Applying IFRS

IFRS 13 *Fair Value Measurement*

Credit valuation adjustments for derivative contracts

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Contents

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Challenging market conditions following the economic crisis and the introduction of IFRS 13 *Fair Value Measurement* (IFRS 13) have highlighted the need to reflect credit risk appropriately in the fair value of derivative contracts.

This publication provides insight into some of the methods used in practice to determine valuation adjustments for credit risk on all derivatives measured at fair value, except those for which a quoted price in an active market is available (i.e., over-the-counter (OTC) derivatives). In addition, we briefly discuss some of the practical implications including data challenges, portfolio considerations and how these adjustments may affect hedge accounting.

Issues and questions are likely to be raised in the future as entities continue to apply IFRS 13. In addition, various groups, such as the International Valuation Standards Council, are developing guidance in respect of credit and debit valuation adjustments. We encourage readers to closely monitor developments.

What you need to know

- All entities engaging in OTC derivative transactions must consider whether a fair value adjustment for credit risk is required
- Two forms of credit-related adjustments should be considered: a credit valuation adjustment (CVA); and a debit valuation adjustment (DVA) to reflect the counterparty's or the entity's own default risk.
- There is no specific guidance on the methods used to calculate CVA and DVA, which creates challenges in estimation.

1. Background

IFRS 13 became effective for annual periods commencing on or after 1 January 2013. IFRS 13 requires that fair value be measured based on market participants' assumptions, which would consider counterparty credit risk in derivative valuations. Furthermore, the standard is explicit that the fair value of a liability should reflect the effect of non-performance risk, including, but not limited to, an entity's own credit risk (as defined in IFRS 7 *Financial Instruments: Disclosures*).

As a result, IFRS 13 requires entities to consider the effects of credit risk when determining a fair value measurement, e.g. by calculating a debit valuation adjustment (DVA) or a credit valuation adjustment (CVA) on their derivatives.

Fair value must be measured based on market participants' assumptions, which would consider credit risk in derivative valuations

As no specific method is prescribed in the accounting literature, various approaches are used in practice by derivatives dealers and end users to estimate the effect of credit risk on the fair value of OTC derivatives.

The degree of sophistication in the credit adjustment valuation method used by a reporting entity is influenced by the qualitative factors noted below. Estimation can be complex and requires the use of significant judgement which is often influenced by various qualitative factors, including:

- The materiality of the entity's derivative's carrying value to its financial statements
- The number and type of contracts for derivatives in the entity's portfolio
- The extent to which derivative instruments are either deeply in or out of the money
- The existence and terms of credit mitigation arrangements (e.g., collateral arrangements in place)
- The cost and availability of technology to model complex credit exposures
- The cost and consistent availability of suitable input data to calculate an accurate credit adjustment
- The credit worthiness of the entity and its counterparties

2. What has changed?

Although the requirements of IFRS 13 for non-performance risk in the valuation of liabilities are consistent with the prior fair value measurement guidance in IFRS, it is clearer that fair value includes such adjustments. IAS *39 Financial Instruments: Recognition and Measurement* (IAS 39) refers to making adjustments for credit risk if market participants would reflect that risk when pricing a financial instrument. However, the adoption of IFRS 13 and its more explicit requirements for own credit risk may result in a change in practice for some entities.

Major bank defaults (and subsequent legal claims on outstanding derivative contracts) during the financial crisis highlighted the need to incorporate counterparty credit risk into the valuation process. As a result, most market participants are able to rationalise the conceptual need for a CVA adjustment on their derivative assets and, in many cases, are already applying this adjustment.

Definition of terms

Credit default swap (CDS)
A credit derivative whereby the seller of the CDS compensates the buyer in the event of default or other specified credit event based on an underlying reference entity or index.

Credit support annex (CSA)
A legal document that regulates the credit support (collateral) for derivative transactions and forms part of an ISDA Master Agreement.

Discounted cash flow (DCF)
A technique used to calculate the present value of future cash-flows.

International Swaps and Derivatives Association agreement (ISDA agreement)
Part of a framework of documents designed to enable OTC derivatives to be documented fully and flexibly.
The ISDA master agreement sets out the standard terms that apply to all transactions and is published by the International Swaps and Derivatives Association.

Hypothetical derivative
A mathematical expedient for calculating hedge (in)effectiveness using a derivative that would have critical terms that exactly match those of a hedged item.

Loss given default (LGD)
The amount that one party expects not to recover if the other party defaults.

Over-the-counter (OTC)
A bilateral derivative executed between two counterparties outside of a regulated derivatives exchange environment.

Probability of default (PD)
The probability that the counterparty or reporting entity defaults.

However, many other financial institutions and most end-users have historically cited a number of reasons for not incorporating a DVA in their derivative liability positions, including;

- The counterintuitive impact of recognising a gain in profit or loss as their own creditworthiness deteriorates
- The difficulty or inability to monetise or obtain economic benefit from the own credit gain upon transfer or close out of the derivative liability
- The increase in systemic risk that can arise from hedging DVA
- That accounting standards are not explicit in requiring such an adjustment and market practice on booking such adjustments is mixed.

IFRS 13 is explicit that own credit risk must be incorporated into the fair value measurement of a derivative liability under the concept of an exit price (as opposed to the IAS 39 'settlement price'). The standard is clear that an entity's intention to settle or otherwise fulfil the liability or exit the instrument is not relevant when measuring fair value. Even if an entity is unable to transfer a liability, the IASB believes the transfer notion is necessary for measuring fair value, because "it captures market participants' expectations about the liquidity, uncertainty and other associated factors, whereas, a settlement notion may not because it may consider entity-specific factors"[1].

In discussing the transfer notion, IFRS 13 explicitly states that the liability would not be settled or extinguished at the measurement date, but rather, is assumed to remain outstanding with the market participant transferee required to fulfil the obligation. Non-performance risk is assumed to be the same before and after the transfer which contemplates a transfer to a market participant whose credit risk is identical to the reporting entity. As the fair value of the liability is considered from the perspective of market participants, and not the entity itself, any relative efficiencies (or inefficiencies) of the reporting entity in settling the liability would not be considered in the fair value measurement.

IFRS 13 also requires that valuation techniques maximise the use of relevant observable inputs and minimise the use of unobservable inputs. This requirement is consistent with the idea that fair value is a market-based measurement and, therefore, is determined using market-based observable data, to the extent they are available and relevant. Therefore, the fair value measurement of an OTC derivative under IFRS 13 would generally require the use of market-observable credit spreads if they are available. This creates an implicit hierarchy of the sources of credit risk data with market observable current credit spreads being ranked higher than historical or blended data.

[1] IFRS 13.BC82.

3. How do credit adjustments work?

In simple terms, the requirement for a credit adjustment as a component of fair value measurement can be analogised to the need for a provision on a trade receivable or an impairment charge on an item of PP&E. Whilst this analogy helps conceptualise the requirement, the characteristics of derivatives mean the calculation itself can be significantly more complex than for amortised cost assets. Many derivative valuation models assume that the parties to the contract will perform and therefore do not adjust for credit risk.

Consistent with the fact that credit risk affects the initial measurement of a derivative asset or liability, IFRS 13 requires that changes in counterparty credit risk or an entity's own credit standing must be considered in subsequent fair value measurements. It cannot be assumed that the parties to the derivative contract will perform.

Given the terms of the asset or liability were determined based on the counterparty's or entity's credit standing at the time of entering into the contract (and since IFRS 13 assumes a liability is transferred to another party with the same credit standing at the measurement date), subsequent changes in a counterparty's or entity's credit standing will result in the derivative's terms being favourable or unfavourable relative to current market conditions.

Unlike the credit exposure of a vanilla receivable which remains constant over time (typically at the principle amount of the receivable), the bilateral nature of the credit exposure in many derivatives varies, whereby both parties to the contract may face potential exposure in the future. As such, many instruments have the possibility of having a value that is either positive (a derivative asset) or negative (a derivative liability) at different points in time based on changes in the underlying variables of the contract.

Table 1 below illustrates the income statement and balance sheet effect of CVA and DVA adjustments as a component of fair value measurement on a single derivative asset or liability.

Table 1: Accounting for CVA and DVA

	Derivative asset example - CVA	CU'000		Derivative liability example - DVA	CU'000
Derivative position valued using the risk-free curve [1]	Risk-free derivative asset	100		Risk-free derivative liability	(100)
Credit adjustment required [2]	Counterparty credit adjustment	(10)		Debit adjustment based on own credit	5
Credit-adjusted derivative position	Derivative asset	90		Derivative liability	(95)

Subsequent credit movements

Counterparty credit improves	A gain arises in the income statement and is reflected by a larger derivative asset on the balance sheet	Own credit improves	A loss arises in the income statement and is reflected by a larger derivative liability on the balance sheet
Counterparty credit deteriorates	A further CVA charge is required in the income statement and is reflected by a reduced derivative asset on the balance sheet	Own credit deteriorates	A further DVA credit is required to the income statement and is reflected by a reduced derivative liability on the balance sheet

Notes:

[1] The table represents a point-in-time during the life of a derivative asset or liability.

[2] For illustrative purposes, we have assumed the counterparty credit valuation adjustment is CU10,000 and the debit valuation adjustment is CU5,000. These credit adjustments are not intended to reflect reality.

4. Valuation methods

The determination of a credit adjustment can be complex. Part of the complexity stems from the particular nature of credit risk in many OTC derivative contracts. Credit risk associated with a derivative contract is similar to other forms of credit risk in that the cause of economic loss is an obligor's default on its contractual obligation. However, for many derivative products, two features set credit risk apart from traditional forms of credit risk in instruments such as debt:

- The uncertainty of the future exposure associated with the instrument. This is due to the uncertainty of future changes in value of the derivative, as the cash flows required under the instrument stem from: (1) movements in underlying variables that drive the value of the contract; and (2) the progression of time towards the contract's expiry.
- The bilateral nature of credit exposure in many derivatives, whereby both parties to the contract may face potential exposure in the future. This can occur in instruments such as swaps and forwards given the potential for these derivatives to 'flip' from an asset to a liability (or vice versa), based on changes in the underlying variables to the contract (e.g., interest rates or foreign exchange rates).

As previously noted, there are no specific valuation methods prescribed in the accounting literature to quantify the impacts of non-performance risk on derivatives' fair value. IFRS 13 is a principles-based standard intended to provide a general framework for measuring fair value. It was not intended to provide detailed application guidance for calculating the fair value of various types of assets and liabilities. Likewise, IAS 39 does not provide specific valuation guidance related to derivatives. As a result, extensive judgement needs to be applied, potentially resulting in diversity in the methods and approaches used to quantify credit risk, particularly as it pertains to derivatives. As discussed above, a variety of factors may influence the method an entity chooses for estimating credit adjustments. In addition, the cost and availability of technology and input data to model complex credit exposures will also be a contributing factor.

Below, we discuss some of the more common approaches that have been observed in practice for calculating valuation adjustments for non-performance risk on OTC derivative contracts. Detailed descriptions of these methods and their advantages/disadvantages can be found in the appendix to this publication.

The most advanced approach for calculating credit adjustments used within the banking sector (and other financial institutions with large derivative portfolios) is the Expected Future Exposure (EFE) approach. Using this method, the market variables driving a derivative's fair value are simulated. Expected exposure over the life of the derivative is calculated by revaluing the derivative for each simulated market scenario. These exposure profiles are then used to determine a CVA and DVA by applying counterparty and own PDs, respectively. While the EFE approach may be considered the most theoretically pure approach, it can be very complex and it needs to be executed by quantitative experts and requires access to significant IT systems.

As a result, many end users have adopted alternative approaches for estimating the effect of credit risk on their derivative contracts. While a variety of less complex approaches exist, they typically focus on current exposure. For example, some approaches calculate CVA/DVA based only on the current market value of the derivative, without simulating different possible future outcomes. Other approaches calculate future exposure of a derivative based on current market information (such as forward rates), assessing whether the derivative is expected to be an asset or liability at several future dates. However, these approaches do not reflect different possible outcomes for the fair value at the point of default. These approaches can be referred to generally as current exposure methods.

Whereas the EFE approach can be used for many types of derivatives, alternative approaches may be more restrictive on the type of products for which they are able to estimate credit adjustments. For example, the swaption approach, which models the exposure as a series of options, can only be applied to interest rate swaps. Furthermore, some methods cannot be applied at a counterparty or portfolio level, either because exposure to a counterparty contains derivative types that the method cannot handle or because of limitations inherent in the method. For example, the discounted cash flow approach, which adds a credit spread to a risk free rate (or a benchmark rate) before discounting, is difficult to apply at a counterparty level when collateral is involved or when there are offsetting trades subject to a master netting agreement.

The bilateral nature of certain derivative types is addressed in some, but not all, of the methods. An example is the variable exposure approach, which calculates CVA as the cost of buying CDS protection for the future exposure at each cash flow date. The future exposures are determined based on the current yield curve (i.e., how the exposure of the swap is expected to change over time, based on the current yield curve). This approach applies own or counterparty credit spreads, based on whether the future exposure at each cash flow date is a net asset or liability. In contrast, the constant exposure approach, based on the same concept of buying CDS protection, assesses the potential future exposure by adding a standard profile as a proxy for the potential future exposure of the derivative to the current fair value of each transaction and, hence, does not incorporate the bilateral nature of certain derivative types.

We have also seen approaches driven by in-house calculations, for example, applying a duration approach to calculate an approximate valuation adjustment. This is a useful starting point to check if the adjustment is likely to be material, but tends to overstate the credit adjustment required.

In some cases, entities have relied on qualitative views of counterparty credit, generally resulting in no credit adjustment being applied. Reporting entities have pointed to both strong internal credit risk management policies, i.e., transacting OTC derivatives with investment grade counterparties and/or major banks only, and also the historical low default rates in the financial services sector. A combination of the guidance in IFRS 13 and a credit environment where credit spreads have widened significantly, has undermined this qualitative approach. The non-performance risk associated with even highly rated counterparties has proven to be volatile and this should be reflected in the fair value of the associated derivative contracts. A qualitative approach may still be applied in certain scenarios, for example, where the unadjusted fair value of derivatives is not material in totality or the tenure of the derivatives is very short-dated.

5. Data challenges

In addition to the method employed to determine a credit adjustment, the inputs used in the various approaches can often require even more judgement. Regardless of method, PD, LGD or credit spread assumptions are important inputs. While the sources of information may vary, the objective remains unchanged, that is, to incorporate inputs that reflect the assumptions of market participants in the current market.

Where available, IFRS 13 requires entities to make maximum use of market-observable credit information. For example, CDS spreads may provide a good indication of the market's current perception of a particular reporting entity's or counterparty's creditworthiness. However, CDS spreads will likely not be available for smaller public companies or private entities. In these instances, reporting entities may need to consider other available indicators of creditworthiness, such as publicly traded debt or loans.

In the absence of any observable indicator of creditworthiness, a reporting entity may be required to combine a number of factors to arrive at an appropriate credit valuation adjustment. For example, it may be necessary to determine an appropriate credit spread using a combination of own issuance credit spread data, publicly available information on competitors' debt pricing, sector specific CDS spreads or relevant indices, or historical company or sector-specific PDs.

In all cases, identifying the basis for selecting the proxy, benchmark or input, including any analysis performed and assumptions made, should be documented. Such an analysis may include calculating financial ratios to evaluate the reporting entity's financial position relative to its peer group and their credit spreads. These metrics may consider liquidity, leverage and general financial strength, as well as comparable attributes such as credit ratings, similarities in business mix and level of regulation or geographic footprint.

The use of historical default rates would seem to be inconsistent with the exit price notion in IFRS 13, particularly when credit spread levels in the current environment differ significantly from historical averages. Therefore, when current observable information is unavailable, management should adjust historical data to arrive at its best estimate of the assumptions that market participants would use to price the instrument in an orderly transaction in the current market.

In Table 2 overleaf, we have highlighted some of the common sources of credit information and the advantages and disadvantages of using each input for the credit adjustment calculation.

Table 2: Credit data requirements

Data requirements	Advantages	Disadvantages
CDS curve (own or counterparty)	▸ Market observable ▸ Information is current (for counterparties with adequate CDS trading volume) ▸ Easy to source from third party data providers ▸ Exposure-specific data available for most banking counterparties	▸ Not available for many entities ▸ May not be representative of all the assets of the entity ▸ May have liquidity issues due to low trading volumes, resulting in higher-than-expected spreads and additional volatility in calculations ▸ CDS quotes may be indicative quotes, not necessarily reflective of actual trades
Current debt credit spread	▸ Market observable ▸ Available for some publicly traded debt instruments ▸ Easy to source from third party data providers	▸ May require an adjustment for illiquidity ▸ May require a judgemental adjustment due to maturity mismatch and amount of security of debt issuance and derivative to be valued
Sector-specific CDS Index or competitor CDS Curve	▸ Market-observable ▸ Information is current ▸ Easy to source from third party data providers ▸ Proxy CDS curve mapping is possible for almost all entities	▸ Not exposure-specific; may require judgemental adjustments to reflect differences between proxy and entity (e.g., size, credit rating, etc.) ▸ Index CDS curves can be influenced by macro-economic factors, which do not affect entity or affect entity to a lesser or greater extent
Debt issuance credit spread	▸ Market observable ▸ Information can be current, in case a recent issuance can be referenced (or where pricing terms are available ahead of debt issuance) ▸ Easy to source from third party data providers and/or from treasurer, through communications with the banks	▸ Information can be outdated and may require an adjustment for illiquidity ▸ As it is not always possible to reference a recent issuance, a judgemental adjustment may be required to bridge gap between debt issue date and derivative valuation date (i.e., financial reporting date) ▸ May require a judgemental adjustment due to maturity mismatch of debt issuance and derivative to be valued
Credit rating /historical default information (e.g. Moody's publication of Historic Probability of Default)	▸ Rating agency data available for most entities ▸ Easy to source from third party data providers	▸ Information can be outdated ▸ Conversion to PD may be based on historical information ▸ May require an adjustment from long-term average measure to a 'point-in-time' measure ▸ Not associated with a specific maturity; ratings are generally long term average estimates of creditworthiness, which may not be appropriate for short term derivatives
Internal credit risk analysis	▸ May be applied by most entities ▸ Ability to customise internal models	▸ Based on unobservable information ▸ Information can be outdated ▸ May not be consistent with what other market participants would use

6. Portfolio approaches and credit mitigation arrangements

When calculating derivative credit adjustments, reporting entities may factor in their ability to reduce their counterparty exposures through any existing netting or collateral arrangements. The measurement exception in IFRS 13[2] allows a reporting entity to measure the net credit risk of a portfolio of derivatives to a single counterparty, assuming there is an enforceable arrangement in place that mitigates credit risk upon default (e.g., master netting agreement).

6.1 Collateral arrangements

In many instances, counterparty credit exposure in derivative transactions can be reduced through collateral requirements. Such arrangements serve to limit the potential exposure of one counterparty to the other by requiring the out-of-the-money counterparty to post collateral (e.g., cash or liquid securities) to the in-the-money counterparty. While these and other credit mitigation arrangements often serve to reduce credit exposure, they typically do not eliminate the exposure completely.

For example, many collateral agreements do not require collateral to be posted until a certain threshold has been reached, and then, collateral is required only for the exposure in excess of the threshold. In addition, even when transactions with a counterparty are subject to collateral requirements, entities remain exposed to what is commonly referred to as 'gap risk' (i.e., the exposure arising from fluctuations in the value of the derivatives before the collateral is called and between the time it is called and the time it is actually posted).

Finally, collateral arrangements may be either unilateral or bilateral. Unilateral arrangements require only one party to the contract to post collateral, whereas under bilateral agreements, both counterparties are subject to collateral requirements, although potentially at different threshold levels.

6.2 Netting arrangements

A master netting agreement is a legally binding contract between two counterparties to net exposures under other agreements or contracts (e.g., relevant ISDA agreements, CSAs and any other credit enhancements or risk mitigation arrangements in place) between the same two parties. Such netting may be effected with respect to periodic payments (payment netting), settlement payments following the occurrence of an event of default (close-out netting) or both. In cases of default, such an agreement serves to protect the parties from paying out on the gross amount of their payable positions, while receiving less than the full amount on their gross receivable positions with the same counterparty.

Given the recent implementation of the amendments to IFRS 7 *Disclosures — Offsetting Financial Assets and Financial Liabilities* (Amendments to IFRS 7)[3], which require disclosure of the effects of set-off and related netting on an entity's financial position, entities should have already examined these agreements and determined how they apply in practice.

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2 IFRS 13.48.

3 Issued in December 2011 and mandatorily effective for annual periods beginning on or after 1 January 2013 and interim periods within those annual periods.

In situations where an entity passes the measurement exception criteria detailed in IFRS 13, it will still need to assess whether it has the practical ability to implement a credit valuation method which reflects the net counterparty exposure. This can be challenging, particularly for those entities that do not have systems in place to capture the relevant net positions by debtor/counterparty. Also, an allocation of the portfolio level adjustments is required, as discussed in detail below.

A further complication arises if the net exposure represents the position across different classes of derivatives (for example interest rate swaps and FX forwards). Basic valuation methods can attempt to approximate a net position through the creation of an appropriate 'modelled net position' representing the net risk.

Given their ability to reduce credit exposure, netting and collateral arrangements are typically considered in determining the CVA for a portfolio of derivatives. This can add to the complexity of the calculation as total expected credit exposure must be determined not just for a single derivative contract (whose value changes over time), but for a portfolio of derivative contracts (which can include both derivative assets and derivative liabilities). Simply taking the sum of the CVA of individual trades could dramatically overstate the potential credit exposure, as it would not take into account positions in the portfolio with offsetting exposures. Consequently, when netting agreements and collateral arrangements are in place, and a company has elected to measure its derivative positions with offsetting credit risk using the measurement exception in IFRS 13, the expected exposure is generally analysed at the portfolio level (i.e., on a net basis).

6.3 Allocation of portfolio-level credit adjustments

The use of the measurement exception under IFRS 13 does not change the fact that the unit of account is the individual derivative contract, a concept particularly important when an individual derivative is designated as a hedging instrument in a hedging relationship.

In the absence of any guidance under IFRS for how portfolio level credit adjustments should be allocated to individual derivatives, we can look to practices that have evolved in the market.

Various quantitative allocation methods have been accepted in practice, based on the appropriate circumstances if consistently applied. These methods have been accepted as long as a reporting entity can support that the method is appropriate for its facts and circumstances and is applied consistently.

The following methods have been commonly used:

- **Relative fair value approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability based on the relative fair value of each of the derivative to the fair value of the portfolio.
- **In-exchange or full credit approach** — the entity uses the derivative's stand-alone fair value (in-exchange premise), which would take into account the credit standing of the parties and ignore the effect of the master netting arrangement. The benefit of this model is that it avoids the complexity of an allocation.

- **Relative credit adjustment approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability based on the relative credit adjustment of each of the derivative instruments to the portfolio. This approach would require use of an in-exchange premise to calculate a credit adjustment for each instrument.
- **Marginal contribution approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability, based on the marginal amount that each derivative asset or liability contributes to the portfolio-level credit adjustment.

Once allocated, the adjustment to the fair value of an individual derivative used as a hedging instrument must be incorporated into the assessment of that hedge's effectiveness.

Given the renewed focus on credit adjustments, it is likely that valuation methods will become more sophisticated and new techniques and refinements to the above portfolio allocation techniques will arise.

7. Interaction with hedge accounting

The inclusion of a credit adjustment within the derivative fair value measurement can have a significant impact on an entity's hedge accounting relationships. A CVA or DVA is likely to cause hedge ineffectiveness in any fair value or cash flow hedge relationship. This is because any change in creditworthiness associated with the hedging derivative that would drive a CVA or DVA adjustment is not likely replicated in the fair value movements of the hedged item. In conjunction with other sources of ineffectiveness, the value volatility from the credit risk associated with the counterparty or the entity may result in failing the hedge effectiveness test.

Although fair value hedges have historically reflected the ineffectiveness caused, the interaction of credit adjustments for cash flow hedges has historically been viewed as more open to interpretation, largely due to diversity in practice. Table 3 outlines some of the approaches which have been used in practice.

IFRS 9 clarifies that for both fair value hedges and cash flow hedges, the hedge accounting model is a valuation model which requires the value of the hedged item and hedging instrument to be measured independently. Hedge (in)effectiveness is then measured by comparing the changes in the value of the hedging instrument and the hedged item, which would both need to consider credit risk. The model does not allow perfect hedge effectiveness to be assumed even where a hypothetical derivative is used, as this could conceal differences in the credit risk or liquidity of the hedging instrument and the hedged item.

Table 3: Credit adjustments in cash flow hedges

	Credit valuation approach	Resulting Ineffectiveness
1	▸ Calculate a credit-related valuation adjustment as part of the fair value of the hedging instrument, but ignore credit risk when valuing the hedged item ▸ Include difference in effectiveness assessment	▸ Where the fair value of the hedging derivative asset or liability includes a CVA or DVA, the cumulative change in fair value of the hedging instrument should, in most cases, be a lower amount than the cumulative change in fair value of the hedged item. ▸ To the extent the hedging derivative has a lower cumulative change in fair value (akin to an under-hedge), the entire change in value is recognised in other comprehensive income. ▸ This method generally assumes that the hedging derivative has a nil fair value at inception of the hedge relationship.
2	▸ Calculate a credit-related valuation adjustment as part of the fair value of the hedging instrument and replicate the credit spread used for the hedging derivative in the hypothetical derivative representing the hedged item	▸ This method assumes the credit spread of the entity and the counterparty are equal, which would be pure coincidence. ▸ Whilst this method eliminates the majority of credit-related valuation ineffectiveness, if there are no matched terms, the relative fair values of the hedging derivative and hedged item may still result in some hedge ineffectiveness. ▸ For measurement purposes only, over-hedged amounts are recognised in the income statement. ▸ This method generally assumes that the hedging derivative has a nil fair value at inception of the hedge relationship.
3	▸ Calculate a credit-related valuation adjustment for the hedging instrument and use an appropriate adjustment for credit risk for the hedged item[4]	▸ This method incorporates the credit risk in the valuation of both the hedging instrument and the hedged item, with the credit risk adjustment representing the credit risk that is associated with each item (i.e., the credit risk adjustment for the hedged item represents the credit risk of that item and is independent of the credit risk associated with the hedging instrument). ▸ For measurement purposes only, over-hedged amounts are recorded in the income statement

How we see it

The issue of credit valuation adjustments has been brought into the spotlight with the adoption of IFRS 13. It is expected that the topic will continue to attract attention and debate. Hopefully, this will result in greater understanding, improved methods and consistency between reporting entities.

Since no method is prescribed for credit valuation adjustments, entities will need to apply judgement in selecting the most appropriate method in the circumstances based on the requirements in IFRS 13. The complexity and judgement involved in selecting and consistently applying a method may require entities to provide additional disclosures to assist users of financial statements.

[4] As considered in IFRS 9

Appendix: Credit risk modelling for derivatives

The methods discussed in this appendix represent some of the more common approaches that have been observed in practice. However, reporting entities may be using other approaches. We have highlighted the major advantages and disadvantages of each approach. In all cases, judgement will be required to assess the appropriateness of the methodology used and compliance with IFRSs. The methods presented only differ in the way they estimate the future exposure profile, and not in the choice of the credit risk parameter.

Calculation method	Description	Advantages	Disadvantages
Expected future exposure approach	$$CVA = LGD \sum_{t=1}^{T} d_t EPE_t PD_t \quad (discretised)$$ $$DVA = LGD \sum_{t=1}^{T} d_t ENE_t PD_t \quad (discretised)$$ This approach simulates market variables that influence the price of a derivative, e.g., interest rates and foreign exchange rates, taking into account the volatility of these market variables. For each scenario, the fair value of the derivative is calculated, which results in an exposure path over the life of the derivative. Running this simulation many times and averaging the positive exposure and negative exposure results in EPE and ENE, where EPE is the Expected Positive Exposure and ENE the Expected Negative Exposure. In the formula above, d_t is the risk-free discount factor at time bucket t. The CVA calculation utilises counterparty PDs, while for DVA, own PDs are used. Collateral may be incorporated directly in the exposure simulation. Netting may be applied when aggregating EPE/ENE over several derivatives with the same counterparty.	▸ Considered to be the most theoretically pure approach ▸ Methodology takes both current and potential future exposure into account ▸ Considers bilateral nature of derivatives (i.e., possibility that a derivative asset becomes a liability) ▸ Can be applied on transaction level and counterparty level (multiple derivatives with same counterparty) ▸ Third-party software packages available	▸ Costly to implement ▸ Involves complex modelling and requires advanced technical skills ▸ High requirements with respect to IT infrastructure
Swaption approach	$$CVA = LGD \sum_{t=1}^{T} PD(t-1,t) Swaption_t$$ The swaption approach models EPE as a series of swaptions and is only applicable where the derivative is an interest rate swap. Simplistically, the exposure is modelled as an option on a reversed swap in case the counterparty defaults before the first cash flow date, plus an option on the reversed swap excluding the first cash flow in case the counterparty defaults between the first and second cash flow dates, etc. The number of swaptions is determined by the remaining term of the contract and the payment frequency. In the formula above, $Swaption_t$ is the fair value of an option with expiry t on a swap opposite to the derivative, with maturity T - t. $PD(t-1,t)$ is the probability of default between time t - 1 and t. The CVA calculation utilises counterparty PDs, while for DVA own PDs are used.	▸ Methodology takes both current and potential future exposure into account ▸ Considers bilateral nature of derivatives (i.e., possibility that a derivative asset becomes a liability) ▸ May be applied on transaction level ▸ Terms of swaptions are easy to determine ▸ Intuitive appeal as the CVA is based on the cost of replacing the asset	▸ Applies to interest rate swap exposures only (including cross currency IRS) ▸ Difficult to apply on counterparty level, especially when exposure to a counterparty includes derivatives other than interest rate swaps

Calculation method	Description	Advantages	Disadvantages
Variable exposure approach	$$CVA = \sum_{t=1}^{T} PV_{PREMIUM\ LEG}(CDS_t)$$ This approach estimates CVA as the hypothetical cost to purchase credit protection, depending on the forecast exposure of the derivative. Forecasting does not require simulation as it is based on the assumption that markets evolve according to current forward/futures prices. Therefore, volatility of market variables is not taken into account. At each cash flow date of the derivative, the fair value of the remaining cash flows is calculated. The variable exposure approach then sums the costs of buying CDS protection for the future exposure between consecutive cash flow dates. For example, if the payment frequency of the derivative is quarterly, the maturity of each CDS would be three months In the formula above, CDS_t is a par CDS with a notional principal equal to the present value of the remaining cash flows of the derivative at time t. In case the present value of the remaining cash flows at a time point is a liability, own credit spreads are used to value the default leg of the CDS. Otherwise, credit spreads of the counterparty are used. The present value of the premium leg is used for calculating CVA.	▸ Methodology takes current exposure and future exposure (based on current market expectations, i.e., current forward rates at the measurement date) into account ▸ Considers bilateral nature of derivatives (e.g., possibility that a derivative asset becomes a liability) ▸ Can be applied on transaction level and counterparty level ▸ Market-observable CDS spreads are directly used for CDS pricing, not requiring assumptions to convert to PD ▸ Intuitive appeal as the CVA is the cost of purchasing credit protection	▸ Does not account for potential future exposure, as it does not consider any variability of market variables that influence derivative fair value
Constant exposure approach	$$CVA = \sum_{t=1}^{T} PV_{PREMIUM\ LEG}(CDS_t)$$ This approach is a simplification of the variable exposure approach, as the notional amount of each CDS is based on the current fair value of the derivative plus an add-on profile. This add-on profile is a proxy for the potential future exposure of the derivative. The add-on profile is computed in advance for a series of representative theoretical trades of standard maturities. In the formula above, CDSt is a par CDS with a notional principal equal to the current fair value plus the add-on (delta) profile at time t. CVA is calculated as the present value of the premium legs of this series of CDS. For CVA, counterparty credit spreads are utilised to value the default leg of the CDS, while for DVA own credit spreads are used. A further simplification of this approach is to ignore the add-on profile. In this case, CVA is calculated as the present value of the premium leg of one par CDS with a notional principal equal to the current fair value of the derivative.	▸ May be applied at the transaction level and counterparty level, as add-on profiles can also be calculated on counterparty level ▸ Market-observable CDS spreads are directly used for CDS pricing, not requiring assumptions to convert to PD ▸ Intuitive appeal as the CVA is the cost of purchasing credit protection	▸ Does not account for potential future exposure, as it does not consider any variability of market variables that influence derivative fair value ▸ The approach without add-on profiles does not account for potential future exposure at all ▸ Does not consider bilateral nature of derivatives (i.e., only considers counterparty credit risk for derivative assets and own credit risk for derivative liabilities, over the life of the derivative)

Calculation method	Description	Advantages	Disadvantages
Discounted cash flow approach	$CVA = FV_{Risk\ free} - FV_{Credit\ adjusted}$ The discounted cash flow approach involves adjusting discount rates by including an additional credit spread to the discounted projected future cash flows. These adjusted discount rates are then used to calculate $FV_{Credit\ adjusted}$. There are several variations of this methodology, with the difference being whether to use own credit spread or counterparty credit spread. These variations include: (a) Own/counterparty spread based on whether current MtM position is an asset or liability (b) Own/counterparty spread based on whether each individual future cash flow is a net asset or liability (c) Own/counterparty spread based on whether the cumulative net exposure at each cash flow date is a net asset or liability. Method works through cash flows in chronological order (d) As (c), but method works through cash flows in receding order with latest cash flows first	► Methods (b), (c) and (d) consider bilateral nature of derivatives (i.e., possibility that a derivative asset becomes a liability) ► Methodology can be easily applied to most vanilla derivative valuations ► Can be applied on transaction level ► Implemented by several software vendors	► Does not account for potential future exposure ► Method (a) does not consider the bilateral nature of derivatives (i.e., only considers counterparty credit risk for derivative assets and own credit risk for derivative liabilities, over the life of the derivative) ► Not applicable to complex derivatives ► Difficult to apply at counterparty level, as this requires valuing a synthetic instrument that includes all cash flows related to this counterparty. Exposure to a counterparty also cannot include complex derivatives
Duration approach	$CVA = MtM \times Credit\ Spread \times Duration$ Duration is a measure that quantifies the sensitivity of the fair value of a derivative to interest rate movements. This approach uses duration to measure how much the fair value of the derivative changes by applying the credit spread to the risk free valuation. The CVA calculation utilises the counterparty credit spread, while for DVA own credit spread is used. In the formula above duration is the present value weighted average time of the cash flows. MtM is the current market value of the derivative, assuming neither party is subject to credit risk	► Simple methodology can quickly determine if adjustment is likely to be material and therefore warrants further attention ► Can be applied on transaction level and counterparty level	► Does not account for potential future exposure ► Does not consider bilateral nature of derivatives (i.e., only considers counterparty credit risk for derivative assets and own credit risk for derivative liabilities, over the life of the derivative) ► Not considered best practice

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