



Funding valuation – a clear and present future

It is now generally accepted that banks should use a different pricing methodology depending on whether a derivatives trade is collateralised or non-collateralised. Specifically, dealers are now using overnight indexed swaps to discount the present value of future cashflows on collateralised swaps transactions. Risk convened a forum recently to discuss the changes with a select number of leading swaps dealers. Barclays Capital and the Royal Bank of Scotland sponsored the event and their representatives' comments are reported in this article

Risk: Can you elaborate on some of the events that have recently affected valuations for collateralised positions?

Simon Wilson, Royal Bank of Scotland (SW): When people talk about the 'credit crunch', what do they mean? What has happened is that the price of money – how and where banks and people borrow money – has changed. Historically, the difference between an overnight rate of money and a three-month rate of money was very small, to the tune of two or three basis points (bp). At the time of the credit crisis, that widened out and so the overnight indexed swap (OIS)-Libor spread widened out to as much as 150bp. Previously, everyone had assumed in their pricing models that OIS and Libor were interchangeable. In the middle of the credit crunch, this blew out to 150bp and the discrepancy became very large indeed. That kind of widening of the OIS-Libor spread happened fairly early on. It was certainly before the Bear Stearns blowout and a long time before the Lehman blowout. It's one of the things that the people in the industry took as a bad sign because, in particular, Libor – which is roughly where banks are able to get money – started becoming much higher than overnight money. Those circumstances are indicative of distress in the market.

Risk: Have dealers always been aware of the theoretical differences between pricing collateralised and non-collateralised trades? What was the difference at the height of the crisis between using OIS as a discount rate on a collateralised trade and using Libor discounting?

Nick Hallett, Barclays Capital (NH): It's fair to say it has always been a theoretical discussion. It was one of those things where the differences was so minimal and the conventions were so locked into Libor discounting that, in general, it wasn't reflected when you were showing prices to clients. What's really brought it into focus and made everyone aware of it across the industry was the credit crunch and the resultant widening of Libor-OIS spreads. To

The Panel

Barclays Capital

Nick Hallett, Global head of cross currency swaps

Royal Bank of Scotland

Simon Wilson, Head of euro swaps

be clear, the strongest collateralised agreements are generally cash collateralised and the rate of return on that collateral is OIS. That is why everyone is so concerned about this Libor-OIS spread because that is what drives the valuation of a lot of the interbank trades and a lot of the strongly collateralised trades. LCH.Clearnet has a very clear collateralisation model, which makes it very easy to value and identify their products.

Risk: Can you give an example of a trade at the height of the crisis and to compare that with now, and give an indication of how prices would differ?

NH: The biggest differences are in off-market trades, and then it is very hard to compare it in basis points because a very off-market trade could have a very large adjustment on it. An interesting one is forward-forwards, because par swaps in this world that we're in – the swap rates you see on the screen – if you assume it's Libor-discounted or if you assume it's OIS-discounted you achieve the same price because that's what your model tries to do – it reprices all these swaps. For forward-forwards, which are funding-sensitive, you can start to see divergences in pricing between the various methodologies. At the moment, if you look at sterling, a five-year five-year forward-forward is, say, 2.5bp different if you assume OIS discounting versus just plain vanilla Libor discounting, so it's for those sorts of interbank instruments that you have the most visibility [in methodology differences].

Risk: There are a variety of credit support annex (CSA) agreements that have different clauses and various optionalities. How would a dealer go about pricing a collateralised trade, given those differences?

NH: It's fair to say that, in theory, this optionality has value and, technically speaking, it should probably be the worst plus a little extra bit of option value. It's unclear as to exactly how much that option value is worth. In my experience, there is a degree of stickiness in collateral agreements. International Swaps and Derivatives Association (ISDA) wording is relatively loose to allow people time to return collateral when you're talking about substitutions. This means that, at the limit, you may not be able to instantly get your collateral back so the value of that option switching is diminished from where you would see it to be in pure theory. With all these varying collateral agreements, there is a degree of subjectivity in valuing them in a whole degree of scenarios including the scenario we're talking about here, which is the choice between currencies. Another classic example would be how you value a collateral agreement where, for example, it's at the LCH.Clearnet but it's in Norwegian kroner. There's some sort of cash OIS equivalent setting in Norwegian kroner that is used to collateralise these trades, but there is no OIS market in Norwegian kroner. So how do you estimate the forward value? Do you start off with dollar OIS in cross-currency converted? Do you use the same spreads you're seeing in, say, euros or dollar OIS and use a proxy curve? There's a degree of subjectivity, so the very standard stuff at LCH.Clearnet – euro, sterling and dollar – is very easy to value. As you move away from that, it becomes much more subjective.

SW: Typically, between a European and an American bank, at a minimum, you would allow posting of euro cash or euro government bonds and US dollar cash or US dollar government bonds. At the Royal Bank of Scotland (RBS) – and I'm sure at Barclays as well – as we are sterling banks, most of our collateral agreements include sterling cash and sterling government bonds. Essentially, when we do a standard trade with the market counterparty, the party posting collateral has the option of posting three different currencies. For the optionality of that, how do you price that in? It's reasonably clear what the cheapest thing to post is currently, and that's essentially euro cash or euro government bonds. That has been the same for a long time and will probably continue to be. It's really to do with the fact that treasuries trade in a special way, so it's always going to be quite hard to post treasuries to anyone and gilts are a smaller market. With euros, you have more countries and a large amount of collateral to access, so it makes euros the easiest thing to post. That's the real reason why the market hasn't come to consensus about what to do about that optionality. Really, for the first five to 10 years, there isn't any optionality.

Risk: How would you approach one of the issues that Nick raised when perhaps there's a trade in Norwegian kroner where there isn't necessarily an active OIS market?

SW: Particularly if you're posting to the LCH.Clearnet or to somebody else, you have to consider how you raise that money yourself. That's probably the right thing to do because, typically, how you raise the money would also be how your counterparty raises money if they're posting collateral to you. For example, it would be very typical that we would raise our money in euros and then cross-currency foreign exchange forward that into Norwegian kroner in order to generate the collateral in Norwegian kroner.



Simon Wilson

Risk: Are you seeing an increasing push towards standardised CSAs or is there still quite a lot of variety in what's out there?

NH: There is a huge variety in what's out there. There's such a large existing population of trades that it will take a long time to work through that. It's clear now that, as people are aware of what the optimal posting should be, to actually go through the collateral agreements and make those postings. Customers, other banks, suddenly have become aware of these issues too. Because simplicity makes it far easier to value these products, the banks are, in general, guiding people towards a much simpler solution. The other thing is the regulatory side. The banks actually may not have the luxury of guiding people to what they think should be the perfect CSA. What may happen is that the regulators may come in and say that certain classes of counterparties have to go through central clearing. That is another thing you need to be aware of when you're looking at any potential optionality in pricing trades. When you're looking at a trade with a counterparty, where maybe the optimal collateral is, for example, sterling or euros, if they are forced onto central clearing for that particular product type, they will end up being, say, dollar-collateralised. You've got to take some sort of decision when you're looking at a trade. It's fair to say most of the interbank business will very rapidly be forced onto central clearing. As it is, there is a lot of backloading going on in LCH.Clearnet. It's what happens to the rest of the counterparties that is the big question.

Risk: How will some of the regulatory changes, in particular, the proposed move towards central counterparty (CCP) for standardised derivatives affect market dynamics?

SW: There are two comments to make about the forced central clearing of counterparties. The first thing is that clearly LCH.Clearnet has a reasonably standard collateralisation policy so interbank trades, for example, become very easy to value. It's reasonably clear, certainly for the G-4 currencies, how to value them. For the majority of trades, everything is going to be easier and more standardised. It doesn't really solve the problem for other trades like Norwegian krone swaps, for example. LCH.Clearnet doesn't clear cross-currency swaps but, if they do, the obvious collateral call to make is to say all cross-currency swaps will be done in dollars. That's fine, but it has a fairly significant impact on how we price cross-currency swaps right now. That's a reasonably big move and then the question is how do we backload them, because backloading them will be a significant profit-and-loss event that consequently people will not be keen to do. The other side of things about central clearing in general is that it will increase the cost of doing derivatives reasonably significantly, and



Nick Hallett

primarily not for the banks but for counterparties who use swaps in a certain way. Banks in general keep their portfolios reasonably delta-neutral overall so the cost of central clearing, particularly the initial margin for central clearing, is reasonably small for banks. But there are certain customer types for whom it will become prohibitively costly to do so because they run large outright derivative exposures.

Risk: Do you think that the dealer can have a say in how many counterparties use CCPs?

SW: Particularly if the central clearing houses are government supported, it would be interesting to see if they can organise cross-posting of collateral. For example, a client may register to be in London and then have their Singapore-dollar/euro-dollar futures cleared and the margins posted to, say, LCH.Clearnet. That would retain the efficiencies while still having the benefits of clearing.

NH: The Japanese authorities are thinking of doing that. That is one of their suggestions, backing into LCH.Clearnet. I agree that will probably be one of the easier-to-handle scenarios.

Risk: Returning to the issue of discounting using OIS for collateralised trades, how have clients responded to some of these changes, how much effort has gone into explaining some of the changes to clients?

NH: There has been a lot of effort going into explaining to clients what's going on. The good news is that it's fairly easy to explain rationally and to estimate the effects of OIS discounting, particularly on off-market trades. It's fairly easy to show and allow somebody to estimate it. The one issue is that it does make the pricing of swap products even more complicated than it was, whereas before, there were very simple bootstrapping models that a lot of clients had access to, or they could use Bloomberg to price trades. Suddenly, that's no longer available to them. The technical expertise needed to accurately value these products has increased. That is one of the downsides for clients, although estimating the effects is fairly easy. In general, the take-up by the client community has been very good. They understand what's going on, they understand banks are looking at collateral and they are working together to get to a more sensible solution.

Risk: Simon, what is your experience with clients with regard to some of the system and infrastructure needed to price using OIS as a discount? Perhaps you could explain what RBS did and also what you see clients doing?

SW: Had you asked this two years ago in the middle of the

credit crisis, the answer would have been that clients did not want to hear you telling them they couldn't unwind their swaps at a particular value. By now, most clients have heard people explain the funding difference to them, the OIS discounting, and have heard it from more than one bank. Now, it has become much easier to explain this. As to actually how to value this, it is interesting to look at how the yen market evolved, particularly when yen credit became troublesome during the late 1990s. It was then that US banks trading in Japanese products started to look at the impact of the cross-currency swap markets on where they would price yen swaps. It's exactly the same kind of process. Essentially, the US banks were realising that their funding requirements were in dollars and the dollar-yen cross-currency swap basis market was reasonably higher at around about 30bp. As a consequence, they had to change the way they price forwards. In fact, the technique for dual bootstrapping has existed for some time and most banks do it for yen swaps. When we bootstrap a curve, when we are building up a one-year interest rate at 1% and two-year interest rate at 2%, it means that we have to dual bootstrap. You will do that bootstrapping with a projection curve as well as with a discounting curve underneath. And where you discount your cash flows is clearly at OIS. The techniques existed for a while but the application of it on portfolios of euro swaps, dollar swaps and sterling swaps takes a bit of time to implement.

Risk: Do you see consensus across the market for these issues that we have been discussing? Are there a few outliers that are still perhaps using Libor as a discount? Is Libor still being used as a discount for the exchange of collateral generally in the market?

NH: As far as the market is concerned, it's clear that LCH.Clearnet is part of this whole consensus. They are the major clearer for trades in the major European, US and Japanese markets. So how they collect collateral is absolutely crucial to the whole thing. The positive side to this is that they are also the key to ensuring that there is timely consensus within the industry. I don't think anybody disagrees on the principle, it's getting everybody to move in the right direction at the same time. LCH.Clearnet is clearly key to this and they are looking at OIS discounting. At the moment, I believe they are using some sort of Libor discounting.

SW: Some ISDA documentation for swaps allow for valuations by a pool of five selected dealers using the usual kinds of averaging of five dealers or valuations by certified clearing houses. The impact of LCH.Clearnet changing to OIS discounting has some legal ramifications because it allows people to go to them to value a swap. They can then say that, since they have had a central clearing house value the swap, the price must be right.

Risk: LCH.Clearnet is thinking about reviewing its methodology and moving towards OIS discounting. Do you have any idea on the timeline?

SW: My understanding is that LCH.Clearnet will be making margin calls, additional margin calls, as of this month based off valuations of their major portfolios on OIS. Those figures have been circulated to the banks already. My understanding is that the full systems implementation of doing the daily margining on an OIS basis is probably not something they will deliver before the end of the year. Until that time, they will be making top-up margin calls on a monthly basis based on batch runs of OIS discounting. So the answer is that, as of this month, it's OIS discounting.

Risk: Has the fact that LCH.Clearnet isn't yet using OIS discounting led to any disputes in the market?

SW: The majority of banks are still calling for collateral on a Libor basis. Everyone is waiting to change to OIS discounting, but currently everyone is posting and calling for margin on a Libor basis, with some notable exceptions. It means that there have been collateral disputes with certain counterparties. The economic impact of a collateral dispute is negligible unless that counterparty is about to go bankrupt. But there are some fairly substantial collateral disputes out there.

NH: It is fair to say that collateral is a noisy business anyway. The banks have various methodologies that are similar but are not identical even in the old Libor discounting world. There are various banks that may assume that their base currency is euro or dollar or the currency of the swap itself and that impacts the valuation, so collateral disputes are an everyday process. There are systematic biases in the setup and, to be honest, I'm hoping this LCH.Clearnet centralisation will actually remove a lot of those for the interbank business and will make it very rigorous and simplified.

Risk: We've talked about the treatment of collateralised trades. I just want to touch briefly on the treatment for non-collateralised trades; Nick, could you briefly describe the difference in treatment and what is the approach to uncollateralised trades?

NH: It is clear that, just as the spreads between OIS and Libor changed during the credit crisis, so did the spreads between Libor and where banks actually fund at. It's clear that, for a non-secured position where there isn't any collateral providing funding for that position, one of the components that goes into the pricing of that unsecured derivative is how that bank is able to achieve that funding. That clearly needs to be reflected in the pricing of uncollateralised trades. The other thing is that there is a huge overlap between the pricing of funding and the pricing of credit. That needs to be very closely taken into account. The link instrument between uncollateralised and collateralised trades is one-way CSAs. This is a big issue where one counterparty will post on one side if their net present value is negative but where on the other side, if they have a positive present value, they don't receive any collateral back. Where we see it in our day-to-day business is often when we're facing counterparties that are of far superior credit quality to the bank, which are the sovereigns, the central banks and the supranationals. Historically, because there has not been that much difference in these funding spreads, the valuation of this theoretical option of funding has been very minimal and people have been able to ignore it. That's now really not the case.

Interestingly, for facing these counterparties, the cost of the credit is fairly minimal, but the cost of the funding can be material. Credit pricing is for a theoretical event that may or may not happen in the future, whereas you continually have to fund a position from day one. So, if there is a large funding exposure where you're continually having to post collateral to a sovereign but not receiving it on the other side for a similar position in the opposite direction, that can be a major drain on liquidity from the financial system. The sovereigns are now aware of this. It has been brought to their attention and there may even be slight differentials between the price of interbank instruments and the price of instruments under these one-way CSAs, but I think it would be very useful to get around these problems by having these entities centrally cleared as well, particularly as many of these regulatory authorities who are very closely linked to the sovereigns are the ones who are insisting on central clearing. It would be very good to see those types of entities going into central clearing too.



SW: The cost of a one-way CSA is very substantial. It's worth understanding where the cost is. Let's say I do a 30-year trade with somebody, where I have the obligation to post collateral to them if the trade moves in their favour, but they have no obligation to post to me if the trade moves in my favour. For a 30-year trade, it's very likely that, in the course of that trade, it would be substantially off market – hundreds of basis points off market. It's not a credit event but for the time that this trade is off market, if it's in my favour, then I will be getting no collateral from the client. This trade will be essentially a loan that I am making to the client. If it's the other way around, if the trade is in their favour, I have to post the collateral anyway. The value of that, when a typical bank is raising 10-year funding at sometimes as much as 200bp over Libor, for a 30-year trade is hugely substantial. We're talking in the order of 10bp or so running on the trade. It's a real cost, it's not to do with the credit of the company, but it's a real cost to do with the funding of that position. In many ways, it's an unsustainable situation. We really have to come up with a solution whereby either these counterparties start to post collateral on two-way form or, in some ways, they become cleared.

Risk: How do you think the sovereigns are going to react – particularly in the current environment – to a requirement to post collateral given some of the difficulties in raising funds?

SW: Most of them are aware of the problem and are sensitive to it. The bigger issue is that the processes involved tend to take, in the same way that banks tend to take, a while to change at these counterparties. An interesting example is that the collateral that they post can be their own government bonds.

Let's say I'm facing a counterparty that is a central bank. If I ask them for collateral, they can give me government bonds. My credit situation doesn't change but I can actually use those government bonds to improve my funding. It's something that the counterparty should have very little concern in doing. It's a process that is an alternative to central clearing that would solve the problem. It doesn't change the credit position so the central bank is very happy that they haven't changed their credit exposure to me. It's not worsening their credit terms at all and it's not improving the credit terms for me, because I still end up owning the exposure to the counterparty. It's a reasonably nice solution that somebody has proposed.

To view and listen to the full proceedings of the *Risk* funding valuation adjustments forum, visit www.risk.net/media-centre