



## "The Only Perfect Hedge is a Japanese Garden"

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I have been given a lot of advice about my remarks this afternoon: keep it light, but serious; don't talk too much about regression analyses and dynamic hedging, but make sure that you cover all of the risks implicit in financial engineering; make it relevant, but not too specific, and, of course, start off with a joke or funny story. I am particularly puzzled by the last admonition. I can think of nothing funny to say about derivatives, convexity, volatility, swaptions, floortions, inverse floaters, and the rest. After all, a subject which lends itself to Congressional hearings and a 900-page Report, a new FASB exposure draft, a General Accounting Office report (issued but yesterday), an analysis by the Group of Thirty, and apocalyptic visions of the future, not to forget law suits between corporate clients and their bankers, write-downs approaching a magnitude equalling the write-offs occasioned by downsizing and restructuring, is not one which lends itself to a Robin Williams monologue.

But I do have a story, nonetheless, about two operators in derivative products. One was a banker, the other a corporate treasurer. They see a dog in a store window. The banker says, "I am going to buy that dog," and he purchases it for \$5. A few days later the treasurer says, "You know, I've been thinking about that dog. I want it. I'll give you \$20 bucks for it." The sale takes place. The dog is taken by the treasurer. A month later the banker says, "I'll buy back the dog back for \$100." The dog goes back. Sure enough, a few weeks later the treasurer offers \$1,000 for the dog, and later, as you can expect, sells it back to the banker for \$5,000 when the banker realizes he cannot do without the dog. But

neither can the treasurer. He repurchases it for \$25,000 and so it goes, back and forth between the two of them, until the dog is sold to the treasurer for \$500,000, who resells it to the banker for over a million dollars! Neither one of them can do without the dog. The dog runs out in the street while in the care of the banker, gets hit by a car and is killed immediately. The treasurer, on hearing about it, is furious: "You fool! Couldn't you have been more careful? Do you realize how much money we were making on that dog!"

I also thought about the parallels between the world of derivatives and psychoanalytic theory. Indeed, what better product than derivatives to show how we react to pain and pleasure and meet our insatiable need to fool ourselves. Let me be specific: my remarks today are about five or six related matters: (1) Know the reasons for using derivative products, or financial engineering. I can think of no better paradigm than the use of denial and the process of rationalization -- the pretense that we are doing one thing when we really mean to be doing something else. (2) The basic conflict between the corporate end user and its banker, whom the client relies on to provide wisdom and guidance. What better example than the father figure, the resentment over his accomplishments and his materialism. (3) The use of accounting conventions and their irrelevance to financial risk management. A classic example of reality testing and repression. (4) The work environment and the bureaucratic setting in which we conduct our financial operations. It is living proof of the pleasure/pain principal and the use of reward and punishment as a motivating tool. And what about counterphobic be-

havior in response to loss -- maybe we should double our bets -- in response to the first loss. (5) The pitfalls and the risks attendant to the world of financial engineering, and (6) What to do about it and how to manage risk -- the last, a textbook example of the behaviorists' use of desensitizing -- or dynamic hedging to get you comfortable with fear and anxiety. Finally, of course, termination therapy and transference. The former, termination, is what the CEO will ultimately do to the financial staff if the derivatives do not work out; the latter, transference, is how the treasurer subtly moves the risk to his or her boss.

But I could not decide whether this literary conceit was 90% jest and 10% serious, or whether it was 90% serious and 10% jest, which in turn, would determine the tone of these remarks. So, instead, let me just take these subject matters and talk to you about them informally, for all I can really do, basically, is share with you some observations about my own experiences about risk and the work environment and hope that they might be relevant to your own experience. But first, I think some background is in order. Why are we here discussing this stuff? What was the environment which prompted the use of derivatives and, more generally, financial engineering?

### *The Background*

- ❖ Floating exchange rates. At first the world was fixed. Then the Yen, for example, went from 360 to the dollar to 300 to 240 to 200 to 300 to 120 to 100 - with many changes of direction in between. That volatility, which occurred in many currencies, created

the incentive to speculate on potential exchange rate movements -- or if possible, to cause them. That, in turn, led to market risk and a proliferation of products for protection and for speculation.

- ❖ Volatile interest rates. In the U.S., long-term interests moved one percent in the period 1955-1965. Since then, long-term rates have moved from 7% to 15%, down to 8%, rose to

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12%, down to 6-1/2%. Short-term dollar rates have similarly fluctuated between 3% and 20% and everywhere in between. That kind of volatility also has led to the potential for profit by speculation or hedging interest rate movements.

- ❖ Lowest common denominator regulatory and supervisory controls. If a financial intermediary could not offer particular services because national controls were too demanding, it moved its operation to a more accommodating, less intrusive domicile.
- ❖ Communications. That let everyone know what all market participants -- end users, intermediaries and the rest -- were doing and seeing at the same time. That, in turn, narrowed spreads between buyers and sellers. However, the efficiency of the information flow increased volatility because high levels of volume become destabilizing when markets are responding to the same information. The increased liquidity, a natural consequence of the number and capital of the players, therefore, did not reduce volatility given the immediacy of the information flow; it increased it.
- ❖ An accommodating accounting system. That permitted failure and risk to stay undisclosed because of the practice of not marking assets to market -- despite their depreciating value.

- ❖ Securitization. That meant if you could sell an asset after putting it on your books, you need not worry about credit quality. Someone else would pick up the pieces. Securitization and the prospects for immediate liquidity damaged the normal attention to prudential credit assessment.

- ❖ Finally, financial engineering. It gave great advantage to first users. But it was easily imitated by others. Even

the most sophisticated products are now replicable because of broad skills, communications and information technology. Arbitrage opportu-

nities, once quickly identified, then disappeared. But more important, the products were, and are, increasingly complex, leveraged, not readily understood by managers or regulators, or end users. Moreover, they are off balance sheet, which means that they were, and are, for the most part, "unrecorded," with uncertain, or sometimes unknowable, risk -- clearly not readily subject to capital requirements or risk management systems.

It is with that background that I come to my first point: We must admit openly and honestly why we are using derivative products or, indeed, any form of financial engineering. You may think the cliché is obvious, but I suspect that it is not so. For example, a dealer or bank may be in the business of financial engineering for a variety of reasons:

1. To profit from the spread between the end users of a liquid derivative product. The trader takes no risk and hopes the spread is wide enough to sustain a market making interest.

2. A financial intermediary may wish to take on a speculative position. Usually it is massively leveraged. Often, on the other side of the transaction is an end user -- a corporation, or perhaps a pension fund or insurance company. The dealer simply

believes that it can predict better than the non-professional the movement of interest rates, exchange rates, market indices, share or commodity prices, etc.

3. Or, a dealer may be in the business simply of taking advantage of imperfections in the marketplace. It believes that it can identify those aberrations, totally hedge its own position, and through leverage, make a great deal of money. Those aberrations, however, increasingly have become difficult to come by and only can occur when either the information systems or the counterparty is less sophisticated than the dealer.

4. A financial intermediary may be in the business of simply servicing a client, and that, in turn, may either be in an adversarial or supportive way. You are that client. You should hope that you are not merely a customer. There is a difference. I will talk more about that issue in a few moments.

5. Or, a financial intermediary may be acting solely as agent for a fee -- a commission, if you will -- to bring you a product which you believe you need in order to conduct your business affairs.

From the point of view of a financial services company -- a bank, a securities firm -- it is, as you can imagine, quite important for them to know which lines of business they are in. Too often, after an unhappy or unprofitable event, they engage in a kind of historical revisionism and

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argue that their objective was quite different from what it appeared to be: that they weren't really speculating; that it was a client's idea in the first place, that they were merely servicing the client need; or that it was a loss leader; or that they thought they were hedged. Those in the business of finance too often shift their objectives after an unhappy event in order to rationalize why they did what they did.

Of those of you in this room, though, few are financial intermediaries. But, you, too, must know why you are engaged in

financial engineering. There are four quite fundamental issues:

1. Are you, or are you not, using derivatives as a means of speculating on an unknown in the future by taking either a long or short position -- betting on the movement of a commodity, interest rates, exchange rates, an index, rainfall, etc. In effect, are you operating in the market in a manner beyond what you need to do to immunize yourself from future uncertainty. There is nothing intrinsically wrong with it -- speculating -- but you must know whether or not you are only trying to hedge a contractual cash flow, or an asset, or liability against future uncertainty. It is not a simple determination. Indeed, even issuing a floating rate versus a fixed rate, or borrowing now versus later, is "speculating" on the future in a quite real sense. The decision to "hedge" that transaction simply means that you are unsure about whether the future will make you look bad.

2. If you are using derivatives for the purpose of reducing or eliminating future uncertainty -- hedging -- you might ask a further question: what is the precise cost of doing so, just as you would ask the up-front cost and the present value of paying an insurance premium against a fire burning down your plant and facilities. And you must know, also, that the only perfect hedge is in a Japanese garden.

3. For each hedge, you must evaluate the cost of not hedging, and, more important, evaluate alternative ways of getting the same result through some other means. We must do this, I would suggest, even if some techniques produce a visible articulated expense while others, because of the nature of accounting systems, do not articulate or record the cost, but which may in fact be less economically costly.

4. Finally, I think it is important to have a rather precise sense of your responsibilities: whether you are in the posture of convincing the CFO and CEO, for one reason or another, that you should be a profit center in the accounting sense, whether you have had that burden thrust upon you; what is your responsibility to your Board, the CFO, etc. But I will say more about that later.

Before going on, let me give you one example of how one issuer, the World

Bank, uses a rather straightforward product -- swaps -- and other derivative products to manage the liability side of its balance sheet, which has over \$100 billion of fixed rate, medium term debt denominated in over 20 currencies:

1. To change the currency of a specific borrowing. Its use of the swap market and its comparative advantage often permits it to access one currency and simultaneously swap it for another targeted currency at a lower cost than a direct borrowing.

2. It converts floating rate borrowings, where it is highly competitive because of its credit standing, into fixed rate borrowings at a lower cost than its direct access to the fixed rate market.

3. It separates the fixing of interest rates on a note issue from the timing of the

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issue. At times the opportune moment for accessing the capital markets (in terms of, say, spreads over U.S. Treasuries) is not necessarily the best moment to lock-in the specific rate level. The use of derivatives can separate, therefore, the timing of the issue from the actual fixing of the interest rate and, through deferred rate settings, spread the rates over different times -- perhaps a year in the future.

4. The Bank imbeds in derivative products call features and sinking fund options which provide it with the right, at no cost, to retire debt. Or, in a more complex operation, it issues "structured" notes which provide the buyer an interest or exchange rate play. The Bank, however, simultaneously, hedges itself against the option given to the buyer and ends up with all-in savings relative to a direct, so-called plain vanilla borrowing.

5. Finally, the Bank shifts, from time to time, major portions of its existing stock of debt from one currency to another based on cost and risk considerations. It, therefore, fairly regularly liquifies the liability side of its balance sheet, but that initiative does not involve a risk to the Bank since it passes on the exchange risk directly to its

borrowers - something that you can't do to your customers. That, by the way, is why it is so important to know who you are and what you are trying to do.

That brings me to my second point: the relationship, perhaps potential conflict, between the banker and the client. It does not much matter here, for purposes of my remarks, whether you have chosen to hedge or speculate on a future unknown development, whether you are leveraged or not, or whether you know the up-front costs, the alternative costs, or even the potential opportunity cost of your activity. In any event, you must determine whether your banker/dealer treats you as a fiduciary would treat its beneficiary, or whether you are a client, or whether you are merely a customer. I would suggest that one way to determine the nature of that relationship might be to determine the nature of your

banker's compensation, whether its profitability is uncertain or fixed, whether its risk is hedged or not hedged, and the structure of the transaction as it appears to your banker. You also might want to determine if there is a lack of symmetry between what you are buying and

what the counterparty is selling, and why the transaction makes sense from both sides. That will go a long way to reducing your risk because, ultimately, you will find yourself asking questions which will not only tell you the economic risk distance between you and your counterparty, but more important, tell you whether or not you alone have an open-ended risk. If you do, that should prompt caution.

You may, of course, have asked that your banker provide you with a vehicle to hedge or speculate, say, on interest rates or exchange rates or commodities or share prices. But, some products are more costly than others and have all kinds of open-ended provisions to either enhance profit and/or reduce losses. They should be explored. But, most important, if you are buying a product from a banker, structured for you, on which the banker is on the other side, remember that you are in the business of selling automobiles or paper products, or of manufacturing, of planting, of harvesting, of providing services, of developing technology, etc. On the other side of your transaction, there is someone in the financial services industry whose business is to earn a return on capital by predicting

interest rates and exchange rates. If there is, exercise caution. You are in their business. It, too, is not a long term recipe for success -- particularly if your professional counterparty is unhedged.

Now it could be that on the other side of your transaction is a fellow corporate treasurer and the financial firm is simply servicing the accounts. But even if that is the case, you should ask why it isn't on one side or the other. The answer, of course, is that it would rather take the fee, not the market position, yet you both are taking the latter. But again, I do not want to preempt your desire to speculate in the world of finance. But know that the father figure, your investment banker, probably did not become rich and successful by doing what you are doing. They did so either by being on the opposite side of your financial decisions, or by being neutral.

Third, let me talk a little about the seduction of accounting conventions. We do not measure opportunities lost. We, generally, do not mark to market. Many of the products are unmarkable. We do some transactions explicitly because our mistakes can be hidden, because accounting conventions do not record them, either because they are ad hoc or there is no market, or worse, they are off balance sheet. There is, typically, little reality testing. We continue to pretend that a rolling loan gathers no loss. We pretend that if it isn't recorded, or if the triggering event occurs in a different time period, the loss can be ignored or delayed. And when losses can be ignored, greater risks are taken. I cannot take the time here to describe the latest FASB proposed draft on derivative accounting -- they aren't bad; they are a beginning, but they are deficient -- because they will not, yet, put you under the pressure involuntarily of admitting to failure, risk and error.

Accounting conventions are, to a great extent, grounded in tax implications and, to a lesser extent, disclosure. But disclosure does not yet require adverse scenario simulations -- particularly of illiquid products, which are off balance sheet and whose status may be embodied in a piece of paper which reads as follows: "I promise to pay you, five years from today, quarterly for a period of five years thereafter, 50% of the interest rate differential over

7% in the London Inter Bank market." No model can tell you what is your risk on that transaction. No accounting convention requires disclosure, nor is any proposed -- particularly if it is embedded in a piece of structured finance where, in return for making that promise, you paid 2% less than current market for your latest note issue.

That brings me to my fourth point: the work environment. Many of you are subject to a rather difficult environment -- one

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which tests your managerial and survival skills considerably.

The code words are financial engineering and innovation. But the human psyche, and certainly the bureaucratic setting in which we carry out our transactions, have not changed. There remains how we cope and how we make decisions in a competitive world:

1. We respond to peer pressure. Develop and then sell that magic zero coupon bond with a perpetual maturity so a borrower needs pay neither interest nor principal.
2. We want to capture rewards quickly and visibly so we can look good if we can't be good.
3. We deny blame or responsibility. We seek not to be identified as the provider of unwisdom.
4. We do not measure opportunities lost.
5. We rely on sympathetic accounting conventions. We need not show losses until we sell.
6. We design performance measures to cover-up error. They are called benchmarks.
7. Senior management is rarely as informed as operational managers.
8. We make decisions based on: Will we be found out? Discovered? Identified as the wrongdoer? The recommender of unwisdom? Will we be hassled? By peers,

superiors, the bureaucracy. Do we really want to have to explain this stuff to someone who spent his life in sales or marketing?

9. We are subject to the herd instinct. If we get really good at it, maybe we can become investment bankers.

10. Leverage is fun.

11. Present pleasure -- future pain: someone else will pick up the pieces.

Whatever else one can say about these pressures, it certainly inhibits rational thought about interest rates. It is an environment which makes it all the more difficult to articulate the objectives that I have talked about earlier. The difficulties also are compounded by the fact that senior management is usually quite un-

aware of the technical operations in financial engineering. They rarely have had experience or training in the world of finance. Worse, they are often afraid to ask, out of concern of admitting to their lack of mastery over the subject matters, and, of course, they are also preoccupied by accounting conventions.

I think we also must admit to the fact that there is a good deal of underlying hostility to quants -- we believe they are too young; too overpaid; they have too much control; they are too smart; and they know what to hide and, too often, how to hide what they are doing and why they are doing it. This attitude is endemic not just in the financial services industry, but is probably even worse in the corporate/industrial/agricultural sector where middle management is not trained in the intricacies of convexity or volatility, or the abstractions of financial engineering. As a result, reports are inadequate, supervision thin. Risk management leaves a lot to be desired. Most of us have great difficulty in admitting to those who report to us that we do not know nearly as much as they. That, too, is a recipe for potential disaster.

In some companies, certainly not here, financial management finds itself, if the truth be known, somewhat titillated by the fun or the competitive pressure to execute the latest exotic instrument simply because it is market clearing at a cost which appears low compared to some benchmark. Sometimes, too, there are pressures for the financial operations to make up for,

a profit center, the shortfalls in the main business. That responsibility is sometimes initiated voluntarily in an effort to show that the corporate treasurer/CFO does not merely publish accounting statements and issue commercial paper, but is intimately involved in determining whether or not the company makes a profit and a yet higher return on its equity. For multinational corporations, the correct timing of a move in the foreign exchange markets can do wonders to offset a fall-off in sales. I mention these points simply because directors and shareholders are increasingly becoming aware of the risks of such activity.

This brings me to my next point: What are the pitfalls, or risks in the derivative markets? Time does not permit a detailed description of what can go wrong. I can here only list the main ones:

1. **Liquidity Risk.** You think you are precisely hedged, but the product is so esoteric and idiosyncratic that you cannot sell it because there is simply no market for the product. This, typically, will happen not so much on the liability side of your balance sheet, but on the asset side, where you may want to either capture a profit or minimize a loss, and you can find no buyers. This is typical in the OTC derivative market or parts of the mortgage-backed securities market.

2. **Credit Risk.** Your counterparty has lost money and fails. You were on the right side of the market, unfortunately, your counterparty was on the wrong side. Or, your counterparty would ordinarily be just fine, but its counterparties, strangers to you, default.

3. **Legal Risk.** The laws in Asia and Western Europe are not nearly as clear as those in the United States. You believe that you are totally netted with a particular counterparty; that you had a net zero position and, in the event of default and bankruptcy, you would be protected. It turns out that the netting rules outside the United States are not so clear, and you may have to get in line with other creditors or depositors.

4. **Event Risk.** A war takes place; an earthquake occurs; a flood of a magnitude not seen in a hundred years washes over the land; a cartel falls apart; oil prices quadruple; tax laws change, and the market in which you were speculating, or even hedged, moves in a magnitude not only

unforeseen, but totally outside past models. They always do. You are in trouble.

5. **Basis Risk.** You thought you were hedged. You believed that investment A hedged instrument B. You were long in one, short in the other. They, in fact, moved in the same direction. The three-year Treasury note in which you were long deteriorated in price, but unhappily, the five-year note, in which you had a short position, increased in price. You lost both ways. Again, the only perfect hedge is in a Japanese garden.

6. **Leverage Risk.** You are so leveraged that even a small market movement will prompt a margin call. The security which is out of line will move back to its normal position on the yield curve, but someone out there, for one reason or another, has chosen to put pressure on a particular coupon, a particular security, at a particular point on the yield curve, and while over the next week or two it will surely come back into line, in the meantime, you must liquidate. Then your loss becomes visible.

7. **Operational Risk.** Back-office systems, yours or someone else's, fall apart; credit monitoring systems break down; documentation is flawed; transcription and recording mistakes are made; settlements are delayed; systems do not capture fully the nature of the transaction -- the computer program doesn't yet cover that kind of transaction (they are working on it). And, it is all quite expensive to put in place and keep it up to date. And, most important, there is no natural constituency to support the financial and resource expenditures that are needed, particularly if you are not supposed to be a profit center and are trying to keep quiet the risks you are taking.

Let me conclude with a summary of what one might do. It is based only upon my own experience and observation of others. It is not complicated, as a matter of basic principles, but not so easy to put into practice. (I have written elsewhere about the technical aspects of a risk monitoring system.) But, perhaps, these basic principles may provide some guidelines or foundations for risk management. I will just list them here:

- ❖ Know what the risks are.

- ❖ Know the costs, the premium, the present value outlay for protection.

- ❖ Admit what you don't know.

- ❖ Ask "what if." Quantify "what if."

- ❖ Clarify precisely what you are trying to do.

- ❖ Ignore accounting conventions. They are not useful risk management tools; they are designed to make your life easier and comfortable.

- ❖ Always measure opportunities lost.

- ❖ Never penalize those who work for you for mistakes or reward them for being right about markets. It will go to their heads or be counterproductive, and in any event, material compensation will not correlate with their ability to predict the future next time.

- ❖ Ask for alternative approaches and costs to meet your objectives.

- ❖ Spend resources on systems and people smarter than you are.

- ❖ Talk to them.

- ❖ Do not hire or maintain staff whose ethics are such that you would not want them to marry your son or daughter.

- ❖ Try and figure out why the transaction makes sense to your counterparty end user. Understand both sides of the transaction.

- ❖ Fully understand the role, risk, and profit of your financial adviser/banker. Be modest, admit to vulnerability, unsuredness and uncertainty.

Thank you.