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In Search of: Higher Yield and Lower Risk

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Summary: The continuing pressures of competitive insurance products, combined with shrinking spreads and a paucity of deal flow, have forced portfolio managers to look for new outlets for their investable cash. What are some of the products and techniques being used by companies to find a few extra basis points without going out on a limb or, to reduce required capital without giving up yield? This session discusses the following:

- *New/alternative risk classes*
- *Update on insurance and catastrophe risk bonds*
- *Capital-efficient structured notes (what is a bond anyway?)*
- *Leveraged debt and equity plays*
- *Other risk/reward enhancement techniques*

Ms. Elizabeth A. Ward: We all know there is no such thing as a free lunch, but we can get higher yield with similar or different risks. We have three people from Wall Street here to speak to you about some of the possibilities we might consider.

Before that, though, I want to call your attention to why everyone is trying to get higher yield. The Bloomberg Yield Curve shows that the 5-year, 10-year, and

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Note: The charts referred to in the text can be found at the end of the manuscript.

30-year yields are flat. So how are we going to get those yields that we've promised to our annuity policyholders in pricing or whatever crediting strategy we have?

I'd like to start out with Dave Hogan who's a senior vice president of Lehman Brothers in the derivatives group. Second, we'll hear from Mark Griffin, vice president of Goldman Sachs, in the insurance products group. And, third, we'll hear from John Scowcroft, a principal with Morgan Stanley Asset Management.

Mr. David Hogan: More and more, insurance companies are looking for higher yield with the same risk. They're not always trying to get a lower risk, but want to become more efficient at investing the same amount of risk. They want to get more yield for each incremental amount of risk. For example, if I take on 10% more risk can I get 11% more yield? That's what we're driving at in this session.

I'm going to talk about why people are using alternative investments, which asset classes they are trying to access, and what types of structures and vehicles are being used. I'd like to begin with three examples of a principal-protected equity trust, a collateralized debt obligation (CDO), and a basket default note.

Why alternative investments? When we're looking at yield enhancement we're trying to get more efficient yield or extra yield out of investment, not just pure selling optionality or what's typically referred to as yield enhancement. We want asset diversification and an efficient use of capital. Another reason is market access for companies looking to tailor either the maturity size of the amount of risk. An example would be if a company wants two-year risk to a certain type of credit, but there is no two-year security in that market. That's where the alternative investment can come in. The insurance company can find and tailor the exact maturity and risk parameters that it wants.

Which asset classes are used? There's a whole parade of them. High-yield bonds are some of the bigger ones. Mark Griffin will be going through the catastrophe (CAT) market. I won't go through each one, but whatever the asset class people are looking at, they're trying to find out how to access that market more efficiently at a better yield.

What types of structures and vehicles are being used? Trust structures and swaps or derivatives are common. Although swaps and derivatives aren't asset classes, they're a means to accessing or restructuring an asset class. Examples include structured notes, reinsurance contracts, public securities, and CDOs.

My first example is called the principal-protected equity trust. In December 1992, the NAIC came out with its risk-based capital (RBC) guidelines. Basically, you were

charged a 30% RBC for holding equity and much less for holding a NAIC 1 bond, the factor differential being 100. It became very capital expensive for insurance companies to hold equity, but they still wanted to do it. So 1993–1994, when you saw a lot of structures, the typical structure was a six-year equity-linked note issued by a single A or a double A corporate. Someone like SmithKline Beecham would issue it. All you really brought was a zero-coupon bond. You were giving up what SmithKline would normally be paying on its debt and buying an equity call option. And that was all going into a structured note.

However, because it was only six years, you weren't getting a lot of bang for your buck and you weren't able to buy as much equity exposure as you wanted. Plus, you were paying what's called the issuer subsidy. The issuer might say, I'll issue the structured note at, say, London Interbank offered rate (LIBOR) less 25. That's the net financing I want for the transaction. What might have been fair value for that name was LIBOR flat, so you, as the insurance company, were paying 25 basis points per annum extra for this structure. But the market has evolved and is trying to make it more efficient without having to pay the structuring fee to get an issuer to put the structure together (1), and (2) to help you buy the equity more efficiently as well.

Here's what a principal-protected equity trust would look like today. An insurance company has \$100 and would like to have equity exposure. The company spends \$50 on a 10-year zero-coupon bond and \$50 on an equity product, such as a Standard & Poor's mutual fund. Then, the two of those go into the trust and the insurance company buys the trust certificates from that. Now the company has a NAIC 1 security with equity participation in it.

Among the motivations for getting into these structures is providing exposure to the equity market. (I won't even go through the numbers of what it means to have 30% versus 23% of RBC against that position.) It was a no-brainer for the insurance company to get into doing these. A bigger reason for getting into some of the newer structures is that a lot of insurance companies are looking for income-generating securities. If you're a stock company or a mutual company looking to become a stock company, you want investments that will kick off high earnings, not high capital gains which you're not going to get credit for from the stock analyst. And the benefit of some of the 10- and 15-year trust structures is that they can be structured such that the gains can be kicked off as income.

Structure 2 is the CDO. You've probably heard it called collateralized bond obligation (CBO) or collateralized loan obligation (CLO). I'll be using these terms interchangeably. If we put bonds and loans into a trust, we can't call it either a CBO, or a CLO so CDO covers all the bases.

Let me give you an idea of the two types of deals being done and the reasons for doing them. In the first type of transaction, say, a \$500 million transaction, there's an arbitrage structure with a discrepancy between the price of underlying securities and the price of the CDO classes. Either a money manager or someone else thinks that he or she can invest that \$500 million into a certain type of asset class and sell the participation in, say, \$450 million of that, essentially have that amount financed cheaply, and retain what's called the equity class. The manager is trying to take advantage of an arbitrage in the market where he or she can buy the assets more cheaply and sell off the liabilities. In essence, creating a mini-company.

In a portfolio-type structure, an insurance company or a bank that has assets already on its books, is looking to take the majority of those assets off its books, securitize them, and keep the remainder. It helps the company either from an accounting, tax, or regulatory standpoint. You may have heard of some Japanese banks looking to securitize their U.S. loan portfolios, take them up in, say, a CLO or CBO, and raise capital that way. They can take a \$500-million portfolio of U.S. high-yield loans and retain only \$50 million on their books while taking the other \$450 million in as capital.

The structures are set up, generally, as sequential pay and senior substructures. But the main theme is you're tranching credit risk. It's the same thing as the collateralized mortgage obligation market. You're taking the credit risk and setting up as a senior substructure whatever is the first to default. The first losses are taken by what's called the non-rated or equity class. The next set of defaults are taken by what's called a mezzanine class. And the last people who take the pain of defaults are going to be the high-rated classes. The theme here is garbage in, garbage out or junk in, junk out. We taking \$500 million of securities into a structure and kicking out highly rated assets. It's the same idea as in the mortgage market, where you're taking away the bulk of the risk from the high-rated classes.

Here's an example of what's called the cash-flow structure. An insurance company could take its \$500 million and invest it in, say, 50% high-yield and 50% emerging markets. The company is going to issue in this case four different tranches, and it's basically getting financing for its portfolio. It's getting LIBOR plus 25 on the bulk of the portfolio, and will retain the equity class. Remember, this special purpose entity or the CBO is set up as a mini-company with assets and liabilities. You also see the CBO do caps and/or swaps in that they're only fixed-rate instruments. And, remember, their liabilities often are all floating, they need the swaps under the fixed-rate assets. Some of the assets that they're buying may have caps on them, and they often will want to buy those caps back so they're not at risk from that. The other plus is that you can be your own asset manager. I'll go into a couple reasons

why insurance companies are looking to do that, aside from the fact that they can make a nice per annum spread on that.

Insurance companies and banks are looking to create these structures because they create a leverage position underlying assets at an attractive funding rate. They're also providing the high-spread assets. They want to get more spread without necessarily taking on lower quality investments. You are putting high-yield investments in there, but you can also kick off tranches. Let's say that the mezzanine tranches are a triple B type of investment. An insurance company can get a high-spread product off a triple B tranche, yet that spread is actually coming from high-yield assets. The actual security they're holding is triple B, yet they're accessing that spread from the high-yield market.

The other issue is that they can restructure their current portfolios. We talked about a portfolio-type deal. If an insurance company or a bank has x amount of assets on its books, and wants to get rid of some of them, it can restructure the assets and retain whichever tranches it wants. It can retain the equity tranche, or maybe a piece of a mezzanine tranche. Usually it would not be a buyer of the higher-rated tranches.

A growing interest for insurance companies is the asset management side of these structures. If you are the asset manager, you're taking in, say, 50 basis points per annum on that \$500 million. So you're creating stable, third-party income. An even bigger issue is that more and more insurance companies are setting up investment subsidiaries, and it provides them with an opportunity to use and market their expertise. They can say, "We have these four deals, which shows our high-yield expertise." Now they can prove to the investment world that the markets have accepted them as a high-yield asset manager through these structures.

The last structure I want to go through is what's called a "basket default note." The credit derivatives market can offer several types of structures to insurance companies: total return swaps and notes, single name default swaps and notes, and basket default swaps and notes. Considering some of the replication issues going on, I would expect more and more insurance companies to get into this market. Currently they are generally in the market in note form, but as replication and synthetic assets become more accepted and permitted, I'd expect more people to be doing swaps instead of notes. I'll give an example of the default basket note.

A AAA-rated insurer such as a Lehman shell would issue this type of security. It's a five-year structure and the coupon is a LIBOR plus 75. Remember that this is not principal protected. You're getting back par unless a credit event occurs, and that credit event occurs if one of the five reference issuers in your basket defaults. If you

have a basket that's structured on the default of five single A names, the likely credit rating for it would be triple B. I am buying a security that's based on the default of five single A names, yet it's going to be rated triple B or NAIC 2. The insurance company is simply taking \$100 and earning LIBOR plus 75 on it.

You've seen a lot about the efficient frontier. I thought this would be an addition to that. Somebody raised a question in one of the earlier seminars about whether to take into account the cost of capital in your efficient frontier. Usually people do not.

I want to go through how to take a capital-adjusted yield for an investment. Our example is a default basket note. You could buy that default basket note that's going to be rated NAIC 2 or you could buy five single A cash bonds for \$20 each, and those would all be rated NAIC 1. Your coupon on the default note is LIBOR plus 75. On the five cash bonds, you have LIBOR plus 20. I'll just go down. You have an RBC factor on an NAIC 2 security of 1%, if you assume two times RBC. I use that number. In my experience, most insurance companies want to have at least two times the RBC requirement, certainly for advertising reasons. I rarely see anyone dipping below that. Assuming that, you're going to set aside \$2 for that investment. If you assume a return on equity (ROE) of 15%, your per annum cost of that capital is 30 basis points.

Now, if you take the 30 basis points away from the LIBOR plus 75, your capital-adjusted yield is LIBOR plus 45. Your alternative would be to buy a LIBOR plus 20 investment. You're only putting aside 0.3% of capital for that. If you do the same two times RBC and get a 15% ROE, now you have a per annum cost of capital of nine basis points, for an effective yield of LIBOR plus 11.

There is no free lunch here. You are taking more risk in the bonds in the default basket structure. If one of those names is to default and the recovery is fifty cents on the dollar, you're going to be out \$50 on this structure, whereas if one of those names defaults on your five cash bonds, using the same numbers, you're out only \$10. So there is more risk, but more and more people are starting to see, especially if you're on the cusp of RBC, what this investment can yield.

To summarize, we're looking for yield enhancement with the option of principal protection. Certainly a big driving factor for all these structures is an efficient use of regulatory capital. Diversification is a very large issue. You're also looking for regulatory and accounting optimization. Accounting has become a larger and larger issue. We have *Financial Accounting Standard No. 133* now. And you can structure assets that are less correlated with your liabilities.

Mr. Mark W. Griffin: It's very important for actuaries to look at insurance-linked securities (ILS), not just as potential investors in this asset class, but also as potential issuers of these investments. Securitization is a very important concept to understand because, with the convergence of the financial services industry, it's a very important tool.

Just about everything in your portfolio has some exposure to what Mr. Allan Greenspan does or says, and, of course, there is no free lunch. There is risk with these securities. What we're doing here is "trading Greenspan for greenhouse." It's not all greenhouse, but I thought that was a good way of expressing it in a few words.

One of the questions we often get is, why is this happening now? I think there are four reasons. The first reason is investor demand. The yield curve is low, corporate spreads are low, and the equity market is extremely high. Investors are looking harder and harder to find new ways and new places to make money, and we think this is a very interesting one. The second reason is issuer demand. An issuer could be an insurer, a reinsurer, or even a corporation. The issuer is the entity that is seeking insurance or reinsurance coverage through this structure.

The reinsurance market tends to be very cyclical. There's a certain amount of capital available. If a large catastrophe comes along and takes a bite out of it, reinsurance pricing changes for just about all risks. One of the biggest complaints we hear from people in my California earthquake cover, is that a big hurricane hits Florida, my price doubles overnight, even though nothing has happened in California. They would like to fix market anomalies like that. One of the other advantages is that you're buying insurance or reinsurance protection through this structure. You have no credit or counterparty risk. So the concept of diversifying your reinsurers is completely gone under this structure.

The third reason ILS are attracting attention is lack of regulation. One of the first concerns of investors when we went out years ago to propose this as an asset class was that they would buy one of these securities and get a knock on their door from the insurance regulator saying, "Congratulations, I'm your new regulator. You purchased one of these securities." So we went very painstakingly to the various regulators in the states and outside of the states to explain what this was. Once they understand what it is, regulators find it to be a very positive development because it basically provides collateralized reinsurance. It takes away that nightmare of a bad event in the industry having some sort of domino effect with various reinsurers or insurance companies. We have opinions from all the relevant states and foreign jurisdictions that they will treat this as an investment and not as insurance.

Technology is the fourth reason investors find these securities attractive. A lot of the risks that we're going to talk about are property catastrophe risks like hurricanes and earthquakes. Only a fairly small number of expert firms specialize in assessment of those risks. Basically, a room full of Ph.D.s specializing in earthquake risk or hurricane risk are generally accepted to be the best source of that risk assessment because they are used by the majority of the insurers and reinsurers that play in those risks. The important point is that they are small but independent firms, so their modeling can be used as part of these bond issuances. In this way the capital markets investor has access to the same analysis the insurance and reinsurance industry sees, and that's very important. Think of yourself as an investor for a minute. If you thought that all of the greatest experts in the world were at Munich Re, and it was Munich Re trying to lay off its risk, I think you'd be a bit wary and wonder if there was something Munich Re knows that you don't know.

The ILS-sponsoring entity can be an insurer buying reinsurance, a reinsurer buying retro, or a corporate going directly to the capital markets to get coverage rather than going to an insurance company. The latter hasn't happened yet, but it has been discussed. When that does happen it will be a bit of a wake-up call within the insurance industry. Sponsors pay their premiums into the structure, or the single purpose reinsurer, and get a reinsurance contract in return. Then this entity, the single purpose reinsurer, begins issuing the bonds to investors. The investors buy the bonds and take the risk. The event—whether a hurricane, earthquake, or series of events—is clearly defined. If the event doesn't happen, the investors get their \$100 back. It's a short-term rate of return.

Imagine a one-year security, the money that sits in is the \$100 from the bond and the net premium from the sponsor. If nothing happens, it earns money at a short-term rate of interest, giving the investor a return of LIBOR plus the net premium. However, if the event does happen, then that complete amount of money is available to come back to the sponsor. That is the notional amount or the amount insured. In the worst-case scenario, all the money comes out of the single purpose reinsurer and is returned to the sponsor. The money is all there. So the worst situation is that the sponsors get all the money that's in the single purpose reinsurer. They don't have to worry about the creditworthiness of anybody in the food chain or care who the investors are. Once they buy the bonds, the money is in the structure.

There are a few larger deals and a handful of smaller ones in the market today. We're now at well over \$1 billion of risk capital raised, and have a bunch of deals in the pipeline for this year's wind season. That, in itself, is going to take us past \$1.5 billion. I'm pretty sure that by the end of the year we'll be well beyond \$2 billion. Because of the trend, we expect capital markets insurance transactions to

accelerate geometrically for a number of years. We'll get into a couple of specific deals later on to explain the risk and how ILS is structured.

Who buys these things? The investment advisors and mutual funds are the biggest part of the market, 44%. That slice is split between high-yield funds and funds that have a global asset allocation or a broad mandate to invest in different asset classes. A very small piece of that 44% is CAT bond funds. Some fund managers have set up funds comprising only CAT bonds. These funds are now attracting pension fund money and other institutional money to gain exposure to this new asset class. The next biggest chunk of this asset class, 25%, is life insurers. We expect that to grow because the life insurers tend to have a lot of momentum. Once they get up the curve, they get all the internal signoffs needed to be part of a market and they tend to buy most well-priced deals that come along. And, yes, spreads have tightened now, so it is time for a lot of life companies to get in.

Hedge funds, at 15.5%, constitute a significant chunk as well. They tend to be nimble but have very high-return benchmarks. Over time, their slice of the pie will probably become smaller as that of life companies grows. Reinsurers have 75% of this. What's interesting is that reinsurers are buying these bonds to get the same risk they would otherwise get in the direct market through the bond structure. I don't know if they're trying to arbitrage some type of rating or ratio, but smaller reinsurers are buying this as a bond because sometimes they can't get at very infrequent but very severe risks any other way. If you're a sponsor, the universe of potential reinsurers would be Munich Re, Swiss Re, Berkshire Hathaway, or any of the very largest, capitalized, best-rated reinsurers. Some of the smaller reinsurers don't get a shot at that direct business. So this is a way for them to go up the ladder and take that risk.

ILS have been used strategically by a number of the issuers to stimulate competition. This structure allows the capital markets investor to stand in the shoes of a very largely capitalized and very well-rated reinsurance company. They can get at those same risks and access that same pricing through securitization.

Are these things liquid? The answer is no, they're not liquid, depending on how you describe liquidity, but, yes, we do trade them. We have a trader who has the weather channel on his desk, trades ILS, and has a lot of fun doing it. Chart 1 shows that our trading in residential re, which closed last June, was very oversubscribed. The bars show the level of trading activity by month. There was a bunch of activity in June after closing. The two lines indicate the prices of the different tranches, which I'll talk about later. The one on top is the price of the full principal-at-risk tranche. If the worst-case scenario hits, you're completely wiped out. The price was oversubscribed and jumped above \$100.

The risk here was that a very large hurricane would hit the East Coast and cause a particular insurance company, United States Auto Association, to lose more than \$1 billion on one single event. To put that into perspective, the largest historic loss was Hurricane Andrew, which cost just over \$0.5 billion. So we're talking about an event that would be twice the severity of anything that's ever happened. Investors got about 5.75% over LIBOR to take that risk for a year. Then we got into serious hurricane season in August, September, and October. In September the fact that we had a strong El Niño became widely known. The link between a strong El Niño and a lower level of Atlantic hurricane activity also became widely known. So that market mechanism fell into place and people said "This is a great risk. We're getting paid a lot to take a very small risk." And, of course, the price of these securities went up. The chart shows that, for a one-year floating rate instrument, the price went up to \$103, which is pretty impressive price performance.

There was a lot of activity in September because a lot of people wanted more of it. Some people were paid to accept less of it and the price went up. It stayed between \$102 and \$103 for the rest of the year. And we saw some people selling the bonds after the hurricane season was over in November because of the appreciation. They bid the high coupon and the capital appreciation, the risk was over, and they took their gain by year end. This product doesn't trade anymore because the new one has come in its place, but for the rest of the year, from January on, it trades at 25 to 50 over LIBOR. It's not risk-free, but it's useful for people to understand how this mechanism works.

One of my examples is a transaction we call Parametric Re. It's the single purpose reinsurer that's set up just to do this transaction. It has no other purpose in the world other than to do this transaction. The sponsor was Tokio Marine & Fire, the largest property/casualty insurer in Japan. It writes a certain amount of earthquake risk, although not much. The Ministry of Finance in Japan has tightly controlled insurers' ability to write earthquake risk because, obviously, that's a big risk for the economy and the country. However, the advent of financial deregulation has loosened so insurers like Tokio can offer earthquake insurance to corporates and, ultimately, to individuals.

Tokio wanted to secure long-term capacity for this earthquake risk in advance of offering it to corporates because, in Japan, you don't do business on a year-by-year basis. You do it over a long period of time. Therefore, Tokio wants to secure very long-term capacity to become a leader in this market.

One of the things about earthquake risk is that all kinds of science goes into looking at the various faults. When was there last an earthquake on that fault? How big

was it? When is it likely to happen again? Scientists and Ph.D.s are digging trenches across the faults and doing this kind of analysis. In Japan, unbelievably, historic records on earthquakes go back to about the year 679, so there are a lot of data. Although it's somewhat fuzzy when you go back further, there are lots of data, even by actuarial standards. It's very difficult, though, to link the magnitude of an earthquake to the amount of damage that it causes. There are far fewer data points and some other scientific factors that come into play, so we set up a parametric structure. Tokio Marine & Fire's biggest exposures were in Tokyo, and, as you moved outside of Tokyo, the exposures decreased. We set up a geographic grid with these two boxes (see Chart 2). The inner and outer grids are defined in terms of their actual geographic coordinates around the Tokyo area.

We defined the recovery of Tokio Marine & Fire and, therefore, the loss to investors by the size of the earthquake that is, its magnitude, and where it happened. If there is a magnitude 7.1 event in the inner grid right around Tokyo, the investor loses 25% of his or her money, future coupons, and eventual principal payment. That money is there to go back to Tokio Marine & Fire as their reinsurance proceeds. For worse events, you can see a 7.6 or greater magnitude earthquake in the inner box, the investor is completely wiped out, and all the proceeds go back to the insurer. So the payment to the insurer is not based on its actual losses due to the earthquake. In the outer grid, you would have to have a 7.3 magnitude earthquake to lose a quarter of your money. You need a 7.7 to lose all of your money. If a big earthquake happens completely outside of the grid, there's no effect on the security.

This is the solution to the particular situation that this sponsor was in. Each one of these deals is different in terms of how the security is triggered. In the residential re security, the losses are simply based on indemnity, where the losses to the bondholder are based on the actual losses to the insurer. In that case you have more data points to link the frequency of hurricanes with their severity, which becomes part of the modeling.

The modeling is very scientific and very in depth. We typically hire one of the specialty modeling firms to do this analysis. In the Tokyo case, we hired a seismic modeling firm called EQE. In addition to working with insurers and reinsurers, EQE assesses the seismicity of particular sites. A corporation building a chip plant or a power plant might hire such a firm estimates the chance of it being affected by an earthquake. EQE does a lot of work in Japan and California and the other earthquake-prone areas of the world.

In our case study, the annual expected loss is 70 basis points. So your chance of having an earthquake that will cause some loss under the security is about 1% a year. Interestingly, these bonds are rated. The rating agencies either try to build

their own models for the risk or come in and kick the tires of the modeling firm. They will apply some stress tests, turn the knobs on the assumptions a bit, and say, "OK, we believe it really is 70 basis points." Then they simply look on their chart of historic default and loss rates and declare it a double D rated bond, for example. That's one of the reasons that number is very important.

EQE's sensitivity analysis covered three different time periods: 679 to the present, 1600 to the present, and 1875 to the present. The year 1875 was when they instrumented the Tokyo area, improving accuracy of the various measurements. You can do this analysis over the three different time periods. And you can do the analysis in different ways, such as time independent and time dependent. For time independent analyses, you're looking back at historic earthquakes determining how many 7.1s or greater occurred in the inner grid, how many 7.3s or greater in the outer grid, and how many events that would have caused a loss under these securities. From that, it's a very easy calculation in terms of your expected loss and frequency.

The time dependent theory is that you have a number of plates on the surface of the earth that are moving together. The pressure between them is fairly constant per year. The earthquake is just a release of that pressure. After you have an earthquake, and a couple of aftershocks, you've released the pressure and another big one is less likely immediately after one big one. EQE goes through all the data to try to get a sense for when the last earthquake hit, how big it was, and compare it to the previous one to get some idea of the periodicity of the particular fault. This analysis is far more mathematical. It all goes into the black box at EQE and comes out with 70 basis points for expected loss and a 102 basis point for frequency. Doing this in different ways and for different time periods revealed that those numbers do not change that much. So there's a definite range you can put on both of those numbers using the most extreme case.

Several different types of risks are in the process of securitizing, including: (1) hurricane, (2) earthquake, (3) industrial, (4) combination, (5) mortality, and (6) lapse. And there are different types of trigger, including parametric, index, and indemnity. The term of the Japanese earthquake deal was 10 years of risk. The hurricane ones tend to be a year right now. Those will probably get longer because that's what investors tend to prefer. It can be a single or multiple event. In the Tokyo earthquake security, you can have multiple events that continue to hit investors and continue to pay the sponsor. It simply depends on the way the trigger on the bond is defined.

Let's look at the current market environment. I made the point earlier on that spreads have come in, and, in fact, more insurers are getting into the market. Chart 3 shows the spread over LIBOR on some of the bigger transactions in the market.

The squares on the left show the net premium that the investors are being paid for the tranche where all of their money is at risk. That's comparable to the net rate on line in reinsurance terms. That's where the reinsurer gets paid to take that risk. These are different risks, but they are all double B to double B-minus rated securities. So in terms of how the rating agencies look at them, they're a similar level of risk. Basically, the spread is coming down. As more investors come into this asset class, there's more competition and more demand on the investor side.

Residential Re recently came back. If you project out to June 1998, the spread is about 400 over LIBOR. That's a \$450 million transaction. Others are currently in the marketplace, so there certainly has been some leveling, but we have seen the same risk that was placed this year with investors sell for about a point and three-quarters less than it was last year.

In Chart 4, we took portfolios that were 100% bonds, 100% stocks, and calculated the efficient frontier. A is 100% bonds and B is 100% stocks. In the case of an insurance company, this would be different because your liabilities tend to look like bonds, but the same kind of result can be gained in a different manner. If you think of yourself as a pension fund or some sort of balanced fund investor, that would be your efficient frontier. The efficient frontier changes as you add incremental amounts of ILS. The beauty is that you're well paid to take an uncorrelated risk.

You're trading Greenspan for greenhouse or earthquake or whatever you call this. As you add more of these risks, the diversification gives you a better efficient frontier. Your efficient frontier moves up and to the left if you add 5% Trinity Re, the Florida hurricane risk. Then add another 5% in ILS, this time in SR Earthquake, the California earthquake risk. With the 15% Parametric Re, you've added another 5% of Tokyo earthquake risk.

So the beauty is that these risks, to the extent that you can add independent risks, are also diversified within themselves. The diversification is much stronger than simply buying a bunch of different double B or triple B names because they tend to be very strongly correlated with a high exposure to the overall economy. However, once you have 15 or 20 of those names, you don't have much diversification beyond that. To the extent that you can add new risks on the asset side—and we're assuming you don't have those risks already on the liability side—that increased diversification is extremely powerful.

Regarding the spread behavior we saw last fall, when you had the emerging markets crisis and the stock market crash in Hong Kong, the spreads on emerging market bonds gapped out very quickly. We found the spread on similarly rated ILS stayed where they were or actually came in. So the first data point we have is that investors will treat these as uncorrelated risks.

Mr. John Scowcroft: If there were any way for a portfolio manager, or a corporation or an insurance company to achieve higher yield and lower risk, the way to do it would be through management. My perspective comes from observing how people invest and the investment performance of certain people.

Say that you have two Wall Street traders who each have similar trading positions. The assets they trade are very similar, and their client base is very similar, so according to all the books and records of the firm and every other superficial view, they look the same. Yet, if you look at their profit and loss statement on a daily basis over time, you'll find that one trader has huge swings, and the other has smaller swings. So there's a difference in the risk of that entity managing those assets, and the risk has to do with things you can't see and that the regulators can't pick up. It has to do with the nature of the human being and his or her trading style.

You can observe this in an institutional context—take real estate investing. Let's look at two different companies: Mutual Benefit Life and Standard Insurance in Oregon. They both have big exposures to real estate, but one firm is no longer with us. The other continues to have a high exposure to real estate, and the defaults it's had over the last x number of years you can count on the fingers of one hand. This is a group of very successful, safe, and sound real estate investors.

It was interesting to look at where the losses were during the market locations of last fall. That was when the emerging markets crisis first hit. The stock market had some jumps, and some spreads in the bond market widened; however, the big losses were not sustained in the emerging markets portfolio. Those traders were used to that volatility because they see it every day and were ready for it. The big losses were not in the high-yield business either. Again, those people have been through a lot of volatility and were on top of their risk. The big losses were sustained in the high-grade corporate bond desks. Those people had about 15 years of good news in their market, positive carry, and stable-to-ever-narrowing spreads. This provided a nice wind at their back to help them manage their mini crises. But spreads on corporate bonds widened a lot, and, lo and behold, that's where the risk was.

The bottom line is that people matter. I've organized my comments around the jobs of three people: the chief investment officer (CIO), the portfolio manager, and the asset acquirer. I'd like to show the basic elements of a risk-competent business by highlighting the way these people do their job.

The CIO creates an investment business within the institution. The institution itself has some sort of stakeholder value model and those interests must be served with some sort of objective. A good objective would be to maximize after-tax and after-expense risk-adjusted value expressed in operating earnings. That statement will set the tone for the organization. Within that framework, all policy, strategies, tactics, performance, and risk measures should be consistent in supporting that overall objective. If there's a distinct business unit, the accountability and the interest alignment of that business unit should serve the purpose of the organization. It shouldn't be trying to manage a lot of outside money at the expense of the general account unless, of course, the value to the firm from outside money exceeds the value of the firm doing a good job with the general account, which probably isn't the case.

After the philosophy is sort of laid out, then portfolio management objectives must be set, and they must be set to balance the demands of your debt or risk constituencies and your equity or performance constituencies. There's a tension within every organization. Policyholders just want the money to be there when they die. They don't care about anything else. They just want the money there when the car is wrecked. The rating agencies never want anything to go wrong. And more and more shareholders really don't care about anything but their stock price going up. If you view the equity in a firm as an option on the value of the assets, which is the proper analytical framework, then the equity holders would want a lot of volatility. So there's a tension that has to be managed very explicitly.

Another thing to pay attention to in terms of portfolio management objectives is to focus on ROE, both the numerator and the denominator. When they seek yield, people get in trouble when they only worry about the numerator and they ignore the denominator. If interest spreads are narrowing, make sure that narrow spread never goes away and is always there. How do you do that? You look at the denominator, the risk of the equity in the capital exposure. That would lead to diversification strategies with all different types of risk—equity, commodity, international, insurance, option, credit, and liquidity exposures. All of these risks should be analyzed and taken in balance.

There's such a thing as an investment culture, which needs to be defined and addressed within the organization. The expertise of the individuals and a knowledge base within the institution have to be maintained. Some insurance

companies that I'm aware of, again using the real estate example, have a tremendous expertise in the real estate area. In fact, to exaggerate a bit, the investment committee has a big stock portfolio, a portfolio of long-term assets or big high-yield portfolio. The investment committee will spend 10 minutes addressing those portfolios to make sure everything is OK, and the rest of the hour and a half is spent on real estate. They pass around pictures and get into every little asset they invest in. That company, across the board, knows real estate. You could lose a key person and it wouldn't matter because there's a knowledge base. There's expertise that understands real estate and can survive the turnover of people.

Another key aspect of human capital is to blend experience and analytics across the board, from asset/liability strategy to sector tactics. You have some people, let's just call them the tire kickers—the old, wise investors who have been around, and seen it all, who can stare you in the eyeballs and tell whether you're going to pay off that loan—and then you have the high-tech, quantitative, black boxers who don't need to know anything other than the data they've got, and they're going to beat the market and make a fortune with that black box. I think nowadays both camps are doomed to fail. The ones who will succeed are those who understand that there's value on both sides, that all the analytics ultimately provide extremely powerful insight that, almost by design (given that they're all based on assumptions) exclude part of the real world. You need human experience that can capture all the things that can't be captured in models to enhance the models. However, the human brain cannot process data as well as the statistical model or some other analytical model, so the human brain and the experience needs to be supplemented with the data to enhance judgment. And the successful firms that manage risk well and perform very well with risky assets are the ones that blend those two. Both camps have an appreciation and respect for each other, and essentially the models can be used to enhance the human judgment.

Performance measurement and compensation must work to align interests. Then people have to be innovative and responsive in their investing sector by sector. You want to be able to invest intelligently when something's new. That's when the spread is there. Finally, make sure that the company has a policy to make effective use of counterparty resources—systems that you can buy from the outside such as Wall Street traders and outside money managers. You could hire an outside money manager to work with an asset class you're not familiar with, and look over his or her shoulder to learn how to do it, and then slowly bring the money inside. Don't think you have to be a know-it-all firm, but taking information expertise from anywhere can help.

The portfolio manager has to develop a comprehensive framework for managing assets, and this kind of framework needs to be based on modern statistical and

financial principles. Finance now is a well-developed field. Several Nobel prizes have been awarded to financial people. Good finance incorporates the use of statistics which, of course, is one of the key foundations of the actuarial sciences. Everything has to be viewed that way to be able to manage and understand risk well. We understand that different data sets and characteristics of investments can be nonstationary, non-normal, and hard to deal with statistically. Nonetheless, statistics is the best vehicle to start trying to put your arms around those problems.

A portfolio manager develops a consistent framework within which all investment policies, strategies, and tactics can be developed and implemented across all the different portfolio-related disciplines. Asset/liability management and asset allocation should be approached the same way. Capital and risk management, value at risk, etc., should all be incorporated into your asset-allocation and asset/liability management models. Overlay strategies and tax strategies also can be handled within the same framework. Tax risk can be evaluated with some sort of probability framework.

Once the framework is set, each asset and obligation can be modeled and reflected in it because each has some sort of an interest rate option and credit risk that can be represented. With credit risk, I'm speaking very broadly. Think in terms of an event of default, a severity of loss under the event of default, and then an exposure to loss resulting from the event of default. You can evaluate these CAT bonds within that framework to see how they look within your portfolio. The value of a corporate bond is based on the value of the underlying asset of the firm, and there are claims against that underlying asset. There are senior claims, all the way down to junior claims. So understanding debt involves an understanding of the equity markets and vice versa, just to predict how these assets are going to behave. You have value distribution. A contract on the claims on that value will define and describe your probability of default and your default points. The probability of default, again, is determined by the overall value distribution of the underlying entity, and that framework can be applied to almost everything.

You need input to your analysis and your understanding of risk, which, again, are all statistical measures, including behavioral inputs. You have expected yield to return, which is a mean, probability of loss, which a standard deviation, and higher moments. The risk contribution to the portfolio is a diversification analysis, which is some form of correlation. Once you have those inputs, you also express the outputs in a framework that reveals the consequences of investment decisions. There could never be a surprise, perhaps a disappointment, but never a surprise in terms of the outcome of an investment decision. You can look at the range of possible outcomes and probabilities, model almost anything that could happen, and look at those over different time horizons and in different market environments to

add richness to the statistical analysis. Every institution needs a strong portfolio management capability. This is a core competency that the institution has to have even if all the assets are outsourced. And it must be integrated in a portfolio management context on the basis of a strong understanding of the liabilities of the firm.

Finally, the asset specialists develop a framework for each asset class by:

- (1) Thinking about the qualitative analysis, the Graham & Dodd type of financial analysis where you look through the financials of the entity
- (2) Developing a story about the performance of all the financial securities
- (3) Kicking tires as in the Janus ads where they visit the suppliers and the customers of the firms in which they invest
- (4) Looking at securities market fundamentals
- (5) Thinking about information economics (who has what information and how do you determine where you are and if you have imperfect information?) and
- (6) Looking at all costs of the transactions

Those are basically the judgment calls that have to be made. Combine that with the quantitative analysis of the distribution of returns. Or you can analyze, through yield curve models and option models, the correlation of returns, which you can then analyze through portfolio analysis and portfolio-related models, time series, and cross-section analysis. This is the essence of economics, most trading strategies, and the basis for credit prepayment analysis. Finally, compare your results to benchmarked firms. Another good quantitative technique to throw in there is trying to extract information from all markets, such as the concept of implied volatilities where you have option prices. You can watch how they change and imply how the volatility of the markets are changing over time.

Next, you put all your results into the institutional context, considering the tax, accounting, rating, and regulatory considerations. Think about the economics, economic capital, and expenses. Finally, institute all that with discipline and experience. A firm that runs itself like this can take a lot of risk, manage it extremely well, and have outstanding performance. This is the solution to the current dilemma of narrowing spreads—having the human beings compensate for the state of the world we're in.

Let's say you figure all this out conceptually, and have it all nailed down in your mind. How are you going to go about this? You might encounter a systems problem, because all of your data will have to be integrated and usable. That is the big challenge now for financial institutions at large. Once you start thinking along these lines, suddenly the data warehouse concept will become alive. You'll want to have data on every asset and liability that can be accessed and modeled in a unified

framework. Then you can massage the data with different models, some of which models you can buy and some you'll have to build. More and more of the competent firms will have the ability to build from scratch all analytical models relating to all the asset and liability classes that they have. That's part of the consolidation trend. The companies with scale will have the wherewithal to do that and are already starting. These companies are distinguishing themselves as very good investors. All of this is analogous to the portfolio management capability of being able to integrate the asset and liability analysis. I think integration capability will become a core competency that every firm is going to need in the future.

I remember talking to an insurance company five to ten years ago when all these models by vendors were becoming available to analyze exotic securities transactions. One person told me that he had all these different models in front of him and was thrilled because he had information he never thought he could have. But he couldn't do anything with it because he was unable to bring it all together into a portfolio framework and trade his portfolio based on these analytics.

The assets in the investment community are great, and the tools the capital markets provide are great. That's the foundation and the source of the actual yield. But the way the company is set up to think through the issues of managing assets will differentiate firms. Some will perform well and be safe and others will be less competent and on the margin.

Mr. Scott L. Fitzpatrick: This question is for Mark Griffin, and it is in two parts. First, who calls the actual Richter Scale amount? That could mean \$1 million or \$2 million either way, how do you control or audit that when the event occurs?

Mr. Griffin: The Japan Meteorological Agency, an official government agency, measures the earthquake and the epicenter. That is used as the measurement and becomes publicly available, triggering the bond. If you have one that's very close, within a kilometer, then you average the result of it being inside or outside your perimeter. It's not a matter of one yard one way or the other.

Mr. Fitzpatrick: The second question is on multiple events. I know you said the release of pressure minimizes the risk that another quake would occur again, but say I tapped out 30% and then a week later had another event over the 7.1 magnitude.

Mr. Griffin: The bond is structured such that you take the biggest event within a month. If there are multiple events, you look at the biggest one within a month. If it's over a longer period, then it's not officially an aftershock. Then you can lose more than once as an investor.

From the Floor: Let's say I had fifty 8.0 Richter Scale events. Would I lose 50 times my money?

Mr. Griffin: No, you can only lose your money.

Mr. Clark A. Ramsey: Another question for Mark. On the CAT bonds with the indemnity structure, could you comment on how investors in the market view the management risk and how they price it?

Mr. Griffin: The risk assessment incorporates the exact exposure profile of the company. You typically have a couple of mechanisms in the bond to control that, such as at least a 10% coinsurance. There is no point at which the insurer is writing checks and not feeling some pain. And you also have an auditor who will look over the shoulder and audit the single event nature if that's part of the security.

From the Floor: Does the pricing also take into account differences in the claim abilities of the underlying insurance company?

Mr. Griffin: What do you mean by claim abilities?

From the Floor: Not all companies will pay the same claims, given the same set of circumstances. Some companies will, unfortunately, overpay. Other companies will try to underpay. And I'm wondering if the market recognizes that in these types of securities.

Mr. Griffin: I don't think there's sort of a spectrum of those who overpay and those who underpay in investors' minds. I think you'll get that that there is some kind of event and people can compare what different companies paid on an apples-to-apples basis. If you have two companies that have issued bonds on the same event, you can see if what they end up paying differs from what the risk assessment would have shown on a relative basis. But we're not at that point yet where people will say, "This is a generous company or this company is a bit tighter on its claims."

Ms. Sarah L. M. Christensen: I have a question for Mr. Hogan, who did the securitization. I work in asset modeling for valuation and have to model reactions to interest-rate scenarios and lot of the structured tranches. I'm not comfortable with how they would react and not getting a good level of support from the investment community for some of the more exotic securities. I'm assuming that the CAT bonds are completely uncorrelated, so I just take the best estimate and use it for everything. But I don't think that's the case in the CDOs or some of the other securities.

Mr. Hogan: I can agree with you. I don't see that the market has progressed, especially on the buy side, such that people have a way to analyze that. Let me give you an example from a client. We use fairly complex models to put the structures together, but afterwards it seems to be on a one-off basis where you're working with an investment firm on a particular portfolio. It goes along with what John was saying, that you have to develop that relationship for these types of transactions. My suggestion would be to find one or two firms and work with their traders. Odds are the trader has a book that you're talking about and is dealing with the same issues. Once again, more to the issue is do you have the systems that the Street has to do that? Or can the Street help you build your own system or divert you towards someone who can get you one?

Ms. Christensen: Can you give me some ballpark guidance so I can make some adjustments? I'm not comfortable saying that no matter what happens, these are going to pay off the same way.

Mr. Hogan: I'd recommend finding a firm that you can spend half a day with, looking especially at your particular bond or portfolio of bonds.

Ms. Christensen: Would you ever look through to each of the underlying securities?

Mr. Hogan: Absolutely. Look at some of the tranches that have, say, several emerging markets in them. Everyone's looking through to them pretty heavily, and their spreads are reflecting it. You have securities that have widened 100–200 basis points. The mezzanine or the triple B tranches have widened dramatically. Right now, if a security has emerging markets in it, it's getting hurt on a spread-widening basis, as opposed to something that might have only U.S. high-yield loans in it. Everyone is looking through to those securities. Maybe the question should be how rigorously are they doing that? It tends to be done a bit more qualitatively, though. "Emerging markets? No, thank you. I won't buy unless the spreads widen another 20 basis points."

Ms. Christensen: You need to have the actuary work with your investment person to then get your investment person to work with the people who are putting the deal together.

Mr. Hogan: Absolutely.

Ms. Ward: And if that happened at issue, hopefully, you wouldn't buy something that you hadn't modeled up front.

Ms. Christensen: Somehow the investment people have their own ideas. They think a best estimate of a model is the same thing as modeling the reactions under 50 or 60 different interest-rate scenarios.

Mr. Neil J. Davidson: I have a question for John. How much more in performance can you expect from your ideal investment department compared with an average one, and could you answer that net the increased compensation you would have to pay to get those people?

Mr. Scowcroft: I can't answer that off the top of my head, but there are data for it that illustrate the point. Let me just use Miller Andersen and their mortgage investing, which is an affiliate of Morgan Stanley, as an example. Miller Anderson is a division of Morgan Stanley-Dean Witter, Discover, et al. If you look at the ranks of money managers and net out their fees, the consistency of those ranks of money managers becomes apparent. You will find that there are some Chicago Bulls that just keep winning, even though everybody knows what they're doing, films every game, and studies their moves. They have a group of people that not only has some stars, but also is well-managed. The Chicago Bulls analogy is an interesting one, because not only does the team have Michael Jordan, who is obviously important, but they also work well together, and the coach has a unique philosophy about how to manage these people and make them work together. And I think you can find evidence that, when dealing with a fixed-income money manager, competence can make a difference of 10, 50, or 100 basis points.

The Miller Andersen group has a very good track record. I became involved in the mortgage market in 1983. I've known of and watched them over the years, and they have practically no turnover. Nobody has ever left. They've figured out how to pay employees and keep them. Look at all the turmoil in the mortgage market since 1983. Look at all the hedge funds that have started up and all the lures there for people to leave that firm and do something on their own. But they just hang in there and keep turning in good performance.

That's my evidence that it can be done. And there are other firms like that in other markets. If you talk to the people who work there, you find that there's a key manager who understands the people, just like Phil Jackson understands Michael Jordan and Dennis Rodman, and can get everyone working together.

Mr. Griffin: There is an advantage to being highly rated and highly capitalized. In the past, that's been a barrier to entry to a lot of the reinsurance markets or mortgage insurance markets. Now you have the capital markets. You can step in and have no capital requirements and no credit risk. And to the extent that you can put one of these risks in a form where they can understand it and buy it, then that

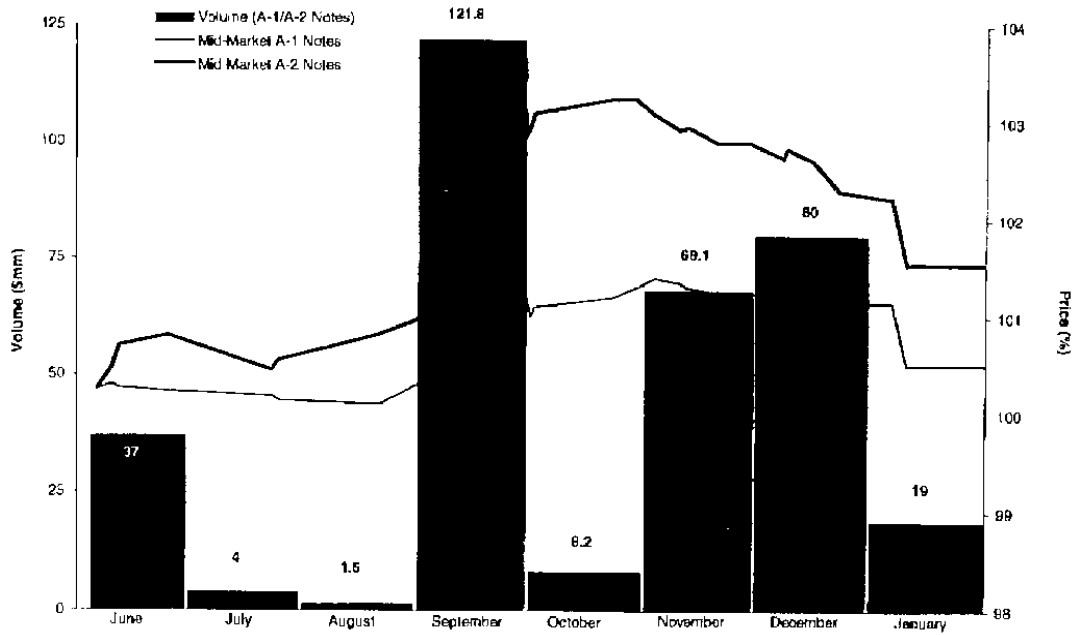
barrier eventually is completely gone. If you're an insurer, you're going to have to look to your underwriting expertise more and more as the way to make money and differentiate yourself, whereas, in the past, part of that has been size and rating. I think that will be true in Japan as well.

From the Floor: I'd like to go back to Mark Griffin's Tokio Fire & Marine example. What is the potential for securitizing non-life risks in Japan in terms of the potential volume you could write? Are you writing yen-denominated securities, and, if so, what kind of spread do you think you might be able to get over, say, Japanese government bonds?

Mr. Griffin: We haven't done anything in the yen yet, because the biggest block of investors is dollar-based. It's the spread over LIBOR that is the crucial thing. Whether it's in pounds sterling or yen doesn't really matter that much because it's very easy to swap that underlying floating rate exposure for whatever it is you want. And a lot of insurers swap the LIBOR to fixed to get the right interest rate exposure and capture the spread. There is a lot of risk in Japan, and much of it is earthquake related. The indication is that there is great capacity in the capital markets for different risks. Of that \$1 billion-plus that's out there, a good chunk of it is in East Coast windstorms. Supposedly you'd have at least as much appetite, ultimately, for a Japanese or Asian earthquake. There's even a small typhoon deal that was closed recently.

Again, whenever you look at the size of the capital markets, \$1 billion is not even a drop in the bucket. It's nothing. The potential capacity is enormous. We also are in the process of looking at this to address risks that are less traditionally insurance risks, such as weather risk. Utilities in the United States are going to have a lot more risk after deregulation. In the past, they've simply changed their rates and passed losses on to consumers. In the future, they won't be able to do that. They're going to have the risk that it's extremely hot in the summer and extremely cold in the winter. And they're probably going to be guaranteeing their rates. That's the kind of thing that you can securitize. Very recently, mortgage default risk was securitized for the first time. If you're in one of those five or six mortgage insurance companies, your product has just been securitized.

CHART 1
SECONDARY TRADING
RESIDENTIAL RE GOLDMAN SACHS' SECONDARY TRADING VOLUME (a)



(a) does not take into account derivative trades.

CHART 2
CASE STUDY: PARAMETRIC RE/TOKIO MARINE & FIRE
JAPANESE EARTHQUAKE RISK IN THE SOUTHERN KANTO REGION

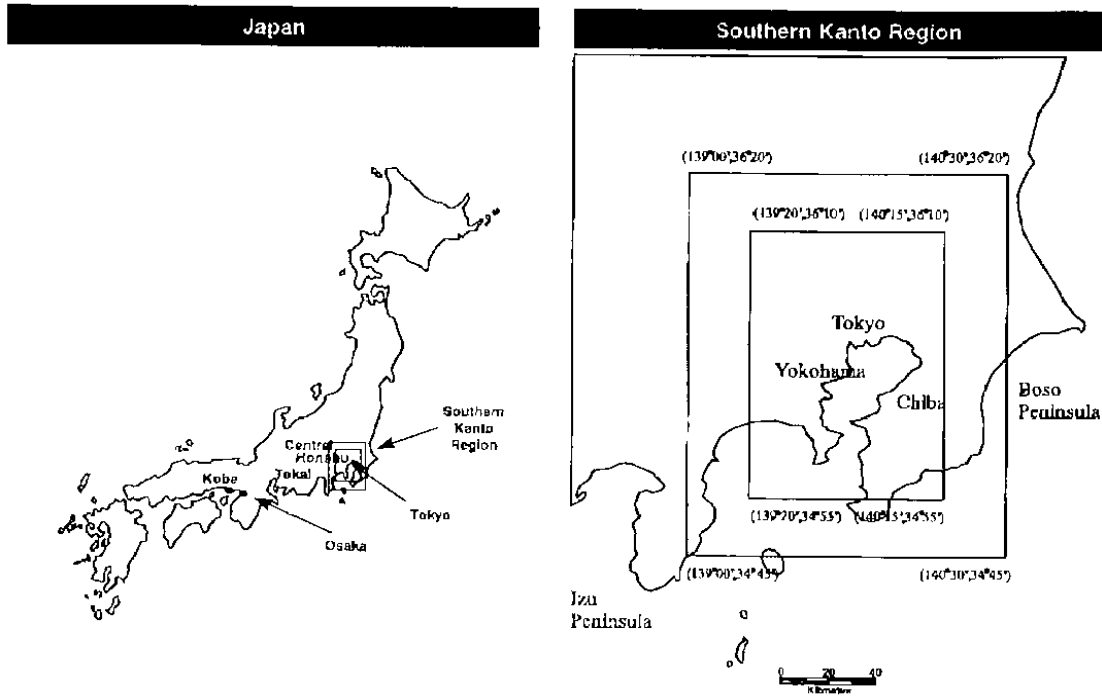


CHART 3
CURRENT MARKET ENVIRONMENT
PRICING HISTORY

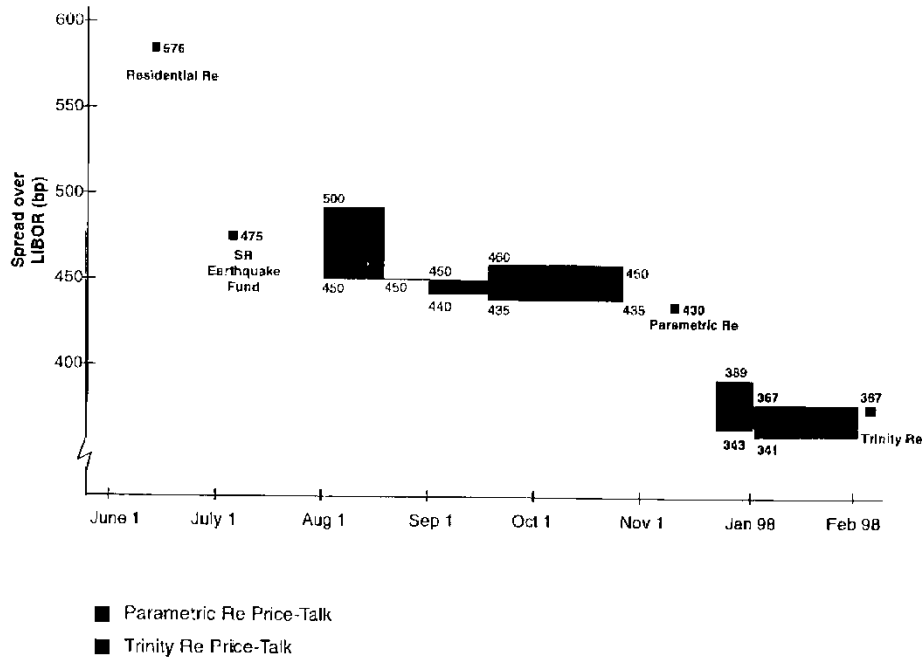


CHART 4
THE DIVERSIFICATION PROPERTIES OF ILS

Correlation Coefficients

	S&P 500	Long-Term Government Bonds	Catastrophe Notes
S&P 500	1	0.18	0
Long-Term Government Bonds		1	0
Catastrophe Notes			1

