Gambling with the Treasury

Cash Management And Investment In Derivatives

Eli Schwartz

The first half of 1995 was marked by a series of reports on monies lost on derivatives investments by local government cash managers. The case of the treasurer of Orange County, California, was the most publicized of several examples. At the height of the treasurer's "success," he controlled $20 billion in gross assets, but he drove the county into bankruptcy by losing $1.7 billion of the $7.4 billion in net assets of the municipal fund that he managed.

This financial manager was not alone. Money managers in local governments throughout Ohio and the Southwest lost money, and government financial managers continue to risk large portions of their portfolios. One example is the sheriff of Palm Beach County, Florida, who lost $7 million out of a $24 million portfolio. Speculative excesses are not confined to the managers of local government cash funds, however; the supposedly sophisticated treasurers of such large corporations as Gibson Greetings, Inc., Air Products and Chemicals, and Procter & Gamble lost hundreds of millions of dollars in their investments in derivatives.

The notion that cash management can be made to yield extra returns and that investing in derivatives is the way to achieve them lies at the core of the problem.

What Are Derivatives?

Broadly speaking, a derivative is a security or holding that has a value or return based on that of some other, underlying security or market index. A share in a stock market mutual fund, a closed-end investment fund, or a

participation in a GNMA (Ginnie Mae) pool of government-insured mortgages (in which the mortgage, not the value of the fund, is insured)—all are simple derivatives. Their positions are covered by the holding of underlying securities.

More complex arrangements, such as the various tranches (financial sections) and the residual in a collateralized mortgage fund, are harder to track. Some tranches have a clearly defined position tailored to the demand of particular investors; the remainder of the portfolio is called the residual. Purchasers or holders of the residual take on a position that is difficult to project because it is fluctuating and risky. This circumstance helps to insure the stated returns of the more conservative tranches.

A derivative need not be covered by the actual holding of any underlying securities. It can be a contract between two parties (the seller and the buyer) where the relative returns or payouts are based on the direct or contrasting movements in the prices of a group of agreed-upon securities, a market index, interest rates, exchange rates, or prices on the commodity market. These types of derivatives usually are constructed or arranged by a bank or a brokerage firm acting as a middleman.

The money managers' problems stemmed from their speculative investments in complex and in constructed derivatives.

Functions of Derivatives

Constructed derivatives can be used to hedge a given position, to "arbitrage" a market differential, or to speculate.

Hedging reduces the maximum loss, but it also reduces the maximum return available if things should go well for the underlying portfolio. A hedge is made with the purchase of a derivative whose projected return goes in the opposite direction from the one to which the investor is already committed. In other words, if the return or the interest on the established portfolio should fall, the expected return on the hedge instrument should rise. Conversely, should the return on the existing position rise, there will be an offsetting fall in the return from the hedge instrument. Hedging is a way of reducing risk and increasing the stability of returns from the overall position.

Brokerage fees or transaction costs for the sale of derivatives are not small. Because the hedging involves increased transaction costs and because a perfect hedge usually is not possible, hedging usually reduces total returns. A partial hedge to set a floor on maximum possible losses, however, can be a good strategy.

Arbitrage is a procedure employed by sophisticated traders in the commodity, currency, capital, and money markets. It involves scanning the market to find two or more of the same item whose price spread is further apart than it should be in equilibrium. An example from the commodity market will illustrate this strategy. In the summer, the futures price of December wheat should not be higher than the price of August wheat by more than the storage and borrowing costs from August to December. If the differential between the price of August and December wheat exceeds this spread, the arbitrageur will buy August wheat and sell December contracts.

In the security markets, an arbitrage situation could exist if the derivative price is significantly below the value of the underlying securities. When arbitrageurs spot a disparity, they buy the underpriced situation and simultaneously sell the overpriced one. When the market closes the spread, arbitrageurs liquidate their positions and pocket the profits. Profit may be small in percentage terms, but it can mount up to a good sum, if the nominal amounts in the transaction are large or if the market presents many short-term arbitrage opportunities over time.

A good arbitrage should be essentially risk-free, but not everyone engaged in arbitrage gets the spread right or moves in and out of the position before being defeated by other, faster arbitrageurs. In any case, the time and acumen that must be devoted to successful arbitrage are great and arbitrage opportunities are not likely to be open to the managers of cash funds. In fact, money managers should be leery of placing their funds with security salesmen and brokers who claim they will let them in on complex arbitrage transactions. More often than not, the money manager is likely to be taken in rather than let in.

There also is a speculative motive for investing in options or other constructed derivatives. A speculative purchase, in contrast to a hedge, is based on a view of the future course of the market and is set to enhance the direction of return that already exists in the portfolio. If the portfolio is constructed so that its market value increases with a drop in market interest rates and falls with a rise, the purchase of a derivative that moves forcibly in the same direction multiplies both the potential return and the risk of the portfolio. Also, a speculative situation also arises when the hedge position, which was entered into in order to immunize the existing position, is so large that it dominates the portfolio. If the hedge goes wrong, its losses offset the gains on the original holdings.

Hedges, Leveraged Derivatives, and Risks

Derivatives can be structured to contain significant degrees of leverage. That is, they may be purchased with debt. A derivative that has a yield fixed on the current yield of intermediate or longer-term treasury issues may be bought by giving the seller an issue of notes carrying a floating rate based on the market yield of short-term Treasury bills. A holder of longer-term securities might sell this

arrangement as a hedge. If market rates rise, sellers gain as buyers pay more on their notes, and this offsets the market loss on sellers' long portfolios. On the other hand, if market rates fall, the payments made to the seller of the derivative drop, but the market value of the holding in longer-term securities rises.

The obverse is that the holder of short-term securities who wishes to secure his income by continuously reinvesting his portfolio can hedge his position by purchasing this derivative. If interest rates rise, the hedge loses, but the return on the reinvested portfolio rises. If interest rates fall, the return on the rolled-over securities falls, but there is an offsetting profit on the hedge.

The leverage in this derivative enhances the gains and losses of a speculator who buys the derivative cold or is already holding longer maturities. The speculator is betting that the interest rates are going to fall or at least hold steady over the holding period. If the rates rise and the speculator needs the funds, the market price of her holding of long maturities declines, and so does the market value of the derivative. The speculator falls into the same abyss that engulfed the S&Ls in the 1980s, when the market level of the short-term rates pushed up against the imbedded return on the S&Ls' mortgage portfolios, and the existing mortgages could not be sold at par.

A derivative that has a high degree of internal leverage has a yield based on a multiple of the change between two base interest rates. These are called basis swaps or floating swaps. One variant, which yields a "big bang" for the funds invested, is an inverse floater whose return moves sharply in the opposite direction from the changes in the short-term market rate. For example, a derivative might be constructed so that its yield moves as a multiple in the opposite direction of the London International Bank Offering Rate (LIBOR). (LIBOR is a rate charged by one bank to another for the overnight or weekend borrowing of reserves, akin to our Federal Funds Rate.) This is a leveraged inverse floater. The formula might be constructed so that if LIBOR drops 50 basis points (0.5 percent), the yield on the derivative *goes up 14 times*, or 700 basis points (7.0 percent).

Who might buy this volatile derivative as a hedge? If one held an extremely short-term underlying portfolio that was rolled over rapidly, and if one wished to maintain the income level derived from the current interest rate, the LIBOR-based inverse floater would provide a hedge. Should the current interest rate and income fall on the reinvestment of the funds, the derivative would provide an offsetting increase in returns. The multiple, or leverage, effect allows one to immunize the portfolio with a relatively small outlay, compared with the amount in the portfolio.

On the other hand, the sellers of an inverse floater obtain a hedge if they have a portfolio of intermediate or longer-term securities that they may need or desire to liquidate before maturity. The funds obtained by the sale of the derivative can be invested in the money market. If interest rates fall, the cost of maintaining the inverse floater rises, but this result is compensated for by the rise in the market value of the securities in the portfolio. If, on the other hand, interest rates rise, the value of the basic portfolio falls, but this effect is offset by the gains made on the spread between the lower payments on the inverse floater and the rate earned in the money market.

An enhanced speculative position is developed, however, when the portfolio manager buys securities that have values that move in the same direction as the hedge instrument. Such a position arises, for example, when the holder of longer-term securities buys an inverse floater. Gains multiply if the interest rates fall; there is a gain on the market value of the securities and also an increase in the returns on the inverse floater. The speculator wins on both ends.

The outcome will not be so favorable if the interest rate should rise. In this case, the return on the inverse floater will fall. Furthermore, the market value of the base portfolio will fall, resulting in realized losses if it must be liquidated.

Problems increase if the floater was bought with borrowed funds. The cost of holding the inverse floater rises as the rates on the money borrowed to hold the floater rise and the payments from the floater decrease. This is known as an inverse or negative spread.

In such circumstances, the market for the floater derivatives (never broad to begin with) dries up. Holders are faced with severe losses if they have to liquidate their positions. The speculator may decide that a possible way out is to buy more derivatives in hopes that the upward course of the interest rates will shortly reverse and trend downward. This approach is similar to doubling a bet. Of course, if this move proves ill timed, losses multiply from the millions to the hundreds of millions to the billions of dollars.

What Happened

What brought about the big play in complex derivatives? They do not seem pertinent to the management of a cash fund. The formula for administering a risk-neutral, maximum-return treasury cash fund is quite simple. The need for expenditures is projected period by period. This forecast is usually more precise for a government agency than for a private firm. The fund is invested in a portfolio with staggered maturities, so that the due dates of the investments meet the needs for expenditures. Some liquid reserves may be maintained in bank deposits or in money market funds for safety. Such a portfolio has no interest-rate risk,

but it will not earn more than the existing money market rates.

Two factors led to the gambling fever that seized the managers of both business and local government cash funds. One involved a change in managerial directives. On the business side, there was an emphasis on profit centers. A conservative cash fund manager could only show minimal results. There was little reward for losses avoided, but a manager willing to take risks could add to the total returns of the firm (at least temporarily) and could receive commendations and bonuses. On the government side, there was pressure to hold taxes in line, and extra income from secondary activities like cash fund management was greatly appreciated.

The second factor that encouraged risk taking was the steady decline in interest-rate earnings over a span of five years. From January 1989 to December 1993, the yield on three-month Treasury bills dropped from 8.29 percent to 3.08 percent. Under these circumstances, money managers looked for ways to better their results; the higher returns available on complex derivatives began to seem more and more attractive. Moreover, many managers became subject to the "structural change delusion." This is the belief that an economic trend that lasts for three or more years represents a fundamental change in the system and is likely to continue indefinitely. The upward movement in the short-term rate from 3.08 percent at the end of 1993 to 5.71 percent in January 1995 came as an unpleasant surprise.

The Lesson

The fundamental lesson to be derived from the unfortunate experiences of these money managers is not that all risk must be avoided. The first rule is that the net risk premium should be positive. The risk premium—the extra return from undertaking a riskier position—should exceed the amount of normal possible losses.

The second rule involves the calculation of the maximum sustainable loss. Even if the extra returns for risk exceed the normal expected losses, investors must avoid the risk of ruin. In short, they must eschew positions in which the one-time possible maximum loss is greater than their resources can sustain.

Did the money managers' investments in derivatives conform to the rules on taking risks? Did the expected returns on risky derivatives exceed the norm by an amount sufficient to make the investment worthwhile? Because transaction costs and brokerage and bankers' spreads (profits) were notoriously high on these instruments, the answer is most likely no. High spreads can easily eat up any positive risk premium. Did the managers follow the rule that there should be a maximum sustainable downside risk? No. In many cases, downside losses devoured more than 30 percent of the starting portfolio.

The essential function of cash management is to provide the operational sectors of the organization with secure and timely funds. The administration of the treasury cash and liquid balance is not a profit center and should not be rewarded for being so. No cash manager should invest in an arrangement without fully understanding its features and potential risks. The cash manager may take risk positions only where the investment is a minimum part of the total portfolio and where the costs of liquidating the situation have been guaranteed. Lastly, the cash manager should avoid the hubris that arises from a series of successful ventures. PM

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