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Session 116PD Long-Term-Care Asset Management

Track: Long-Term-Care/Investment

Moderator: MARK D. NEWTON

Panelists: MARK D. NEWTON
RICHARD B. PITBLADDO

Summary: Many actuaries practicing in the long-term-care (LTC) specialty focus on product development, financial, or valuation issues that evaluate the liability side of the balance sheet. This session provides an exploration of the asset side as presenters discuss appropriate investment policies for LTC and asset/liability matching.

MR. MARK D. NEWTON: Sometimes you'll see asset management topics at Society meetings. You'll also see a lot of long-term care, but you hardly ever see these two put together. I hope you find the presentation a little bit different and unique.

I'm from AUL Long-Term-Care Solutions in Avon, Connecticut. AUL Long Term Care Solutions was formerly known as Duncanson & Holt. Before that I spent many years in John Hancock's long-term-care area. I'm very pleased to have with me Richard Pitbladdo from GE Capital. GE is an absolute master at capital management, investment management, and liability management. They're really terrific at what they do, and part of the reason they're so good is because of what Richard does. Richard works with asset and liability management, hedging, and capital management. We're very fortunate to have Richard with us today.

Insurance is a complicated enterprise and each of its parts is connected. If you happen to work in pricing, valuations, or on the asset side, you need to talk to each other because the dangers of writing long-term-care business go far beyond whether claims are right or wrong or whether you got persistency right or wrong. We want to spend some time talking about how interest rates can go right or wrong and what that can do to you. We also want to talk about what you can do to prevent things from happening to you.

As we go through the presentation, I'm hoping that you will start to think very broadly. What would happen if something happened to interest rates? What other parts of the organization do I really need to think about integrating with more than

I do already? If we think broadly like that during this session, I think our time will be more productive. So let's start with that as a hedge going into this program.

As far as the goals of the presentation, I want you to think very broadly and very globally. I mention globally because in the United States we're somewhat used to interest rates fluctuating, but not within a terribly wide range, unless you go way back to the 1970s. The interesting problem today exists in Japan, not in the United States. In Japan, interest rates are basically zero. Many people might believe that that couldn't happen in the United States. I assure you that there's a lot of Japanese that never thought it could happen in Japan. So to think that something similar couldn't happen here I think is actually irrational. It might not happen to the extent it has in Japan, but long before interest rates ever reached zero, you'd be in a lot of trouble in your long-term-care area. We'll be talking a little more about that later. So think very broadly, think very globally, and think about the connection between investment risk and the return that you're getting on your assets.

Finally, if you find that some of that applies to you, I'd like to urge you, as pricing or valuation actuaries, to start dialogues with your investment professionals. If you happen to be an investment professional, I really urge you to get out of your department and go talk to the guys on the pricing and liability side.

Let's think about some risks. In long-term care, as pricing and valuation actuaries, we know that there are many risks in insurance, particularly for long-term care. You have morbidity risk, or the chance that the claims will be more than you thought they would be. You also have a persistency risk, and this is one area where actuaries who were here in some of the early years in long-term care probably got the most wrong. They thought persistency would be much worse than it actually turned out to be, and persistency's almost not even an issue today for many companies where lapse rates are in the zero, one, or two percent range. If they're always that low, you can hardly be very wrong if you're assuming something in that range. So, it's almost as if persistency is not as much of an issue as it used to be. If you have a book of business that you priced at four, five or six percent ultimate lapse rates, and now it's at zero, one, or two, you well understand the persistency risk in long-term care.

Expenses can be a problem. Maybe you were anticipating economies of scale in your pricing which you might or might not get. You might have inflation factors that you use for expenses in your pricing that might or might not come to be. There are many companies who implicitly assume that inflation and productivity enhancements are going to offset each other exactly, which might or might not be, but that's a risk in long-term care. There's investment risk, which we're going to spend a lot of time on today, and then there are other general risks, like litigation risks, the chance that the courts will want you to do something different than you planned on, IT risks, and guarantee funds. Some companies whose pricing may not be what it was supposed to be might not be around very much longer, and that affects you even just peripherally.

One of the questions you can think about is, "What if I am wrong?" And what are

the solutions for that? I put down as a possibility the first thing that comes to people's minds. If I am wrong, can I raise rates? I've talked with many people and many of your companies across the industry about what kinds of risks could lead to rate increases and what kinds of problem experience would be acceptable to a regulator who's looking at a rate increase package. My personal opinion is that not very many of these risks are going to pass muster at most insurance departments. If you didn't agree with that before, I think it doesn't take very much of a review of the new NAIC model regulation to understand that the regulators are focusing on one of these risks in particular. If interest rates go wrong, I don't think that's going to get a whole lot of play at most insurance departments, and rate increases are not a solution for that kind of risk.

Investment risk in particular is an interesting concept in long-term care. If you think about the risk-based capital (RBC) factor and the different C factors for risk-based capital, it's interesting to me that there is no C-3 risk for long-term care. What does that say to you? What it says to me is that maybe we missed something because, in fact, you could have a tremendous asset/liability mismatch in long-term care. Whether or not you believe that the RBC formula produces a capital standard that's too high or too low for long-term care overall, the simplicity of the RBC needs to be considered. If the RBC formula includes the C-3 risk, what are we going to do about it. I point it out because, to me, it's an obvious miss for risk-based capital formula.

So how is that handled in terms of capital? You have your statutory valuation standards, and maybe this is where some of the regulators were thinking that this gets made up. The current interest rate for long-term care is 4.5%. Does that say that we missed it in the C-3 standard, and therefore we're going to overcompensate in the statutory valuation rate standard? It's a possibility because 4.5% is a fairly low standard. For those of you who have older blocks of business and are continually adding to reserves based on a 4.5% interest rate standard, you know what can happen to your reserves and your surplus because of that one single assumption. So what's possible is that even though investment risk is not handled in the RBC formula, it is because we're overcompensating in the statutory valuation rate standard. I don't think that's the best solution, but it's a possibility.

The other place that we think about long-term-care insurance investment risk is in the cash-flow testing area. Asset adequacy testing under New York standards gives you the seven interest rate scenarios that you have to run through. Those of you who have gone through that exercise should be able to see what happens in the down and pop-down scenarios in particular. Some companies that I work with do not segment long-term-care assets. Maybe the long-term-care book of business is not big enough to have its own segment. That's fine. But within that you need to think about what happens to your long-term assets, even if your long-term-care assets don't happen to have their own segment. But if they do, one of the problems with long-term-care assets and liabilities is that it's very hard to find assets that are long enough to match the liabilities on long-term-care.

Say you have lapse rates in the zero, one, and two percent range, and you're

currently writing people who are average ages (in the 60 to 65 range). Those people are going to be around for a very, very long time, especially with the low lapse rates. The low lapse rates exacerbate the problem of the asset/liability mismatch in long-term care. In the New York Seven scenarios, if your assets are shorter than your liabilities, what's going to happen in the down and pop-down scenarios is that you're going to be reinvesting assets as they roll over at lower and lower rates. What you will see in the interest rate scenarios is a gradual deterioration in yield and a gradual deterioration in surplus position that can produce some rather wild and extreme results over a long period of time.

In asset adequacy testing, as I mentioned, you'll see a gradual deterioration of portfolio yield. This won't materialize for quite a long period of time because the assets that you'll be using in your interest rate scenario are based on various durations. You'll have assets that are very short and will be reinvested in the relatively near future, and then you'll have some that are longer. As these roll over, you won't see this massive drop in your surplus. It'll be gradual, but it'll be chronic, and there's not a heck of a lot you can do with it under those kinds of scenarios. So it's more like a cancer, not a stroke.

It also has consequences for companies who look at themselves under GAAP standards. If you're going to have future investment losses in your portfolio, you're going to need to reflect those at some point in time. It's not a matter of if you choose to do that; it's a matter of when you choose to do that. But what happens is, at some point, you're going to accelerate the income deterioration in your portfolio, and you will have to recognize those losses. If you do deferred acquisition cost (DAC) recoverability testing, then you will be able to see yourself getting closer and closer to problems in your recoverability, and sooner or later, you're going to have to write down your DAC. That will not go over very well with your senior management. As I mentioned before, you're also going to fail cash-flow testing at some point in time. Then what's going to happen is you're going to have to post additional reserves on your statutory statement, and you're going to have to use some of your surplus. This also will not be wildly popular with senior management.

I want to take a poll, before we move on to an example. I think that'll help clarify some of these very general concepts that I've gone over. The first question is, what interest rates movements are harmful to long-term-care insurance? I'll give you four scenarios—rising interest rates, falling interest rates, inversion of the yield curve, and the steepening of the yield curve. For now, just answer these in your own mind. Later on we'll check your answers and see how many people got all these answers right.

The second one is bond maturities. I mentioned before that long-term-care liabilities are very long, and if you haven't done the calculation yet, you may be very surprised at how long they really are. How long are they, and what kinds of assets are appropriate? Which set of maturities do you think most closely resembles an asset portfolio that's appropriate for long-term care? Once again, think about that for a minute and make a choice in your own mind.

The third question is, what's the real cause of long-term-care interest rate sensitivity? Is the sensitivity due to the benefit payments having a very long duration? That is actually true for probably most of your portfolios. As far as I can tell, lifetime benefit coverage has become an increasingly popular selection among insureds across the industry. Is it because the expenses can vary over time for many of the reasons that I talked about before? Or is it because the premiums exceed the benefit's expenses in early years? So, these are the three choices, A, B, and C, and you can think about those while Richard and I switch.

MR. RICHARD B. PITBLADDO: I'll go back to the first question. Are rising interest rates a problem for long-term care? Are falling interest rates a problem? What would you say about an inversion of the yield curve or a steepening of the yield curve? How many answered B and C? Great! Now, assume we have a coupon-paying bond. If you have a portfolio of all these bonds that are either 100% 10-year bonds, 100% 30-year bonds, or 100% hundred-year bonds, what sort of portfolio do you think would be long enough to actually match the interest rate risk in the liabilities? Would five-year, 10-year, 30-year or 100-year bonds be sufficient enough to match the long-term-care liability? Who would say none of the above?

Did anybody guess none of the above? None of these are long enough to match the long-term-care liability. What's the root cause of long-term-care interest rate sensitivity? Is it because we have a long tail? It looks like we're going to pay off benefits 40 years from now. How many think that's the answer? Variable expenses? Premiums coming in ahead of benefits? It seems like the audience is well aware of the basic risk factors in long-term care; what happens to our block of business when interest rates go down. But I think what's not understood is how big this impact is and how big the gap between assets and liabilities can be when we actually start looking at it.

We're going to take you through a numerical example of a single cohort of policies, which means that they're issued at one particular time. We're running them out over time rather than layering on new business. This is not a particular block of business, but we created some data that represents a typical cash-flow pattern of modern long-term-care liabilities, which would be typical; there is level premium rather than increasing premium. We think it's fairly representative of most of the policies out there, but not any particular block of business.

Now the most important aspect of getting a handle on asset/liability management is taking a look at the cash-flow pattern of the liabilities. If we take a look at the cash-flow pattern just after we've put the block of business on the books, we see the basic picture of long-term care is that the cash flow is positive and then it goes negative. There are other insurance liabilities that share this characteristic. You can think of 30-year term life, although a lot of term life actuaries are in denial about the cash flows ever going negative. There are a lot of insurance liabilities that are dominated by single premiums, annuities and structured settlements. These are the kind of liabilities investment professionals are used to working in.

Some of these cash flows are fixed cash flows, fixed in nominal dollar terms, and some of them can float. For long-term care, we don't have any floating interest rates in our contract, but we do have sensitivity to inflation; inflation is very highly correlated with interest rate. You can think of your variable expenses, claims adjustment costs, and things like that, as variable expenses that you would expect to fund with floating rate assets rather than fixed assets.

Now if we take a look forward from that point and take the present values of the future cash flows, we get what is basically a mirror image of the gross premium reserve. Initially, if you run a gross premium reserve on a cohort of long-term-care policies, your negative gross premium liability says that we've issued some policies. We better hope they're an asset because we spent a lot of money to get these policies on the books. We paid a first-year commission, and we have all sorts of underwriting expenses. You better believe this is an asset. So initially we have this cohort of policies that is an asset, and we start collecting premiums for a couple years. We realize that after collecting premiums, the liabilities assert themselves. Your liabilities might be anywhere from three years to fifteen years before they cross zero, depending on how adequate your pricing is. Where they cross that point I'd rather have them go away. Initially, we have an asset, and then we have a lapse-supported liability, presuming there's no cash value to these policies. If the customers walk away, we know that we end up with a financial gain.

In your mind, whenever I change interest rates, picture a parallel upward or downward shift in the yield curve. Whatever the slope of the yield curve is, it's going to go up 100 basis points across the board or down 100 basis points across the board. That's not even a typical interest rate movement, but it's very standard in the profession.

Liabilities are sensitive to the interest rate. The economic value of the liability or the present value of the liability, is sensitive to the interest rate, and this is what we need to use to match with the interest rate sensitivity of the assets. The trick to asset/liability management is having an asset portfolio that offsets this volatility so that the assets change in sync with the liabilities. As interest rates change, you don't really care whether interest rates go up or down because what you gain in asset value you lose in liabilities, and vice versa.

How is interest rate sensitivity generally measured in the insurance industry, by actuaries and by investment professions? Let's take some time out to take a little path into interest risk measurement.

Let's take a look at how interest sensitivity is measured. Actuaries talk about dollar duration. Dollar duration is a measure of an increase in present value for a 100-basis-point drop in yield curve. If we're talking about an asset, what happens if the yield curve drops 100 basis points? That's a 1% drop, and liabilities increase 6% across the board or 5% across the board? What happens to the present value of the asset? We have an increase because generally, for an asset, if interest rates drop, the value of the asset increases.

Investment professionals, instead of talking about this dollar duration measure, tend to work in one basis point increments rather than 100-basis-point increments. They have a measure called PV01 or present value of a basis point. That's just a dollar increase in present value for a one-basis-point fall in the yield curve. Those of us that spend a lot of time looking at the measures have come to the conclusion that dollar duration is 100 times PV01.

The most common language between investment professionals and actuaries and the most dominant method used for interest sensitivity is just plain duration. Rather than a dollar change, this is a percentage change. It is a percentage increase in the present value for a 100-basis-point fall in the yield curve. Some of you might ask, where does the word duration come from here? All I see is value changes and changes in yield curve. Why is it called duration? If we take an asset or liability that only has a single cash flow that's out there in five years, the duration of that is the number of years that it's out there. A five-year zero-coupon bond doesn't pay any coupons along the way. A five-year zero-coupon bond has a duration of five years. That's where the terminology duration comes from.

If you go from zero-coupon bonds to coupon-paying bonds, then this terminology remains. Suppose we have a bond at some fixed rate for five years. Its duration might be somewhere like four years because there are some coupon payments that come in earlier, and the principal comes in later, and the duration tends to be present-value weighted with the average life of the cash. In a 30-year bond, because of the present value weighting, a 30-year bond might have a duration of 12 or 13 years. But a 100-year coupon paying bond that's not callable might have a duration of 15, 16, or 17 years, but that's mostly because of the coupon payment. So the duration of a 100-year bond is not a hundred years, unless there's no coupon payment for 100 years. You better not buy one of those.

This mapping from interest rate sensitivity to the average life of the cash flow that's so useful for fixed bonds actually turns out to be a mental block for analyzing long-term-care liabilities. This mental block is a bridge you have to cross in the communication with investment professionals. That's one of those links that has to be broken when you get the conversation going between the investment department and the liability people.

Let's go back to the definitions. It's time to apply them to our example. Let's take the dollar duration and the percent duration. Some people call it effective duration. Dollar duration is just the vertical distance between any two of these curves. The dollar duration of liabilities with a change in interest rate of 100 basis points generally increases over time and tends to maximize at the 20-year point for this example, and then attenuate over time. Initially, the present value of premiums offsets the present value of benefit payments when you change the interest rate. After a while, the present value of premiums is hardly anything compared to the present value of future benefit payments, so only one side is changing. Then, after a while, your block runs off so that there's hardly anything left, so there can't be any duration.

Let's move from that dollar duration to a percentage change and imagine how that would look. The duration is usually measured in years. It's the vertical distance between two of those curves divided by the base value. What's going to happen around five years? If you take the absolute dollar change and divide it by the distance, you are basically dividing by zero. That's when trying to talk to investment professionals really gets crazy. You're trying to explain dividing by zero and getting an infinite duration. They just say, get out of here. You know this is not an infinite duration liability. It might be 20 years. Let's go forward a couple of pages and just confirm that we did the calculations correctly. Here's dollar duration. It has the characteristics we talked about. It increases a little bit, maximizes out maybe 13 or 14 years and then attenuates over time because the block of business has disappeared.

This is the kind of language that drives investment professional crazy. Although we talk about policies with liabilities, they aren't liabilities yet. They're assets. Okay? We'd rather have these than not have these because we expect our future benefit payments to exceed our future premiums. We have an asset, though, that doesn't behave like the normal asset. If interest rates go down, the value of the normal asset increases. But that doesn't happen with a long-term-care line of business. If interest rates go down, this asset that is a policy gets worse. As interest rates go down, the asset that is a policy or a cohort of policies becomes an asset that's less valuable to us. If interest rates go down enough, it becomes a liability.

As this asset becomes less and less of an asset over time, it actually has more and more duration. The percentage change of value with respect to a change in interest rates increases, but that's more because the denominator of the equation has been increasing, not because of the interest rate sensitivity. We get an evolution of a cohort of business that starts with an asset with negative duration, and it goes to a very, very, very large negative duration; however, it's a very small asset with a very large negative duration. I know policies are an asset, but we also have some investment assets that we're going to bring into the equation.

So we added some assets. If we were interest risk neutral, we have a cohort of policies whose value declines as interest rates go down. So we have to get another asset that has the opposite property. It has to have the opposite property in the same measure so that the value of those assets changes considerably as interest rates go down.

Then we go into the more normal range when you actually have a block of business that's increasing over time. You tend to get policy blocks of business aggregated that are more in the zone in six or seven years. You have liabilities that have a very small present value but a very high proportional interest rate sensitivity as you go forward. If your block of business is right at the critical time where you're switching over from having a block of business that's essentially an asset to a block of business that is an economic liability, duration goes nuts. Something to keep in mind when you're going through these calculations is that you might come up with some extreme numbers. Just to maintain your sanity, expect some erratic results like this when you go through the calculations. They're not very material results

because it's a very high sensitivity on a very small base. So don't let that distract you.

What lessons have we learned? We have seen that the duration behavior of long-term-care blocks is bizarre, but there are easily understood rationales to work your way through this. The lesson that comes off is that your investment professionals are not used to seeing this kind of extreme behavior in liability duration. The closest thing on the asset side that comes to that is maybe interest rate swaps. They have zero value and there's no cash transaction when you acquire them. Investment professionals are used to seeing these types of assets that have high interest rate sensitivity and are often crossing the line between where there's an asset or a liability. Six months from now you don't know whether they're going to be assets or liabilities. It depends on where interest rates are moving. So maybe some people with a lot of swap experience might understand what's going on, but generally that's not the case.

We also see that the more stable metric is to talk about the dollar. That's our metric that we care most about. How much economic surplus in dollar terms are we losing when the interest rate changes? Get them off the proportional measures and get them onto the dollar measures. It's not too hard to get a CFO to talk about dollars instead of percentages. They can relate to that.

We talked a little bit, but have not considered in detail that we have to hold statutory investments -- invested assets greater than the present value of liability. Even though we consider a long-term-care cohort of policies to be an asset, the NAIC doesn't say you should put an asset on the book and get a loan to back it. You still have to back it with invested assets. So let's take a look at how that would work out. Over time, how much in assets are we required to hold to back these policies? Initially, we don't have any reserves. We have the full preliminary term reserves after the first year, but we do have to post some target capital. I'm assuming that we have to have enough assets to have 200% of the action level RBC. I'm not showing the square root formula because square roots are applied after aggregation of all the other liabilities.

Over time we have more and more assets to invest. That gives us a better chance to offset the interest rate. The more assets we have, the better chance we have to offset the interest rate sensitivity of the liabilities. The minute we write a policy we've created interest rate sensitivity. Dollar duration doesn't start at zero. We started at a discreet level of dollar duration. The cohort of policies isn't normalized very well. There is \$55 million of annual premium and over \$100 million of dollar duration. At the very minute you issue a policy, a 100 basis point shift can wipe out a couple years of premium for you. That's a discrete level interest rate sensitivity before you've acquired a similar amount of assets. So you start out having half a year's worth of assets with a discrete interest rate risk.

If we invest an asset equal to the amount that we're told to hold by the statutory authorities, what would the duration of those assets have to be in order for their economic volatility to offset the economic volatility in the liabilities with respect to

interest rates? We see that, at the start, these would have to be very extreme assets; assets that you just don't find on the open market. Regular invested assets with a 30-year bond, as we mentioned, had a 12-year duration. As such, it's not until this cohort goes out 10 years that the longest normal asset we tend to acquire, a 30-year bond, is long enough to match the liabilities. So we're in a situation where it just can't be done. If you use normal investment strategies, the longest asset we have for you, under normal conditions, is a 30-year, non-callable bond. It's the longest duration we can use.. We get some hundred-year bonds, but they tend to be callable, so they don't have the same duration. So without getting sort of sophisticated with alternative assets and alternative strategies, you just can't do it. You can't go long enough until you have a very old block of business. I don't know if anybody out here has a block of business whose average issue age is past ten years. Even those of us that have been around a long time like to grow. To the extent we grow, that keeps the youth of our block down. So we tend to be in the area where we have to have assets (if we're going to have assets to match our liability) in the 15-20 year zone, and they're just not on the plate.

Understand this: The younger the block of business, the greater the duration of the assets has to be to provide a match. Now that's not generally understood in this industry. In the industry you hear, "We expect that we can increase the length of our investment portfolio as the block matures." It's just the opposite. If you have a mature block of business you have enough assets to offset the economic sensitivity to the liability. It's when you're a young and growing block you just don't have enough assets accumulated to be able to offset the interest sensitivity of the economic value of the liabilities.

What can you do? First of all, go long. The problem never is going too long. There are 30-year bonds, but that's not long enough. There are 100-year bonds, but they are callable, so they're not really long. You can't get them non-callable, so they're not really long bonds. The longest duration you can get is 30 years. It's more and more difficult to get these, and it's more and more difficult to get these in a diversified manner. There are some names issuing out there in 30-year bonds but not many CFOs, with the current yield curve shape, want to issue a lot of 30-year liabilities and pay a higher price. They'd rather issue 5-10 year debt and pay lower funding cost. It's more and more difficult to go out that far. It's a lot easier to get 10-year bonds than 30-year bonds. You must to be careful not to invest 100% of your portfolio in AT&T.

The other thing is to go to the root cause. Why do we have economic volatility of the liabilities? It's not really reinvestment risk. It's initial investment risk, and it comes from the liabilities, not from the rollover of the interest payments and the coupon payments of the asset. Our problem is not rolling over assets. Our problem is dealing with the liability cash flows, not the asset cash flows. Find any way you can to absorb the positive cash flow that's running off the liabilities. Assets don't normally start out with negative cash flow. What I'd like is an asset that starts out with a negative cash flow and ends up with a positive cash flow. Then I'll have a nice cash match to the long-term-care liability. You don't really want to invest in assets that have negative cash flow for the obvious reasons. If you did that, it

would have a pretty high credit risk, so we need to get creative.

One of the things we can do that's a little better than buying a 30-year bond that addresses the root cause is at the very least, try to get assets that don't add to the problem. Let's get assets that are stripped out and don't have any coupon payments for, say, the first ten years. So zero-coupon bonds are bonds that have no cash-flow payments for the first ten years. There are coupon payments for 20 years and maybe principal payments at the 30-year point. Many of the zero-coupon bonds actually go through an investment bank trust account where the investment bank breaks the bond apart and sends the coupon payments to somebody and then the principal repayment elsewhere. They don't absorb the cash flow, but at least they don't add to the problem. Even if you had a portfolio with all zero-coupon bonds, you'd still have that positive cash flow. You'd still have to invest assets at uncertain interest rates going forward. Zero-coupon bonds can't even get you all the way there.

What we have been able to do successfully at GE is use derivatives. We've used four-star interest rate swaps. That can do the job. That can completely immunize you. It's not a perfect solution, but the nice thing about that is we've been able to lock in interest rates at levels higher than current rates, which is beautiful. We hedge our risk, and we add to our return. There are not too many times you can be a hero by reducing risk and increasing return, but long-term-care is one of those wonderful liabilities in which you can do it. Essentially we're locking in investment yield at forward rates, and with an increasing yield curve forward rates are higher than PAR rates or spot rates. You get a nice little premium for them.

This is a very delicate operation where you have to worry about *Financial Accounting Standard (FAS) 133*. It's possible to satisfy the requirements of *FAS 133* with these forward interest rate swaps, but you have to be real careful in doing it. It's a lot of documentation, a lot of designation. You have to look at not only the GAAP world but also the tax world and the statutory world. The tax accounting rules for derivatives are very complex, and you sort of have to negotiate around there. The other thing is it's not a buy-and-hold strategy. When you put swaps like this on the book, you have to have a very careful plan as to how you close out swap positions as you bring the investments on board in the future.

So this is a good possibility, but it's going to take a lot of work in terms of getting the accounting people together on the tax, statutory, and GAAP side. Investment professionals and derivatives managers need to be involved, making sure that everything's working in sync. They must have an operational plan going forward to make sure you have compliance with all the complicated strategies you've set up. There are a lot of high-level people working together to make sure this works. All the loops are closed, which includes operational controls on the trader so they don't go nuts.

Forward purchase agreements. Investment bankers can put together a package of bonds. If you want a portfolio of bonds, they will give it to you five years from now at fixed terms. The terms are nice because whatever the portfolio is yielding now,

they'll give it to you at a price that will make the yield maybe 25 or 50 basis points higher than the yield at the current level. Five years from now, you get a package of bonds that are yielding higher than those bonds yield on the books. You say, "Investment banker, you've done wonderful things for me. You've solved my risk problems, and you've actually given me a nice little spread." They will take a nice little cut, too. There's a value proposition. When we hedge long-term-care interest rate risk, we get a return for it. In this way the investment bankers will walk away with half the return, and we'll get half the return. It's better than nothing, but they're not charitable enterprises.

There are ways to do this without getting into the zone of derivatives and the zone of *FAS 133* and tax accounting and all that. One way that's often overlooked is one of your liabilities is holding company debt. You have at least as much control over the maturity structure of your corporate debt as you have over the maturity structure of your invested assets. There is one play that I've always wanted to do, but I have run into roadblocks. I've wanted to tell the CFO to issue bonds of two years, three years, four years, and five years maturity. I'll tell you the maturity because I'm going to make that the maturity that soaks up my positive cash flow. I want you to give me the proceeds of that debt so I can invest it in long-term bonds. So I invest the proceeds of the debt to match the benefit payments of long-term care, and I retire the debt from the positive cash-flow liability. This is my ultimate cash match, but you run afoul in very many ways. Standard & Poor's and Moody's look at your corporate debt and start to put a rating on it. They calculate your debt/equity ratio, and you've just shot that through the roof. Even if it actually reduced risk to the bondholders, it just doesn't look good on paper, and it turns out in some areas of the world that paper risk is more important than the real risk. I have never been able to do that. The other thing is to restructure existing debt. If you're a stock company, you generally have a holding company. You generally have some debt financing, and you ought to take a look at the maturity structure. This is not just from the long-term-care perspective but a corporate perspective. Too often the structure of the corporate debt is driven by accountants' idea of goodwill run-offs and not with an idea of what is the risk position of the enterprise. When you drill down to long-term care, you can make sure the debt maturity or rollover schedule is coordinated with the investment risk of long-term care and have a ladder maturity structure coordinated with the positive cash flow, long-term-care liabilities. If you do this, you can stabilize GAAP income and protect the holding company from interest rate risk, and actually protect the bondholders that way. Since that structure is happening up in the holding company and not in the insurance company, the insurance company retains risk that's offset at the holding company level. The holding company offsets the dividend fluctuation pattern coming out of the insurance company, but it doesn't help the risk at the insurance company itself. When you do GAAP recoverability or cash-flow testing, and it doesn't take a look at the holding company, it's not going to help you pass cash-flow testing just because your corporate debt is structured appropriately.

With long-term care it's hard to bring the assets to fit the liabilities. So why don't we turn this whole thing on its head and say, if we can't fit the assets to the liabilities, why don't we try to fit the liabilities to the asset? Why don't we try to

acquire liabilities that fill that hole? If you pool other liabilities with long-term care, it's pretty easy to invest for that. I'm speaking of liabilities like GICs, where you can actually have a reasonable amount of control over the duration pattern of those liabilities by issuing a certain amount of two-year GICs, a certain amount of three-year GICs, and a certain amount of four-year fixed GICs.

There are retirement annuities in which somebody is 65 and has a certain period in the life period. It generally attenuates over time. It's a declining cash-flow pattern that tends to fit pretty nicely with a long-term-care declining positive cash flow. The strategic concept here is these are single-premium liabilities that you're bringing to the table, and you take the single premiums for those liabilities. That's going to give me the asset base so that I can invest to match the premiums in long-term care. If I've invested those single premium assets from the complementary liability to match the benefit payments for long-term care, how am I going to fund those liabilities? Well, your answer is you've got all this positive cash flow from the long-term-care liabilities, and you use the positive cash flow, long-term-care liabilities to fund the GIC or to fund the payout annuity.

So you can make these things work together in synchronization. You do run afoul in a few places. All these strategies have little problems you must deal with. One of the things is GAAP recoverability. You try to tell your auditors, that you are investing in an integrated strategy. You want them to let you do recoverability testing for this *FAS 97* liability and the *FAS 60* liability all together. You probably end up not doing that. We have *FAS 97* and *FAS 60*.

You do recoverability testing for GICs, payout annuities, and long-term care. Eventually you have to take this wonderful integrated strategy and decompose it for all this testing. You try to deal with the GICs, but it's as if you have a short-term liability with long-term assets backing it. If interest rates go up, you're in real recoverability trouble. So there are some things you've got to work out. There's many ways to get it out of the derivatives buckets that are "not ready for prime time" yet.

What happens once the corporate enterprise understands that you can't possibly invest with normal strategies long enough for long-term-care liabilities? I'll just let my GIC line and my single-premium deferred annuity (SPDA) line invest a little longer, and that should make up for it, right? So instead of a five-year asset, that SPDA line might pick up. They're going to go seven years. –They'll go long, and we can't go long enough; therefore, we'll go a little longer for the other liabilities. The first strategy tends to be a nicely coordinated, tight package. That other strategy is a little too loose and actually leaves you exposed to some risk. It's just not tightly coordinated enough. What actually happens is you take the short liabilities and you invest it a little long. Then you take a look at if you pool all the liabilities and take a look at the cash-flow pattern of the liabilities, and the cash-flow pattern of the assets. You then find the liabilities are all spread out, and the asset cash flows are packed up in the middle. This might not be a concern if you're absolutely sure that yield curve movements are always parallel up and down.

But I remember going back to the beginning of 2000 when the yield curve was bowed up. If the yield curve bows up and you have assets in the middle and liabilities at the end, then the values of your liabilities stay where they are. The values of the assets go down. It would have been nice if the whole yield curve moved together, but it didn't. Many a company of our size can lose a billion dollars every year in that way in economic value, and we don't like that. That's what's called a barbell, and barbells are exposed to various shape changes in the yield curve. It's much better to do a tight cash match of your liabilities and assets across the whole maturity spectrum than it is to just use these duration measures without thinking about what happens to shape changes.

I mentioned that as long as you have a positive yield curve, just about any of these strategies is going to increase your returns. It's going to increase income by reducing risk. If the yield curve inverts, that relationship also inverts. There are other ways to increase investment return, and I've chosen four categories; pick up assets with high credit risks, increase reallocation to equities or introduce some equities to the mix, get some callable or pre-payable assets, or assets that are illiquid. I'm only happy about one of these categories. I think that three of these categories have pretty high risks, and one of them is pretty good for long-term care. That'll become clear later on.

What about credit risk? Everybody might have loved credit risk before last year when we received the wake-up call. The economy is not necessarily always on the stairway to heaven, and we have to think seriously about default risk. Compounding this means high-yield assets tend to be short term. No CFO of a highly risky company is going to want to commit long term. They're in it because they're in a highly risky company with some upside potential. They think they can really score big with this risky company, and they have hopes that after five years this company's going to be really good. I don't want to saddle my company with 30-year, high-yield debt and never to be able to capture that upside. For that reason, below-investment-grade annuities are usually short term. Investors don't want a 30-year commitment to a highly risky asset either. The new issue market in below investment grade issues is short term. We already said that you can't get assets long enough for long-term care. Now you have to go short. It doesn't make sense for us. A worse problem is, if you have a 10-year below investment grade bond, it is typically callable in five years. This is a very risky feature because this means that if an investment with a high credit risk is callable, it's not just an interest rate thing. It's a credit thing because if this company gets better in five years or its risk goes away, that bond's going to be called, and you don't have it anymore. You don't have the high yield in that bond. If that company gets in trouble, which is a likely scenario because that's why it's high-yield in the first place, then you have the bond for ten years. You have a good bond for five years and a bad bond for ten years. In the liability community, we call that anti-selection. That's pretty material antiselection in this territory, and it's an antiselection for which there's no reserving. We get the high yield now. We don't reserve for this antiselection issue. We just suffer in yield later. –We suffer in yield or suffer in default or you sell it at a big discount and suffer in a capital loss, too.

The bond market is highly efficient. You have to be thinking that if you are picking up a high yield because there is a high credit risk, you are also picking up risk with that, too. You don't get something for nothing in this world. The other nasty thing in terms of shareholder value for high credit risk (and it's even nastier for equities) is that credit risk is highly correlated with equity market risk. It's highly correlated with the risk shareholders already have in their investment portfolio. So if you're really acting as a fiduciary for your shareholders, you don't really like to pick up yield from things that are actually transferring to high risk for the people you're supposed to be taking care of, your shareholders. That's in terms of beta. Higher credit risk is higher RBC, but that's just part of the story. It's the risk profile of your book of business that you have and how that translates to shareholder value where credit risk and equity risk really make little sense.

There are some assets out there that are not short term or callable. If you are going to pick up credit risk, these assets would make a little bit more sense in terms of long-term care. These would be fallen angels. They might recover, or they might get worse, so I can use the secondary market to get a 25-year, non-callable bond at a fairly high yield. Latin American bonds and things in other emerging markets are another example where you can get long-term, non-callable structures.

Another asset category that everybody has been very fond of increasing until last year when the bottom dropped out is equities. When you invest in equities you might think that makes sense for you. Maybe some of you that have more wealth than I do invest in equities. In the long term, you're going to get extra premium, and the risk cancels out over years. You don't have to worry too much about it. An insurance company is a levered instrument. An insurance company issuing equity or investing in equities is like an individual investor investing in equities with a very large margin. An equity investment at an insurance company is like a highly levered equity investment for an individual. So you're essentially borrowing money and then investing in equities.

An insurance company is essentially a leveraged financial instrument. If you invest in a lot of equities in order to handle this kind of leverage, it has implications for what your capital structure has to be. If you have a highly risky investment portfolio, you better not have a high debt-to-equity ratio, and you better make sure, if you invest in a lot of equities, that your corporate financial structure is appropriate. So the more you invest in equities, the more you've got to raise your capital in terms of equity instead of debt. I find it more effective to have a more highly leveraged financial enterprise than to get involved with the highly costly strategy of raising equity capital. Equity capital is particularly inefficient when you take a look at the double taxation of capital gains. Why would we go through all the inefficiencies of raising equity capital support investing in equities?

I have to make a modification for mutual insurance companies. Mutual insurance companies don't have the substitution opportunities between having a debt capital structure and an equity capital structure. They're pretty much all equity. The other nice thing about a mutual insurance company is the dividends to policyholders. You

pass gains and losses in equities to the policyholders, and you get to take a deduction for the dividend payments that you hand over to the policy. So the cost benefit situation in a mutual company is very much different. So I'm not necessarily adverse to a mutual company with a lot of surplus to invest in equities, but I would definitely recommend against it for a stock company.

For callable and prepayable assets the yield is high in the beginning. It has nowhere to go but down. You lose it just when you want it. You lose a callable bond or prepayable bond just when you would really like to have it. Interest rates go down. Your high-yielding bond goes away, and you have to reinvest the proceeds in a lower interest rate environment. Rates go up. I don't mind reinvesting it when rates go up. Sorry, this is going to extend out. You're going to hold it for 30 years. I don't like that. I've also mentioned the credit side. When you have a callable bond that has credit risk you lose it when the risk of the bond goes away. You keep it when the risk of the bond gets worse.

I won't talk a lot about negative convexity. There are a lot of things going on behind the scenes, but at the end of the line there's a hidden cost of having these kinds of structures. What happens if you have a lot of these things in your portfolio and you go through asset/liability management to manage duration over time and you end up finding out that all the long-term bonds we have in our portfolio are from low interest rate environments? There's a certain dynamic in terms of the dynamic hedging strategy you have to do to manage negative convexity. You end up losing the assets that you acquire in high rate environments more quickly and retaining the assets that you acquired in low interest rate environments for a long time.

Liquid assets, privately placed bonds and commercial mortgages are assets that give you a higher yield. Why do they give you a higher yield? You can't sell them very quickly. Do we care? Do we ever have to sell long-term-care assets quickly? No. What happens when our customers walk away? We keep the assets. You might say, "Hey, they're ours." There is no cash value here, folks. If you want to walk away, walk away, but we get to keep the cash. Other product lines have to seriously worry about disintermediation. Interest rates go high, policyholders leave, and they have to sell their assets quickly or you get a run-on-the-bank type of situation. You can't satisfy your policyholder demands, and everybody is lining up at the door. We don't have a run on the bank in long-term care. We might be asked to support the liquidity of other product lines. That's a different story. From the perspective of long-term care alone, we want to take advantage of the inherent positive liquidity properties of our business and get higher returns because of that.

Why don't I like U.S. Treasuries? They come across as an enemy of credit risk. You might think I would love U.S. Treasuries, but I don't. I don't like any asset that you pay extra for because you can sell it fast. U.S. Treasuries are a prime example. You pay a higher price for it; that is, you accept a lower yield for it so that you can sell it fast, but you never end up selling it fast. So you're just letting value sit on the shelf and never using it. It's sort of renting liquidity and never using it. Pure credit risk is something you just plain pass through your shareholders. That's not true

about liquidity risk.

If you can take on liquidity risk, manage the liquidity risk, and transfer illiquid claims to liquid claims, then you have a fundamental source of value creation for a financial intermediary, and it's something you have to think of. Personally, I spend a lot of time thinking of how I can I go past privately placed bonds and commercial mortgages and come up with more innovative strategies that really press on the liquidity properties on long-term care.

MR. NEWTON: I'm going to summarize. We've given you some very complicated stuff in a very short period of time. Some of this takes a lot of practice and a lot of time to just think about and study, especially with each other. Liability people should be talking to the asset people. As a corollary to that, and the asset people should be talking to the asset people. Why is that? Some of the best structures for dealing with the long-term-care investment risk happen to be innovative solutions that you can manage between segments or between product lines. You can use retirement annuities, single premium deferred annuities, or GICs. Those kinds of investment properties for those segments can be used on the flip side to help long-term care assets, so it's a win-win situation for both. As long-term-care actuaries that talk to your long-term-care investment people, don't forget to invite some of the other product lines. At the same time, see if you can come up with a better solution between product lines.

We pricing actuaries are making bets about interest rates. When we price long-term-care products, we're setting one interest rate or maybe a set of interest rates over a period of time. We're making interest rate bets for 30 years or longer. In addition to that problem, long-term care products tend to run in generations of two to four years. So you're refreshing your products. You are not only making a bet on the products that you're going to sell in the next few months, but you're also making a bet on a product that you won't even sell for six months from now because you have to file it. It'll be out there for two to four years. The bets that you're making when you implicitly price a product will stand the test of time and will be there for a long time.

The other reason you should get involved with this is because it's fun. Much of this is pretty meaty stuff. This really will do a lot to expand your horizons. Intellectually, you're going to have a great time when you try to integrate the asset side with the liability side and vice versa for the asset people.

The other reason to do it is because you can be a hero. There are very few opportunities where you can reduce the risk of the coverage that you're selling and get paid for it. It's almost a no-brainer when you start to try, especially if you go down the derivatives route. Derivatives are a very crude instrument as you'll find when you get into this. The yield curve shaped the way it is these days can be very advantageous, and it can add a lot of dollars to your bottom line.

Communication is sometimes very difficult because the asset people don't understand the liability people and vice versa. You can't just call a friend and set up

a meeting. It's going to take a series of meetings to really understand what's going on. The asset people will want a lot of data. I can't do anything to solve your problem until you give me much more results in terms of projections of cash flows. Don't even bother to give me one. I want to see what happens under several different kinds of scenarios. What if interest rates do this? What if lapses do that? What happens if claims are more or less than you thought? They'll be looking at stochastic kinds of scenarios, and there'll be some work on your side in that part of the process. Let me stop with the summary there and offer up the rest of our time for questions.

MR. GERALD J. RANKIN: Many of the buyers of these products pay for them out of investment income. The older citizens seem to be conservative. So they're, to some extent, funded by CDs. If interest rates drop, there has to be some impact on lapse rates, especially if your buyers are 70-and-over issue age groups. What do you think if the industry would promote the CPI feature rather than a 5% guaranteed compound rate which is probably above historical CPI and would track a little better with the interest curves?

MR. PITBLADDO: That idea about CPI is a reasonable one from the point of view of the policyholders' risk and the actual coverage of their benefits. If inflation runs away again, then the value of their long-term-care policy erodes. I think that's a reasonable thing. That would definitely reduce the duration of the liabilities, too. From an asset/liability management standpoint, that would change the picture quite a bit.

The policyholders are into their policies for the long term. The reason they don't lapse is because they have all sorts of pre-fund building up, and it takes a huge change in interest rates for them to walk away from the whole thing. Once you get out 10 years, the interest rate sensitivity from the policyholder perspective is just not there. In the first policy year, if interest rates go down or go up, and all sorts of companies then manage to file quickly and reduce premium rates, then you might get people jumping over from the policy they just bought. That's a possibility. We don't see any data to show that that is material at all. We haven't seen any reason to worry about that.

MR. NEWTON: I come at it from a slightly different angle, and I understand your comment about lapse rates. When lapse rates are 1%, how much can they change from that? From a consumer point of view, if there is a risk, like the investment risk, that [the insurer] can actually do something about, then it should, not only because it's good for the insurer but because it's good for his customers. I would not want to be in a position of losing a lot of economic value for my company and trying to pass that on to consumers who really expect that their long-term-care policies are going to be there for the duration. We don't know a lot about some of the areas of claims, and if you don't know about these areas, you can't do anything about them. To some extent, I think we're saying that you can when it pertains to the investment risk. So, if you could have done that, and you should have done that, and you didn't do that, then I would say, shame on you for not doing it. You shouldn't go back and expect consumers to eventually fund you out of something

that you should have been doing for them already.

MR. JAMES M. GLICKMAN: Other than the obvious solution of doing periodic non-billings to increase your lapse rates, it sounds like that is the best practical solution, given the accounting world and given the instruments that are available. My concern is you have to have such a high level of sophistication, and you have to know that the people that you're using are not just stating the sophistication but actually have it. What, for practical purposes, should a company be doing either to get into derivatives on a safe basis or to find an investment manager who really understands all of the implications?

MR. NEWTON: I have a couple of concerns about derivatives. Richard said, don't try this at home. Derivatives are not for everybody. First of all, derivatives are a very blunt instrument. When you enter into a derivative agreement, there's always credit risk or counterparty risk, on both sides, if you want to call it that. For smaller companies, derivatives might not be an option just because there's not a party on the other side who's willing to take the other half of the risk that you want to put out there. You're going to need to look to other solutions. Once you enter into a derivative position, you need to change it from time to time. It's not a static thing. We have layers and layers of derivatives and we try to rebalance them or get out of them entirely, which can be somewhat complicated and expensive. Derivatives are useful for getting a start on the problem, but I would not suggest derivatives as the permanent and only solution to the problem.

MR. PITBLADDO: I would not recommend your company starting a derivatives operation for long-term care. That probably applies to companies that already have an ongoing derivatives operation with the appropriate amount of oversight. Put your effort into the alternative solutions, some of which I tried to outline. I'm actually trying to press on some of these other solutions because I like some of the properties of them. There's a lot of credit risk protection in them. If the counterparty that you're dealing with gets downgraded, they essentially get marked to market and transferred. So I'm not actually too concerned about the credit risk. We're dealing with AAA parties. What Mark said, though, is that if your company doesn't have the confidence of the other parties, don't even think about getting started in derivatives. But if you have corporate debt, you can structure that. If you have other liabilities, you can make sure that they fit together as a package with long-term care. I wouldn't downplay these other strategies. There are a few things that have to be worked out.