



POST-CRISIS DERIVATIVES VALUATION

ACT III: FUNDING VALUATION ADJUSTMENT

MAZARS THOUGHT LEADERSHIP / 2015

IN LIGHT OF THE TEACHINGS OF THE FINANCIAL CRISIS, BANKS HAVE CONSIDERABLY REVIEWED THE WAY DERIVATIVES ARE VALUED. INSTITUTIONS ARE CURRENTLY DEVELOPING METHODOLOGIES THAT CONSIDER ALL THE COSTS AND RISKS RELATED TO DERIVATIVES ACTIVITY.



Christophe Bonnefoy
Senior Manager
Quantitative Analyst & Actuary at Mazars

In light of the teachings of the financial crisis, Banks have considerably reviewed the way derivatives are valued. Institutions are currently developing methodologies that consider all the costs and risks related to derivatives activity.

- Initially, this has been particularly reflected by the Credit Valuation Adjustment (CVA) and the Debit / Debt Valuation Adjustment (DVA) that account for the credit risks to which each counterparty are exposed.
- Secondly, the rates used to discount the cash flows of the collateralized derivatives have been defined in accordance with the rates used to value the exchanged collateral, usually the OIS¹.

¹ European reference for the overnight rate (swaps indexed on the EONIA : Euro Overnight Indexed Swaps)

THE ACTUAL PROBLEM

While institutions are continuing to enhance their estimation of the above elements, a consensus seems to be emerging on how the cash flows of the non-collateralized derivatives are to be discounted. Discounting assuming a short-term financing of these positions (EURIBOR 3M rates were used as reference) has been abandoned by institutions that observe that the prices of derivatives transactions appear to incorporate more long-term liquidity risks.

In this article, we first propose to illustrate this problem by bringing out the reasons why these costs might have to be taken into account; secondly, we study the normative requirements governing the determination of the discount rate; and finally, we propose a methodological approach.

A BRIEF SYNOPSIS

- > Several Top Tier Banks have already taken into account the funding costs of their non-collateralized derivatives by recording a Funding Value Adjustment (FVA) in their financial statements.
- > The main impact of the FVA is a negative discount applied to current (and potential future) assets. The impact of the FVA on the liabilities has been almost fully considered through the DVA (Debt Value Adjustment) calculation.
- > The current norm recommends to value a position as two market participants would have done so. Hence, the valuation should not be tied to the funding cost of a specific entity which is preparing its financial statements. Theoretically, it will be very difficult for most market participants to observe transactions defining the market "derivative funding" spread level.

1. FUNDING COSTS FOR THE NON-COLLATERALIZED DERIVATIVES

In this section, we seek to economically highlight the presence of financing costs inherent to non-collateralized derivatives positions.

For the purpose of our illustration, we assume that the valuation of the derivative does not change sign over the lifetime of its position. We will relax this hypothesis, in order to study a more general framework, in section 3 by considering potential exposures.

Let us consider the following assumptions to study the case of a transfer of derivatives between two Banks:

- Bank « A » is the one preparing its financial state-

ments;

- Bank « B » is a participant representing the market, the derivatives funding spreads of "B" are non-entity specific, they reflect what is observed on the transaction being operated in the market.

Let us further assume that the Banks finance themselves with the following derivatives funding spreads (i.e. those used to value derivatives, observed on derivatives transactions and potentially different from the classic funding spreads).

In the two cases studied, one assumes short-term funding and the other assumes long-term funding:

Spread over EURIBOR 3M	Banks « A » and « B »		Bank « A »	Bank « B »
	Short Term	Long Term	Long Term	Long Term
Credit (bp)	0		90	20
Other « liquidity bases » (bp)	0		10	5
Total financing cost (bp)	0		100	25

1.1 STUDY OF A SWAP RECOGNIZED AS AN ASSET

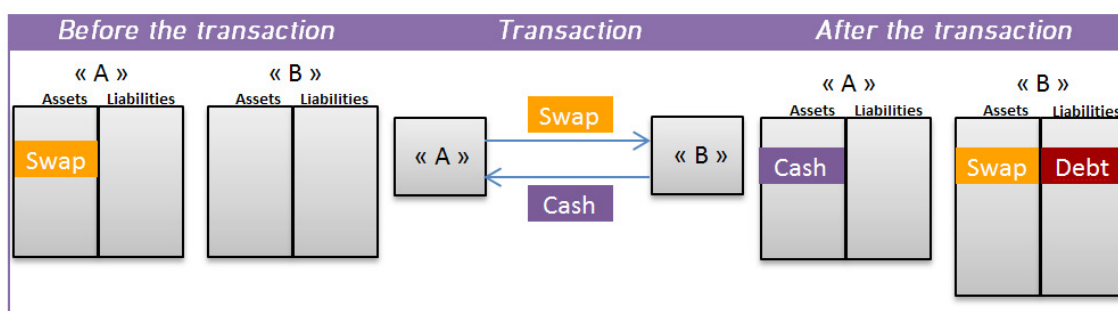
Let's study the case where Bank «A» sells to Bank «B» a swap recognized as an asset (whose MtM is positive). Also, let « C » be the counterparty of « A ».

For instance, « A » is committed to pay to its counterparty « C » 1% per year for 5 years, while the 5 year market swap rate is 3%: « A » earns 2% per year for 5 years and hence the MtM of the swap is positive.

Therefore, it is clear that setting this transaction consumes a resource to Bank « B »: the liquidity. In particular, the buyer « B » wishes to rebill the transferor « A »

the financing costs tied to the derivative it is carrying.

The way the swap is valued in this transaction will depend on the way the liquidity is managed / charged by the different market participants. According to our assumptions, the cost over the EURIBOR 3M is null if the liquidity is considered from a short-term point of view. However, « B » will undergo a cost of 25 bps in the absence of FVA if liquidity is long-term financed.



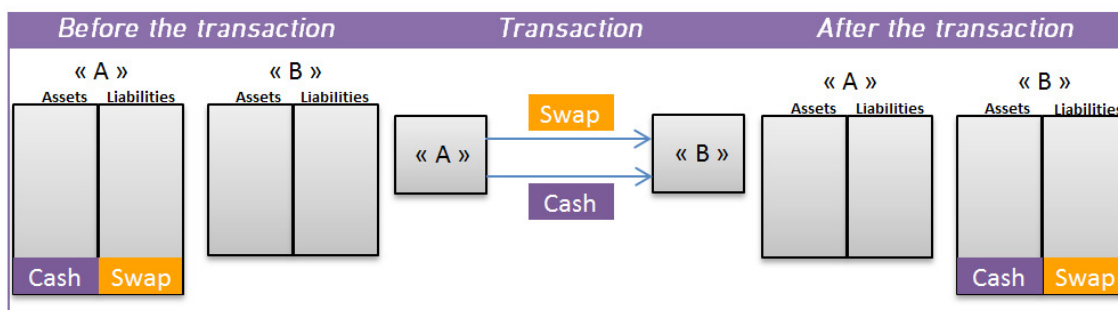
1.2 STUDY OF A SWAP RECOGNIZED AS A LIABILITY

Let us now study the transfer of a swap recognized as a liability (receiving the cash today and, according to the current expectations giving it back in the future): the liquidity is perceived at the transfer date and will be reimbursed to "C" over the swap lifetime.

« A » brings liquidity to « B » in this transaction; it is natural then that « B » remunerates « A » according to its derivatives funding cost. Depending on whether the participants agree that « B », the participant representing the market, has a short-term or long-term funding cost, the impact will be determined on the basis of a zero or 25 bps spread.

Seen from "A", the swap recognized as a liability is replaced by a debt, this transaction will be associated with a P&L impact if the market derivatives funding spread is not aligned with the classic funding spread of "A". This is explained by the fact that these two liabilities, even though "theoretically analogous", are not traded in the same markets: vanilla debt market vs. non collateralized derivatives market.

In case these spreads are equal, the null P&L impact of this liability replacement does not mean that no FVA exists. It means that once the FVA impact is registered, similar transactions do not have a P&L impact.



It is interesting to point out that in both cases (asset vs. liability), the potential impact of the FVA is strongly related to the time horizon that the participants in the transaction agree to assign to the exchanged liquidity (called derivatives funding spread):

> If the derivatives activities of (both) the Banks are considered as short-term activities and the liquidity is charged by the treasuries of these Banks, on the basis of a short-term horizon (according to our assumptions, the EURIBOR 3M can be taken as the reference in this case), then the liquidity costs are properly taken into account with the current derivatives valuation framework. No FVA should be recognized.

> However, if it turns out that the liquidity is backed by long(er) term funding (and therefore more expensive than short term liquidity), then this extra cost will lead to a discount rate higher than the one obtained using EURIBOR 3M. In the transfer transaction, the entity that perceives liquidity would be inclined to grant a discount on the cash payment. The theoretical impact of the FVA is a reduction in the value of both assets (negative impact) and liabilities (positive impact).

In other words, the derivatives funding spread over EURIBOR 3M is not necessarily not-null and aligned with the classic funding spread. In particular, transactions and market practice should also be considered.

2. THE REQUIREMENTS OF THE NORM WITH RESPECT TO THIS SUBJECT

As a first analysis, and without foreseeing normative documentation of individual institutions, it should be noted that the following features are present in IFRS 13¹.

Fair Value definition (IFRS 13 Annex A)

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.

It is interesting to note that the transaction mentioned here is not a setting up of a new swap or a cancellation of a former (unwound) one. This is a transfer, to a market operator, of an existing transaction (cf. transactions exemplified in the previous section). Such a transaction is rare in practice as it limits considerably the number of observations and thus the robustness of the estimate.

Let's study the consequences of IFRS 13.42 on the transfer price of a liability as studied in Section 1.2.

Specific point on the risk of non-performance (IFRS 13. 42)

The fair value of a liability reflects non-performance risk (the risk the entity will not fulfill an obligation), including an entity's own credit risk (defined in IFRS 7 Financial Instruments: Disclosures) and assuming the same non-performance risk before and after the transfer of the liability.

IFRS 13.42 states that the risk of non-performance, which is a strong component of the cost of funding, must remain unchanged and integrate the own credit risk of the entity (i.e. corresponding to the risk of non-performance of the entity preparing its financial statements as it is estimated by the market valuation date).

To determine the fair value under IFRS 13, in the case of an entity backing its derivatives to long-term funding, we should not consider the 25 bps of Bank « B » representing the market participants, but:

- 90 bps: spread corresponding the risk of non-perfor-

mance of the Bank « A », considered unchanged during the transaction (a direct result of IFRS 13.42).

- 5 bps: component « Base » does not match the risk of non-execution of Bank « B »;

The funding spread required by IFRS is – based on our interpretation – 95bp for a liability and 25 bps for an asset (which is not affected by the provisions of IFRS 13.42).

¹ The excerpts quoted below can be found at the following address : <http://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32012R1255&rid=3>



Given our interpretation of these articles, the considered cost of financing must:

> Be based on the observation of transactions between market participants, to determine if the cost of funding is short-term or long-term. Although in theory these costs correspond to funding for which the maturity horizon is related to the maturity of the derivative. If the transactions are done without considering spreads, or with taking into account a projected horizon shorter than the maturity of the derivatives, then the observed transactions will be preferred over the theory; and

> For liabilities, include the risk of non-performance, specific to the entity and determined consistently with the horizon of funding determined above.

3. PROPOSITION OF A METHODOLOGY

In this section, we aim to give an economic illustration of the impacts related to the FVA implementation within a coherent valuation framework.

3.1 ASSETS FVA

The assets FVA corresponds to the valuation difference between the liquidity costs currently considered (EURIBOR 3M) and the average funding costs for a market participant (EURIBOR 3M + spread_{market}).

We do not predict the exact nature of this spread, especially in terms of its maturity (if the market funds these activities in a short-term perspective then the reference EURIBOR 3M is still valid and the spread is null, based on our assumptions). As seen previously, under IFRS 13, this spread is ideally observed when transferring derivatives between market participants.

These costs concern the expected assets, this concept is very close to that of the base used for the CVA: the EPE (Expected Positive Exposure) component. To estimate the costs of a period with a horizon "t" and duration of 1 year, we can initially approach this cost with:

$$\begin{aligned} \text{Assets_FVA_approx_1}(t) &= -\text{funding_spread}_{\text{market}} \times \text{EPE}(t) \times 1\text{yr} \\ &= -(\text{credit_spread}_{\text{market}} + \text{base}_{\text{market}}) \times \text{EPE}(t) \times 1\text{yr} \end{aligned}$$

Numerical implementation:

if Bank « B » represents the market participant and Bank « A » determines the IFRS 13 fair value of the active swap, the spread of the assets FVA is : 20 bps + 5 bps = 25bps.

It is interesting to note that this new component concerns a base analogous to that of the CVA. It is therefore interesting to investigate the related redundancies and the potential double-counting.

With reference to the box above : valuation incoherence (IFRS 13) between cash instruments and derivatives for the retreatment methodological proposal.

The costs of the future periods should be of course summed up to obtain the total cost.

3.2 LIABILITIES FVA

As mentioned previously, the liabilities spread used should be adjusted, if necessary, so that the credit risk corresponds to that of the institution preparing its financial statements. For instance, one way to proceed is:

$$\begin{aligned} \text{SpreadFVA_Liab} &= \text{funding_spread}_{\text{market}} - \text{credit_spread}_{\text{market}} + \text{credit_spread}_{\text{entity}} \\ &= \text{credit_spread}_{\text{entity}} + \text{base}(\text{CDS/Bond})_{\text{market}} \end{aligned}$$

Numerical implementation:

$$\begin{aligned} \text{SpreadFVA_Liab} &= \text{funding_spread}_{\text{market}} - \text{credit_spread}_{\text{market}} + \text{credit_spread}_{\text{entity}} \\ &= 25\text{bp} - 20\text{bp} + 90\text{b} \\ &= \text{credit_spread}_{\text{entity}} + \text{base}(\text{CDS/Bond})_{\text{market}} \\ &= 90\text{bp} + 5\text{bp} = \mathbf{95\text{bp}} \end{aligned}$$

As in the case with the assets FVA for which the base is close to the CVA, the base to which the liabilities FVA applies is analogous to that used for the calculation of the DVA (the aggregation levels to be used for calculating the ENE: the position, the counterparty or all positions, should be studied).

However, as for this base, the credit spread of the entity has already been recorded in the DVA, and must only consider the component (CDS/bond)_{market}.

$$\text{Liab_FVA_approx} = -\text{base}(\text{CDS/Bonds})_{\text{market}} \times \text{ENEmodified by CVA}(t) \times 1\text{yr}$$

These items are of course intended to present the economic basis of the problem and institutions might rigorously study the related modelling of the different components of the valuation (CVA, OIS, DVA, FVA...).

VALUATION INCOHERENCE (IFRS 13) BETWEEN CASH INSTRUMENTS AND DERIVATIVES

The proposed methodology does not seem to be consistent with the way instruments other than derivatives are valued:

For a derivative recognized as an asset:

Similar to a security issued by the derivative counterparty, we saw that -in sum- recorded:

- the credit spread of the counterparty via the CVA; and
- the market funding spread consisting of both the market credit spread and the market base.

We note in particular that two credit spreads are involved (the spread of the entity funding itself in the FVA and the spread of the counterparty in the CVA), whereas in the valuation of a security issued by the counterparty of the derivative, only one credit spread is involved (the return on the issued liability).

Based on the article «The black art of FVA, Part II: Conditioning chaos» written by Matt Cameron Risk.net, Obbe Kok of ING asserts that there is double-counting of counterparty risk. According to him, a Bank's creditors demand a particular remuneration for the counterparty risk that the Bank undergoes. CVA and financing costs would result in a single risk that the Bank would transfer through from the counterparty to creditors. If recorded in the CVA for a second time, this item would be redundant.

The reality seems more nuanced as investors take into consideration elements other than the nature of the counterparties to determine the Bank's financing cost: market risk taken by the Bank, legal risk of past activities and other potential risks related to activities other than derivatives, are examples of such considerations. However, a possible retreatment of a part of the credit risk common to counterparties (CVA) and Banks (FVA) could be considered by some institutions in order to reflect in valuations the double-counting, as mentioned by ING. A possible split of the spread into systemic, sectorial and specific components could be considered in order to identify the part of the spread already booked in CVA. Observed transactions would again be decisive.

For a derivative recognized as a liability:

Similarly to a security issued by the Bank preparing its financial statements, we saw that -in sum- recorded;

- the own credit spread via the DVA; and
- the base credit spread / funding spread **of the market**.

In the case of a fair value option debt, the spread base that would have been considered would have been an entity own base: if the debt is quoted, the funding spread that will be considered will consist of an entity own credit component, as well as an entity specific base. This inconsistency comes from the theoretical exercise requested by the formulation of Articles 24 and 42;

- in the case of a liability, the fair value should consider all the entity specific components: the non-performance risk and the other risks; and
- in the case of valuing a derivative recognized as a liability, Article 24 requires that the funding cost is calculated based on the market conditions and that the non-performance risk is entity specific. Funding components, other than credit spread, are hence not entity specific.



OPERATIONAL DIFFICULTIES: OBSERVING TRANSACTIONS AND FUNDING HORIZONS

In the introduction to this article it was pointed out that the valuation was closely linked to the practices adopted by various market participants, in terms of the funding of these positions. In particular, it was mentioned that if all the Banks were funding (or were billing as such) these short positions so there was no need to consider FVA, EURIBOR 3M reference would have relevant.

Due to the several positions of Banks (particularly JP Morgan), it seems that this situation is no longer up to date. In these conditions, it is not obvious that a derivative generating potential funding demands of 5 years must necessarily be funded at the 5 year horizon.

The first reason is that this would require Banks to regularly invest / redeem long-term resources depending on the evolution of the market and on their own potential evolution.

“ IT IS NOT OBVIOUS THAT A DERIVATIVE GENERATING POTENTIAL FUNDING DEMANDS OF 5 YEARS MUST NECESSARILY BE FUNDED AT THE 5 YEAR HORIZON.”

Therefore, it is possible that the practitioners would withhold more long-term intermediary funding horizons, more expensive than EURIBOR 3M, without exposure horizons that coincide with EPE and ENE. It is hence preferable for the emergence of a clear consensus that institutions communicate more about the spread level being used.

CONTACTS

Mazars

61 rue Henri Regnault
92075 Paris-La défense France
Tel. +33 (0)1 49 97 60 00

Emmanuel Dooseman

Partner, Global Head of Banking
E-mail: emmanuel.dooseman@mazars.fr

Nordine Choukar

Partner, Head of Financial Quantitative Services
E-mail : nordine.choukar@mazars.fr

Christophe Bonnefoy

Senior Manager, Quantitative Analyst & Actuary
E-mail: christophe.bonnefoy@mazars.fr

Detailed information available
on www.mazars.com