

RECORD OF SOCIETY OF ACTUARIES 1994 VOL. 20 NO. 1

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

Moderator: STEPHEN D. REDDY
Panelists: JEFF F. MULHOLLAND
 TIMOTHY L. PATRIA
Recorder: STEPHEN D. REDDY

- Types of Investments
 - CMOs
 - Structured Bonds
 - Other
- Uses
- Implications
 - RBC
 - IMR
 - Disclosure
 - FAS 115/Hedge Accounting

MR. STEPHEN D. REDDY: This session is Fixed Income Derivatives—Uses and Implications. I think this is a timely topic. Hardly a day goes by when you don't see an article on derivatives in the paper or some magazine. Unfortunately, they're mostly negative in some respects. Hopefully we'll send you away with a better impression of derivatives after this session. We've got an excellent panel. Even though we're a little bit short in number, I think you'll find we're not short in stature, and we have some wide experience on the panel to give you some good food for thought on this particular topic.

First, Tim Patria from Hartford Life is going to give you several examples of things you can do in this field. Tim's worked in traditional actuarial roles of life and health pricing and financial reporting. Five years ago he moved over to the investment department, where he's now a portfolio manager.

Next, Jeff Mulholland from Goldman Sachs will be speaking. He's the vice president at Goldman Sachs responsible for marketing derivatives to insurance companies countrywide. He has worked for Merrill Lynch and UBS in similar capacities. Prior to that, he worked as an actuarial consultant for three years. Jeff graduated from the Wharton School, magna cum laude in 1985.

I'm Steve Reddy. I'm a vice president in Morgan Stanley's fixed income division in New York. I've had the opportunity there the last couple of years to work on lots of derivative work. I've seen how these things are put together, how they're priced, and how they're traded; so hopefully, that qualifies me a bit to be on the panel and share a few thoughts with you. There's obviously lots to cover here, and we can probably go on all day and still have a lot left uncovered.

Any session on derivatives has to start with a definition or two because it's not exactly clear to everybody what they really are. *USA Today* had an article on derivatives, and this is what I view as one of those classic definitions: "Customer-designed financial contracts based on (derived from) the value of a stock, bond, commodity or currency, or whose value is linked to a financial index or to an interest

rate." They're indicating a financial contract derived from the value of some underlying instrument, or an interest rate, or financial index. That's a fairly typical definition.

We can move on to a definition that is perhaps a little more cynical, which I found in *Fortune* magazine a couple of months back. I don't know if you can all see it, so I'll just read it. "Concocted in unstoppable variations by rocket scientists, who rattle on about delta, gamma, rho, theta, and Vega. They make total hash out of existing accounting rules and even laws." For better or worse, most of that is probably true. I'm not sure about the "rocket scientist" part. Maybe it should say "financial geeks" or something like that. Certainly with regard to existing accounting laws or accounting rules, they certainly have made hash out of that for better or worse. And it's just going to be a matter of time before those things really catch up to insurers. Derivatives are something that can have a lot of value, and like some other things, can be used or abused. As you know, many articles focus on the abuse of derivatives and how they're mismanaged. We're going to try to focus on how they can be properly used and why insurance companies should include them in their portfolio.

I've got a third definition here where I tried to put a better spin on it. "Vehicles that offer a more convenient or desirable form of exposure to various risks; they offer customized exposure to such risks with risk return profiles that may not otherwise be possible." That's the kind of definition that I would offer up. Again, the main message is that these things allow you the opportunity to get exposure to something, or a risk reward profile, that is just not available in the more traditional, asset classes.

Again, because you're able to customize something, it offers many opportunities. So you can use it properly, or it can be abused if not done prudently, but certainly the opportunities are there. And our panelists are going to provide several examples of different kinds of exposure to risk return profiles that are out there, can be achieved, and are currently being done today. And with that, I'll turn it over to Tim Patria.

MR. TIMOTHY L. PATRIA: Recently I was talking to a group that was forming and was going to be using quite a bit of derivatives. They said the biggest boon to them forming was the cancellation of the nuclear accelerator project in Texas because they were able to hire all those laid-off physicists. So in effect, they do employ those rocket scientists.

I see my role as trying to tell you a bit about the derivatives market, how I see it broken up, and try to give you a definition of what it is, since it's several different things now. It's no longer just one specific type of bond or off-balance-sheet derivative that you may have heard of in the past. I want to show you how you might be able to use them to quantify and hedge some of your risks. I also want to put a sense of caution into you. These things involve a lot of leverage. They, as you've seen in the newspaper recently, can cause heartburn for a corporation. Then I want to give you a few parting words on regulatory limits, where I think limits might make some sense, and what those limits should be.

I see the market broken up into two basic categories: the on-balance-sheet and the off-balance-sheet derivatives. The on-balance-sheet derivatives are those that are going to show up on your balance sheet with a specific value. If you purchased a \$10 million bond, it shows up on your balance sheet as an asset worth \$10 million.

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

One of these forms is collateralized mortgage obligation (CMOs). A CMO is a collection of home mortgages. Most people in this room have home mortgages. If we put those together in one pool and invested in that, we just own the standard mortgage pool. But now, let's say we sliced and diced it up. Let's say the first five years worth of cash flows were bought by this side of the room, the next ten years worth of cash flows were bought by the back half of the room, and then the last 15 years worth of cash flows were bought by this part of the room. That's 30 years worth of cash flows; standard 30-year mortgages. But now we've tranced it up, or broken it up (they're called tranches) into three separate parts and sold them to three distinct investors, who needed *just* those particular cash flows. That structure is a sequential structure because as the homeowner prepays his mortgage, the first tranche is paid off first, then the second, and then the third, in order. There are probably hundreds of different varieties of CMOs, all which have different exposures. You can no longer say what your risks are going to be and that it's going to be like a standard mortgage. They're very difficult to model. Most analytical packages don't cover the entire CMO universe very well. Even if you have all the data necessary to model bonds in terms of historical information, you still can't know for sure what the prepayments are going to be like. As we know, most of you in this room probably refinanced your mortgage. When you did that, you prepaid your mortgage. So those of us who owned mortgage products got our money back faster than we expected. For instance, this first group may have expected their cash flows evenly over the first five years. But because you all prepaid your mortgages, they got their money back in one year instead of over five years. That's something that has to be projected. We have to take a look at what the risk of the bond is going to be, based on the various prepayments. As rates rise now, people aren't prepaying, and instead of a five-year payback on the mortgage, it pays the principal over a ten-year period. They've actually extended, and that carries with it a variety of risks.

Some tranches actually perform better as prepayments are faster. Some perform worse. Some tranches perform better as prepayments change, regardless of whether prepayments are faster or slower. Some perform worse, no matter whether prepayments are slow or fast. Like I said, there are many varieties of CMOs that these rocket scientists have thought up.

The structured notes are more like a standard corporate bond, where you're getting your principal back at some fixed, maturity date period. But you want a bell and whistle attached to it. For instance, maybe for the first two years you want five-year Treasury rates. For the next three years, you want short-term floating rates. And for the last five years, you want ten-year rates. You can build this profile into one bond structure. These bonds are going to be carried on your balance sheet at amortized book value. Now let's move to the off-balance-sheet derivatives.

I'm only going to talk about the swap contract; the others are listed for information. A swap contract is more of an agreement to do something. For instance, let's say I have equity returns, but I don't want equity returns. I want bond returns. I can swap my equity returns to someone like Jeff at Goldman for bond returns. Upfront, that's just an agreement. Neither one of us has paid anything to the other. For some of these other derivatives, such as caps and floors, you might pay a small premium; but for a swap contract you don't pay anything, so it doesn't even show up on your

balance sheet. But certainly your risk profile has changed, because you're no longer exposed to equity returns; now you're exposed to bond returns.

The other main difference between the two types of derivatives is that off-balance-sheet derivatives tend to isolate your risk down to one particular risk. With a swap in this case, we isolated it down to bond returns. I'm collecting bond returns, so now I have interest rate risk, but that's basically all. I didn't pay anything for the structure, so my credit risk is small (we'll talk more about that later), so it's really just interest rate risk that I now have. Whereas if I bought a CMO or a structured note, I'd have interest rate risk, but I'd also have prepayment risk with the CMO. For the structured note, I might also have credit risk. So there's a multitude of risks that are inherent in the on-balance-sheet derivatives that you can get rid of. You can isolate the one risk that you want to either buy or sell when you go into the off-balance-sheet market.

Now why do we want to use derivatives? As you heard before, it can be a customized structure. Like that structure note I talked about, where you have your changing interest rates. That's not going to be available in the public markets. You have low transaction costs. This is primarily for off-balance-sheet derivatives. There are some markets where the off-balance-sheet market is actually more liquid and more efficient than the cash market, such as the stock market for instance. If you want to buy S&P 500 exposure, you can buy all 500 S&P stocks. That actually might cost you more than if you just entered into a swap where you're collecting the return of the 500 stocks. It's actually easier to do a derivative, and it costs less in terms of commissions over time and in terms of how you're going to move within the market over time, or around the one transaction date when you buy or sell.

Portfolio flexibility is another reason to use the off-balance-sheet derivatives. For instance, let's say you had a ten-year bond exposure, and you're worried that rates are going to rise and that bond is going to lose value. So you really want short-term rate exposure. Well your bonds are now at a loss and you know that if you sell them, it's going to show up in your GAAP accounting as a loss for that period, and your management just won't stand for that. But you definitely want to get rid of that exposure. You can do a swap contract, where you swap that exposure away and get short-term rates. Now you've got the exposure you need, but you haven't taken that loss. Effectively, you've amortized it over the period. Another reason could be that you have an equity manager that's doing outstanding things for you. You've got someone whose benchmark is the S&P 500 and they're earning 4% over the S&P 500, but your company doesn't want equity returns anymore. You can get out of the equities and fire the manager. Now this manager might be a jewel; his four percent is tremendous extra performance. You can enter into a swap where you pay the S&P 500 and collect your bond returns. You've kept your manager, because he can continue outperforming his target, and just pass the equity return to somebody else. But you've kept that extra performance, that 400 basis points, that can now be thrown on top of the bond return you just collected on the other side of your swap.

Getting into derivatives shouldn't be done lightly. It requires quite a bit of an investment. Your standard settlement procedures probably are not going to be adequate. Many of these contracts, for instance, futures contracts, are marked to market and settled in cash daily. You're going to have to designate people in your shops to monitor, not only the mark to market and make sure that this cash settles back and

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

forth every day, but you're also going to have to put somebody on the analytical side to make sure they can monitor the risk. You don't want to be caught owning an exposure or selling an exposure that you didn't really want to sell or buy.

An education is going to be required, not just for yourselves to get into these types of contracts, to understand the risks and the trading conventions; but you're going to have to educate senior management. They're going to have to know what you're doing. You don't want to surprise them with any large gains or losses. The same applies to the accountants. You want to let them know upfront what's going to be happening. Your tax people are going to have to know what's going on so they can figure out how these contracts are going to be taxed.

You have to forge new relationships. You have to talk to brokers and negotiate contracts. You have to find out who is going to provide a market. Who's going to be there when you need to sell the exposure you own? You don't want somebody who is willing to sell you everything, but never willing to buy it back from you when it's time to get out of that contract. You want to make sure they're going to give you reasonable prices. And you're going to want to make sure that they can explain the risks to you about the contracts they're showing to you.

You're going to have to get comfortable with credit risk. Whenever you're dealing with somebody, just like you're dealing with them in reinsurance, you want to make sure that the party that you're dealing with is going to be there to pay you when it comes time for you to collect.

For an off-balance-sheet derivative, the only time you have credit risk to a counterparty is when they owe you money. So on day one, you paid nothing for a swap contract. If it's mark to market, and you're at a gain, they're going to owe you money at some time in the future. You have a credit risk for that amount of money. So, for instance, if you bought a bond, a \$10-million bond from some investment bank, your credit risk to them would be a full \$10 million. If they defaulted, your bond would be worthless. But if you had a swap contract, where you were just collecting a fixed rate from them, you're not sure what the credit risk is going to be. For instance, if the bond was marked to market, if rates rise, the bond is worth only \$9 million. Your credit risk to them would now be only \$9 million. In a swap, if the same interest rate movement would cause you to owe the investment bank \$1 million, you now have no credit risk to them. You're actually owing them. So in that case there's no credit risk, and if rates move only a small amount, you still would have no credit risk. It's only when they owe you that a risk is going to exist. And it's generally going to be a much smaller size than if you owned the bond outright. So the credit risk is very much diminished, but an important piece that you still have to quantify.

The hedge documentation can be rather burdensome. I don't know about your firm, but our accountants want to know the day we get into the trade why we're getting into it, and when we plan on getting out of it. As it goes along, they want to monitor it and make sure it's doing what it's supposed to do. When we get out of it, they want closing documentation. I imagine you're going to find a similar situation in your own shops.

The regulatory uncertainty is tough to deal with because you don't know for sure what's going to happen in the tax area. You don't know how it's going to show up on your books. You don't know how *FAS 115* may impact any of these contracts. Let's take a look at an example of how you might use these contracts.

Let's say you have a Universal Life or single-premium, deferred-annuity block of business, and you want a crediting strategy that varies with five-year Treasury rates. As those rates rise, you want to be able to pass more interest to your policyholders, and vice versa, as rates fall.

Let's assume you have a \$100 million block. You could purchase a CMO floater, where its coupon is the five-year Constant Maturity Treasury (CMT), let's just call it the five-year Treasury, minus 25 basis points. I've taken some liberties with some of the prices I'm going to be showing here, so don't take them as absolute fact in the marketplace. The coupon cap is 10 percent. So if rates rise significantly, the largest coupon you could receive is 10 percent. If rates rise to 12 percent, you're locked in at 10 percent. So you do have a risk there. Because of the prepayment risk, you don't know whether you're going to get your money back in two or ten years. If you need that money back in five years, and it comes back to you in two, you don't know whether you can reinvest it and get the rates you need. You don't know if the yield of CMT minus 25 basis points is going to be available two years from now.

If what you're really worried about is that rates go to 15 percent and your policyholders are going to leave you because they can go elsewhere and get better rates, a capped security will not satisfy this need. This bond isn't always liquid in the marketplace. There are times when it trades very actively and very fairly priced, but not always. There are times when investors just aren't looking for this kind of exposure, and you may not be able to sell this particular bond.

So let's go to a different structure, one that takes care of some of the problems with the CMO tranche: the structured note. Here again, the bond is going to be issued by some corporation. The coupon, again, is the five-year CMT minus 25 basis points. In this case, you've gotten rid of the coupon cap, so that ceases to be a problem. Principal repayment is five years. You know for sure that it's going to be five years, so a little bit of your reinvestment risk is gone. Also, if you needed the money in five years, you don't have to worry about what the mark to market is going to be. However, you've increased some risks over the CMO structure. Now you've got some credit risk. The CMO is generally guaranteed by either a government agency or a quasi-government agency. This bond is going to be guaranteed by some industrial corporation, which could go bankrupt. So now you've taken on some additional credit risk. It tends also to be a little less liquid than the CMO, because of all of the private placement documentation. There's going to be an inch-high-thick stack of documents that are prepared to build a bond like this. And if you want to sell it to the marketplace, someone on the other side is going to have to read all these documents. And quite often, the market's not going to be willing to do that.

So let's see if we can go to the off-balance-sheet side and see what that does for us. In this case, we're going to use a swap. We're going to purchase short-term assets, so we're going to be earning short-term rates. We already know that we don't want to earn short-term rates. We want the five-year CMT. So we're going to turn to a

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

swap where you collect the five-year CMT minus 70 basis points, in this case for a five-year period, and pay to our counterparty short-term rates, which in this case will be London Interbank Offered Rate (LIBOR). So you're earning LIBOR on the assets, paying LIBOR on the swap, and collecting the five-year CMT based return. Net all and you've got an exposure to the five-year CMT, which is what you're looking for. There's no cap. So the risks are: the credit risk of the short-term assets, which are often deemed to be a little more creditworthy than the longer-term assets or a little safer, because you can see problems coming in a thirty-day period that you can't see in a five-year period. The credit risk of the swap, which we've already talked about as being of small size in comparison to on-balance-sheet assets. Probably the biggest risk is going to be the management of those assets. If you have a hundred-million dollars in short-term assets, and a hundred million notional size of a swap, again, you didn't pay anything for the swap, but you want those two to be working in tandem. If those two get out of whack, I mean, the short-term assets fall to \$80 million or rise to \$120 million, you haven't managed those things properly. You need that short-term size to go along with the size of the notional swap until it matures.

You may be thinking to yourself, "Well Tim, thanks for all this great information, but why are you telling this to us? Tell our investment department so they can do all this investing for us. How can I apply any of this stuff to my general day-to-day work?" Well, this can help you talk to your investment department. You can tell them these things exist. Maybe they don't know it. If you want your credited rates to rise basis point for basis point with rises in interest rates, they may look at you and say, we buy fixed-rate bonds. If we buy a five-year bond, you've got that rate for five years. That's not going to change. If rates rise, you're stuck. They might not know about these types of securities. They might not know about CMT exposure or what you're trying to do, so you need a way to bridge that gap and talk to them in their language. One thing they do know is how to earn LIBOR-based returns. By talking to swap counterparties, you can take that five-year CMT exposure that you really want, find out what current swap terms are, and say to your investment department, we need you to earn LIBOR plus 25 basis points. Because you already know that you're going to earn LIBOR plus 25 basis points, you can pass LIBOR on to the swap counterparty, and you can get your CMT exposure. You know what that's worth, and when you talk to your investment department, they've got an understandable short-term-rates benchmark to try to beat. You have just bridged the gap.

Even if there is no gap to bridge, you can use derivative prices to price your business, because the marketplace is telling you what they can give you in terms of CMT exposure in today's market. In this example, you're earning 70 basis points below five-year Treasury rates. If, to sell your product, you have to earn 70 basis points above five-year Treasury, you ought to take a step back and think about that. You're bucking the market. The market's telling you the most that you can possibly earn in this marketplace is minus 70. It may be pie in the sky to be able to go plus 70. You might be creating a situation where the only way you can credit your policyholders what you want to, and to sell this kind of business, is to guess where the market's going, pitch your portfolio that way, and be correct. Well if you're that good, to do all that, you might as well manage your own money. You can make millions and keep it all yourself.

This establishes a market price that you have to think about. How much risk are you going to take in your portfolio to be able to sell business? You can also go one better than what I've told you here, with a customized, five-year CMT swap. You can talk to a counterparty and give them your lapse information. You can even say that if rates go up 100 basis points, I think lapses are going to be 20 percent. If they go up another 100, they're going to be another 25 percent. You can give them schedules for rates changing up and down. They can design a swap that will have a notional size, follow those lapse rates with the credited rate paid to you in whatever format you specify. If you thought you would want a portfolio CMT rate to rise as rates rose in the marketplace, but at some point the portfolio rate doesn't need to rise further, you can build that into the structure. The structures can be very flexible. There is no standard product in the marketplace. You can design whatever you want.

I'm sure a number of you have had a few sleepless nights the last quarter of 1993, when rates were very low. Many of us have guarantees on our contracts that are three percent up to 5.5 percent, and rates went to the point where you probably couldn't earn enough to cover both the rate you were crediting to your policyholders, that you guaranteed to them, plus get your profit margins. We were in a box. If rates went lower, we were stuck. These guarantees were going to cost us a lot of money. At least in loss of profits, if not outright loss. How do we take care of that?

Well, one thing we can do is buy a floor. Let's continue using the example I have been using, this five-year CMT product, with a four percent rate guarantee. A floor gives you the difference between whatever you put the strike rate at, in this case, four percent, and where rates are in the marketplace. If rates went to three percent, and we had done nothing, we're going to have an outright loss to the tune of the difference between three percent and four percent that we guaranteed. Let's pretend we have no margins in our business at this point. For the floor, we can buy a \$100 million notional floor, again, because we sold \$100 million of business. This floor will give us the difference between three percent and four percent in cash as a payment. The maturity date can be whatever we can afford, or deem appropriate, for the block of business. You do have a credit risk here because you have paid a premium to the counterparty. That premium is going to define how much this floor cost you, and if you amortize it over the five-year period, it should determine the reduction in the credited rate you give to the policyholders, so you can pay for this floor. If you don't pass through the cost of this floor, whether you do this floor or not, you're essentially giving the policyholders an option for free. The market's telling you what that rate guarantee is worth. There's no way around it. If you don't pass that through to your policyholders, you're taking a risk. If you don't do the floor, certainly you're taking a big risk. But there's no sense giving away this option for free.

I'm sure a number of you have read *The Wall Street Journal* over the last two weeks. There's been a number of articles on derivatives. I just cut out one of the most noted ones about Procter & Gamble and its experience with derivatives. I want to read a few quotes here. "After taxes, the charge for the period ended March 31, will be \$102 million. Derivatives like these are dangerous. And we were badly burned. We won't let this happen again," said the P&G chairman. A little later on, Mr. Nelson, the P&G's chief financial officer said, "The individuals involved didn't fully understand what they were up against, in terms of swaps that were presented to them. From a

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

control standpoint, we should have never gotten into these." This can happen to you. If you don't know what you're doing, if you don't know what the risks are, if you don't take a look at interest-rate scenarios that are not just within a narrow band, you can find yourself in the same situation. If these folks really didn't understand what they were doing, and this cost them \$102 million, that's a tremendous loss. Think of what the loss of surplus would do to your company in terms of lost sales, policyholder dissatisfaction, and worrying about the effects of rating agencies. You might have a run on the bank occur in a scenario like that. That's a risk that you just can't take. That can easily happen. These are very leveraged instruments. They can be monitored. The risks can be quantified. Some of the risks can be controlled, like I just showed you with the floor. But you've got to be a little careful about what you're doing, and don't rush headlong into doing these contracts.

What if you had seen the headline, "Major Insurance Company Loses \$100 Million In Futures Trading?" What would you think? Your thoughts would probably have been similar to those you experienced when you read the Procter and Gamble article, which was, oh my God, these guys don't know what they're doing! And this is scarier, because it occurred in a financial services company. If you have a financial company all of a sudden blow up, start thinking about what the regulators are going to do to you. They're going to limit what you do, severely.

Let me show you a scenario that might make you question whether public information always gives you the complete picture. Let's say you sold a ten-year annuity. In fact, we can just call it a ten-year GIC contract for now. The policyholder gives you a dollar on day one and in ten years, you're going to give them \$1 plus the interest at 7.5 percent for that entire ten-year period. No withdrawals occur in between the start and end dates, and let's say on day one, they give you cash. For instance, let's call this a \$1-billion assumption reinsurance. You're taking over a large block of business from another company. In fact, this is very possible. The Hartford has done something similar to this just within the past year. In fact, the numbers were probably even bigger. And let's say, when you take over this business, the company you're taking it from gave you \$1 billion in cash. You've got to do something with that cash. You're probably going to go out and buy something like ten-year bonds or ten-year duration assets. Well, what if you didn't do this right away? You have the cash. There weren't bonds to buy. Either they weren't available or they didn't give you the kind of margins you needed. Let's say the market moved very shortly thereafter. Well, what's going to happen? Well certainly if the market doesn't move, you're here at the zero line and your liability is going to be marked to market at \$1 billion. Your assets are also going to be marked to market at \$1 billion. And your surplus impact would be zero. Let's say the rates moved up and down 1.15 percent or 115 basis points. You can see if rates moved up, your liability is worth less, \$899 million. Your cash is still worth a billion; that hasn't changed in value. And the impact on your surplus is positive. What this really represents, since we know liabilities are not marked to market, is the present value of the fact that you can now take your cash, buy bonds earning 8.65 percent and credit only 7.50 percent to the policyholder. So over a ten-year period, you're going to get this excess lift off. It doesn't show up on your books this way on day one.

A similar situation happens when rates fall, except now, you've lost. Although it won't show up on your books this way, you have suffered an economic hit of \$114

million, whether you admit to it or not. That doesn't seem very prudent. You're taking a large amount of risk here. Why would you want to do this?

One thing you can do to avoid that situation is to buy a futures contract. Futures contracts will lock in interest rates. In this case, we bought a ten-year futures contract and we've locked in the ten-year rates on day one, at 7.50 percent. Again, you can see if rates don't change, nothing happens to your surplus. Your liability and assets are each worth \$1 billion. Again, as rates move up and down, the liability is going to be marked to market, as will the cash. Now your futures contract has lost \$100 million as rates rose. That can be the \$100 million futures loss mentioned in the article. But is that the whole story? No, not at all. The story was that this company hedged its risk. It took care of a risk that was inherent in the product and although it lost on the futures contract, it did exactly what it was supposed to do in that environment. Really, what it was supposed to do is take care of a problem that could occur down here. It just so happens, you lose here. But it doesn't matter. Surplus impact was zero. It protected its margins. It got exactly what it expected.

Now that I've told you a couple of things you can do with derivatives, let me tell you a few you can't. State insurance laws, for the most part, don't let you speculate in derivatives. You can't just say, pork bellies are going up, so I'm going to go buy pork bellies. You've got to have a reason for doing them. Either you're trying to hedge an asset or a liability, or cover some risk of your company. The other thing you should not do (you can do this, but you shouldn't) is destroy your asset-liability match. That seems very obvious.

Let me give you a scenario where, as you're in a meeting, you might not even recognize the outcome as destroying your asset-liability match. You could be talking about *FAS 115*, where you have to mark to market your assets for GAAP surplus purposes, but you don't get to mark to market your liabilities. Management may see that as rates rise, their assets are worth less and less, and the GAAP surplus is falling because of it. They may want to limit that exposure. For some reason, GAAP surplus becomes very important to them. They may decide to sell those long-term assets we have and go into short-term assets, so as rates rise we won't lose anything. On the surface, that seems quite logical. Great. We'll make sure that our GAAP surplus doesn't change and we'll all be happy. But, let's go back to this scenario. This is what happens when we didn't buy long-term assets and we stayed in cash. I think you've seen this chart before; you got crushed! On the surface, you solved an *FAS 115* problem, but you may have just set yourself up for tremendous, real economic risk.

I promised some parting views on regulatory limits. You know, there's been some thought about how much should an insurance company be allowed to do? Maybe there should be some pigeon-hole kind of rules where you can't do more than some percent of your assets in derivatives. My personal opinion is if you can monitor these assets and display that you know what the risks will be over broad, interest rate or equity movements, (whatever risks you have, and you know you can quantify it and you know that you can stay solvent), and that the rest of your portfolio is pitched in a way to deal with these particular transactions, you should be able to do a lot of derivatives. As we can see, there's great risk-limiting ability for these transactions, whereas, sometimes if you don't use them, you're taking more risk than if you do use

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

them. So for those companies that are sophisticated to deal with them, I think low limits are actually rather imprudent.

On the flip side, I'd also say companies that can't deal with them or don't have the technical know-how to understand them should probably not get into the market at all. And I hate to see some company that doesn't know how to deal with them put 10% of their assets into these kinds of asset classes, if they can't monitor the risk or quantify it. I'd hate to allow them that pigeon-hole, because they might use it. With that, I'll turn it over to Jeff.

MR. JEFF F. MULHOLLAND: I was going to spend some time speaking about hedges and specific hedge products. But I think Tim's done an excellent job of covering the basic reasons why you would want to use these instruments to hedge. So I would like to switch gears a bit and look at the use of derivatives as the senior management of an insurance company might. Both Tim and Steve have mentioned many of the articles in *The Wall Street Journal*, and I know some of you have probably been keeping track of which companies are the latest to incur the "wrath" of derivatives.

Seriously, though, in one article, *The Wall Street Journal* actually made reference to what I believe is the key issue. This is whether a specific company is using derivatives to reduce risk (i.e., hedging) or to take a view (speculation). I believe there is a big distinction as to the applicability of derivatives between hedging uses and speculative uses. Tim made this distinction very clearly. A *Wall Street Journal* article on April 14 made an extremely interesting point. It said that twenty percent of senior management believes that their treasury department should be a profit center for their company. This is in sharp contrast to what the role of the treasurer is typically represented to be (generally to find the lowest cost of funds for the company). To turn a company's treasury area into a profit center creates pressures for managers to take risks that they otherwise would not, and creates an opportunity for disaster.

Meanwhile, another interesting statistic was quoted in that same article stating that 29 percent of board members know "very little or next to nothing" about derivatives, (among those companies who actually have been using derivatives).

Now we will focus on the legitimate uses of derivatives, which include the uses that Tim has outlined. Generally for insurance companies, if assets and liabilities are valued *consistently* using capital markets' assumptions, mismatches can be identified. Companies then have the alternative of changing their cash investment strategy to hedge these gaps, or to allow their portfolio managers to continue to buy assets where they are "cheap," and to accomplish asset/liability matching objectives via an overlay strategy (using derivatives).

Oftentimes the \$64,000 question is, what do our liabilities look like, and can we break them down into cash flows that can then be valued from a capital markets perspective? In other words, can we incorporate all our other decrements into cash flow, and then use capital market assumptions to put a value on those cash flows. That is where this process is more art than science, as we know.

Let us assume that we have done that. And let us also assume (while we're assuming a perfect world) that on the asset side, we know how to forecast mortgage prepayments perfectly, which we all know is a pipe dream. In this manner, we have incorporated all information, excluding the impact of interest rates, into the cash flows, and now it's merely a matter of valuing these cash flows using capital market assumptions for forward rates and volatility. Intuitively, you may wish to consider forward rates the expected value of rates at each point and volatility at each point as the standard deviations.

After having completed this process, we can place a "market value" on the assets and liabilities under parallel shifts of up to a 300-basis point increase in rates and up to a 300-basis point decrease in rates. At this point, you are then ready to examine the need for rising rate and/or falling rate hedges. For example, let us assume we own a portfolio of assets consisting of mortgage-backed securities, and we have written liabilities that are single premium deferred annuities (SPDAs).

On the asset side, the mortgage-backed securities are negatively convex and underperform corporate bonds if rates both fall and rise. If rates fall, the mortgage-backed securities prepay early, and cash flows must be reinvested at low rates. If rates rise, CMOs extend and lock the company into coupon rates lower than prevailing levels. Therefore, the insurance company wins only if rates stay relatively constant within a band around today's levels. In other words, the company has short volatility.

On the liability side, an analogous problem exists. If rates fall, the company is hurt by minimum-rate guarantees, which increase the value of the liabilities relative to the assets. Meanwhile, if rates rise, policyholders will surrender their contracts more frequently, leading to underperformance for the company, because upfront sales commissions may not have been recovered early enough to provide for an acceptable profit margin. Again, the insurance company only wins if rates stay near today's levels. The company has short volatility on the liability side as well.

How do derivatives fit into the equation? Derivatives can be used to hedge out an insurance company's exposure to falling rates and rising rates, and to hedge a company's natural tendency to be short volatility.

Typically, insurance company exposures to interest rates are hedged using either caps (to hedge rising rate exposure) or floors (to hedge falling rate exposure). Caps are typically used to hedge exposures to disintermediation and CMO extension. One important issue is, at what point of the yield curve is the company exposed to rising rates? For example, is it if three-month rates or if five-year rates rise that the company incurs losses? If the answer is five-year rates, then a hedge that pays a company if five-year rates rise should be chosen. Caps that pay the company if five-year rates rise above a strike are thus more appropriate hedges than LIBOR caps, which make payments based upon three-month rates. One important note is that caps based upon five-year rates are also *cheaper* than LIBOR caps, since volatility is lower and forward rates are less steep for five-year rates.

On the falling rate side, companies may hedge using floors, which are options that make payments if rates fall below a certain strike rate. Floors tend to be less

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

expensive than caps, since interest rates are expected to rise in the future. Floors are typically used by insurance companies to hedge reinvestment risk, mortgage-backed prepayments and/or minimum rate guarantees.

Again, the issue arises as to which point of the yield curve the floor payoff should be based upon. The answer to this question lies within the following issues:

1. For reinvestment risk, is the company investing in three-month maturity instruments or five-year maturity instruments? (If five-year notes, then the floor should be linked to five-year rates.)
2. For prepayments on mortgage-backed securities, which point of the yield curve is most highly correlated with prepayment speeds (i.e., PSAs), and thus drives the amortization of these securities?
3. For minimum-rate guarantees, a reduction in rates at which point of the yield curve forces portfolio returns below the minimum-rate guarantee?

Because insurance companies almost always have a limited amount of cash to spend on option-based hedges, and a full hedge requires a sizable upfront payment, swaps become an important alternative to caps and floors. Swaps based off five-year rates or some point further out on the yield curve are typically used by insurance companies to hedge these exposures. For example, instead of purchasing a ten-year maturity cap off five-year rates (five-year CMT), an insurance company may enter into a swap with five-year rates reset quarterly for a ten-year maturity. To hedge against falling five-year rates, the other side of the trade would be appropriate.

In this manner, an insurance company can gain these exposures without an upfront cash outlay. Two issues that become important in comparing alternative strategies are credit risk and mark-to-market exposure. Please contact your favorite derivatives marketer for an "interesting" dissertation on these topics.

MR. REDDY: There are some excellent points that Tim and Jeff have raised that I just want to reiterate. One, in terms of the negative articles that have been out there, I think Tim raised an excellent point that, in a lot of cases, that's only half the story or could potentially be half the story. If, in fact, the company is using it for hedging purposes, the article in the paper may completely miss the objective there, in the fact that the liabilities actually moved in the opposite direction. So, on that basis, there really was not a loss there. Now maybe, in these cases, that wasn't the situation, but certainly there's no reason, no inherent reason, that a loss on a derivatives contract is necessarily a net loss for the company. Also, Tim mentioned the use of swaps to perhaps convert an asset from LIBOR to some constant maturity Treasury (CMT) or floating CMT. You can also do essentially the reverse. If you've got an SPDA where you've got some credited rate formula that's a function of five-year CMT less a spread, and maybe you plan on moving credited rates up more slowly than you move them down when rates change. Again, you can do a swap to convert that to LIBOR, at which point you effectively know the price of your liability from a capital market's perspective. Then once you've defined that, it's much easier now to talk to your investment people and say, "If we need to earn LIBOR plus 25, how much can we beat that with LIBOR-based assets?" Essentially, you can now capture what the market's told you about the value of the options that you've built in your contracts. It's a fairly simple exercise to know whether or not you can issue the

product profitably, on an immunized basis. Maybe you can't, and maybe that tells you something about the product. Perhaps you need to go back and revise the product or some of the options you've built into it.

Also, Jeff mentioned an excellent point. I think that it certainly is very important to understand and be able to define your risk-return profile first. Once that's done, it's not necessarily a difficult task to find solutions. I think solutions are out there. The hard part is defining what your problem is, and once there's agreement on that, within the company, a derivative solution is either out there now or could be developed. And again with derivatives, you can get more customized solutions, obviously, than you can with more traditional asset classes.

I just wanted to touch on a couple of regulatory items. Most of what we've talked about here are really the economic impacts of what derivatives can bring. There are also reasons you may want to do derivatives from a capital standpoint, or perhaps an accounting standpoint. Risk-based capital has obviously created a new constraint, a very important constraint within which companies need to operate these days. And derivatives certainly provide an opportunity to manage your company more efficiently from a risk-based capital perspective. Just very briefly, I have some fairly simple examples of things that could really be an efficient trade from an RBC standpoint.

First, common stock holds a very high RBC factor of thirty percent generally (if you've got just common stock in an unaffiliated company). If you sell that, you can replace either the exact exposure or something close to that in swap form or perhaps an equity linked note, which may have some equity exposure but still have, perhaps, a principal guarantee. So you're talking about reducing your risk-based-capital factor to either nothing or something more on the order of an investment-grade bond. So obviously, that's a big plus from an RBC perspective.

So, it certainly makes sense to look at something like that, and we've seen companies that already have done those kinds of transactions. Junk bonds are another area where I think companies are getting more comfortable, perhaps getting back into high-yield investments, except for the fact that risk-based capital does penalize you for that. Again, you can get exposed to junk bonds or junk credit through swap form. You can essentially reproduce the same exposure, except you now have some additional credit risk with the dealer that you did the swap with. But, it may be a good tradeoff, again, from a risk-based capital perspective; you essentially can move off balance sheet, the specific bond factor that's associated with an NAIC 3, 4, or 5 bond.

Commercial mortgages and real estate are a tougher problem for some companies. A lot of companies are stuck with some of these properties and mortgages, and again, they can carry a relatively high factor compared to investment-grade bonds.

Securitization of these things has been happening and it's becoming more common. One thing necessary to pull it off is to retain a residual tranche of the securities that are formed while selling off the higher grade tranches. Many companies feel that they like the exposure of the real estate they have. They feel it's a good investment, but from the risk-based-capital perspective, they're being hurt by the capital requirement. So any transaction that will let you reduce or get rid of the capital requirement,

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

while retaining some of the exposure or all of the exposure, again, makes a lot of sense. There are actually real estate swaps that you can do if you want to; perhaps you're not even exposed to real estate now, but are interested in doing that. A real estate swap allows you to move in and out of that market with less transaction costs and avoid the problem of having to sell the real estate down the line.

The last thing I'll mention is just an interest rate swap and the fact that there is a C3 component dealing with interest rate risk and duration mismatch. Interest rate swaps can certainly be used to improve upon that, and avoid having to post additional reserves, which some companies may face if they are mismatched and if certain interest rate scenarios indicate a fair amount of problem there. So in general, derivatives essentially escape RBC today, for the most part. The off-balance-sheet items are not covered at all except in the sensitivity test. If you do a structured note, where you have a bond with some derivative option built in, you may be getting an investment-grade rating, whereas if it were in some other form, you may actually have had a higher capital requirement.

Now there is some movement afoot to actually include risk-based-capital factors more directly, with regard to derivatives. What I've heard is going on is, and I think is being proposed in a subcommittee of the Risk-Based Capital Task Force, is that they will define some exposure amount as a function of the notional amount of a swap, for example, and then multiply that by a credit risk factor based on the counterparty that you have the swap with. That may make sense, although it'll still end up being a relatively crude formula. There's still the question as to what might be required for a junk bond swap or real estate swap, or any other kind of off-balance-sheet item cap.

So my guess is that whatever gets done, there will still be relatively crude treatment, and it probably won't close the door on opportunities that derivatives give you from a risk-based-capital perspective. But even so, the fact that they're going to be hit more than they are today, there probably is a couple-of-years window here, where you can get a specific boost from doing things in derivative form, as far as RBC goes.

In terms of *FAS 115*, there's been a lot of commotion and distress regarding the *FAS 115* statement that was just put into effect at year-end by the *FAS*. And it certainly creates an undesirable and, I think, absurd volatility of GAAP surplus. I think a lot of companies are struggling with how to deal with that. Companies may feel comfortable with their economic situation but obviously don't like the kind of crazy accounting impact that *FAS 115* is causing, particularly for something like a structured settlement block of business, where you've got long liabilities that are not being marked to market, but backed by the long assets, that now need to be marked to market at least for certain categories of assets. Unless you do something, that certainly creates a lot of economic or GAAP volatility of surplus.

FAS has created this sort of untenable situation. Playing devil's advocate, derivatives possibly offer an opportunity to fight fire with fire. Maybe certain things could be done that actually don't affect your economic situation, which are really the kinds of examples that we've been talking about so far. But some derivatives could be constructed that really offer more of an accounting impact.

I brought a couple of possible examples. Again, these are things that you need to talk to your accountants or auditors about, to see if they really work. One possibility is actually having two swaps, one hedging a block of fixed rate assets and one hedging a block of liabilities. What could happen there is, if the one swap is hedging the assets, the combination of the assets and the swap hedging it get accounted for the same. So if those assets are being marked to market, you may now have essentially a floating rate asset, which has little price fluctuation. Then you can have an essentially offsetting swap going the other direction, assuming it can be justified as a hedge on liabilities. You've now got little economic impact from the combination of swaps, but from a GAAP standpoint, you actually eliminated the volatility of the assets, and the liabilities are already at book. The swap on the liabilities would not be marked to market.

Regarding exposure to held-to-maturity assets, I know many companies are trying to cram lots of assets into that category so that they don't have to be marked to market. That serves one purpose but, on the other hand, it sort of stifles the value that a portfolio manager can add by moving in and out of assets when he thinks there's more value in another set of assets. So you've got a dilemma there. Ideally, from a GAAP perspective, you'd like to throw things in held-to-maturity, but there's a big penalty for selling those assets once there. It may jeopardize every asset that's in that category, and then they all end up possibly being marked to market.

You could effectively eliminate your exposure to a particular asset by layering on a swap that passes on those bond returns to some third party. So, you still own the bond, it's still on your balance sheet, but you effectively have eliminated your exposure to it. *FAS* actually addressed this specific question to see if they would allow this. They addressed it with respect to futures and hedging the futures. And even though they generally thought this kind of action should not be allowed, they decided they would actually allow it, because they've got a project currently going with regard to hedging and hedge accounting, and they're going to deal with this issue through that particular task force and that initiative. So for now, they've effectively blessed that kind of action, which may allow you to maneuver more effectively with held-to-maturity assets, and the fact that those do give you a break with regard to *FAS 115*.

MR. RICHARD A. DERRIG*: I wonder if any of you could, first of all, speak to the tax consequences of the swaps and so forth. And then second, how this might fit into a tax-management policy for a company.

MR. PATRIA: The way we've handled our tax payments on the swaps have been, as the cash payments are made to or from the counterparty, the payments are taxed at that time. There might be situations where that general rule doesn't come into play, such as if you had offsetting swaps, and you're trying to mark them to market and maybe sell one or the other. If you sold one at a loss, that would be a tax straddle, and you wouldn't be able to take the loss at that time. But if your account

*Mr. Derrig, not a member of the sponsoring organizations, is a Senior Vice President of Automobile Insurers Bureau in Boston, MA.

FIXED INCOME DERIVATIVES—USES AND IMPLICATIONS

held them to maturity, I think the swaps are going to be taxed on the payments that are actually made.

MR. MULHOLLAND: One thing, as far as tax strategies go, there's actually a market out there, in the nontaxable market, where you can, instead of paying LIBOR and receiving fixed, you pay the analogous, floating nontaxable rate, which is the JJ Kenney high-grade index, and receive fixed. There's a whole sub-market of nontaxable derivative hedges that have evolved over time.

MR. PATRIA: To some extent there's probably no one, general method to using derivatives to manage taxes. One potential use occurs when selling a bond that happens to be at a gain, which may be unpalatable, because you don't want to pay the tax on that gain immediately, but you need to sell away the exposure the bond is giving you. Certainly you can put a swap on it to get rid of that exposure without having to take that gain immediately. Likewise, if you want to buy long-term municipal bonds, but you don't really want long-term exposure, you want short-term exposure, you can still buy the municipal bonds, get the tax-free income, but swap away the long-term exposure to get short-term exposure. There's going to be a lot of pockets like that, I think, that don't fall into any one category for tax planning. It's just going to be whatever the imagination can come up with.

MR. MULHOLLAND: I think that is an important point. The derivatives market can put a price tag on any set of contingent cash flows based on interest rates. The derivatives dealer then merely chops the trade up into long and short Treasury and futures positions to be implemented as their hedge.

MR. JOSEPH KOLTISKO: As far as tax strategies go, one thing that has been tried and it is contraindicated is entering into off-market swaps, where you receive a tax loss right away. The IRS knows about this and it's not a healthy thing to do. Second, you mentioned cutting up future cash flows, and the dealer is going to market and getting at this exposure, hedging that exposure directly. The question comes up then, why go to a dealer if the insurance companies can do that themselves? And one thing can be pointed out is that you can rely on the dealer to find counterparties, evaluate credit risk, and come to them for one-stop shopping. But, if you have any other comments about that, I'd be interested in hearing them as well.

MR. MULHOLLAND: Let's look at a five-year forward, five-year trade based upon floating seven-year rates. If you think about it, the longest maturity hedge needed to create that last-floating, seven-year rate out ten years involves the dealer going short on 17-year rates, and going long on ten-year rates in a duration weighted manner to create a short, seven-year rate position out ten years. If you consider all the individual pieces needed to create the trade, in fact, the bid offers that you would have to incur in order to create that position would overwhelm what it costs to purchase the package. We have actually gone through this process with insurance companies in the past in order to prove our point.

MR. REDDY: You can also end up with exposure to only one counterparty as opposed to possibly several counterparties if you tried to break it up.

RECORD, VOLUME 20

MR. KOLTISKO: I also have a question for Steve about the venture reporting for the IMR and the Schedule DC, some of those issues. If you're unwinding a hedge or unwinding a swap, what are some of the implications for your statutory reporting, specifically for the IMR or the ABR?

MR. REDDY: That's a good question. I was talking to someone yesterday about derivatives and IMR and what you can do to avoid having to set up a reserve for a gain that you took on a particular asset. I'm not sure, quite honestly, how to accomplish that. Now maybe that's not the exact question you're asking; perhaps some of the other members on the panel can do a better job. I think basically it's difficult to get around IMR. Let's say you've got a gain on a bond you hold and you want to realize that gain, but not have to set up the IMR and get it all in income. You could hold on to the bond and do some hedge/swap, the way the flow is, but at that point, you're still not recognizing the gain that's already in the bond. That doesn't really accomplish what you want to do. So I'm not really sure how to get around the requirements through derivatives. Now maybe somebody else here does. I'd be interested to hear.

MR. PATRIA: Probably much of what derivatives will be used for will be hedging specific assets. I'm not sure I can speak about when they're just for hedging liabilities. If they're hedging assets, and you keep the assets on your books, but you cancel the derivative contracts or sell it or it matures in some fashion, generally you get hedge accounting treatment for statutory, which is the gain or loss that's going to be adjusted into the basis of the asset you actually have. So it never actually touches the IMR until the asset that it's hedging is also sold. Sometimes the contracts might be used in anticipation of buying a particular asset. So you may get rid of the contract when you actually finally buy that asset. The gain or loss is put into the basis of the asset that you bought. That's probably the most general case. So that gain or loss never hits income until the asset is gone.

MR. KOLTISKO: The situation that I'm thinking of is if you have a gain in the hold-to-maturity portfolio and you enter some sort of a swap, and you believe rates are going to fall, but you can't sell that particular asset. You enter into some sort of a swap, rates fall as you predicted because you're smart, and you sell the swap. You unwind the swap at some point. Anyway, we're just trying to wrestle with some of these issues. I think you bring up some practical accounting problems that we're all going to have to be wrestling with down the road. But if you have a comment, any other comments on that sort of situation, I think that would be interesting for us.

MR. PATRIA: As far as I know, you can get into a swap and the gain or loss would be put into that particular held-to-maturity asset. You can get out of the swap for a time period, get into another one two years down the road, and you'll have a gain or loss, and that, too, will be put into the basis. I don't think it matters that this hedge is there, and then it's not and then it's there. Whatever hedges are put on, as long as they can be documented as being appropriate, gain or losses will always be put into the basis of the security.