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Equity-Indexed Annuities: Modeling and Product Design

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Summary: This session provides an overview of recent developments in equity-indexed annuity product design and valuation. Topics include: overview of recent trends; new product design; hedging strategies for hard-to-price options; hedging certificates; non-forfeiture requirements; market conduct issues; and valuation options. At the end of this session, participants have an awareness of recent developments in the equity-indexed annuity market and insights into trends in product features, regulation and valuation.

MR. JOHN R. ROEGER: I'm going to give a brief overview of the market, product overview and modeling. Eric Carlson will talk about a non-forfeiture law along with any other regulation issues. Dan Patterson is going to talk about dynamic hedging.

I'm going to give a brief overview of the products. A lot of this will be review for a lot of you, but hopefully it will be insightful for some not too familiar. I'm going to talk about the markets, where sales have been and where sales are. I will talk about what else is going on in markets such as acquisitions. Then I'll talk about interest modeling. It's going to be brief, but hopefully will put a few things into people's minds.

Equity-indexed annuities (EIAs) are fixed annuities where credit interest rates have positive external returns with minimum downside risk. What does that mean? First of all, it's a fixed annuity. EIAs are not registered products. They're held in the general account. They are just like a fixed declared rate annuity except the interest is credited based off an external index. The minimum downside risk, what does that mean? The external index goes down 20 percent for a particular year it gets 0. It doesn't get minus 20. The product features the Standard & Poor's (S&P) 500 but there are other industries including the Dow Jones, the S&P 2000, Russell, NASDAQ

and others. The policyholders get credits from this external index by one of two vehicles, a participation rate or an index spread. For example, we are going to credit you 70 percent of the S&P 500 growth for any year. At the end of the year if the index grows 10 percent and our participation rate is 7, we get 7 percent into our account. A spread would be an example of S&P 500 index, less 250 basis points, so if the index goes up 10 percent and my spread is 250, we're going to credit 750.

There are two types of products out there. Annual reset is where you renew every year. The end of each policy anniversary we start a new period so it's totally independent of what happened the previous year in terms of return. The other product would be multi-year term. Roughly 10 percent of the market share is multi-year term sales, but in the early days this is really the predominant seller. There's still a lot of in-force out there. Multi-year products might be where we are going to credit 70 percent of the S&P 500 in your account at the end of five years with cumulative point-to-point growth. If the S&P 500 goes up 60 percent cumulative during the five-year period, then you're going to get 42 percent at the end of five years. Some multi-year term products have vesting schedules. Some don't have vesting schedules. A vesting schedule might be if it's a five-year product, one year over five years, get 20 percent at the end of each five years. It is very common for products to have caps today. An example would be a 7 percent cap on any year's return. Also common would be hybrid products such as a choice between putting money in a fixed account with no equity participation at all and maybe multiple buckets of equity accounts.

Other than interest credit, what else is different between an EIA and a fixed declared rate annuity? There are several other differences that I think are subtle, but they are differences. . It is very common with EIAs to extend surrender charges 15 to 20 years but not always. You will often see eight- or nine-year surrender charge periods just like a declared rate, but it's common to see 15 to 20 years. That's pretty uncommon in the fixed declared rate. Cliff surrender charges are common in both. Cliff surrender charges are very common with asset-indexed annuities. Commissions are generally higher. There is a range, but generally if you look at a book of business, the fixed annuity rate and EIAs, it's not uncommon to see 1 to 2 percent higher commissions. With some products it can be quite a bit higher than that. Premium bonuses are extremely common with the recent sale as well as fixed declared rates. Fixed guaranteed value is your guaranteed interest rate and it matches asset growth. For asset-indexed annuities you are guaranteed two things. It is common for the participation rate to have a guaranteed value such as 50 percent. It also indicates your interest index guarantee such as 90 percent growing at 3 percent over five years. EIA products do exist, but they're not very common.

Recent sales in EIAs have been pretty interesting, because what happened in the late 1990s was pretty obvious. The equity markets were booming. People wanted to put money into the equity market; variable annuities were a vehicle to get money

for insurance companies with the tax benefits and interest rates lowering. As a result, fixed sales were down. Early 2000 through 2003, equity markets tanked. The S&P 500 was down close to 50 percent of its peak in early 2000 and though interest rates remained low, the fixed rate annuities made a comeback. The other interesting thing is why EIAs made a comeback. People still wanted to get participation in the equity markets and this was a vehicle that allowed them to get back. If you look at the history from 2000 through 2003, one of the worst equity markets in history, EIAs didn't perform that poorly. They have a floor, so as markets went down 20 to 30 percent, the EIAs just credited zero. In that regard, you can see the markets are trending toward a fixed declared rate and EIAs.

I did a market overview of 35 companies that are currently in the market. Allianz is clearly the leader of market sales. It had roughly 36 percent of last year's sales. The top six companies had 71 percent of sales. In the first quarter of 2005, the top 10 companies accounted for 85 percent of sales. There are other significant events with the EIAs in recent history. Sun Life acquired Keyport in 2001. Old Mutual acquired ING in 2001. Those are significant acquisitions with blocks of business that have significant EIAs. Old Mutual and Sun Life continue to be market leaders. Both are in the top six. These are situations where the buyers found this vehicle very attractive. They acquired expertise along with a block of business. Conseco was the market leader prior to the restructuring in the early 2000s, so in the late 1990s they would have been up in the top 10.

Now I'm going to talk about in-force modeling. In-force modeling products, in general, are getting more sophisticated. Fifteen years ago variable annuities were considered products with zero risk. The risk was handed over to the policyholder. That's obviously changed. EIAs didn't exist. Systems have gotten much more complex, much more sophisticated to handle with sophisticated products and risk management tools. Risk management ideas have gotten much more sophisticated. As a result, the models need to get much more sophisticated and they have.

Certainly some classic in-force modeling needs will always be different for any cash-flow testing, appraisals and GAAP. For European and Canadian companies, embedded value is not a new concept. European embedded value is a new concept, and it basically requires companies to value their options and guarantees, which means stochastic and which means EIAs are subject to that for European companies.

Other in-force modeling you certainly could add would be securitization and principle-based reserving. You could add economic capital. There certainly are needs coming on for execution in-force modeling and building sophisticated models. When working with an in-force model of EIAs, really as I said earlier there are two types of products. They are multi-year period products and annual renew products. With annual renew products, companies manage option costs via participation rates to achieve the target spread. The remaining assets after purchasing options are invested in fixed income, so a typical portfolio would be 96 percent in bonds and 4

percent in options. What does that mean? You're earning 6 percent potentially and you want to earn a 200 basis point spread, so you're going to set your participation rate especially if your option costs hit 4 percent. That's the concept behind that.

For multi-period products, options are purchased to hedge against future positive participation to the policyholder. The remaining assets are invested to cover the guarantees. A typical guarantee would be 90 percent growing at 3 percent for five years to achieve your spread. The products need to be priced appropriately. You have an option out and the capital markets sits back. You have the participation of the policyholders and you would go out and buy a bond or a fixed income instrument that would be back in the 90 percent growing at 3 percent.

I've not seen any EIAs with an annual reset in cash-flow testing or embedded value or any other type of modeling need that is not modeled with a fixed annuity, with a credited rating equal to the earnings rate less the target spread. Basically the credited rate is equal to the option cost. I think this is appropriate in most situations, certainly static scenarios and cash-flow testing. It seems totally appropriate and fairly easy to follow. It can be problematic in guessing equity-indexed scenarios such as stochastic or scenarios where you want to trust the S&P going up 20 percent for the next five years or going down 20 percent for the next five years. Certainly I think it's problematic in European embedded values.

Another thing to consider with these types of products would be what about the asset that is purchased for the option? When you look at the way companies model their business, I'm not sure that it's always considered with the money that's purchased or the option. In other words, lowering your earnings rate because you have 4 percent in a non-earning asset is considered in that spread. For example, I have a bond earnings rate of 6.5 percent and an option cost at 6.3 percent at 100 percent with a participation rate of 60 percent; therefore my net option cost, 6.3 times 60, is 3.8 percent. It is an important consideration because this is roughly 25 basis points across multiple portfolios. If you're earning 6.5 percent, the option cost is 3.8 percent. Intuitively you would think your spread of 6.5 less the 3.8, but that's not really the case. Generally you have 4 percent or in this case 3.8 percent in a non-performing asset that is truly there as a vehicle to back interest credit. The spread is really cut to 2.45 percent or in other words, cut by the 1 minus .038 times your 6.5. That is something to consider. Maybe companies do take that into account, but I haven't seen many. With the companies I have seen, generally that's something that's not taken into account.

For modeling fixed EIAs in multi-term periods, my experience dealing with some of my clients and some of the clients that I've reviewed is that companies generally throw out their hands. They have a wonderful risk management team, wonderful complex system of backing their index returns with options or maybe dynamic hedging. There isn't a company that I've seen that there's any reason to doubt that that is a solid risk management approach and things are very well matched. On the modeling side, the actuary typically throws up his hands and says we're getting

about a 200 basis point spread so we are modeling it as a fixed. To me that seems kind of odd. You have the information available. You know what your book value of your options is; you know the amortized costs in terms of value and that sort of thing. You know your initial price. You know your strike price and strike dates. You know what index it's on and you make an assumption on indexed returns. If you're doing stochastic, certainly that's something that's pretty readily available. You could just assume the S&P is going up 8 percent and then going to tack plus 3, minus 3, that sort of thing. Dynamic hedging does add some complexity. On liabilities you know you should have the information available about your premiums plus withdrawals, what the value of your account is. You should know what your participation rate is on a cell-by-cell or policy-by-policy basis. You should also know your vesting schedules to date, caps, initial index and future index assumption, which would be the exact same thing as on the asset side. Also know your surrender charges and reserves. There's no reason why we can't set that out, force it to massage the in-force initially at your valuation date and project it forward much like you would a fixed declared rate.

Dynamic lapse is certainly something to consider. On a fixed declared rate annuity, several drivers of dynamic lapse are very common. Most companies have some formula that is similar amongst companies as far as surrender charge, market rate and your current credited rate. They are clear drivers of dynamic lapse. You see formulas that are somewhat similar though there are some different approaches, but those are the drivers. EIAs are a little different. I would argue that the market rate or the competitive rate on a fixed declared rate is still a driver. Certainly surrender charges are a driver, but what is the credited rate? On an annual reset product, I think the option cost, fixed assets, less your credited rate is appropriate. I use it in cash-flow testing. I don't think there's anyone who would argue that that's inappropriate.

If you're doing stochastic testing, I think that is quite a bit different. An example would be if the markets go up 20 percent a year for five years and you're using an approach where earning your credit just the option costs, then you're not really capturing the interest credited rate. Markets have gone up 20 percent a year and your participation rate is 7. You're crediting 14 percent. You're going to have almost virtually no dynamic lapse. You'll also have a much higher pie to earn that spread. That's not going to change, but you'll have a much larger piece of the pie that is going to earn that spread. For multi-year products, I won't argue that market rates are clearly one driver along with surrender charges. The credited rate is much more accessible to dynamics in the equity markets. Some of the companies that were multi-year products, in the early 2000s, were experiencing 20, 30 percent lapse rates on a five-year product that was priced at 3 or 4 percent.

Lastly, I want to talk about statutory reserves. In most in-force cases, you are running a statutory cash-flow model. I think first and foremost with any model, you want to put together a static validation. Before you start producing dynamic valuation and analyzing results, how does it look today versus the financial pages?

One of the things I see that is very common with annuity models, and it's no different than equity-indexed, would be what does it mean to have a 99 percent reserve fit? In my opinion, it doesn't mean much. It's the dollar fit that matters. An example would be a $2.5 billion block of EIAs, the other 99 percent reserve fit, ultimately it's just an embedded value. Your future cash flows are going to be understated by $25 million. The monies in surrenders obviously have an effect. The idea is to reserve it. At some point in time it's going to be equal to your in-force account value. I would advocate your forced reserve. In my opinion the objective is to minimize the initial dollar difference, but still reflect the reserve fluctuation through the changes in market conditions and surrender charges. I think AG35 can get pretty complex. I would advocate in sophisticated models not to get too bogged down by run time. You can go factor approaches or in some cases it's pretty easy just to go through the formulas and model it out. Accounts with quick surrender charges are kind of the opposite with my first point. You see models where the cliff surrender charges are very common with equity index. You'll see a model where the reserve is right on, it's also equal to your cash surrender value. The actuary says great, reserves are going to equal the cash surrender value. Well, in three years if your surrender charge is up and then zero, in three years you need to account for that.

MR. ERIC J. CARLSON: I get the exciting topic in this, the regulatory and law-based topic. I'm going to go through it and try to keep it at a fairly high level, not delve into too much detail. If you have any specific questions or something that's applicable to your company or your situation, I'd be more than happy to talk to you later.

I've been involved in the annuity non-forfeiture since about 2001. Back then of course is when interest rates were starting to come down and companies went to regulators and said we need some relief, 3 percent is just too expensive. We have a lot of concerns about this. The Life and Health Actuarial Task Force (LHATF) is the regulatory body that comes up with the model laws and model regulations. They work with the American Academy of Actuaries for some changes to the law. I became involved in this after the framework of the law was involved.

Given the urgency of the situation with the low-interest-rate environment, the law was actually pushed through fairly quickly and probably didn't get as much thought and as much critical review as was necessary. A lot of the details were left in the regulations to be worked out later. I think quite honestly that shows up as we go through this. What we've also seen is that in the development of the annuity non-forfeiture regulations, its primary purpose was to clarify around EIAs, but I think we've also seen that that regulation is being used to clarify some ambiguities in the law that existed well before this change was made. So the scope of the regulation has kind of been continuing to change which, for those of you who are involved in it, know this has dragged on for a long time. That's part of the reason why we still haven't seen the regulation approved. I think in John's presentation I noticed a couple times where points he made and things he said really tied into this well.

I'm going talk about the law briefly and the annuity non-forfeiture regulation. I will also hit a little bit on the company implications and marketplace trends and then finally some other regulatory impacts. Every few years it seems like the FCC and the NAIC bring up EIAs, should they be registered, is that a risk and things down that road. I really want to look at why the change is needed in the law. When did it become effective? What are the major changes from what the annuity non-forfeiture law was prior to that? The reason for the change, of course, was the declining interest rate environment. Theoretically there could have been some solvency concerns. With a 3 percent guarantee when you have assets that are earning, at some points I think it was just even in the 3 or maybe 4 percent range, that is a very small spread. It gets even more exaggerated when you have products that are out of their surrender charge period. Essentially having a tax-deferred savings account earning 3 percent, that's demand money and the company needs to invest fairly short on that. You could actually have a negative spread situation, which is probably not healthy long term.

The law was adopted by the NAIC in December 2002 and most states have adopted that model law since then. There were over 30 states that adopted it very briefly thereafter, some time within about six months to a year. Most states provided a two-year grace period where you could file your products under the old law or under the new law, although two years for most states has already come and gone. What that means is that you have to be filing your annuity products under the new law for the annuity non-forfeiture regulations, which are supposed to clarify the 2002 law but they have still not been passed. There's some uncertainty that's out there right now.

What will happen? The way this works is that the LHATF first exposes and then adapts a model law and then it gets approved by its parent committee, which is the A committee. Then it gets approved by the full NAIC and then it goes to the state legislators. It's a fairly lengthy process in order to get this from a piece of paper into law that is effective in all the states.

The old law essentially splits annuities into two categories. You have a single premium deferred annuity which was 90 percent of your premium accumulated at 3 percent, you had flexible premium deferred annuities and your first year premium was 65 percent and your renewal premiums were 87.5 percent of those, all accumulated at 3 percent. The new law has very several major changes. You have a different non-forfeiture rate, and it's a variable non-forfeiture rate; it can fluctuate from 1 to 3 percent. You have some additional carveouts or considerations for EIAs. That's the first time that's ever been the case, and then you have this new concept called re-determination, which I'll get into also.

First and foremost, on all annuities under the new law front-end load is 87.5 percent of your premiums that you need to accumulate. You need to accumulate that at the non-forfeiture rate. The non-forfeiture rate has 41 percent and a cap of

3 percent. It's a function of the five-year constant maturity treasury (CMT) that occurred some time within the last 15 months and then you get to subtract 125 basis points. A simple example of this is a company could say I'm going to take a very simple approach. I'm going to use the average from November of last year and that's going to be my non-forfeiture rate for all my issues for the next calendar year. For November 1, it's going to be 14 months until the end of the next year so you're still okay. Another company might say I'm going to change my non-forfeiture rate every month. I'm going to update it based on the monthly average of the preceding month or the 15th of the preceding month. We'll have a lot more ideas on that on different ways you can do it. You're going to have variation by company. You're going to have variation maybe even by products. There are a lot of administrative implications on what has to happen here as you change your non-forfeiture rates.

The EIA considerations are a new topic. It's carved out for the first time, which is also a slight concern to some people about the regulatory bodies, the NAIC, the FCC can say hey, you're giving them special treatment, maybe there really are fixed annuities, which is an opinion I disagree with, but they are carved out. You also get a reduction of an additional 100 basis points. You take your five-year CMT, however you're calculating that, and you subtract 225 basis points. This is interesting because you have to have substantial participation, which at one point would be fine. I believe that's part of the regulation now, but what that means is if your annualized option cost is 100 basis points or more, then you get the additional 100 basis points reduction. If it's less than 100 basis points, you get an additional reduction of less than 100 basis points. All the modeling that I've ever seen and done has shown that the typical product has about a 400 basis point annual cost, which ties in very nicely with John's example of 400 basis points is 3.8. It also has the same floor and cap, the same 1 percent and 3 percent cap which has some implications for the relative competitiveness of the EIAs, versus non-EIA fixed annuities. An additional thing is you have the certification to the commissioner. This is something new basically justifying that that additional reduction was appropriate to take. You have to file that at the time of your policy filing, and it's an annual filing. I'm actually talking now about some of the things I'm going to hit in the regulations, so you're going to hear some of these concepts twice.

Re-determination is a totally new concept. Theoretically this is a great risk management tool. What re-determination says is that you can change your non-forfeiture rate at some pre-determined point in time. For example, if you have the seven-year surrender charge period, it might make a lot of sense to re-determine your non-forfeiture rate seven years from now. It's a great opportunity to manage risks and to align your assets and liability duration. Practically speaking I think it's a lot more difficult to implement, because there are some requirements in the regulations for disclosure to the consumer and you'll end up having to define your exact methodology. I'm not sure how many company's phone teams, customer service teams and other folks can explain to your typical consumer what five-year CMT minus 125 basis points means. It's really a balancing of the additional product

management capability versus simplicity.

A lot of the topics in the standard regulation were written to really clarify some of the points. The key points that I think the regulation tries to hit include how you can determine your non-forfeiture rates and how you calculate your non-forfeiture values. The final key point is the equity-indexed considerations. You have both an initial method and a re-determination method and this is where you have to say for this policy how you are going to define your non-forfeiture rate. How are you going to pick your CMT? It's nothing more, nothing less.

What's interesting is that the parameters for how you calculate your non-forfeiture rate don't have to be included typically in the policy form. This is something that is a little bit tricky. You have two separate values and two separate ways that you really need to keep track. You have your non-forfeiture rates and your non-forfeiture values. That's the statutory definition. You're required to give the consumer no less than that. Then you have your contractual guaranteed interest rate and your contractual guaranteed value to the consumer. The key is that your contractual guaranteed value must meet or exceed your statutorily required minimum non-forfeiture value, but the minimum guaranteed value must be clearly defined in the contract. A lot of times it's the same because the guaranteed value is going to equal your non-forfeiture value, but they can be different. I think the way it should be viewed is that the company must disclose all the guarantees as clearly as possible to the consumer. The intent behind the regulation was to say that this is your minimum value or more than that if required by law. That's going to be tough to go through the states at this point. You have to define clearly what your guaranteed minimums are and then the company needs to demonstrate separately to the commissioner that the contractual guarantees listed in the contract meet or exceed the required minimum non-forfeiture value.

The regulation really tries to clarify that the law mandates only a minimum accumulated non-forfeiture value. It does not require any minimum interest crediting and that's actually really demonstrated and it comes to life in EIAs, because if you have no growth in your equity index, you have no interest credits. You are focused about how much money the consumer gets out. Is what you're giving the consumer greater than or equal to what's required by law?

An interesting thing is that the current regulation requires a separate bucket if you have an EIA that has a fixed account in it. If you have that, you'll have a non-forfeiture rate associated with your fixed account or the fixed option which would be the CMT minus 125 basis points. You'd have a separate rate for your equity-indexed money, which would be the five-year CMT minus 225 basis points. As you allocate your non-forfeiture value, that has to grow at different rates. You're going to see some serious administrative challenges I think in calculating that rate.

EIAs are an important part of the non-forfeiture law, but within the law, it hasn't been a huge focus of how this is going to work. It has been more focused on

annuities as a whole. We have to have a substantial participation. The point there is the companies shouldn't be able to subtract the additional 100 basis points for the equity index if they're offering an equity index that has essentially no value. The regulation here is that you have to clarify that it is a real EIA. I believe the words and the definitions for substantial participation have disappeared from the exposed draft of the regulation. It is on the NAIC Web site and you can look at the exposed regulations and you can find a copy of the non-forfeiture regulation.

You have the certifications for EIAs. You have your initial certification as you demonstrate what your option cost is and that the policy form is in compliance with the law and you deferred the 100 additional basis points offset. Then you have annual certifications. These annual certifications are essentially saying that all the policies you've sold in the last year do in fact comply with that and if their option cost was in excess of the required minimum. With these certifications I think it's definitely unclear as to exactly what this means. There are sample certifications in the regulation but it hasn't been flushed out. For the working group that has been developing the regulation and the LHATF, it's kind of been an aside. We have said, "This is what the certification needs to look like. Here are some samples." We needed to check the wording and everybody was good with it. I think as you actually try to do this, you actually have to sign your name on the certification and the states will review that certification. I believe there's going to be some different interpretations by the states as to what they need to do to meet the requirements. I think there's going to be a lot of confusion among some of the companies about exactly what they need to do. This is something that's going to evolve over time.

Finally you have the non-forfeiture rate and the minimum values. This is interesting as it relates to transfers of money. If you have an EIA that has a fixed interest option and you transfer money back and forth, you need to allocate your non-forfeiture value in some fashion because it's going to grow at different interest rates. There are a whole bunch of different methods. You can just do it as a percent of what the cash fund is. It can be a percent of your accumulation value. You could actually transfer dollar amounts back and forth. To be quite honest, I think all of the methods produce essentially the same results. Keep in mind this is just the minimum guaranteed value so it's not going to come into play for the consumer too often. However, there has been an incredible amount of discussion among LHATF for how you should define these transfers. There was a conference call with the task force to potentially adopt the exposed regulation. We had about 45 minutes of conversation about how transfers should be handled. What's appropriate and why? That's a lot of work for something that has pretty minor consequences for the consumer at least.

The prospective test is in the old laws, and in the new law it is completely unchanged, but I think there are a couple of different interpretations. I'm aware of really three primary interpretations of the states having to do with beginning of year, end of year, how do you factor withdrawals in? As a result, as the interstate compact was putting together its standardized filings, requirements and

procedures, it was unclear as to how the prospective test should be interpreted and what value is provided. The interstate compact group requested from the Academy some thoughts and opinions on what the prospective test is, what it does, what value it adds, what protections it provides. The Academy researched the historical reasons for it, what it does and looked at what value it provides to the consumer. They shared that report with LHATF because this is clearly important in their changes to the law and the regulation. The report essentially said that the prospective test provided a lot of value under the old school policy forms where they have fixed premiums and a fixed maturity date. With flexible payments and flexible maturity dates, the retrospective test is really the one that matters. That's something to keep your eye on as far as how that's going to change in the future.

As far as the company implications, we are going to see a lot of additional administrative burden to companies and a lot of additional disclosure burdens. If you do re-determinations of your non-forfeiture rating, you need to explain in the contract how you're going to calculate events of your five-year CMT minus 125 basis points. I think that's going to get a lot of calls. Depending on how often you update your administrative systems and everything else, if your non-forfeiture rate is changing every month, you're going to have to update everything every month. There are going to be a lot of additional company implications here. There's also this increased reliance on the company's certifications. This is fairly consistent with what's going on in the rest of the actuarial world. We are seeing the trend towards principle-based reserve. We are seeing the model based on C3 Phase II. It's increased the amount of time the actuary, which I think is a very good trend. Seeing how well that's received and the consistency of the interpretations among the different authorities is where the challenge is going to be.

Under this new law, there's a very large decrease in the relative competitiveness of the EIAs. If you think about the fact that the typical EIA product design was probably 75 percent of premiums accumulated at 3 percent. That means you have to return premium in about 10 years if there is no index growth. If you're in a higher-interest-rate environment where the five-year CMT is at 5.25, subtract 2.25, that gets you back to 3 percent, but 87.5 percent accumulated at 3 percent, that gives you break even. You have to return premium in about four years. That gives you a lot less money that's available to go out and purchase options or to have a lower guaranteed credited rate. I think it decreases the relative competitiveness of the EIAs.

For current products, I haven't seen or heard of a lot of changes to current products. Product actuaries have been able to come up with some unique designs that continue to meet the consumer needs and still are palatable and manageable under the current environment. It may affect the management of the product a little bit more, but it really hasn't affected the product design.

Finally consider the other regulatory impacts. I believe there are some types of NASD and FCC inquiries. At one point in time there was a potential suggestion to

change EIAs to indexed annuities. In fact, you see a lot of companies doing that nowadays. They are referring to indexed annuities as opposed to EIAs. I don't know that that changes in the NASD thoughts on it. As of now I'm not aware of any immanent threats, but it's an ongoing thing as I mentioned before that they like to do every couple years. One interesting note in the regulation is we tried to broaden the definition of EIAs, so that it was not just an EIA. If you have a credit based off an external index, why does that has to be the S&P 500 or the NASDAQ or anything else, why couldn't it be a real estate index or a commodity index or something else? That ended up not being allowed, so it just equity annuities.

Especially if you're doing re-determination, at that point forward you probably need to illustrate at 1 percent going forward, because that's really the consumer's worst case scenario but it's something to keep in mind and again it's possible with different interpretations.

I'm going to have to apologize a little bit here because my background is primarily on the product side and not the valuation side. I don't think there's too much impact with this. It's primarily in determining what your non-forfeiture rate is. If you have an EIA and you don't know that you're going to have to have the 100 basis point offset or if that isn't locked in and guaranteed, then you would not be able to take that additional 100 basis points reduction. LHATF has scheduled a whole bunch of conference calls to address all the issues and they had a conference call to potentially adopt the exposed version of the model regulation. Due to the conversation and lack of consensus among the task force members, primarily on the transferring money to calculate your non-forfeiture value, they didn't issue that consensus. I believe that we exposed something, and I'm not actually quite sure exactly what they voted to re-expose.

MR. JAMES R. THOMPSON: I've been following that issue. The A committee had a special conference call and passed the regulation. They did some tweaks on some of these bookkeeping issues, mainly policy transfers. It's complicated, but the LHATF passed it five to one extensions. That's to the A committee and the A committee passed it. It will probably be in the Chicago December meeting before the NAIC.

MR. CARLSON: So the regulation was adopted?

MR THOMPSON: I got the e-mail and it is on their Web site now.

MR. CARLSON: That's certainly a very current topic and I thank you. I actually had no idea about that. Those of you who are following the fixed annuities and the EIAs, it sounds like you might have a little bit of research to do.

MR. DANIEL R. PATTERSON: As John mentioned but I've mainly focused on the EIA product development for five years, so I'll try to share a little bit of my experience. I'll start off with my usual disclaimer which is all models are wrong.

That was always a hard thing for me to accept. It is a good thing that some of them are useful. I want to start off and think about how the world is changing with respect to product development. Before EIAs, everybody was in competition for a pretty efficient bond market. Everybody could replicate an annuity crediting 6 percent to a seven-year surrender charge. Products quickly became a commodity. It leads to margins tightening and a competitive market. Distribution definitely was king. A person could come out with an annuity that was 25 basis points better but they didn't have to have access to the shelf. They were not really going to sell it. Product development was much more at the background of the company. There wasn't a lot of sophistication with product development.

In the EIA world, the fixed income strategy is still there. I would like to introduce the derivative strategy. It's largely in two camps. The one camp is call people at the company to tell them what you want. Ask them: How is company ABC doing it? Can you do something for us? We'll pay the price for it. The other camp is people are saying we're going to try to divorce ourselves from the other counter people. They want to be more creative in-house. They try to keep some of the secrets in-house so it isn't as easily replicable. I don't know what the structure is. I just kind of split it up between who is doing what. It definitely adds complexity to the product development cycle.

The good thing is I don't think products are as easily copied. In 2002, Allianz came out with a high-water product that had an annual resetting function to it. It wasn't like a term-to-term insurance product. It became the number-one product in the industry. It did about $2.5 billion when it was at its peak, yet no one did come out and copy that product. That was one of the first products that Allianz looked to to get away from the over–the-counter products. We did not tell them how to do it for us. That way they couldn't just tell the next company how to do it. Compensation is typically a little higher on these products. There's more room for margins. It's not as easy replicable. Of course, I work for a marketing company so distribution is still king. I do feel like product developing, particular in the hedging around product development is more in the forefront in companies.

When you think about what makes the products a success, I think product development is at the top. I think you have to have real creative people in that camp who really understand the derivative markets, to price derivatives. You need to have people who can build models independently and not rely on the shelf product, because the shelf products typically lag the competition. Hedge management is another key group. I really feel like product development and hedging are one in the same. It was really product development that defined what the hedges were. When deciding how we were going to hedge it, it was part of the hedging model and it ultimately became the model that was used on an ongoing basis. Communication is key. The last group is the in-force management group. The product development is going to have an assumption set. They are going to price the product. They have all their assumptions. Most of these products are annual reset. You need to have some kind of process to identify as the business is being

written, as it is approaching the rules. What decisions do you make? What information do you need to make that decision?

When you're thinking about hedging and the product development pricing process, assumptions essentially should replicate real world. You don't want to price something that when you turn around and go buy that contract, you realize I couldn't get it that cheap. Another question is what notional to hedge to. I've heard people talk about hedging to account value and cash surrender value. I am going to introduce the concept of options budget. I'm going to try to create a derivative strategy that keeps me on track with my budget. It's critical that you understand the drivers of profitability because no matter what you have in your pricing model, it's not going to be what you had in your pricing model. You need to understand you have to make an in-force renewal decision. Again, what are the new parameters that are going to define an in-force basis and on a new business basis too? As you're writing this product, as you are declaring caps, you want to keep things refreshed to what's going on in the market.

A simple model is where you observe an option price as a percent of notional, you purchase your notional model, you add it to your balance, and you're basically taking some away from a fixed income. Determine your income statement item. Look at the profit measures under several scenarios and modify the cap to achieve the target profit measure. For a simple model, you take your traditional deferred annuity model, take a little bit out of the balance sheet, add a derivative and observe the change in the liability, change in the derivative and hope your income stays well matched. This kind of leads to the question of: What do you hedge to? Think about not so much in the traditional sense of the traditional annual reset point-to point product but consider high annual reset product. What do you really hedge to? You have two moving parts. There's the account value going up but if the market falls, then you're going to have to basically recover what you fell before your account value starts kicking in, so it's not such a clear question of hedge to some amount of the account value.

Another thing about EIAs, I do feel like they're similar to variable annuities. The profit in the EIA can become relative to the market. For a simple example, I could hedge two times account value. Well, if the market does really well, I'm going to do really well. If the market falls, I'm going to do poorly. You can see a leverage in your results under a rich set of scenarios. I'm not saying that's good or bad, I'm saying that the companies should just understand that. What is their goal? Is their goal to be leveraged, or is their goal to try to flatten out profits? I've seen this in my models and you hedge to a simple hedged account value and you end up making more profit in strong markets. As Eric mentioned now you got these standard non-forfeiture guarantee rates. If the guarantee rate is 87.5 with 3 percent, that's just a different decision of how to hedge versus if it were growing at 1 percent. Surrenders play into the hedge amounts. If you do expect 5 percent of the people to leave next year and they're not going to get participation out, why would you hedge to that 5 percent?

I'll talk a little bit about what I call the option budget approach. The goal is to find a hedging strategy that first of all is self replicating. In other words, there's no profit that's being provided from the hedging. I could take my EIA model and I could actually strip out the piece that's just the sort of bond income and just have it be a simple model that has a derivative with an uncertain payoff in the future, and I want to derive a hedging strategy where I don't lose or make money under this scenario set. That will create an unleveled profitability. I'll try to walk through a few examples with you. Let's make it simple. Let's just assume that I have one policyholder and he's going to leave 10 years from now. We'll use a standard non-forfeiture law in which you get your money back. Let's do that to make it a little bit easier. Let's imagine we live in this world with the Black-Scholes paradigm where nothing changes. For this example, let's think about an annual reset high water product. At year 10, I have to give back the $100. I don't know what another amount is going to be in year 10, but my goal is that whatever the market does, I'll have enough cash on hand to pay that excess amount. What's going to happen in years zero through nine is I'm going to be purchasing derivatives annually, either dynamically replicating them or buying something from the counterparties. For the derivative purchases, my goal is that the amount that I have at times zero allocated to do all the derivation purchases can't change by scenario, but I always have enough money to sort of walk down the time spectrum. I won't overspend what I was allowed in the beginning. I won't underspend it and pay off that last cash flow item. If you kind of think about it in graphic where you lay out the scenario set, you represent the amount of money you would have spent under that scenario set to hedge this product. It is an up and down bond market. The goal is at time 10 after that thing rolls out, I'll have enough money to pay off that benefit.

Let's consider another scenario where the market has just tanked and it never recovers. When I get to year 10, that high water option will be worth nothing. At year 10 the market is down like 50 percent. In year nine the market's down 50 percent and the probability of me paying a claim is still low, and I've been spending almost nothing in the option at year nine. The goal with this new one is that the time zero number should never change depending on what the scenario is. When the market goes up real strongly every year, I'm going to pay off in year 10 a substantial sum of money. Now in year nine, I have to hedge for that. You start getting a compounded effect on top. You're hedging has to sort of follow that compounding effect. Again what I call self financing is that you kind of think of it in a simple mathematical formula. The budget I have at time J minus what I'm going to spend right now on a derivative strategy plus what I get at the end of the derivative period has got to equal the next budget so that I can always chain these things together. I need to always feel comfortable that I have enough money every year to do two things. The first is to continue hedging and not have to do an infusion into the product. The second is to ultimately pay off that item at time 10.

The second example I thought I'd go through is sort of a monthly point-to-point. This is the product design out there that is doing quite well. The industry is

probably doing at least $12 billion of annual sales just in this design alone. I'm going to think about my goal a little differently. I want to derive a hedging strategy that is self financing. What I am going to try to benchmark is the fact that I could go to the counterparties and say give me a monthly point-to-point option. You guys do the work and then give me a price. I'll use that as my benchmark. That's my budget. I get to spend a certain amount of money. I'm going to try to dynamically replicate that over time. I'm going to choose a monthly period to do the replication. I am going to assume it is just a one-year product. Whatever the market fund does over the year, I pay that in cash. I want to make sure I have enough money to pay that cash-flow item. They might tell me that going counterparty will cost me 3.5 percent of notional. I'm just going to pay it right away at time zero. They're going to give me the payoff in month 12. I do the math and say that I can only afford a 2.75 cap. Alternatively I can think of it in a time spectrum of if I'm going to do this on my own, I'm going to hold that 3.5 percent in cash. I'm going to look at it in month 12, and I am going to have this uncertainty out there of what the market is going to do. Will I or will I not have enough money to fund that ultimate payoff of the liability? I start with the 3.5 percent and I get to make a choice of what I put in derivative strategy.

On the extreme, I could say I am just going to buy a co-option in month one. I will spend all of the 3.5 on a co-option in month one, but then in month 2 when the market falls I won't have any money left. I wasted all my budget in the first month. It's gone and then if I want to have enough money to continue hedging, I have to hope the market falls. I could say month to month I'm not going to hedge anything, it's the first month. Whatever happens in the first month will never have an impact. I'll hedge for nothing and when the market goes up, say it goes up 3 percent, now I don't have enough money to keep hedging. I didn't track my option budget. You can think of the option budget as moving depending on how that market grows, and I want to take my cash at time zero and be able to move forward and continue the replication process. Again it's all financing. Budget at zero, 3.5 percent minus what I have to pay in a derivative strategy. What I'm going to get one month out is going to equal to my month two budget. I'm going to keep walking up the time curve.

What I like about this strategy is it's not a strategy that is not truly what people think of as a dynamic hedging strategy where you're making a decision every day. You sell a bunch of futures and buy this strange option to get my gamma positioned. It's really something that is almost a buy-hold mentality of I can make a decision today and I don't have to revisit that assumption until one month from now. Now, I'm not saying it's perfect because it can still be replication uncertainty at month 12. I was talking about the Black-Scholes world, so obviously volatility is not going to change, and interest rates are not going to change. But in fact they do. If I step out one month and volatility falls, that's going to all of a sudden change my option budget. If I didn't have a volatility hedge, I wouldn't be able to hedge for that. I had to do something else.

I want to talk about some modeling considerations. If you are going to define the pricing models and have sophisticated strategies built into the pricing models, I think that's what you need to do. Be as realistic as you can. In our company, the pricing models were just taken over and used on an in-force basis. Mimic real world as much as possible. You're not going to do it exactly. I try to choose a platform that allows creativity. We used Excel and complied executables for the real difficult option calculations. I think if there's one guy that deserves a Nobel prize for economics, it's Gates. I mean I think Excel has done more for productivity extension than anything. No model's going to be perfect. Get it so that it's reasonable to sell business. After issues, this is going to get fun because now the Black-Scholes is going to go away. I have an actual cost and I have my price flow cost. I want to make sure that I can manage my profitability. You need to understand the drivers of profitability again. What I would recommend is that while you're pricing the products you're thinking you're going to have this need for a variance report because you want to identify changing assumptions.

When you price the product, you're going to have this kind of an option budget. Six months into the product, the option budget has changed because interest rates went up and derivatives are costing more. You chose a time zero not time seven interest ratchet. That's not worth it. You have levels in the products to manage the caps. You can manage those risks with the cap management, but you got to have a credibility to identify and understand them before they're issued. For a simple example, as you're writing business, you ought to be tracking what the hedge budget was. On a particular block of business, I might say we're six months into writing this product, we think we had a price for a budget of $75 million. We have actually spent $84 million. We can track it and we can understand it. We have created a variance. We are not hedging correctly, but hopefully it's the reason you chose not to. You want to be able to break it down I feel like.

I think one of the critical things s timing. This industry is notorious for issuing a product every day but trying to hedge it every two weeks. There's going to be some timing risk if you're not hedging day to day as your products are being issued. Volatility is a big deal. The slope of the volatility curve, interest rates and then we kind of lump everything else in as unexplainable. Obviously you want that be as small as possible. You've identified the variances and why they are, so you can come back and make a decision. You know we're having a timing risk. Maybe it is better if we just buy options more frequently, maybe not get the best pricing on them, but we in fact are eliminating a pretty significant item. Then it should go into a cap management to where it says look, we have these variances, now we can identify how we remove that $9 million variance. We can come back and say that $9 million variance has to be removed by lowering the monthly point to point cap by a quarter basis point. You can identify that that will, in fact, create $9 million of value back to the company, because the future value of the liability has fallen.

I'm not a big fan of FAS 133, but for an example, a product actuary should be ready to answer these questions. The thing about FAS 133 is the liabilities discount

at these future risk-free rates. The asset backing by future purchase is in bonds, so they're not being marked to market, because they're on a book basis. You're getting FAS 133 running fluctuations that have no economic impact at all. One thing I'd recommend is call about some assets and tag them as available for sale so you kind of counter that item. You get financials, but you are going to need some understanding of exactly how much I carve out to be able to counter that change in the liability.

MR. JAMES R. THOMPSON: One of the interesting features that is going to come out in cash-flow testing is how to model the minimum interest guarantee on the remedial periods when you do a projection of influence business. I've talked with other people I know and this is going to be somewhat of a challenge. People have to start thinking through it. We have the model regulation in place with the model role of some basis. I guess we'll all have to be thinking about this.

MR. CARLSON: I'd keep it simple. I don't think regulators are going to be really that interested in an item like that. I don't think it is going to have that big of an impact on the solvency of the company. That would be my view though. I would not put too much energy to it.

MR. JERRY F. ENOCH: When I first read the model law for individual deferred annuities, I was pretty excited about this re-determination as Eric mentioned. I thought this allows some wonderful asset-liability modeling (ALM) possibilities, primarily the way that Eric had said. I know our company didn't really get excited about that, primarily the marketing folks, because of simplicity. In the early discussions I had with people, it's probably a year ago or more, I didn't hear of anyone who was actually using re-determination in any of their products. I haven't even discussed it with anyone recently, but I was wondering, are people actually using re-determination in their deferred annuities?

MR. CARLSON: I'm not aware of anybody who has used re-determination. I would just have to think given the number of companies that are out there and the different things that all these companies do, that somebody's going to do it. I think it's an excellent tool. I think people need to first kind of wrap their brains around the law and the regulation and what that's going to mean first. Then at some future point, I think you will see more companies starting to utilize the re-determination once they kind of get up to speed on the implications of the changes already. I'm not aware of anyone currently.

MR. DAVID J. WEINSIER: I'll take a shot at that last question. I know of several companies in this arena. A lot of them considered doing that re-determination but because of the complexity of it and given the interest rates today and the CMT, it doesn't seem like it gives them a whole lot of gain. I think some are considering it, but I don't know of anyone who has gone ahead and initiated replication and put it in their policy forms. John, you said a lot of the companies that you see are just purely pricing this on a deterministic basis and so this kind of contradicts what I see

particularly on a pricing basis and not so much on a modeling basis. I feel like when you are a pricing these things, you miss out on a lot of the policyholder optionality when you purely price it on a deterministic basis just like the fixed annuity. I was wondering if you could comment. Maybe I misinterpreted you or some of the things that companies should make sure to consider. If they're truly are pricing on a deterministic basis, but they could be missing because of that policyholder rationale.

MR. ROEGER: My point is not necessarily pricing, it's more on the valuation side. I do see a lot of stress testing and some stochastic testing. I'm not a product development actuary myself, so I'm not directly involved like these guys are. My point is on in-force models, a lot of companies that I've seen tend to oversimplify the approach of what is your profit margin on the book of business on an in-force block. It's already been priced. We know we have some risk management in place. We know we're roughly going to get 200 basis points right on this product, but do we really apply what was priced for and how options were priced and on the books to our actuarial models for an in-force block of business, not necessarily for our pricing block of business.

MR. CARLSON: I think when you price the product it's useful to use stochastic analysis on what's going to be the big impact. We would do a stochastic scenario largely tied to equity. I could argue if short-term interest rates fluctuate, that's going to have an impact on future option purchases. What tends to be on these products is the ability to reset the cap. If you price a product correctly and you make that guarantee cap low enough, all you are going to do is build a model that figures out a stochastic short-term interest rate. Then your assumption is you are just going to model that. You are just passing that through to the policyholder and the cap decision down the road, so why bother with it. I think maybe it is better to focus on stressing it out, saying all right, let me break this thing by showing how the thing can break if the short-term rate did something. When you are thinking about modeling, don't focus so much on stochastic things that aren't really going to drive the product profitability when in fact there might be a management action to counter that. We don't want to pass through risk to the policyholder if I screw up on the hedging. That's something that we don't want to get in that arena.