IFRS Practice Issues for Banks: Fair value measurement of derivatives – the basics

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Highlighting the path to fair value for derivatives

Under IFRS, derivative financial assets and financial liabilities are measured at fair value. When quoted prices in active markets are available, those prices are used to record the derivatives at fair value. However, because the majority of derivatives have tailored terms and are traded over-the-counter rather than through exchanges, quoted prices in active markets are usually not available; therefore, banks establish fair values using valuation techniques.

Banks use a number of established valuation techniques to value their derivative holdings, and these techniques continue to be refined and enhanced by market participants. The most common is a discounted cash flow approach whereby probable future cash flows are estimated and then discounted to calculate their present value. The present value amount is adjusted for factors that a market participant would consider, for example for counterparty and own credit risk. Such adjustments are often estimated on a portfolio basis and then allocated to individual instruments. Alternatively, banks may make the required measurement adjustments at the individual instrument level; however, in our experience this practice is less common.

This publication highlights some of the issues relevant to the valuation of derivatives under IFRS, including the types of portfolio level adjustments that a bank might make and how some of the accounting requirements are made operational. Interest rate swaps are used as an example to illustrate the principles. This publication is not a comprehensive guide to the valuation of financial instruments and if you require any specific information regarding valuation please refer to your usual KPMG contact or the contacts listed at the back of this publication.
1. **Introduction**

This issue of *IFRS Practice Issues for Banks* considers some of the issues relevant to fair value measurement of financial instruments, particularly as they relate to derivatives.

We briefly summarise the key concepts underlying fair value, such as its definition, the use of quoted prices and valuation techniques to arrive at fair value and the types of typical inputs into a valuation model. We then explore in more detail the valuation of interest rate swaps, starting with the construction of a basic net present value (NPV) calculation and then discuss more complex issues such as adjusting for liquidity and credit risk, and performing valuations on a portfolio basis. We also discuss evolving practices in valuations, for example moving away from using a single swap curve for both discounting cash flows and projecting forward rates when valuing interest rate swaps. Additional matters considered include how ‘day one’ gains or losses are recognised and the general impact of derivative measurement on hedge accounting.

The currently effective guidance for measuring the fair value of financial instruments is included in IAS 39 *Financial Instruments: Recognition and Measurement*. This guidance will be superseded by IFRS 13 *Fair Value Measurement*, which is effective for annual periods beginning on or after 1 January 2013. IFRS 13 replaces the fair value measurement guidance contained in individual IFRSs, including IAS 39, with a single framework for fair value measurement.

The principal objective of IFRS 13 relating to financial instruments is similar to that in IAS 39. However, some of the key definitions, such as the definition of fair value, have been changed and result in differences – perhaps subtle – that may significantly impact application in practice. IFRS 13 expands and articulates in more detail the concepts and principles behind fair value, including the introduction of new concepts such as the ‘principal market’. It also includes general descriptions of valuation approaches and techniques.

When applicable, each section of this publication deals with the relevant requirements of both IAS 39 and IFRS 13 and explains differences between the two standards in the area discussed. However, application of IFRS 13 may be further refined once the standard becomes effective and as potential new implementation issues are identified and considered. IFRS 13 guidance is highlighted in separate boxes throughout the publication.

While this publication considers certain key accounting issues that a bank may encounter when applying the requirements of IAS 39 and IFRS 13 to the measurement of derivatives, it is not a comprehensive analysis of the IFRS requirements. Therefore, further analysis will be necessary for a bank to apply the requirements to its own facts and circumstances. Also, this publication is not intended to cover all aspects of derivative valuation or discuss valuation in detail, and instead highlights selected features and complexities of derivative measurement.
### Defining derivatives

- **IAS 39** defines a derivative as a financial instrument or other contract within its scope that meets all of the following criteria:
  - its value changes in response to some underlying variable – e.g. an interest rate;
  - it has an initial net investment smaller than would be required for other instruments that have a similar response to the variable; and
  - it will be settled at a future date.

- Some derivatives are traded on organised exchanges where the terms of the contracts are standardised and quoted prices for the instruments are generally available publicly.

- Non-exchange traded derivatives, commonly referred to as over-the-counter (OTC) derivatives, are transacted directly between market counterparties (which include trades carried through central clearing entities) with the terms of the contracts often tailored to the parties’ specific requirements. These trades are usually governed by general terms published by the International Swaps and Derivatives Association (ISDA) and may be accompanied by a Credit Support Annex (CSA), which details the requirements for the posting of collateral. Typical OTC derivatives include swaps, forward rate agreements and non-vanilla options.

- Generally, derivatives fall into the following categories:
  - forward-based
  - swap-based
  - option-based.

- ‘Forward-based derivatives’ are contracts with a mandatory requirement to settle at a set point in time in the future at a specified price. The agreement stipulates the reference rate – e.g. interest rate or currency exchange rate – the settlement date and the notional value. A forward contract that is exchange-traded is generally referred to as a ‘futures contract’. Futures are generally based on interest rates, currencies, commodities or stock market indices. OTC forward-based derivatives are generally referred to as ‘forward agreements’. The two most common types of OTC forward agreements are based on interest rates and foreign exchange rates.

- ‘Swap-based derivatives’ are contracts in which counterparties exchange, over a period of time, one stream of cash flows for another stream of cash flows. The streams are referred to as ‘legs’ of the swap agreement. The cash flows are normally calculated with reference to a notional amount, which is often not exchanged by the counterparties – e.g. interest rate swaps. Swap-based derivatives are a type of forward-based derivative because their structure is a series of forwards.

- The most common type of swaps are vanilla interest rate swaps, which are generally traded OTC. A vanilla interest rate swap is an exchange of a fixed rate stream of cash flows for a floating rate stream calculated on a set notional amount. An interest rate swap may also consist of the exchange of one floating rate stream of cash flows for a different floating rate stream (a basis swap). The term of the interest rate basis to which the floating rate of an interest rate swap resets (e.g. three-month LIBOR), which usually matches the frequency of the reset, is often referred to as the *tenor basis* of the interest rate. Examples of other types of swaps are: cross currency (where exchanges of principal amounts in each currency usually do occur), commodity, credit default and total return swaps.

- ‘Option-based derivatives’ include contracts that give one party the right, but not the obligation, to engage in a transaction to buy or sell an asset on a set date or within a set period of time at a particular (strike) price. Options can be exchange-traded or OTC.

  Additionally, many derivatives like swaps include various types of option-like features, such as early termination and term extension options, which can make their values behave like option-based derivatives. Option-based features include other terms that give rise to asymmetric exposure to increases and decreases in market variables similar to an option – e.g. an interest rate cap that allows one party to enjoy the benefit of decreases in interest rates, but not the full risk of increases in interest rates.

2. **How are derivatives classified and measured at initial recognition?**

*IAS 39.9*

All derivatives within the scope of IAS 39, other than derivatives that are financial guarantee contracts or that are designated hedging instruments, are classified as held-for-trading in the financial instruments category: financial assets or financial liabilities at fair value through profit or loss.

*IAS 39.9, 43*

All derivatives are measured initially at fair value.

3. **How are derivatives measured subsequent to initial recognition?**

*IAS 39.46–47*

Subsequent to initial recognition all derivatives are measured at fair value with changes in fair value generally recognised in profit or loss.

*IAS 39.46–47, AG81*

However, a derivative that is linked to and settled by delivery of an unquoted equity investment whose fair value cannot be reliably measured, is measured at cost. This exemption is very limited as normally it is possible to estimate the fair value of a financial instrument that has been acquired from a third party. In addition, in our view this exemption cannot be extended to cover other underlying variables with no available market data.

Derivative assets and liabilities that are designated as hedging instruments are subject to hedge accounting requirements, as discussed in section 13.

The currently effective guidance regarding the initial recognition, classification and subsequent measurement of financial instruments included in IAS 39 will be superseded by IFRS 9 *Financial Instruments*, which is effective for annual periods beginning on or after 1 January 2015. IFRS 9 eliminates the exemption for a derivative that is linked to and settled by delivery of an unquoted equity investment to be measured at cost if the equity investment’s fair value cannot be measured reliably. See chapter 7A in the 9th Edition 2012/13 of our publication *Insights into IFRS* (chapter 7A in the 8th Edition 2011/12) for further discussion of the requirements of IFRS 9.

4. **How does IFRS define fair value?**

*IAS 32.11, 39.9, 48, IGE.1.1*

IAS 39 defines ‘fair value’ as the amount for which an asset could be exchanged, or a liability settled, between knowledgeable and willing parties in an arm’s length transaction. Fair value does not take into consideration transaction costs incurred at initial acquisition or expected to be incurred on transfer or disposal of a financial instrument.

*IFRS 13.9, A*

IFRS 13 amends this definition. ‘Fair value’ is defined in IFRS 13 as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The definition is explicitly described as an exit price and no longer refers to ‘settlement’ in the context of a financial liability, but rather to the price ‘paid to transfer a liability’. Therefore, the fair value of a liability is determined using a transfer notion – i.e. the item is not assumed to be settled with the counterparty or otherwise extinguished on the measurement date. It is based on quoted prices in a market for transfers of an identical or similar liability, when available. When such pricing is not available and the liability is held by another entity as an asset, the liability is valued from the perspective of a market participant that holds the asset.
Underlying the concept of fair value is the presumption that the entity is a going concern and does not have an intention or a need to liquidate instruments nor to undertake a transaction on adverse terms. Therefore, normally fair value is not an amount that an entity would receive or pay in a forced transaction, involuntary liquidation or distressed sale. See 7.6.200.30–50 in the 9th Edition 2012/13 of our publication Insights into IFRS (7.6.200.30–50 in the 8th Edition 2011/12) for a discussion of forced transactions.

The objective of determining fair value is to arrive at a price at which an orderly transaction would take place between market participants at the measurement date. In our view, an orderly transaction is one that involves market participants who are willing to transact, and allows for adequate exposure to the market.

In IFRS 13, fair value measurement assumes that the asset or liability is exchanged in an orderly transaction between market participants to sell the asset or transfer the liability at the measurement date under current market conditions.

An ‘orderly transaction’ is defined as a transaction that assumes exposure to the market for a period before the measurement date to allow for marketing activities that are usual and customary for transactions involving such assets or liabilities; it is not a forced transaction – e.g. a forced liquidation or a distressed sale. It is generally reasonable to assume that a transaction in which an asset or liability was exchanged between market participants is an orderly transaction. However, there will be circumstances in which an entity needs to assess whether a transaction is orderly, such as when the seller marketed the instrument to a single market participant or when the seller was forced to meet regulatory or legal requirements.

For derivatives traded in an active market, a quoted market price reflects the price in the most advantageous active market to which a bank has immediate access.

Determining who constitutes a market participant, as well as which market is most advantageous for a particular entity, involves judgement and consideration of the applicable facts and circumstances, because these terms are not defined in IAS 39.

IFRS 13 introduces changes in this area. Under IFRS 13, a bank will value financial instruments, including derivatives, assuming a transaction takes place in the principal market for the asset or liability – i.e. the market with the highest volume and level of activity. In the absence of a principal market, it is assumed that the transaction would occur in the most advantageous market. This is the market that would maximise the amount that would be received to sell an asset or minimise the amount that would be paid to transfer a liability, taking into account transport and transaction costs. In either case, the bank needs to have access to the market on the measurement date. In the absence of evidence to the contrary, the market in which the bank would normally sell the asset or transfer the liability is assumed to be the principal market or most advantageous market.

Because a bank has to have access to the principal (or most advantageous) market in order to use a price from that market, the identification of the relevant market is considered from the perspective of the bank. This may give rise to different principal or most advantageous markets for banks with different activities and for different businesses within a bank.

In some cases, different entities within a consolidated banking group (and businesses within those entities) may have different principal markets for the same asset or liability. For example, a parent company identifies a particular market as its principal market for a particular asset. Due to regulatory restrictions, its overseas subsidiary is prohibited from transacting in that market. As a result, the overseas subsidiary has a different principal market for the same asset.
5. When are derivatives measured using quoted prices?

**IAS 39.AG71–AG 72, IFRS 7.27A**

Derivative financial assets and financial liabilities are always measured using quoted prices if a published price quotation in an active market is available for an identical instrument. Such measurement is defined by IFRS 7 Financial Instruments: Disclosures and IFRS 13 as Level 1 in the fair value hierarchy. Generally, bid prices are used for long derivative positions (assets) and ask prices are used for short derivative positions (liabilities).

**IFRS 13.70**

Under IFRS 13, entities are generally required to use the point in the bid-ask spread that is most representative of fair value; however, the use of bid prices for long positions and ask prices for short positions is permitted.

**IFRS 13.71**

The standard does not prohibit using mid-market prices or other pricing conventions generally used by market participants as a practical expedient for fair value measurements within a bid-ask spread. However, it appears that the use of mid-market prices is subject to the condition that a mid-market price provides a reasonable approximation of an exit price. We believe that use of the practical expedient does not override the general fair value measurement guidance, and should not be used if it leads to a measurement that is not representative of fair value.

**IAS 39.AG71**

A financial instrument is regarded as quoted in an active market if quoted prices are readily and regularly available from an exchange, dealer, broker, industry group, pricing service or regulatory agency, and those prices represent actual and regularly occurring market transactions on an arm’s length basis. Determining whether a market is active involves judgement. See 7.6.220.20–40 in the 9th Edition 2012/13 of our publication Insights into IFRS (7.6.220.20–40 in the 8th Edition 2011/12) for a discussion of how to determine whether there is an active market for a financial instrument.

Generally, quoted prices in an active market for identical instruments should not be adjusted when valuing large holdings. For example, a bank cannot depart from the quoted price in an active market solely because independent estimates indicate that it would obtain a higher or lower price by selling the holding as a block.

**IFRS 13.69,80**

IFRS 13 states that positions in a single financial instrument (including a group of identical assets or liabilities) that are traded in an active market are measured as the product of the quoted price for the individual item and the quantity held. This is also applicable if the market’s normal daily trading volume would be insufficient to absorb the quantity held and placing orders to sell the position in a single transaction might affect the quoted price. Premiums or discounts that reflect size as a characteristic of the entity’s holding rather than as a characteristic of the financial instrument are not permitted. Under IFRS 13, this principle is applicable whether or not the instrument being valued is quoted in an active market.

Quoted prices for derivatives are usually only available for standardised and transferable exchange-traded contracts such as options and futures – e.g. a six-month Eurodollar future based on three-month LIBOR. See 9.5 for a discussion of prices used for portfolios with offsetting market risks, both under IAS 39 and IFRS 13.

6. When are derivatives measured using a valuation technique?

**IAS 39.AG74**

When a derivative is not traded in an active market, its fair value is determined using a valuation technique. Such a measurement is defined by IFRS 7 and IFRS 13 as Level 2 or Level 3 in the fair value hierarchy. IAS 39 does not include explicit references to Levels 1 to 3 of the fair value hierarchy although the underlying principles it contains are very similar.

**IAS 39.AG72–AG73**

If a published price quotation in an active market does not exist for a financial instrument in its entirety, but active markets exist for its component parts, then fair value is determined on the basis of the relevant market prices for the component parts. If a rate – rather than a price – is quoted in an active market, then the bank uses that market-quoted rate, adjusted to include credit risk or other factors as appropriate, as an input into a valuation technique.
Valuation techniques that are based on inputs that are observable are referred to as Level 2 valuations. Valuation techniques that use significant unobservable inputs are referred to as Level 3 valuations. Differentiating between Level 2 and Level 3 fair value measurements – i.e. assessing whether inputs are observable and whether the unobservable inputs are significant – may require judgement and a careful analysis of the inputs used to measure fair value, including consideration of factors specific to the asset or liability. An input is observable if it can be observed as a market price or can be derived from an observed market price. In each case, it is not necessary that the market is active. However, an input based on a distressed or forced transaction would be given less consideration regardless of whether or not the market is considered active. See section 11 for a further discussion of the fair value hierarchy and the associated impact of allocating portfolio level adjustments.

The availability of observable market prices and inputs varies depending on the type of derivative and the markets in a respective jurisdiction, with the availability subject to changes based on specific events and general conditions in the financial markets. OTC derivative contracts are generally measured using valuation techniques, because there are no observable market prices for such instruments as a whole.

IFRS 13 contains the fair value hierarchy concept (Levels 1 to 3) that was already included in IFRS 7 and the definitions of the three levels have not changed from what currently exists in IFRS 7.

7. How does a bank choose an appropriate valuation technique?

If the market for a financial instrument is not active, then a bank establishes fair value using a valuation technique. If there is a valuation technique commonly used by market participants and it has been demonstrated to provide reliable estimates of prices obtained in actual market transactions, then a bank uses that technique.

The objective when choosing and developing an appropriate valuation technique is to establish what a transaction price would have been on the measurement date in an arm’s length exchange motivated by normal business conditions. In our view, the valuation technique used should reflect current market conditions and appropriate risk adjustments that market participants would make for credit, liquidity and other risks on the measurement date.

A selected valuation technique makes maximum use of observable market data about the market conditions and other factors that are likely to affect a derivative’s fair value. The technique should be consistent with accepted economic methodologies and its inputs include factors that market participants would usually take into account when pricing an instrument, relying as little as possible on entity-specific factors. Also, it is necessary for the validity of the results of the technique to be tested regularly so that the technique can be recalibrated as needed and the fair value measurement objective can be met.

In our view, it is not appropriate to adjust the results of a model-based valuation for entity-specific factors such as uncertainty in estimated cash flows, liquidity or administration costs. However, we believe that such factors should be incorporated into a valuation model based on the amounts that market participants as a whole would consider in setting a price. Furthermore, it is not appropriate to adjust the result of a valuation technique to reflect the model risk unless market participants would make similar adjustments. Valuation adjustments considered by market participants for factors such as model uncertainty, liquidity and administration costs, are discussed in section 9.

Examples of valuation techniques include:

- discounted cash flow analyses;
- recent market transactions in the same instrument, adjusted for changes in market factors between the date of such recent transactions and the measurement date;
current or recent market transactions in another financial instrument that is similar to the instrument being valued, adjusted for factors unique to the instrument being valued; and

option pricing models.

In our experience, banks use very similar valuation models for determining the fair value of common and simple financial instruments, such as vanilla interest rate and currency swaps. For simple frequently-traded products and maturities, it is common for such models to use primarily observable market data and they may require less judgement in their application. However, models are subject to ongoing enhancement as market practice develops; see 9.1, 9.3 and 9.11 for a discussion of such recent developments in market practice.

For valuing more complex derivatives, banks generally use proprietary valuation models that are adjusted to reflect the specific contractual terms of the instruments. Such proprietary models should still only incorporate adjustments that would be applied by market participants.

Regardless of the level of activity in the market, relevant transaction prices that do not represent distressed transactions cannot be ignored when measuring fair value using a valuation technique, although they might require significant adjustment based on unobservable data.

8. What are the typical inputs into a valuation model?

A valuation model would typically incorporate one or more of the market inputs listed below. These are general inputs into valuation models of financial instruments and some of them may be used for the valuation of cash instruments (e.g. bonds) rather than derivatives. For example, when valuing a corporate bond, an input derived from government bond prices may be used. However, inputs derived from government bond prices would not generally be used in the valuation of a derivative. Instead, inputs would be obtained from instruments of derivative markets, such as observable interest rate swap rates or futures.

- **Time value of money** – i.e. a ‘risk-free’ or ‘basic’ interest rate: A ‘risk-free’ interest rate for use in a valuation model can be derived from a variety of financial instruments, the prices of which are often quoted. Such basic interest rates are determined by reference to the highest-rated securities issued in the specific currency. However, the prices and rates used to develop an interest rate curve depend on the quotes available in a given market and the underlying liquidity of the financial instruments. Well-accepted and readily observable general rates such as LIBOR and overnight index swap (OIS) rates are also used as benchmark rates.

- **Credit spread**: An appropriate credit spread for the particular instrument may be derived from quoted prices for corporate bonds of similar credit quality to the instrument being valued, rates charged to borrowers of a similar credit rating, or the credit default swap market. A requirement to post collateral will impact the determination of an appropriate credit spread.

- **Foreign exchange**: Foreign currency rates are usually quoted in daily financial publications and electronic financial databases.

- **Commodity prices**: Observable market prices are available for many commodities from public exchanges, such as the Chicago Mercantile Exchange and the Tokyo Commodity Exchange.

- **Equity prices, including equity indices**: Quoted market prices are often available for listed equity securities. For unquoted equity securities, valuation techniques based on discounted projected earnings and multiples may be used to estimate fair value.

- **Volatility**: Expectations for volatility can often be implied from current market prices or quotes for options. Failing this, volatility may be estimated on the basis of historical market data.

- **Prepayment and surrender risk**: Expected prepayment patterns for financial assets and surrender patterns for financial liabilities can be estimated on the basis of market expectations and historical data.
A ‘risk-free’ rate is often considered to be the interest rate for an investment that is completely free of credit risk. However, a truly risk-free rate does not exist in the market because all instruments carry a certain amount of risk. Therefore, a ‘basic’ interest rate, derived from observable prices of high-quality instruments, is often used as a market proxy for the risk-free rate.

When valuing cash-based securities, such as a bond, risk-free interest rates derived from government bills, notes or bonds (e.g. US Treasuries or UK gilts) are often used as an input, whereas when valuing derivative instruments, interest rates derived from the derivatives market, such as futures, forward rate agreements or interest rate swaps, are often used.

A set of interest rate curves (all mathematically derivable from one another) – yield, spot/zero, and forward – are constructed to create a term structure of interest rates used to forecast future variable cash flows and to determine the rates needed to discount future fixed and variable cash flows to a present value. Separate curves are generally needed for cash flows in each currency, tenor basis (i.e. cash flow fixing frequency – e.g. three months) and interest rate reference/index (i.e. basis for the floating element of a derivative contract – e.g. LIBOR).

For ease of illustration, this basic overview portrays an example of a single curve framework where the same yield curve is used to calculate a forward rate curve for forecasting cash flows and a spot rate curve for discounting cash flows. However, in some cases separate forward rate and spot rate curves will be used. See section 9.3 for further discussion of this multiple curve framework.

**Yield curve**

A starting point is the construction of a market-based yield curve using a number of data points that represent interest rates applicable to different periods of time. The yield curve plots yield-to-maturity against time-to-maturity.

The data points in a yield curve are derived from a selection of liquid, benchmark instruments of different maturities that provide reliable prices, which can be observed in the particular marketplace. The instruments selected are usually as close as possible to risk-free rate instruments. Yields are either quoted in the market or can be implied from current market prices for the instruments.
For example, prices and rates used in general interest rate curve construction can include one or more of the following.

<table>
<thead>
<tr>
<th>Portion of the curve</th>
<th>Example types of securities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-end</td>
<td>Benchmark interbank rates (e.g. LIBOR), discount securities (e.g. Treasury bills, although these are not generally used for valuation of derivatives) and repurchase agreement.</td>
</tr>
<tr>
<td>Mid-section</td>
<td>Futures and forward rate agreements.</td>
</tr>
<tr>
<td>Long-end</td>
<td>Extended interest-bearing swap rates quoted by brokers/dealers or bond rates, such as highest-quality sovereign bonds, although the latter generally are not used for valuation of derivatives.</td>
</tr>
</tbody>
</table>

Some of the complexities in developing a reliable curve include:

- dealing with overlapping data points when different observable instruments indicate slightly different interest rates applicable to the same periods;
- ensuring that instruments with a similar level of credit risk are used in different parts of the curve;
- interpolating data points when calculations are used to estimate a rate at a specific date as observable prices are only obtained for dates before and after that specific date;
- extrapolating beyond observable data; and
- obtaining reliable data for illiquid currencies.

Construction of a yield curve often involves judgement.

**Spot rate curve**

A spot rate curve (which is often referred to as a zero-coupon curve) is usually arrived at by ‘boot-strapping’ and interpolating the yield curve.

‘Boot-strapping’ is a process of converting yields of coupon-bearing instruments to yields of zero-coupon instruments of the same maturities. When short-term discount securities are used in determining the yield curve, boot-strapping is not required for those data points because there is only one cash flow from these securities that takes place at maturity and so the quoted yield represents the yield of a zero coupon instrument.

Each point on the spot rate curve represents an annualised interest rate that discounts a single future cash flow back to its present value. The spot rate curve is used to discount future cash flows. Spot rates are often converted into discount factors – i.e. the figure by which a future cash flow is multiplied to obtain the present value at the measurement date.

**Forward rate curve**

A forward rate curve is calculated by applying an arbitrage-free mathematical formula to the spot rate curve; alternatively a spot rate curve can be calculated from a forward rate curve if the forward rate curve was calculated first. A forward rate represents the yield for a certain period, starting at a certain point in the future – e.g. a six-month forward rate curve represents the borrowing/lending rate for six months starting at each date in the future.

A forward rate curve is used to forecast future variable cash flows of a derivative. The tenor and interest rate basis of the curve should match the tenor of the reference rate of the derivatives being valued – e.g. a six-month LIBOR curve is used to forecast floating leg payments of a derivative if the derivative agreement stipulates that such payments are based on six-month LIBOR.
An illustrative example of a term structure of interest rates is provided in the table below; the prices, spot rates, discount factors and forward rates are all derived mathematically from the market-quoted/observable yields (provided in the ‘6-month LIBOR yields’ column).

<table>
<thead>
<tr>
<th>Maturity (N, in years)</th>
<th>6-month LIBOR yields (% p.a., for maturity of N)</th>
<th>Coupon (annual % rate)</th>
<th>Price (at time zero)</th>
<th>Spot rate (% p.a., at time N)</th>
<th>Discount factor</th>
<th>Forward rate (% p.a., starting at beginning of time N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.500</td>
<td>N/A</td>
<td>99.26</td>
<td>1.500</td>
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</tr>
<tr>
<td>1.0</td>
<td>1.710</td>
<td>2.00</td>
<td>100.29</td>
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<td>0.9831</td>
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<td>4.31</td>
</tr>
</tbody>
</table>

The data in the table are shown in graphical form below.
9. **How are interest rate swaps valued?**

9.1 **What technique is commonly used in the market?**

In our experience, the common approach to valuing an OTC vanilla interest rate swap is to use a discounted cash flow model. A discounted cash flow model estimates future variable cash flows and discounts those cash flows, together with the fixed cash flows, to arrive at a NPV.

The interest rate swap’s variable future cash flows – i.e. the floating-leg of the swap – are estimated using the constructed forward rate curve. The fixed-leg cash flows are based on the rate stipulated in the derivative agreement. The estimated cash flows are then discounted using a spot rate curve.

Primarily as a result of the 2008-09 financial crisis, many market participants have moved towards using multiple curves as inputs into the valuation model for interest rate swaps as follows:

- one interest rate curve to estimate floating cash flows, with the curve based on the relevant tenor that matches the cash flow reset frequency and interest rate basis stated in the derivative agreement – e.g. six-month LIBOR; and
- a separate interest rate curve to discount all estimated cash flows, with the curve based on the tenor that matches the risk/funding cost of the transaction (i.e. the terms – such as rate and reset frequency – of the funds used to finance the transaction), which is usually the tenor that is conventionally used in the relevant market. Alternatively, some market participants use the most liquid tenor and adjust for relevant differences.

Section 9.3 includes further discussion of this topic, particularly relating to differences between collateralised and uncollateralised derivatives.

The resulting NPV is a starting point or base for the calculation of fair value. The model then incorporates other factors that market participants would consider, such as credit, liquidity/close out, model uncertainty and possibly other adjustments. These factors are discussed below.

9.2 **Using market rates to construct the yield curves**

Typically, the curves used as the base in a discounted cash flow model are mid-market rate curves. The approach of initially marking derivatives based on mid-market rates and prices allows the valuation adjustments that are required to arrive at a fair value to be specifically defined and quantified. This often leads to greater transparency of the valuation process. Also, given the ability over time for derivative assets to become derivative liabilities, and vice versa, mid-market rate curves may be used as a starting point to simplify the system requirements of a bank’s valuation process.
The fact pattern below does not address the multi-curve approach referred to above and discussed in section 9.3. The single-curve approach has been used to illustrate the basic principles in a simple way.

**Fact pattern:**
A bank has entered into an uncollateralised OTC interest rate swap agreement with the following terms:

- Notional amount of swap: 1 million
- Settlement: Every 6 months
- Start of swap: 1 January 2011
- End of swap: 31 December 2013
- Receive leg: 2% a year (30/360)
- Pay leg: 6-month LIBOR (actual/360)

For simplicity, assume the bank uses the 6-month LIBOR curve to discount estimated cash flows.

Mid-market interest rates at the measurement date of 30 June 2012 have been determined as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>LIBOR forward rates (%)</th>
<th>LIBOR spot rates (%)</th>
<th>Discount factors (derived from the spot rates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 December 2012</td>
<td>1.92</td>
<td>1.50</td>
<td>0.9926</td>
</tr>
<tr>
<td>30 June 2013</td>
<td>2.61</td>
<td>1.71</td>
<td>0.9831</td>
</tr>
<tr>
<td>31 December 2013</td>
<td>3.15</td>
<td>2.01</td>
<td>0.9704</td>
</tr>
</tbody>
</table>

The bank estimates cash flows at 30 June 2012 using the above rates as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Receive fixed leg</th>
<th>Pay floating leg</th>
<th>Net cash flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 December 2012</td>
<td>+1m × 2% × 6/12 months = 10,000</td>
<td>−1m × 1.92 × 184/360 days = −9,813</td>
<td>+187</td>
</tr>
<tr>
<td>30 June 2013</td>
<td>+1m × 2% × 6/12 months = 10,000</td>
<td>−1m × 2.61 × 181/360 days = −13,123</td>
<td>−3,123</td>
</tr>
<tr>
<td>31 December 2013</td>
<td>+1m × 2% × 6/12 months = 10,000</td>
<td>−1m × 3.15 × 184/360 days = −16,100</td>
<td>−6,100</td>
</tr>
</tbody>
</table>

The NPV is calculated by discounting the above cash flows using the discount factors:

NPV (mid-market) = (+187 × 0.9926) + (−3,123 × 0.9831) + (−6,100 × 0.9704)  
= −8,804 (a derivative liability)
9.3 Collateralised vs uncollateralised derivatives

Generally, the fair value of a collateralised derivative is different from the fair value of an otherwise identical but uncollateralised derivative since the posting of collateral mitigates risks associated with credit and funding costs. This difference tends to be particularly pronounced during times of market stress.

Before the 2008-09 financial crisis, unsecured interbank borrowing rates, such as LIBOR, were commonly used to discount cash flows of both collateralised and uncollateralised derivative instruments. Although derivative valuation theory recognised conceptual differences between the two types of transactions, the very small basis spreads that previously existed between the interest rate curves used for discounting collateralised trades – e.g. overnight rates – and those applied to uncollateralised trades – e.g. three-month LIBOR rates – meant that the impact on valuations was rarely significant.

However, as a result of the widening of spreads, changes in banks’ funding costs, and the increased use of collateral in OTC derivative trading since the financial crisis, market participants have moved towards using multiple curves for collateralised and uncollateralised trades when valuing derivatives.

9.3.1 Uncollateralised derivatives

For uncollateralised transactions, in our current experience, there is no clear market consensus as to the most appropriate discount rate to apply in a valuation model. One view that has developed is that estimated cash flows should be discounted using an entity’s own cost of funding, but it is unclear how the cost of funding should be determined and included in a derivative valuation model. Banks would need to ensure that any funding cost risk adjustment used in measuring fair value is consistent with the cost that market participants would take into account when pricing an instrument rather than being only an entity-specific estimate.

A funding cost adjustment can be estimated by applying a valuation adjustment to the base NPV (discounted using proxy ‘risk-free’ or benchmark rates) to reflect the estimated funding spread over the proxy rates used in the base NPV – e.g. the funding cost above the relevant LIBOR swap rate in an uncollateralised derivative transaction. In the past, the assumption often made by banks was that they funded themselves at the relevant interbank borrowing rate, such as USD LIBOR or Euribor, but this assumption may no longer hold because many banks are incurring higher funding rates.

Using a bank’s own specific cost of funding as the discount rate would reflect that bank’s ability to fund the derivative transactions. But the diversity of different banks’ funding rates would result in different banks arriving at different valuations for similar instruments. A consensus approach has not yet fully developed in this area, although a typical market participant would consider its funding cost in actually setting the price of a new derivative transaction. Also, care has to be taken when using internal funding rates, because they may incorporate a bank’s internal treasury funding incentives (such as the bank’s goal of generating new business) and not reflect the true cost of external funding. Further difficulties can arise in constructing long-dated funding curves that may be entity-specific.

One issue holding back the advancement of market consistency in the area of discount rates for uncollateralised derivatives is the potential for overlap in a valuation model between the funding rate of an entity and its own credit spread, which is often taken into account through the application of a debit valuation adjustment (DVA) – see 9.7.3 for a discussion of DVAs. Funding cost discounting techniques usually incorporate both liquidity and credit components, because these are difficult to separate; however separation is required to avoid double counting if a DVA is also included in the valuation model. An approach based on reflecting credit risk as part of the funding cost adjustment may be simpler to apply than one that separately incorporates a DVA.

Any adjustment applied to the discount rate should be consistent with the definition of fair value in IAS 39 discussed in section 7 or, once adopted, in IFRS 13.
9.3.2 Collateralised derivatives

Our recent experience suggests that the majority of derivative market participants agree that as part of valuing collateralised interest rate swaps the estimated cash flows should be discounted at the rate agreed for cash collateral posted under the respective derivative’s CSA, which typically is an overnight benchmark rate in the respective currency – e.g. Sterling Overnight Index Average (SONIA) or Euro Overnight Index Average (EONIA).

For collateralised transactions, market participants generally view using OIS rates as appropriate for discounting purposes, since they reflect the rate payable on the overnight cash posted. CSAs or other agreements that stipulate posting of collateral often require that the interest rate on posted cash collateral is to be paid at the relevant overnight rate. However, given the limited number of markets with regular active overnight trading, the liquidity of the relevant market should be considered, since market participants in our experience would make liquidity adjustments to rates from non-active markets. Additional valuation complexities may arise when the contract terms include thresholds for posting collateral – i.e. collateral posted is less than the full market value of the derivative. In such instances, more complex techniques are used to determine discount rates.

Furthermore, although market practice varies and continues to develop, it appears that many market participants consider the impact of differences between the currency of the cash flows of the derivative and the currency of the collateral when calculating discount factors. For example, a bank may calculate discount rates using the currency of the collateral posted and may also take into account any multi-currency optionality – e.g. the ability for the counterparty to choose the currency in which it will post required collateral – and any other relevant CSA terms. Market practice in this area is evolving. Therefore, banks should monitor developments in valuation techniques to ensure that their own valuation models appropriately reflect the types of inputs that market participants would consider.

Whatever discount rate is used, banks have to ensure that their application of IAS 39 results in a value for which a derivative asset could be exchanged (or a derivative liability settled) between market counterparties, which means that the discount rate should reflect only inputs that market participants would consider.

9.4 Why are adjustments applied to the base discounted cash flow model?

The base NPV calculations have to be adjusted for factors not included in the base NPV that a market participant would consider in order to arrive at the derivative instrument’s fair value. Such adjustments in our experience include:

- credit risk – to reflect the spread between the ‘risk free’ or basic interest rate, such as LIBOR or OIS rates, and the interest rate that reflects counterparty or own credit risk;
- liquidity – to reflect the bid/ask spread;
- other adjustments – such as administrative/servicing costs or a risk premium relating to the valuation complexity of a derivative instrument; and
- model uncertainty – to reflect a known model deficiency or model risk.
9.5 Instrument-by-instrument or a portfolio basis?

Generally, fair value is determined on an instrument-by-instrument basis. However, in our view in some cases a portfolio valuation approach may be appropriate as a practical expedient to determine the sum of the fair values of the constituent individual instruments within the portfolio.

Furthermore, IAS 39 permits a group of derivative assets and derivative liabilities with offsetting market risks to be valued at mid prices for the offsetting risk positions, while a bid or ask price is applied to the net open position as appropriate.

The level at which a valuation technique and associated valuation adjustments are applied can vary across banks. The approaches that we have seen for a portfolio of interest rate swaps generally fall into one of the following categories.

• Discounting the cash flows of each individual interest rate swap using a discount curve already adjusted for liquidity and credit risk; in our experience this type of approach is the least widespread.

• Applying a valuation model, which has been adjusted for liquidity risk but which does not incorporate credit risk, to all interest rate swaps individually and then determining the adjustment for credit risk at a portfolio level.

• Following a full portfolio valuation approach by discounting all cash flows of a portfolio of derivative instruments using basic ‘risk-free’ curves and adjusting the results of the model for items such as liquidity and credit risk; this has the practical advantage of avoiding the construction of potentially thousands of counterparty- and instrument-specific forward rate and discount curves. In our experience, this type of approach is the most widespread.

However, although valuation adjustments may be made at a portfolio level for a group of derivative instruments, there is still the need to consider each instrument’s unit of account, which is generally the individual instrument. See section 11 for a discussion of how portfolio level adjustments are allocated across a portfolio of derivative instruments.

IFRS 13 generally does not specify the level of aggregation or disaggregation of assets and liabilities for the purpose of determining at what level fair value should be measured. Instead, the specific standard dealing with accounting for the particular asset or liability is used to determine the unit of account. For example, as noted, the unit of account in IAS 39 is generally an individual financial instrument.

The standard includes an optional exception for the measurement of a group of financial assets and liabilities that is exposed to market risks and to the credit risk of each of the counterparties, if certain criteria are met (as discussed below). The exception allows a bank to measure the fair value of a group of financial assets and liabilities on the basis of the price that would be received to sell a net asset position or transfer a net liability position for the particular risk exposure that is managed on a group basis. It is permitted because the measurement of a group of financial instruments by market participants is considered to be a market-based measurement with the application of the exception considered to be consistent with the way that market participants would price the net risk position.

Application of the exception is permitted only if an entity:

• can demonstrate that it manages the group of financial instruments on the basis of the net exposure to a specific market risk or credit risk of a particular counterparty in accordance with its documented risk management/investment strategy;

• provides information about the group of financial instruments on that basis to its key management personnel; and

• has elected to measure the financial assets and liabilities in the group at fair value.
When using the exception, the market risks to which the entity is exposed within the portfolio should be substantially the same as regards both their nature and duration. For example, a bank cannot combine interest rate risk associated with a financial asset with the commodity price risk associated with a financial liability, because the nature of these risks is not substantially the same. Additionally, if a bank manages its interest rate risk on a net portfolio basis, then it may include financial instruments with different rate bases (e.g. GBP LIBOR and UK Treasury yields) in one portfolio. However, the difference in interest rate bases/basis risk resulting from market risk parameters that are not identical is reflected in the fair value of the net position. For example, if Bank B has a 12-month futures contract to offset 12 months’ worth of interest rate risk exposure on a five-year financial instrument, then the exposure to 12 months of interest rate risk may be measured on a net basis but the interest rate risk exposure from year two onwards has to be measured on a gross basis.

It appears that application of the portfolio measurement exception in IFRS 13 changes the unit of valuation from the individual financial instrument to the net position for a particular risk exposure. We believe that the size of the net risk exposure is a characteristic to be considered when measuring the fair value of the net risk exposure.

The IFRS 13 exception is not carried through to the presentation of the related financial assets and liabilities in the financial statements. Accordingly, if an entity applies the exception, then the basis of measurement of a group of financial instruments may differ from their basis of presentation. If a group of financial instruments are presented separately on a gross basis in the statement of financial position, but fair value is measured on a net exposure basis, then the portfolio-level bid-ask and credit adjustments are allocated to the individual assets and liabilities on a reasonable and consistent basis. This guidance is consistent with our view of current IAS 39 guidance, discussed in section 11.

9.6 What if adjustments for tenor and currency are made at the portfolio level?

In our experience, the common practice of banks when valuing a portfolio of OTC derivatives is to forecast future cash flows using tenor and currency specific curves. This necessitates grouping together interest rate swaps of the same tenor and currency. Alternatively, tenor and currency differences can be addressed at the final valuation stage as portfolio level adjustments, although in our experience final valuation stage adjustments for tenor and cross-currency basis tend to be an intermediate step in a bank’s development of its valuation processes before ultimately correcting the application of its base forward curves.

For example, when a base forward rate curve is applied to a portfolio of derivatives, basis differences can arise between the:

- interest rate tenor/currency used to construct the base forward rate curve; and
- contractual reference interest rate/currency for individual derivatives in the portfolio.

This could be the case when, for example, a bank selects a three-month forward rate curve as its base forward rate curve to estimate the future cash flows of its portfolios of interest rate swaps, but one of the bank’s interest rate swap portfolios is referenced to six-month LIBOR rates (a reference rate tenor difference). A bank may wish to use a base forward curve that reflects the predominant type of interest rate swaps in the pool (e.g. three-month US LIBOR based swaps) to simplify the calculation. Furthermore, a bank might use a base forward curve in a particular currency in valuing swaps denominated in another currency if there are not sufficient and reliable data points to form a base forward rate curve in the second currency. It would then be necessary to make an adjustment to the output of the valuation model to reflect the swaps’ actual currency.
For Euribor-based derivative contracts, the market convention or standard tenor is for contractual floating cash flows to be referenced to the six-month rate and for Sterling-based derivative contracts it is three month LIBOR. In our experience, the increase in tenor basis spreads – e.g. between a three-month and a six-month basis – over recent years has had significant impacts on the valuation of non-standard tenor derivatives; in particular, if a bank continues to use a base derivative valuation model that incorporates only the standard tenor rates, then it usually makes tenor adjustments to the valuation model using basis swap spreads.

9.7 How is credit risk incorporated into the valuation model?

The fair value of a financial instrument incorporates its credit quality. For a derivative, a positive fair value represents a ‘receivable’ from the counterparty and a negative fair value represents a ‘payable’ to the counterparty. An interest rate swap can be a receivable or payable at different points in time depending on the relative net present values of the estimated future cash flows payable by each party. Accordingly, the valuation of derivative instruments should reflect at any time the credit risk of both the counterparty (counterparty credit risk) and of the reporting entity (own credit risk). It also needs to incorporate the effect of collateral/margining requirements, and the impact of master netting agreements, if applicable. Therefore, generally for a derivative transaction, the higher the level of collateral posted, the lower the level of credit risk adjustment needed.

Credit risk relates to the risk that a party will default before the maturity/expiration of the transaction and will be unable to meet all contractual payments, thereby resulting in a loss for the other party to the transaction. A valuation adjustment for credit reflects the amount at which such risk is valued by a market participant. The theory for such an adjustment is fairly straightforward: a bank originating a derivative would distinguish between a credit ‘risky’ counterparty and a hypothetical credit ‘risk-free’ counterparty by charging the credit risky counterparty a spread for entering into the contract. Similarly, if a bank were to sell an existing derivative asset to a market participant, then the market participant would, with other things being equal, pay less for a trade with a risky counterparty than for a trade with a riskless counterparty.

The valuation adjustments to reflect the two-way risk of loss for the counterparty and the reporting entity/bank are commonly referred to as a credit valuation adjustment (CVA) – i.e. those reflecting the counterparty’s credit risk – and a debit valuation adjustment (DVA) – i.e. those reflecting a bank’s own credit risk. Although each may be relevant for both derivative assets and liabilities, CVA tends to be most significant for derivative assets and DVA for derivative liabilities. However, for some instruments, such as a purchased option, only one party – the investor in (or purchaser of) the instrument – is exposed to the credit risk of the issuer. Such a position is often referred to as a unilateral derivative.

9.7.1 Credit valuation adjustments

A CVA is an estimate of the price of assuming the risk of credit losses in a financial instrument. For a derivative (or portfolio of derivatives), CVA is the price of the default risk with a particular counterparty, net of the effect of collateral.

Credit adjustments for derivatives can be calculated for a transaction, single counterparty or portfolio of similar counterparties. In our experience, the single counterparty and portfolio of similar counterparties’ approaches are the most common. A CVA is based on counterparty credit risk taking into account:

- derivative netting arrangements – e.g. the netting terms in an ISDA agreement and a bank’s legally enforceable right to set off positions;
- risk of future default (see 9.7.2 and 9.7.3); and
- collateral held (see the discussion in 9.3).
IAS 39 does not provide guidance on how the CVA is to be calculated beyond requiring that the resulting fair value reflects the credit quality of the instrument. In our experience, a number of different methodologies are currently applied by banks to calculate CVAs. Unlike investments in conventional loans and securities for which the credit exposure can be considered largely fixed at the amount invested, the credit exposure related to a derivative instrument can vary greatly and quickly as market values change. This is a feature that market participants would generally be expected to consider in pricing a transaction. Accordingly, banks use a variety of more complex approaches that model current and expected future credit exposures using simulation techniques and volatility assumptions.

9.7.2 What is a common method of calculating CVA for interest rate swaps?

In our experience, a common method for calculating CVA for interest rate swaps is similar to the Basel regulatory capital loan loss provisioning methodology whereby CVA is equal to exposure at default (EAD) multiplied by the probability of default (PD) and the loss given default (LGD).

The following provides a broad indication of the components of the calculation, and how the data may be derived for each component.

- **EAD** – uses simulation techniques, such as Monte-Carlo, or regulatory add-on factors.
- **PD** – uses actual historic default rates or implied current market default rates which can be obtained from credit default swaps (CDSs) or broker quotes for debt instruments. Where there is no directly observable CDS market, proxies for market default rates may be obtained from CDS indices and consensus pricing service data. In our experience, market participants generally appear to have moved towards using implied current market default rate data in their models when possible, which is designed to capture the risk of all losses, including the uncertainty inherent in the loss estimates. The PD data utilised in this method reflects the incremental PD from one period to the next, which recognises at each point that default did not occur in past periods. This prevents the calculated total CVA exceeding the maximum potential loss across the life of the swap.
- **LGD** – is based on the estimated level of expected recovery should a counterparty default and may be obtained from a bank’s own historical experience or from rating agency data. Such estimates take into account the level and quality of collateral held.

A graphical illustration of how a CVA for an interest rate swap is calculated under this method is provided below. A typical pattern of the forecast mark-to-market (MTM) value of an interest rate swap over time is illustrated with the MTM value at each future point in time (i.e. the EAD) used as an input into the calculation of the overall CVA.
The method above is one possible approach; however, there is no mandated methodology and other approaches may be appropriate. The method described is based on an assumption that the market factors underlying other components of a derivative valuation are not correlated with counterparty default. However, for certain OTC derivatives counterparty credit risk is impacted by the derivative underlying’s volatility, the counterparty’s credit spread volatility and the correlation between the underlying variable and the probability of default of the counterparty (often referred to as the wrong-way risk).

For example, for a bank that purchased credit protection through a credit derivative (such as a CDS), a movement in the underlying credit spread that increases the asset value of the derivative to the bank may also increase the likelihood of the counterparty defaulting if the movement also reflects a significant reduction in the derivative counterparty’s credit standing. A recent example of such wrong-way risk occurred when some monoline insurers wrote significant amounts of mortgage credit protection. When credit risk of those mortgages increased significantly causing the market value of the receivable from the monolines (i.e. the fair value of CDSs) to also increase significantly, the credit risk of the monoline insurers increased. Accordingly, CVA may need to incorporate adjustments to reflect the correlation between credit risk and other underlying market variables.

Whichever method of calculating CVA a bank adopts, it is important for it to be calibrated against actual transaction prices, including understanding how it is aligned with the pricing methodologies applied by the bank’s front office staff.

9.7.3 What about debit valuation adjustments?

When estimating the fair value of a derivative, some banks may consider themselves to be risk-free or use such an assumption as an approximation when the counterparty has a much lower credit standing. Additionally, because the current definition of fair value in IAS 39 refers to the price at which a liability could be ‘settled’, some believe that little if any discount for own credit risk would be obtained in a negotiated early settlement of a derivative liability with the counterparty. Also, unlike CVA, DVA cannot be hedged effectively, nor monetised, and generally equity analysts exclude it in their assessment of entities. These arguments have been used to rationalise not recording a DVA.

However, in our experience many major banks include bilateral credit adjustments (i.e. both CVA and DVA) for derivatives that may change from payables to receivables during their life. Such an approach appears consistent with the IAS 39 requirement for the fair value of a financial instrument to reflect credit risk. A report issued by the IASB Expert Advisory Panel in October 2008, *Measuring and disclosing the fair value of financial instruments in markets that are no longer active* (IASB EAP report), states that fair value includes own credit risk and that one of the components of the fair value of an entity’s financial liabilities is the credit risk that the market participants would require to take on the credit risk of the instrument. However, the IASB EAP report also observes that there is some inconsistency in practice as not all entities make the bilateral credit adjustments. The IASB EAP report assumes that an entity that does not include own credit risk when valuing derivatives presumably does not do so because of credit enhancements (e.g. posted collateral) or because it has concluded that the effect is not material.

IFRS 13 specifically states that the fair value of a liability reflects the effect of non-performance risk, which is the risk that an entity will not fulfil an obligation. Non-performance risk is assumed to be the same before and after the transfer of the liability. Non-performance risk includes an entity’s own credit risk. The requirement to include own credit risk is also consistent with the requirement to value a financial liability from the perspective of an entity that holds this item as an asset, and should lead to greater consistency in practice between the calculation of DVA and CVA in measuring derivative assets and liabilities. 
In principle, the credit risk adjustments (i.e. CVA and DVA) made as part of the fair value measurement of a financial instrument should be the same for both counterparties to the instrument. However, in some circumstances this may not be the case, such as when the unit of account for the asset is not the same as for the liability – e.g. in certain circumstances when the liability is issued with an inseparable third-party credit enhancement such as a guarantee.

In our experience, when calculating DVA for derivatives, market participants use similar models to those used for CVA calculations.

### 9.8 How is liquidity risk incorporated into the valuation model?

If OTC derivatives are initially valued using a mid-market interest rate curve, which is often the case, then a liquidity/close-out adjustment is needed to arrive at an appropriate bid price (for derivatives that are assets at the time of the valuation) or ask price (for derivatives that are liabilities at the time of the valuation). The liquidity adjustment represents the amount that would be incurred to close out the derivative position.

In the context of financial instruments with a quoted price in an active market, IAS 39 states that the fair value of a portfolio is the product of the number of instruments held and the quoted market price, implying that a blockage factor or discount to the market price based on the size of the position would not be appropriate.

IFRS 13 explicitly states that an entity selects inputs that are consistent with the characteristics of the asset or liability that market participants would take into account when pricing the asset or liability; and that an entity does not apply a premium or discount if it reflects size as a characteristic of the entity’s holding (e.g. a blockage factor). A ‘blockage factor’ is a discount that adjusts the quoted price of an asset or a liability because the market’s normal trading volume is not sufficient to absorb the quantity held by the entity.

For example, a bank may hold a large number of identical financial instruments, but the market for the instrument does not have sufficient trading volume to absorb the quantity held by the bank without affecting the price. IFRS 13 clarifies that a blockage factor is not a characteristic of an asset or a liability but a characteristic of the size of the entity’s holding, and it expressly prohibits the application of blockage factors. This guidance applies to all instruments regardless of their classification in the fair value hierarchy.

While a blockage factor reflects the marketability based on the size of a total position that is an aggregate of multiple instruments, a liquidity discount reflects the marketability based on the unit of valuation. Therefore, the unit of valuation is critical to determining whether a discount’s nature is that of a blockage factor or a liquidity discount and the guidance below (in the next box) regarding changes to the unit of valuation needs to be considered when a bank applies the optional portfolio measurement exception in IFRS 13.
For non-exchange traded derivatives, liquidity (or bid-ask) adjustments are usually computed with reference to the relevant market risk parameters that impact the valuation of the instrument. This may reflect the way in which prices are quoted for the instruments (e.g. a spread between pay-fixed and receive-fixed rates on an interest rate swap) and how market participants view derivatives as primarily a means of trading these underlying market risks.

For interest rate swaps, a common method for determining interest rate liquidity adjustments is illustrated in 9.8.1. For other derivatives, additional bid-ask spread adjustments may be appropriate for specific market risk parameters associated with a transaction – e.g. for the volatility risk of a trade. For instruments with a low level of observable input, a high degree of judgement will likely be required in determining the appropriate liquidity adjustment.

When a bank has a group of derivative assets and derivative liabilities with offsetting market risks, mid prices can be used to value the offsetting risk positions with bid and ask adjustments applied to the net open position. IAS 39 does not define more precisely what ‘offsetting market risks’ are. Judgement may be needed in practice to ensure that market risks are only offset to the extent appropriate – e.g. dissimilar risks are not offset and basis differences are considered in determining net positions. Common practice amongst banks when considering interest rate risk is to stratify their derivative portfolios into maturity or repricing time periods or ‘buckets’ and calculate net positions per bucket. A bid-ask spread (or a close-out) adjustment is then applied to the net position in each bucket.

As noted in section 6, under IFRS 13, the use of bid prices for long positions and ask prices for short positions is permitted, but not required. Instead, entities are required to use the point in the bid-ask spread that is most representative of fair value. IFRS 13 applies the same principle to all levels in the fair value hierarchy.

IFRS 13 includes an optional exception for the measurement of a group of financial assets and liabilities that is exposed to market risks and to the credit risk of each of the counterparties, if certain criteria are met (as detailed in 9.5). Judgement may be required to evaluate whether, based on the specific facts and circumstances, it is appropriate to apply the portfolio measurement exception.

The exception allows an entity to measure the fair value of a group of financial assets and liabilities on the basis of the price that would be received to sell a net asset position or transfer a net liability position for the particular risk exposure that is managed on a group basis. It appears that the application of this portfolio measurement exception changes the unit of valuation from the individual financial asset or financial liability to the net position for a particular risk exposure. We believe that the size of the net risk exposure is a characteristic to be considered when measuring the fair value of the net risk exposure.

9.8.1 How is bid-ask spread calculated in practice for interest rate swaps?

For a portfolio of vanilla interest rate swaps, the spot rate discount curve and the forward rate cash flow estimation curve are the primary inputs into the basic valuation model. Most common yield curves, such as LIBOR, have observable bid-ask spreads, which are generally available from news and pricing services, such as Reuters and Bloomberg (in both data point and graphic curve formats).
As discussed above, typically a bank will value its entire interest rate swap portfolio using mid curves. Then, to quantify the adjustment from the mid curves to bid and ask prices for the portfolio as a whole in the single-curve approach, the bank may adopt a process similar to the following common process. Additional complexities arise when a multi-curve approach is applied.

• Step 1 – Calculate the sensitivity of the present value of the portfolio to a one basis point change in the curves used in the valuation model (often referred to as ‘PV01’). A PV01 figure measures in currency terms how much the present value of a position will change if the yield curve is moved up or down one basis point.

• Step 2 – Disaggregate the resulting total amount into the sensitivities of the valuation across a number of future time points (or buckets) based on the repricing or maturity profile of the instruments in the portfolio. A number of mathematical approaches are possible for disaggregating a portfolio’s PV01 results in to time buckets.

• Step 3 – Compare the generally observable bid and ask curves (created along with the mid curves) to the mid curves to identify the bid-mid and bid-ask spreads for each time point or bucket.

• Step 4 – Use the sensitivity amount (i.e. disaggregated PV01) and the observable bid or ask spread for each time point/bucket to calculate the bid or ask adjustment for that point.

• Step 5 – Sum the bid and ask adjustments calculated for each time bucket to determine the overall portfolio level liquidity adjustments.

For example, a bank may find that its swap portfolio has a PV01 of +25 million at the one-year point (Step 2). By comparing the bid curve to the mid curve (Step 3), the bid to mid spread can be calculated at the one-year point using the corresponding PV01 calculation (Step 4). In this example, the bid to mid spread at the one-year point is three basis points (bps). A bank then multiplies the spread by the PV01 sensitivity, which at the one-year point is +25 million, to determine a mid-bid adjustment value of +75 million for the one-year bucket. Finally, a bank sums all of the resulting buckets to calculate the mid-bid portfolio adjustment (Step 5), which as shown in the example below is +1,675 million.

The following illustrative and simplified example shows the above common method of calculating the bid-mid-ask adjustments for a portfolio of interest rate swap contracts within a one-year repricing/maturity timeframe.

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>1 week</th>
<th>1 month</th>
<th>3 months</th>
<th>6 months</th>
<th>1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV01 [A] (STEP 2)</td>
<td>100</td>
<td>200</td>
<td>500</td>
<td>-100</td>
<td>-50</td>
<td>25</td>
</tr>
<tr>
<td>Bid/mid spread (bps) [B] (STEP 3)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ask/mid spread (bps) [C] (STEP 3)</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>Bid/mid adjustment [A x B] (STEP 4)</td>
<td>200</td>
<td>400</td>
<td>1,000</td>
<td></td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>Ask/mid adjustment [A x C] (STEP 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-200</td>
</tr>
</tbody>
</table>
The calculation of liquidity (close-out) adjustments may involve complexities similar to those mentioned above for the construction of the basic mid curve (e.g. overlapping data points and interpolation). In addition, challenges may include:

- ensuring that the offsetting of risks is done appropriately before the calculation of a liquidity adjustment at a group level; and
- disaggregating a group level calculation, which may reflect netting across legal entities, when preparing the individual financial statements of a bank’s subsidiaries.

9.9 How is adjustment for administrative costs calculated?

Administrative (also referred to as maintenance or servicing) cost adjustments reflect the costs that a market participant would expect to incur over the life of an existing derivatives portfolio, including system and operational costs. The precise costs that a market participant would incur in respect of a portfolio of derivative are difficult to quantify, but they are not zero and all market participants would incur some. Certain banks have more sophisticated models to capture the associated costs than others.

Although each market participant maintains settlement systems and bank accounts, and process payments and receipts, the associated costs will differ by entity and will not necessarily vary in line with the number of derivative trades, since certain system costs will be borne regardless of volume. Estimating costs that should be included in the valuation model requires judgement and ultimately only adjustments that market participants would price in for future administration costs are included.

Furthermore, in our experience if a transaction contains complex terms and requires extensive documentation, then market participants might demand a premium to compensate them for the costs necessary to understand and evaluate the terms of the specific instrument, or the potential additional hedging costs that might have to be incurred. The IASB EAP report also notes this as an example of another type of administrative cost that may have to be taken into account in valuing a derivative.

When evaluating whether and to what extent an administrative costs adjustment is appropriate, it is important for a bank to ensure that it does not double count the effect of a feature. For example, if the compensation that a market participant might demand for servicing a transaction is already factored into a bid-offer spread adjustment, then it should not be duplicated in an additional administrative costs adjustment.

9.10 How is model uncertainty addressed?

Model uncertainty is a factor incorporated into derivative valuations by market participants. However, IFRS does not provide specific methodologies for determining valuations or model uncertainty valuation adjustments, since modelling best practices change with time, developments of derivative products and the views of investors.

9.11 How is a model’s ongoing reliability assessed?

A valuation technique is periodically tested against any observable current market transactions in the same instrument or against other relevant observable market data to confirm its validity. If this testing provides evidence that the valuation technique does not arrive at a price that appropriately reflects current market conditions, then the technique should be calibrated to the market. The market data should be obtained consistently in the same market in which the instrument was originated or purchased.
As discussed in section 4, under IFRS 13 an entity is to measure a financial instrument assuming a transaction takes place in the principal market for the asset or liability, or in the absence of a principal market, in the most advantageous market.

A calibrated model is one that reproduces values that are consistent with observed market prices. Data used for calibration may include indices, brokers’ quotes or consensus pricing data, provided that such data reflects actual market transactions.

For example, assume that Bank L has a portfolio of OTC equity options. Because the terms of the options are tailored, there are no observable trades in the market for identical instruments. As a result, the bank uses a model to measure the fair values of the equity options. The bank determines what observable data is available for input into its valuation model. It concludes that it is possible to observe the prices of the underlying equities and the selected ‘risk-free’ rate.

Bank L then estimates the expected volatility of the equity prices. It decides that it will base its estimate of expected volatility on the historical volatility of the entities’ equity prices with adjustment to incorporate expected future volatility, because historical volatility on its own may not always be a good indicator of future volatility that a market participant would use in pricing an equity option. Accordingly, the model used to measure the fair values of the options will be calibrated periodically using actual observable data, such as the implied volatility of traded equity options issued by similar entities.

Calibration is more frequently required for models valuing complex and exotic derivatives. For example, if valuation requires an entity to take into account foreign exchange and equity correlations and the entity’s model does not do so, then an adjustment would be required that brings the model in line with what a market participant would be willing to pay. When an adjustment is required for such a model weakness, in general a bank would not expect the adjustment to persist over the longer term. This is because over time new techniques become available and therefore a model adjustment that corrects a known error should become unnecessary.

Selecting a valuation technique involves risk in respect of the ongoing appropriateness of the technique and the related inputs, particularly those inputs that are unobservable. For example, as the IASB EAP report notes, a model might have appropriately reflected market conditions when markets were more liquid, but might not do so when liquidity decreases. This might be the case even when the inputs used in the model are still available and observable. In such circumstances, adjustments to the model are required to ensure that it continues to provide an reasonable estimate of the fair value of the instrument. As market practices for pricing financial instruments continue to evolve, banks should monitor developments in valuation methodologies and practices and update their valuation models as, and when, appropriate. For example, it was less than five years ago that market participants began seriously considering the use of OIS for discounting cash flows for the purpose of valuing of collateralised derivatives.

However, it is also important that a bank’s valuation techniques are consistent from period to period. Changes are appropriate only when a bank can demonstrate that the revised technique and assumptions provide a better estimate of fair value and are consistent with the techniques and inputs used by other market participants. In this situation, banks would also need to consider the requirements of IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors.
10. How is fair value established if a model estimates a range or if a number of models are used?

When the outcome of a valuation model is a range of estimates, then the probabilities of the estimates within the range are determined and applied to arrive at a single estimate of fair value.

In our view, if different models are used and each model gives a different outcome (e.g., when a new model is being developed or a secondary model is used to corroborate the primary model), then judgement should be used in determining which outcome is likely to be most reliable. In applying judgement, a bank may consider the sources of inputs; for example, the experience and expertise of the brokers providing different quotes within a range, giving greater weight to a quote from the broker of the instrument who has the most detailed information about it, and the availability of corroborating evidence in respect of some inputs.

Generally, we do not believe that it is appropriate to simply use the average outcome of various valuation models as a fair value measure in the financial statements, because averages may not represent a price at which a transaction would take place between market participants on the measurement date. However, in some circumstances, it is possible that an averaging analysis might be a reasonable basis for a model uncertainty valuation adjustment.

IFRS 13 provides specific guidance for circumstances when multiple valuation techniques are used to measure fair value. It requires that the results are evaluated considering the reasonableness of the range of values indicated by those results. Fair value measurement is the point within that range that is most representative of fair value in the circumstances. A wide range of fair value measurements may be an indication that further analysis is needed.

Also, IFRS 13 gives specific guidance for situations in which the volume or level of activity has significantly decreased and a bank concludes that the market for that asset or liability is not active. In such cases, it may be appropriate for the bank to change the valuation technique or to use multiple valuation techniques to measure the fair value of an item.

11. How are portfolio level adjustments allocated for financial statement reporting and disclosure purposes?

Valuation adjustments calculated at a portfolio level are reflected appropriately when presenting the related derivatives in the statement of financial position and for disclosure purposes, for example disclosure of the fair value hierarchy.

IAS 39 does not prescribe particular allocation methods and in our experience methods applied vary based on the nature of the derivative portfolio and the level of sophistication of a bank's systems. A bank should perform such allocations on a reasonable and consistent basis.

An allocated portfolio level adjustment is taken into account in determining a derivative's level in the fair value hierarchy. The adjustment is an input in the fair value measurement of the derivative and the level in which the fair value measurement is categorised is determined on the basis of the lowest level of input that is significant to the fair value measurement in its entirety.
For example, assume that Bank B holds a portfolio of OTC derivative assets and derivative liabilities that it manages on the basis of its net exposure to market risk. The bank uses mid-market prices as a basis for establishing fair value for the offsetting risk positions and applies the bid or ask price to the net open position. Also assume that the inputs to the portfolio level counterparty credit risk adjustment – i.e. CVA, for a particular counterparty, Company V – are unobservable, while all other inputs to the fair value measurement of the portfolio and its individual derivatives are observable (Level 2 inputs). If the counterparty CVA allocated to the derivatives entered into with Company V is significant to the fair value measurements of each of the individual derivatives, then those derivatives are categorised within Level 3. However, if the CVA was significant only to the fair value measurement of some of the individual derivatives with Company V in the portfolio, and not to the fair value measurements of others, then the former would be categorised as Level 3 measurements and the others as Level 2 measurements accordingly.

See 13.3 for a discussion of allocating portfolio level adjustments for hedge effectiveness assessment and measuring ineffectiveness.

12. What if the fair value calculated by the model results in an apparent gain at initial recognition of the financial instrument?

12.1 How does a day one gain occur?

A bank may believe that the initial fair value of a derivative instrument exceeds the consideration paid or received. There are a number of reasons why this may be the case. For example, a bank may:

• acquire a financial instrument in one market and intend to sell it or issue an offsetting instrument in a different market;
• repackage the instrument; or
• build a structuring or arrangement ‘fee’ into the initial transaction price.

Additionally, the consideration may include compensation for something in addition to the financial instrument, particularly if the transaction is not based on market terms and no market prices are observable for such a transaction. In this case, the amount of the additional compensation would need to be deducted from the total consideration to determine the transaction price for the financial instrument.

For example, a bank may enter into a foreign exchange forward contract with a client and subsequently enter into an equivalent offsetting contract with another bank to economically hedge the market risk. An issue then arises as to whether the forward contract with the client may initially be measured at its fair value in the selling (interbank) market and a gain recognised on initial recognition – a day one gain.

Similarly, an issue arises as to whether an apparent gain resulting from a built-in ‘fee’ may be recognised immediately. Such a day one gain may arise from a bank’s pricing in vanilla markets (the most common transaction by volume, although potential gains tend to be small), or in bespoke and complex derivative contracts (which have larger potential gains and generally more complicated recognition principles).
12.2 What is the treatment of a day one gain at initial recognition of a derivative?

IAS 39.AG76

The best evidence of the fair value of a financial instrument at initial recognition is deemed to be the transaction price (i.e. the consideration paid or received), unless the fair value can be evidenced by comparison to other observable current market transactions in the same financial instrument (without modification or repackaging) or is based on a valuation technique that uses only observable market data as inputs. Therefore, a gain may be recognised on the initial recognition of a financial instrument only if a fair value that is different from the transaction price is calculated for that same financial instrument by reference only to market data. However, in our experience the practice of some banks is to recognise losses immediately, even if their computation is not based wholly on observable market data. Additionally, in our experience banks may consider recognition of day one gains consistent with the principle established in IAS 39 if any unobservable inputs used in the valuation technique that forms the basis for determining an instrument’s fair value at initial recognition are judged to be insignificant in relation to measuring the day one gain.

What constitutes ‘observable market data’ may be a matter of judgement and just because a market is not active does not mean that market data is not observable. As a simple example, assume that Bank F is valuing a long-dated debt security at 30 January and observes a similar long-dated trade in the market at 30 January, but does not observe any other long-dated trades during the month of January. The 30 January trade in a similar debt instrument might be viewed as providing observable market data even though the market may not be considered active.

Judgement is needed to assess whether prices for similar instruments, observed at dates (and times during a day) different from the time that bank measures the position, constitute observable market data in respect of the instrument being valued. An adjustment to an observed price may also be needed to reflect the different credit risk of the counterparties to the observed transaction compared to the counterparty to the instrument being valued.

In our experience, unobservable inputs are typically required for derivatives with long-dated maturities, options that are deep in-the-money or deep out-of-the-money and derivatives that have inputs based on asset-to-asset and asset-to-currency correlations.

12.2.1 What about a bank that has access to multiple markets?

IAS 39.BC98

The objective of fair value measurement is to arrive at the price at which a transaction would occur at the measurement date in the same instrument in the most advantageous active market to which a bank has immediate access. Therefore, if a bank operates in, and has immediate access to, more than one active market, then it uses the price at which a transaction would occur at the balance sheet date in the same instrument without modification or repackaging in the most advantageous active market.

For example, assume that Bank R enters into a derivative transaction with Corporate U and receives an upfront premium of 100. R has immediate access to a more advantageously priced dealers’ market in which the premium payable is 95. R recognises a profit of 5 on initial recognition of the derivative instrument with U. However, R adjusts the price observed in the dealer market for any differences in counterparty credit risk between the derivative with U and that with the dealers’ market. Such a valuation adjustment may however prevent the conclusion that the price in the dealer market is calculated by reference only to observable data.
IFRS 13 introduces consequential amendments to IAS 39 (and IFRS 9) that align the guidance on measurement with the definitions in IFRS 13 but without substantively changing the threshold for the recognition of day one gains and losses. The standard reiterates that transaction price is normally the best evidence of the fair value of a financial instrument on initial recognition. However, there may be cases where it is appropriate for a bank to determine that the fair value at initial recognition is different from the transaction price.

If the entity’s fair value measurement is evidenced by a quoted price in an active market for an identical asset or liability or is based on a valuation technique that uses only data from observable markets, then the entity immediately recognises a gain or loss. This gain or loss is equal to the difference between the fair value on initial recognition and the transaction price.

If the entity determines that the fair value on initial recognition differs from the transaction price but this fair value measurement is not evidenced by a valuation technique that uses only data from observable markets, then the carrying amount of the financial instrument on initial recognition is adjusted to defer the difference between the fair value measurement and the transaction price.

Also as noted in section 4, under IFRS 13, fair value measurement assumes that a transaction takes place in the principal market for the financial instrument. In the absence of a principal market, it is assumed that the transaction takes place in the most advantageous market.

If a gain is not supported by observable inputs, then the most common approach is to record the value of the derivative as calculated by the model and also record a valuation adjustment on a sub-line of the ledger for the amount of the gain, such that the net of the two lines equals the transaction price. In this way, the derivative’s day one gain can be tracked over time.

12.3 What is the subsequent treatment of a day one gain not recognised at initial recognition of an instrument?

When a gain or loss is not recognised on initial recognition of a financial instrument, a gain or loss is recognised subsequently only to the extent that it arises from a change in a factor (including time) that market participants would consider in setting a price.

There is no further detailed guidance on how banks should recognise ‘suspended’ day one gains or losses. A bank should establish consistent accounting policies and methods for determining the recognition of day one gains. These should be supported by robust valuation processes and controls for each type of financial instrument.

In our experience, the practical methods applied for subsequent measurement are diverse. The following are common approaches.

- Amortising the gain or loss on a reasonable basis over the life of the derivative contract. This may be appropriate for instruments for which the sensitivity of the valuation to the unobservable input(s) tends to decay in line with the passage of time.
- Recognising the gain or loss when the contract matures or when the underlying parameters become observable, whichever comes first. In practice, observability may arise through a bank entering into actual trades or obtaining executable independent broker quotes (i.e. quotes on which the bank could transact).
13. What is the impact of hedge accounting on the measurement of derivatives?

13.1 The basic principles of hedge accounting

Because IAS 39 uses a mixed measurement model requiring the measurement of different financial assets and liabilities on different bases, an accounting mismatch may result. Such a mismatch may create profit or loss volatility that may not most usefully reflect the underlying economics of the transactions. Hedge accounting may allow a bank to address such accounting mismatches.

For example, many financial assets and liabilities are measured at amortised cost, while generally all derivatives are measured at fair value through profit or loss, even derivatives used for economic hedges and derivatives that will be held to maturity. Similarly, other IFRSs require or permit assets and liabilities to be measured on bases other than fair value through profit or loss, and certain contracts, for example executory contracts, are recognised in the financial statements only to the extent of performance.

Hedge accounting may allow a bank to selectively measure assets, liabilities and firm commitments on a basis different from that otherwise required under the applicable IFRS, or to defer the recognition in profit or loss of gains or losses on derivatives. Since hedge accounting results in a bank deviating from the normal measurement or presentation requirements under IFRS, it is permitted only when strict criteria are met.

IAS 39.71

There are three hedge accounting models and the type of model applied depends on whether the hedged exposure is:

- a change in the fair value of an asset, liability, or an unrecognised firm commitment;
- a variability in cash flows; or
- a currency exposure on a net investment in a foreign operation.

Hedge accounting is voluntary and the decision to apply it is made on a transaction-by-transaction basis. If an economic hedge does not qualify for hedge accounting, then any derivative used is measured at fair value, with all changes in fair value recognised in profit or loss, and the hedged item is measured in the usual way.

The subsequent accounting treatment of the hedging derivative and the hedged item depends on the hedge accounting model applied, as summarised in the table below.

<table>
<thead>
<tr>
<th>Hedge accounting model</th>
<th>Hedged item</th>
<th>Hedging derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair value</td>
<td>Adjusted for fair value changes attributable to the risk being hedged. The adjustment is recognised in profit or loss.</td>
<td>At fair value through profit or loss in the usual way.</td>
</tr>
<tr>
<td>Cash flow</td>
<td>Not adjusted.</td>
<td>Effective portion of the gain/loss recognised in other comprehensive income (OCI). Ineffective portion recognised in profit or loss. Gains/losses from OCI transferred to profit or loss to match hedged cash flows.</td>
</tr>
<tr>
<td>Net investment</td>
<td>Similar to cash flow hedges.</td>
<td>Similar to cash flow hedges, although transfer of gains/losses from OCI to profit or loss occurs on disposal of net investment.</td>
</tr>
</tbody>
</table>
Hedge accounting is not the subject of this publication and further information on this topic can be found in 7.7.20–7.7.1010 of the 9th Edition 2012/13 of our publication Insights into IFRS (7.7.20–7.7.1010 of the 8th Edition 2011/12). This publication focuses on the impact of certain aspects of derivative valuation on hedge accounting, including the treatment of portfolio level adjustments and effectiveness testing.

13.2 What is the impact of derivative portfolio valuation adjustments on hedge accounting?

Allocated portfolio valuation adjustments included in measuring the fair value of derivatives can impact hedge effectiveness assessments and the measurement of hedge ineffectiveness, since comparable offsetting adjustments may not be present in, or relevant to, the hedged item. These differences in measurement may lead to a conclusion that the hedging relationship has not been and/or is not expected to be highly effective and could possibly lead to hedge accounting being discontinued prospectively. In our view, banks should consider the effect of both changes in counterparty credit risk and own credit risk on the assessment of hedge effectiveness and the measurement of hedge ineffectiveness.

As previously noted, when a bank has a number of derivative instruments with a counterparty that are subject to a single master netting agreement, margining or collateralisation, the bank may calculate the effect of changes in counterparty and own credit risk by means of a valuation adjustment at the portfolio level. Other valuation adjustments may also be made at the portfolio level. However, when assessing hedge effectiveness and recognising ineffectiveness, a bank needs to determine how portfolio adjustments should be allocated to individual instruments in the portfolio in order to arrive at the fair values of the individual hedging derivatives – or the respective group of derivatives if they have been designated together as the hedging instrument in a single hedging relationship. See section 11 for a discussion of allocating portfolio level adjustments.

IAS 39 does not require a single method for the prospective and retrospective assessment of effectiveness and the method applied may be different for different types of hedges. This allows flexibility in selecting an appropriate method that minimises potential ineffectiveness.

In our experience, the periodic measurement of hedge effectiveness usually involves a method that compares the actual change in fair value of the hedged asset or liability or hedged cash flows with respect to the hedged risk with the change in the fair value of the hedging instrument (an offset method). The offset method measures the degree of offset between changes in the fair value of the hedging instrument and changes in the fair value or cash flows of the hedged item, as a percentage. Additionally, retrospective effectiveness is usually measured on a cumulative basis, as opposed to a period-by-period basis, since the cumulative basis will often make a hedge more likely to meet the effectiveness tests.

13.3 How can banks deal with the impact of derivative valuation adjustments on hedge effectiveness?

Given the concern about hedge effectiveness failures following the inclusion of portfolio level adjustments in the fair value of individual derivative hedging instruments, banks often use regression analysis or other statistical methods to demonstrate that hedge relationships are effective retrospectively. Such methods are used because of the complexities with assessing effectiveness that can arise with the offset method, such as when a hedging derivative at the start of the measurement period is valued near zero or when a hedging relationship is nearing expiration. For example, the ‘small numbers’ problem can arise when fair value changes are very small in absolute terms but significant from a ratio perspective, possibly causing the offset method to indicate that a hedge relationship is ineffective.
Additional ways banks can structure the designation of hedge relationships so as to maximise the likelihood of achieving hedge effectiveness are discussed in 7.7530–670 in the 9th Edition 2012/13 of our publication *Insights into IFRS* (7.7530–670 in the 8th Edition 2011/12).

**IAS 39 AG107 IGF.5.2**

Even when it is concluded that a hedge has been highly effective, the allocation of derivative portfolio level valuation adjustments will result in ineffectiveness being recognised in profit or loss for fair value hedges. Such adjustments also require the recognition of ineffectiveness in profit or loss for cash flow hedges if the cumulative gain or loss on the hedging derivative is greater than the cumulative change in fair (present) value of the expected future cash flows on the hedged item. Similarly, for net investment hedges in which the hedging instrument is a derivative, ineffectiveness is recognised in profit or loss if the gain or loss on the hedging derivative exceeds the foreign exchange differences arising on the designated net investment.

As noted previously, in our view a bank should adopt a reasonable and consistently applied methodology for allocating credit risk and other valuation adjustments determined at a portfolio level to individual derivative instruments for the purpose of measuring the fair values of individual hedging instruments that are used in assessing effectiveness and measuring hedge ineffectiveness.

### 13.4 What strategies can help reduce hedge ineffectiveness?

For fair value hedging relationships, banks can seek to minimise the amount of hedge ineffectiveness through appropriate designation of the hedged risk. This involves identifying the primary driver impacting the ineffectiveness of the hedge relationship and minimising its impact through the designation of the hedged risk.

In our view, it is possible to reduce ineffectiveness by designating a portion of the cash flows as the hedged item, as long as the designated risks and portions are separately identifiable and reliably measureable. Further complexities impacting hedge effectiveness arise when collateralised derivatives that are valued using OIS curves are used in hedge relationships, which is increasingly the case.

When a cash flow hedging relationship includes a collateralised derivative as the hedging instrument and the bank uses the hypothetical derivative method for measuring hedge ineffectiveness, a bank should ensure that it states in its hedge documentation that it considers the hypothetical derivative to be a collateralised instrument in order to minimise hedge ineffectiveness in profit or loss. This is because such an approach would result in the valuation of the hypothetical derivative, which acts as a proxy for the hedged item, being valued using the same OIS discount rate as the collateralised hedging derivative. For a discussion of the application of the hypothetical derivative method, see 7.7630.10–50 in the 9th Edition 2012/13 of our publication *Insights into IFRS* (7.7630.10–50 in the 8th Edition 2011/12).
Additionally, we believe that when existing hedge documentation is silent on whether the hypothetical derivative instrument is collateralised, it is possible to adjust the discount rate applied to the hypothetical derivative to an OIS rate when, due to changes in the market valuation convention, the bank has determined that it is appropriate to use an OIS discount rate for the hedging derivative, without the change resulting in a hedge de-designation and redesignation event.

However, in our view the hypothetical derivative method is not available in a fair value hedging relationship; therefore, ineffectiveness may arise when there is a change in market valuation conventions that affect the discount rate that is used to determine the fair value of a hedging instrument. For example, Bank E has designated a collateralised pay-fixed receive-floating interest rate swap in a fair value hedge for changes in six-month LIBOR. Banks may seek to reduce ineffectiveness through de-designation and redesignation of the hedge relationship going forward.

14. Derivative valuation going forward

As we have discussed, IFRS does not specify methodologies or models for valuing derivatives or determining valuation adjustments. This is partly due to the fact that market practices and conventions evolve over time. Therefore, banks select valuation techniques and assess their ongoing acceptability for determining fair value, including incorporating inputs that are consistent with observed market prices.

This publication provides an overview of some of the issues relevant to the determination of fair value for derivatives under IFRS. However, estimating the fair value of financial instruments can be complex and require specialist expertise. If you would like any further information on any of the matters discussed in this *IFRS Practice Issues for Banks* publication, then please talk to your usual local KPMG contact or any of our banking contacts listed on the back page.
About this publication

This publication has been produced by the KPMG International Standards Group (part of KPMG IFRG Limited) in collaboration with IFRS banking specialists across the KPMG network.

Content

This IFRS Practice Issues for Banks publication considers the accounting requirements related to fair value measurement of derivatives and related portfolio valuation adjustments. The text of this publication is referenced to IAS 39 and to other selected IFRSs in issue and effective at 31 August 2012. It also discusses relevant considerations resulting from the application of IFRS 13 issued in May 2011, which is effective from 2013. References in the left-hand margin identify the relevant paragraphs. The publication also references certain sections of Insights into IFRS, KPMG’s practical guide to International Financial Reporting Standards, 9th Edition 2012/13 (and 8th Edition 2011/12).

This publication considers some of the key issues that a bank may encounter when applying the requirements of IFRS relating to derivative measurement, but it is not a comprehensive analysis of the requirements of IFRS for derivatives or financial instrument recognition, measurement or disclosure. In most cases, further analysis will be necessary for a bank to apply the requirements to its own facts, circumstances and individual transactions.

When preparing financial statements in accordance with IFRS, a bank should have regard to its local legal and regulatory requirements. This publication does not consider any specific requirements of any particular jurisdiction.

IFRS and its interpretation changes over time. Accordingly, neither this publication nor any of our other publications should be used as a substitute for referring to the standards and interpretations themselves.
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For a sector-specific or local perspective, including further reading on the valuation of financial instruments, follow the links to the IFRS resources available from KPMG member firms around the world, which are also available on www.kpmg.com.

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