How to right wrong-way exposure

How can banks make sure they are on the right side of a hedge that may be designed to offer protection, but which could result in significant losses? In the first of a new series, David Rowe offers a simple approach to the thorny issue of wrong-way exposure

Risk managers, particularly those concerned with credit, have had their curiosity pricked by the issue of wrong-way exposure. The research being carried out by JP Morgan (*Risk* July 1999, pages 52–55) reflects this wave of interest. Many derivatives dealers suffered heavy losses as a result of wrong-way exposure during the Asian crisis of late 1997 to early 1998.

The Asian crisis is a classic example – with an interesting twist in that Asian institutions appeared to steal a march on their foreign competitors. Many Asian companies with hard currency debt were sensible enough to hedge their exposures against a possible depreciation in their domestic currencies. They generally chose to place these hedges with Western institutions that would not be unduly weakened by such a depreciation. This left the Western dealers with an unacceptable open position that they needed to neutralise. In the end, many of them chose to lay off their positions with Asian financial institutions, putting themselves in the position where their exposure was "wrong-way".

I believe, however, that this type of wrong-way exposure is the exception rather than the rule. Assuming most derivatives users are hedging and not speculating, then "right-way exposure" must be the norm. If a business has used derivatives contracts to hedge, at least partially, against a market event that ultimately causes it to fail, then its dealer counterparties will be out of the money on those contracts at the time of default. When this happens, there is favourable covariance between the value of the dealers' exposure and the health of the counterparty. Deteriorating credit quality triggered by the hedged event will coincide with falling or negative exposure on the hedges (from the dealers' perspective).

To be sure, this process is far from foolproof even when the end-users are hedging. It is widely accepted that high interest rates are bad for the real estate market. When rates were in the high single digits, in the mid-1980s, some commercial real estate firms believed that this was as low as they would go. So they chose to lock in such rates using term swaps on which they paid fixed and received floating. What happened is that rates continued to drop, while excess capacity squeezed commercial rental rates. When some of these firms failed, these pay-fixed swaps were well in-the-money to their dealer counterparties. The resulting write-offs were some of the largest credit losses the derivatives industry had experienced up to that time.

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Nevertheless, given the size of the exposures, the credit history of the derivatives industry is a remarkably healthy one. Even recognising that derivatives use has traditionally been concentrated in larger entities with above-average credit ratings, much of this must reflect favourable covariance between exposure and counterparty credit quality.

Sensitivity

I believe there is a simpler, more effective approach to wrong-way exposure than that put forward by JP Morgan. My proposal involves concentrating on the market factor sensitivity of exposure to each counterparty. Many leading firms have for several years been using Monte Carlo simulation to quantify counterparty exposure. Each transaction's value is simulated in multiple market scenarios at defined dates throughout the remaining life of the deal. These values are then aggregated across a counterparty's portfolio (with appropriate application of netting rules) to produce the resulting credit exposure for each set of market conditions and simulation date.

With this in place, it is a relatively straightforward step to add a series of controlled simulations in which only one market variable is changed in a specified way (for example, raising the sterling Libor curve by two standard deviations above its expected level at each simulation date). The difference between a counterparty's credit exposure in this controlled simulation and exposure with all market variables at their mean values in all periods is a useful measure of the sensitivity of exposure to this directional move in the relevant market variable.

These sensitivity measures are in the form of a vector, specifically the difference in exposure between the two simulations at a series of future dates. To be useful, this sensitivity needs to be reduced to a scalar. Several alternatives, with varying degrees of sophistication, are possible. These include:

- the simple sum of the exposure differences;
- the signed exposure difference with the largest absolute value; and
- a weighted average of the differences that reflects discounting from the simulation date to the present and counterparty credit quality factors.

The signed exposure difference with the largest absolute value has an easily understood interpretation. Storing it for all risk factors affecting each counterparty would allow the exposure system to respond to commands such as "show all counterparties with peak exposure increases exceeding $5 million from a two standard deviation decline in the Thai baht/dollar exchange rate". It also would allow these counterparties to be ranked, from most to least sensitive.

Monitoring wrong-way exposure on a routine basis requires an additional step. One or more "wrong-way market moves" need to be defined for each counterparty. For some counterparties these will be obvious, for example, oil price falls for a petroleum extraction company or oil price rises for an airline. For others they will be far less obvious. A decline in the value of a financial institution's home currency would be a logical candidate for a wrong-way market move.

Once these are defined, the scalar measure of exposure sensitivity to these wrong-way market moves must be stored in consistent locations across counterparties. This facilitates the formulation of a standard report defined to contain, for example, all counterparties with wrong-way exposure sensitivity greater than $5 million. If credit ratings are stored with each counterparty, this could be further restricted to counterparties below a given rating.

Implementing this fairly simple approach would represent a significant step forward in this area. It does not attempt to quantify the absolute magnitude of an exposure in the case of a default. But it would act as an early warning mechanism as such exposures build up and allow timely preventive action on the part of credit risk managers. ■