Counterparty credit risk uncovered - part two

Terri Duhon, managing partner at B&B Structured Finance and author of 'How the Trading Floor Really Works', discusses counterparty credit risk on credit default swaps

As explained in the first in this series of articles (SCI 3 May), counterparty credit risk in interest rate swaps can generally be thought of as a symmetric picture of potential future exposure, a fraction of the notional of the trade and non-correlated between the credit risk of the client (counterparty) and the market risk of the trade. In this article, the focus will be on counterparty credit risk in credit default swaps, where none of this is applicable. However, the interest rate swaps framework will still be the starting point: analyse each trade based on the market risk of the product itself to look at potential future exposure, understand the credit risk of the counterparty and then analyse the trade in the context of the overall existing exposure to the client.

Let's start with comparing the interest rate swap and credit default swap picture of potential future exposure from just the market risk. In the interest rate swap world, the picture is symmetric in that the dealer has the same potential future exposure on the trade, whether he is paying fixed or receiving fixed on the interest rate swap. This is because we broadly say it is just as likely for interest rates to go up as it is for them to go down.

Of course, when considering how a new trade impacts the existing risk with a particular counterparty, the direction of the new trade (paying or receiving fixed) is very important to the portfolio exposure but that is a later step. For credit derivatives, the direction of the trade is important in this first step because the potential future exposure profile is asymmetric.

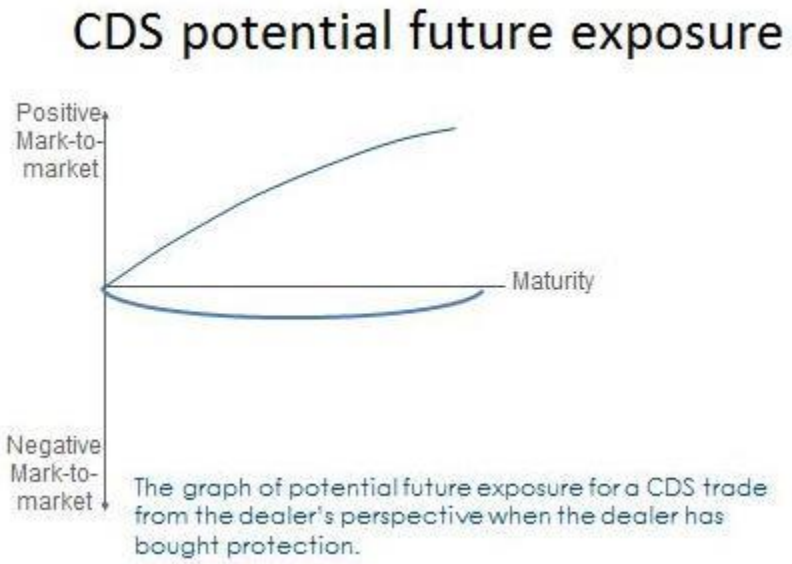
While it may be the case that credit default swap prices have an equal probability of going up as they do of going down, the maximum possible loss is very different whether the dealer pays the CDS premium or receives the CDS premium. When the dealer is receiving the CDS premium (he has sold protection on the reference entity), it has a positive mark-to-market when the CDS spread tightens; in other words, when the credit risk of the reference entity is lower. The lowest that the CDS spread can theoretically go is zero, making the maximum possible positive mark-to-market the PV of the difference between the trade spread and zero.

Similar to the interest rate swap market, the CDS premium is paid over time – which means that by the maturity of the trade, there is only one quarterly premium left to pay. Also - depending on the initial spread, how volatile we assume spreads will be in the future and the confidence level used for the calculations (e.g. 95% or 99%) - it is unlikely that the potential future exposure ever reaches the PV of the difference between the initial spread and zero. In a very simple example, think about how much credit spreads can actually tighten between a reference entity that trades around 50bp versus a reference entity that trades around 450bp.

Now let's look at the trade when the dealer buys protection on the reference entity. The dealer has a positive mark-to-market on the trade when the credit spread widens.

In the extreme scenario, the maximum positive mark-to-market is when the reference entity experiences a credit event and the dealer is owed the contingent payment, which is equal to the trade notional times (1 – recovery rate). Similar to the situation when the dealer sells protection, how close the potential future exposure is to this maximum contingent payment is a function of the initial spread, the volatility assumption and the confidence level used.

The contrast, though, remains between buying protection and selling protection. The picture is not symmetrical (see diagram below). Because buying protection has a larger potential future exposure than selling protection, it is generally the harder trade to get approved when a client's credit lines are full or the client credit quality is low.



This analysis also explains the second difference highlighted between CDS and interest rate counterparty credit risk, which is in the relative size of the potential future exposure and the notional of the trade. In interest rate swaps, the maximum potential future exposure could be on the order of 4% of the notional of the swap. This is similar to the maximum potential future exposure in CDS, when the dealer sells protection.

But when the dealer buys protection, the maximum potential future exposure could be multiples of this up to the maximum of (1 – recovery rate) as described above. As long as there is a recovery rate, it should not be the full notional, but it is possible that it could be very close (e.g. Icelandic bank credit events had very low recovery rates).

Finally, the third point is the correlation of the market risk to the credit risk of the client. The interest rate swap counterparty credit risk is non-correlated because we do not take into account the fact that the level of interest rates could be related to the default of the counterparty. It is possible in times of extreme market stress that there is a correlation, but we generally simplify and assume that there is not a correlation.

In credit default swaps, we cannot make that assumption. We always consider the relationship between the counterparty and the reference entity of the CDS trade. The relationship we theoretically care about is the probability of joint-default.

In other words, we care about the probability of our counterparty defaulting when the reference entity defaults. Intuitively, this is a greater issue when the dealer buys protection rather than sells protection (remember the asymmetry of the potential future exposure graph).

Unfortunately, joint default probability is not observable. For example, when a dealer buys protection on Goldman Sachs from JPMorgan, the dealer can't look at the number of times JPMorgan defaulted when Goldman Sachs experienced a credit event, as it's never happened before. So, we look at other related data – such as equity price moves and credit spread moves – and generally make a lot of assumptions.

Despite having to make a lot of assumptions, we need to take this relationship into account when we think about the potential future exposure in CDS and in extremely correlated situations, we need to consider whether it makes sense to do the trade in the first place. Thus, the closer to default that the reference entity is, there is a higher likelihood that the counterparty will also default when the reference entity and the counterparty are highly correlated (in the example above, Goldman Sachs and JPMorgan are more correlated than say Disney and JPMorgan). This is really where the challenge lies in managing this type of counterparty credit risk.

When we compare CDS counterparty credit risk to interest rate swap counterparty credit risk, we can immediately see these three distinctions: asymmetry of future potential exposure, large percentage of the notional of the trade and correlation between the market risk of the trade and the credit risk of the counterparty. When we look at each of these in isolation, understanding the risk becomes more intuitive. Unfortunately, understanding the risk and managing it are different things and a topic for a later article.

The next article in the series will examine another correlation issue of wrong-way risk.

This article was published in Structured Credit Investor on 17 May 2013.