Tall order

The advent of Basel 3 significantly changes the way in which financial institutions address counterparty credit risk (CCR) and credit value adjustment (CVA). While a small number of banks are geared up for the regulatory changes and are actively managing CVA, the complexity and cost of implementing the necessary infrastructure remains a daunting task for the majority. **Anna Carlisle** reports

Large losses resulting from CVA volatility during the global financial crisis led banks and regulators to scrutinise CVA and CVA charges more closely. Around two-thirds of CCR losses during the crisis were attributed to CVA losses and only one-third to actual defaults. As a result, Basel 3 will introduce revised rules for calculating CVA, as well as new capital charges based on the stressed VaR adjustment.

It is estimated that most financial institutions are at relatively early stages of implementing up-to-date CVA systems, aside from the top-20 dealing banks. The majority are understood to have an informal CCR solution in place or may just be in the planning stages of an enterprise solution. Some may not even have started planning at all.

"Moving from Basel 2 to Basel 3 means quite a change in the level of counterparty risk analysis," says Rohan Douglas, ceo at Quantifi. "For most banks that may not have been doing anything particularly sophisticated in that space, it's a huge step up in terms of where they were to where they need to get to."

CVA cuts across many areas of a bank: there are trading aspects, a corporate risk management aspect and regulatory and accounting aspects. It affects both the front and back office of a bank.

"Many institutions are working against the clock," adds Douglas. "The Basel 3 framework is looming and, in many cases, existing infrastructure for risk management in banks is geared towards separate market and credit risk management. The requirements for counterparty risk are completely different: we're talking about a very large, very complex infrastructure that has to be implemented across all divisions of the bank [see charts]."

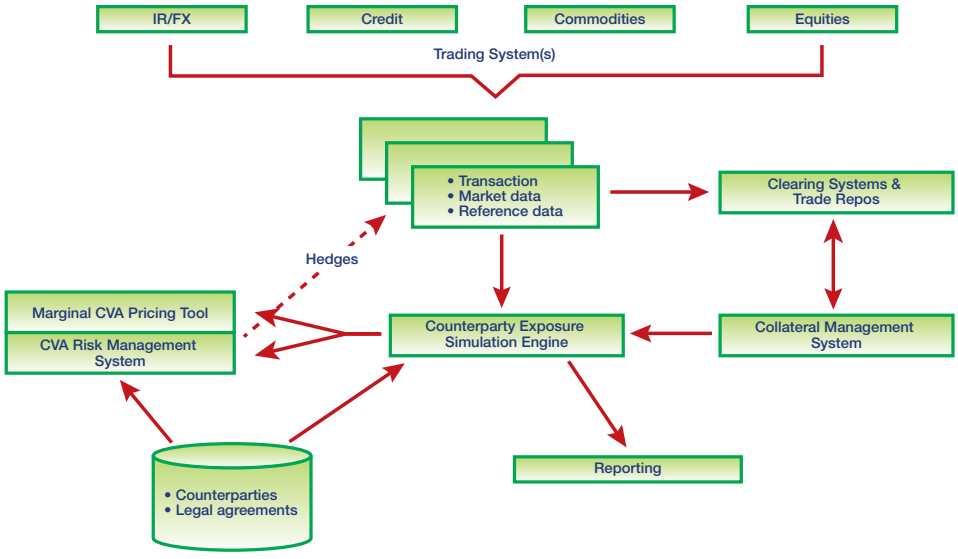
According to Dan Travers, product manager, risk solutions at SunGard, three big challenges are associated with CVA: the policy challenge, the data challenge and the calculation itself. "Banks need to decide whether CVA will be charged on some or all transactions," he says. "They then need to get the go-ahead and investment to implement a CVA function across the bank, which can take a considerable amount of time."

He adds: "Many of the Tier 1 US and European banks have started to insist that all deals are subject to a CVA charge, which comes out of the P&L of a deal, and will be actively managed by a centralised CVA desk. Getting an agreement from board level as to what the bank is going to do, however, is a big challenge."

A huge amount of data needs to be collected in order to make a CVA calculation possible, including CDS spread data, recovery rates, netting set collateral information, transaction data – for all asset classes – and market data. "All those pieces of information

Figure 1

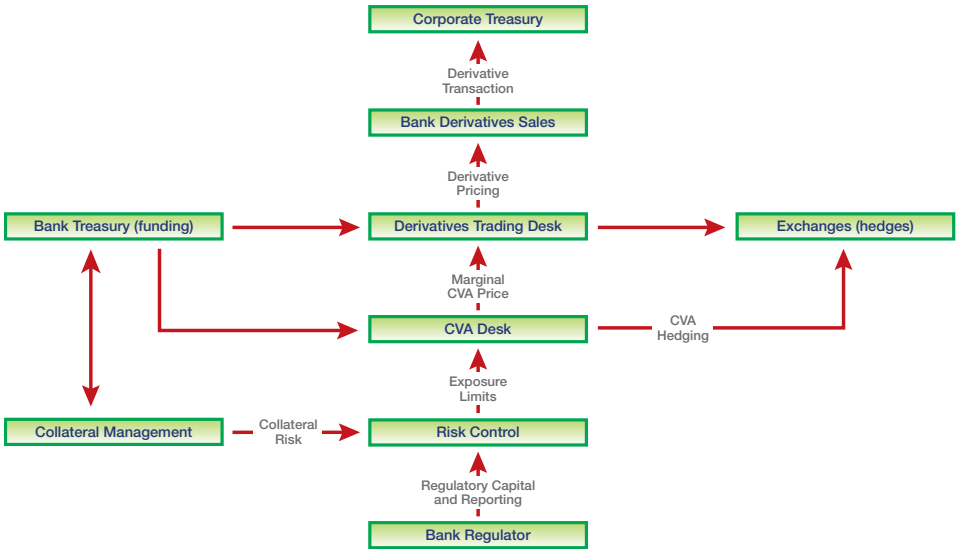
Data and Technology Challenges



Source: Quantifi

Figure 2

Counterparty Risk Workflow



Source: Quantifi

come from different areas in the bank, so that's a challenge that shouldn't be underestimated," notes Travers.

Finally, there's the actual CVA calculation itself, which not only requires a Monte Carlo simulation of around 5000 scenarios, but also needs to take into account the path- dependent nature of relevant derivatives and the netting and collateral in order to get an expected exposure and calculate the CVA. "Once you've got the data assembled, it's a huge computational challenge. Then when you put sensitivities on top of that, it's another order of magnitude of complexity," says Travers.

He continues: "We are seeing a lot of banks talk to vendors about CVA solutions because they are realising it's a problem that they are unable or do not want to take on themselves. They want to be live on CVA trading in 12 months."

Basel 3 requires a CVA capital risk charge in January 2013. While banks will be expected to have solutions in place by then, it will be possible to take a more basic standardised approach. Many banks are understood to be taking this option.

At the same time, however, banks need to remain competitive in terms of CVA pricing and need systems that not only accurately price CVA, but also price it correctly from the bank's perspective. This needs to be done in a real-time, almost sub-second environment.

"CVA is an integral component of the value of derivatives and ideally it should be part of the valuation models for each instrument," says Dan Rosen, ceo of R2 Financial Technologies. "However, it must be calculated separately at the counterparty portfolio level because there are portfolio effects beyond the valuation of each instrument; for example, netting and collateral agreements."

If a trader brings in a new transaction, the CVA desk needs to understand how it interacts with existing deals with that counterparty and work out the incremental CVA charge to the new transaction. The trader may be able to give the counterparty a cheaper price if the transaction's contribution is small or even negative, if it cancels out some other exposure, for example.

"At the same time, counterparties can shop around with different dealers to see who is the cheapest, based on what has been traded with them before," notes Rosen.

Cost may be one deciding factor as to the type of CCR and CVA solutions banks are able to implement. Travers explains that while there are some variable infrastructure costs that are related to the size and number of transactions, there are also some fixed costs, such as gathering the data and putting processes in place to manage collateral data, transaction data and market data.

"Some of those fixed costs may preclude the smaller banks from entering into CVA for at least the next couple of years," he says. "There are also staff costs to think about. For a medium-sized bank, it is going to cost in the region of €10m to implement a system. There's been a huge amount of interest in CVA recently, but it will be interesting to see whether cost pressures will hamper progress."

Hedging strategies

A number of banks have – or are in the process of – setting up centralised CVA desks to manage CCR exposure. Commonly staffed by traders and structurers previously involved in structured credit or exotics, the desk has two main roles.

The first is to provide counterparty credit insurance to the derivatives dealers. For simple products such as interest rate swaps, this should be fairly straight forward. However, whether it is a physical cash amount or rate that is provided to the dealer, the CVA desk needs the infrastructure to be able to provide this.

The larger banks will typically have a large CCR solution in place with an automated system that calculates CCR exposures across all different desks and positions overnight. Saved information from those calculations allows the CVA desk to calculate incremental pricing of a new trade very quickly and also will be able to produce all the sensitivities that a CVA desk needs to hedge and manage those exposures.

At the same time, the CVA desk proactively monitors the state of the market. New events during the day affecting the

Dan Travers, SunGard

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state of a particular counterparty will not have been priced in by the automated system. Therefore the CVA desk is required to update in real-time restrictions on certain trades: they need to proactively manage the credit risk of the bank to make sure new trades are not put on when news comes in.

"From a pricing perspective, CVA is the most complex instrument that we have ever priced, by a long way," says Rosen. "In practice, CVA cannot be captured to a decimal place. There is no perfect quote. We are really pushing our limits on how well we can do it."

The second role of the CVA desk is to actively hedge positions. "CVA desks need to preserve the figure that they quote to traders," says Neil Dodgson, vp business development & customer solutions at Algorithmics. "This can be done via relatively simple FX, CDS, IRS, equity and commodity hedges."

However, a significant concern for CVA desks is cross-gamma hedging. "Instead of putting on a static first order hedge, the CVA desk needs to look down further at hedging its second order. For example, if you have a FX and interest rate movement at the same time, how do you hedge that? At the same time, they also need to think about credit risk," continues Dodgson.

He points out that some desks are looking at contingent CDS, which could encapsulate both of those risks into one transaction. However, that market is very small and highly illiquid at present (see box below).

There was some initial controversy and discussion as to what qualified as a hedge for CVA under Basel 3. But, following market feedback, the rules were modified so that currently single name CDS, single name contingent CDS and CDS indices (jurisdiction-dependant) are eligible hedge securities for CVA.

Tranche securities and nth-to-default swaps are not eligible. Often interest rate and FX risk for CVA is hedged using interest rate swaps and FX products, but these currently would not get treatment as hedge securities for CVA and would be measured as adding to the overall risk under Basel 3.

The next traded risk?

The growing number of CVA desks has also given rise to the concept of CVA becoming a viable traded risk. To date, a small number of CVA securitisations have been issued.

These deals have involved the CVA desk pooling CVA exposure and selling tranches of risk to investors. The Amstel and Alpine transactions, for example *(SCI passim)*, issued by ABN AMRO and UBS respectively tranched a pool of risk and sold the equity portion, thereby reducing the risk-weighting of the exposure.

Neil Dodgson, Algorithmics

One structured credit manager confirms that his firm has been talking to four or five different houses about CVA trades over a long period of time, with one particular deal close to completion. "People are at different stages in terms of completing these transactions," he says. "There's one bank that has done several trades already and we'd expect we could trade with them if we can agree terms."

The manager adds: "There are other banks that have done CVA trades in the past, such as Deutsche Bank, ABN/RBS and UBS. These firms have got specific systems in place and could do further trades if they want to. Most banks do not have a system in place, but several are looking to set something up."

The trade in question would consist of a bank taking its exposure to around 400-500 counterparties; for example, US$10m in exposure to one manufacturer and US$20m exposure to a bank, and so on. The bank would buy protection for the portfolio from the structured credit manager, with the manager selling the bank protection on a first-loss portion of the portfolio; in other words, the first 8% of losses.

"From a regulatory perspective, I think this market has the potential to grow," says the manager. "The capital charge arising from CVA under Basel 3, which is based on the stressed VaR adjustment, is much larger than the capital charges under Basel 2.

Supply issues

Contingent CDS (CCDS) has been touted as an effective hedge for incremental regulatory capital charges for CVA volatility outlined in Basel 3. Indeed, regulators have tacitly approved CCDS as a possible hedge. However, the likelihood that this product will gain traction looks unlikely in the current environment due to the lack of sellers.

"CCDS is not being widely used to hedge CVA books due to the lack of adequate supply," confirms Shankar Mukherjee, co-founder of Novarum. "What banks want is a suitably-rated counterparty to sell the CCDS, but these simply do not exist."

While there has been a limited interbank market for CCDS, volumes have been low and, in order to make an impact, a meaningful supply of the product is necessary. Regulators have also stipulated that the supply of CCDS should come from outside the banking industry – that is, they do not want to see a reciprocal trade between banks, where one bank hedges another and vice versa. However, non-bank suppliers – such as the monolines – are no longer in a position to sell protection.

"I struggle to see how a meaningful supply of CCDS will emerge," says Mukherjee. "The difference between vanilla CDS and CCDS is that a bank using CDS can distribute that risk to other investors."

He adds: "If one trading desk sells CCDS protection to another, what do they do with that risk? Do they warehouse it? If they don't warehouse it, they need to show that they can distribute that risk to an investor, and this is not currently possible."

Mukherjee explains that in the absence of CCDS, it comes down to banks managing their CVA volatility by essentially replicating a CCDS strategy internally. However, one problem with this strategy is that often the idiosyncratic CDS hedges are not available.

"To my mind, instead of going for more active portfolio management on a name-by-name basis, I think people are stepping back and looking at the bigger picture," he notes. "Before Basel 3 specifics were announced, many banks had no idea what their counterparty exposure looked like. The new regulations are forcing people to think more about it."

Mukherjee continues: "It has certainly brought people up to scratch in capturing all of their derivative trades: they are putting in risk exposure clarification programmes and capturing the data properly. This is the first step."

Wrong-way risk

Wrong-way risk – when the exposure to a counterparty is adversely correlated with the credit quality of that counterparty – occurs in two forms.

The first – and most commonly referred to – is 'general' wrong-way risk. In this case, exposure to a counterparty may be related to the likelihood of default through non-specific microeconomic factors, such as interest rates or general market indices. Although general wrong-way risk is something that can in principle be amenable to statistical analysis, in practice it may be difficult to estimate with a high degree of accuracy.

The second type of wrong-way risk is 'specific wrong-way risk'. In this case, an exposure to a specific counterparty is very highly correlated to default.

"This generally arises from badly-structured transactions," explains Dan Rosen, ceo of R2 Financial Technologies. "For example, a counterparty might be a company that writes put options on its own stock or that is collateralised with its own shares or shares of a subsidiary. If they go into default, what you think is collateralised isn't actually collateralised and is worth nothing. That is true wrong-way risk and is something that can be avoided by structuring deals properly."

Rosen explains that wrong-way risk is difficult to model and calculating it for a portfolio is a computationally-intensive task. First, the correlations (co-dependence) between exposures and default probabilities are generally very difficult to estimate in practice.

Given the complexity of wrong-way risk, the methodology must be simple, robust and easy to understand. More importantly, stress-testing and model-risk must be built into the core of the methodology.

"One problem that arises is that counterparty exposure calculations are computationally expensive to begin with, requiring the simulation of thousands of derivatives positions, over thousands of market scenarios and a hundred time-steps," Rosen notes. "In addition, systems in place at banks often handle exposures and default simulations separately. A brute-force Monte Carlo simulation is straightforward but not really feasible, given the time and computer constraints and complexity of the calculation. An effective methodology to calculate CVA and capital with wrong-way risk must necessarily leverage existing exposure simulation engines."

CVA and economic capital calculations will be affected by market-credit correlations. "It is more than just the pricing that is impacted, however," adds Rosen. "If you are trying to hedge CVA, the hedges may not be effective."

Therefore banks have the incentive to carry out these transactions because capital charges in this space are increasing so much."

Not everyone agrees that this market has a future, however, with questions over the investor base and the complexity of such deals. "While it is good to push the boundaries of financial engineering with talk of securitising CVA, at the same time we also have to understand our own limitations," notes Rosen. "I think that CVA securitisation is probably a bad idea. I do not see the idea of CVA securitisation developing and capturing the interest of sufficient investors and the approval of regulators."

He adds: "If done correctly, securitisation itself has proven to be a powerful tool, which can bring funding and distribute risks through the capital markets. We've also seen through the crisis that, done wrongly, it can result in a financial disaster. I think the industry trend is towards simplicity and transparency."

It is questionable whether investors will be able to understand and model the underlying risks of a structure based on the CCR of complex underlying portfolios of derivatives, which are also changing continuously. "I think we will look for better solutions, but I don't think securitisation is the solution to managing counterparty credit risk. Sure, our creativity as financial engineers allow us to design vehicles to securitise any risk. Also our technological capabilities and models to compute CVA and counterparty credit risk are improving dramatically. Just because we can do it, it does not mean we should do it," continues Rosen.

> "While it is good to push the boundaries of financial engineering with talk of securitising CVA, we also have to understand our own limitations"

He remains concerned that another "monster" could be created, bringing a whole new set of problems. "As an industry, we need to look for solutions for how to manage the CVA risk, given that it is now embedded in accounting, P&L and in the regulations. But we need to find the right tools to do this."

Shankar Mukherjee, co-founder of Novarum, notes that it would be difficult to see CVA becoming a serious traded risk unless banks figure out a way to distribute the risk. "There have been very few securitisations of CVA risk done and, considering the amount of risk on banks' books, this shows that there isn't an effective mechanism at the moment to securitise," he says.

He adds: "It comes back to the fact that CVA is a very difficult risk to understand. Added to which is the fact that the risk profile changes over time and there's no upper bound to what that exposure might be. That makes it difficult for end investors to buy that risk."

Many banks may therefore reduce CVA risk by more simple methods, such as restructuring transactions with various counterparties. This includes breaking transactions, mark-to-market resets, re-couponing or employing various techniques to restructure the transaction that reduces the CVA number. Another option is to sign a credit support annex (CSA) if a bank has a large amount of CVA with one particular counterparty.

Industry participants also point out that putting credit hedges in place is expensive and there remains a large basis risk for names without liquid CDS markets. This means that credit hedging of CVA on the market is usually the last resort after market hedging and restructuring.

"One of the issues with actively trading CVA is there are transaction costs involved," concludes Mukherjee. "Every time you buy a CDS, you pay a bid/offer spread to whoever you buy from. Every time that position is re-hedged, again a bid/offer spread needs to be paid. If you look at how much it costs you over the life of the deal, it can be quite significant, so you need to work out if it's worth going out and spending all that money." SCI