The credit risk sling

Moorad Choudhry of JP Morgan in London gives us an extensive crash course on how banks effectively use and manage synthetic CDOs to offset worsening credit risks. A senior fellow at the Centre for Mathematical Trading and Finance of CASS Business School in London, as well as a certified FRM, Choudhry also provides a case study to illustrate how the Development Bank of Singapore has set a new trend in the Asia-Pacific region.

Managing credit risk in banking

For a commercial bank, the risks inherent in its core business are the traditional ones of credit risk, market risk and funding risk. All three of these risks are contained within its loan book.

In the normal course of business, a bank will seek to manage the risk exposures inherent in its loan book through a combination of risk management techniques. This article considers how credit risk can be stripped out of the combined group of risks and managed separately. This is achieved through the use of credit derivatives, which enable credit risk to be traded as an asset class in its own right. And by combining the use of credit derivatives with securitisation techniques, a bank can manage its credit risk, as well as its regulatory capital costs. This explains the rise in popularity of the static synthetic balance sheet collateralised debt obligation (CDO), which is at the heart of this article.

The reasons that banks originate CDOs are two-fold:

- **Transfer of credit risk**: a synthetic CDO structure enables the credit risk of a loan book to be separated from the market risk and funding risk, and managed on its own. The costs of transferring this risk away are a function of the CDO structure and related to the credit derivative pricing of the reference assets, whether these are funded or unfunded. With a partially funded structure, the issue amount is typically a relatively small share of the asset portfolio. This lowers substantially the default swap premium. Also, as the CDO investors suffer the first loss element of the portfolio, the super senior default swap can be entered into at a considerably lower cost than that on a fully funded CDO
- **Capital relief:** banks can obtain regulatory capital relief by transferring lower-yield corporate credit risk, such as corporate bank loans off their balance sheet. Under Basel II rules, all corporate debt carries an identical 100% risk-weighting; therefore, with banks having to assign 8% of capital for such loans, higher-rated (and hence lower-yielding) corporate assets will require the same amount of capital but will also generate a lower return on that capital. A bank may wish to transfer such higher-rated, lower-yielding assets from its balance sheet, and this can be achieved via a CDO transaction. The capital requirements for a synthetic CDO are lower than for corporate assets; for example, the funded segment of the deal will be supported by high quality collateral, such as government bonds, and via a repo arrangement with an OECD bank would carry a 20% risk weighting, as does the super senior element

The remainder of this article analyses the structure and use of the static synthetic balance sheet CDO, and a subsequent article for the March/April issue of *GARP Risk Review* will consider the synthetic arbitrage CDO.

The balance synthetic CDO

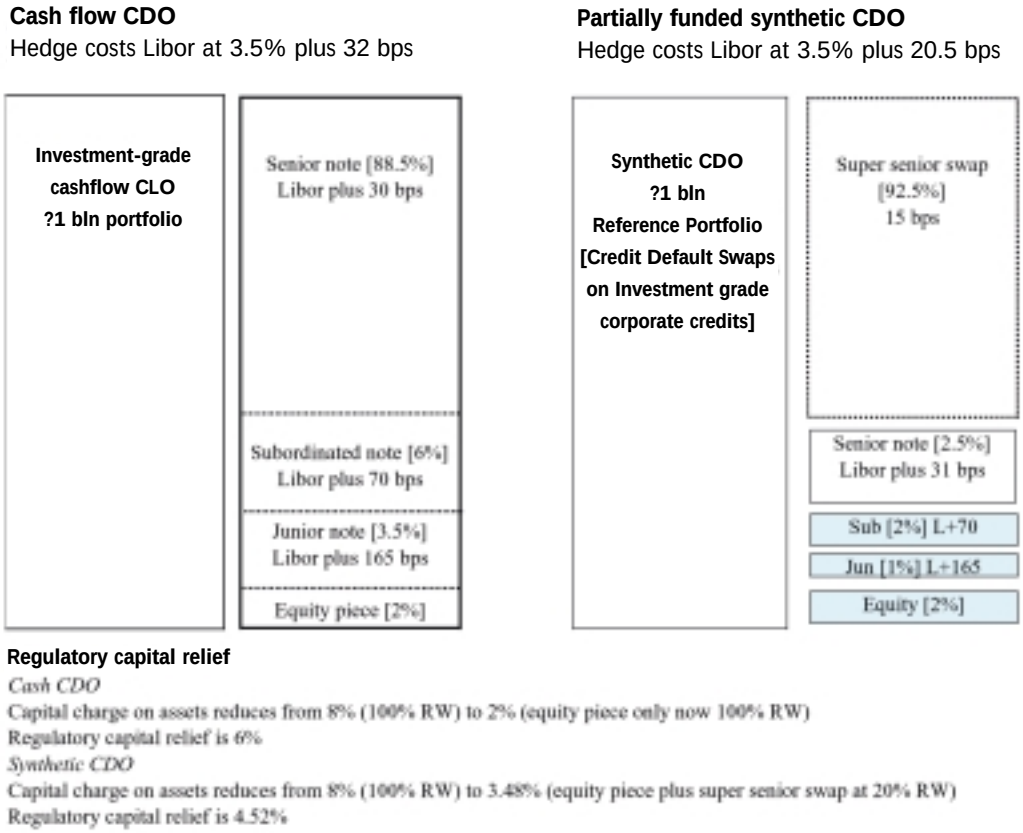
A synthetic securitisation structure is engineered so that the credit risk of a pool of assets held on the originator's own balance sheet is transferred from itself to investors by means of credit derivative instruments. The originator is in effect buying credit protection from investors who are the credit protection sellers. This credit risk transfer may be undertaken either directly or via a special purpose vehicle (SPV). Using this approach, underlying or reference assets are not necessarily moved off the originator's balance sheet. This makes the vehicle an ideal means by which to manage credit risk.

Because the synthetic structure enables removal of credit exposure without asset transfer, commercial banks can use it for risk management and regulatory capital relief purposes. For banking institutions, it also enables loan risk to be transferred without selling the loans themselves, thereby allowing customer relationships to remain unaffected.

Now I would like to discuss the value of the static synthetic balance sheet CDO. To start, a synthetic CDO can be seen as being constructed out of the following:

- A short position in a credit default swap (bought protection) by which the sponsor transfers its portfolio credit risk to the issuer
- A long position in a portfolio of bonds or loans, the

Figure 1 CDO cost structures – synthetics versus cash flow



cash flow from which enables the sponsor to pay liabilities of overlying notes

The economic advantage of issuing a synthetic versus a cash flow CDO can be significant. Put simply, the net benefit to the originator is the gain in regulatory capital cost minus the cost of paying for credit protection on the credit default swap side. In a partially funded structure, a sponsoring bank will obtain full capital relief when note proceeds are invested in 0% risk weighted collateral, such as Treasuries or gilts. The super senior swap portion will carry a 20% risk weighting.[1]

In fact, a moment's thought should make clear to us that a synthetic deal would be cheaper: where credit default swaps are used, the sponsor pays a basis point fee, which for AAA security might be in the range 10-30 basis points, depending on the stage of the credit cycle.

In a cash structure where bonds are issued, the cost to the sponsor would be the benchmark yield plus the credit spread, which would be considerably higher compared to the default swap premium. This is illustrated in the example shown in Figure 1, where we assume certain spreads and premiums in comparing a partially funded synthetic deal with a cash deal. The assumptions are that the:

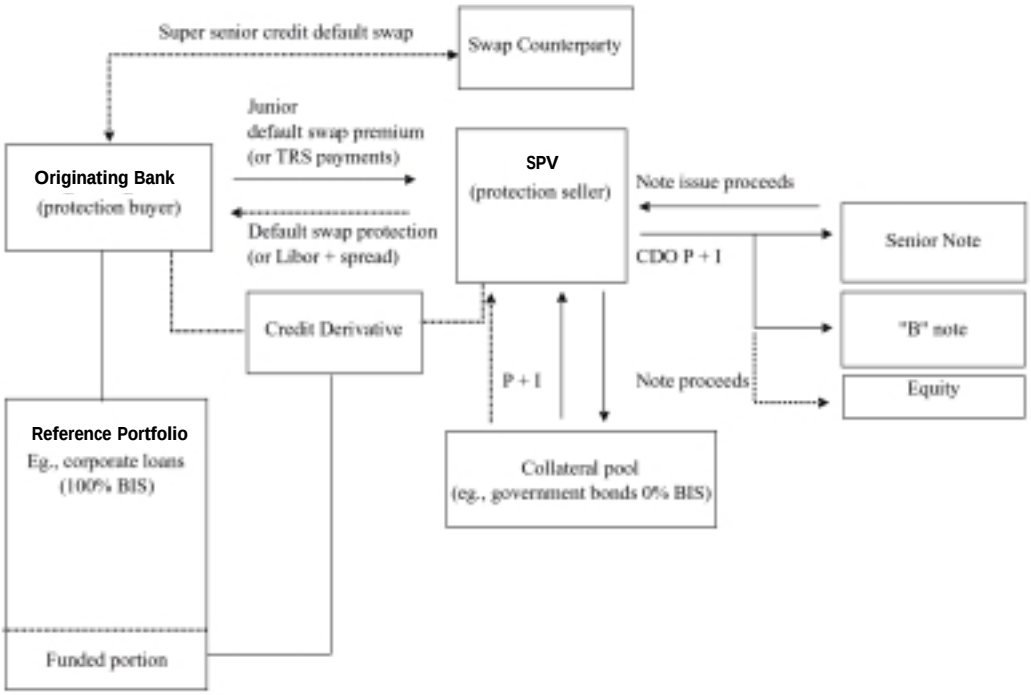
- Super senior credit swap cost is 15 basis points, and carries a 20% risk weight
- Equity piece retains a 100% risk weighting
- Synthetic CDO invests note proceeds in sovereign collateral that pays sub-Libor

A generic synthetic CDO structure is illustrated more thoroughly in Figure 2. In this generic structure, the credit risk of the reference assets is transferred to the issuer SPV and ultimately to the investors by means of the credit default swap and an issue of credit-linked notes (CLNs). In the default swap arrangement, the risk transfer is undertaken in return for the swap premium, which is then paid to investors by the issuer. The note issue is invested in risk-free collateral rather than passed on to the originator in order to de-link the credit ratings of the notes from the credit rating of the originator. And if the collateral pool was not established, then a downgrade of the sponsor could result in a downgrade of the issued notes.

Investors in the notes expose themselves to the credit risk of the reference assets, and if there are no credit events they will earn returns at least the equal of the collateral assets and the default swap premium. If the notes are credit-linked, then they will also earn excess returns based on the performance of the reference portfolio. If there are credit events, then the issuer will deliver the assets to the swap counterparty and pay the nominal value of the assets to the originator out of the collateral pool. Credit default swaps are unfunded credit derivatives, while CLNs are funded credit derivatives where the protection seller (the investors) fund the value of the reference assets up-front and receive a reduced return on occurrence of a credit event.

As the super senior piece in a synthetic CDO does not need to be funded, this provides the key advantage of the synthetic mechanism compared to a cash flow arbitrage

Figure 2: Synthetic CDO structure



CDO. During the first half of 2002, the yield spread for the AAA note piece averaged 45-50 basis points over Libor, while the cost of the super senior swap was around 10-12 basis points. This means that the CDO manager can reinvest in the collateral pool risk-free assets at Libor [2] minus 5 basis points it is able to gain from a saving of 28-35 basis points on each nominal $100 of the structure that is not funded.

This is a considerable gain. If we assume that a synthetic CDO is 95% unfunded and 5% funded, this is equivalent to the reference assets trading at approximately 26-33 basis points cheaper in the market. There is also an improvement to the return on capital measure for the CDO manager. Since typically the manager retains the equity piece, if this is 2% of the structure and the gain is 33 basis points, then the return on equity will be improved by (.36/.02) or 16.5%.

Another benefit of structuring CDOs as synthetic deals is their potentially greater attraction for investors (protection sellers). Often, selling credit default swap protection on a particular reference credit generates a higher return than going long of the underlying cash bond. In general, this is because the credit default swap price is greater than the asset swap price for the same name for a number of reasons (Choudhry 2001). For instance, during 2001 the average spread of the synthetic price over the cash price was 15 basis points in the five-year maturity area for BBB-rated credits. [3]

The two main reasons why default swap spreads tend to be above cash spreads are:

- The credit risk covered by the default swap includes trigger events that are not pure default scenarios, such as restructuring
- On occurrence of a credit event, the amount of loss is calculated assuming that the reference security was at an initial price of par, whereas in the cash market that security may have been bought at a discount to par. Assume we buy a security at a price discount to par of x, and that the obligor defaults. The physical security can be sold at the new defaulted-price of y, where $x > y$, resulting in a loss of $(x - y)$. If the investor had instead sold a credit default swap on the same name, then the investor would pay the difference between par and y, which is a greater loss. Therefore, the default swap price is higher to compensate for this

Note, however, that the existence of ongoing counterparty risk for the seller of a default swap is a factor that suggests its price should be below the cash price.

The key structural differences between a synthetic and conventional securitisation are the absence of a true sale of assets and the use of credit derivatives. Investors, therefore, must focus on different aspects of risk that the former instrument represents. Although it might be said that each securitisation – irrespective of it being cash or synthetic – is a unique transaction with its own characteristics, synthetic deals are very transaction-specific because they can be tailor made to meet very specific requirements. Such requirements can be with regard to reference asset type, currency, underlying cash flows, credit derivative instrument and so on.

Investor risk in a synthetic deal centres on the credit risk inherent in reference assets and the legal issues associated with definition of credit events. The first risk is closely associated with securitisation in general, but synthetic securitisation in particular. Remember that the essence of the transaction is credit risk transfer, and investors (pro-

tection sellers) desire exposure to the credit performance of reference assets. Thus, investors are taking on the credit risk of these assets, be they conventional bonds, ABS securities, loans or other assets. The primary measure of this risk is the credit rating of the assets, taken together with any credit enhancements, as well as their historical ratings performance.

The second risk is more problematic and open to translation issues. In a number of deals, the sponsor of the transaction is also tasked with determining when a credit event has taken place; as the sponsor is also buying protection there is scope for conflict of interest here. The more critical concern, and one which has given rise to litigation in past cases, is what exactly constitutes a credit event. A lack of clear legal definition can lead to conflict when the protection buyer believes that a particular occurrence is indeed a credit event and therefore the trigger for a protection payout, but the protection seller disputes this. Generally, the broader the definition of "credit event", the greater the risk there is of dispute. Thus, trigger events should be defined in the governing legal documentation as closely as possible.

Indeed, this is critical. Most descriptions of events defined as trigger events include those listed in the 1999 ISDA Credit Derivatives Definitions, but circumstances that fall short of a general default so that payouts can be enforced when the reference asset obligor is not in default. This means that the risk taken on by investors in synthetic deals is higher than that taken on in a conventional cash deal (Choudhry 2002). First off, it is important for investors to be aware that credit ratings for a bond issue will not reflect all the credit events defined by ISDA. In the end, this also means that the probability of loss for a synthetic note of a specific rating may be higher than for a conventional note of the same reference name.

What are the advantages of synthetic structures for originators? Balance sheet synthetic securitisation vehicles present certain advantages over traditional cash flow structures. These include:

- Speed of implementation: a synthetic transaction in theory can be placed in the market sooner than a cash deal, and the time from inception to closure can be as low as four weeks, with average execution time of 6–8 weeks compared to 3-4 months for the equivalent cash deal. This reflects the shorter ramp-up period noted above
- No requirement to fund the super senior element
- For many reference names the credit default swap is frequently cheaper than the same name underlying cash bond
- Transaction costs, such as legal fees, can be lower as there is no necessity to set up an SPV
- Banking relationships can be maintained with clients whose loans need not be actually sold off the sponsoring entity's balance sheet
- The range of reference assets that can be covered is wider, and includes undrawn lines of credit, bank guarantees and derivative instruments that would give rise to legal and true sale issues in a cash transaction
- The use of credit derivatives introduces greater flexibility to provide tailor-made solutions for credit risk requirements
- The cost of buying protection is usually lower as there is little or no funding element and the credit protection price is below the equivalent-rate note liability

For this reason they are increasingly preferred by commercial banking treasury and asset liability management (ALM) desks.

Variations in balance sheet synthetic CDOs

A balance sheet synthetic CDO is employed by banks that wish to manage credit risk and regulatory capital. In a balance sheet CDO, the SPV enters into a credit default swap agreement with the originator, with the specific collateral pool designated as the reference portfolio. The SPV receives the premium payable on the default swap, and thereby provides credit protection on the reference portfolio.

There are three types of CDOs within this structure. A fully synthetic CDO is a completely *unfunded* structure that uses credit default swaps to transfer the entire credit risk of the reference assets to investors who are protection sellers. In a *partially funded* CDO, only the highest credit risk segment of the portfolio is transferred.

The cash flow that would be needed to service the synthetic CDO overlying liability is received from the AAA-rated collateral that is purchased by the SPV with the proceeds of an overlying note issue. An originating bank obtains maximum regulatory capital relief by means of a partially funded structure, through a combination of the synthetic CDO and what is known as a *super senior swap* arrangement with an OECD banking counterparty. A super senior swap provides additional protection to that part of the portfolio, the senior segment that is already protected by the funded portion of the transaction. The sponsor may retain the super senior element or sell it to a monoline insurance firm or credit default swap provider.

A *fully funded* CDO is a structure where the credit risk of the entire portfolio is transferred to the SPV via a credit default swap. In a fully funded (or just "funded") synthetic CDO the issuer enters into the credit default swap with the SPV, which itself issues CLNs to the entire value of the assets on which the risk has been transferred. The proceeds from the notes are invested in risk-free government or agency debt, such as gilts, bunds or Pfandbriefe, or in senior unsecured bank debt. Should there be a default on one or more of the underlying assets, the required amount of the collateral is sold and the proceeds from the sale paid

Oriental routes

To illustrate the concept of the static balance sheet synthetic CDO and its application in credit risk management, JP Morgan's **Moorad Choudhry** explains how the ALCO 1 structure works. Originated by the Development Bank of Singapore and closed in December 2001, it has led to the development of more rated synthetic balance sheet deals in the Asia-Pacific region.

ALCO 1 Limited

The ALCO 1 CDO is described as the first rated synthetic balance sheet CDO from a non-Japanese bank. It is a S$2.8 billion structure sponsored and managed by the Development Bank of Singapore (DBS).

The structure allows DBS to shift the credit risk on a S$2.8 billion reference portfolio of mainly Singapore corporate loans to a special purpose vehicle, ALCO 1, using credit default swaps. As a result, DBS can reduce the risk capital it has to hold on the reference loans without physically moving the assets from its balance sheet. The structure is a S$2.45 billion super senior tranche – unfunded credit default swap – with S$224 million notes issue and S$126 million first-loss piece retained by DBS.

The notes are issued in six classes, collateralised by Singapore government T-bills and a reserve bank account known as a "GIC" account. There is also a currency and interest rate swap structure in place for risk hedging, as well as a put option that covers purchase of assets by arranger if the deal terminates before expected maturity date. The issuer enters into credit default swaps with specified list of counterparties. The default swap pool is static, but there is a substitution facility for up to 10% of the portfolio. This means that under certain specified conditions, up to 10% of the reference loan portfolio may be replaced by loans from outside the vehicle. Other than this though, the reference portfolio is static.

Name	ALCO 1 Limited
Originator	Development Bank of Singapore Ltd
Arrangers	JPMorgan Chase Bank DBS Ltd
Trustee	Bank of New York
Closing date	15 December 2001
Maturity	March 2009
Portfolio	S$2.8 billion of credit default swaps
Reference assets	199 reference obligations (136 obligors)
Portfolio Administrator	JPMorgan Chase Bank Institutional Trust Services

Class	Amount	Per cent	Rating	Interest rate
Super senior swap	S$2.45m	87.49%	NR	N/A
Class A1	US$29.55m	1.93%	Aaa	3m USD Libor + 50 bps
Class A2	S$30m	1.07%	Aaa	3m SOR + 45bps
Class B1	US$12.15m	0.80%	Aa2	3m USD Libor + 85bps
Class B2	S$20m	0.71%	Aa2	3m SOR + 80 bps
Class C	S$56m	2.00%	A2	5.20%
Class D	S$42m	1.5%	Baa2	6.7%

to the issuer to recompense for the losses. The premium paid on the credit default swap must be sufficiently high to ensure that it covers the difference in yield between that on the collateral and that on the notes issued by the SPV. Fully funded CDOs are relatively uncommon.

One of the advantages of the partially funded arrangement is that the issuer will pay a lower premium compared to a fully funded synthetic CDO. This is because it is not required to pay the difference between the yield on the collateral and the coupon on the note issue (the unfunded part of the transaction). The downside is that the issuer will receive a reduction in risk weighting for capital purposes to 20% for the risk transferred via the super senior default swap.

The *fully unfunded* CDO uses only credit derivatives in its structure. The swaps are rated in a similar fashion to notes, and there is usually an "equity" piece that is retained by the originator. The reference portfolio will again be commercial loans, usually 100% risk-weighted, or other assets. The credit rating of the swap tranches is based on the rating of the reference assets, as well as other factors, such as the diversity of the assets and ratings performance correlation. In addition, to the equity tranche, there will be one or more junior tranches, one or more senior tranches and super senior tranche. The senior tranches are sold on to AAA-rated banks as a portfolio credit default swap, while the junior tranche is usually sold to an OECD bank.

The credit default swaps are not single-name swaps, but are written on a class of debt. The advantage for the originator is that it can name the reference asset class to investors to investors without having to disclose the name of specific loans. Default swaps are usually cash-settled and not physically settled, so that the reference assets can be replaced with other assets if desired by the sponsor.

Conclusion

The case study in the shaded box illustrates an innovative structure with a creative combination of securitisation technology and credit derivatives. Analysis of the vehicle shows clearly how a commercial bank can utilise the arrangement to effectively manage its credit risk exposure and optimise balance sheet capital, as well as provide attractive returns for investors. As the market in synthetic credit is frequently more liquid than the cash market for the same reference names, it is reasonable to expect more transactions of this type in the near future. ■

1. This is as long as the counterparty is an OECD bank, which is invariably the case.
2. Averaged from the yield spread on 7 synthetic deals closed during Jan-Jun 2002, yield spread at issue, rates data from Bloomberg.
3. Source: UBS Warburg, CDO Insight, 29 March 2002

Figure 3 Alco 1 structure and tranching