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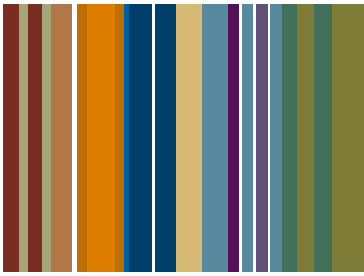

CREDIT VALUE ADJUSTMENT (CVA)

Building a CVA System Into a Bank

Credit Value Adjustment (CVA): Building a CVA System Into a Bank

SunGard Adaptiv's Andrew Hudson examines the hidden complexities of building a CVA system into a bank and explains why it is important to develop a system that is flexible and scalable.

Credit Value Adjustment (CVA) has a simple enough definition. It is the market value of counterparty credit risk, a calculation of the difference between the risk-free valuation of a portfolio and a portfolio value incorporating the possibility of the counterparty's default. CVA originated within banks as an accounting measure, and the introduction of accounting standard IAS39 in 2000 required banks to provide a CVA number every three months.

For years there was little demand on CVA systems. In the early 2000s, bank credit spreads showed little volatility, and so P&L swings due to CVA changes were relatively small. However, following the Lehman Brothers default in 2008 and the ensuing credit chaos, the P&L swings were measured in billions of dollars and interest in CVA began to grow. Now, whether it is driven internally or in response to external forces such as new regulation, many banks are now moving towards calculating CVA and CVA greeks on a daily and even intra-day basis.

Building a new CVA system is a notoriously complicated process, especially if it is intended to produce daily rather than monthly calculations. As a software firm with a lot of experience of implementing CVA systems, SunGard has gained a number of critical insights that banks should consider before they embark on such a challenging project.

IDENTIFY THE GOALS

Banks must be clear about their objectives when building a new CVA system. This is not always as straightforward as it sounds. Different levels of complexity can be employed in the CVA calculation, and a bank's choice will shape the system's design and associated workflow.

For example, in the early days of CVA, some banks got by with simple approximations. Exposure might be calculated with a mark-to-market plus add-on approach; collateralised counterparties might be ignored etc. Nowadays, a full Monte Carlo approach is commonplace.

There is the choice between unilateral and bilateral CVA (including the cost of the bank, as well as the counterparty, defaulting), the choice of a risk neutral versus a historical simulation measure, the model for capturing wrong-way risk, a methodology for efficiently calculating the greeks etc. The level of sophistication that a bank wishes to adopt becomes a crucial factor in the development of a CVA system.

NEGOTIATE THE DATA CHALLENGE

Banks that choose to adopt a more sophisticated approach to CVA also face a more complicated data challenge. In fact, the biggest operational challenge in implementing a CVA system is almost always the data. CVA is a counterparty-level calculation, not a trade-level adjustment, and trade information must be aggregated across the myriad systems that are found within most organisations. Netting and collateral agreements, which are rarely stored in the same system as the trade data, must also be pulled into the calculation.

Admittedly, building a basic Monte Carlo simulation engine that can turn out raw CVA numbers for standard trades is not overly challenging. However, the additional features and optional extras can cause difficulty. An end-of-day system needs a workflow to marshal and initialise the calculation. Banks wishing to hedge CVA to reduce P&L volatility need an interface to view the CVA greeks aggregated across their counterparties. And what if a bank decides to exert some control over traders' behaviour by employing CVA numbers as part of the front-office pre-deal pricing? Its system must support real-time incremental CVA calculations and be capable of calculating, for every deal, a CVA price that captures the effects of the whole portfolio. That price must then be returned to the trading system in seconds. Speed and scalability are therefore critical components.

Banks have been required to do a lot in risk management terms in the wake of the Lehmans default. But the provision of CVA numbers is the most computationally complex demand yet. The number of valuations required when calculating CVA sensitivities can run into the tens of millions – for every trade. Any enterprise-wide system must be able to scale well with increasing hardware while performing accurate valuations many times faster than a traditional front-office pricing system.

BASIC VERSUS STATE-OF-THE-ART

Of course, building a state-of-the-art system with complete support for all possible functionality is a daunting proposition, especially if a bank is starting from scratch. Consequently, many banks may feel that they can address only their current CVA needs and employ a rigid point solution that uses basic Monte Carlo simulation rather than taking a scalable and real-time enabled CVA approach. This model is not sustainable. A bank's CVA requirements may be simple now, but they will quickly become more complex. Any cost saved in the initial investment will be squandered as soon as the system is no longer able to keep up. For example, CVA is a cross-asset, portfolio level calculation, and banks should not be seduced into thinking that these analytics can be added to a system built to run single deal valuations. They will have to build a whole new solution.

Or consider the example of an incremental pre-deal CVA pricing tool. A system that is fast enough to calculate CVA on the FX and rates books may be good enough right now. However, next year it may need to include equities and credit, calculate 100 Greeks overnight, and capture wrong-way risk and funding value adjustments too.

Banks need to consider this issue at the outset and future proof systems wherever possible. They may decide to design a system that can be constructed in phases, starting with essential functionality and followed by more sophisticated processes as the project gains momentum. Even banks that want to install a state-of-the-art system from the outset will find that CVA is an evolving concept. As practice and regulation evolve, new techniques will emerge, and technology will become more accessible.

BUILD FOR TODAY WITH AN EYE ON TOMORROW

Banks should see the development of a CVA system as akin to climbing a ladder. Different banks will be on different rungs as they pick the point that best suits their capability and capacity. But they must also ensure that they are able to progress up that ladder by adopting a framework and architecture that is scalable and allows for further development in both performance and sophistication.

Above all, a system must be flexible. There are still a number of uncertainties around CVA. Some of the specifics of the regulatory requirements are still unclear, and such is the nature of modern-day regulation that it is hard to predict how onerous or liberal future legislation will be. Neither is it clear how the market for hedging of credit will evolve. Systems must be flexible and scalable to handle not just today's requirements but new demands as market practices around CVA further develop.

MANAGING CVA WITH SUNGARD'S ADAPTIV

The shifting picture of regulation and the sheer processing power required to run complete calculations makes CVA implementations on traditional systems costly and difficult. Adaptiv delivers fast, accurate CVA calculations at lower cost, powering a more accurate and timely analysis of exposures in real-time.

Putting CVA to work for front and middle offices, Adaptiv creates a shared understanding of risk among CVA desks, traders and business heads.

Continually refined over fifteen years and in hundreds of implementations worldwide, Adaptiv is the most robust, transparent and auditable platform for understanding and controlling CVA.

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