Quo vadis, CVA?

Hedges of derivatives counterparty credit exposure – when based on credit default swap spreads – are unreliable and may lull banks into ignoring tail risks, argues **David Rowe**

Analysis of counterparty credit exposure has come a long way since I first addressed the issue almost two decades ago (*Risk* November 1993, pages 52–55). Nevertheless, nothing in traditional exposure estimation takes account of the probability of default by the counterparty in a rigorous, quantitative way. Instead, judgemental assessment of the financial strength of a counterparty became the key determinant of how much potential future exposure credit officers would approve.

Even in the early 1990s, however, periodic estimation of a loan loss reserve or credit valuation adjustment (CVA) was used to recognise that some future payments would not materialise. The sophistication of this calculation varied dramatically from one institution to the next, and that continues to be the case today. More recently, however, the losses banks suffered during the crisis – when counterparties were downgraded or, as in the case of Lehman Brothers, actually failed – have prompted renewed attempts to calculate CVA more accurately and hedge it explicitly.

One of the central questions arising in these efforts is whether CVA should be based on historical 'real world' probability of default (PD) estimates or risk-neutral estimates derived from the credit default swap (CDS) market. Many institutions have opted to take the latter approach, arguing they need to use PDs implied by the instruments used to hedge their positions. I believe this seemingly sensible argument fails in practice.

First, CDS spreads do not provide a direct estimate of default probabilities. Instead they reflect an amalgam of PDs and recovery rates. Extracting accurate default probabilities from CDS spreads is complicated by the fact that expected recovery rates themselves are cyclically variable. A common shortcut is to hold recovery rates constant at their historical average values – but, unless recovery rates are carefully modelled, the resulting PD estimates will be unreliable. As such, it's unfortunate that the Basel III framework – which includes for the first time a discrete capital charge for CVA exposure – mandates the use of CDS spreads as an input.

There are other problems. The price sensitivity of a CDS is highly non-linear relative to the level of default probability. When market sentiment turns against an entity, the price of its CDS can change suddenly and dramatically (*Risk* August 2011, page 6, *www.risk.net/2097606*). This can introduce a risk premium into the CDS price that is ignored in a risk-neutral analysis.

In addition, CDS spreads are subject to liquidity issues that can introduce significant basis risk between a cash bond and a combination of a risk-free bond and a CDS – there is no guarantee that hedges based on CDS contracts will closely reflect movements in the value of the underlying position. This problem can be further exacerbated in the case of derivatives credit exposure if the same factors driving downgrades in the counterparty's credit quality also substantially affect the underlying exposure amount.

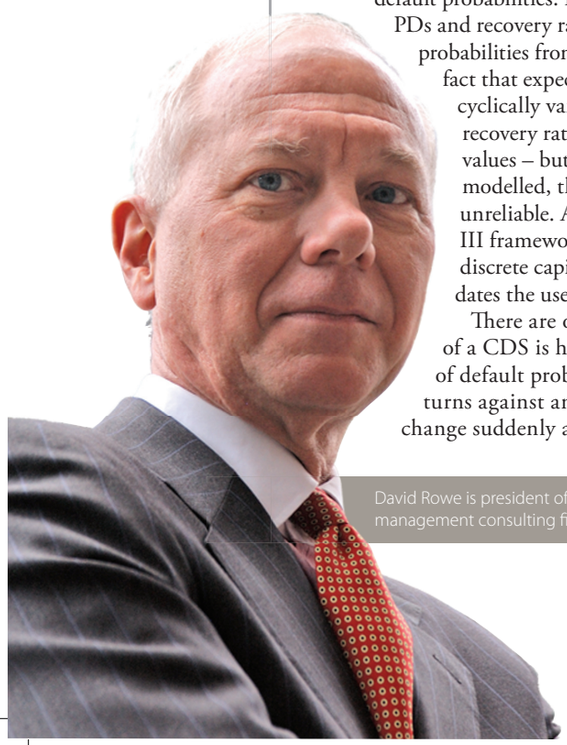
Questionable accuracy of PDs extracted from the history of CDS spreads creates other problems if one is seeking to evaluate the potential volatility of the CVA. Modelling the impact of varied market conditions on the CVA means addressing the covariability of the PDs across all counterparties. This is typically done using correlations that are derived from the flawed historical PDs with recovery rates held constant. Such correlations are suspect in themselves and, like all correlations, are far from stable in a stressed environment. The bottom line is that the effectiveness of CVA hedging is, at best, questionable.

A more realistic view is to recognise some forms of risk cannot be hedged with great precision. Beyond a basic level of mitigation, such risks must either be borne or avoided.

Given this reality, it makes more sense to evaluate CVA using historically based PDs that, in my view, provide a far more realistic and structural foundation. If the historical estimates for default probabilities reflect empirical analysis of the impact of specific macroeconomic factors, this greatly strengthens the reliability of stress scenarios. It is no longer necessary to rely on questionable and, in any case, unstable correlation coefficients.

Covariability is generated implicitly based on the structural impact of common economic factors. This would allow stress tests to yield a more reliable indication of the impact of tail events and provide a better basis for making the decision on whether to bear or to avoid the risk.

In summary, precise and effective hedging of CVA, especially under stress conditions, is not something on which banks should rely – especially in extreme economic and financial environments. There is a serious danger that the illusion of the ability to hedge effectively will lull managers and regulators into a false belief that such risk is well controlled and thus not a subject for concern requiring further evaluation. This is largely the dynamic that played out with respect to subprime mortgage securities. Let's not repeat this mistake in a different context. ■



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