

## Waiting for CVA?

# OVERCOMING THE CHALLENGES

of Counterparty Risk Management

### Also in this issue:

Survey:  
How do you Manage your  
Counterparty Credit Risk?  
Page 3

OIS and CSA Discounting  
Page 6



# MESSAGE FROM THE CEO



The global financial markets are experiencing major changes with new regulations and the impending Basel III capital accord. While there is significant uncertainty about key details of final regulations and implementation timelines, there is a growing consensus and direction emerging for a new OTC market landscape. Key drivers of this new landscape include counterparty risk, a new valuation framework adjusting for the cost of collateral agreements called OIS discounting and central clearing.

Quantifi is focused on what is important to our clients and is leading the market in developing solutions tailored for this new OTC market landscape. In addition to a significant investment in product development, as demonstrated by our QX.1 release scheduled for this quarter, we have also published two recent thought leadership pieces on the challenges of counterparty risk implementation and derivatives valuation using OIS discounting. The goal is to engage clients and the market in the ongoing discussion around trends and best practices. One important example of this engagement is our upcoming seminar in London co-hosted with PRMIA where leading industry practitioners and regulators will be joined by market participants in a forum for discussion and sharing of ideas around counterparty risk and CVA.

Through the first half of 2011 we have seen a continued pickup in the OTC markets as evidenced by a host of new clients including CM 10-CIC, Sterne Agee and CIMB. We see the entry of new participants and an increase in risk appetite reflected by a dramatic increase in the depth of the credit index options market. We have also seen a rapid evolution and convergence in the counterparty risk space towards that of the largest banks and what we consider market best practice.

I look forward to an exciting second half of 2011 in what is turning into a seminal year for the OTC markets.

**ROHAN DOUGLAS**, Founder and CEO

## NEWS

### Client News:

#### CM10-CIC Selects Quantifi

One of the largest banking groups in France sought a powerful and advanced pricing and structuring tool. Compared to the competitive solutions, Quantifi XL proved to fit all necessary requirements. "Quantifi has a strong track record in this space and we expect to see significant benefits as we now have access to a proven solution that matches prices in the market combined with responsive support." Senior Derivatives Trader Linda Kessour, CM-CIC Marchés

#### CIMB Investment Bank Selects Quantifi

Malaysia's largest investment bank selected Quantifi XL, based on speed, accuracy and flexibility, to support its expanding operations. "Securing CIMB as a client is excellent news and a welcome addition to our growing client base both within the investment banking sector and across Asia."

Rohan Douglas, CEO, Quantifi

#### Sterne Agee Selects Quantifi

For the largest privately owned broker-dealer in North America, Quantifi XL has proved to be the ideal solution, providing traders and salespeople with immediate access to advanced pricing and deal analysis at a fraction of the cost of an internal build. Sterne Agee realises an immediate competitive advantage by rapidly scaling their business and competing on a level playing field with the most sophisticated global banks.

### Product News:

#### CDS Index Option Models

Quantifi enhances its credit index option models in response to client demand for more sophisticated analysis and to support for the latest market developments. "We have been working closely with clients to develop flexible tools for pricing CDS index options, consistent with techniques used in other markets. We have implemented tools to calibrate credit volatilities used in CVA pricing and hedging from CDS index option quotes." David Kelly, Director of Credit Products, Quantifi

# How do **you** manage your COUNTERPARTY CREDIT RISK?

Quantifi recently exhibited at the Global Derivatives and Risk Management conference in Paris and surveyed a cross section of financial firms on the topic of counterparty credit risk. The purpose of the survey was to gain an insight into the various approaches and timing in implementing counterparty risk management processes. This report highlights the key preliminary findings<sup>1</sup>.

## Managing Counterparty Credit Risk

27% of firms actively manage and hedge CVA. 59% of firms use exposure limits and 50% use counterparty selection as their primary method for counterparty credit risk management.

The trend is towards active management, as hedging CVA is becoming increasingly important to offset significantly higher regulatory capital requirements and the impact of CVA volatility on earnings.

## Timing of Major Changes

All respondents have or plan to implement major changes in their counterparty risk systems. 41% of respondents plan to complete major changes in 2012 or beyond.

As outlined in Quantifi’s recent whitepaper - ‘Challenges in Implementing a Counterparty Risk Management Process’ - the data, technological and operational challenges can be significant and contribute to extended implementation timelines.

## Calculating CVA for New Trades

64% of respondents calculate CVA on new trades. 50% of these use an integrated calculator with netting and collateral.

It is expected that the number of firms that calculate marginal CVA on new trades, reflecting netting and collateral, will continue to grow and evolve to near real-time pricing.

## Key Issues with Existing Counterparty Risk Systems

The largest challenge within existing counterparty risk systems is data management and integration (64%). The next largest challenge is the calculation of CVA sensitivities.

Data management and integration is the most widespread issue which reflects the diversity of systems within most firms and the challenges around integration and management of transaction, market and reference data.

Another significant challenge is the calculation of CVA sensitivities due to significant computational and numerical complexities. Although many respondents are not hedging CVA, the importance of CVA sensitivities reflects the trend towards this goal.

## Technology Initiatives

31% of firms are currently implementing or evaluating vendor counterparty risk and CVA systems.

For many banks that have not yet implemented counterparty risk management systems, a new generation of vendor systems can provide a fast and effective solution with reduced maintenance costs.

Key considerations for successful implementation of a vendor solution include the number of systems that must be integrated, data sourcing and format conversions, and the ability to add proprietary models.

### Key Findings

- 27% of firms actively manage and hedge CVA. 59% of firms use exposure limits and 50% use counterparty selection as their primary method for counterparty credit risk management.
- All respondents have or plan to implement major changes in their counterparty risk systems. 41% of respondents plan to complete major changes in 2012 or beyond.
- 64% of respondents calculate CVA on new trades. 50% of these use an integrated calculator with netting and collateral.
- The largest challenge within existing counterparty risk systems is data management and integration (64%). The next largest challenge is the calculation of CVA sensitivities.
- 31% of firms are currently implementing or evaluating vendor counterparty risk and CVA systems.

<sup>1</sup> A number of respondents selected multiple answers

# Waiting for CVA?

## OVERCOMING THE CHALLENGES of Counterparty Risk Management

by **DAVID KELLY**, Director of Credit at Quantifi



Most banks are in the process of setting up counterparty risk management processes or improving existing ones. Counterparty risk is increasingly being priced and managed by a central CVA desk or risk control group since the exposure tends to span multiple asset classes and business lines. Moreover, aggregated counterparty exposure may be significantly impacted by collateral and cross-product netting agreements.

Gathering transaction and market data from potentially many trading systems, along with legal agreements and other reference data, involves significant and often underestimated data management issues. The ability to calculate credit value adjustments (CVA) and exposure metrics on the entire portfolio, incorporating all relevant risk factors, adds substantial analytical and technological challenges. Furthermore, traders and salespeople expect near real-time performance of incremental CVA pricing of new transactions. Internal counterparty risk management must also be integrated with regulatory processes.

In short, the data, technological, and operational challenges involved in implementing a counterparty risk management process can be overwhelming.

**CVA & Capital:** CVA is the amount banks charge their counterparties to compensate for the expected loss from default. Since both counterparties can default, the net charge should theoretically be the bilateral CVA, which includes a debt value adjustment (DVA) or gain from

the bank's own default. While clearing and collateral are the principal means for managing counterparty risk in the inter-bank market, uncollateralised exposure is more prevalent in the corporate derivatives market and banks compete aggressively on CVA pricing. CVA pricing is inherently complex for two reasons. First, the incremental (or marginal) CVA for each trade should reflect the application of collateral and netting agreements across all transactions with that counterparty. Second, CVA pricing models not only need to incorporate all of the risk factors of the underlying instrument, but also the counterparty's 'option' to default and the correlation between the default probability and the exposure, i.e., right- or wrong-way risk.

Given the complexity, two problems arise. Some banks are not able to compete for lucrative corporate derivatives transactions because they do not take full advantage of collateral and netting agreements with their counterparties in calculating CVA. Or, they win transactions because their models under-price some of the risks and subject the bank to losses. The complexity is compounded by the need for derivatives salespeople to make an executable price in near real-time.

While CVA covers the expected loss from counterparty defaults, economic or regulatory capital provides a buffer against unexpected losses. Subject to approval, the Internal Model Method (IMM) specified in the Basel accord allows banks to use their own models to calculate regulatory capital. The total regulatory capital charge for

counterparty risk is the sum of the counterparty default risk charge and CVA risk capital charge. The counterparty default risk charge is calculated using current market data, either implied or calibrated from historical data. Three-years of historical data are required, including a period of stress to counterparty credit spreads. The CVA risk capital charge was introduced in Basel III, as CVA losses were greater than unexpected losses in many cases during the recent crisis. The charge is the sum of the non-stressed and stressed CVA VaR, based on changes in credit spreads over a three-year period. Eligible credit hedges can be included to reduce the total capital charge and cleared transactions may be omitted.

**Data & Technology:** Gathering all the data necessary to calculate CVA and capital reserves translates into a very challenging technology agenda. Most banks have multiple systems for reference data, market data, and transactions. These systems may be further subdivided into front-office analytical tools and back-office booking systems, each with its own repository of market and reference data. The counterparty risk system must integrate with potentially many of these systems in order to extract the data needed to produce a comprehensive set of counterparty risk metrics.

For a large bank, the counterparty risk system may price something on the order of one million transactions over one thousand scenarios and one hundred time steps, or 100 billion valuations. If the bank actively hedges CVA, the number of valuations is roughly multiplied that by the number of sensitivities required. The counterparty risk system's infrastructure must also support back-testing, stress testing and historical VaR. In addition to fine-tuning the analytics, acceptable levels of performance and scalability can be achieved by distributing computations across servers and processor cores using grid technology.

With the huge amount of data involved and analytical complexity, the ability to view the various counterparty risk metrics across a variety of dimensions is absolutely essential. At the very least, the system should show current and projected exposures, CVA and regulatory capital by counterparty, industry and region. The ability to inspect reference, market and transaction data inputs is vital in verifying calculated results and tracking down errors. The system must also provide reports for back-testing, stress testing and VaR outputs with similar aggregation and drill-down capabilities.

**Trends:** Post crisis, the ability for senior management to get a comprehensive view of the bank's counterparty risks is a critical priority. Consolidated risk reporting has been elusive due to front-office driven business models. As influential revenue producers, trading desks have maintained a tight grip on data ownership, model development and front-office technology. This has resulted in a proliferation of systems, making the job

of aggregating risks across business lines excessively complicated. Continuous development of new types of derivative payoffs and structured products has exacerbated the problem. But the failures and near failures of several global banks have changed the traditional mentality. Banks are now taking a 'top-down' approach to risk management. Decision-making authority is transitioning from the front-office to central market and credit risk management groups.

A key component of the top-down approach to risk management is the central CVA desk or counterparty risk group. In practice, the CVA desk sells credit protection to the originating trading desk, insuring them against losses in the event of a counterparty default. Housing counterparty risk in one place allows senior management to get a consolidated picture of the exposures and proactively address risk concentrations and other issues. As banks continue to ramp up active management of CVA, having a specialised group allows careful management of complex risks arising from liquidity, correlation and analytical limitations.

Decentralised infrastructures may make the data and technology challenges too great to ensure provision of meaningful consolidated counterparty risk metrics on a timely basis. Some banks have aligned counterparty risk management by business line in order to more effectively manage the data and analytical issues at the expense of certain benefits, like netting. For centralised CVA desks, there is also the challenge of internal pricing and P&L policies. Most banks position CVA desks as utility functions that simply attempt to recover hedging costs in CVA pricing.

Recent regulatory activity has also had a profound impact on counterparty risk management. Mandating central clearing for an expanding scope of derivative products effectively moves counterparty risk out of complex CVA and economic capital models and into more deterministic and transparent margining formulas. The heavily collateralised inter-dealer market is also undergoing significant changes. Institutions are now looking more closely at optimising collateral funding through cheapest-to-deliver collateral, re-coupons existing trades to release collateral, and moving positions to central counterparties in order to access valuation discrepancies or more favorable collateral terms.

It is expected that most corporate derivatives transactions will remain exempt from clearing mandates since banks provide valuable hedging services in the form of derivative lines. The cost of extending these lines is increasing due to significantly higher regulatory capital requirements. Therefore, competitive CVA pricing and economic capital optimisation will remain priorities for corporate counterparty risk management alongside collateral and clearing processes. ■



by ROHAN DOUGLAS, CEO of Quantifi  
and PETER DECREM, Director of Rates at Quantifi

# OIS and CSA Discounting

Following the credit crisis, interest rate modelling has undergone nothing short of a revolution. During the credit crisis, credit and liquidity issues drove apart previously closely related rates. For example, Euribor basis swap spreads dramatically increased and the spreads between Euribor and Eonia OIS swaps diverged. In addition, the effect of counterparty credit on valuation and risk management dramatically increased. Existing modelling and infrastructure no longer worked and a rethink from first principles has taken place.

Today a new interest rate modelling framework is evolving based on OIS discounting and integrated credit valuation adjustment (CVA). Pricing a single currency interest rate swap now takes into account the difference between projected rates such as Euribor that include credit risk and the rates appropriate for discounting cash

flows that are risk free or based on funding cost. This approach is referred to as dual curve, OIS discounting, or CSA discounting and forces a re-derivation of derivatives valuation from first principles. In addition, the counterparty credit risk of (uncollateralised) OTC transactions is measured as a CVA.

## Impact of the Credit Crisis on the Rates Market

As the credit crisis unfolded, there were significant impacts on the structure and dynamics of the rates market. Credit and liquidity drove segmentation and rates that were previously closely related diverged, causing a rethink of how these rates should be modelled.

Reflecting the different credit risk and market segmentation between different Euribor rate tenors, basis swap spreads blew out during the crisis from being fractions of a basis point (where they had been quoted for decades) to double digits in a matter of months. The 3M Vs 6M Euribor Basis swap spread went from under a basis point to peak at over 44bp around October 2008, after the Lehman default. This divergence is again a

reflection of different credit and liquidity risks between these indices. The longer term deposits (6M) carry more credit risk than the shorter (3M) deposits.

## The New Interest Rate Modelling Paradigm

Clearly the credit crisis had a significant impact on the interest rates market. These changes have driven a profound shift in the way all OTC products are valued and risk managed. The result has been an abandonment of the classic derivatives pricing framework based on single interest rate curves and the introduction of a new approach that takes into account current interest rate dynamics and market segmentation using multiple curves.

### Dual Curve/OIS Discounting:

The old-style no-arbitrage, single-curve derivatives valuation framework where Euribor was a reasonable proxy for a risk-neutral discount rate has been permanently changed by the credit crisis. An understanding of the credit risk embedded in Euribor and similar rates and an increased importance in the modelling of funding have driven a separation between the index rates used for the floating legs of the swap (the projection rates) and the appropriate rates used for present value (the discount rates). The market-standard rate to discount future cash flows is now OIS rates.

The method of projecting rates using Euribor and discounting rates using Eonia changes the fundamental framework for existing derivative modelling. It has required a rethink from first principles that continues to be discussed and refined. Pricing and risk managing even a vanilla single currency swap has become significantly more complex. Curve construction, pricing and hedging now involve multiple instruments and additional basis risks. These complexities compound for interest rate products such as cross currency swaps, caps/floors and swaptions.

### Counterparty Risk and CVA:

The measurement and management of counterparty risk is now something that impacts all market participants. Accurate valuation of OTC products now requires accurate valuation of the credit component of each transaction. In addition, regulatory initiatives such as Basel III and Solvency II, along with accounting rules such as ASC 820 (FAS 157) and IAS 39 have mandated more accurate counterparty risk valuation and risk management.

The larger banks have led the evolution of valuing and managing counterparty credit risk. Over time they have converged to generally consistent methods and processes. The concept of a CVA is now widely accepted and consistently calculated across the markets. OTC transactions that carry counterparty exposure executed by all the larger institutions now have a CVA component as part of the valuation.

## Dual Curve OIS Discounting Curve Construction

Following the credit crisis, interest rate derivatives are now valued with models that reflect the observed market segmentation, counterparty risk, and interest rate dynamics. Valuing a single currency vanilla interest rate swap involves calculating forward rates based on Euribor rate curves and discounting expected cash flows using Eonia rates. As in the single-curve case, these curves are calibrated from liquid interest rate products. For the EUR curves this includes money market securities, futures, FRAs, Eonia swaps, basis swaps and interest rate swaps. The process is complicated, however, by changes to the modelling principles around calculating the expected forward rates. These forward rates must be conditional on the Eonia rates used for discounting.

**“A new generation of interest rate modelling is evolving. An approach based on dual curve pricing and integrated CVA has become the market consensus.”**

A new generation of interest rate modelling is evolving. An approach based on dual curve pricing and integrated CVA has become the market consensus. There is compelling evidence that the market for interest rate products has moved to pricing on this basis, but not all market participants are at the stage where existing legacy valuation and risk management systems are up to date. The changes required for existing systems are significant and present many challenges in an environment where efficient use of capital at the business line level is becoming increasingly important. ■

# Whitepapers

## OIS AND CSA DISCOUNTING

- A new generation of interest rate modelling based on dual curve pricing and integrated CVA is evolving



## CHALLENGES IN IMPLEMENTING A COUNTERPARTY RISK MANAGEMENT PROCESS

- Key data and technology challenges
- Current trends in best practices

## EVOLUTION OF COUNTERPARTY CREDIT RISK

- Explores practical implementation issues and how approaches have converged
- An insider's view from the major banks that have influenced this market

Request a copy:  
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## QX.1 Preview

QX.1 is Quantifi's next major release on schedule for this quarter. QX.1 will include significant enhancements across all of Quantifi's product range and continues our tradition of first to market releases that address our clients' needs. A sample of new features include:

- Expanded asset coverage and product enhancements for FX options and exotics, basis swaps, callable bonds, convertible bonds, FRAs, swaptions and credit index options
- Significant enhancements to counterparty risk management including Basel III compliant capital calculations, historical CVA VaR, stress testing, back-testing, enhancements to margin period of risk calculations, collateral thresholds by rating, additional calibration tools and extended product coverage for commodities and inflation
- Expanded data management capabilities to simplify complex data integration and data management
- A new generation of APIs for plug-and-play client model integration, product extendibility, and data integration
- A redesigned reporting engine with in-memory hypercube for improved reporting and drill down flexibility, simplified integration of external data sources, and improved performance for high-volume portfolios

## ABOUT QUANTIFI

Quantifi is a leading provider of analytics, trading and risk management software for the Global Capital Markets. Our suite of integrated pre and post-trade solutions allow market participants to better value, trade and risk manage their exposures and respond more effectively to changing market conditions.

Founded in 2002, Quantifi is trusted by the world's most sophisticated financial institutions including five of the six largest global banks, two of the three largest asset managers, leading hedge funds, insurance companies, pension funds and other financial institutions across 15 countries.

Renowned for our client focus, depth of experience and commitment to innovation, Quantifi is consistently first-to-market with intuitive, award-winning solutions.

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