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## **Session 118PD**

### **Interest Rates: Current Liability, Lump Sums And Others**

**Track:** Pension

**Moderator:** DONALD J. SEGAL

**Panelists:** RONALD GEBHARDTSBAUER  
JEREMY GOLD  
DONALD J. SEGAL

*Summary: Panelists discuss current understanding of interest rate issues, recent regulatory changes, adaptation to these changes and possible direction of additional legislation. Attendees learn the considerations and possibilities that are governing this assumption.*

**MR. DONALD J SEGAL:** Welcome to session 118, Interest Rates: Current Liabilities, Lump Sums and Others. I'm Don Segal, senior vice president and research actuary at The Segal Company in New York. My distinguished panelists are Ron Gebhardtsbauer, pension fellow at the American Academy of Actuaries and Jeremy Gold, proprietor of Jeremy Gold Pensions.

I'm going to start with a little background on the interest rate situation we are in. This is based upon a presentation that was done at the enrolled actuaries meeting called, "Stop the Insanity," and it refers to the insane situation we have with interest rates.

Ron is then going to talk a little bit about 30-year Treasuries and the myriad of issues that are involved with them. Jeremy Gold is going to talk about setting valuation interest rates and the whole approach to setting interest rates and funding.

Here is a little background in terms of interest rates. ERISA was passed in 1974 and

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**Note:** The chart(s) referred to in the text can be found at the end of the manuscript.

was first mandatory effective in late 1976, which is very simple compared to what we have today. Because you worried about a minimum required contribution, which would basically be equal to the normal cost plus amortization of bases, not greater than the full funding limitation, you had a maximum deductible in it, which was based upon the normal cost-plus-ten-year amortization of your bases—not greater than the full funding limitation, not less than the minimum and we used one interest rate. Those were the good old days.

Now we have what we refer to as insanity. In addition to the normal cost piece and the bases, which were pretty similar last time, we now have three full-funding limitation limits. One is based upon the accrued liability, one is based on the current liability and one is based on the floor. And it's even more complex than that, because in terms of the current liability, you have a choice of interest rates to use, and you may not even be consistent from one year to the next.

And there's a floor; based on 90 percent of the Retirement Protection Act (RPA) current liability and again you have a choice of interest rates. They're not necessarily consistent from one year to the next. On top of that, we also have quarterly contributions, so we have to worry about what interest rate is to be used for the late quarterly charges—note that sometimes the actuarial fees will exceed the amount of the charge—and then you get into a year like 2002, where if your interest rate is greater than 8 percent, there is no additional charge for late quarterly contributions.

When you're in that situation, you go back and look at the rulings to learn what to do. It's based on 175 percent of the federal mid-term rate, but you can be exempt if the assets for the prior year exceed the current liability.

We also have to worry about a deficit reduction contribution—we keep building. We have a maximum deductible contribution based upon the unfunded current liability, which is based upon whatever interest rate you choose within the range of acceptable interest rates for the current liability. You have PBGC variable premiums, which again are based upon another interest rate. Of course, right now we're in a period in which we have temporary relief.

And then there are liquidity requirements. So you might say we've come a long way from the good old days. We also have multiple sets of liabilities that we have to worry about when we're doing our calculations, and we haven't even gotten into selecting the interest rates yet.

We still do funding, accrued liability and normal cost. Basically, that hasn't changed from ERISA. I'm showing here that we have three current liabilities, but I will shortly make a case that as of this year we have six current liabilities. The three current liabilities are RPA, the Omnibus Budget Reconciliation Act (OBRA) and the threshold percentage. But then again, if you're calculating your 2002 quarterlies, you have to go back and change your calculations for 2001. So you're now using six

current liabilities instead of three.

There's the PBGC liability, which is on a different basis, and of course, we haven't even mentioned financial accounting standards (FAS) liabilities, which are on different bases. Also, usually the discount rate is different from the assumed rate of return on assets. The insanity builds.

What do we get as a result? Complexity of calculations, which may be understating the situation and the volatility of contribution levels, which are getting worse because we haven't even talked about what the assets have been doing, we've just been talking about selection of an interest rate.

You have overstated plan liabilities. It's an editorial comment, but it has to deal essentially with the current liabilities, and we have unreasonably large PBGC premiums because of the unreasonable interest rate that we're using.

The motivations of the law are good. The purpose of the deficit reduction contribution is to have the 90 percent of current liability covered by assets. Of course, the issue is, what's the current liability? You do have sponsors who want to avoid it. The reason they want to avoid it is that it increases the required minimum contribution and volatility, which is going to be a recurrent theme here. Also, it's one of the conditions for required notification to participants, which isn't always the best thing for your employee relations.

Okay, what's wrong with the deficit reduction contribution (DRC) calculation? It is based on a specified mortality table and an unreasonable interest rate.

I don't know how many of you were at session 95PD, "Late-Breaking Developments," yesterday, but the following question was raised by Ethan Kra to Jim Holland: "When are we going to get a change in the specified mortality tables for current liability, because the law, what was it '97, said that by 2000, or no earlier than 2000, the Treasury secretary can change the rate?" Even though it was in the 2002 business plan, that's the fiscal year ending June 30, 2002, in the business plan for the IRS to publish a new mortality table for current liability. The word we have is that it is not very high on the priority list for the 2003 business plan. With all the legislation and everything that's passed, it's probably already been dropped, so if we don't see it until the 2004 business plan, it's highly unlikely that we will see a change until 2005, even though the Academy forwarded the study that was done by the Society in 2001, with a recommendation. It will be some version of the RP 2000 mortality table.

Of course, when we finally adopt it, up goes the current liability; up goes your volatility. How do you avoid the DRC? There are many ways. You could have a funded current liability greater than 90 percent; you could be a small group. You have the 80/90 rule, which is the three-year look back, and I'm presuming you know what that is, so I'm not going into details. Or you can play what I refer to as

the Schedule B games, where you can look at the plan year designation of contributions.

**MR. PAUL ANGELO:** Or you could be multi-employer.

**MR. SEGAL:** Yes, you could be multi employer. That is a very interesting point. I'm going to diverge here from what you might say was done in terms of the multi-employer plan. The IRS, I guess it was at the Academy meeting, pointed out that if you have a multiple-employer plan, and some of the employees in the multiple-employer plan are subject to collective bargaining agreements, you have a multi-employer plan, not a multiple-employer plan. This means you are now exempt from the DRC. You also pay lower PBGC premiums and have lower PBGC guarantees.

We've heard rumors, especially in certain industries, that employers have been looking at essentially turning a single-employer plan into a multi-employer plan, just to escape the DRC.

The three-year look back relief basically says that if you have two years out of the last three in which the funded current liability percentage was at least 90 percent, then 80 percent is treated as 90 percent and you don't have a DRC, but you still must maintain the bases.

One thing that not everyone seems to be aware of is the phase-in of participation service. This is 412 (I)(7)(D), which is my code reference for this session where you only recognize the percentage of pre- participation service. This was put in to avoid employers not adopting new plans and giving past service in new plans, because the way things are set up, you adopt a new plan, you put in past service and all of a sudden you have a huge unfunded current liability. Therefore, why should an employer adopt such a plan if a good portion of this is subject to the DRC?

Statutorily, there is a phase-in of pre-participation service if the individual employees had not been covered under another defined benefit (DB) plan sponsored by the employer. And this is mandatory, unless the employer elects out of it. It goes 20 percent a year from one to five, and, by the way, the first year is considered year zero, so the percentage for the phase-in is zero. It's not clear in the code, but that's the way it works. In the gray book this year, there was the question that even if you had a plan merger, could you still identify those employees subject to the phase? Then they would still be subject to the phase-in for the current liability.

Then there's also what I refer to as Schedule B games, in which you could designate quarterly contributions for the current year to be in the prior year to get your funded current liability percentage over either the 80 percent or 90 percent threshold. Or you could make the current contribution; the contribution for 2002, by September 15, 2002, and put it on the 2001 Schedule B. Therefore, your funded ratio, as of January 1, 2002 is now over the threshold and you have no DRC.

I've had situations in which you put in \$400,000 early and you escape a million-dollar DRC. The million-dollar DRC would have given you a zero credit balance at the end of the year. The \$400,000 you put in early now adds \$400,000 to the credit balances of the beginning of the year. And you might say it's accomplishing the law's purpose; you're funding the plan. The purpose of the RPA '94 minimum full funding limitation is to basically prevent a zero full funding limitation based upon an aggressive interest rate of assumption. That's a reasonable goal even though it's a pain at times.

And what's wrong with this? It's based upon current liability and the unreasonable interest rate. It doesn't consider the credit balance in its calculation, which is a fault. This means that the more you put in, the more you don't get recognized, although the credit balance can offset the minimum required contribution. This way the credit balance can count twice.

When we come to the maximum deductible contribution, we sometimes get caught in a trap, because if we want to increase the amount that we can deduct, we select a lower current liability interest rate. But in selecting a lower current liability interest rate, by definition, if we're deducting the unfunded current liability, this means we don't have a 100 percent current liability funded ratio; therefore, we're subject to quarterly contributions, which may or may not be covered by the credit balance. So that's something we have to deal with and worry about.

Again, there is the history of the maximum deductible versus the minimum required. There are different amortization periods of bases. Different bases can be established because of the wonderful rules we have, the equation of balance and things like this. It creates more work for the actuary.

Now the PBGC's purpose is to protect the benefits accrued in DB plans. Their mission is very honorable; they want to encourage the continuation of maintenance of voluntary pension plans and, specifically, DB plans. I'm sure none of us would disagree with that purpose. They want to provide a timely and uninterrupted payment of benefits and they want to maintain the premiums at the lowest level consistent with the ability to carry out the statutory obligations.

What's wrong with their calculation? It's based on a vested liability calculated using an unreasonable interest rate. We have our temporary relief, but it's still an unreasonable interest rate. They took the cap off a while ago. It's a little bit of an editorial there that the overstatement of this premium requirement has resulted in a surplus position for the PBGC. Their surplus as of the end of the last fiscal year was not quite as high as the previous fiscal year. I think it was down to \$10 billion and then their taking over a number of steel plans has lowered it to about \$7 billion.

How do you avoid those premiums? You have no unfunded vested benefits. That's easier said than done. Again, recognize that the unfunded vested benefits are

based on current liability. There's a direct connection in the law to that; therefore, you have the same phase-in for participation as with any calculation of current liability affecting the DRC and everything.

Again, you can qualify for the full funding limitation exemption by adjusting your timing of contributions—again, more Schedule B games. The PBGC has given us some guidance on how you can contribute less than the full funding limitation and still qualify. Basically, it's how to use the credit balance.

We did get interest rate relief in the Job Creation and Worker's Assistance Act (JCWAA). That for two years, 2002 and 2003, the upper limit for the current liability (the RPA current liability) is now 120 percent of the weighted four-year average. By the way, this relief was pushed by the American Benefits Council (ABC) with the assistance of a number of actuaries who helped in designing this request. ABC took it to the congressional staff and they went with it.

One of the reasons they liked the 120 percent was its simplicity. Some of the other proposals were in the four-year weighted average. Let's use the 30-year Treasury plus 50 basis points or 100 basis points—that would have been a monster. It's much easier for congress to understand the instruction to change 105 to 120. And that's what we got.

We were going for three years; we got two. We actually asked for 125 percent. That's why we got 120, because if we would have asked for 120, we would have gotten 115. As I mentioned before, you can go back a year to 2001, but only for quarterly contribution purposes. It affects the current liability, it affects the DRC, and for the PBGC variable-rate premiums for the next three years, we can use 100 percent of 30-year Treasuries, instead of 85 percent.

As my last comment, I will mention that the Academy's pension committee is working on a total simplification of the funding rules to try to get rid of the multiplicity of calculations and interest rates, recognizing the objectives of the law. That is, if you have an underfunded plan, you have to put more money in. But it would be so nice to rewrite the funding rules to make it simpler, to go back closer to how it was in 1976 when we were first affected by this.

**MR. RONALD GEBHARDTSCBAUER:** Don talked a little bit about the past and brought us up to date. I'm going to spend a little more time on what's happening in the present, and how you think it should be. Then Jeremy is going to take us into the future and what he thinks it should be.

I'm going to begin with recent history. The Treasury rates are kind of low, so we had this temporary fix from the JCWAA, and then I'm going to talk about some possible permanent fixes.

Back in 1998, I remember calling up the PBGC and saying, "I think something is wrong with your discount rate." The PBGC rate has actually gone above the Treasury rate. The pale blue line in Chart 1, near the end of '98, started going above the Treasury rate, the red line. So, after a few months, I realized the PBGC might be right. Maybe it's because we're paying off the debt and we're even buying back Treasuries. Then in 2001 it looked like the economy was not doing as well and we got a tax increase. Maybe we're not going to be paying off the deficit as much as we thought, but now there's a lot of flight to safe securities, so that's another reason why the Treasury rates are lower.

The problem for us is that it meant we were going to have contributions that would be much bigger and PBGC premiums that are much bigger even though in the last few years we weren't contributing anything and now the employer is going to have to contribute something much bigger than the normal cost. So, at the Academy, that gave us the job of seeing what we could do to help Congress understand what's going on.

Not only were you going to have bigger contributions and PBGC premiums, but there are a lot of other penalties that come when your plan looks underfunded according to the law.

You can't have transfers to post-retirement health plans, you can't use prior-year valuations. If your plan is funded under 110 percent, then you have restrictions on lump sums. If you're under 100 percent, then you may have to pay quarterlies, PBGC premiums. If you're bankrupt, you can't improve benefits. There are PBGC liens if you don't pay your full contribution and financial reports to the PBGC if your unfunded vested benefits are over \$50 million.

You have additional funding contributions, as Don mentioned, if you're under 90 percent funded, depending on the 80-90 percent rule. And you have a PBGC notice to employees saying your plan is not real well-funded. If you're under 60 percent funded, you have to put security up if you have a plan amendment, and so all these bad things start happening—things that the PBGC put into effect in the '80s and '90s. Maybe it's artificial because these Treasury rates have gone so much. Perhaps Jeremy may have a different thought on whether it's artificial or not.

In recent history we have the PBGC rate, and it actually got to the point where it was even above the top of the corridor. In other words, we could even use interest rates as high as the PBGC interest rate for determining current liability. In fact, PBGC's interest rate is already artificially low, because if they were using an up-to-date mortality table, their interest rate would probably be 50 basis points higher. Chart 2 shows the highest interest rate you could use in the current liability corridor. Notice that it is lower than the PBGC rate and much lower than corporate bond rates.

Not only did the Treasury stop issuing 30-year Treasuries in February 2001, a year later they said that they really don't have any more 30-year Treasuries. The oldest is a 29-year Treasury, so we're just going to stop providing a 30-year Treasury number. So the IRS had to come up with something else. So they're using the Treasury that matures in February 2031.

The lack of a 30-year Treasury helped us actually to pass this provision in the law that changed the interest rate that you use to discount liabilities. We were able to explain that our 30-year Treasury doesn't even exist anymore. So, as Don mentioned, instead of using 105 percent, we can now use 120 percent, but just for the next two years. There's also a proposal in Congress to allow that for the year 2001.

Don also mentioned that you can use 100 percent of the Treasury rate for PBGC premium calculations instead of 85 percent. There are a whole bunch of different purposes and uses for a current liability. It only changed the current liability that came about because of the RPA law. It doesn't change the OBRA current liability that was created back in the 1980s.

There are still some instances in which we have to use the old interest rates. For example, we still have to use 85 percent of the Treasury rate for participant notices that are due for the year 2002.

It also doesn't affect some of these other OBRA87 current liability rates. The 125 percent of current liability is still using the old corridor and the prior-year valuation is using the 160 percent of current liability full funding limit. It doesn't affect lump sums; it doesn't affect cash balance interest credits. It doesn't affect projection of employee contributions. It doesn't affect interest on waived or missed employer contributions.

So the question is, should we also be thinking about some of these, and what should the interest rates be for these? For instance, lump sums are now more valuable than annuities. Maybe it's going against the other rules that we have—for instance, the joint and survivor rules where the qualified joint survivor option should be the most valuable option. Well right now it's not the most valuable option.

As an actuary, I can't in good conscience encourage employees to take something that is good policy; to take the joint survivor benefit. The lump sum is more valuable.

So what should the permanent fix be? We have a paper that we're sending to Congress and we're talking about the various options. Should it be the expected rate of return on the plan assets, as in the funding rules in the old days? Should it be a corporate bond rate? Should it be the interest rate that's implicit in pricing annuities? Or should it be a treasury rate?

Let's talk about the pros and cons of using any one of these. For instance, if we used the expected rate of return on assets, this could depend on how we allocate our assets. So there would be an incentive to increase the equities in the plan, if we could use a higher discount rate. That would be a way for us to manipulate what our premium is for the PBGC, for instance.

Also, I guess the concern of the regulators would be that the enrolled actuary could change the assumption, not only based on the allocation of the assets, but then we could also base it on our own interpretation of what we expect the rates of return on equities in the future to be.

One way to limit that would be for the government to say, "Okay, it's not what *you* think stocks are going to return in the future." But maybe we could just say it would be the rate of return on corporate bonds, plus 2 percent. We could just make that rule and give you credit for the fact that you could have had equities in the plan. But PBGC is on the hook so they probably wouldn't want something like that to happen. They want to make sure plans are fairly well-funded, and they don't want to have to take a plan over.

If you have enough assets in your plan to pay everyone their lump sum or annuity, then they don't have to take it over, so they would probably want to encourage something like a corporate bond rate of return or an annuity price. But Congress has already decided this, so it looks like we probably won't get to use our expected rates of return. They've already decided they want it to be in the area of annuity prices. Can we get them to use corporate bond returns? I don't know. Maybe corporate bond returns minus something for expenses and margins credit risk.

**MR. SEGAL:** Ron, originally, weren't current liability rates supposed to be unique rates that reflected the annuity purchase rates, and just in 15 years they still haven't figured it out?

**MR. GEBHARDTSBAUER:** Yes, it uses the word settlement, or something that you could use to pay all benefit liabilities. I think that's right in the law. I remember when the IRS got that, they were given the corridor. You're not supposed to reflect what the actual experience of the plan is. It actually says that in the law. But the IRS declined to actually ask how you determine what these rates are. They just said, "anything within the corridor," right?

**MR. SEGAL:** Until they figured it out.

**MR. GEBHARDTSBAUER:** We could also use corporate bond rates instead of what our expectations of the future returns are. In our Academy paper "Alternatives to 30-year Treasuries" we note that if the average plan duration is around 12, using corporate bond rates will increase the current liability by about 27 percent. It could be anywhere between 12 percent for a duration of 6 or for a duration of 25, if you

have a company with a lot of very young people, then it could be increasing your current liability number by 64 percent or something very big.

So, what should it be? Should it be just this bond rate or should we subtract something for credit risk or expenses? The plan has to immunize this liability, but we'd have to pay benefits, so maybe there should be something subtracted from that.

By the way, PBGC doesn't need plans to have the assets equal to the current liability using an annuity rate, because PBGC only pays guaranteed benefits which are less than all benefits. So they don't really need it to be fully funded for all benefits. In addition, if the plan assets are close to being able to terminate in a standard termination, companies, instead of wanting to go through this distress termination through the PBGC will spend the money so they can have a standard termination.

That's why Don was talking about 90 percent of current liability. PBGC wants your plan to be funded at least up to 90 percent. Actually, they would like for you to be up to 100 percent of current liability, but the law doesn't force that.

So, these are some of the reasons. The sponsor can often contribute the unfunded termination liability. Also, lump sums may not include subsidies in early retirement benefits, so there are some reasons why the law does not force your plan to have assets up to the termination liability. But PBGC will trustee fewer plans than if you use a discount rate based on your expectations.

So here's one reason why they would prefer this over expectations. If PBGC trustees plans with assets equal to the current liability, using the bond rate, they make a profit in the long run on average, since the PBGC still invests in equities, they actually don't buy annuities, but they also have risk.

Another alternative is that we could use an annuity rate. This is what the market prices these liabilities at; it's about 70 basis points lower, so that means current liability would be another 9 percent higher. These are the numbers we gave to Congress, but we say it's not going to be exactly that. Young and old plans will have different increases, but if Congress decided to use this, it would increase the liabilities another 4 percent or 19 percent depending on whether it's a young or old plan. Again, PBGC would trustee even fewer plans if the law required those rates.

We could also use Treasury rates, but I don't want to spend too much time on that. We already wrote a memo on why we thought Treasury rates were bad and that they're no longer a good predictor of what annuity prices are. We convinced Congress that they were not the right way to go.

So, what should the permanent fix be based on? Even if they decide this fix should be based on annuity prices, some people in Washington, D.C. want it to be based

on a government rate. We've told them that it's because Treasuries are unusually low right now; it's not easy to estimate annuity prices using a Treasury rate, so we're trying to encourage them to use a corporate bond rate.

A Society of Actuaries paper by Victor Modugno said that a good way to approximate the price of annuities would be to use Bloomberg's A3 rate. This includes companies that have an A credit rating, but of A1, A2, and A3, A3 would be the worst credit rating of A-rated companies. Then subtract 70 basis points if you want to approximate the annuity price.

Moody's Aa rate is close to Bloomberg's A3 rate, so we could also use Moody's Aa or. Moody's composite, which is already in the law, I'll talk about that later. In Chart 3, the red line is Treasury rates, and you'll notice that they're much further away from corporate bond rates now. At the bottom, I have a red line that shows that if you were to approximate the price of the annuity using the Bloomberg A3 rate minus 70 basis points, but instead you want to calculate it based on Treasury rates, then your Treasury rate would not be a good predictor. At one time, practically through all of the '90s, it would have been fine to use a Treasury rate to help you predict what the annuity price would be. But then starting in 1998, when the spread got bigger, it was no longer a good way of approximating annuity prices.

**MR. SEGAL:** Interestingly enough, Ron, wasn't August of '98 when the treasury started the buying back program of the 30-year Treasuries?

**MR. GEBHARDTSHAUER:** I think it was somewhere in the area of when we started thinking that we were going to have surpluses forever.

Also, some people have suggested that we use Fannie Mae rates or swap rates and they're higher than Treasury rates. So maybe that would be the right direction for us. But as I show in this chart, they would not be very good at approximating annuity prices either, because again, their spreads have increased from corporate bond rates.

Suppose we went back to the good old days and spreads went back to being 100 basis points between Treasuries and corporate bond rates. This chart is important for people in the government who want to use a Treasury rate and just approximate annuities from that. This would not be good for the PBGC.

Suppose we went back to the past where the spread between Treasuries and corporates went back to 100 percent. If we use something like 120 percent of the Treasury rate, then it would be even above the corporate bond rates. So one of our winning arguments is that I don't think PBGC would like this. You shouldn't want to base your current liability interest rate on Treasury rates. Some of the people in Congress are concerned that we can manipulate corporate bond rates. We told them that actually it's a lot easier to manipulate Treasury rates; Salomon Brothers

did it in 1991, and the Treasury department themselves did it when they eliminated the 30-year Treasury.

Some people say that Moody's Aa is easier to manipulate. We say, well, it's only 18 companies. You could use Moody's composite. That's got 70 companies in it. That changes year by year, though. Moody's composite rate is triple A's, double A's, single A's, B double A's. It pretty much goes up and down with Moody's double A, so rough justice would be good, and in fact, Moody's composite is already written the law in the Internal Revenue Code for some insurance purpose.

The next question is, should we smooth it? Right now, we have a four-year average of the Treasury rates, and that's been good in the past, if you didn't want to have to contribute as much because interest rates were high in the past. So a four-year smoothing of those rates meant in the past that the top of the corridor was fairly high.

Suppose in the future that interest rates started going back up, and we started having inflation expectations. You can see the four-year lag would cause the opposite; we would have some really low Treasury rates in there. So I think we might be concerned and employers might be concerned where the laws would then be forcing us to put more money into the plan because of this deficit reduction contribution, or it would be charging us PBGC premiums. Even though we could probably buy an annuity for everybody in the plan, we would still have to make these deficit reduction contributions and pay these PBGC premiums.

**MR. SEGAL:** Ron, with respect to the smoothing that's in the law, or is not in the law, I believe the law says weighted average rate. But that four, three, two, one, I believe, was nowhere in the law or the committee reports. You know, the Treasury just came up with it.

**MR. GEBHARDTSBAUER:** That's right.

**MR. SEGAL:** Has anyone, to your knowledge, ever looked at what would happen if you had a different formula for the smoothing?

**MR. GEBHARDTSBAUER:** Like one, one, one, four?

**MR. SEGAL:** Yes.

**MR. GEBHARDTSBAUER:** I've put in a possibility here, and I'll be very interested to hear what you think about this. My concern is that there is so much smoothing, in this particular scenario of the future, employers may not like having to put a lot more money into the plan, even though they could buy annuities for everybody. So my interest is maybe moving toward Jeremy here. So I suggest instead of having four, three, two, one, that you might change to zero and zero one and one; something like that.

There's a lot more weighting at this valuation date, and maybe at the last valuation date. A lot of the people I've talked to have been interested in predictability, so if you have weights from the past, you have an idea of what the current liability interest rate is going to be for the next valuation, so you have some sort of predictability in there.

There would still be some smoothing, but we wouldn't have this long tail. I Under the current rules you'll notice that the green line, the top of the corridor, would be below Treasury rates if interest rates went up. But something that had less smoothing in it would be much closer to the corporate bond rate.

Or should we go all the way and not have any smoothing at all? Do you like the four-year smoothing? Do you want to have less smoothing? Do you want to have no smoothing at all?

A lot of the actuaries that I talk to are interested in predictability, and Jeremy said something even better—hedgability. He will be speaking about that in more detail.

That's on the liability side. He will also be talking about asset smoothing. It adds conservatism when the asset returns are greater than expected, so using market assets decreases contributions when asset returns are more than expected. In reverse, if the asset returns are less than expected, it would increase contributions.

Is smoothing encouraging us to buy high? I don't know. But maybe there is a rationale for smoothing the assets. Maybe the market value of assets two years ago were too high; maybe they were higher than what those stocks were really worth.

Our memo to Congress discusses whether we should use just one interest rate, say the rate for a 30-year bond? Or should it be the whole yield curve?

Our concern, then, with a whole yield curve is that Congress would be promulgating tons of numbers. Would these tons of numbers be used not only for funding but also for lump sums? Can you imagine explaining that to participants? Maybe you would want to use just one rate for lump sums. If you had multiple rates you might have different discount rates for older people versus younger employees, so it could get pretty confusing.

It would be different for different plans. If you were in a plan that had a lot of young employees, would your lump sum be different than if you were in a plan with a lot of older employees? There are a lot of things to think about there.

We're going to do a paper on lump sums, so if any of you are interested in giving us advice on what the interest rate should be for discounting for purposes of lump sums, we'd be very interested in your thoughts on that. I'll end here because I want to give Jeremy time to talk.

**MR. JEREMY GOLD:** Thank you, Ron. I am notoriously a finance type of actuary. I favor using market values for virtually everything, which leads many actuaries to say, "Jeremy thinks the market is always right." I actually know that the market is always wrong. My problem is, I do not know which way it is wrong. That often ends up leading to the same implications as if I believed the market were right.

I am going to go over some of the same history as Don, but I am going to spin it my way, which is the finance way or market way. I agree entirely with the idea that we have reached an insanity point. In fact, we reached it some time ago, and we just keep piling on. More rates, more rules, more twists, turns and arguments about what the right thing is. I also agree with Don that all constituents, whether they are participants, taxpayers, whatever their interest is, would be better off if we had a simplified system. This is very inefficient; this insanity, as Don describes it.

**Pre-ERISA:** Before ERISA there was no PBGC, there was no employer liability and the participants bore the brunt of any underfunded plan termination. With the very visible failure of the Studebaker automobile company in the 1960s, everybody learned what that meant to the participants. Participants vote; plans do not, ergo ERISA.

**ERISA creates PBGC:** The most important element of ERISA, with respect to the current liability, is that ERISA created the PBGC. That took participants substantially off the hook. Of course, it put the PBGC on the hook, in the first instance. Solvent employers ended up on the hook, in the second instance, because of the lien that the PBGC held against their net worths. Temporarily, there was an idea that there would be contingent employer liability insurance (CELI), but many viewed CELI as an uninsurable contingency, and the idea was abandoned.

As soon as the PBGC is on the hook, we taxpayers, we citizens need to worry about the lack of rules governing the level of required plan assets. Although there were some fairly minor pre-ERISA requirements necessary to continue the plan's tax qualification, there were no minimum funding standards with teeth. Unchanged, this would have left the newly created PBGC underwriting unlimited liabilities. Therefore, a necessary companion to the existence of the PBGC was a way to build up well-funded plans, a way to create enough collateral to protect the PBGC.

**Collateral:** We can define collateral most usefully in terms of a pool of assets which may be compared to the magnitude of the liabilities. The actuarial tradition, however, was not to determine the required pool size but rather to estimate the rate of flow—the stream of funding into the pool. Although the actuarial process was influenced by the level of the pool, the primary concentration was on the stream. Consistent with this tradition, it was natural to define minimum funding standards that regulated the stream.

**Bodie-Merton (1992):** is a paper that discusses the management of financial guarantees. Zvi Bodie and Robert Merton were thinking of the FDIC, the PBGC—all of the various guarantees, state guarantees for insurance companies, and so on. Their principle is that one needs to combine three elements to manage (regulate) guarantees effectively:

- Monitor frequently—seize collateral
- Restrict assets—limit mismatch
- Risk-based premium

If the regulator is able to monitor frequently, it need not step as hard on the other two pedals. If monitoring is less frequent, then the regulator has to step harder. It is a balance among these three pedals that controls the exposure of the guarantor. With frequent monitoring and the ability to seize the assets, the regulator can demand a smaller pool of assets; the assets and liabilities may be mismatched. Alternatively, the mismatch may be restricted.

There are tradeoffs. If the regulator monitors every day and can seize the assets, the plan can hold all equities. This may mean that tomorrow the plan will be state-owned, but that is the tradeoff between asset matching and frequent monitoring with right of seizure. The third element in this management system is risk-based premiums. As you all know, in the 1990s the PBGC implemented a rudimentary form of risk-based premiums.

**ERISA's flawed design:** ERISA's original design focused on a stream rather than the pool. While this is a step in the right direction, certainly compared to having no control over the funding level, it is like controlling the faucet rather than the level in the sink.

A critical element is that the stream, as it is presently defined, depends on actuarial expected return. At the time of ERISA's passage in 1974, before the current liability was introduced in 1987, the higher the expected return, the lower the flow of the stream and the lower the level of the pool.

**Merton (1974):** In 1974, Merton proved that a smaller pool requires a better match of assets and liabilities to provide the same level of benefit security. Yet ERISA said that the more you include equities, which are a very poor match for guaranteed benefits, the smaller the pool, and that is backwards; it is topsy-turvy. Long bonds/less equity is, almost by definition, the better match. For a \$100 certain liability, ERISA (before the current liability was added) says that \$70 in equity is just as good collateral as is \$110 in bonds.

But Merton tells us that \$110 in equity is not as good as \$110 in bonds. Just pledge \$70 in equity on a \$100 no-recourse loan at your bank and see if you get the loan. Give them \$110 worth in bonds, and they might lend you \$100.

**PBGC "Gets it":** PBGC figured this out. Perhaps the 1980s bankruptcies of Allis-Chalmers and LTV reminded them that they really were on the hook. So they began the process of fixing things to their liking, and they did it in a debate with all of us, all the constituents, participant representatives and politicians with various axes to grind. The outcome was reflected in two steps: SEPPAA (1986) clarified the definitions of the types of terminations and OBRA (1987) installed, for the first time, the current liability measure, a variable premium, and accelerated funding if plan assets are far enough below the current liability. Then, the IRS decided that the current liability would be a nice way to help lower the full funding limit and reduce tax deductions. In 1987 we probably did not imagine we would ever be in surplus again. Kind of like today, when we may also (but only recently) have a hard time imagining it.

The test is based on the current liability. The current liability follows the pool (rather than the stream) concept as a MEASURE of plan funding. This is financially sound. Unfortunately the TREATMENT is still stream based and ignores the lessons taught by Merton and Bodie.

**MR. SEGAL:** I was going to ask that, just your last point about the IRS using the current liability and the, you might say, the revenue enhancement motivations of the IRS, for almost 20 years. How much harm did that do to the whole system?

**MR. GOLD:** Frankly, I do not have an opinion. But the implementation is still stream based. What happens when the pool is too low, when the plan assets are below the current liability? Funding is accelerated. The plan is not required to top up the asset pool immediately. So it is still not as solid as I would like it to be, in terms of protecting the PBGC and societal interests.

Because we have this hard floor and contributions do end up volatile, when assets fall below a certain level, required contributions can skyrocket. They are also unpredictable, particularly if you are mismatching assets and liabilities.

**Current Liability:** During the development of the current liability definition and application, the PBGC would have been happy, by and large, with a single point-in-time interest rate measure. We, the collective actuarial community and sponsors as well, anxious to avoid volatile contributions, encouraged the weighted-average technique, which I think of as four, three, two, one.

As an aside, Dick Daskais is a financial actuary who worked at Goldman Sachs when I was at Morgan Stanley. He said that the weighted average is a great thing. The only problem is the weights are wrong. They should be zero, zero, zero, and 10. (Laughter.) Dick will be delighted to read the transcript and to see that you laughed at the right point.

**Fast Forward – 2001:** Now we jump forward from OBRA (1987) to 2001. We now have this inordinately low 30-year Treasury rate. You are probably all familiar with

it. If you are not, go to the Academy's Web site and read Gebhardtsbauer–Turpin (2001). Then swing over to the SOA Web site and read two papers, one by Victor Modugno (2001), the other by Ryan Labs (2001).

My idea of the best practice consists of three ideas that I have discussed with Ryan Labs—three ideas that are in their paper. These are what I would like to use to define meaningful interest rates that will have an impact on funding:

- Use point-in-time rates, not averages
- Use entire rate curve
- Avoid arbitrage, enable hedging

1) Use point-in-time rates, not averages. 2) Discount the pertinent cash flows that we can project from a plan using a full rate curve. Now, I know that creates practical problems for small plans, and if anybody wants to make exceptions for small plans, go right ahead.

I think in terms of big rules for big plans. And I think that there is no large size plan that could not implement a yield-curve calculation rather than the single-rate calculation.

**MR. SEGAL:** Jeremy, could you explain a little bit more about what you mean by "use the entire rate curve?"

**MR. GOLD:** Yes. You take the cash flow due one year from now and you discount it using the return on a one-year zero-coupon instrument; you take the two-year cash flow and discount it using a two-year zero-coupon instrument, etc.

Plans have different weights. Suppose plan B has twice as large a payout at, say, 20 years as it has at 10 years, and plan A has half as much. If you use the entire curve, you will get a better answer. We have the technology, and if we do not do this, we will be the only financial practitioners in the world who are still using a single rate.

**MR. SEGAL:** You're saying you would recommend this even if you had two plans from the same employer, as you described it, that were invested in the same pool of assets?

**MR. GOLD:** I do not want to digress too far, but the investment—other than the amount—is of no interest to me in this calculation. And it should not be to anyone who is using a pool-based concept. We can talk about volatility and investment strategies, but in terms of defining the current liability, as far as I am concerned and as far as every finance professor is concerned, as far as every Wall Street trader is concerned, the expected return on plan assets is of no relevance. Whether the assets are expected to earn 9 percent or 4 percent is irrelevant.

The third point that I want to stress from the Ryan Labs paper is that we should, if

we can, when we reach our one new method, create a method that does not invite arbitrage. We want one for which the measures are by themselves buyable and sellable in deep and liquid markets. We do not want to define rates in terms of some private placement or some GIC somewhere or even in terms of an average of annuity rates.

We want to define rates that we can buy and sell because, as we go to transparent accounting—and we will—we will learn that hedging is more important and more valuable to market participants than predictability. Predictability means that I can specify the distribution of uncertain outcomes; hedge-ability means that I can control them.

**FROM THE FLOOR:** It seems to me that this whole idea is based on the idea that somebody can predict with certainty what the cash flow is going to be 10 years from now. And that's not at all true. What do you do? Run a bunch of scenarios? And then how do you determine the current liability?

**MR. GOLD:** Well, I do not know how much I want to get into the nature of the variance around the 10-year liability projection. But without too much facetiousness, let me say that I trust you, my fellows, to do a good job with the demographics. And incidentally, of course, the 10-year cash flow of the current liability does not include future service and future salary increases.

Because it is an ABO-like measure, we do know much of what has been promised. The variation will depend on mortality, termination and those other assumptions on which I implicitly trust you with my life. (Laughter.) Just do not tell me my mortality rate. (Laughter.)

**Beyond 2002:** Let me leave you with four finance-based recommendations:

- Funding requirements should be based on the level of plan assets and their match to plan liabilities
- Volatility is a property of markets—it is not a disease curable by actuarial methods
- Reduce volatility by hedging—a good measurement system will produce nonvolatile results when assets hedge liabilities
- Hedging is more important and powerful than predictability.

**MR. SEGAL:** Can I just follow up on one point? Your focus is on the current liability, the ABO, so to speak, not on, as Ron just said, the projected benefit obligation (PBO) and not even on the valuation interest rate. You're really focusing now on the liability for accrued benefits.

**MR. GOLD:** Yes. The PBO is not a financial measure, the ABO is.

**MR. ROBERT T. MCCRORY:** I have one or two comments. But it strikes me,

particularly when you look at Ron's and Don's presentations, that we're no longer doing, and have not done for some years, actuarial work. This is not about the long-term funding of the plan. This is instead a very technical kind of accounting. And we're making very technical calculations without a lot of flexibility.

Now, it seems to me that within that context, anything we can do to mitigate the negative impacts on the plan sponsors and help to foster the growth of defined benefit plans or their retention is a good thing from a societal standpoint, even if it doesn't hold up very well to technical or theoretical financial analysis.

So, I'm leery about treating this accounting stuff as if it's anything other than accounting stuff. And I think we should act in a way that protects the system as well as we can.

**MR. GOLD:** My comment back to you is that certainly anything that can engender a positive environment for DB plans is very welcome. But whether we should "do anything" in your words, to encourage that, I cannot agree. I think we have to do things that are financially sound, and my idea of financially sound may be different from yours. But I think there are limits, and I think in fact, you may have over-spoken. You would agree that you are not going to rob banks to make DB plans attractive, so you must have some limits on what you are willing to do. I suspect my limits are narrower than yours.

**MR. MCCRORY:** I think, given the amount of success that actuaries have had in shaping legislation, that we're a long way from being able to rob banks to protect the defined benefit system. I guess we have very limited power, very limited input. To say otherwise just doesn't reflect history.

It concerns me to inject additional factors into the debate that make it worse. I'm not telling you to shut up, by any means. But at the same time, I'm questioning whether the theoretical underpinnings ought to apply in this case. This is accounting; this is filling in the blanks.

**MR. GOLD:** Don asked for a single basis in order to "stop the insanity." I agree. But how do we achieve a stable consensus on what that single basis should be? Every constituency in the pension community wants to pull the consensus value in a fashion that best serves its own interests. The PBGC wanted to pull the consensus rates lower in order to protect itself. Sponsors wanted to pull rates higher in order to lower contributions. They also wanted wider contribution ranges. Participants wanted greater protection. Everybody has a direction in which they want to drag the artificial numbers. How could we ever reach a single consensus value?

My assertion to you is that the best that Don can design, the single system, if it is not market value, will just start the cycle over again. Is that better than where we are today? Yes, although it is merely a fresh start for future battles over artificial values: "My rate is better than your rate." "Let us slap this one on top because

some company goes bankrupt." "Let us slap this one on top to balance the budget." All of these artificial slap-ons will come again.

Yes, it would be nice to clear them all out and get one consensus approach. But if that one approach is not market rates and market values, somebody will see a discrepancy between the implications of market and the implications of Don's perfect system. And that person will incite some Congressman, who will be infuriated that the company in his backyard went bankrupt, etc. You can complete the scenario for yourselves.

Until we have rates that no one can improve upon, we do not have the perfect system. My contention is, wrong as it is, the only rates we cannot disagree with are market rates.

Over the next five or ten years, internalize this: "Volatility is a property of markets. It is not a disease curable by actuarial methods."

It is, however, in most instances treatable by hedging. But to hedge fixed liabilities or close-to-fixed liabilities, you have to invest in fixed assets, which do not earn equity premiums for a variety of other reasons. Check my SOA presentations in Dallas in 2001. I tell you that equities do not belong in pension plans, but I will not try to prove it here. The best I can do on that takes over an hour. But do not be so unhappy if your fixed promises can be made less volatile with fixed assets that match them.

**MR. RONALD L. SEELING:** I'm intrigued by your comment about the strength of the sponsor having an impact on this to the extent of the future viability of the sponsor. Is this a one-size-fits-all theoretical concept, or is one end of the spectrum a large state that's an ongoing concern? Do I have the right to worry about volatility there if I'm IBM or Joe's Donut Shop? Do you recommend the same approach to all of the above?

**MR. GOLD:** What motivates me is to mention the sponsor, and it is a second-order effect for well-funded plans, is that finance tells us how to value debt-like promises. If I promise you \$1,000 next year, you can call Dun and Bradstreet and they will tell you what that is worth. Or you may access my TRW credit report and get some idea of what interest rate you should discount my \$1,000 promise at. It depends on my wealth, my spending habits and some other things. This is how corporate debt is valued. Companies that have a lot of assets in comparison to their debt, which means they have a lot of shareholder equity, are likely to find that their debt is discounted at lower interest rates because the collateral, the assets of the corporation are greater.

Now, if we have a promise of a supplemental executive retirement plan (SERP) from General Electric, that promise is roughly valued to the executive at the debenture rate—an unsecured bond is a debenture. General Electric is still a triple-A

rated company and their promise is very valuable. That same promise made by a distressed steel company is virtually worthless, if it is not payable tomorrow. And so the same \$1,000 promised by General Electric or promised by a distressed steel company is of greatly different value.

**MR. SEELING:** If I'm understanding this right, suppose your company has a good rating, but it's not doing as well, so you've been downgraded. So that means the value of liabilities in your pension plan would be less than before, since the interest rate would then go up. So that would mean that perhaps the company is in better shape now, because it doesn't have to contribute as much to its pension plan.

**MR. GOLD:** Before we get to the pension plan aspect, the more dramatic effect that occurs immediately is that the bonds are worth less. Let us just keep it at that level. The FASB had a problem with this when I tried to present it to them in 1989 in conjunction with unfunded health care plans. But now, as part of the worldwide paradigm of fair value, it is recognized that bonds issued by weaker companies marked to market are worth less than bonds promised by good companies. And when a company faces a downgrade, its bonds go down in value. If that is the only thing you look at, it appears to create income. If the company says, "Well, let us downgrade our company even more and get more income," that does not work. Merton (1974) is just spectacular in this regard.

A drop in asset values is shared by bond holders and equity holders. In a very well-funded company like General Electric, if their asset values go down by a billion dollars, the equity holders lose almost the entire billion and the bond holders lose almost nothing. But if you have a very poor company, and its value, its assets were worth \$2 billion last year, and those assets go down to \$1 billion, their debt may absorb a lot of that loss. The shareholders, the equity holders, while they will proportionately take more of the loss, will never take all of it and the worse the company is, the bigger the hit to its debt.

But the company does not make a profit on its own weakness. Assets go down 100, liabilities go down 70 in a terrible company (or 1 in a good company), and equity holders take the balance of the loss. So those are the general rules for corporate debt. But if a distressed steel company promised me \$1,000 and General Electric promised me \$1,000 and they each put up \$2,000 in Treasury bills as collateral, suddenly one company's promise is as good as the other's. So collateral can overcome the strength or weakness of the company. In a pension context, you look to the collateral (the fund) first and to the company second.

In a well-funded ERISA plan using a current liability definition, the collateral is kept at a fairly high level. The proper discount rate for those liabilities is something that may be described for a strong company as 'near riskless'—and even for a weak company as 'not far from riskless'. I'm talking about double-digit basis points of adjustment for well-funded plans between strong and weak companies. So I'm talking about a range for ERISA plans, if the riskless rate is 5 percent of something

under 6 percent.

So, the question of 9 or 10 percent from equity is irrelevant to my evaluation of those liabilities from a finance perspective.

**MR. SEELING:** I use the word liability loosely because I'm not quite sure how you define it. If I have a billion dollars in liability from General Electric and a billion dollars from a distressed steel company, how would you value those two then, based on what you just said?

If I had the exact same demographics and the exact same promises with respect to future payments, how would you value the two companies?

**MR. GOLD:** Absent funding, a distressed steel company promise is worth a small fraction of what the General Electric promise is. If you have any doubt about that, I'll give you my distressed steel company bond and you can give me your General Electric bond.

**FROM THE FLOOR:** What if they were funded?

**MR. GOLD:** Well, if they are funded in a committed way, and ERISA creates that kind of commitment.

**FROM THE FLOOR:** It's a typical pension fund with equities.

**MR. GOLD:** Yes, well, again we go back to Merton. If a distressed steel company had a funding ratio using near-riskless rates of 160 percent, I would say their promise is just about as good as General Electric's. On the other hand, if a distressed steel company really has 70 percent.

**MR. BARTON G. FLEMING:** I see we have great organizational representation, great financial representation and great private-sector representation from the world. But, as always in the United States, we've left out history and international. And I think we ought to take a real hard look at the basic assumption of ridiculously low interest rates we've been using here, because any Japanese fund manager who could have achieved these ridiculously low interest returns for the last ten years would be the hero of the world's second-largest economy. So maybe they're not so ridiculously low; at least we can point to a rationally run powerful world economy that can be compared to the United States. It certainly was in the 1980s, and those ridiculously low interest rates suddenly became everyday interest rates.

Now let's get back to the 18<sup>th</sup> and 19<sup>th</sup> centuries and the dawns of finance. Because we can go back and look and ask what the risk-free rates were for the last few-hundred years. If you go to the great financial centers, France and Germany for the 19<sup>th</sup> century, you're going to find that, until September 1914, when interest rates started going up, that your long-term, risk-free rates were between two and three

percent. And they were that way for quite a while. And then, of course, they dropped back after the wars.

My own thought is that we've had an unusual situation. We had a 40-year period of war from 1949 until the fall of the Soviet Union that may have artificially inflated interest rates in the traditional pattern of inflation of interest rates due to wars.

**PANELIST:** Just so you know, I wasn't saying that they were ridiculously low for all time. I was just saying that in relationship to what you could get on a corporate bond, a double A corporate bond, they were very low.

**MR. GOLD:** Chris Barr from Goldman Sachs made two presentations at this conference. He reminded me that the ratio of the interest rates is more important than the absolute difference. He meant that when you have long enough liabilities, and you cut the interest rate in half, the liabilities double. That is just a perpetuity calculation.

Therefore, when people saw that Japan had a half-percent interest rate, they said that they must have lost all of their monetary power because they could not make it much lower. However, they only had to lower it one-quarter of a percent, and businesses could finance twice as expensive an asset for the same promise of cash flows.

So, it is not the absolute levels. A rate reduction from 10 to 8 percent interest is roughly as powerful as a rate reduction from 5 to 4, not a 5 to 3 reduction. Therefore, the impact of a 5 to 3 is much bigger than the impact of 10 to 8. Think in capital terms, or think of the value effect on the price of the liabilities, rather than a rate. And you may or may not conclude that today's rates are so low.

**MR. MCCRORY:** First of all, an editorial comment. Jeremy, I think at this point I disagree with some of your conclusions. But I'm very glad that you're doing what you're doing. I think that's wonderful and I congratulate you for it.

Alan Biller's comments at Session 87SM, "Relating Investment Experience to Benefit Changes in Defined Benefit Pension Plans," reminded me of the fable of the seven blind men and the elephant. And if you think of the pension system as being the elephant, we have a lot of blind men feeling it and taking away their own stories. The accountants feel the elephant and they say, "Wow, this is just like a going concern company, I know what to do with this." And so they construct income statements and balance sheets and we have various accounting pronouncements.

The IRS feels the elephant and says, "Wow, this feels like a tax expenditure. I know what do to with that." The PBGC feels the elephant and they come away with their own statement. And financial people feel the elephant and say, "Wow, this looks like a bond or something. I know what to do with this." Alan Biller was classic in

that, "Well, we know how to do that," in investments.

The thing is, it's an elephant. It's a pension system, and it's big enough and critical enough in this country, to be regarded as what it is. When other people come from other fields and say, "Well, we know what this is; we know how to handle it; we have to recognize that maybe only about two-thirds of their knowledge can be brought over." And that unthinking, or just complete application of all the principles may not fit. So let's remember what it is. This is a pension system. It's not a company. It's not just a tax expenditure. It's not just a financial system.

A pension plan has assets, but it's not purely an investment scheme. That's just my thought.

**MR. GOLD:** I think you've done an excellent job of defining the range of our differences. I think that financial economics is demonstrating that the power of markets subsumes many of those other considerations you have offered. Now, it is hard to subsume the IRS, they have the power of the sovereign. But at least as far as some of the other measures, the financial economists are winning. They are persuading the accountants. They will persuade the regulators. They MAY persuade the legislators.

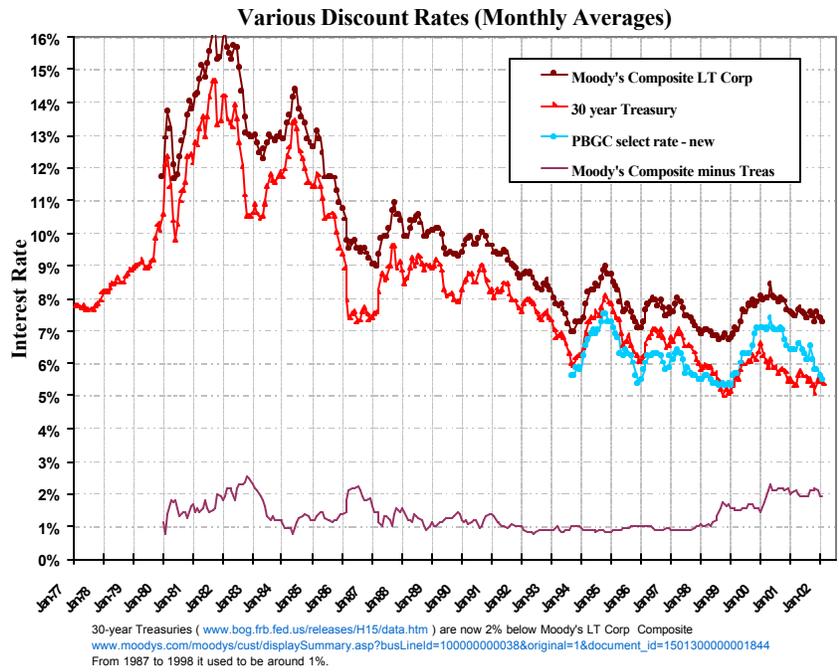
I like to think that as far as you all might be concerned, when I tell you the accountants are coming, the accountants are coming, and that I think they have it righter than we do at the moment, please remember I am Paul Revere. I am not Lord Cornwallis and I am not Benedict Arnold.

**MR. SEGAL:** Thank you, Jeremy. Thank you, Bob. I think the last two comments were a wonderful way to finish.

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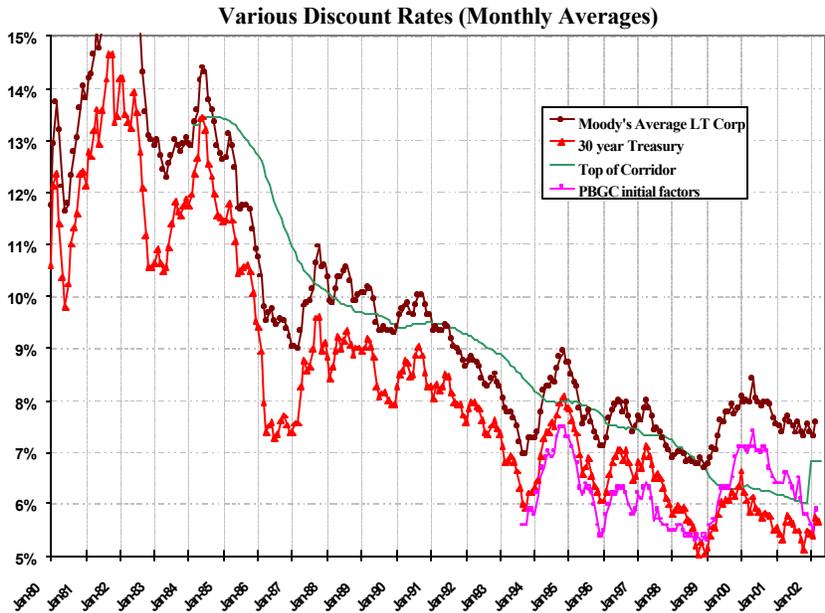
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Chart 1



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Chart 2

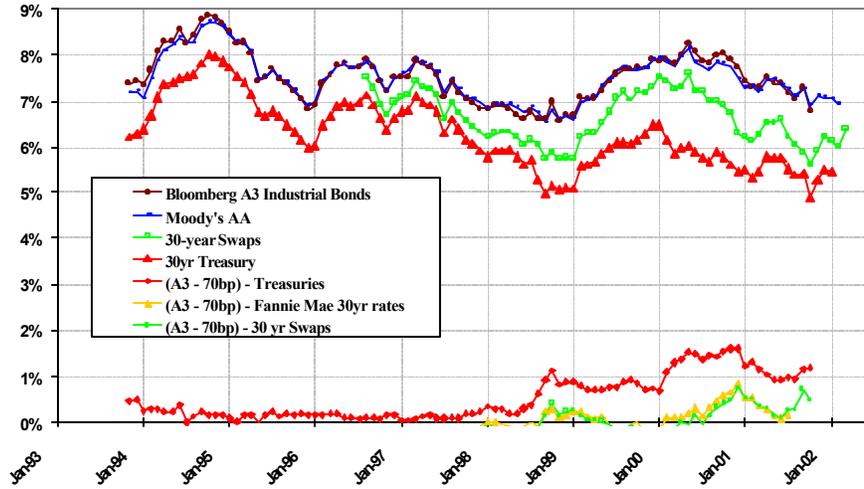


Note how corporate bond rates and the PBGC rates for the first time are both above the top interest rate allowed for determining Current Liability in late 1999, 2000, and 2001.

8

Chart 3

Various Discount Rates - End of Month



Bloomberg A3 Industrials are option-adjusted (e.g., pull out call provisions) which is why they are close to Moody's Aa's. Victor Modugno's study for SOA suggested that annuity prices could be estimated using Bloomberg A3 less 70bp. Treasuries were close prior to 1998, but have fallen way below recently due to paying off debt, buy backs, and flight to safety. 30-year Fannie Mae and Swap rates are much closer (except fall 2000 and winter 2001). PBGC rates would be close too, but they don't want us to use their rate.