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cutting through complexity
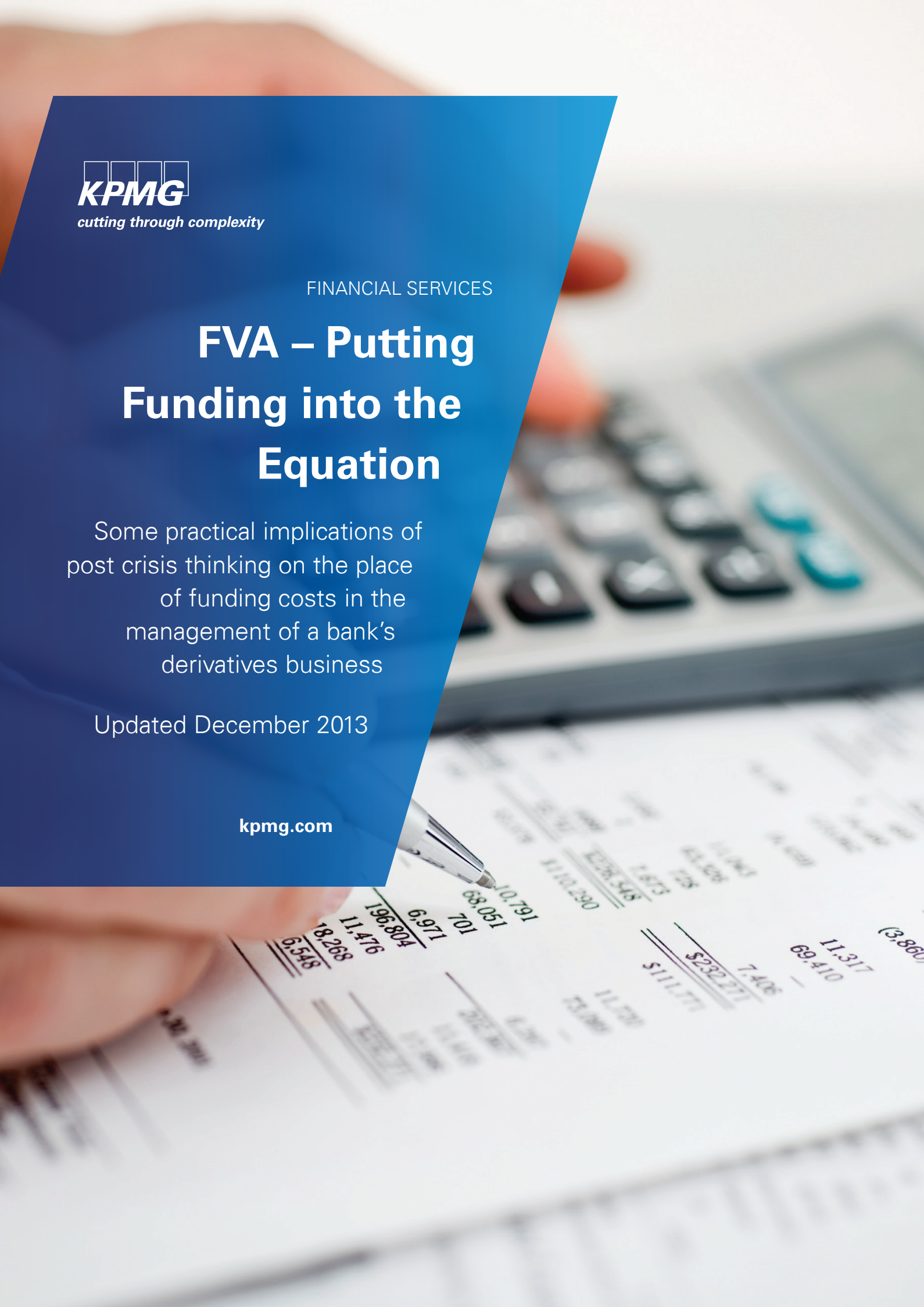
FINANCIAL SERVICES

FVA – Putting Funding into the Equation

Some practical implications of post crisis thinking on the place of funding costs in the management of a bank's derivatives business

Updated December 2013

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Editor's foreword

Until recently the methods used to value interest rate swaps had been stable for decades. However, the last couple of years has seen an unprecedented evolution, with changes in particular to the discounting rates used to value collateralised derivatives (OIS), and to the methods used to reflect counterparty credit (CVA) and own credit (DVA). The latest and most complicated potential change which is now looming is funding valuation adjustment (FVA), a fundamental change in the approach to the valuation of uncollateralised derivatives.

2012 saw significant discussion around FVA. The changes already made around OIS, CVA, and DVA broke down many barriers, increasing openness to further change. Whilst no one felt obliged to change, as almost no one else in the market had, the impetus for change was also there – any good trader pricing a large uncollateralised trade would carefully consider taking liquidity costs into account rather than simply follow the libor flat discounting implicit in the existing models.

However, the 2012 market discussions stalled somewhat. Some banks implemented FVA for specific positions and situations but there was nothing like the level of change that might have been expected from the momentum of discussion and thought. One of the main drivers for this slowing down was that the market's valuation experts on the front line of implementation ran into some significant theoretical challenges. It was also highlighted that many banks couldn't implement FVA well without getting to the bottom of its interaction with internal treasury liquidity management and pricing. FVA was turning out to be a lot more complex to implement than other recent moves.

2013 has seen renewed interest in the topic but the detailed theoretical challenges remain. This paper seeks to add value by offering a potential way forward on a number of these difficult issues of approach and interaction with liquidity management. As such, therefore, it is unashamedly technical. We offer nine propositions on some of the key open topics being discussed. In doing so we seek to spark debate and generate consensus, as well as perhaps enhancing awareness for those who might be at an earlier stage in the journey.

Note: We have produced this second version of this document to reflects source evolution of market thinking over the last six months

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Introduction

Amongst the many important lessons that the global financial crisis (GFC) has taught participants in the financial markets is that inter-bank liquidity is a scarce resource that requires careful management and appropriate pricing. This holds despite the fact that central banks continue to flood the markets with cheap money and is – along with other factors – reflected in the size and volatility of tenor basis, OIS[a] and repo spreads.

Practitioners – traders in particular – and academics alike were quick to realise the importance of this development in relation to the pricing of derivatives. Using a single term structure of interest rates to represent the interest rate derivatives market in one currency is no longer sufficient. Instead, even in a single currency, a whole range of rate curves is required to model the market adequately. In this set of curves the discounting curve plays a key role as it is used to discount derivative cash flows to obtain their net present value. As such the discounting curve implicitly reflects the market price of liquidity in a derivatives business. Unfortunately it is only for the fully collateralised part of the derivatives market that a consensus has emerged that discounting should be based on a suite of rates known as CSA rates[b]. In the big currencies, where active OIS markets exist, CSA rates are often OIS rates meaning that in the markets for fully collateralised derivatives the price of liquidity is conveniently observable and hedgeable. It should, however, be noted that even under such circumstances implicitly determining the costs of funding of a derivative position by simply discounting the future cash flows using the OIS curve is, strictly speaking, only appropriate in the absence of any initial margins/independent amounts and any impediments to an immediate bilateral exchange of collateral such as threshold or minimum transfer amounts.

In view of this situation it should not be surprising that, with the exception of derivatives governed by bilateral collateral agreements, many banks continue to struggle with whether and how to include funding costs into their derivative pricing and valuation. Whilst there are pragmatic ways of dealing with the issues in the price-setting of the front office, more and potentially greater challenges arise in the downstream functions of a bank, namely in the treasury, risk controlling, accounting, and regulatory capital functions. The matter can be further complicated by the fact that the liquidity pricing and funding costs for derivatives cannot be discussed without taking the interdependencies with counterparty and debit valuation adjustments (CVA, DVA) into consideration.

In the recent past a number of surveys have been presented that deal with topics around CVA, DVA and funding valuation adjustments (FVA). While these are useful in shedding some light on the range of practices in the market, by their very construction they are less helpful in explaining the reasons behind different approaches taken by banks or in coming up with a view as to what might be a sensible way forward. For this reason the authors of this paper decided to embark on a series of extended interviews with a number of leading global banks to discuss the topic. Based on these conversations we derived a set of propositions reflecting KPMG's tentative view, which we then discussed with the interview subjects in a subsequent in-depth feedback workshop. The present paper now summarises in nine propositions of current thinking[c] on how to cope with liquidity prices and funding costs in the derivatives business of a bank.


Note: (a)   Overnight Index Swap: a fixed for floating interest rate swap in which the float leg pays accrued interest on the basis of overnight rates.

(b)   CSA-rates are interest rates agreed upon in the credit support annexes of the documentation for OTC derivatives. Collateral posted earns interest at the CSA rate. In the big currencies, where OIS markets exist, the CSA rate is often based on OIS.

(c)   These propositions represent current thoughts in a developing situation to facilitate discussion. They do not represent the final views of KPMG on these topics.

Proposition 1

Valuation models need to take into account all cash flows associated with a derivative – including collateral flows and funding costs and benefits

At first sight this proposition seems to be stating the obvious. Derivative valuation is based on self-financing trading strategies that duplicate all the payoffs of the derivative in question and whose value at inception must therefore, in the absence of arbitrage opportunities, be equal to the value of the derivative. One key assumption of this elegant theory is, however, that for anybody wishing to implement such a strategy, funding will always be available at the "risk-free" rate. This means in particular that the risk of markets for funding (fully) drying up is not inherent in this theory, nor is there any consideration of the issue that access to funding may be different both in terms of volume and price for different players in the financial markets, or that spreads between collateralised and non-collateralised funding are wide and volatile. Yet these points were some of the key insights of the GFC, and the discussion about FVA is precisely reflecting the uneasiness of the financial markets shortcomings of traditional derivative valuation theory. Whilst we do not want to repeat the theoretical debate about FVA sparked by Hull and White it seems to be clear from the above that a fully satisfactory incorporation of funding into the valuation of derivatives cannot be achieved without extending the traditional theory and models to account explicitly for the funding risks previously outlined[a].
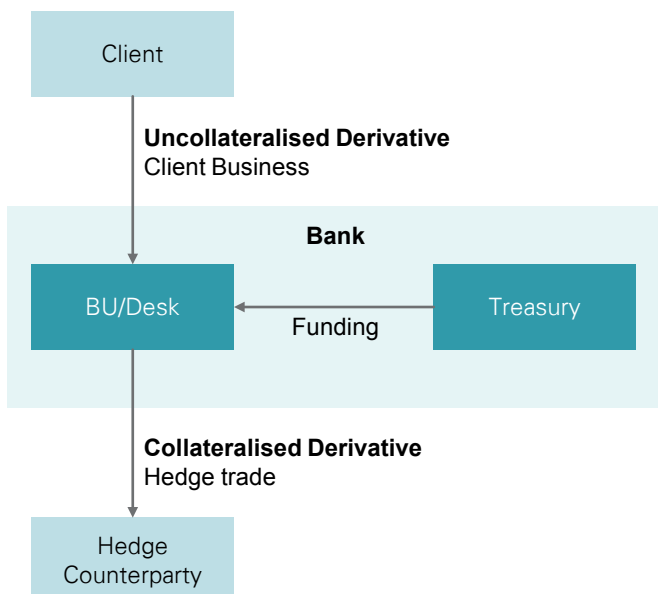
Meanwhile, funding costs are a fact of life in the derivatives business. This is easily seen in the following example reflecting the typical situation where an uncollateralised client derivative is hedged by a collateralised derivative in the interbank market. Assume that the present value of the uncollateralised client derivative rises from the bank's perspective. This implies that the bank expects future positive net cash flows from the client while the current net cash position of the bank remains unchanged. Conversely the present value of the hedge derivative will decline, but, unlike with the client derivative, this change in value will – thresholds and minimum transfer amounts aside – immediately trigger a funding need for the bank due to the collateral call from its counterparty. As both the client and the hedging derivative approach maturity this funding will be repaid only through the future cash flows from the client deal since the cash flows from the hedging derivative will match the cash flows from the release of the collateral.

In essence this could be viewed as if the bank had implicitly granted its client a loan. Conversely, in the case of a decline in the present value of the client derivative, the bank would implicitly receive a deposit from its client. The liquidity effect from the implicit client loans and deposits is, however, the result of collateral being posted or received in the interbank market. There it earns the CSA rate, which, since the GFC, exhibits a significant and volatile spread compared to the bank's funding and investment rates outside the collateralised interbank market. Taking the bank's funding rates and opportunities outside the interbank market into account then gives rise to funding cost and benefits being reflected in the pricing and valuation of the client's derivative trade. Note that in taking funding benefits explicitly into account we deviate from part of the existing literature which claims that FVA was asymmetric as collateral received could only be invested at the CSA rate thus not generating any funding benefit[b].

On the other hand from a funding perspective the interbank derivatives market can conceptually be considered a closed system, where liquidity is available to all the participants at the CSA rate to cover any funding mismatches.
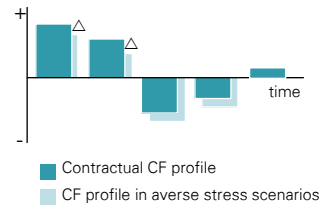


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        │   Client    │
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Source: KPMG International, 2013.

Summing up, even post GFC there is an interbank market where cash flows are exchanged on a collateralised basis at interest rates common to all market participants. Collateral requirements from hedging client derivatives in the interbank market impact the net liquidity position of banks because client derivatives are typically not fully collateralised. Unlike prior to the GFC spreads between interest rates in the collateralised interbank market and the markets for uncollateralised liquidity, in which banks interact with their clients, are significant and volatile. It is the combined effect of these market conditions that gives rise to funding costs and benefits being factored into the pricing and valuation of derivatives that are not fully collateralised.

Unfortunately, the effects of the GFC on funding a derivative position do not stop here. In a post GFC world, due to the fact that the access to and functioning of funding markets can no longer be taken for granted, both practitioners and regulators[a] have recognized the need for a liquidity reserve to cover sudden adverse cash flows beyond expected funding requirements. This is particularly pertinent to the derivative business, where cash outflows can be generated at short notice e.g. by market price movements or by downgrade triggers in CSAs. Likewise haircuts stipulated in collateral agreements or the requirement to post initial margin in the OTC derivative business as envisaged by the Basel Committee on Banking Supervision (BCBS)[b] lead to liquidity being trapped in the system and liquidity buffers thus being automatically built up. Clearly the existence of significant liquidity buffers needs to be reflected in the funding costs of the derivative business and will hence following the same logic impact the pricing and valuation of derivatives.

CF profile at current term structure and volatility

■ Contractual CF profile
■ CF profile in averse stress scenarios

Liquidity spread risk	Insolvency risk
Risk of PV losses Symmetric w.r.t. Funding spread moves Most relevant for long-term CF gaps **Hedge: Term-funding/investment**	Risk of not meeting payments Asymmetric w.r.t. cash outflows Most relevant for short-term CF gaps **Hedge: Rolling liquidity buffer to cover all** △=CF (stress)-CF (contractual)
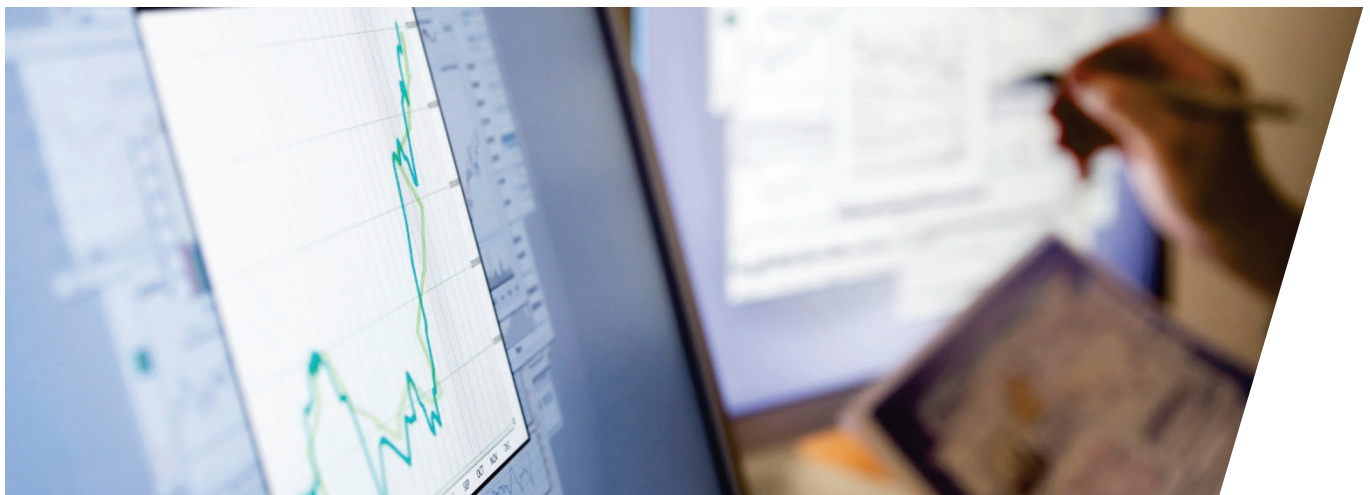
Source: KPMG International, 2013.

Proposition 2

Assumptions concerning effective lifetimes of uncollateralised derivatives positions will influence FVA

Part of the determination of the expected cash flow profile of a derivative position is the assessment of the expected maturity of the cash flows as well as the expected lifetime of the position as whole. Supportable expectations of future restructurings, cancellations, novations or changes in regulatory requirements that are known to happen at some point in the future may all have an influence on the expected maturities of cash flows and lifetimes of trades and could justify a behaviouralised expected maturity. The situation is not unlike the one with classical loans and deposits where statistical modelling is used to determine expected maturities – similar techniques could be applied in the determination of FVA. The concept is summarised in the following graphic.

Term funding/investment on contractual maturities
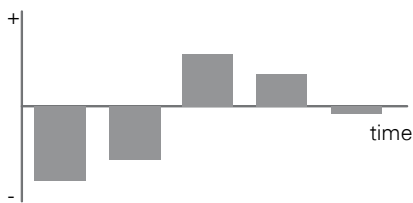
Effective lifetime of trade or "survival probability"
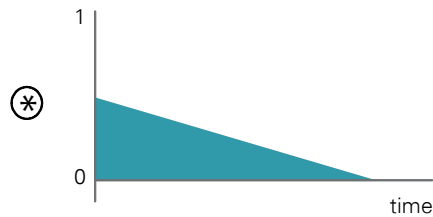
Term funding/investment on effective maturities

Modelling the probability of:

- restructurings
- novations
- cancellations and
- known future changes of regulatory requirements

will lead to more realistic cost/benefit estimations

Source: KPMG International, 2013.

Proposition 3

From a bank management perspective a close alignment between the rules for FVA calculation and the bank's funds transfer pricing rules would be desirable

Assuming that funding effects will be considered in the pricing and valuation of uncollateralised derivatives, besides the determination of cash flows discussed in Propositions 1 and 2, the choice of the liquidity spread curve used to fix the price of term liquidity is the second key factor in the FVA calculation.

In the literature on FVA the choice of the liquidity spread curve is typically discussed from an accounting perspective with the definition of accounting fair value guiding the thinking. We shall postpone this discussion until later in Proposition 4. At this stage we want to highlight the implications that the choice of a liquidity spread curve would have for the management of a bank's liquidity.

For, unlike the cash flow model, which can be determined at the level of the individual product, the choice of the liquidity spread curve potentially affects the entire transfer pricing system in a bank.

It should, hence, be discussed from a bank wide management perspective with a view to ensuring that it does not generate internal arbitrage opportunities and that trader behaviour is aligned and responsive to the bank's true funding cost.

The following diagram summarises the cash flows, including collateral and interest flows, which would result from entering into an uncollateralised derivative position with a client and hedging it in the collateralised interbank market. It visualises where the implicit loan-making and deposit-taking described in Proposition 1 occurs, and, in this context, highlights the role of the treasury as the manager of liquidity in the bank.
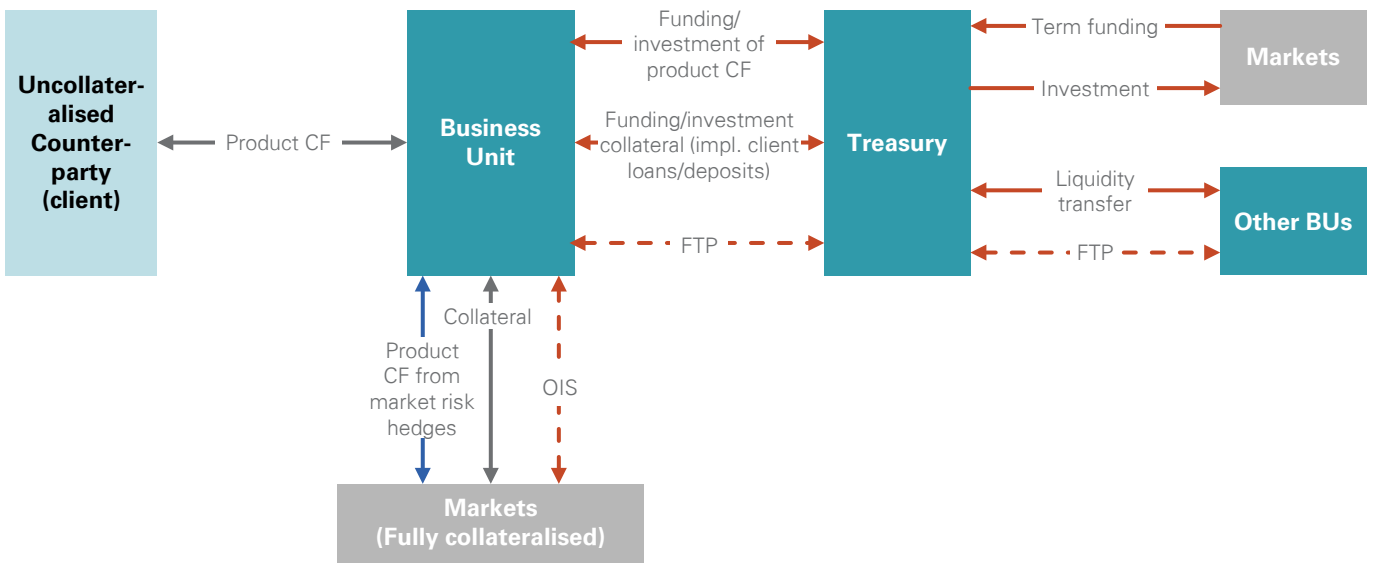
Source: KPMG International, 2013.

Now consider the bank offering the client the choice to either enter into a deep-in-the-money derivative transaction or to take out a loan of the same amount and maturity. Arguably if liquidity was priced differently in the two transactions, other things being equal, the client would choose the one with the lower implicit liquidity cost thus negatively impacting the bank's profitability. At the same time traders facing internal liquidity transfer pricing (LTP) curves that did not represent the effective liquidity cost of a bank would be encouraged to enter into liquidity consuming or liquidity generating derivative trades with clients that would produce spurious profits at the level of their individual books whilst generating losses for the bank as a whole.

In order not to present arbitrage opportunities to external clients or set wrong incentives for internal counterparties the general rules of the bank for LTP, along with the

resulting liquidity spread curves, would have to be applied to uncollateralised derivative transactions in the same way as they are to the wholesale loans and deposits business. If we further take it for granted that – for reasons of transparency – aligning accounting results to economic P&L is a value in its own right, this would be a compelling argument for aligning, as closely as possible, the liquidity spread curves used in FVA-calculations with the spread-curves used in LTP.

Last but not least, the aspect of operational convenience should not be underestimated. In defining liquidity spread curves issues like the treatment of bid-ask spreads, funding in FX, country or legal entity specific liquidity spreads and the costs of the liquidity buffer should already have been solved within the LTP framework of a bank. Revisiting them for the purpose of FVA calculations would be a burden that could be avoided.

Proposition 4

Despite the bank- specific nature of FVA calculated using a bank's own funding curve this can often still be justified as a reasonable estimate of funding costs and benefits in IFRS fair value calculations

IFRS 13 defines fair value as "[...] the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction in the principal (or most advantageous) market at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly observable or estimated using another valuation technique." Moreover, section IN9 states that "the definition of fair value emphasises that fair value is a market-based measurement, not an entity-specific measurement. When measuring fair value, an entity uses the assumptions that market participants would use when pricing the asset or liability under current market conditions, including assumptions about risk. As a result, an entity's intention to hold an asset or to settle or otherwise fulfil a liability is not relevant when measuring fair value."

In the absence of an active market for novations of uncollateralised derivatives and the difficulty to distinguish the liquidity cost component from other cost components such as adjustments for counterparty credit risk in the prices of client transactions there is a debate about how to determine a liquidity-spread curve that would satisfy the requirements of IFRS fair value.

From the above definition certain market participants conclude that the liquidity spread of a third party potential buyer would have to be used to determine FVA in conformity with IFRS. However, there seems to be considerable scepticism among market participants as to the feasibility of such an approach. Short of trying to second guess what liquidity spread a trader at a potential third party buyer would apply in a hypothetical transaction, participants discuss the construction of benchmark curves – for example on the back of market instruments such as senior unsecured bonds – or some kind of consensus pricing approach as a less-than-ideal solution to an intrinsically insoluble problem. However, other banks apply their own funding spreads in the determination of FVA under IFRS. We believe that this is often supportable. As long as the bank can be assumed to have comparable funding costs to other market participants it is possible to apply the own funding spread as a proxy for market funding cost. As a practical answer to the difficult question of "what is a generic level of bank funding spread?", then justifying that the bank's own funding spread as a reasonable proxy is an attractive solution.

However, this still leaves open the question of how to determine own funding costs. Often banks equate these with their own senior unsecured bond spread. Others use blended curves taking further sources of funding into account. A further choice could be a target funding curve set by ALCO provided that it is reflective of actual funding costs. Following our reasoning above this is a question a bank should answer consistently across businesses and products, and not only a question to be dealt with from the perspective of unsecured derivative valuation in the context of fair value accounting.

It is at this stage that internal LTP rules can provide useful guidance. However, care has to be taken when LTP rules apply fairly arbitrary bonuses and penalties to foster or discourage certain businesses or actions – if for whatever reason the internal LTP rules are way out of line with the bank's level of funding spread then to adhere to them would not be supportable under the above proxy logic. Coming back to our Proposition 3 it seems that, depending on the specific LTP concept, a close alignment between IFRS fair value and internal LTP rules could be possible while some differences may remain.

Proposition 5

In general FVA needs to be determined on a portfolio level with subsequent allocation to individual trades

Consider the situation of a number of uncollateralised derivative transactions having been closed with a specific counterparty. Assume further that they are hedged by fully collateralised derivatives with no threshold or minimum transfer amounts. Now, provided further that funding benefits and funding costs are calculated using the same liquidity spread curve and no liquidity buffer component is included in FVA, then the FVA for the portfolio would be the same as the sum of the FVAs for the individual transactions.

Deviating from any of the above assumptions would lead to portfolio effects having to be taken into consideration.

This is obvious in the case where a bid-ask spread is applied to the funding curve. The net expected cash flows from a specific client's derivative portfolio would clearly result in a different overall FVA for this portfolio than the sum of all FVAs calculated for the expected cash flows of the individual trades independently.

Likewise in the case of partially collateralised transactions that form part of a netting set the correct funding rate to be applied can only be determined if the net present value of all the trades in the netting set is considered jointly.

As to the liquidity buffer it goes without saying that this is a portfolio number since it serves to cover the risk of unexpected liquidity requirements from the client's derivative portfolio as a whole.

As a result of the portfolio character of FVA, similar to that which is the case with CVA, the liquidity cost of an individual new trade will depend on how it interacts with the funding position resulting from the existing portfolio – i.e. whether it increases an already existing net funding mismatch or instead balances it. This marginal effect on the funding position would ideally be reflected in the pricing of a new transaction. Likewise when allocating FVA from the portfolio level to individual positions marginal contributions need to be taken into account.

Finally we need to consider the potentially inextricable complications that the consideration of specific regulations in the CSAs of the hedging portfolio might imply. Remember that it is the posting and receiving of collateral triggered by the CSAs that eventually triggers the funding requirements or liquidity surpluses in the client portfolio. Since there is no allocation of the client deals to specific netting sets in the hedging portfolio then strictly speaking the funding requirement or excess cash in the client portfolio can only be determined through a full simulation of the collateral flows in the hedging portfolio taking the specific CSA rules for the individual netting sets into account. Allocating the resulting funding effects back to the client trades would be a significant challenge. Therefore, in calculating FVA typically the simplifying assumption is made that positive market values of client trades need to be funded whereas negative values generate deposits.

Proposition 6

FVA has potential overlaps with both CVA and DVA that need to be taken care of in a consistent pricing/valuation framework

Conceptually FVA can be thought of as consisting of three elements according to the following equation:

$$FVA = FVA^{cost} + FVA^{benefit} + FVA^{buffer}$$

In this equation both FVA^{cost} and FVA^{buffer} will reduce the price of a derivative whereas $FVA^{benefit}$ will increase it. FVA^{cost} will be calculated on the expected positive exposure (EPE) of the derivative (portfolio) whereas expected negative exposure (ENE) will be the basis for the determination of $FVA^{benefit}$. As mentioned previously the basis for FVA^{buffer} will be a stressed liquidity requirement, which we will not consider further in this section.

Now, turning to $FVA^{benefit}$ the potential overlap with DVA is obvious. If we assume – as we have done throughout this text – that the funding curve of the bank is symmetrically applied to both funding requirements and cash surpluses then differences between DVA and $FVA^{benefit}$ can occur only from different portfolio cuts on which the two quantities are calculated and from the CDS-funding-spread of the bank as DVA would be determined using the CDS rather than the funding curve of the bank. On the other hand, if one assumes – as some do – that liquidity received as collateral by the bank can only be invested at the CSA rate then $FVA^{benefit}$ is zero and no overlap with DVA can occur.

As to CVA, the potential overlap with FVA^{cost} is of much less concern, if any, in the public debate perhaps because there is no risk of overvaluation of derivatives. Nevertheless it exists as demonstrated by the following example. Assume the only contracts a bank had on its books were a client derivative plus the corresponding fully collateralised hedging derivative. As we have pointed out previously if the bank has to post collateral this will be tantamount to granting a loan to its client because the funds raised for posting the collateral will eventually be repaid only from the proceeds from the client derivative. As a consequence a third party providing the bank with the necessary funding would factor the credit risk of the bank's client into the interest it would charge the bank. Indeed if the bank had no equity its funding spread would be the same as the credit spread for its client. In this situation charging FVA^{cost} and CVA would be full double counting.

Now, in reality this relationship is less direct as a bank's funding spread is not dependent on a single borrower but on the quality of the entire portfolio. Nevertheless, deducting full CVA on the basis of a client's CDS spread (or what might be considered a suitable market proxy) plus FVA^{cost} based on the bank's funding curve would still contain elements of double counting for the above logic.

Proposition 7

One way to avoid double counting between FVA on the one hand side and CVA/DVA on the other is to take one as the increment to the other. However, the order of calculation could impact accounting and regulatory capital requirements.

The traditional way of looking at the problem of double counting is to take CVA and DVA calculated using CDS spreads for the client and for the bank as the given valuation adjustments first for counterparty and own credit risk. As CDS spreads reflect the market price for unfunded credit risk one then tries to add components to capture the funding risk . However, this approach runs into inextricable practical problems.

As to DVA and funding benefits one approach applied in practice to avoid double counting of credit risk and liquidity risk related costs is again to add a component based on the difference between the bank's funding curve and its CDS curve to DVA. It has been noted that this difference need not always be positive as supply and demand effects caused in particular by CVA/DVA hedging activities in the shrinking CDS markets might lead to a reversion of the expected sign of this difference. In any case in the absence of an active market for liquidity put options there is little hope to extract pure market prices for liquidity risk as distinct from credit risk from market data.

Neglecting these fundamental concerns for a moment, avoiding double counting in CVA and FVA has other problems. As pointed out above adding an FVA cost adjustment based on the funding costs of the bank to CVA implies double counting and hence a more sophisticated adjustment would be required. Theoretically the most appealing possibility would be to consider the spread between the client's external funding spread and its CDS spread thus trying to measure the additional value that the actual provision of liquidity would have for the client over and above the bank taking on the client's credit risk. However, besides the fact that for many clients neither of the two numbers will be available in the market place and proxy curves would be required, this would bear no immediate relation to the bank's aggregate funding costs. As a consequence, although in theory this should work out correctly, in practice the bank would have to be very careful to make sure it recovers its funding costs across its entire business. Moreover, it is not clear that obtaining liquidity through the bank should have the same price for the client as obtaining it in the capital market, if the latter was at all possible.

On the other hand, using the spread between the bank's own funding curve and the client's CDS spread might yield a negative number and clients with a low credit quality would be subsidised. Finally using the spread between the bank's own funding curve and its CDS curve as an add-on as in the case of DVA, would equally be a form – if milder – of subsidising weaker credits as they would benefit from the fact that the bank's funding and CDS curves relate to the quality of the bank's overall portfolio rather than that of the individual credit in question.

As the traditional approach has its obvious difficulties one might consider reversing the order of thinking. Start from the intuition that client derivatives business where underlying market risks are hedged in the interbank market can be thought of as implicitly making loans and taking deposits. Then it would appear natural to use the funding curve of the bank and as a starting point to calculate a fully fledged FVA for the derivative business with clients.

Following this logic CVA would appear as an additional credit risk charge over and above a bank's pure funding cost similar to what is being done in the initial pricing of corporate loans. However, simply adding up a bank's funding spread and a client's credit risk spread may lead to incorrect values due to some of the client's credit spread already being contained in the bank's funding spread as described in Proposition 6. Hence, in practice the spread charged to a client will likely be somewhat lower than the sum of the client's credit spread and the bank's funding spread.

In this logic there is little room for additional DVA to be taken over and above the FVA benefit, at least in a going-concern environment with the bank being far away from needing to restructure its liabilities in order to be able to survive . Economically the funding curve of a bank indicates the prices at which the bank would be willing and capable of taking funding from the market. Of course there might be a positive difference between the bank's CDS and its funding spreads, which could be used to calculate additional DVA. However, the economic meaning of this figure would be questionable as the possibility or even the desirability of hedging and monetising DVA in a going concern environment is among the most controversial issues in derivative trading . The challenge would be to justify whether or not such an FVA led approach met the accounting rules around own credit in valuations.
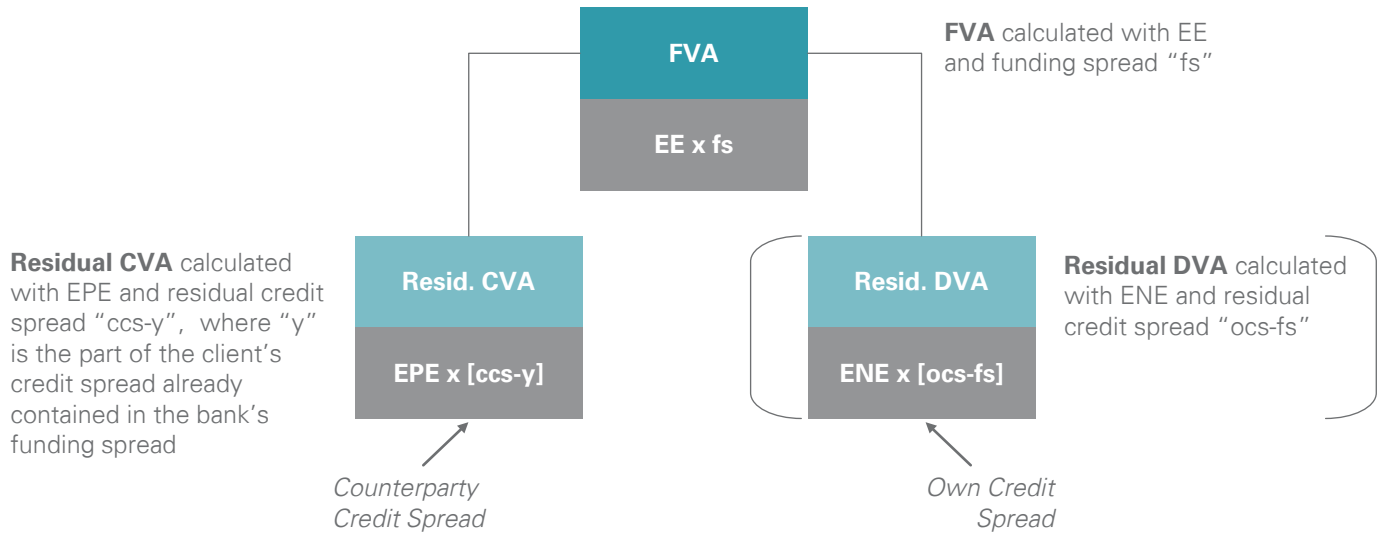

Note: (a)   See for example Morini Massimo and Andrea Pramploni: Risky Funding, Risk Magazine, March 2011

(b)   This is very convenient as it allows netting of funding need and funding surplus in a simple additive framework which would be complicated under the „traditional approach".

(c)   This view is supported by a number of practitioners and researches. As an example consider Lu Dongsheng and Frank Juan: Credit Value Adjustment and Funding Value Adjustment All Together, Dongsheng Lu and Frank Juan, April 2011, SSRN Paper, who propose to drop DVA and go with FVA and CVA instead.

(d)   For a discussion on DVA hedging see for example: "Show me the money: banks explore DVA hedging" Risk Magazine 04 March 2012

These ideas are summarised in the following figure:

FVA calculated with EE and funding spread "fs"

FVA

EE x fs

Residual CVA calculated with EPE and residual credit spread "ccs-y", where "y" is the part of the client's credit spread already contained in the bank's funding spread

Resid. CVA

EPE x [ccs-y]

Counterparty Credit Spread

Resid. DVA

ENE x [ocs-fs]

Own Credit Spread

Residual DVA calculated with ENE and residual credit spread "ocs-fs"

Source: KPMG International, 2013.

The order of calculation raises some interesting questions on regulatory capital requirements.

First of all according to the EU's Capital Requirements Regulation (CRR) the starting point for the calculation of counterparty risk capital is the "exposure value", which is determined starting from the "current market value" of a derivative. What is meant by the "current market value" is not specified further. Obviously if funding costs and benefits were considered part of "current market value" this number would be reduced in the case of a derivative with a positive market value as compared to a situation where "current market value" was calculated without taking funding spreads above LIBOR/EURIBOR or CSA rates into account. As a result regulatory capital requirements would apparently be reduced at least as far as the CVA risk charge is concerned due to "exposure value" being calculated starting from a smaller "current market value".

Finally, if after applying symmetric FVA it could be argued that there is little if any DVA left and symmetric FVA was considered part of "current market value", then FVA costs and benefits could be offset against each other and the deduction of DVA from Tier 1 capital would apparently be largely avoided. Clearly this would need to be resolved with regulators.

Proposition 8

Whilst DVA is an accounting requirement it should not be considered in managing the business

As has been pointed out in previous sections there are huge overlaps between DVA and funding valuation benefits in a symmetric FVA environment. It has been argued that[a], with the exception of potentially closing out specific big derivative trades with the counterparty, it is hard if not impossible to monetize DVA in derivatives in the normal course of business in a going concern environment[b]. This situation would certainly lead to a negative carry, also called DVA-bleeding, for the portfolio[c].

In contrast it should be possible to monetise funding valuation benefits by making investments in the normal course of a bank's business. We therefore suggest that, at least for internal management purposes of a bank, derivative DVA should be neglected and funding valuation benefits be considered instead as they provide the possibility for hedging / replication. The idea is illustrated in the diagram below.
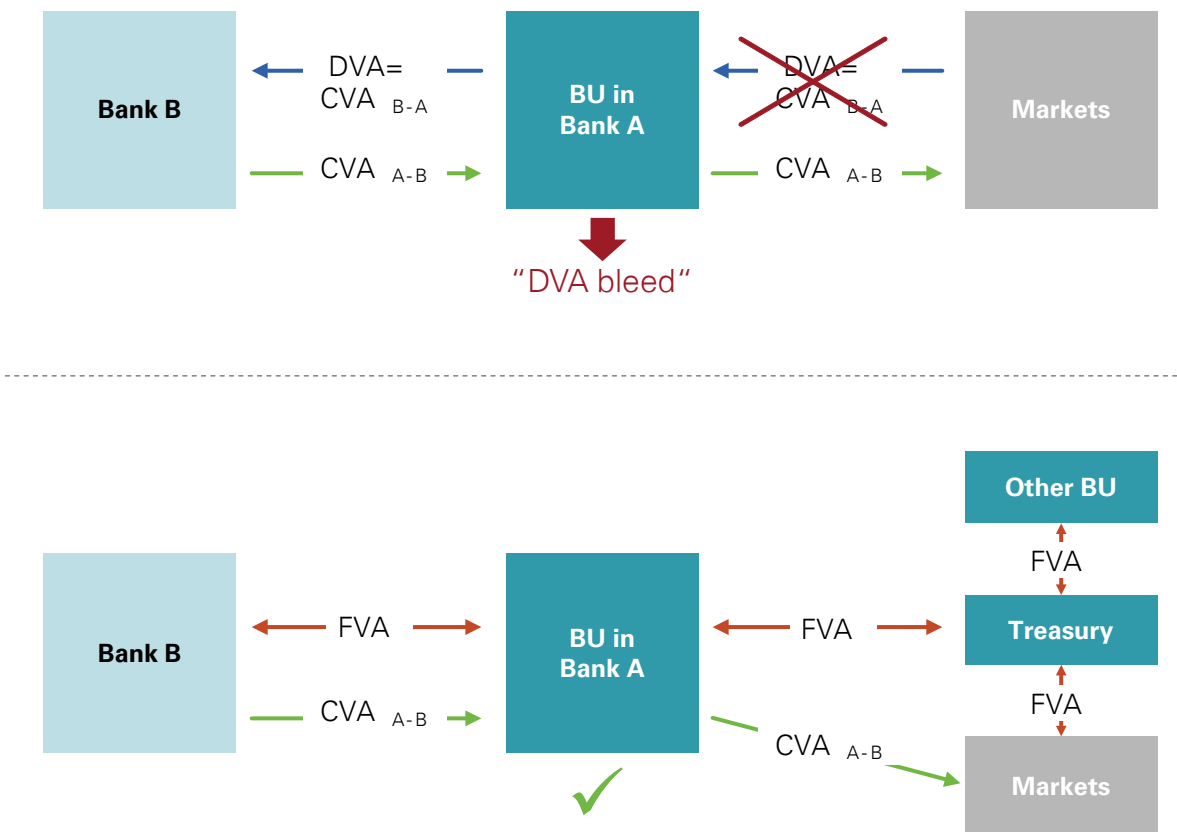
Source: KPMG International, 2013.

Note: (a)   For a discussion of the issues around DVA hedging see for example: Carver, Laurie; Show me the money: banks explore DVA hedging; Risk Magazine, March 2012

         (b)   We consider strategies such as shorting a CDS index an buying back all the names except for ones own or typical proxy hedging as causing too much transaction cost or being too risky.

         (c)   This view is widely supported. As an example see Castagna, Antonio: On the Dynamic Replication of the DVA: Do Banks Hedge their Debit Value Adjustment or their Destroying Value Adjustment, July 2011, iasonltd.

Proposition 9

There are advantages to managing FVA centrally, and close alignment to the CVA desk can be efficient

Managing the liquidity spread risk inherent in FVA is a challenging task. The objective from KPMG's point of view should be to achieve a flat liquidity spread risk position because whether or not to take liquidity spread risk should – the discussion about ring-fencing certain businesses not withstanding – be taken centrally and not on the level of individual business units.

However, for various reasons this is difficult to achieve. First the risk position is hybrid as the size and timing of the liquidity requirements depend on all the market risk factors driving the values of the underlying derivatives. It is therefore also a highly non-linear position in the underlying market variables. Additional non-linearity is added if different funding and investment curves need to be taken into account for cash surpluses and funding needs. There may also be elements of wrong way and right way funding risks as there may be a positive or negative dependency between funding or investment requirements and the movements of the bank's own funding curve.

Clearly this complex risk position is best managed on a portfolio level covering the funding and investment needs from various trading desks. The simple rationale is that much of the risk would wash out at a portfolio level leaving a more stable funding position, and that statistical models work best on a large and diverse population. How the portfolios should be cut depends on a number of factors. Certainly they must be cut by currency as the funding curves of a bank and its access to liquidity are different from one currency to the other. They may be cut by country or legal entity as again these may have different funding curves or liquidity may need to be managed within one country or legal entity. These are just examples. However, the common underlying idea is that portfolios should be cut so as to reflect the units in which liquidity is managed and to which different funding curves apply.

Hence, it may well make sense to centralise the management of this risk position in the hands of an FVA desk. This would act as an intermediary between the respective trading desks and the bank's treasury. It would take up the liquidity and funding requirements from the trading desks leaving them with the task of hedging the markets risks of their positions. It would try to hedge market price driven changes in the liquidity position thus obtained. Eventually the FVA desk will have a modelled liquidity gap position which it can then close with the treasury. The treasury could then decide about taking open funding positions without being concerned with the hybrid liquidity risk from the derivatives business.

Obviously the role of such an FVA desk looks very similar to that of a CVA desk with the one exception that its counterparty for hedging the liquidity spread risk is not the external market but the treasury. Otherwise in terms of the infrastructure required for simulations, scenario and sensitivity analyses it would make sense to leverage whatever exists for CVA.

Conclusion

The GFC has brought liquidity risk to the forefront making the old paradigm of a single funding curve per currency for derivative valuation obsolete. Liquidity risk and funding spread risk must therefore be addressed explicitly in derivative valuation models. From a bank management perspective this means that a bank's own funding costs must play a much more important role in managing the derivatives business if this is not fully collateralised. Within limits a bank's own funding costs can often also be used as a proxy to determine FVA in line with accounting fair value. FVA is now often considered as being symmetrical yielding FVA costs for uncollateralised in-the-money derivatives and FVA benefits for not fully collateralised out-of-the money derivatives. The overlap between FVA and CVA/DVA is significant and inextricable such that there is considerable difficulty in the concepts being used consistently in parallel. In view of the importance of managing funding risk properly, the difficulty of monetising DVA in a going concern context, the shrinking reliability of prices in the CDS markets and the importance that business with clients for whom no CDS market exists has for a large number of banks, the attraction for many banks in seeking to relinquish DVA as a primary valuation and risk management component and adopt symmetrical FVA instead is understood.

Deviating from the established CVA/DVA framework to give FVA a central role in valuing derivatives will create open questions both with accounting standards and prudential regulation as these contain no rules directly dealing with FVA. FVA is a portfolio number that should be broken down to individual deals but that should be managed centrally. Implementing an FVA desk that leverages the technology and processes of the CVA desk could be an appropriate and efficient way to manage funding spread risk associated with FVA. Such an FVA desk would act as an intermediary between the trading desks and the treasury with a focus on managing the hybrid risk contained in FVA.

At the current stage it seems that there is still considerable diversity in practice regarding the valuation and management of derivatives which are not fully collateralised. Some answers to the open issues look more promising than others.

References and further reading

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