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XVA explained

Valuation adjustments and their impact on the banking sector

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Introduction

The past decade has seen a raft of changes in the banking industry, with a focus on seemingly never-ending new regulation.

One of the less well understood changes is a revision to the fundamentals of trading book fair value measurement and pricing, through the gradual introduction of various valuation adjustments. These are far from minor tweaks to banks' balance sheets; instead they are having a genuine impact on earnings across the industry.

For example, one major global investment bank reported a loss of $1.5Bn due to 'Funding Valuation Adjustments'. Also known as FVA, this has joined CVA and DVA in the apparently ever-expanding list of adjustments to derivative contract valuations. What are these adjustments and where do they come from?

In this article we describe the origins of FVA and the many related adjustments which go under the umbrella name of 'XVA'. We then discuss how XVA affects auditors and, finally, we will look at how these are driving change in banks' front office teams.

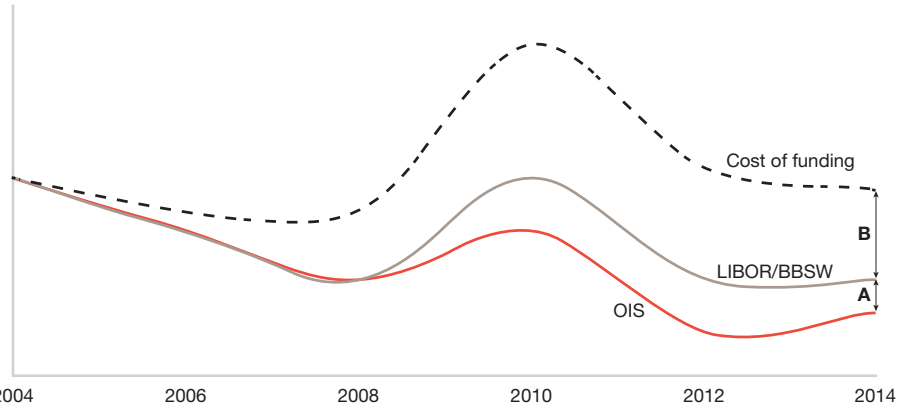
Background

The global financial crisis saw a structural shift in the operation of the global banking sector. Two changes are particularly relevant in understanding XVA.

The first relates to the operation of the interbank funding market. During the crisis, and especially post the Lehman collapse, concerns about bank creditworthiness led to an almost complete breakdown of the interbank funding market. Post the crisis, interbank lending rates have been more volatile and traded at increased spreads to the Central Bank rate. This has reflected a correction in the market view of bank credit risk.

As derivative desks have traditionally relied upon cheap, unsecured borrowing to fund their operations, this change has significantly increased the funding costs for banks actively trading derivatives. We have set out below a simplified illustration to highlight the differences that flowed from these changes, and how they are impacting core inputs to derivative pricing and valuation concepts seen today.

Changes in inter-bank funding



A: Post GFC, there is a greater divergence between benchmark rates that were traditionally regarded as 'risk free' (such as BBSW and LIBOR) and the Overnight Index Swap (OIS) rate, where the OIS rate is now seen as a better proxy of the 'risk free' rate.

B: Banks' funding costs over and above LIBOR have increased post GFC as the market repriced bank credit risk.

The second significant change has been the introduction of new regulation to ensure that the banks are adequately capitalised. These have targeted OTC derivative transactions, and have had such an impact that trading desks have needed to incorporate these changes in pricing. Further new regulation will require all financial sector derivatives that are not cleared through central clearinghouses to be collateralised (margined), in much the same way as exchange traded instruments or futures contracts. The costs of margining, and associated liquidity volatility, represents further overhead in trading derivatives.

As a result of the above macro changes, we have seen the introduction of various derivative valuation adjustments, essentially to reflect the additional 'costs' in holding derivative contracts today. From an accounting perspective, in concept this is similar to an inventory costing model, where additional costs are being factored into unit pricing and, for existing 'stock', valuation.

Some of these adjustments, like Credit Valuation Adjustments (CVA), are well understood and already an integral part of the way that banks price derivatives. Others are emerging, and many banks are unable to reliably quantify and compute the adjustments.

A key challenge is that a number of these adjustments need to be calculated on a portfolio basis, not trade by trade. This has led to changes in bank structures. The required changes in IT infrastructure, organisational reporting lines and front office staffing are proving costly, ironically adding further costs to trading functions.

A 'fully-costed' derivative

Adjustment	Description	Applicable to
CVA (2002+)	Impact of counterparty credit risk.	Primarily uncollateralised derivative assets.
DVA (2002+)	Benefit a bank derives in the event of its own default (the 'other side' of CVA).	Primarily uncollateralised derivative liabilities.
FVA (2011+)	Captures the funding cost of uncollateralised derivatives above the 'risk free rate'.	Uncollateralised derivatives.
OIS/COLVA (2010+)	Cost of funding a collateralised derivative position, at new 'risk free' rate.	Collateralised derivatives.
KVA (2015+)	Cost of holding regulatory capital as a result of the derivative position.	All derivative contracts, more punitive on trades that are not cleared.
MVA (2015+)	Cost of posting 'initial margin' against a derivative position.	Derivatives that are cleared, likely wider population in the future.

Credit Valuation Adjustment (CVA)

CVA is probably the most widely known and best understood of the XVA. CVA captures the 'discount' to the standard derivative value that a buyer would offer given the risk of counterparty default. In concept, it is somewhat akin to credit provisions on loan assets. There are two key differences to loan loss provisions though:

- derivatives are marked to market, requiring a 'market price' to accept the risk of counterparty default. This is often calculated by reference to the cost of hedging the counterparty credit risk on the contract, through credit default swaps (CDS);
- a loan contract typically has standard and predictable future cashflows, and therefore an easily calculated 'credit exposure'. Derivative cashflows are highly variable and difficult to predict. As such, sophisticated CVA calculations involve Monte Carlo approaches to determine the range possible future exposures.

Currently, the industry is revisiting the blanket use of CDS rates in CVA calculations. This is due to reduced liquidity in CDS contracts, flowing from lower participation by banking intermediaries reacting to banking regulation such as the Volcker rule.

Debit Valuation Adjustment (DVA)

DVA is a rather counter intuitive notion as it involves recording a gain as the bank's own credit risk deteriorates.

Consider the situation where a bank trades an uncollateralised OTC derivative. Assume now that the bank defaults when the derivative is 'out of the money'. The counterparty to the derivative typically recovers only a proportion of the market value of the derivative, the remainder being a windfall to the bank's bondholders. This windfall benefit is captured in DVA.

DVA is normally computed in much the same way as CVA, and is often thought of as 'the other side' of CVA (ie. a bank's DVA is its counterparty's CVA).

Funding Valuation Adjustment (FVA)

Standard derivative valuation models used in most banking and corporate treasury systems assume a discount rate based on benchmark rate (LIBOR or BBSW). These models therefore assume the time value of money, or funding rate available to the bank, is the benchmark rate. As outlined at the onset of this paper, post-GFC there has been a significant divergence in the cost of funding available to a bank versus the benchmark rate. FVA attempts to capture the cost of funding uncollateralised OTC derivatives. FVA is divided into two component adjustments, being:

- Funding Benefit Adjustment (FBA), and
- Funding Cost Adjustment (FCA).

A funding benefit arises for the bank typically when the derivative has a negative market value (liability). Consider the case where a bank acquires a derivative in a liability position. The bank will accept this liability in exchange for cash. The cash received by the bank can be used to fund other ventures, in lieu of raising external funding. The value of the funding benefit can be seen as the rate at which the bank can raise cash, which is based on its credit quality. FBA therefore has significant overlap with DVA.

Similarly, a funding cost arises for the bank when a derivative has a positive market value. The purchase of an 'in the money' or asset position derivative requires the bank to pay cash. The incremental cost of funding this purchase can also be seen as equivalent to the cost of the bank raising funding. FCA is also therefore a function of the bank's credit quality, and is calculated typically using the same rate as FBA.

Note that unlike the FBA/DVA overlap, FCA is more distinct from CVA, as FCA is based on the bank's own funding cost (and credit quality), whereas CVA is based on the credit quality of the bank's counterparty.

Collateral Valuation Adjustment (COLVA or OIS)

Posting collateral (margin) against a derivative position significantly alters both the credit risk and funding profile of that position.

A perfectly collateralised derivative has no credit risk, and therefore requires no CVA (or DVA). In practice though, these situations are rare due to operational practicallities in posting collateral, so credit risk is rarely completely eliminated.

The collateral received against an in-the-money trade typically means the receiving bank pays interest at the overnight cash funding rate (approximated by the Overnight Index Swap, or OIS, rate). As such, receiving collateral on a derivative reduces the need to otherwise fund that position at a more expensive rate. The converse holds true for positions that are out of the money. COLVA or OIS captures this cost or benefit.

There are several complications in the calculation of OIS, given the range of collateral that can be posted under existing contracts (ranging in cash in different currencies to different securities). Some banks have developed sophisticated tools to ensure they are posting the 'cheapest to deliver' collateral given the range of options.

Capital Valuation Adjustment (KVA)

Banks are required to hold capital reserves in order to survive large unexpected credit, market or operational risk losses. The introduction of Basel III, following the GFC, has substantially increased the capital required by banks for holding derivative contracts. KVA captures the cost of this additional regulatory capital.

KVA is having a substantial impact on the way traders' price derivatives, as capital charges do not 'disappear' when market risk is offset in the trading book. Consider for example a portfolio consisting of a derivative and a perfectly offsetting hedge contract. Both the derivative and the hedge will likely generate KVA individually, whereas traditionally this would be seen as a 'zero risk' position.

Consistency of KVA across the industry is difficult as some banks have standard capital models, whereas others use advanced methods. In addition, some banks are forward thinking in pricing, and starting to factor in future regulatory capital changes such as those contained in the Fundamental Review of the Trading Book (FRTB). This is essentially to protect the bank today from writing a long-dated (eg. 20 year) derivative contract that will be punitive under the regulatory capital regime of tomorrow.

At this point in time, there are virtually no banks that have adopted KVA for books and records due to ongoing debates on methodology. We expect this to change as industry consensus develops.

Margin Valuation Adjustment (MVA)

New regulations aim to enforce both initial and variation margin postings on all derivative transactions between financial institutions that are not cleared through a central clearinghouse by 2019.

Variation margin represents the day-to-day fluctuation in mark to market positions and is much the same as the collateral agreements covered by the COLVA or OIS adjustment. Initial margin is different to variation in two respects:

- Whilst variation margin can be thought of as symmetrical – you post collateral if out of the money and you receive if in the money – Initial Margin is a 'sunk cost' on each contract;
- Initial margin is generally not re-hypothecable.

Initial margin requirements vary during the life of the trade and are typically computed based on a Value at Risk (VAR) type approach. Initial margin is already being posted on the rapidly growing set of derivative contracts that are being posted at clearinghouses. Whilst MVA approaches and methodology are being discussed at an industry level, banks are yet to adopt MVA against derivative positions in their accounting books and records.

The auditor's perspective

The reporting of valuation adjustments in financial statements has been a topic of considerable debate in the finance and audit community over the past decade. The financial crisis further focused minds, particularly in the case of counterparty credit adjustments. However, market consensus has been slow to solidify and as a result views on the accounting treatment of some valuation adjustments remain in flux.

It has certainly become the norm to recognise both CVA and DVA in the accounts for large financial institutions, however, the inclusion of DVA left many people uncomfortable. Other concerns with XVA include the potential for 'double counting' with DVA, CVA and FVA. With FVA in particular, the debate continues on how to reconcile an entity's own funding costs to the accounting view of fair value, which requires an 'exit price' or market price.

On the other hand, accountants recognise that doing nothing is not an option. The developments noted in this paper highlight a number of risks that are not being captured in the traditional practice of booking mark-to-market 'Day 1' profits on derivative transactions, derived using standard market inputs. This is particularly in recognition of trading positions that can sit on a bank's books for 10 or 20 years.

From an accounting standards perspective, IFRS 13 and ASU 2011-04 were issued in May 2011 and resulted in substantially converged fair value measurement and disclosure guidance between U.S. GAAP and IFRS. There are still certain key differences between the fair value measurement and disclosure guidance under the two standards. However, as far as we are aware there are no differences that would result in a difference in measurement of XVAs.

During the 2014 financial year we have witnessed most bulge bracket investment banks report FVA in their annual accounts for the first time. This was closely followed by Canadian banks, and then replicated in Australia. This is a significant step forward as we close in to a consensus, at least in the banking industry.

Outside of the banking sector, there is still significant deliberation on XVAs. A point of differentiation is non-banking entities are unlikely to have access to the inter-dealer market. Under IFRS 13, this means that such entities would mark derivative products to the most advantageous price available to them, which could be different to that available to the major banks.

Regardless of industry, in our view the key question that we should not lose sight of is – *what is the price another market participant would pay (or receive) to assume your derivative contract?*

It is clear that banking market participants today will offer a 'discount' off the price calculated by standard valuation models to account for funding costs, credit risk and regulatory capital. The mix between these components from an accounting perspective is, in our view, arbitrary. As an example, one bank can adjust the price of a $100 contract by $3 for FVA, $2 for CVA and $1 for MVA, with a total value of $94. Another can apply its methodology to the same contract to calculate $1 for FVA, $3 for CVA and $2 for MVA.

As long as the ultimate contract price is supportable by reference to traded market prices, we see differences in methodology for component calculations as less relevant.

XVA – the challenges to come

Valuation adjustments have been a hot topic for a number of years now. In this article we have considered the primary sources of valuation adjustment and described how they arise.

At face value, the net impact of XVAs is that there is dispersion in both valuation and pricing on previously 'vanilla' derivative contracts. Whilst we expect this to converge going forward, the experience with XVA to date suggests this can have a longer lead time than one would initially expect.

At an operational level at banks, the challenges of XVA are deeper. XVA implementation is requiring an operating model change to traditional front office trading operations, and significant investment in IT infrastructure is required to assist Finance, Risk and Operations functions with the change.

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