New valuation and pricing approaches for derivatives in the wake of the financial crisis

Moving towards a new market standard?

October 2011

kpmg.com
1. A new valuation and pricing framework
2. Collateralized deals
3. Uncollateralized deals
4. Implications for bank management
5. What institutions need to do now
6. References
1. A new valuation and pricing framework

As a result of the financial crisis, the ‘old’ derivatives valuation framework with one master swap curve for discounting and projection of forward rates no longer applies.

In particular, the crisis revealed differences in value between collateralized and uncollateralized trades, which were negligible before. Collateralized trades must be theoretically discounted with the agreed collateral rate (mostly an overnight index swap (OIS) rate)1 (see e.g. Piterbarg (2010), Fujii et al (2009a, 2009b, 2009c)). Due to the small basis spreads and the low volatility of those, this valuation concept never played a major role. With raising and volatile spreads discounting collateralized cashflows with the CSA rate is no longer a purely theoretical concept, but has become material.

On the other hand, the price at which an institution would trade an uncollateralized deal is related to the cost of funding of the respective institution (see e.g. Fries (2010), Morini and Prampolini (2011), Burgard and Kjaer (2009), Piterbarg (2010) etc.). As funding spreads dramatically increased, their consideration in the pricing and the valuation makes a big difference.

KPMG has carried out an industry survey on CSA and funding cost related discounting which also addresses the transfer pricing and risk management topics arising from the transition to the new discounting regime. The target group consists of 18 banks from 10 countries. KPMG classified the banks in two groups on the basis of their trading activities and balance sheet size: major international and medium sized institutions. This classification reflects the different approaches with regard to CSA and funding cost related discounting in these two respective groups.

The interviews and subsequent evaluation of the questionnaires carried out by KPMG reveal that CSA discounting has become the market standard for pricing collateralized deals, and will become the market standard for valuation at trade level. In contrast to the accepted methodology for the valuation of collateralized deals, the treatment of uncollateralized deals is still open to discussion. For most of the institutions the consideration of funding costs in the valuation of uncollateralized deals does not go beyond the collection of ideas. Consequently, the corresponding risk management and transfer pricing questions are very much under review and discussion.

Reasons for the move towards new valuation methods:

- Widening of basis spreads: The swap rate associated with a swap vs. 6M LIBOR no longer coincides with the swap rate of a swap vs. 3M LIBOR given the same currency and maturity. OIS – LIBOR spreads have also widened considerably.
- Collateral: To mitigate counterparty risk, most of the interbank OTC trading is now carried out on a collateralized basis, i.e. daily changes to the mark-to-market value of the derivatives are balanced via collateral accounts. Details regarding the daily margining process are described in the so-called Collateral Support Annex (CSA) agreement.
- Funding cost: The assumption that banks fund themselves at the LIBOR rate is no longer valid. This is particularly the case for longer tenors.

© 2011 KPMG International. KPMG International is a Swiss cooperative. Member firms of the KPMG network of independent firms are affiliated with KPMG International. KPMG International provides no client services. No member firm has any authority to obligate or bind KPMG International, or any other member firm vis-à-vis third parties, nor does KPMG International have any such authority to obligate or bind any member firm. All rights reserved.

1 In the following CSA discounting or in case of an OIS rate paid on the collateral OIS discounting.
2. Collateralized deals

The survey shows that all banks have dealt with CSA discounting approaches for some time and have a well-defined idea regarding its implementation. In the interviews carried out for our survey, and from projects done in this field, we get the impression that major banks are driving the transformation of the market towards CSA discounting, whilst medium sized banks (though perhaps alerted in the first place by the announcement of some early bird to switch its collateral management valuations to CSA discounting) lag behind in the implementation process. Due to current developments, such as the adoption of CSA discounting by central clearing services and a high regulatory pressure to move to central clearing, this market transformation has become irreversible.

Looking at overall implementation status, we found that major banks have switched the pricing to CSA discounting and consider this effect in valuation. Most banks currently report an offline P&L adjustment and intend to switch to a CSA based valuation at trade level by 2012. Medium-sized banks seem to lag behind in the switch to CSA discounting. Not all survey participants have adopted CSA discounting for pricing yet, and the time horizon for the implementation of the valuation spans the next 1-3 years.

The implementation in many banks is driven by materiality assessments and pragmatism. Major banks have commenced their implementation with the most critically affected asset class, i.e. interest rate derivatives, and the most highly impacted product types, e.g. long-running FX or inflation products. This has in some cases led to inconsistencies in the valuations used between desks. Some institutions cured these valuation inconsistencies by running a parallel infrastructure capable of both CSA and Libor discounting.

The implementation is currently being rolled out to all essentially affected asset classes. Curiously, a move to CSA discounting in equity markets is evident, but not at the same scale as for the interest rate business. Some institutions, especially medium sized banks, still withhold from planning an implementation of CSA discounting for this asset class in the short-term.

In the institutions that have partly implemented CSA discounting, the implementation has started with the economic valuation but has not yet been extended to processes such as collateral management, risk measurement or fair value accounting.

Figure 1
Survey result – When do you plan to go live with your CSA discounting methodology?

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pricing &amp; Valuation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pricing &amp; Valuation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

© 2011 KPMG International. KPMG International is a Swiss cooperative. Member firms of the KPMG network of independent firms are affiliated with KPMG International. KPMG International provides no client services. No member firm has any authority to obligate or bind KPMG International or any other member firm vis-à-vis third parties, nor does KPMG International have any such authority to obligate or bind any member firm. All rights reserved.
Materiality assessment is also key when it comes to model CSA specifics. This is particularly the case when considering amongst other issues minimum transfer or threshold amounts as well as the various eligible currencies to post collateral. The institutions only plan to model CSA clauses explicitly where these deeply impact the value of their portfolio and where these can be economically hedged and, thus, market data rather than historic data is available for modeling purposes. Therefore none of the participants actually plan to incorporate convexity adjustments in moving from collateralized to uncollateralized measures or to different currency measures. Though institutions seem to incorporate the collateral currency in their discount factors, the embedded multi-currency optionality is only valued with its intrinsic value.

The right of the collateral posting counterparty to switch the collateral currency as soon as another eligible currency becomes the cheapest to deliver can actually be seen as an option on the cross-currency basis spreads. One institution stated it may be inappropriate to consider the time value of this option due to the lack of a market in which to hedge the resulting vega risk. Minimum transfer and threshold amounts tend to be only modeled in case of concentration risk, otherwise a pragmatic approach is applied: An assessment is carried out whether the counterparty should be classified as collateralized or unsecured based on the size of the minimum transfer amounts and minimum threshold agreements, as well as the exposure towards the respective counterparty.
Compared to the pragmatism with which the institutions deal with other CSA clauses, the consideration of eligible collateral currencies in their valuation appears to be an important detail for the survey participants. This is remarkable considering the difficulties and efforts the institutions may have to face.

So far none of the standard front office systems actually supports the introduction of discount curves, which depend not only on the deal currency but also on the collateral currency.

In the near future the multi-currency issue might even become irrelevant – at least for new deals (except for cross-currency trades in less important currencies) – when the new standardized ISDA CSA\(^2\) is released and central clearing becomes obligatory. This new standard is thought to solve, among others, the multi-currency issue by introducing single currency cash collateral accounts. However, it is apparently essential for the institutions to be capable of measuring the value differences when back-loading existing trades to central counterparties or single currency CSAs.

All international and nearly all medium sized institutions stated their aim to build discount curves while considering collateral and deal currency.

With respect to the valuation of cross-currency swaps the majority of the participants follows the approach taken for vanilla swaps – collateralized in a currency which is not the deal currency and adjust the discount factor correspondingly. Some of the medium-sized banks are still undecided as this question is linked to the choice of the basis currency for the cross-currency swaps. Even though the markets mostly quote and trade cross-currency swaps with USD leg flat, institutions with a focus on EUR convert the quoted basis spreads quoted based on USD flat to basis spreads with EUR flat and apply these for valuation and portfolio hedging.

The markets and currencies for which OIS discounting will be applied reflect again the relevance of each of the markets for the respective institution. While most banks will build OIS curves in the big six currencies, EUR, USD, GBP, JPY, CHF and AUD, some banks which are heavily involved in emerging markets build curves for these markets as well. Rather than sticking with Libor discounting for markets with illiquid overnight swap markets, institutions started to build synthetic OIS curves by using a liquid proxy adjusted by the cross-currency basis.
3. Uncollateralized deals

The price at which an institution would trade an uncollateralized deal is related to the cost of funding of the respective institution. From the survey, we obtained the impression that the majority of the banks plan to consider their own funding costs in the valuation of uncollateralized deals in some form.

Cost of funding discounting is one of the valuation approaches banks consider. Another approach might be CVA/DVA with a funding value adjustment. However, there is still no clear market view yet as to which valuation methodology and which curve construction should be chosen and/or how cost of funding is actually determined. This is especially true for the group of major international institutions – the valuation of uncollateralized deals seems to be still under discussion and implementation plans are very vague.

Having realized the impact of the new valuation approach for collateralized deals, medium sized institutions have initiated comprehensive projects which work on topics such as multi-curve set-ups, CSA discounting and the valuation of uncollateralized deals. If they proceed as planned, the medium-sized institutions might even be early birds with respect to the introduction of a new valuation approach for uncollateralized deals. Most of these smaller institutions plan to follow a cost of funding discounting approach.

A reason for the reluctance of major institutions to move forward may lie in their counterparty risk measurement infrastructure. Many of them have adopted a symmetric CVA/DVA approach. They are, as a result, forced to handle the double counting problem when they wish to implement funding cost discounting or to switch the method.

Several contacts informed us that their traders argue for the latter approach because they prefer an approach at trade level rather than at portfolio level. At least one of these banks will try to implement a parallel infrastructure – a corrected DVA on portfolio level for the accounting P&L and funding cost discounting for the economic P&L. The funding curve would be determined in such a way that both approaches can be reconciled. The reconciliation task is not trivial, as the P&L effects from diversifications and concentrations need to be broken down to trade level. This might be one of the reasons the institutions still seem to be rather undecided on the issue.

In summary, there are various ideas to derive the actual discounting curve for uncollateralized trades. Institutions planning to adopt a funding cost discounting approach mostly tend to determine the spread based on an analysis of their current short-term and long-term (unsecured) funding costs. Others use the average of their current funding mix or short-term funding costs only. Institutions which favour keeping or implementing a CVA/DVA approach stick to Libor discounting and might adjust the DVA by the bond-CDS basis.

**Figure 5**
Survey Result – Do you use/plan to use a CVA/DVA approach in pricing uncollateralized derivatives?

<table>
<thead>
<tr>
<th>Major international banks</th>
<th>Medium sized banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implemented</td>
<td>Planned</td>
</tr>
<tr>
<td>CVA/DVA</td>
<td>CVA/DVA</td>
</tr>
<tr>
<td>CVA only</td>
<td>CVA only</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

© 2011 KPMG International. KPMG International is a Swiss cooperative. Member firms of the KPMG network of independent firms are affiliated with KPMG International. KPMG International provides no client services. No member firm has any authority to obligate or bind KPMG International or any other member firm vis-à-vis third parties, nor does KPMG International have any such authority to obligate or bind any member firm. All rights reserved.
Weighing up the techniques

In our opinion, some issues can be brought forward for and against funding spread discounting. Discounting based on own funding spread renders a rather subjective valuation and P&L allocation of uncollateralized deals. The ‘one’ funding spread curve to be applied for the valuation of uncollateralized derivatives does not exist. At first glance, you would expect that the funding grids applied for transfer pricing on the asset or liability side are an obvious choice for the discounting curve. However, closer analysis is required because those grids usually incorporate business incentives and do not necessarily reflect the current funding level. The funding spreads applied to value own unsecured liabilities – blended with short-term funding spreads – might be an alternative. The question about the correct market value cannot be answered easily because the value of the trade now depends on the owner and his funding spread. This is especially relevant in case of novations.

On the positive side, funding cost discounting can create transparency about the actual costs of a business model. Incorporating the full funding spread in pricing derivatives might be detrimental for some business units. Banks may, therefore, choose not to include them fully in their pricing, but at least they are made aware of the true long-term costs of their business and their business model.

Comparing an adjusted DVA approach and funding cost discounting, it is clear that liquidity and credit components in the spreads are difficult to disentangle. As funding cost discounting comprises both and can be furthermore applied at trade level rather than at portfolio level, funding cost discounting seems to be preferable to an adjusted DVA approach.
4. Implications for bank management

The discussions about the true funding cost may have already revealed that the new valuation schemes deeply affect transfer pricing between derivative desks and treasury/funding functions on one hand, and between treasury/funding functions and loan units on the other. This has called previous transfer pricing approaches into question.

Due to the ongoing discussion about the valuation of uncollateralized deals, transfer pricing and risk management is still under review at most institutions. One thing, however, seems to be clear: internal deals are, or will be, valued as if they are collateralized in all institutions participating in the survey even though an uncollateralized set-up could also be conceptually operationalized.

There could be manifold reasons for the popularity of the collateralized valuation set-up. Applying CSA discounting to internal trades provides the bank with an objective valuation method for internal trades which is not dependant on subjective assessment. Most of the external derivatives trades are carried out on a collateralized basis. Valuing the internal trades as collateralized ensures that there is no advantage of doing trades externally rather than internally. Furthermore, in case of an adoption of funding cost discounting for uncollateralized deals, the valuation of internal trades as uncollateralized would lead to the introduction of funding spread risk at every desk in the bank.

However, we got the impression that – while treating internal deals as collateralized in the valuation – not all banks participating in the study appear to have implemented the respective cash processes involved with a collateralized set-up.

Rethinking existing transfer pricing schemes and risk management

From our point of view, collateralized internal trades must be set up in a consistent transfer pricing framework for funding costs from the derivatives business in the bank. This transfer pricing framework should not differentiate between internal and external trades in order to avoid internal arbitrage opportunities.

Another objective of the transfer pricing scheme must be to allocate funding costs and benefits arising from internal and external (collateralized or uncollateralized) derivatives to the unit where they have been generated. From projects done in this field we gather that the actual design of the transfer pricing scheme depends on the business model of the bank and the size of the trading area of the respective bank. The cost of collateral may be distributed retrospectively, e.g. in a monthly run, to the respective desks and business units (e.g. loan units) considering collateral on internal and external trades. This approach fits a passive management of the funding needs and benefits from the derivative area.

For institutions with larger trading operations a set-up with internal collateral accounts and daily margining for the external and internal collateralized trades at each desk is thinkable. As a consequence, each desk is responsible for the management of second order effects on the funding needs and benefits arising from the underlying trades.

Additionally, under both schemes, i.e. in case that cost allocation or internal collateral accounts are implemented, each desk is responsible to hedge mismatches arising when an uncollateralized derivative is hedged with a collateralized one.

Analogously to a CVA the funding needs and benefits from collateralized and uncollateralized trades could also be transferred to a central desk via upfront fees or internal trades. This central desk would manage the funding needs of the derivatives business and the second order effects of the underlying market movements on the funding of the collateral pool. A central desk ensures that netting effects over all desks can be exploited and that the funding needs of the capital market business can be pooled. However, the installation of an additional desk can be quite costly. The last alternative is, thus, chosen by some of the banks with major capital market operations.

In the evaluation of the study we found that not many of the participating institutions consider a link between internal derivative trades and internal loan/deposit (funding deals), e.g. between the treasury/funding functions and the loan business units. We think that a consistent transfer pricing framework must comprehend internal derivatives as well as internal funding tickets to avoid arbitrage opportunities, e.g. in the form of internal block trades. This is especially true for institutions which incur a big derivative portfolio to support their loan business.
5. What institutions need to do now

The relevance of CSA and funding related valuations originates from fundamental changes in the markets since the beginning of the financial crisis. Driven by the fast implementation of CSA discounting by central counterparties and major banks, CSA discounting has already become the market standard for pricing collateralized interest rate derivatives, and is about to become the market standard for valuation of collateralized derivatives at trade level. However, a market standard framework for uncollateralized deals consistent with the existing valuation infrastructure does not yet exist.

In light of this, financial institutions need to rethink their pricing, valuation and transfer pricing.

Key actions

- In order not to be arbitraged out, each institution must adopt CSA discounting for collateralized deals, at least for asset classes where the market indicates that most of the banks have switched their pricing to the new method.

- In times of rising funding costs, no bank can afford to ignore its funding costs. The economic valuation of uncollateralized deals should be linked to the actual funding spread of each bank. A business model which does not allow to fully price in its actual cost of funding is not feasible in the long-term.

- CSA or funding related valuation is not a pure playground for quants, but rather a topic that evokes questions about transfer pricing, steering of risk and, most importantly, the business model of each bank.
References


M. Morini and A. Prampolini (2011): Risky funding with counterparty and liquidity charges, Risk March 2011, p. 70-75.


Contacts

Daniel Sommer
Head of Financial Risk Management
KPMG in Germany
T. 49 69 9587 2498
E. dsommer@kpmg.com

Matthias Peter
Senior Manager, Risk Consulting
Financial Risk Management
KPMG in Germany
T. 49 69 9587 1649
E. mattiaspeter@kpmg.com

Dr. Barbara Götz
Manager, Risk Consulting
Financial Risk Management
KPMG in Germany
T. 49 89 9282 4601
E. barbaragoetz@kpmg.com

Giles Williams
Partner, Financial Services
Regulatory Centre of Excellence, EMA region
KPMG in the UK
T. 44 20 7311 5354
E. giles.williams@kpmg.co.uk

© 2011 KPMG International Cooperative (“KPMG International”), a Swiss entity. Member firms of the KPMG network of independent firms are affiliated with KPMG International. KPMG International provides no client services. No member firm has any authority to obligate or bind KPMG International or any other member firm vis-à-vis third parties, nor does KPMG International have any such authority to obligate or bind any member firm. All rights reserved.
The KPMG name, logo and “cutting through complexity” are registered trademarks or trademarks of KPMG International.
The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.
Produced by KPMG’s Global Financial Services Practice in the UK.
Designed by Mytton Williams
Publication name: New valuation and pricing approaches caused by the financial crisis: Moving towards a new market standard?
Publication number: 314799
Publication date: October 2011