GLOBAL riskupdate

The quarterly independent risk review for banks and financial institutions worldwide

JANUARY 2012

The Myth about Exchange Traded Deriviatives

Also in this issue

- Building CVA on Top of an Existing Risk Infrastructure
- Contingent Capital Instruments – What is the future likely to hold?
- Africa: The "Last Emerging Market"
- Africa: The Fascination, Rewards, Hazards and Management of Risk
- Casino v. Jungle
- The Future of Islamic Risk Management
- To Aggregate Risk or Not? Should that be the Question?

Building CVA on Top of an Existing Risk Infrastructure

Michel Dorval is a respected financial services risk management and compliance specialist at Thomson Reuters Risk Management. In this article he offers practical help whilst explaining the 'CVA landscape' drivers and the different approaches that banks can adopt in response to these drivers as well as how banks can implement CVA projects effectively taking into account the implications of each of these strategies.

The potential cost of doing business with certain counterparties is now a significant concern for anyone trading in the financial markets. In the past, the valuation of counterparty credit risk (CCR) was largely ignored, thanks to the relatively small size of derivatives exposures and the high credit rating of the counterparties involved, in general, other highly rated financial institutions. As the size of derivatives exposure increased and the credit quality of the counterparties fell in the wake of the 2008 crisis, however, the valuation of counterparty credit risk could no longer be assumed to be negligible and had to be priced in, more in particular **credit value adjustment** (CVA).

CVA captures the counterparty default risk inherent in over-the-counter derivatives portfolios. In a sense, the CVA is similar to loss reserves made on loan portfolios; on the other hand CVA is a highly volatile figure that depends directly on fluctuating daily market prices.

CVA appears in several different contexts. The original context was in managing P&L volatility arising from counterparty default risk in large OTC books. Since then, the CVA concept has been taken up by accounting standards organizations (specifically, with the development of IFRS 9 and ASC820 standards for fair value), as well as forming part of the requirements for additional regulatory capital, as put forward in the Basel III framework.

Since the current Basel II counterparty credit risk rules cover only default risk and no CVA risk, the Basel Committee on Banking Supervision introduced in the Basel III framework a new capital charge for potential mark-to-market losses associated with any deterioration in the creditworthiness of a counterparty. These new guidelines put forward both a standardized and advanced CVA charge.

Following the 2008 credit crunch, front offices realized that better quantification, pricing, and management of their counterparty credit risk was crucial because CVA losses dominated default losses during the crisis. Some banks created specific CVA desks that managed CVA P&L and collected charges from the originating desks in return for insulating them against counterparty default losses.

The total CVA book may represent a very large part of the bank's P&L, making it important to hedge the overall CVA and so avoid CVA uncertainty having a negative impact on bank profitability.

It is up to each bank to decide the level of CVA management it will try to attain in both short and long term.

To this end, it may be helpful to categorize a bank's CVA strategy into four broad stages, with the sophistication and cost increasing at each stage:

Building CVA on Top of an Existing Risk Infrastructure

Measure: A CVA measuring capability is created to calculate and aggregate CVA risks. Accounting and risk management departments will be the principal users of this function. This stage fulfils compliance obligations under accounting and regulatory standards.

Advise: In addition to measuring CVA, the bank will advise its trading departments on CVA-related risks. For example, position limits may be set to include CVA, or traders may be given minimum spreads to charge on a counterparty by counterparty basis.

Hedge: At this level the CVA is transferred from the trading desks to a CVA desk, perhaps through a one-time charge to the trading desk. The CVA desk is then responsible for managing the CVA P&L and, for example, for hedging it through the CDS market.

Trade: Here the CVA desk becomes a profit centre. The bank is not only hedging its own CVA risks but is also actively taking CVA positions

The choice will depend on the size of the bank and the scope of its derivatives book; the strategic direction the bank is following; and the regulatory and accounting standards in place. So banks with only limited derivatives activity may opt to stay at a compliance level and restrict investment in CVA measurement to whatever is required to be in line with the accounting and supervisory regime in place. A larger derivatives player on the other hand will transfer CVAs from individual trading departments to a consolidated CVA desk that will hedge or even trade CVA.

Having previously invested in the capabilities necessary for calculating economic and regulatory capital, most banks will already have in place all, or at least parts, of the different elements required to build a CVA solution. Unfortunately, these elements might be (and usually are) dispersed across different departments, where they serve specific purposes. A more consolidated approach is required for CVA. These elements can be broadly grouped under the headings of data, analytics and reporting.

Data

Most of the data will already be present in the bank as it is standard input to current platforms used to calculate market and counterparty credit risk. The challenge, however, lies in consolidating and normalizing this data so that it can be used for a centralized CVA computation.

- **The securities data** is usually available from the front-office trade capture and pricing systems and may already have been consolidated into risk management systems to calculate Value-at-Risk (VaR) for market risk or Potential Future Exposure (PFE) for credit risk.
- **The static data** required is generally the same as that used by limit management solutions. Market data, such as yield curves, equity prices, FX rates and volatilities, can be sourced from trading and risk management systems.
- **Credit risk data**, such as loss given default or recovery rates, ratings and probability of defaults, is entered into systems for the calculation of economic or regulatory capital, particularly if the bank is already using an internal ratings approach for regulatory capital.

Analytics

In terms of analytics a complete CVA solution could potentially cover different functions like beside an EPE engine also components like calibration, wrong way risk and calculation of sensitivities to support hedging.

In terms of methodology, the requirements of CVA overlap with those required to estimate PFE in many respects. CVA also entails a simulation of the future evolution of market data, deal pricing on future dates along these paths and aggregation, while incorporating the effects of netting and collateral agreements. Many of the challenges are the same: the performance of portfolio simulation, portfolio netting and collateral agreements modeling; a need for aging and reinvestment strategies; provision for the rapid pricing of complex structured derivatives, and so on.

The common use of PFE is to compute exposures that feed into limit management systems and regulatory capital calculations, where the bank has approval for the Internal Model Method (IMM)[1]. Calibration for PFE is therefore performed principally on historical market data to capture through-the-cycle risk. Regulatory requirements specify three years of past history, with an additional calibration over a period of significant stress for the bank[2]. The same calibration could arguably be applied to compute CVA in the context of risk management. If, on the other hand, the purpose is to calculate CVA for trading and hedging or fair value accounting, then calibration needs to be implied from current market data (also referred to as risk-neutral pricing).

[1] *BIS , Basel II : International Convergence of Capital Measurement and Capital Standards – A Revised Framework – Comprehensive Version – June 2006*
[2] *BIS , Basel III : A global regulatory framework for more resilient banks and banking systems – December 2010 (rev June 2011)*

Building CVA on Top of an Existing Risk Infrastructure

The CVA function is generally also tasked with checking for wrong way risk. Wrong way risk occurs when the exposure to the counterparty increases at the same time as the counterparty's credit quality deteriorates. This correlation between exposure and credit quality is difficult to express as a model. Academics and practitioners have proposed various models for wrong way risk, but while these papers explain interesting relationships they are not general enough; hence, a common practice does not yet exist for detecting wrong way risk.

The CVA function also needs to support pre-trade CVA inquiries. This may be handled in different ways: approximated and delivered as guidance or by means of an exact computation. The latter needs to be performed rapidly, but it is worth noting that only the simulation of the new deal and aggregation with the previous deals in the same netting set need to be performed. All other values can be reused from a larger overnight batch.

While CVA is computed on a netting set by netting set basis and the CVA contribution of different netting sets is additive, CVA must also be allocated back to the transaction level. The contribution of a granular level to the total CVA can be based on different mathematical definitions (marginal, incremental, component, etc.). Note that this is generally different from the additional CVA that the counterparty would be charged at the time the deal was done.

Hedging requires a vast number of sensitivities covering credit risk, other underlying market variables, volatilities, and correlations. While the credit calculations may be quite inexpensive to calculate, most other sensitivities will require multiple Monte Carlo simulations to be run. The efficient generation of Monte Carlo-based sensitivities is therefore critical to this process.

The following table summarizes the links between the four broad stages and the functionalities discussed.

ANALYTICS REQUIRED	STAGE 1 MEASURE	STAGE 2 ADVISE	STAGE 3 HEDGE	STAGE 4 TRADE
Data				
EPE engine for CVA and DVA				
Calibration for accounting and regulatory reporting				
Wrong Way Risk				
Attribution to trade or other granular level				
Pre-deal impact				
Sensitivities for hedging				

Analytics required as per CVA strategy

Reporting

Any decision on reporting capabilities must be made with user profiles in mind. A CVA desk or Risk Management team would tend to be primarily interested in aggregated CVA figures. They would, however, also need drilldown capabilities to support the validation of the figures and to enable them to answer requests from the trading desks to approve new deals.

Aggregated views usually follow counterparty and instrument hierarchies and must show the netting and collateral agreements that are in place in a transparent manner. Traders are focused on their desk's activity and are primarily interested in pricing (which also means knowing how much to add as CVA), in current CVA amounts, in details of any defined limits, in receiving guidance about which counterparties are favored or to be avoided and in whether or not a new transaction will 'pass'.

Technical requirements depend on the size of the bank's OTC derivatives operation and the scope of its CVA strategy. The number of prices that need to be simulated and the consequent amount of data that needs to be handled depends on the number of Monte Carlo paths, the number of simulation time steps and the number of transactions. If CVA is calculated purely for compliance with accounting and supervisory requirements, then a regular daily batch simulation is sufficient. Should the bank require fast, intra-day simulations to quantify the impact of new deals, then it needs to bring the CVA computation closer to the front office. A solution to deliver this capability could mean having separate engines and data stores, fed with overnight results from a centralized CVA computation, but additionally allowing quick incremental CVA calculations and re-aggregations on netting set basis.

In conclusion, existing risk infrastructures will be a good starting point on which to build a CVA capability. What this article has aimed to show, however, is where the gaps may be and where additional work will need to be done, in line with the stance adopted by each bank towards CVA, as compliance necessity or potential profit generator.

Michel Dorval can be contacted via JK@riskrewardlimited.com

For further information please contact:

Dennis Cox – CEO
telephone: +44 (0)20 7638 5558
email: DWC@riskrewardlimited.com

Lisette Mermod – New York
telephone: 1-914-619-5410
email: LM@riskrewardlimited.com

Joanna Kraska – Public Relations
telephone: +44 (0)20 7638 5558
email: JK@riskrewardlimited.com