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Innovative Investment Vehicles

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The downward ratchet to today's low interest rate environment has helped spark enthusiasm for new investment vehicles with a potential for higher returns than more traditional asset classes. Leveraged bank loans, catastrophe bonds, convertible bonds, high-yield bonds, and various types of structured securities have appeared in capital markets in response to the hunger for yield.

What are some of these structures and how well do they address the needs of insurers seeking yield? Do they risk violating state insurance laws or sabotaging RBC sufficiency? What new risks do these vehicles introduce? How do their risk profiles fit with portfolios backing the insurance products they support? What impact will Regulation 133 have in the asset/liability mix?

MR. RONALD S. OLDENKAMP: I'm with Genesis Marketing Group. I'm going to double as a moderator and a panelist. My fellow panelist is Vadim Konstantinovsky. He's with Lehman Brothers of New York. He's a vice president in the Quantitative Portfolio Strategy Division, and been with Lehman Brothers for six years. He received his MBA from New York University and he's about to receive his Chartered Financial Analyst (CFA) designation. He just

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All charts referred to in text can be found at the end of the manuscript.

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passed his third exam. Vadim is going to discuss mortgage-backed securities and how to better control their varying maturities. He believes this is a way he can help you better manage your liabilities and match your liabilities to these particular asset class.

MR. VADIM KONSTANTINOVSKY: My presentation will be very impromptu, but we are going to publish a very detailed paper on this subject within the next month, and I will be happy to mail anybody who is interested a copy.

I'm going to talk about an extensive study that we completed recently. It is from a year-long study that we were uniquely able to perform because we have a historical database of daily returns and statistics on all fixed-income securities in the Lehman Aggregate Index. This unique database allows us to run historical simulations of various strategies and methodologies and ask "what if" questions. We can look at how a particular strategy would have performed in the past over the last five or ten years.

We undertook this study with two goals in mind. It's pretty much common knowledge that mortgages possess both positive and negative properties. The positive is spread advantage over Treasuries or excess return over the past decade. The negative is the very unstable duration that is due to the negative convexity of mortgage pass-throughs that, in turn, is due to the embedded optionality. The fluctuating duration presents a real problem for any asset managers who, for some reason, target stable or constant duration benchmarks. The most obvious example is the asset/liability management context.

So there are two ways of dealing with this problem. One is simply to exclude mortgages from investment portfolios. Some managers are forced to do that by rating agencies, who may prohibit mortgages from their portfolios because they don't pass stress tests. That's the case with many insurance companies. People might try to do something about the unstable duration by engaging in some sort of dynamic or delta hedging. The problem of the latter group is the lack of appropriate and fair benchmarks, because you cannot really measure performance of a manager who absorbs hedging costs and who created a new asset class against a nonhedged market index, such as Lehman Brothers and MBS Index. So the approach that we developed and back-tested over the last five years can be viewed as an alternative way to invest in mortgages that can, for example, help insurance companies

convince rating agencies to allow mortgage-backed securities (MBSs). Or, people who are already doing something like that have a way to construct fair benchmarks.

Chart 1 is a graph that shows just how closely the mortgage duration follows the changes in Treasury yields. The blue line on this chart is the yield on the ten-year on-the-run Treasury security that we selected as the benchmark. The darker line on top is the duration of the Treasury index.

It stays pretty much constant, increasing just slightly with declining yields. The lightest line represents the mortgage index duration that follows the changing Treasury yields, and Treasury yields can be very volatile. You can see what's happening if you have a mortgage portfolio. That's how this portfolio duration will be jumping around. This is clearly unacceptable for many asset managers.

Chart 2 is another illustration of the badness of the negative convexity. I'm pretty sure most of you are aware of what negative convexity does, but this graph just nicely illustrates it. When yields rally, meaning when yields go down and the whole fixed-income market enjoys healthy returns, negative convexity of mortgages and callable corporate bonds, for that matter, limits the returns. The dotted line is a mirror image of the increasing yield part. That's what the price return on this investment would have been if convexity were not negative. This chart is the mortgage index return given an instantaneous parallel yield shift, but, in reality, the solid line shows what you really get. So we tried to see if we could hedge negative convexity away.

The first thing we have to decide on is exactly how to hedge mortgages. To hedge a mortgage portfolio means adding something on top of that, so that the combined position has more decent convexity characteristics. There are various ways in which you can hedge the underlying mortgage investment. Depending on how you do that, the risk/return characteristics of that synthetic investment might be vastly different.

Depending on how closely you match the term structure exposure of the overall investment, the strategy will be more or less sensitive to the changes in the yield curve shape. The strategy return will reflect

what the yield curve did over a particular period. All I want to say about Table 1 shows the vastly different magnitude of the annualized excess return over the Treasury index. When people ask how attractive a particular asset class is (for example, mortgages), they normally ask what excess return does this asset class offer over the risk-free investments? We can see that this advantage, this excess return that draws people to invest in a particular asset class can be very, very different, depending on how this hedge is implemented.

TABLE 1
Excess Return $\frac{3}{4}$ “Right” vs. Investable
Matching Term-Structure Exposure in
Computing MBS Index Excess Returns, 1989- 98

Methodology of Computing Excess Return	Annualized Excess Return (bp)	Annualized Standard Development (bp)
Index vs. 10-yr. OTR + cash	69	129
Index vs. 10-yr. OffTR + cash	50	128
Index vs. 2- and 10-yr. OffTR	39	126
Index vs. 2-, 5- and 10-yr. OffTR	29	131
Bonds vs. duration-matched OffTR	20	134

Source: Lehman Brothers

Now, I'll explain the basic mechanics of the strategy we chose to implement so that we understand what I mean by hedged mortgage investments. The idea is really very simple. You invest 100% of your cash into mortgage assets. This study was done using the Lehman Brothers Mortgage Index, but it can be any portfolio of mortgage pass-throughs. You add a fully leveraged investment into some liquid instrument, and the idea is to bring the overall duration of this strategy to a set target.

For example, let's say we want to bring the overall duration to four. You are mandated to have an asset portfolio with a duration of exactly four and your mortgage portfolio happens to have a duration of 2.4. You have a duration gap that you need to fill. You're actually filling the dollar duration gap. Dollar duration is computed as duration times price, you determine the hedge amount this way: you compute

the dollar duration of the target, subtract the dollar duration of the index and divide it by the duration of the instruments you choose as your hedge. In this case, this illustration shows ten-year on-the-run Treasury. The result is called hedge ratio. It shows that for every dollar that you invest in your mortgage you have to borrow and invest into the ten-year on-the-run Treasury 22.6 cents. So you start with a dollar and you never have any other cash but that dollar. Then you borrow 22 cents, and you buy your hedge with that money. You buy a Treasury bond. The market value of your investment is still one, but the leveraged position in the hedge will affect the characteristics of this investment.

You set-up the position at the end of a month. Let's say on December 31 and at the end of January you have to measure the performance of your overall portfolio. The right-hand side part of this table shows how you compute performance. Performance consists of the return on your real investment. That was 99 basis points in this month, plus the hedge ratio times the hedge performance after financing. Remember that you borrowed 22 cents and you had to pay interest on that, namely, repo. This particular bond was financed with a special ten-year repo rate that happened to be 33 basis points over that month. The bond itself returned 2.05%. You had to pay back the interest of 33 basis points. The difference is yours, times the hedge ratio. Your overall performance is the sum of the two. This is the machinery, the basic idea, the simplest case.

TABLE 2
Core MBS + Leveraged Overlay = Target

MBS Investment: Lehman Brothers MBS Index Financing: 10-year special overnight repo
 Target: Constant duration of 4.0 Hedging Instrument: 10-year on-the-run Treasury

Set Up Position (31/December)		Compute Return (31/January)	
MBS Index duration	= 2.40	MBS Index return	= 0.99%
Ten-year OTR duration	= 7.08	Ten-year OTR return	= 2.05%
Target duration	= 4.00	Financing cost	= 0.33%
For each \$1 invested in MBS		Strategy return for January:	
buy $(\$4 - \$2.40) / 7.08$	= \$0.266	$0.99 + 0.226$	
of the 10-year Treasury note		$\times (2.05\% - 0.33\%)$	= 1.38%

Source: Lehman Brothers

We can perform multiple variations on this simple base case. The previous example was simplistic. You have considerable freedom in this strategy. You can choose various hedging instruments. It doesn't have to be on-the-run Treasuries. It can be Treasury futures contracts or it can be even another mortgage pass through, a liquid mortgage security that can also serve as a hedge, because the most important requirement for the hedge is liquidity. As you will see later, risk and performance will depend dramatically on what hedging instrument you use.

A Simple Benchmark for Hedged Portfolios

Core:	Lehman Brothers MBS Index
Hedging Instrument:	2-year and 10-year Treasury futures contract
Hedge Construction:	Equal contribution to dollar duration
Weights Computation:	

$$W_2 D_2 P_2 = W_{10} D_{10} P_{10}$$

$$W_2 + W_{10} = 1$$

Annualized outperformance vs. Lehman Brothers Treasury Index 1994–98): 0.41% with a tracking error of 1.08%.

Source: Lehman Brothers

You can choose various ways of rebalancing your position. You set-up your position at the end of the month to move your duration equal four. A few days later, as yields move, your duration goes out of sync. Mortgage duration fluctuates. It can go down or up, and you're unmatched again, so you have to adjust that position. The good thing about this strategy is that you don't need to touch your potentially illiquid mortgage position. You adjust the hedge, which is a very liquid investment. Transaction costs are low.

You can choose to rebalance this position only once a month and let duration deviate from the target mid-month. Or, you may impose very strict thresholds on duration mismatch and rebalance as soon as

duration moves out of sync just a little bit. Again, as you will see later, the risk and performance profile will be dramatically different.

The target duration you have to achieve matters a lot because the further the target duration is from the underlying mortgage position duration, the more of the hedge you need and the more your overall risk and performance will be affected by the hedge. Let's say your mortgage duration is two, and you want to achieve a duration of ten. It will be primarily a position in the hedging instrument with just a sprinkle of mortgages and your performance and risk will be determined almost entirely by the hedge.

Let's take a look at these degrees of freedom one at a time. Why does the hedging instrument matter? The most obvious reason is liquidity because liquidity determines whether or not you it is possible and how easy it is to adjust your position when you need to. Liquidity determines how costly it is.

Duration of the hedging instrument is extremely important, because, again, what happens is that you have a mortgage investment with a duration of three, and you need to add some other instrument to achieve the overall duration that equals your target. You can do it with various instruments. You can do it with another instrument that has a duration of roughly three. So you will have two pieces very near each other that will react pretty similarly to the yield curve moves because they are on the same point on the yield curve. Or you can choose a bond with a duration of eight, which means you will have two pieces, and two chunks of money sitting pretty far from each other on the yield curve. Those two chunks will be exposed to movements in different parts of the yield curve. If the yield curve changes its shape, your overall position will be sensitive to that because, as you know, duration measures price sensitivity to parallel shifts. Even though you may be duration hedged to your target, if you have a hedge that is far apart from the mortgage position, you will still be unhedged in terms of changes in the shape of the yield curve. That leads to unpredictability of returns.

Finally, there is return and financing of the hedging instrument itself. If you add a hedge that performs well, that clearly boosts your overall performance, especially if you have a large hedge. If you need a sizeable hedge to bridge a wide duration gap, its performance may drive your overall performance.

Finally, there is financing. Remember that this is a leveraged hedge. You finance it and you buy, so you earn return on the Treasury bond after financing. Depending on how beneficial the financing is, the difference, what's left to you, will be bigger or smaller and it will affect your performance dramatically.

The most interesting parameter of this study is probably rebalancing frequency. I will explain in detail what's happening in this delta-hedged mortgage investments in various yield curve environments. We broke down the 60 months over which we did our study into three yield curve regimes, and defined them based on the overall change in yields over a particular month and volatility of daily changes of yields during that month. A stable month is a month in which yields did not really move anywhere and were not volatile; it is an uneventful month. A volatile month is a month with lots of jumping around, but with yields that end about where they started that month. Finally, trending is a month (regardless of the volatility) with a sizeable change in yields.

We found very interesting things about the yield curve regimes and whether or not it's good to rebalance a hedged position frequently. Let me first explain Charts 3 and 4. We set-up our position pretty much like I explained at that simple example slide. We have a cash investment in the mortgage index, and on top of that, a leveraged investment into a liquid Treasury bond, ten-year on-the-run bond. The target, both duration target and performance, is not constant. It's not just a number; it's the Lehman Brother's Treasury Index, which is pretty stable.

At the end of each month, we compute the hedge ratio to equalize the overall duration of mortgage plus hedge with the Treasury index duration, at the end of that month. In mid-month, we rebalance to maintain this equality. At the end of the month, we compute performance of the strategy, like you saw on the chart, versus return on the Treasury index. So the Treasury index is both a duration target and performance yardstick. We measure annualized performance of our strategy versus the Treasury index. The idea was to show that a hedge strategy that provides stable duration still has an advantage over Treasuries and is an attractive synthetic asset class.

But how the strategy behaves depends very strongly on what's happening to yields during a particular month. In stable months, mid-month rebalancing hurts performance. It's best to just sit tight and collect mortgage spread advantage. There's no need to rebalance, because duration is not really changing much and rebalancing just incurs transaction costs. In volatile months, frequent rebalancing also hurts performance, but for an entirely different reason. It's important to understand this particular phenomenon in order to understand delta hedging. I'll explain this in detail, because I hope this will be interesting and useful.

The decline in performance due to mid-month rebalancings in volatile months is due to what the literature calls the whipsaw effect or the whipsaw loss. What's happening is we know that when yields decline, mortgage duration shortens. That's negative convexity at work. Let's say yields go down in the middle of the month, and the mortgage duration shortens. The target duration is stable or even increases. So what happens? The duration gap that we must bridge widens. That means that we need to buy more hedge just after the yields have gone down and bond prices have gone up.

Two days later, yields reverse themselves. They go back up. Duration gap narrows, and we have to sell part of the hedge. We have to sell it exactly after the yields have just gone up and bond prices have gone down. So this is a buy-high, sell-low roller coaster. It's called whipsaw loss.

In trending months the opposite is true. In trending months, when duration slides away, it's very beneficial to chase duration and to rebalance as frequently as possible. If all months were trending, the only sensible way to invest in mortgages would be by rebalancing them daily or even hourly. The key to good performance of duration hedge strategies is the ability to predict what kind of yield environment is going to happen, which is very difficult, of course.

So let me show you one more thing that gives you an idea of how many subtles we discovered in this study. In the volatile month graph in Chart 4, there is a kink when the line suddenly goes back up. Suddenly, in volatile months, more frequent rebalancing helps. When we saw this, it seemed entirely counterintuitive. We looked closer and discovered what is shown on Chart 5: mini trends. Even in

months that, according to our definition, are volatile, yields might still move in the same direction for three or four days, which essentially creates trend within those volatile months. This illustration is interesting because it shows the power of negative convexity or of just how damaging negative convexity can be to performance even over a few days.

In Chart 5 we see that in March 1996, we simulated rebalancing twice with a slightly tighter threshold and then with a less tight threshold. When we were using a less tight threshold, performance for that particular month was 16 basis points, and we did five rebalancings mid-month. When we tightened the threshold, that led to just two more rebalancings in that month, and the performance pick up was 11 basis points for that month. If you take a look at this portion of the graph, you will see that for three or four days, yields actually trended up, and tightening the duration mismatch threshold led to just one extra rebalancing in the middle of this trend. This single rebalancing dramatically improved the performance for this month. There's a lot that goes in these strategies, and it pays to be very well aware of the mechanics of this asset class.

There's one more variation of this strategy that we tried and that may be interesting. We studied an entirely different type of hedging instrument. It's not a Treasury bond, not a Treasury futures, but a current-coupon MBS. Current-coupon is a mortgage pass-through whose coupon is close to its yield and that trades close to par (close to a 100). This is typically the most liquid mortgage investment, and the easiest mortgage pass-through to trade. So we used that as a hedge, and we ran into a whole new issue, which was mortgage spread exposure.

What makes mortgages attractive in the first place is their spread over the Treasuries (Chart 6). But this is a double-edged sword, because when spreads widen, as they did in August 1998, for example, you lose. In the second half of 1998, mortgage durations dramatically shortened. You see the lowest line going down steeply. The duration gap between the mortgage index and the Treasury index showed that our target widened, and that we had to buy a great deal of hedge. In this case, the hedge was also mortgage investment, and that led to dramatically increased spread sensitivity (measured by spread

duration). Spread duration is defined as sensitivity of an instrument's price to the change in spread. It's not the change in yields, but the change in credit spread.

For example, if you take a corporate bond that trades at some spread over Treasury yields, the yield curve may stay constant, or it may not move at all. But if corporate spreads move, the bond will experience return. It will not be due to yield changes because yields did not move, but it will be due to spread changes.

Chart 6 shows that while spread duration of the underlying mortgage position went down, because we were buying more and more hedge which, was also a spread instrument, the overall duration of the strategy went all the way up. So we were loading on spread exposure and the strategy paid for that dearly in the second half of 1998.

The left graph in Chart 7 shows the option adjusted spread (OAS) or the mortgage spread. In August 1998, it went through the roof. Because duration shortened as well, we were loaded with spread-sensitive hedge. We were very exposed to spread movement and spreads went up. That completely killed the performance of that strategy in 1998. That's reflected in the second graph, which shows a comparison of cumulative outperformance versus the Treasury at two hedging variants. One is hedging with 10-year on-the-run Treasury. This is the line that did not drop. The blue line is the strategy that hedged with the current-coupon. Those two or three months in 1998 completely destroyed the overall performance. So this is just one more dimension to be aware of.

The key to Table 3 is the outperformance column. This is the annualized outperformance of duration hedge strategy versus the Treasury index, and all numbers are positive and meaningful. This is the bottom line of this strategy. It shows that even the current-coupon MBS hedge that suffered in 1998 still picked up almost 20 basis points of outperformance versus Treasury and much more with other types of hedges. This essentially indicates that it is possible to do something about the fluctuating duration of mortgage pass-throughs and still earn some of their return advantage. This may be a

worthwhile investment alternative for people who previously shied away from mortgages because of their unstable duration. That is the punch line of this presentation.

TABLE 3

Performance: Spread Advantage vs. Costs
Summary of Annualized Performance vs. Lehman Brothers Treasury Index
1994- 98: (with transaction costs)

	Outperformance	Tracking Error
2-yr. OTR Treasury	0.19%	1.18%
5-yr. OTR Treasury	0.41	1.14
10-yr. OTR Treasury	0.50	1.10
30-yr. OTR Treasury	0.37	1.07
2-yr. Futures	0.20	1.14
5-yr. Futures	0.24	1.12
10-yr. Futures	0.37	1.09
Current Coupon MBS	0.19	1.37

Let's move to some conclusions. The main outcome of this study was gaining an understanding of what happens when you create a synthetic class like that and leaving decisions to those people that will apply that. We went deeply into this and we took a look at how this thing behaves in different situations. We think we understand it very well and can explain it. But then this strategy is extremely flexible. It has many degrees of freedom. You may decide to do something like that. You may use this freedom to express your views. It can be used to create and publish a benchmark. There's a whole slew of possibilities that we believe this study opens up. With this, I conclude there will be a detailed paper with more numbers. Numbers are what is most interesting in this study because they quantify this understanding.

MR. OLDENKAMP: I want to start off by asking just a few questions. How many of you use alternative strategies in your portfolios? A couple. How many of you have discussed the topic internally? Not too many.

I probably owe you a little bit of an explanation as to who Genesis Marketing Group is since we're probably not as well known as Lehman Brothers. We're a small firm with a lot of experience in the area of marketing and product design for insurance companies. We've combined that with another approach, which is sharing investment managers with insurance companies who we think can add a lot of value to their portfolios either for an existing line of business or for new products.

For myself, I have worked in this area for over 27 years, 15 of those years were with insurance companies. During that time we developed a number of different products that were quite interesting. I came to the conclusion that insurance companies have a very unique franchise in that you can truly create products to meet the specific demands of the marketplace. In reality, the only limitations on you are your imagination and the ability to back those liabilities. We're going to share with you several ideas that we have found to be very successful with our insurance company clients.

We think that this is important to you for several reasons. Number one, we're seeing an increase in insurance carriers adopting these new types of strategies, and as we'll show you later, they do add value to your portfolios. Second, because they're deciding to adopt these strategies, competition is going to be more difficult. We think it's going to have downward pressure on your profitability on existing products and it might limit your ability to offer new types of products. For those of you who are in the business of pricing these types of products, we think using alternative investment strategies will allow you to more comfortably price new products or existing products yet still hit your profit targets.

Currently, we're seeing a flatter yield curve and a little more uncertainty in the markets. Since that slide was made, we saw a little upturn in the interest rate markets. I think that creates other challenges and difficulties if you have assets that are marked-to-market in the traditional asset classes.

In evaluating money managers, we have several objectives that we look for. We try to figure out what we want from a money manager. Number one, it would be nice if there was a consistency of excess performance. Number two, you must have good portfolio controls or risk controls within the portfolio.

Third, we look for low volatility. All these factors provide for comfort on your side and the ability to sleep at night.

We look for managers who have had a great deal of experience and who have developed skills within certain asset classes. We find that experience does count, and we like the fact that they probably have made all of their mistakes or most of their mistakes already. They tend to be very specialized and they do something different in the marketplace, whether it's a different asset class or subsets of an asset class. So they exploit niche markets and they truly do fall within that nontraditional category. Some people call them hedge funds, and we'll discuss that in a little more detail. The big bonus in all of this is that most of these asset classes are noncorrelated to what you already have in your portfolios. That means this will diversify your risk and provide more stability. In our experience in working with these managers, we found two areas that were particularly beneficial. One was supplementing an existing portfolio backing a specific product or products. Second is using a specific manager to back a specific liability or product.

These are examples of strategies that we've had success with in the past. The first three are arbitrage or hedged type strategies. Some people call them market neutral. We have a mortgage-backed security strategy that deals specifically in premium pass throughs. These are government securities. The third is Bank of America's Market Momentum Index. This is a truly noncorrelated index to any other traditional strategy. All of these strategies have the potential for what we call portable alpha. That means you can take the alpha from these strategies and transfer them to a specific liability in the swap markets or other markets to match that liability. We think that gives you lots of flexibility in how you might use these.

The first manager is W.G. Trading. They use an indexed arbitrage strategy. The interesting thing about this particular manager is this truly is a one-of-a-kind strategy. We have not seen anyone else using this in the marketplace or offering it. It is done on a proprietary basis with some of the larger investment banking firms, but it is not normally available to institutions. They typically arbitrage between the S&P 500 Index stocks and the S&P 500 Index futures. The portfolio managers have over 20 years

experience in this marketplace, and they actually were the pioneers in the first real-time trading systems for Wall Street. They have extremely tight risk controls in their portfolios, and they have generated consistent performance, which we'll show you in just a moment. Their goal is 300 to 500 points over three-month Treasury bills. They have 90-day liquidity in their portfolios. Additionally, their objective is to preserve your principal and provide positive, consistent returns. We'll see how they've done. We have a five-year track record. However, it goes back nine years, and the profile is still the same. They have generated a consistent overperformance to their benchmark and, in fact, they've actually beaten the Lehman Aggregate Index over the past five years with lower volatility. This is a high alpha strategy. The other side of the equation is what kind of risk am I taking? What kind of exposure do I have? We also like to look at a few other statistics on the next page.

Another caveat is all the performance numbers that we're showing you are gross of investment management fees. Because they are so different among managers, it was easier just to show, for consistency, gross returns.

The alpha with this manager is in excess of five. A measure of risk, the sharp ratio, which is the measure of reward for each unit of risk, is an impressive 2.44, so you're being rewarded handsomely for your risk. This is, again, a portable alpha type of strategy. You could use a variety of product types if you wish.

The next manager is Warren D. Nadel and Company. This is a manager who has been in business for 18 years. He has a cash enhancement strategy for corporate cash that is for property and casualty (P&C) companies, stock companies, or life holding companies. This strategy applies to the portion of your portfolio that is not going to be moving in and out on a daily basis. This is a strategy that is called doubled hedged, and they invest in investment grade, utility preferred stocks. They have the objectives of preservation of principal, and a performance objective of 50% to a 100% over 90-day T-bills. The big bonus is that almost 90% of the income is tax-free to qualified corporations. They have excellent liquidity as well. This is something that can drop right to your bottom line immediately if you have cash and qualify.

The performance record, as I mentioned, is 18 years long. The numbers have the same type of pattern, which is very consistent with excess returns. In fact, it is even above the Lehman Aggregate Index. From a perspective of risk and return, their sharp ratio is in excess of three. They have an alpha of 8.8 and the beta, which is another number we have ignored. It is not correlated to traditional fixed-income securities. All the strategies we show here typically are noncorrelated with the Lehman Aggregate Index.

Noddings Investments. This is a convertible arbitrage strategy and another portable alpha. They use mathematical models to identify attractively priced convertible bonds. They will hedge these bonds through the short sale of stock. The principals of the firm have over 30 years experience. This is a fairly conservative approach for short duration fixed-income portfolios. They have an objective of preservation of principal and an outperformance of the 45-day London Interbank Offered Rate (LIBOR) of 100 to 200 basis points. They've developed very strict risk controls. They have been able to outperform their benchmark on a less volatile basis than Lehman Aggregate Index and they have beat their benchmarks. From the perspective of risk, you are, again, being rewarded on a sharp ratio of 2.3. The beta is very low relative to the Lehman Aggregate Index and they have a meaningful alpha.

The next manager profile is Sporn and Company. Sporn is a niche player in the mortgage-backed security markets. They focus on premium pass-throughs. The principals in the firm have over 25 years of experience in managing fixed-income strategies. This is a shorter duration portfolio at approximately a year in duration. They have strict sell disciplines and their returns are dominated primarily by the income, the compounding of income on these bonds, and not the effects of price change. They control the risks within the portfolio with a very strict sell discipline. It's a highly liquid portfolio and their objective is to preserve principal and outperform the 90-day T-bills.

How have they done? In this particular marketplace, as you probably know, it's very difficult to outperform. They have had a very strong track record for the past ten years. They have a sharp ratio that is a little over 0.9, so you're still being rewarded for the risks you're taking in a high-quality

portfolio. But what is most interesting about this strategy is that they tend to outperform in rising interest rate markets. That could be a very nice complement to what you might have already in your portfolios.

The last idea we'd like to share with you is something developed by Bank of America. They have a Market Momentum Index that is the synthetic investment design to diversify portfolios of traditional asset classes. The index is made up of a basket of long and short positions of bonds, currencies, and real assets. Real assets are: agriculture, petroleum, and metals. They have a proprietary model for this particular strategy, and they have excellent liquidity. You can buy this either on its own or through a structured note, which can be principal protected or designed for whatever needs you may have. We did an analysis on this strategy as to how it correlated with credit spreads widening, and we found they were noncorrelated. So, in those situations, if you have portfolios with credit risk in them, it is a great diversifier.

What we've done here in Chart 8 is combine two approaches. We took the previous manager, Sporn, and weighted these returns 85% Sporn and 15% Bank of America. If you compare Charts 8 and 9, you'll see a dramatic improvement in returns just by adding a small increment to a traditional strategy in a niche market.

What is more dramatic is how it has impacted the sharp ratios and alphas of this portfolio. Sporn's was just under 0.9. It jumped to 1.5 with just 15% of the portfolio in the Market Momentum Index. This is an idea that I think has a fairly broad application to a variety of portfolios.

The advantages of these types of strategies is, number one, you're able to capture investment expertise that probably is not available internally. You can improve the performance of your existing portfolios and, likewise, improve the competitiveness of existing products, in other words, achieve your profit targets. If you're looking for different markets to get into, you now have the ability and flexibility to look at something that might be equity linked, like the S&P 500 Index.

This is a product that we pioneered. We've had great success with this. It has been a very attractive and a profitable product for our insurance company clients. There are also other opportunities for you as well. You can look at group and individual products. You could do a fund of funds. You could create your own product line to offer to the marketplace if you felt that was warranted. Or, you could offer products to other insurance companies to help them meet their needs. If you have the qualitative capabilities to put these products together, there is another market for you to exploit. The bottom line is that you're going to attract more assets, and have better bottom line profitability. You'll have noncorrelated returns that would stabilize your existing portfolios and a better diversification profile in your portfolio mix.

Other asset classes that we see emerging include merging market debt (which has not done well, but we think it has the potential to do well in the future) and global investing in the equity markets. We have one client who felt, because of the risk-based capital (RBC) rules, that if they were going to invest in equities, they should maximize their return potential in the global markets.

So how do you get started on this? This session is probably a good start for those of you who have not thought about this. Start your thinking and try to visualize how these strategies might work within your portfolios. Start exploring new ways of adding value. It's amazing how many smart people are out there that can help you. I might also suggest that you talk to others who are doing this in the business. Develop a comfort level for how they're applying these strategies to their own product lines and portfolios. Most of you should have the internal resources to evaluate whether or not these strategies are for you. Finally, if you should have any questions after that, please contact us.

CHART 1
Treasury Yields Drive Mortgage Durations

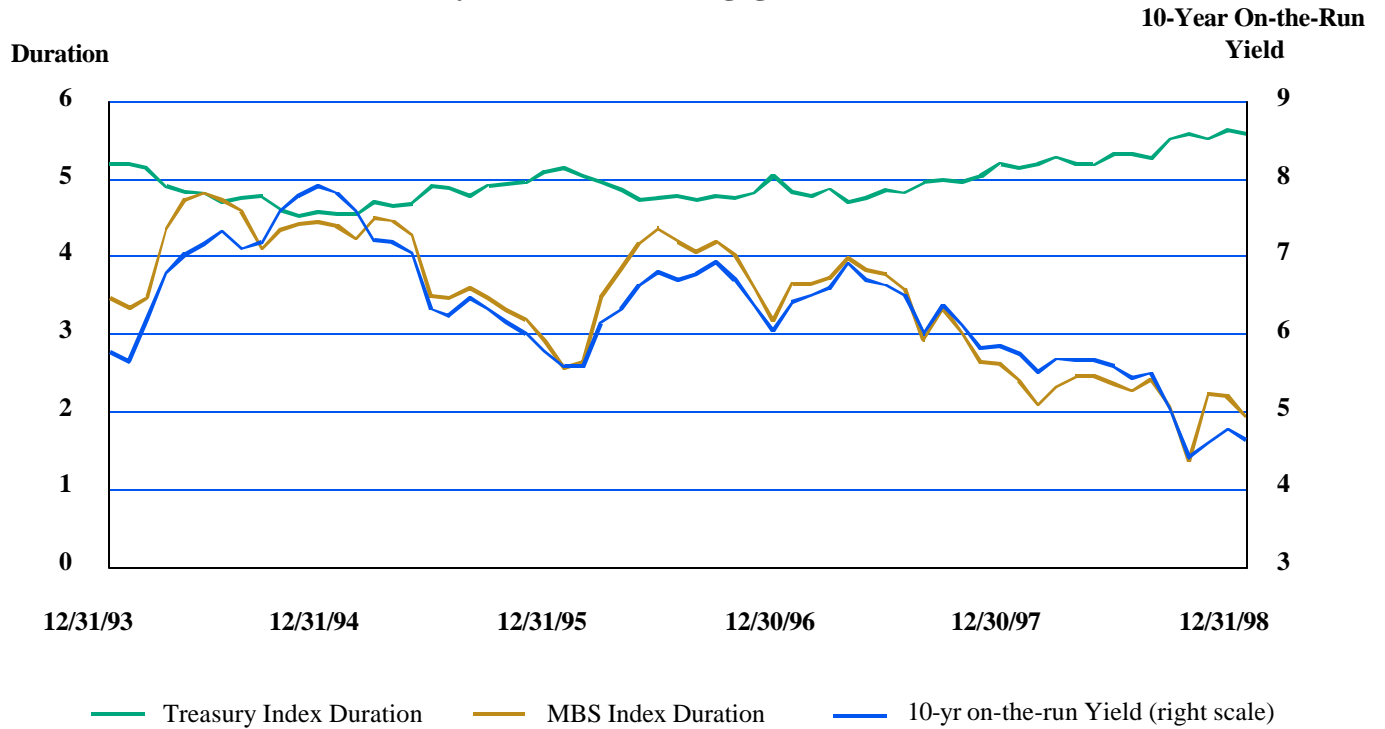
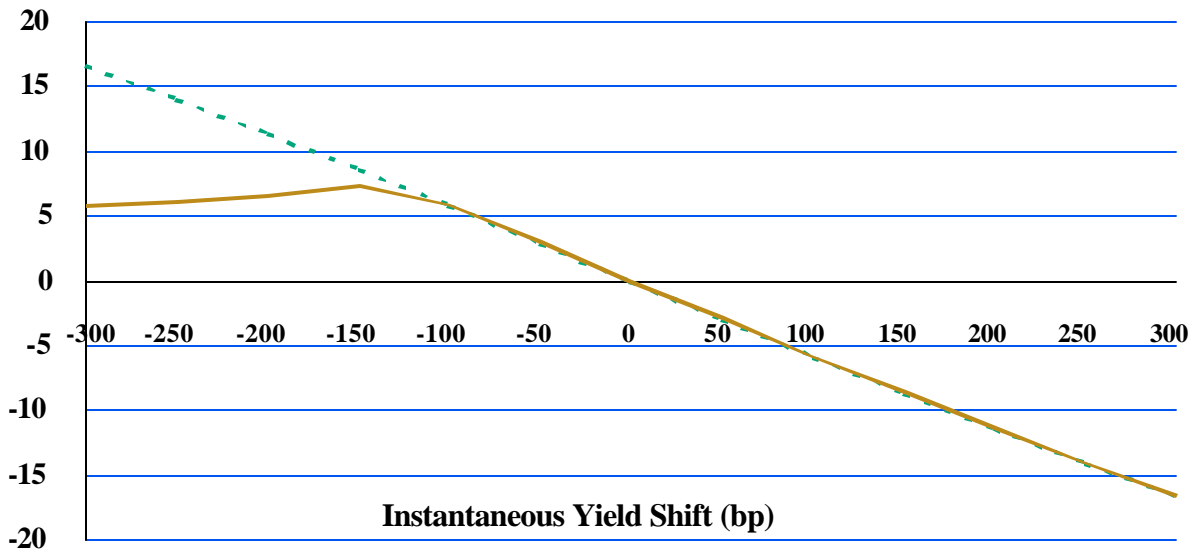


CHART 2
Negative Convexity Limits Rally Participation

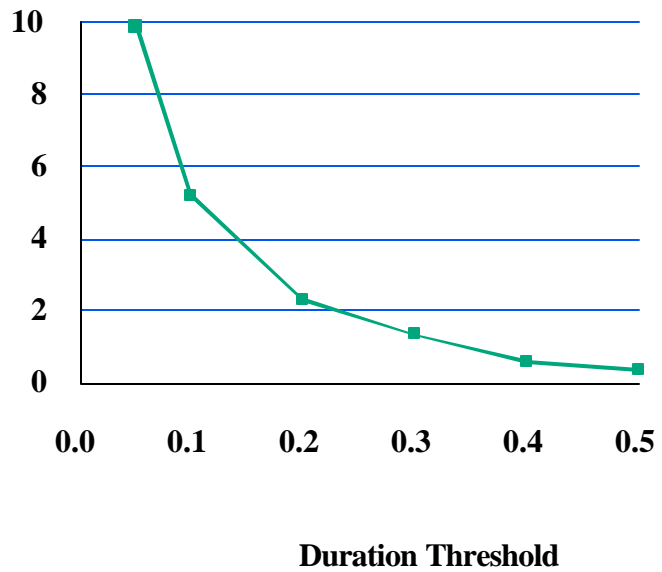
Price Return (%)



Source: Lehman Brothers

CHART 3
Performance = f (Rebalancing Frequency)

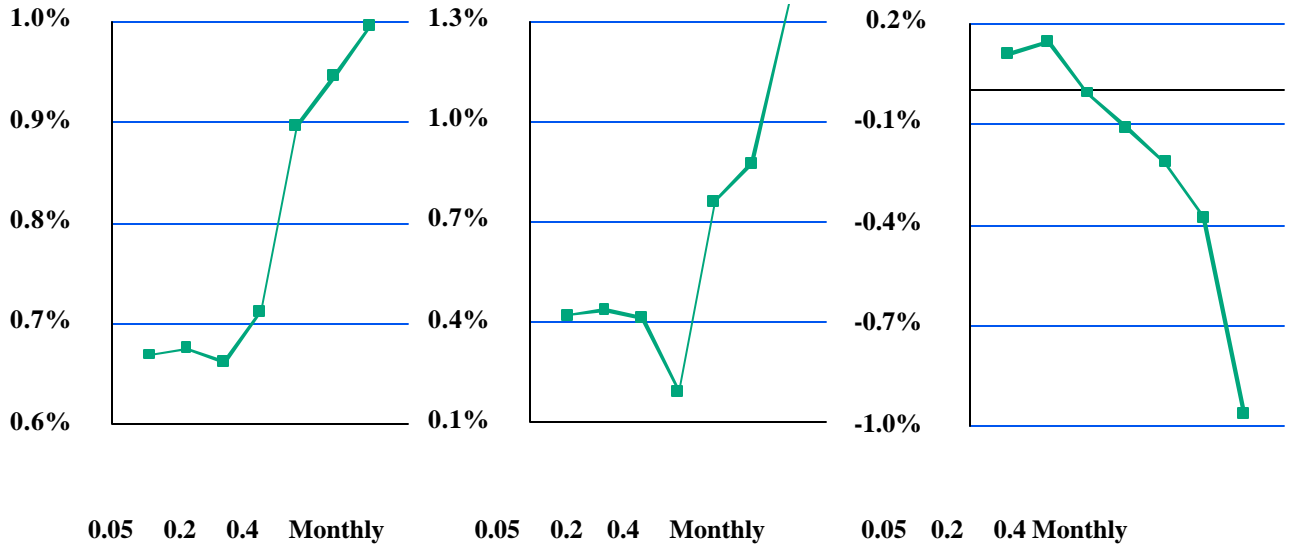
Average number of mid-month rebalancings to maintain given duration mismatch thresholds



Yield Environment Definitions:	Stable	Volatile	Trending
Overall Yield Change (bp/mo)	<25	<25	>25
StDev of Yield Change (bp/day)	<5	>5	—

Source: Lehman Brothers

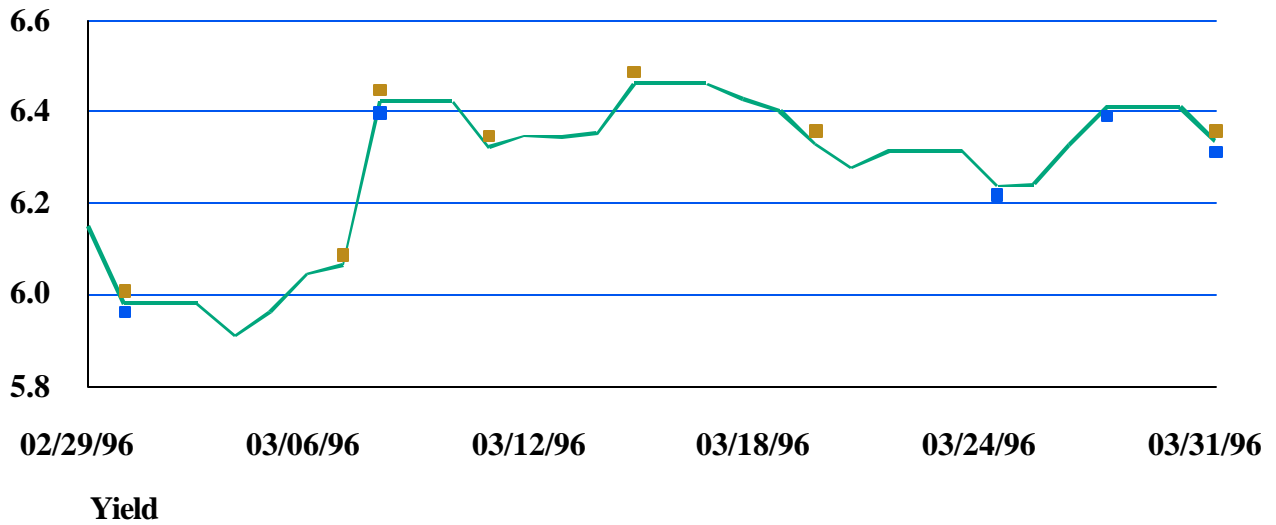
CHART 4
Performance = f (Rebalancing Frequency)
Strategy Performance vs. LB Treasury Index As
A Function of Duration Threshold (1994- 98)



Source: Lehman Brothers

CHART 5
Minitrends: An Example of a Subtle Point

10-Year On-the-Run

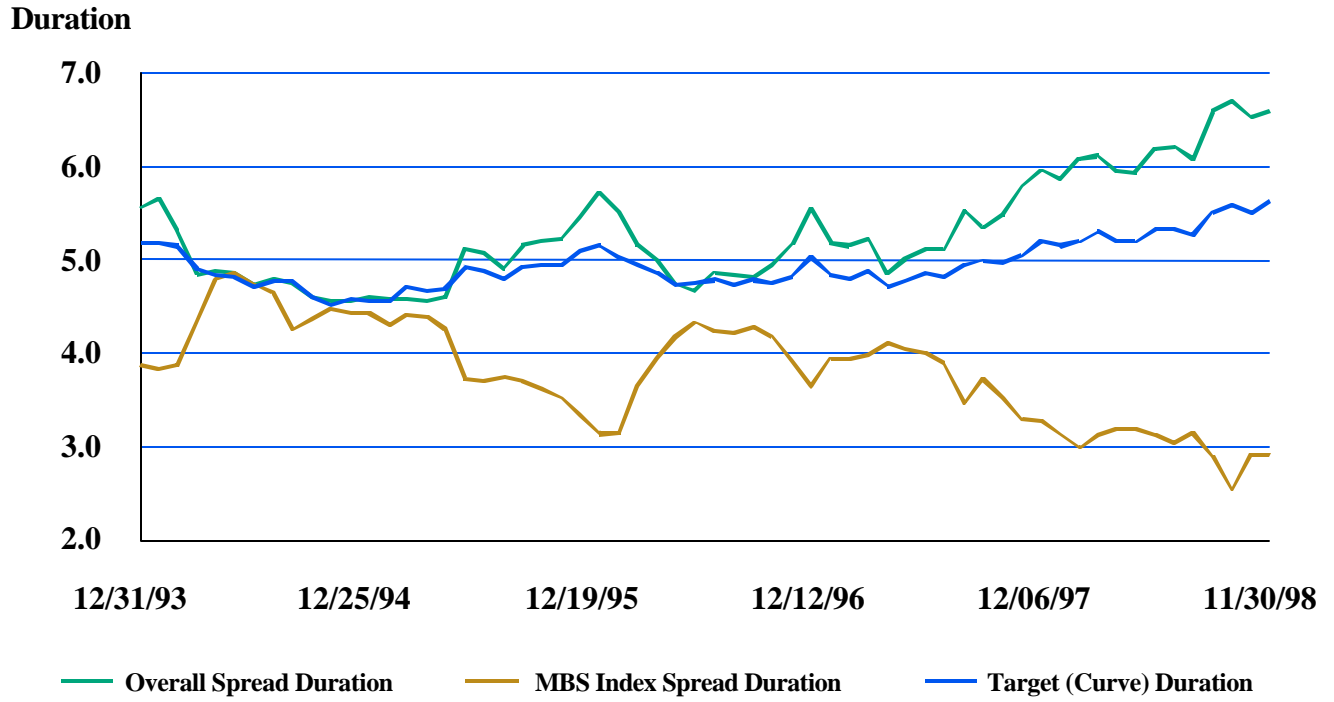


■ Rebalancing points with 0.3 threshold
 ■ Rebalancing points with 0.2 threshold
— 10-yr on-the-run Yield

	Duration Threshold	
	0.3	0.2
Outperformance	-0.16%	-0.05%
Rebalancing	5	7

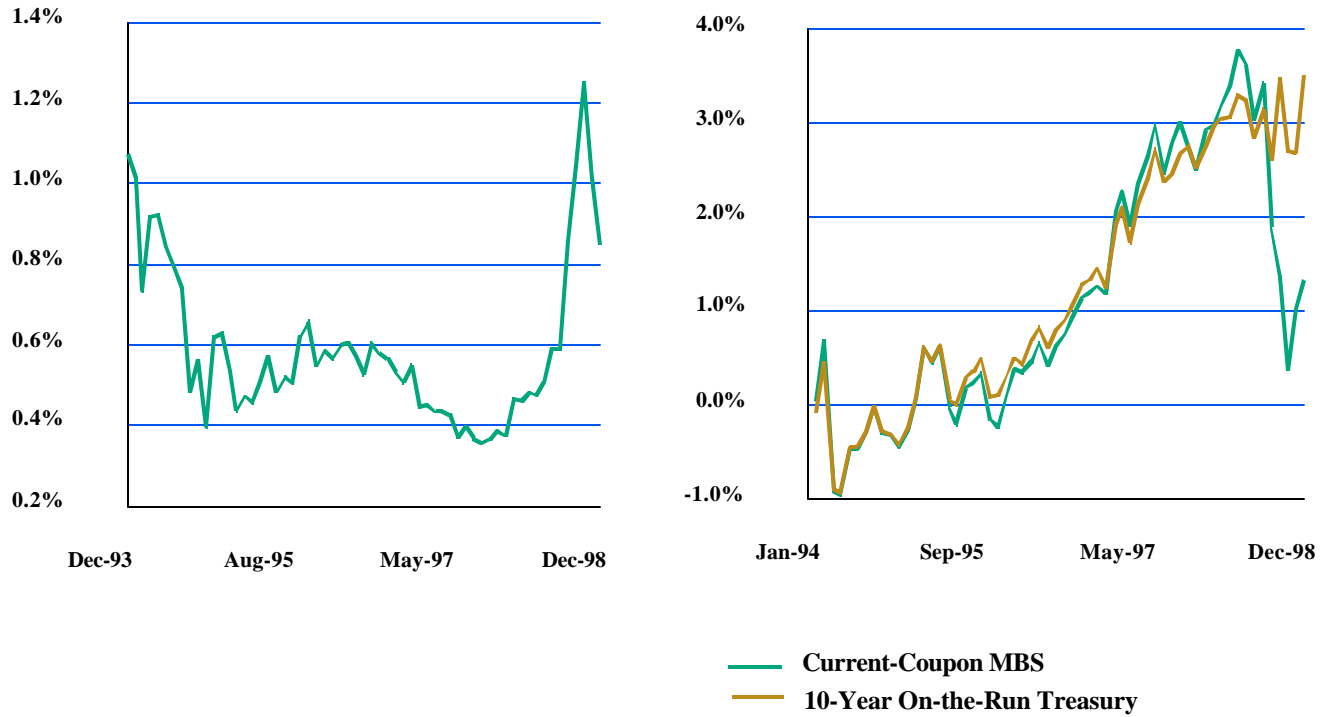
Source: Lehman Brothers

CHART 6
Spread Exposure: Can It Get Out of Control?



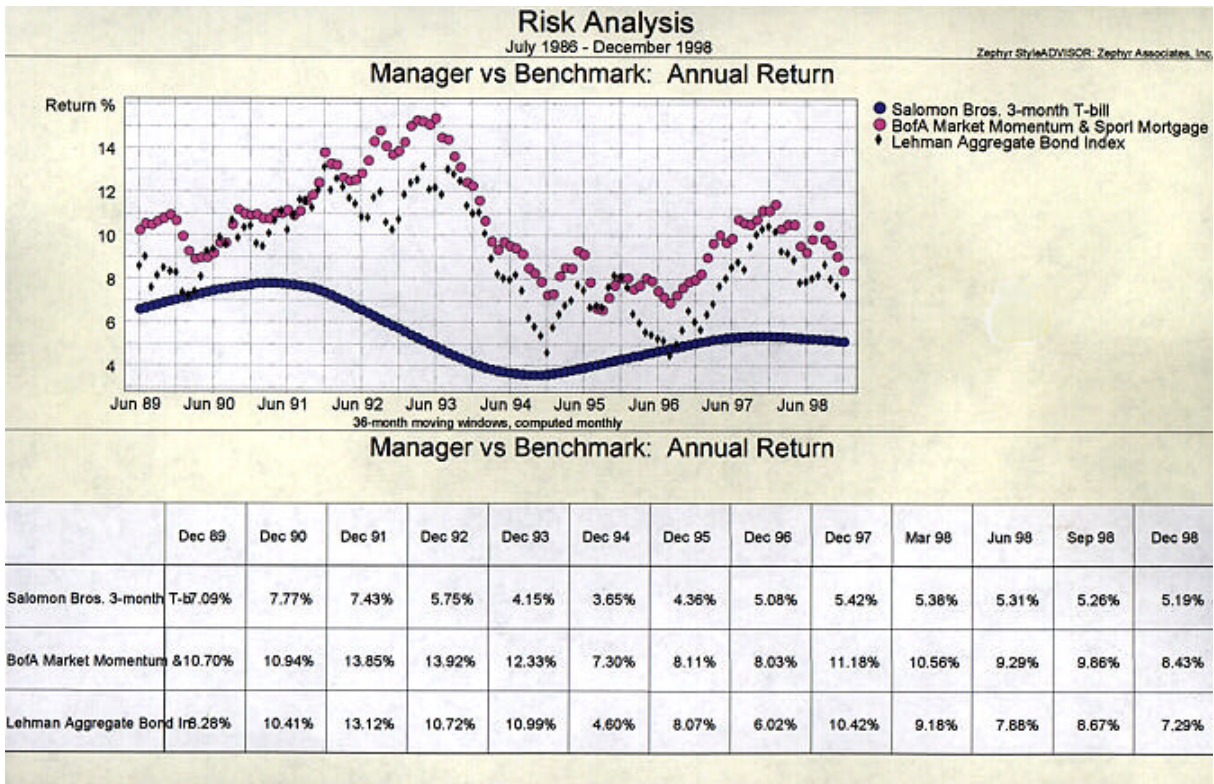
Source: Lehman Brothers

CHART 7
Spread Exposure: Can It Get Out of Control?
MBS Index OAS **Cumulative Outperformance**



Source: Lehman Brothers

CHART 8



36-month moving windows, computed monthly

CHART 9

