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CDO Evolution Creates New World of Risk

Credit derivatives technology has propelled recent rapid growth in the Collateralized Debt Obligation ("CDO") market. In 1997, the $64 billion rated CDO market consisted chiefly of securitizations of cash assets. By the end of September 2003, outstanding global CDO visible issuance YTD 2003 issuance was estimated at around $370 billion, 37% higher than the total issuance in 2002. Furthermore, the majority of CDO collateral consisted of derivatives, not cash assets. Synthetic CDOs - or securitizations incorporating credit derivatives technology to transfer asset risks and cash flows - now make up more than 75% of the global CDO market.

In the CDO market, there is an inherent conflict of interest between CDO structurers –protection buyers who hedge by selling protection in the market – and CDO investors – protection sellers. The conflict is centered on the negotiation of credit default swap language, and can only be cured with full disclosure and investor education about the potential language risks.

In several instances, structurers have taken advantage of the "cheapest to deliver option" by buying protection from synthetic CDO investors using the broadest possible language for allowable deliverables in the event of default. Meanwhile, they hedge their position by selling protection using the narrowest possible language. They book the value of the 'cheapest to deliver' option as profit. The investor receives none of the reward, but takes the extra risk. Investors should negotiate for the narrowest possible definitions of a credit event and the narrowest possible language for the discount and maturity of deliverable obligations.

Cash Flow Challenges

Cash flow economics present other challenges for investors. *There is no such thing as a CDO arbitrage*. An arbitrage is a money pump. A true arbitrage guarantees a positive payoff in some scenario, with no possibility of a negative payoff and with no net investment. The opportunity to borrow and lend - at no cost - at two different fixed rates of interest is an arbitrage. The ability to *simultaneously* buy and sell the *same* security in different marketplaces, and earn a profit at no cost and with no risk, is another example of an arbitrage.

Financial institutions that structure CDOs come closest to approaching an arbitrage when they buy the collateral, tranche the exact risk represented by the collateral, and sell every tranche of the collateral through their distribution network. Time elapses between the accumulation of collateral, especially in a

cash asset based deal, and the closing of the transaction. There is further delay before the deal is entirely "sold". Financial institutions make a secondary market in the CDO tranches, and occasionally have portions of CDOs in inventory that must be hedged. Still, most of the risk of the transaction has been distributed, and reserves are held as a cushion for the residual risk of ongoing trading and risk management. The financial institutions that use this business model have the cleanest type of transaction management from the arbitrage point of view, but it is still not strictly an arbitrage. Within this model there is room for passing on inappropriate risk to investors or for taking inappropriate risk in the trading book depending on the deal structure.

Equity Structures

All equity tranches are not created equal. Besides portfolio selection, the largest variability among deals stems from the structure of the equity cash flows. Portfolios can be either actively managed, have limited right of substitution, or be completely static. Equity can be either rated or unrated. The investment in equity can be either funded or unfunded. There is also a wide variety of ways that cash flow is made available to the equity investor and to the senior tranches.

Losses are allocated first to the equity investor. That isn't the whole story, however. CDOs vary in terms of how much of the stream of residual cash flow the equity investor can claim. Another key issue is the amount of loss that can be allocated to the residual cash flow stream above and beyond the initial equity investment. The equity investor determines whether or not he is getting the best deal possible for the risk he takes, based on these structural features. The more cash flow the equity investor gets, the less someone else gets.

Misleading Promises

Most of the initial static synthetic CDOs, promised to pay a fixed coupon on the remaining equity balance. The equity was unrated. As losses occurred, the equity investor's balance amortized down and fixed income was paid only on the lower remaining balance. Usually equity investors expect to have a claim on excess cash flows unless they are captured in a reserve account, but in this structure, any cash flows in excess of the amount needed to make the liability payments for the CDO benefit the only bank arranger.

The cash flows as constructed above, don't give the equity investor the best possible deal. Most equity investors were unaware of this fact, because the equity was often combined with a zero coupon instrument in a principal protected structure.

The cure is to look at the performance of the equity cash flows in isolation. Often a simple and straightforward technique serves us best. It's very effective to look at the *survival rate* of tranches for a given number of *discrete* defaults, not fractional defaults expressed by rating agency annual default rate data. Reference obligors don't default in fractions; they either default or they don't.

The charts below shows the effect of losses on the remaining equity balance for a Euro 500 million deal in which the equity makes up 4% of the deal for two assumed recovery rates: 50% and 40%.

In the context of actual recoveries experienced in the period from 1999-2002, a recovery rate of 50% seems ridiculously high. Even 40% was too high for many obligors. Simple tables like this show the sensitivity to any assumed recovery rate to any assumed number of discrete defaults. Further IRR calculations can now be done based on these results.

Effect of Default Rate on Equity
Recovery Rate is 50%; Equity Tranche is 4% Euro 500 Million Portfolio.
Each Obligor is Euro 10 million

Class	Subordination (%)	Defaults to experience first EUR loss (50% Recovery)		Defaults to experience full principal loss (50% Recovery)	
		# Defaults	Cum. Default Rate	# Defaults	Cum. Default Rate
SS	16%	16	32%	50	100%
A1	11%	11	22%	16	32%
A2	8%	8	16%	11	22%
B1	4%	4	8%	8	16%
E	NA	NA	NA	4	8%

This CDO is structured so that the equity investor earns a stated coupon on the remaining initial investment less accumulated losses, if any. Accumulated losses for this calculation cannot exceed the amount of the initial equity investment.

Effect of Default Rate on Equity
Recovery Rate is 40%; Equity Tranche is 4%
Euro 500 Million Portfolio. Each Obligor is Euro 10 million

Class	Subordination (%)	Defaults to experience first EUR loss (40% Recovery)		Defaults to experience full principal loss (40% Recovery)	
		# Defaults	Cum. Default Rate	# Defaults	Cum. Default Rate
SS	16%	13.3	26.6%	50	100.0%
A1	11%	9.2	18.3%	13.3	26.6%
A2	8%	6.7	13.3%	9.2	18.3%
B1	4%	3.3	6.7%	6.7	13.3%
E	NA	NA	NA	3.3	6.7%

This CDO is structured so that the equity investor earns a stated coupon on the remaining initial investment less accumulated losses, if any. Accumulated losses for this calculation cannot exceed the amount of the initial equity investment.

Conflict of Interest

If a deal manager has a claim on the equity cash flows, there may be a conflict of interest between the manager and senior noteholders. Investors should be particularly wary of deals in which four structural conditions are met, which can tempt managers to behave against the interest of the noteholders. The first condition is that losses are allocated in reverse order of seniority, and loss deductions are limited to the initial investment of each tranche investor. The second condition is that excess spread does not accrue to the benefit of any of the noteholders and is not available to absorb losses. The third condition is that the manager does not have adequate restraints on his ability to cause a deterioration in the quality of the underlying portfolio. And the fourth condition is that the manager has a claim on the excess spread.

Once the equity is gone, the next most senior noteholder bears additional losses. When losses exceed the initial equity investment, all of the residual cash flows are diverted to the benefit of the manager. The manager now has an incentive to trade out of good credits into credits on negative credit watch, or even into lower rated, but higher-spread credits - if there are no constraints prohibiting this.

This recently happened in a cash CDO deal in which even the integrity of the single A tranche of the CDO was compromised. The portfolio was originally investment grade, but due to aggressive trading to create excess spread, the portfolio ended up with a *junk* rating. The single A investor threatened litigation, and the manager reached a settlement agreement with the investor.

Unfunded Equity Investments

Equity risk can be transferred synthetically, just like any other risk. Who are the investors in unfunded equity? As you might imagine, the investors are usually hedge funds or the offshore subsidiary of a reinsurance company. Saying an investor is "an offshore subsidiary of a reinsurance company" sounds good to bank management and bank credit officers, subsidiaries that sell unfunded first-loss protection are essentially *hedge funds*. Since these are off-balance sheet transactions, the investors usually don't want to disclose how much of this risk they have taken on. They also usually don't want to disclose the exact deals with the exact reference portfolios, in which they've invested.

These investors want *leverage.* The bank sponsor funds the losses. If the portfolio experiences a loss, the CDO bank arranger makes the required payment to the CDO's SPE. The CDO bank arranger must have an open credit line to the subsidiary of the insurance company or to the hedge fund, and allows this to be drawn in the event of a default. The sponsoring bank is usually asked to charge only LIBOR + 25 for this funding.

The problem with this is that most of the CDOs for which this has been done are synthetic CDOs with 5-year maturities. The liabilities will all come due about the same time. In five years, the investors will have to come up with a big chunk of cash, and these are the investors that didn't want to put up cash in the first place. Of course, they don't have a five-year track record with this type of investment, and are reluctant to disclose the degree of leverage they already have. They may have a solid investment grade rating, but rating agencies cannot keep up with the activities of these entities.

For every strategy, there is a counterstrategy, however. Let's say you want to do one of these deals, but you also want to survive a competent internal deal review. If you are dealing with the subsidiary of a reinsurance company, it may be possible to buy credit default protection on the subsidiary. In five years time, when payment for the losses comes due, and if they begin defaulting on obligations, you are covered. The premium for the CDS should be folded into the deal economics.

This article has been a short introduction into the risks and remedies posed by synthetic technology. Models for synthetic risk can't be standardized, because the structural risks are non-standard. In addition to the challenges of creating reasonable models and gathering relevant data, risk managers must assess the

risk to their institutions due to deal cash flow structures and the risks imbedded in documentation.

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