Quantifi Deloitte.

WHITEPAPER

IFRS 13 - CVA, DVA AND THE IMPLICATIONS FOR HEDGE ACCOUNTING

By Dmitry Pugachevsky, Rohan Douglas (Quantifi)
Searle Silverman, Philip Van den Berg (Deloitte)

www.quantifisolutions.com

IFRS 13 – ACCOUNTING FOR CVA & DVA

International Financial Reporting Standard 13: Fair Value Measurement (IFRS 13) was originally issued in May 2011 and applies to annual periods beginning on or after 1 January 2013. IFRS 13 provides a framework for determining fair value, clarifies the factors to be considered for estimating fair value and identifies key principles for estimating fair value.

IFRS 13 facilitates preparers to apply, and users to better understand, the fair value measurements in financial statements, therefore helping improve consistency in the application of fair value measurement. IFRS 13 replaces the sometimes inconsistent fair value measurement guidance, currently included in individual IFRS standards, with a single source of authoritative guidance on how to measure fair value.

Fair value is defined as the price that would be received when selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. IFRS 13 defines fair value as an "exit price". For similar instruments, traded in an active market, the market price is representative of an "exit price" and IFRS 13 requires an entity to use the market price without adjustment[1]. IFRS 13 defines an active market as one in which transactions for assets take place with sufficient frequency and volume to provide pricing information on an on-going basis.

A quoted or listed price does not always represent fair value if the market is not active. For example, when a corporate bond is listed, the bond may not be actively traded and as a result the listed bond price may not be representative of an "exit price". In this case a valuation adjustment is required.

Even if a market is active, the prices observed may not neccessarily be for similar instruments held by the reporting entity. For example, although many OTC derivative markets are active, the prices observed in those markets are often only reflective of the collateralised interbank market prices. These collateralised prices are not representative of fair value or an "exit price" for corporates with uncollateralised but otherwise similar OTC derivatives.

1 IFRS 13:69 states that if there is a quoted price in an active market (for an identical asset) an entity shall use that price without adjustment.

In the absence of an active market for similar instruments, IFRS 13:69 states that adjustments are required to the fair value of the instrument based on the characteristics of the instruments. These adjustments must be consistent with the instrument's unit of account[2]. For example premiums or discounts that reflect size as a characteristic of the entity's holding, rather than as a characteristic of the instrument, are not permitted in fair value measurement.

"Fair value is defined as the price that would be received when selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date."

Fair value measurement should take into account all characteristics and risk factors of the asset or liability that would be considered by market participants. IFRS 13 specifically requires the credit risk of a counterparty as well as an entity's own credit risk to be taken into account when valuing financial instruments. In addition, all the adjustments market participants would make in setting the price for an instrument should be taken into account, in order to arrive at an exit price. Therefore counterparty credit risk, liquidity risk, funding risk, etc. could all be elements that need to be taken into account in order to arrive at an exit price[3].

Derivatives contracts are commonly priced in terms of a "risk-neutral" framework and therefore it is assumed that neither party will default during the lifetime of the contracts. Credit Valuation Adjustment (CVA) is used to adjust the market value to take into account counterparty credit risk and Debit Valuation Adjustment (DVA) is used to adjust the market value to take into account an entity's own default risk. CVA and DVA are in essence expected credit loss valuation adjustments to the risk neutral value of the derivative. Both adjustments are in line with the valuation adjustmets envisaged in IFRS 13.

2 The unit of account is generally the smallest unit of a financial instrument that can be traded (for example a single share), but in some instances could be the entire investment or portfolio.

3 The exit price is equivalent to the fair value.

"Fair value measurement should take into account all characteristics and risk factors of the asset or liability that would be considered by market participants."

CALCULATING CVA AND DVA

There is a relatively straightforward approach, occasionally referred to as Quasi CVA (DVA), whereby the counterparty (own) credit spread is added to the discount curve applied to the cash flow values of the contract. For example, to evaluate Quasi CVA (DVA) for an interest rate swap with a flat par rate of 2% and a counterparty (own) spread of 3%, one has to first discount the cash flows at the riskless interest rate (2%), then discount them at the risk carrying rate (5% = 2% + 3%), and then capture the difference between these two valuations. Note that this method only provides an approximation of the CVA (DVA) for instruments with positive (negative) cash flows or trades heavily in-the-money (out-of-the-money). By over-simplifying the calculation, the Quasi CVA (DVA) methodology excludes certain key considerations, for example:

- Default losses can be incurred if the future MTM is positive, even if the current MTM is negative
- Market volatility
- Bilateral character of CVA (DVA)
- Non-linear probability of default and effect of the counterparty recovery rate
- Wrong way risk
- Effects of netting and CSA

The reason that at-the-money or even out-of-the-money (in-the-money) swaps produce a non-zero CVA (DVA) is because CVA (DVA) is an expectation of future losses (gains). Losses are incurred by the bank if the counterparty (bank) defaults when the MTM of the trade is positive (negative). Therefore, CVA (DVA) is proportional to a zero-strike call (put) option on a future MTM, referred to as Expected Exposure – EE (Negative Expected Exposure – NEE). In general, the exposure of the trade depends on the volatilities of the underlying assets, even if the trade itself does not.

When calculating exposures for simple stand-alone instruments like swaps and forwards, one can use European swaptions priced with Black's formula. However, taking into account netting and collateral requires performing multiple valuations under a host of different scenarios. This allows netted exposure profiles, for any given portfolio of contracts, to be calculated and for collateral to be applied consistently, therefore reducing potential exposure for both counterparties. Specific collateral features to take into consideration include:

- Independent amounts
- Threshold amounts
- Minimum transfer amounts
- Call period (frequency at which the collateral is monitored)
- Cure period (the period of time given to close out and re-hedge a position)

Consistent CVA (DVA) evaluation involves running a Monte Carlo simulation of the market dynamics underlying the valuation of each financial instrument or portfolio. Each market scenario is a realisation of a set of price factors, which affect the value of the financial instrument; for example, foreign exchange rates, interest rates, commodity prices, etc. Scenarios are either generated under the real probability measure, where both drifts and volatilities are calibrated to the historical data of the factors, or under the risk-neutral measure, where drifts must be calibrated to ensure there is no arbitrage of traded securities on the price factors. In addition, volatilities should be calibrated to match market-implied volatilities of options on price factors where such information is available.

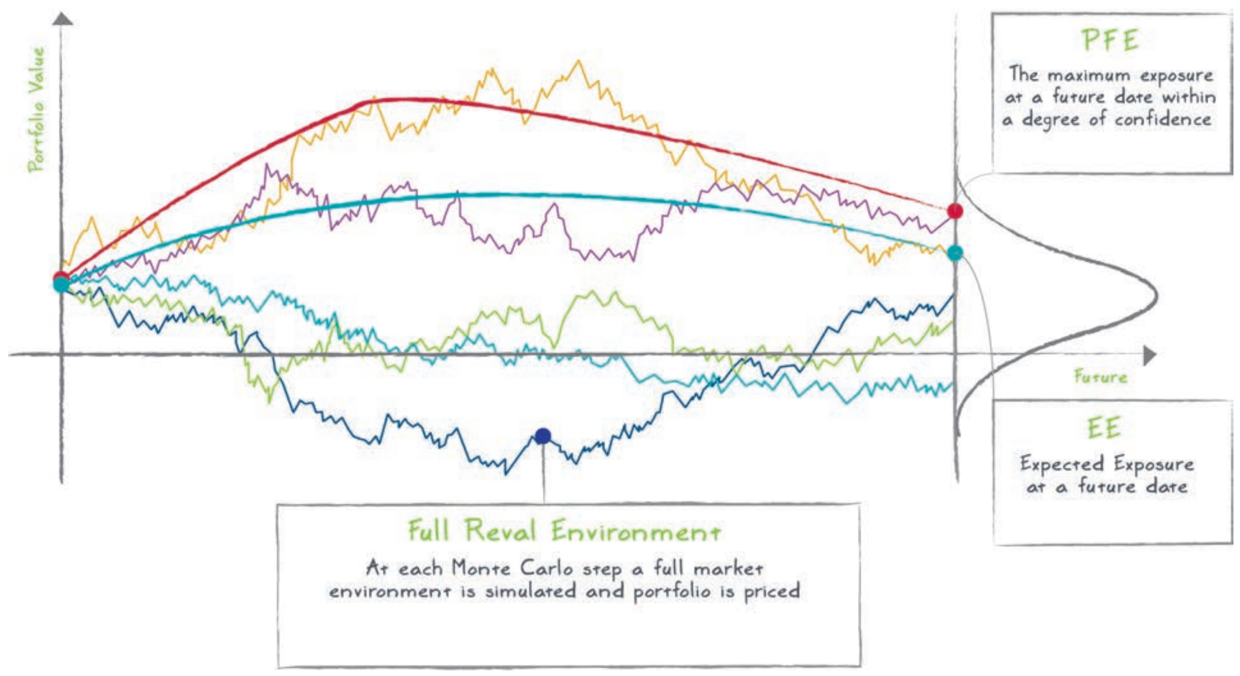

Diagram: Full Revaluation of Portfolio using Monte Carlo

Having calculated the EE (NEE) profile, CVA (DVA) is calculated by multiplying the exposure with the probability of default (PD) and loss given default (LGD). CVA (DVA) can also be approximated by multiplying the average of the EE, the so called Expected Positive Exposure - EPE (Expected Negative Exposure – ENE), by the counterparty (own) credit spread and risky annuity. There are several techniques to obtain the credit spread, although the current Basel III requirement is to use CDS credit spreads of the counterparty or its proxy.

"Consistent CVA (DVA) evaluation involves running a Monte Carlo simulation of the market dynamics underlying the valuation of each financial instrument or portfolio."

Note that the same Monte Carlo simulation can be used for calculating PFE (Potential Future Exposure) and EEPE (Expected Effective Positive Exposure). While PFE is important for calculating Economic Capital and setting internal limits for trading desks, EEPE is part of IMM (Internal Model Method) calculations for deriving Risk Weighted Asset (RWA). Therefore, by building comprehensive Monte Carlo models, consistent valuations for regulatory, accounting and internal limit purposes can be achieved.

The Fair Value adjustment for bilateral credit risk equals the risk free valuation minus CVA plus DVA. Calculations for both CVA and DVA can be performed during the same Monte Carlo run without any extra expenditure of time. Common market practice involves taking into account correlation between own and counterparty defaults. This is achieved by either using separate copula-like calculations or as part of a general wrong-way risk set-up. The latter approach makes it easier to incorporate correlations between own default, counterparty default and market factors.

HEDGE ACCOUNTING IMPLICATIONS

International Accounting Standard 39: Financial Instruments (IAS 39) sets out the requirements of hedge accounting. The objective of hedge accounting is to ensure that the gain or loss on the derivative (hedging instrument) is recognised in profit or loss in the same period when the underlying hedged item affects profit or loss.

There are two ways in which hedge accounting achieves this objective:

- Fair value hedge accounting - changes in the fair value of the hedging instrument are recognised in profit or loss, at the same time as a recognised asset or liability, that is being hedged, is adjusted for movements in the designated hedged risk (adjustment also recognised in profit or loss).
- Cash flow hedge accounting - changes in the fair value of the hedging instrument are recognised initially in equity (other comprehensive income - OCI) and reclassified from equity (OCI) to profit or loss when the hedged item affects profit or loss.

IAS 39 requires both a prospective and retrospective assessment of hedge effectiveness. Hedge effectiveness is measured as the change in fair value of the hedging instrument as a percentage of the change in fair value of the underlying hedged item. To apply hedge accounting, the hedge effectiveness ratio needs to be within a range of 80% to 125%. Instead of measuring the change in fair value of the hedged item (for example loan asset or liability, sales, cost of sales), a hypothetical derivative could be used as a proxy for determining the change in fair value of the hedged item, mostly for cash flow hedging relationships. The hypothetical derivative is the derivative that perfectly matches the hedged item.

As explained above, IFRS 13 requires credit risk to be incorporated in the valuation of the actual derivative, however, IAS 39 is not prescriptive on how to incorporate credit risk in the hypothetical derivative. IFRS 13 clarifies the factors that need to be considered when estimating the fair value of a derivative. A key area where IFRS 13 provides guiding principles is the inclusion of counterparty and own credit risk. These IFRS 13 principles have implications for hedge accounting.

Firstly, it is clear that an entity needs to consider counterparty credit risk in the evaluation of hedge effectiveness[4]. An entity cannot ignore whether it will be able to collect all amounts due in terms of the contractual provisions of the hedging instrument. When assessing hedge effectiveness, both at the inception of the hedge and on an on-going basis, the entity needs to consider the risk that the counterparty, to the hedging instrument, could default.

The devil is often in the detail and thus the challenge is how to set up the hypothetical derivative[5]. At the inception of the trade, should credit risk be included in determining the critical terms (including the pricing) of the hypothetical derivative? If so, should the credit risk be updated in future periods when determining the fair value of the hypothetical derivative?

"IAS 39 requires both a prospective and retrospective assessment of hedge effectiveness. The hedge effectiveness ratio needs to be within a range of 80% to 125%."

The way counterparty credit risk is incorporated into the fair value of the hypothetical derivative can have a significant impact on the hedge effectiveness ratio. Incorporating CVA and DVA in the fair value of the hedging instrument, but excluding it from the hypothetical derivative, could result in ineffectiveness. As mentioned above, there is no clear guidance in IAS 39 on how to incorporate CVA and DVA in hedge effectiveness testing. We are of the opinion that there are two acceptable methods.

The first method is to exclude the credit risk when setting up the hypothetical derivative. Thus, changes in credit risk are not included in determining the fair value of the hypothetical derivative over the term of the hedge i.e. do not include a CVA and DVA adjustment for the 'at-inception' fixed rate on the hypothetical derivative[6].

4 Based on IAS 39:F.4.3 and F.4.7.
5 Mostly for a cash flow hedge.
6 The hypothetical derivative must be set up such that it is worth zero at inception. This is achieved by solving for the fixed rate that results in a zero net present value of the contract.

The rationale for excluding CVA and DVA from the hypothetical derivative is because the counterparty could default and therefore have a direct impact on the effectiveness of the hedge. Even when the entity is perfectly hedged for the market risks, the hedge will be completely ineffective if the counterparty defaults. In order to appropriately measure this potential hedge ineffectiveness, the credit risk must be included in the valuation of the hedging instrument, but excluded from the hypothetical derivative.

"The way counterparty credit risk is incorporated into the fair value of the hypothetical derivative can have a significant impact on the hedge effectiveness ratio."

To summarise, this method assumes that in order to appropriately measure the hedge ineffectiveness, CVA and DVA must be included in the valuation of the hedging instrument, but excluded from the hypothetical derivative.

The second method is to include CVA and DVA when setting up the hypothetical derivative and keep the at-inception credit risk parameters (PDs and LGDs) constant when subsequently determining the fair value of the hypothetical derivative over the term of the hedge. A hypothetical derivative should take into account that it is not economically feasible to enter into a derivative transaction assuming the entity entering the hedge has no credit risk. In other words, it is not required to assume that the hypothetical derivative is fully collateralised when the hedging instrument is uncollateralised.

Under this second approach, the credit risk parameters of the hypothetical derivative are kept constant when determining the fair value in future periods. This way, only the *changes* in credit parameters will result in ineffectiveness, because the credit risk parameters are updated at each valuation date.

With the second method, due to the inclusion of CVA and DVA in the fair value of the hypothetical derivative, there will generally be less of a mismatch between the hedging instrument and the hypothetical derivative compared to the first method. With all else being equal, the mismatches will stem from the *changes* in credit parameters.

Our preferred approach is the second method, as it reduces overly punative ineffectiveness. In contrast to cash flow hedging relationships, market practice for most fair value hedging relationships is to measure hedge effectiveness by comparing the changes in fair value of the hedged item (due to the designated risk only) to the changes in fair value of the hedging instrument.

"To maximise hedge effectiveness, it is necessary that the curve used for determining the coupon rate of the hedged item is also used for discounting the hedging instrument."

For example, consider an interest rate risk fair value hedging relationship. The coupon rate of the hedged item is solved using an interest rate yield curve representing the designated risk. The coupon rate that is solved is impacted by the choice of interest rate curve – be it a LIBOR curve, an OIS curve[7], or a government bond curve. To maximise hedge effectiveness, it is necessary that the curve used for determining the coupon rate of the hedged item is also used for discounting the hedging instrument.

With the introduction of IFRS 13, the requirement to calculate complex variables, such as CVA and DVA has renewed emphasis. The introduction of IFRS 13 will have significant implications for all entities, including corporates and those in the financial services sector that hold derivatives, which are measured at fair value. CVA and DVA also result in additional challenges when performing hedge effectiveness testing under IAS 39.

7 OIS refers to Overnight Index Swap, which is a fixed versus floating rate swap. The floating leg is based on a published overnight rate and has daily accrual of interest. There is daily margining.

Dmitry Pugachevsky
Director of Research: Quantifi
+1 (212) 784-6815
enquire@quantifisolutions.com
www.quantifisolutions.com

Rohan Douglas
CEO and Founder: Quantifi
+44 (0) 20 7248 3593
enquire@quantifisolutions.com
www.quantifisolutions.com

Searle Silverman
Senior Manager: Deloitte Capital Markets
+27 (0) 83 648 7348
sesilverman@deloitte.co.za
www.deloitte.co.za

Philip Van den Berg
Senior Manager: Deloitte Capital Markets
+27 (0) 84 436 5330
phvandenberg@deloitte.co.za
www.deloitte.co.za

ABOUT QUANTIFI

Quantifi is a specialist provider of analytics, trading and risk management software. 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 16 countries.

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

For further information, please visit www.quantifisolutions.com

CONTACT QUANTIFI

EUROPE
128 Queen Victoria St.
London, EC4V 4BJ

+44 (0) 20 7248 3593

NORTH AMERICA
230 Park Avenue
New York, NY 10169

+1 (212) 784-6815

ASIA PACIFIC
3 Spring Street
Sydney, NSW, 2000

+61 (02) 9221 0133

enquire@quantifisolutions.com