



# The law of one price is gone

*In recent years, derivatives pricing has become increasingly complex, assuming a far greater significance than it had previously. Wayne Dennehy, co-head markets structuring and quantitative analysis, Kumeshen Naidoo, risk solutions group, and Shameer Sukha, co-head markets structuring at Absa explain the different factors and calculations that lead to banks quoting different prices on the same contract*

In the aftermath of the global financial crisis, banks realised that certain assumptions – taken for granted for many years – in relation to derivatives pricing needed to be reconsidered. For example, interest rate swap pricing and valuations were based on a model with the assumption that banks fund and invest at Libor flat (known as the ‘self-discounting’ framework). That is, the same yield curve used to forecast Libor for floating leg projections of a swap is also used to discount the projected cashflows under the swap.

Pre-crisis, factors such as counterparty risk, funding risk and capital costs were hardly considered when pricing derivatives, and the primary focus was to accurately price for the market risk of the transaction. Since developed markets are generally more transparent, market risk prices quoted to clients by different banks operating within these markets were generally similar.

There is now heightened awareness of the need to price and value for these additional factors. Since the required inputs to the calculation of these factors are not always transparent, their inclusion in the make-up of derivatives pricing will most likely lead to discrepancies among quoting banks, that is, the law of ‘one price’ no longer holds true.

This means that a client could receive four different derivative prices from four different banks on exactly the same contract priced at the same time. Under self-discounting, a dealer paying a fixed rate of 7% to one client and receiving 7.10% from another – swap terms being equal – would lock in a 10 basis-point margin. Today, this perceived ‘margin’ could in fact turn out to be a loss within the dealer’s books.

## **Pricing derivatives according to the underlying credit support annex**

Given the focus on additional risks arising from derivatives contracts, international practice has evolved to a stage where a derivative trade is priced uniquely according to the credit support annex (CSA) executed – or lack thereof – between bank and client. The CSA is an addendum to the standard International Swaps and Derivatives Association master agreement, and

governs the placing of collateral to mitigate credit exposures resulting from derivatives contracts traded between the two counterparties. There are currently five major considerations when pricing derivatives.

- 1. Credit valuation adjustment (CVA)** – This reflects the cost of mitigating credit risk that the bank faces to the counterparty on a derivative contract.
- 2. Debit valuation adjustment (DVA)** – This is the opposite of CVA, in the sense that it reflects the credit risk the counterparty faces towards the bank. For example, on a swap transaction, both counterparties are exposed to each other’s credit risk and one could argue that the blended credit spreads of the two counterparties is what should be considered.
- 3. Funding valuation adjustment (FVA)** – This refers to the funding consideration of the transaction when the collateral type and terms on the client trade are not in line with collateral type and terms of the market in which the bank will hedge the derivative. For example, if the bank has to post cash collateral on the hedge and does not receive it in return from the client, the bank would need to raise the cash itself as part of its usual funding operations.
- 4. Any embedded optionality or non-standard features within the CSA** – CSAs are negotiated agreements between parties with terms that can be as flexible as both parties agree to choose. Any optionality or non-standard feature could have a pricing implication due to the inconsistency when compared to the standard market CSA. For example, there could be thresholds that reduce according to a pre-determined schedule of one or both sides’ credit ratings, posting cash collateral in various currencies could lead to ‘cheapest-to-deliver’ optionality, or replacement clauses based on ratings downgrades could result in consideration of the replacement valuation adjustment (RVA).

- 5. Capital costs** – Banks price for the incremental cost of capital that will be consumed by the proposed derivative trade and, depending on their internal performance measurement policies and allocation of capital, would aim to achieve risk-adjusted returns in line with the overall business strategy while also ensuring that return on equity-like targets are achieved.

## **Different approaches by different banks**

Most international banks have well-established desks managing CVA, DVA and FVA emanating from their derivative positions. Local banks are at different stages in transforming their business to risk-manage these additional factors. Pricing is further complicated by the terms and conditions of collateral and the type of collateral that can be placed. For example, placing bonds versus cash versus ‘bank paper’ has different cost implications for the bank and the client. This makes it difficult for clients when comparing quotes across different banks. Even if three banks show the same all-in price, the economics may be quite different when one factors in the collateral costs/benefits.

There could be a significant discrepancy between CVA charges for clients with no liquid, observable credit default swap (CDS) or debt markets, since banks would have to proxy the applicable credit spread to price the client’s counterparty risk. In addition, offshore banks may differ from local banks in that they might include a sovereign credit risk premium in the CVA calculation. There are also no liquid CDS levels on banks or index equivalents (such as iTraxx Financials available offshore) to calculate which credit spreads should be used to price bank credit risk (DVA). Bank funding levels are more transparent, albeit only to the five-year point on the funding curve, which gives some transparency to FVA calculations.

Some banks might implement CVA/FVA policies that are adapted for these conditions, while also taking into account their internal operational and system constraints. For example, all derivative products might not be in scope of their policies. It also might not be possible to cater for DVA, since hedging this risk comes with challenges. So, while a particular bank might take the decision not to price for DVA, another bank might decide to pay-up a certain proportion only. The same would hold true for FVA and it relates ultimately to the hedging of these risks – it is straightforward to charge for the costs, but it is not easy to monetise the benefits. In addition, different regulatory capital methodologies lead to different capital amounts and, hence, different costs of capital, which compounds the pricing variability to the client.

It is acknowledged that the changing environment can cause uncertainty as well as frustration for clients. Some clients perceive this to be another way of the bank making more margin on the trade. However, this is not true and derivatives pricing is becoming quite scientific. For example, charging for CVA/FVA on exit/unwind of a trade with a client with no CSA may sound unreasonable, but is possible since these risks are not priced independently, but for the marginal incremental to the client portfolio.

This reinforces why the law of one price to a client with non-standard or no CSA no longer applies: trades are priced not only

for their incremental market risk to the bank’s portfolio, but also for their incremental counterparty, funding and capital considerations to the portfolio. These portfolios can vary significantly across banks. Thus, it is important for clients to understand that the marginal contribution of a new trade could theoretically either increase or decrease counterparty and funding risks, and the same would hold true for the unwind of an existing trade.

## **Migration towards ‘gold standard’ CSAs**

Given the variability around pricing with respect to the application of associated counterparty credit and funding costs, this explains why most banks are focusing on standardising CSAs – making them simpler and attempting to remove complex optionality. The law of one price holds true for a CSA that matches the default market where derivatives are hedged. Any deviations will be assessed and priced accordingly.

Where a particular arrangement is effective at mitigating counterparty risk, it is important for the client to be aware that it might be ineffective at mitigating the bank’s funding risk (for example, the counterparty pledging assets versus the counterparty placing cash collateral). For instance, many institutional clients have asked if they can pledge or deliver South African government-issued bonds instead of cash. Assuming the bank is in-the-money on the client trade and out-of-the-money on its hedge, the bank would need to rehypothecate the bond collateral into cash to be able to place cash collateral with the hedging counterparty. This could lead to a different price compared to the scenario where cash collateral is placed and also suggests how the law of one price is observed where the collateral is cash only.

However, it is not viable for certain clients to set up collateral management functions to meet collateral calls and manage the rehypothecation of assets for cash. We have seen interest from clients wanting to partner with the prime services division in banks to outsource this activity.

## **Navigating the uncertainty**

It is evident that the market is still grappling with these issues relating to derivatives pricing and hedging. Until such a time as a market-consistent framework develops, it is recommended that clients partner with relationship banks to help navigate through this complex and evolving derivatives landscape.



**Wayne Dennehy**  
Co-head markets structuring and quantitative analysis

**Kumeshen Naidoo**  
Risk solutions group

**Shameer Sukha**  
Co-head markets structuring

www.absacapital.com