculous in a certain sense, if we're going to go through this whole industry-wide procedure, and then have the IRS come along and say we're wrong.

MR. WENDT: I think part of the justification and rationale for the standards would go to that point, that people who select the economic assumptions within the scope of the proposed standards would have a basis to fall back on, saying that it's exactly within the scope of the recommendations of the actuarial profession, and we hope that will go a long way to solve that problem.

MS. ADAMS: I'd like to agree with that. Part of the reason for having these standards is as a point of defense. One of the things that didn't come out as clearly as I hoped, and we probably will emphasize it more, is that in the past I would expect that there are very few actuaries who have one sheet of paper in their work papers for each valuation that showed why they used an economic assumption. I mean it's always in your work papers what you use, but why did you use it? I would suggest that part of what we're trying to do is to encourage having one piece of paper in your work papers showing what procedure you followed in order to come up with that assumption. That is a good defense.

\* Mr. Kalish, not a member of the Society, is President of Advanced Actuarial Consultants of NJ Limited in Ridgewood, New Jersey.