

CDO Handbook

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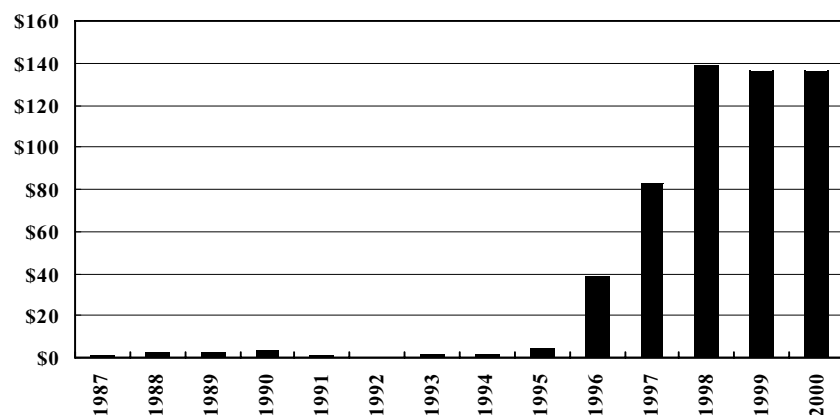
Overview

Global CDO issuance has averaged \$137 billion per year for the last three years. In the context of asset-backed securities (ABS), this figure is about one-half of public and private U.S. issuance. This sustained level of activity is remarkable, given that annual volume never exceeded \$4 billion until 1996. We estimate outstanding CDO volume at \$500 billion. The current status of CDOs is due to the acceptance of the product by investors and credit risk hedgers.

This report is a comprehensive introduction to CDOs. It addresses:

- the structural components of CDOs;
- typical CDOs;
- why CDOs exist;
- the cash flow and market value credit structures;
- synthetic CDOs;
- the asset manager and other parties to a CDO;
- legal, accounting, and tax considerations;
- CDO terminology.

Chart 1
CDO Issuance
(US\$ billions)



Sources: JPMorgan, MCM Corporate Watch, Fitch, Moody's Investors Service, and Bloomberg.

Introduction¹

A person new to collateralized debt obligations (CDOs) is faced with bewildering terminology:

Arbitrage CBO	Balance Sheet CLO	Market Value CDO
Cash Flow CDO	EMCBO	Repacks
CBO of ABS	Synthetic CDO	Re-REMICs
Synthetic Arbitrage CLO	Investment Grade CBO	CBO of Real Estate

These names, for different types of CDOs, reflect the variety of features and forms a CDO can take and still be called a CDO. A CDO can hold bonds, loans, emerging market debt, ABS, RMBS, and CMBS. It can also gain exposure to these assets synthetically. The CDO can issue floating or fixed rate obligations tranching in a variety of ways with respect to seniority and payment. Its obligations can be revolving, have delay draw features, and be guaranteed by a third party. CDOs are done for one of two different purposes and use either of two distinct credit structures or a combination of the two credit structures.

The CDO names above do not fully describe any CDO's structure and are not mutually exclusive from one another. We think the easiest way to both classify and understand CDOs is by taking a component or "a la carte" approach. A CDO can be pretty completely described by the choices made with respect to its:

- (1) underlying assets;
- (2) tranche structure;
- (3) purpose;
- (4) credit structure.

Looking at CDOs this way will also allow future innovations to be placed in the context of an existing conceptual framework.

The next section of this paper discusses these four structural components. The fourth section of this paper describes the most typical CDO structures existing today or, to stretch the menu analogy, the most popular "prix fixe" CDO combinations. In these two sections, we hope to provide a flexible definition of CDOs and a description of current market practice.

The fifth through twelfth sections of this report address specific CDO topics. The sections are "stand alone;" they can be read in any order and sections can be skipped if they are not of current interest. These sections are:

- Why do CDOs exist and why do investors buy them?;
- Market value credit structure;
- Cash flow credit structure;
- Synthetic CDOs;
- Parties to a CDO;
- Legal considerations;
- Accounting considerations;
- Tax considerations.

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A “Glossary and Notes” section defines italicized terms in the text and discusses topics removed from the main concern of the paper. The two final sections of the report list useful articles published by rating agencies and the names of CDO asset managers and asset sellers.

Please note that “CDO” refers to the special purpose vehicle (SPV) that holds assets and issues obligations. “CDO” also refers specifically to the obligations the SPV issues, leading to the seemingly circular phrase “the CDO issues CDOs.” Finally, CDO is an umbrella term encompassing the various subclasses, including the CDO species listed above.

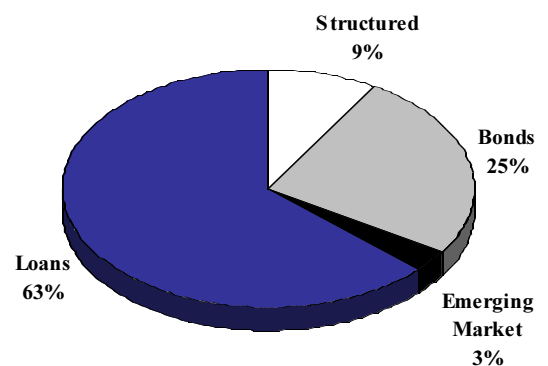
Assets, Tranches, Purposes, and Credit Structures

Assets

Its assets, more than anything else, make a CDO a CDO. The general definition is that a CDO is a securitization² of corporate obligations. By order of volume, CDOs have securitized (or re-securitized) commercial loans; corporate bonds; ABS, RMBS, and CMBS; and emerging market debt. Even tranches of CDOs have been re-securitized into CDOs of CDOs.

The trend year-to-date in 2001 has been for bonds and loans to make up a slightly smaller share (76%) of CDO assets than has been the case historically. The use of investment grade bonds and loans has grown, however, and those assets now make up 42% of CDOs. ABS, RMBS, and CMBS have also increased, and now comprise 9% of underlying assets. CDO assets are more and more diverse globally. Year-to-date, 36% of CDO assets are from non-U.S. obligors.

Chart 2
CDO Underlying Assets
1987 through 2000



But CDOs do not always own these assets outright. Sometimes a CDO achieves exposure to these assets synthetically by entering into a credit default swap. In a credit default swap, the CDO receives a

Sources: JPMorgan, MCM Corporate Watch, Fitch, Moody's Investors Service, and Bloomberg.

periodic payment from a counterparty that seeks protection against the default of a referenced asset. In return for this payment, the CDO must pay the protection buyer default losses on the referenced asset if the obligor of the referenced asset defaults. The exact definitions of "default" and "default losses" can be negotiated to suit the requirements of the CDO and the protection buyer, but typically follow standard ISDA definitions.

The protection-buying counterparty in a credit default swap is usually exposed to the referenced credit by, for example, having made a loan to the name. Any credit loss the counterparty sustains from its dealings with the referenced credit is offset by a payment from the CDO. As the CDO assumes credit exposure to the referenced asset without buying it, the protection buyer gets rid of credit risk without selling the asset. A CDO might have a few synthetic exposures or be comprised entirely of synthetic exposures. Approximately 14% of CDO underlying exposures are produced synthetically.

Tranches

CDOs issue multiple classes³ of equity and debt that are tranching with respect to seniority in bankruptcy and timing of repayment. The equity tranche, sometimes called junior subordinated notes, preferred stock or income notes, is the lowest tranche in the CDO's capital structure. The equity tranche sustains the risk of payment delays and credit losses first in order to make debt tranches less credit-risky. It receives whatever cash flows are left after the satisfaction of debt tranche claims. Chart 3 shows a typical CDO structure.

² Please see the "Glossary and Notes" below for more on specialized terms.

³ SPVs issuing one tranche are generally called *repackagings*. See Glossary.

Chart 3
Typical CDO Tranching

TRANCHES		RATINGS
A-1 Floating Rate Revolving Facility	A-2 Fixed Rate Tranche	Triple-A or Double-A
B-1 Floating Rate Tranche	B-2 Fixed Rate Tranche	Single-A
C Fixed or Floating Rate Tranche		Triple-B
D Fixed or Floating Rate Tranche		Double-B
Equity (Most Subordinate Tranche)		Not Rated

Source: JPMorgan.

Tranches are sized to minimize funding costs within the constraints of investor requirements. In most CDOs, the top-most tranche provides the majority of the vehicle's financing. Other debt tranches are sized around 5% to 15%. Equity is generally around 2% to 15% of the CDO's capital structure, depending on the credit quality and diversity of the assets.

Seniority can also be created synthetically outside the CDO structure by the terms of a credit default swap so that the protection buyer retains a first loss position. The CDO's payment under the credit default swap might occur only if losses on referenced assets exceed some set amount. This first loss carve out might be expressed on a per-name basis (losses up to \$X per name) or on an overall portfolio basis (losses up to \$X across the entire portfolio). In the language of insurance, the protection-buying counterparty in the credit default swap essentially has to meet a deductible before being able to make a claim under the credit default swap.

Subordinated CDO debt tranches protect more senior debt tranches against credit losses and receive a higher coupon for taking on greater credit risk. Coupon payments on subordinated tranches might be deferrable if the CDO does not have sufficient cash flow or if it is in violation of certain tests.

Sometimes a CDO senior debt tranche is structured with a delayed draw feature. This is useful if the CDO's assets are to be purchased over time, as draws against the facility can be taken as they are needed. A revolving tranche might serve to allow the CDO to adjust its leverage. Often a double structure of tranches is used where the same seniority tranche is comprised of separate fixed and floating rate sub-tranches. Finally, debt tranches are sometimes guaranteed by third parties, such as bond insurers.

Purposes

CDOs are classified as either balance sheet or arbitrage CDOs, depending on the motivation behind the securitization and the source of the CDO's assets. Balance sheet CDOs are initiated by holders of securitizable assets, such as commercial banks, which

desire to sell assets or transfer the risk of assets. The motivation may be to shrink the balance sheet, reduce required regulatory capital, or reduce required economic capital.

The most straightforward way to achieve all three goals is the cash sale of assets to the CDO. But for a variety of reasons, the risk of the assets might be better transferred to the CDO synthetically, as described above. This second method can reduce required capital, but cannot shrink the balance sheet. Nevertheless, we refer to synthetic CDOs done to adjust required capital as balance sheet transactions.

Arbitrage CDOs, in contrast, are inspired by asset managers and equity tranche investors. Equity tranche investors hope to achieve a leveraged return between the after-default yield on assets and the financing cost due debt tranches. This potential spread, or funding gap, is the “arbitrage” of the arbitrage CDO. The asset manager gains a management fee from monitoring and trading the CDO’s assets.

An arbitrage CDO’s assets are purchased from a variety of sources in the open market, over a period that may stretch for months from a warehousing period before the CDO closes to a ramp-up period after the CDO closes. The asset manager often invests in a portion of the CDO’s equity tranche or subordinates a significant portion of its fee to debt and equity tranches. There is generally more trading in an arbitrage CDO than in a balance sheet CDO, where trading of the portfolio is not allowed or limited to replacement of amortized assets. By number, 74% of CDOs are arbitrage transactions, but because balance sheet transactions are typically larger, the division is almost perfectly 50%-50% by volume.

The distinction commonly drawn between balance sheet and arbitrage CDOs ignores the fact that the asset seller in a balance sheet CDO also enjoys potential “arbitrage” profits from retention of the equity tranche. After the close of the transaction, there is nothing very different between the economic position of an equity investor in a CDO that buys assets in the open market and the equity investor in a CDO that buys assets the equity investor originated.

A third CDO purpose has been discussed since the inception of the CDO market in 1987, but realized only recently. While CDOs have been ever-increasing purchasers of primary market issues, until 1998 no CDO had been created to purchase new issues specifically originated to be sold to a CDO. This occurred first in CDOs that bought Japanese bank capital obligations and later in rated CDOs that purchased the capital obligations of small U.S. banks. In light of these CDOs, we would like to suggest “origination CDO” as a third CDO purpose and method of obtaining CDO assets.

Perhaps the most practical distinction between balance sheet, arbitrage, and origination CDOs is how likely the proposed CDOs are to be accomplished. The key to the successful closing of a CDO is the placement of the CDO’s equity. A balance sheet CDO often has the advantage of a pre-packaged investor for most or all of the equity tranche. Thus, a typical balance sheet CDO is more likely to close than the typical arbitrage CDO where the asset manager only commits to a portion of the equity tranche.

Credit Structures

A CDO can have either a market value or a cash flow credit structure, depending upon the way the CDO protects debt tranches from credit losses. In a market value structure, the CDO's assets are marked-to-market periodically. The mark-to-market value is then haircut, or reduced, to take into account future market value fluctuations. If the haircut value of assets falls below debt tranche par, CDO assets must be sold and debt tranches repaid until haircut asset value once again exceeds debt tranche par.

In contrast, there is no market value test in a cash flow CDO. Subordination is sized so that after-default interest and principal cash flow from the CDO's asset portfolio is expected to cover debt tranche requirements. This expectation is based on assessment of default probability, default correlation, and loss in the event of default. A common cash flow structuring technique is to divert cash flow from subordinated tranches to senior tranches if the quality of CDO assets diminishes by some objective measure. But while the manager of a troubled cash flow CDO can sell CDO assets, and the senior CDO obligation holders can sell CDO assets after a CDO default, there is generally never a requirement to sell CDO assets. Nine out of ten CDOs, both by number and volume, use the cash flow credit structure.

The À la Carte CDO Menu

A table of these four CDO attributes appears below in Chart 4. A wide variety of CDOs can be constructed by picking one attribute from each menu column, but in actual practice, CDOs tend to fall into three common "prix fixe" combinations as discussed in the next section.

Chart 4
À la Carte CDO Menu

ASSETS	LIABILITIES	PURPOSE	CREDIT STRUCTURE
High Yield Corporate Bonds	Different number of tranches possible	Balance Sheet Transaction: A seller desired to shed assets to shrink its balance sheet and adjust economic and regulatory capital. Existing assets are transferred to the CDO and the seller often takes back the CDO's most subordinate tranche.	Market Value: The haircut value of CDO assets is periodically compared to CDO tranche par. If haircut assets are less than tranche par, CDO assets must be sold and tranches repaid.
Commercial and Industrial Loans	Sequential, fast/slow, or contemporaneous paydown of principal		
Emerging Market Corporate and Sovereign Debt	Coupon can be fixed rate or floating rate		
ABS, CMBS, RMBS and other CDOs	Variety of portfolio tests to divert cash flow from subordinate to senior	Arbitrage Transaction: A money manager wants to expand assets under management and equity investors desire non-recourse leverage. Assets may be purchased over warehousing and ramp-up periods.	Cash Flow: CDO subordinate tranches are sized so that senior tranches can survive asset default losses. If portfolio quality deteriorates, asset cash flow may be redirected from subordinate tranches to senior senior tranches.
Investment Grade Debt	Delay draw tranches possible		
Distressed Securities	Revolving tranche possible		
Equity	Guarantee by a third party possible	Origination Transactions: (not a recognized term) Underlying CDO assets are issued specifically for a CDO.	
Assets can be purchased or exposure can be gained synthetically			

Source: JPMorgan.

Typical Structures

The two ways a CDO can gain exposure to assets, by cash purchase or synthetically; the two main CDO purposes, arbitrage or balance sheet; and the two CDO credit structures, cash flow or market value; would lead to eight types of CDOs (two times two times two) without considering different types of underlying assets. Market value transactions, however, are never done, at least now, for balance sheet purposes and have not been done, at least yet, with synthetic assets.

The negative correlation between the market value credit structure and the balance sheet purpose is ironic, as the first five CDOs ever done, in 1987 and 1988, combined that purpose with that credit structure. But the cash flow credit structure, introduced in 1988, superseded the market value approach because it allowed greater leverage. Evolving accounting standards for retained CDO interests probably would have doomed balance-sheet market-value CDOs anyway. With respect to synthetic securitization, the comparative illiquidity of synthetic assets has prevented their use in market value CDOs.

The fact that market value transactions are almost always cash asset and arbitrage purpose CDOs reduces the number of CDO structural combinations to five. Here are their market shares by value of assets, out of total CDO issuance from 1987 through 2000 of half a trillion dollars:

Table 1

Structure	Percent of Volume 1987 - 2000
Cash, arbitrage, cash flow	36%
Synthetic, arbitrage, cash flow	4%
Cash, balance sheet, cash flow	41%
Synthetic, balance sheet, cash flow	9%
Cash, arbitrage, market value	10%

Sources: JPMorgan, MCM Corporate Watch, Fitch, Moody's, S&P, and Bloomberg.

After the first balance-sheet market-value CDOs in 1987 and 1988, balance-sheet cash-flow CDOs reigned briefly in 1989 before arbitrage cash-flow CDOs took over from 1990 through 1995. In 1996, CDO issuance rose to \$36 billion, more than twice the volume of the previous nine years combined. The explosion of CDO issuance was led by balance-sheet cash-flow CDOs.

On the assets side, 1996 was also the first time loan-backed CDOs exceeded bond-backed CDOs. The former assets were associated with balance-sheet cash-flow CLOs. Over the history of CDOs, loans have been the most prominent asset, followed by bonds. ABS/RMBS/CMBS-backed CDOs are currently increasing market share while emerging market CDO issuance peaked in 1997.

Table 2

Structure	Percent of Volume 1987 - 2000
Loans	63%
Bonds	25%
ABS/RMBS/CMBS	9%
Emerging market	3%

Sources: JPMorgan, MCM Corporate Watch, Fitch, Moody's, S&P, and Bloomberg.

While CDOs sponsored by commercial banks have caused loans to be the primary asset for balance sheet CDOs, loans are also a large factor in arbitrage CDOs. Bonds, in contrast, are almost always found in arbitrage CDOs.

Table 3

Structure **Percent of Volume 1987 - 2000**

Cash and synthetic, arbitrage, cash flow	
Bonds	19%
Loans	16%
Emerging market	3%
ABS/RMBS/CMBS	2%
Cash and synthetic, balance sheet, cash flow	
Loans	45%
Bonds	3%
ABS/RMBS/CMBS	2%
Cash, arbitrage, market value	
ABS/RMBS/CMBS	4%
Loans	3%
Bonds	3%

Sources: JPMorgan, MCM Corporate Watch, Fitch, Moody's, S&P, and Bloomberg.

Table 4 goes into more detail on these typical CDO structures.

Table 4

CDO Structural Prix Fixe Menu

	Arbitrage Cash Flow	Balance Sheet Cash Flow	Arbitrage Market Value
Purpose	Arbitrage: Leveraged return to equity holders via non-recourse term financing, fees to asset manager	Balance sheet: Reduce balance sheet or required economic and regulatory capital	Arbitrage: Leveraged return to equity holders via non-recourse term financing, fees to asset manager
Credit structure	Cash flow: Subordination is sized so that asset's after-default interest and principal repay debt tranches	Cash flow: Subordination is sized so that asset's after-default interest and principal repay debt tranches	Market value: Assets are sold and debt tranches repaid if the market value of assets declines too much
Source of assets	Assets are purchased in primary or secondary market	The balance sheet of a single financial institution	Assets are purchased in primary or secondary market
Sponsor	Asset manager or insurance company	Commercial bank	Asset manager or insurance company
Assets	Speculative grade bonds and commercial loans. Emerging market debt is decreasing and ABS/RMBS/CMBS is increasing.	Bank loans, sometimes to smaller companies. Some bond and ABS/RMBS/CMBS collateral.	Wide range of assets including convertibles, equity and distressed debt
Cash versus synthetic exposure	May have a few synthetic exposures among dominant cash assets or be completely synthetic	Increasingly are completely synthetic	Hardly ever has synthetic exposures
Special tranche features	May have a delayed draw tranche as assets are often purchased over a ramp up period	May have a revolving tranche to accommodate revolving bank loans	Likely to have a revolving tranche as assets are adjusted to meet OC tests

Table 4
CDO Structural Prix Fixe Menu (Continued)

	Arbitrage Cash Flow	Balance Sheet Cash Flow	Arbitrage Market Value
Equity investors	Some retained by asset manager	Often retained by asset seller	Some retained by asset manager
Leverage	7 to 12 times	20 to 50 times	4 to 5 times
Interest rate derivatives	Swaps and caps often used to bridge between fixed rate assets and floating rate liabilities	Not usually used since assets are typically floating rate	Swaps and caps often used to bridge between fixed rate assets and floating rate liabilities
Deal size	\$200 to 400 million for bonds, \$300 to 600 million for loans	\$1 to 10 billion	\$500 million to 1.5 billion
Trading activity	Restricted	Little or none	Greatest
Tenor	Five-year reinvestment period followed by a seven-year amortization period. Senior tranche average life seven to nine years, mezzanine 10-13 years. Callable after three years with premium to fixed rate tranches.	Based on remaining life of original assets or duration of synthetic instrument	Five year life with amortization over the last three months. Callable after two or three years with premium to fixed rate tranches.
Market share by volume	40%	50%	10%

Source: JPMorgan.

Why Do CDOs Exist and Why Do Investors Buy Them?

The Sum of the Parts

The questions above arise from the recognition that the cost of CDO tranches exceeds the cost of CDO assets. The difference goes to pay professionals associated with the transaction: security firms, asset managers, trustees, rating agencies, attorneys, and accountants. Why do investors buy CDOs that cost more than the assets the CDO holds?

We believe it is because the CDO structure creates custom exposures that investors desire and cannot achieve any other way. These custom exposures fit into investors' various risk appetites and capital constraints. Some investors are more efficient holders of speculative-grade assets and some have a comparative advantage holding investment-grade assets. The CDO separates the credit risk of its portfolio into tranches and sells each to the investor most suited to hold that risk.

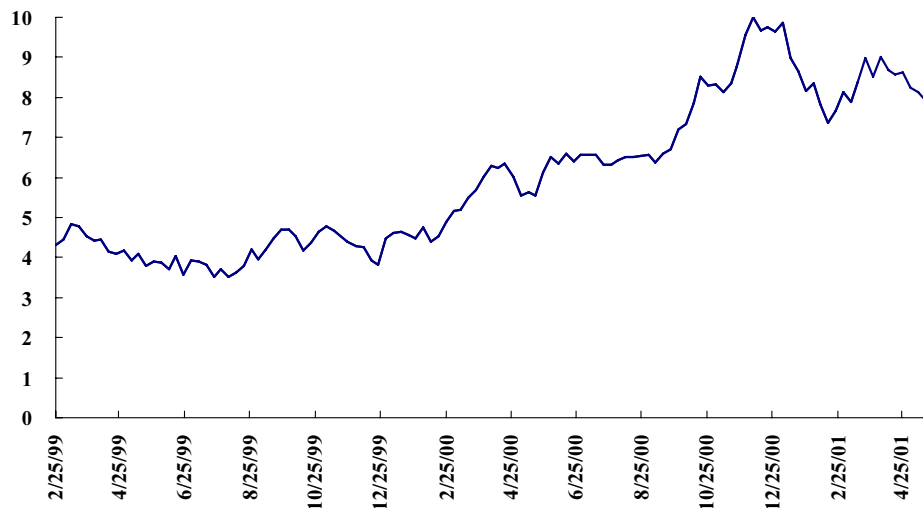
The aggregate price of CDO tranches is bounded at the low end by the cost of the collateral and the minimum amount necessary to entice professionals to create CDOs. At the high end, the aggregate price of the CDO is bounded by the utmost value each CDO tranche investor places on receiving their preferred risk in its distilled form. As more professionals have entered the CDO business, fees have declined and the cost of CDO tranches has steadily declined within the above-described bounds.

Equity Investors

In an arbitrage CDO, equity tranches allow investors to achieve non-recourse term financing of the CDO's underlying assets. If the CDO's assets perform poorly, debt tranche holders have no recourse, other than to the CDO assets, and cannot make a further claim against the equity tranche. This is in contrast to the repo market where financing is short term and the creditor has recourse to the borrower if the collateral is insufficient to extinguish the debt. Equity tranche holders' purpose is to gain a favorable leveraged return between the after-default yield on CDO assets and the financing cost due debt tranches.

In Chart 5, we compare the yield on U.S. high yield bonds to the cost of funds raised via CBO debt tranches. The difference is a rough measure of the gross spread available to CBO equity holders. This gross spread is reduced by fees, trading losses, and default losses; and subject to calls on the CBO assets and de-leveraging of the CBO.

Chart 5
Normalized "Funding Gap" Between High Yield Bonds and CDO Tranches



We take yield data from the JPMorgan High Yield Index and suppose an asset distribution of 50% double-B bonds and 50% single-B bonds. We subtract from this gross asset yield CBO funding costs assuming CBO spreads supplied by our traders and a CBO capital structure comprised of 70% triple-A, 10% single-A, 5% triple-B, and 5% double-B tranches. We avoid false precision by standardizing the results on a scale from zero to ten; setting the highest historical funding gap equal to ten. Source: JPMorgan.

Theoretically, asset spreads are comprised of expected credit losses, a risk premium, and a liquidity premium. Equity tranche holders bet that actual credit losses compare favorably to expected credit losses and that they will also capture risk and liquidity premiums. The level of expected credit losses embedded in asset prices is irrelevant; what matters is the difference between expected and experienced credit losses.

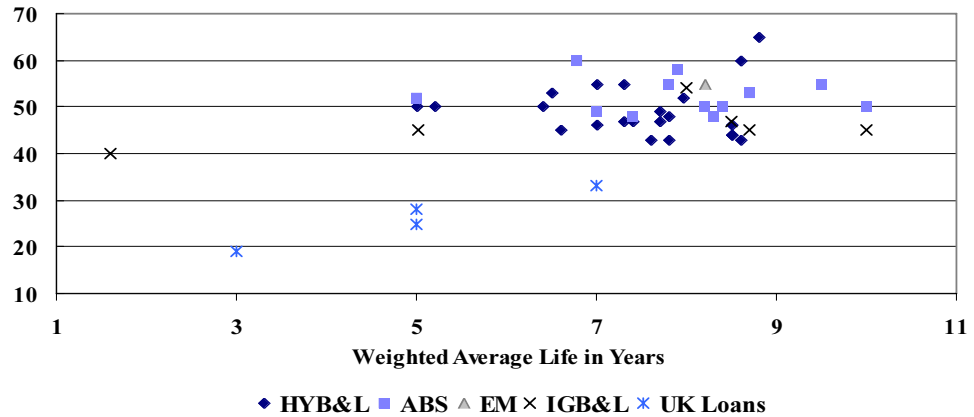
The purchase of the equity tranche of a CDO is first a decision in favor of the underlying asset class, second a decision in favor of leverage relative to that asset class, and finally, a decision in favor of the manager.

Balance sheet CDOs, at the time of execution, are driven by an asset seller's working, economic, and regulatory capital considerations and the availability and expense of alternative methods of managing those considerations. In the longer view, a balance sheet sponsor's decision to gather assets with the intent to securitize them in a CDO is very similar to the decision of an arbitrage equity holder. In the future, balance sheet issuance will be affected by the new Basel capital guidelines for commercial banks and the growing use of single-name and basket credit default swaps. These two factors will change the cost of holding and hedging assets.

Debt Investors

Debt tranche investors are attracted to CDOs because of their higher yields as compared to almost all corporates and many asset-backed of the same maturity and rating. For example, in the first four months of 2001, seven- to ten-year AAA-rated credit card-backed deals were priced from about 17 to 30 basis points above Libor. During the same period, high yield debt-backed CDOs of the same maturity and rating ranged in price from 43 to 55 basis points above Libor.

Chart 6
AAA CDO Spreads to USD Libor
2001 YTD Issuance
(basis points)

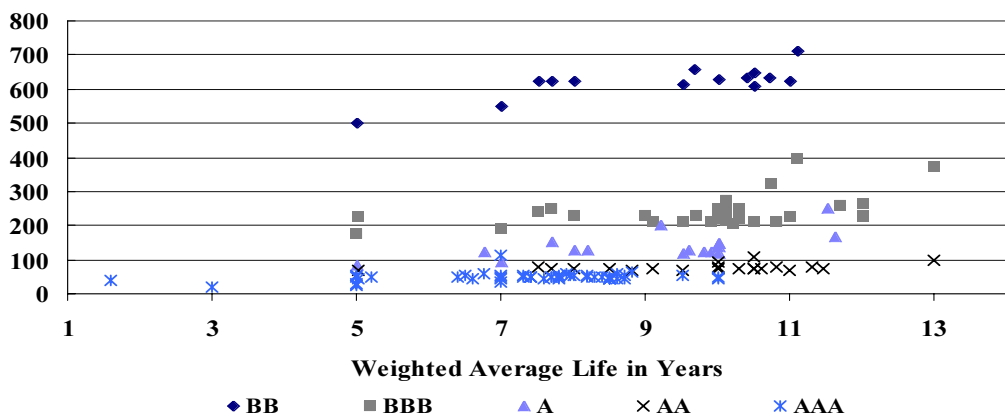


Source: JPMorgan.

Like ABS and MBS debt tranches, CDO debt tranches have narrower default loss distributions than individual corporate bonds. If an individual corporate bond defaults, the loss to investors is usually quite high; 47% of par on average, as measured by a recent recovery study.⁴ But it is possible for a CDO debt tranche to be “a little bit in default.”

Suppose that defaults in the CDO asset portfolio have been so high that the CDO debt tranche now depends upon the performance of each and every one of the names in its portfolio. The debt tranche is still supported by a portfolio comprised of multiple credits. The additional default of one of those credits has a relatively small percentage effect on debt tranche return. And the probability of incremental collateral defaults is less and less likely. In comparison to the drastic loss a corporate bond sustains if it defaults, a CDO might sustain a relatively mild default.

Chart 7
CDO Spreads to USD Libor
2001 YTD Issuance
(basis points)



Source: JPMorgan.

⁴ Hamilton, David T., et al, *Default and Recovery Rates of Corporate Bond Issuers: 2000*, Moody's Investors Service, February 2001.

Because of their different default severities, corporate bonds and CDO debt tranches must be compared on an expected loss basis. Expected loss is the product of default probability and loss in the event of default, and therefore incorporates both those risks in the evaluation of an investment's credit quality.

Finally, CDO debt tranches may help diversify an investment portfolio by providing exposure to a new asset class. By definition, an investment grade investor cannot gain exposure to speculative grade assets other than through the first loss protection offered via a CDO. The CDO debt tranche provides the investment grade investor with exposure to new industries or countries, while still maintaining investment grade credit quality.

Stretching Credit Quality

It would seem that investors prefer the extremes of credit risk, either highly rated triple- and double-A credit or unrated equity. The initial securitization of consumer and corporate obligations stretches the middling credit quality of these assets across the credit quality spectrum into triple-A to unrated equity tranches. The re-securitization of the middle, triple-B tranches of these securitizations again stretches middling credit quality into triple-A to unrated equity tranches. Middle credit quality is stretched and stretched again into the extremes.

This does not mean however, that investor portfolios are also heading for the extremes. They may be taking a barbell approach to credit and liquidity risk by constructing portfolios of highly liquid and creditworthy assets along side positions of concentrated credit and liquidity risk. The investor who changes from a portfolio completely comprised of high yield bonds to a portfolio of equity CDO tranches and Treasuries might maintain the same expected credit loss but improve liquidity, eliminate extreme downside credit risk, and gain regulatory capital relief.

Market Value Credit Structure

Advance Rate Mechanism

As briefly discussed above, the credit quality of market value debt tranches depends upon the ability of the CDO to sell assets and pay off debt tranche principal and accrued interest. The market value of CDO assets is periodically calculated. Asset market values are then multiplied by advance rates (a number less than 100%) to arrive at haircut asset values.

Advance rates are specific to particular asset categories (e.g., performing high-yield bonds, performing bank loans, distressed high-yield bonds, distressed bank loans, and distressed equities). The advance rate is the amount of tranche par and interest the CDO asset can support, expressed as a percentage of the asset's market value. Advance rates decline the higher the rating on the CDO debt tranche and the less diverse the CDO portfolio.

Table 5
Sample Advance Rates

Collateral	Adv Rate
Performing bank loans valued more than 90%	0.895
Distressed bank loans valued more than 85%	0.790
Performing high-yield bonds rated Ba	0.800
Performing high-yield bonds rated B	0.760
Distressed bank loans valued less than 85%	0.630
Performing high-yield bonds rated Caa	0.500
Distressed Bonds	0.400
Reorganized equities	0.380

Source: Moody's Investors Service.

Table 5 shows sample advance rates Moody's requires for a 20-issuer, five-industry CDO portfolio seeking a Aa2 rating on its senior debt tranche.

The sum of haircut asset values is then compared to debt tranche par and accrued interest in the over-collateralization (OC) test. In other words, the sum of each asset's market value, times each asset's advance rate, must be greater or equal than debt tranche par and accrued:

$$\sum_i \{ \text{Market Value}(\text{Asset}_i) \times \text{Advance Rate}(\text{Asset}_i) \} \geq \text{Debt tranche par and accrued.}$$

If market value losses have caused the portfolio to fall below this minimum requirement, the CDO has failed its OC test and must sell assets until the structure regains the prescribed ratio. Alternatively, the equity holders of the CDO can contribute assets to the CDO to cause the CDO to pass its OC test. If the CDO cannot right itself by either of these methods within the cure period, it is an event of default and senior-most tranche holders may take control of the CDO and its assets.

Market value CDOs often have a quarterly net worth test, net worth being the value of the equity tranche, defined approximately as the excess of collateral market value over the par and accrued interest of all debt tranches. If net worth becomes too small, in absolute or percentage terms, the CDO's collateral must also be sold until all debt tranches are retired. The net worth test might terminate the CDO while the CDO passes its OC trigger tests.

It is anticipated that in the normal course a market value CDO will liquidate itself by the voluntary and orderly sale of assets over the final months of its prescribed life.

The Effectiveness of the Market Value Credit Structure

The credit quality of debt tranches in a market value CDO depends upon the effectiveness of its OC test. In a scenario where the market value of CDO assets is declining, the decline in market value must be recognized early enough and the assets must be sold quickly enough so that debt tranche holders can still be repaid. The two time intervals of concern are:

- the time between valuation tests;
- the cure period, or time given for assets to be sold after a test failure.

There is a trade off between the conservatism of the advance rates and the combined length of the above two intervals. In some combination, a longer time period is acceptable with lower advance rates and higher advance rates are acceptable with a shorter time period. In usual practice, the asset portfolio is marked to market daily or weekly and the collateral manager is allowed a two-week cure period to rectify any shortfall in the OC test.

The market value volatility of CDO assets is affected by the volatility of general interest rates and the volatility of credit spreads. While general interest rate volatility affects all CDO assets equally, lower quality assets not only have larger credit spreads, but also greater credit spread volatility, as shown in the Table 6.

The diversity of the market value CDO portfolio is important because a well-diversified portfolio will have lower market value volatility than a poorly diversified portfolio and perhaps be more resistant to liquidity problems, as shown in Table 7.

However, the analysis of portfolio diversity is a difficult task. In times of market turmoil, market value and liquidity trends have exhibited startling uniformity across asset type, industry sector, and issuer domicile. In assessing portfolio diversity, investors often look at the industry distribution of U.S. and European names and the geographic distribution of emerging market names.

Typically, a CDO has restrictions with respect to concentrations by single name, industry, issuer domicile, and other collateral attributes. Collateral value in excess of concentration limits is not counted in the OC test. But given this, it is usual for a market value asset manager to have latitude to invest in a wide range of assets. The debt tranche investor must be comfortable with the allowable set of assets and their associated advance rates.

Table 6
Credit Spread Volatility
Ten-Year Maturity Industrial Indexes
(basis points)

Rating	Range of Credit Spread	Two Week Std Dev of Credit Spread
Triple-A	60	25
Double-A	67	26
Single-A	88	34
Triple-B	100	37
Double-B	277	93
Single-B	596	163
Triple-C	1547	447

Source: JPMorgan.

Table 7
Yield Volatility of JPMorgan High Yield USD Index vs. Constituent Parts

Standard Deviation of Two Week Total Returns of Index	202 bps
Average Standard Deviation of Two Week Total Returns of Index's 25 Industry Categories	224 bps

Source: JPMorgan.

Since the credit quality of the market value CDO structure depends upon the actual sale of assets, should it become necessary, a concern arises over whether a sale can be completed at the assets' value. This is referred to as liquidity risk, and its supposition suggests a contradiction: if a sale cannot be completed at the asset's value, is that indeed the asset's value?

Nevertheless, bid-ask spreads do vary by asset type and over time. A seller's ability to achieve the best price for an asset is also hindered by the urgency with which the asset must be sold. It is felt that certain assets are more susceptible to losing liquidity. Liquidity risk is assumed to be highest for more credit risky assets and for less well-known or less widely-traded names. Regulatory or legal restrictions on ownership can also make an asset less liquid and more apt to become less liquid still. Investor familiarity with asset type is another factor; bank loans are considered less liquid than bonds, all other factors being equal.

Since debt tranche protection derives from the ability to sell CDO assets, the cash flow characteristics of market value CDO assets are irrelevant. For example, assets with a longer tenor than the CDO are welcomed in a market value CDO. In a cash flow structure, they might be prohibited. Similarly, equity, zero-coupon bonds, and even defaulted debt can be put into a market value CDO. However, the ability to get transactionable market prices for an asset is critical. Without credible market valuations, an asset cannot receive credit in a market value CDO.

In a multiple tranche structure, each debt tranche has its own array of asset advance rates, set according to the desired credit quality or rating of the tranche. But the cure for breakage of any tranche's OC trigger is repayment of the senior-most tranche. Thus, the credit requirements of subordinate tranches might call for repayment of the senior-most tranche when the senior-most tranche's OC tests are being passed.

All of the following factors: over-collateralization, market value volatility, liquidity risk, portfolio diversity, and the interaction of tranche OC tests and the CDO's net worth test must be analyzed by the market value debt tranche investor.

Table 8

Market Value Credit Factors

Primary Factors	Secondary Factors
Over-Collateralization Test	Level of advance rates Cushion between the haircut value of assets and tranche par and accrued Time between OC tests Cure period to sell assets
Mark to Market Volatility	Interest rate volatility Credit spread volatility Propensity for credit and other events
Liquidity Risk	Credit quality Ownership restrictions Market familiarity with name and size of outstanding issuance Market familiarity with asset type Seller desperation, e.g., timing constraints
Portfolio Diversity	Industry diversification Geographical diversification Other known and unknown correlation factors Convergence of market value movements in times of stress
Interaction of Tranche Advance Rates and Net Worth Test	Tranche size and differences in advance rates

Source: JPMorgan.

Cash Flow Credit Structure

As briefly discussed above, the credit quality of cash flow debt tranches depends upon the ability of the CDO to withstand portfolio default losses and still pay its debt tranches. The two factors that affect the credit quality of cash flow debt tranches are the riskiness of the CDO's assets and the protectiveness of its structure.

Asset Risks

With respect to CDO assets, the credit risk of debt tranches is determined by three factors:

- default probability;
- default correlation;
- default severity.

To define these factors briefly, default probability is the likelihood that an asset will default over a given time period. Obviously, an asset will either default or not default; there is no middle ground. What is meant, for example, by a 2% estimate of default probability is that over repeated trials we expect an average of 2% of such assets in such trials to default. The implication of higher default probability in a portfolio is obvious.

Default correlation addresses the distribution of defaults in the portfolio given individual asset default probability. If the credits tend to default together, they are positively correlated with respect to default. If credits tend to default separately, they are negatively default correlated. For example, suppose that the default probability of each CDO asset is 5% over a certain time horizon. Maximum positive correlation would mean that 5% of the time the entire portfolio defaults and 95% of the time no credits default. Maximum negative correlation would mean that 5% of the portfolio always defaults over the given time horizon.

The implications of these two distributions, brought about by extremely different default correlations, are very different. In the first scenario, both equity and debt tranches are at risk for massive losses that occur infrequently. In the second scenario, the equity tranche is sure to sustain losses but debt tranches are completely insulated from loss.

Default severity is the loss in the event a default occurs. It can be measured as the market value of the asset after it defaults or as the present value of all after-default cash flows. Default severity, and its complement, recovery amount, is usually represented as a percentage of par. It varies by industry and the type of assets the credit owns. Recovery also varies by legal jurisdiction depending on how quickly local law allows a creditor to be put into bankruptcy and how strictly seniority is enforced.

The combination of all these factors produces a probability distribution of total CDO default losses over the life of the CDO. However, the timing of losses is also important because earlier asset defaults deny coupon cash flow to the CDO. To be complete, the probability distribution of aggregate losses must take into account the timing of losses.

Filling in this theoretical framework with default and recovery assumptions specific to a CDO's portfolio is difficult. Investors use rating agency ratings, default studies, rating transition studies, and recovery studies. Other credit consultants offer default probability

and default correlation products. Investors should look at the manager's track record, not only for experienced defaults and recoveries, but also for sales of assets at significant loss related to credit deterioration. They should also consider trends in both economic conditions and the credit quality of recent new issues in the targeted asset classes. The robustness of the new issue calendar is important for arbitrage CDOs because it dictates how choosy the manager can be in selecting credits. The underwriting quality of the asset seller and the selection process for including assets in the CDO are relevant for balance sheet CDOs.

Structural Protections

Asset defaults and recoveries affect the different tranches of the cash flow CDO according to the subordination of the tranches. There are two kinds of subordination, priority in bankruptcy and priority in cash flow timing.

Priority in bankruptcy in a CDO is almost always strict, meaning that in bankruptcy the proceeds from liquidated CDO assets will first be used to satisfy the claims of the senior debt tranche and only then, if there are any remaining proceeds, the next most senior tranche. The absolute seniority of CDO tranches is discussed in the section below on legal considerations affecting credit risk.

Both within and outside the world of CDOs, priority of cash flow often trumps priority in bankruptcy. Cash flow distributed to subordinated tranches is lost to more senior tranches no matter how poorly the entity does subsequently. With corporate debt, an early-maturing subordinate bond can be a better credit risk than a later-maturing senior bond.

However, a cash flow CDO employs several mechanisms to maintain tranche priority in cash flows. The first is the sequential principal paydown of tranches, meaning that principal payments are made to tranches in order of priority. This has the effect, as the CDO's assets amortize, of increasing the percentage subordination below senior tranches. While the portfolio becomes smaller, less diverse, and more susceptible to default variability, subordination protection increases commensurately.

Table 9

Typical Sequential Paydown Structure

Tranche	Initial Structure		After 50% Collateral Paydown	
	Tranche Size (\$MM)	Subordination	Tranche Size (\$MM)	Subordination
A	\$62	38%	\$12	76%
B	\$10	28%	\$10	56%
C	\$10	18%	\$10	36%
Equity	\$18	NA	\$18	NA
Total Assets/Total Liabilities	\$100		\$50	

Source: JPMorgan.

A few outstanding CDOs use a fast pay/slow pay structure where the bulk of principal payments go to senior tranches while a smaller amount goes to subordinated tranches. Some CDOs also make pro-rata distributions of principal to their tranches.

The second mechanism to maintain tranche priority in cash flows is the use of collateral coverage tests. These tests divert cash flows from subordinate tranches, prevent

reinvestment in new CDO assets, and cause senior tranches to be paid down. The two main collateral coverage tests are the over-collateralization test and the interest coverage test.

In simplified form, the over-collateralization test is the ratio of CDO asset par to tranche par. In the test, defaulted assets are counted at an assumed recovery rate or at the lower of that assumption or market value. Note that this is a par to par test, not a market value style market value to par test. In simplified form, the interest coverage test is the ratio of CDO asset interest to CDO tranche coupon. Scheduled coupons from defaulted assets are excluded from the test. Sometimes the deterioration of CDO asset credit quality, as determined by some objective measure, such as credit ratings, is also used to divert cash flows.

Chart 8

Over Collateralization Collateral Coverage Tests

Tranche A Over-collateralization Test:	$\frac{\text{CDO Asset Par}}{\text{Tranche A Par}}$
Tranche B Over-collateralization Test:	$\frac{\text{CDO Asset Par}}{\text{Tranche A and B Par}}$
Tranche C (& etc.) Over-collateralization Test:	$\frac{\text{CDO Asset Par}}{\text{Tranche A, B, and C (Etc.) Par}}$

Where: CDO Asset Par equals the par of CDO assets deemed not to be in default and a recovery assumption credit applied to defaulted assets.

Source: JPMorgan.

Chart 9

Interest Collateral Coverage Tests

Tranche A Interest Coverage Test:	$\frac{\text{CDO Asset Coupon}}{\text{Tranche A Coupon}}$
Tranche B Interest Coverage Test:	$\frac{\text{CDO Asset Coupon}}{\text{Tranche A and B Coupon}}$
Tranche C (& etc.) Interest Coverage Test:	$\frac{\text{CDO Asset Coupon}}{\text{Tranche A, B, and C (Etc.) Coupon}}$

Where the CDO Asset Coupons are actual coupons received and scheduled coupons from non-defaulted collateral over the current interest payment period and Tranche Coupons are calculated over the same period.

Source: JPMorgan.

A typical priority of payments schedule, or “waterfall” shows how sequential principal paydown and coverage tests work together to enhance senior tranche credit quality by assuring priority in cash flows:

Interest proceeds are used to pay:

1. Base fees and expenses of the CDO, including trustee, custodian, and paying agent fees.
2. The net periodic coupon due any swap counterparty.
3. Base asset manager fee.
4. Interest on Class A tranche and any termination amount due any swap counterparty caused by the CDO’s default.

5. If the Class A tranche coverage tests are not met, redemption of Class A tranche until the coverage tests are met.
6. Interest on Class B.
7. If the Class B tranche coverage tests are not met, first the redemption of Class A tranche and then, if necessary, the redemption of Class B tranche until the Class B coverage tests are met.
8. Class B interest accrued but not previously paid.
(Steps six and eight are repeated for each debt tranche.)
9. Termination amount due any swap counterparty caused by the swap counterparty's termination or default. (Sometimes included in step 4 above.)
10. Any additional fees to the trustee and custodian.
11. Additional asset manager fee.
12. Equity tranche until it achieves a particular IRR.
13. Remainder divided between equity and the asset manager.

Principal proceeds are used to pay:

1. Amounts due in one through eight above not met with interest proceeds.
2. During the reinvestment period, reinvestment in new assets.
3. After the reinvestment period, paydown of tranches in sequence.
4. Amounts in 9 through 13 above.

Note that the above waterfall specifies that all principal proceeds, including proceeds from asset sales, be used to pay down debt tranches in sequence unless the CDO is both (1) in its reinvestment phase and (2) all tranches are meeting their coverage tests. In that case only, principal proceeds can be used to purchase new assets. Importantly, principal cash flow cannot usually reach equity holders until all debt tranches are retired.

Cash flow CDOs also have trading prohibitions that restrict reinvestment. These trading rules revolve around collateral quality tests, or objective measures of certain portfolio characteristics, such as:

- industry or geographical diversity;
- average rating;
- average life;
- prospective average recovery;
- minimum weighted average coupon or spread.

Other concentration tests address the presence in the portfolio of large single issuers, loan participations, triple-C credits, deferred interest instruments, and the like.

In order to reinvest principal proceeds, the CDO must pass its collateral coverage tests as described above and also maintain these quality and concentration measures above their thresholds or, if a measure is already below its threshold, maintain or improve the measure. Since the portfolio is not always in place at closing, and since the portfolio can be traded anyway, the CDO is often evaluated as if all collateral quality and concentration tests were at their thresholds. To maintain trading flexibility, the initial portfolio is chosen to surpass quality and concentration thresholds by a significant margin. Thus, the actual CDO portfolio is better than the theoretical one used to size subordination requirements.

A conservative aspect of the collateral quality and concentration tests is that they are usually applied independently. A proposed trade must cause the portfolio to satisfy each quality and concentration test without allowing for acceptable trade-offs among these portfolio characteristics. An exception to this is that many deals now incorporate a matrix of acceptable combinations of factors such as issuer and industry diversity, average rating, prospective average recovery, or yield spread.

Debt tranche investors examine the cash flow waterfall, collateral coverage tests, and collateral quality requirements closely to assess their priority in cash flows. They also scrutinize possible trading actions that could be taken by managers and frequently ask for modifications. For example, in some CDOs, an appreciated asset can be sold and the proceeds used to purchase the same amount of par at lower cost. The difference between sale proceeds and purchase price can then be put into the interest proceeds waterfall where, if collateral coverage tests are met, cash flow is eventually available to the equity tranche. Such a situation allows the asset manager to sell credit-improved assets and skim off the price appreciation from those assets.

But if other assets have suffered price deterioration, and presumably decreased credit quality, the selling of winners and retention of losers causes the average credit quality of the portfolio to suffer. This scenario is now addressed in most CDOs by requiring capital gains to be reinvested unless the CDO's initial over-collateralization ratios are satisfied.

However, it is still widely the case that a manager can trade a defaulted asset, which is given no credit in a CDO's interest coverage test and only partial credit in the CDO's over-collateralization test, for a performing security that trades at the same price as the defaulted security. Under certain circumstances, this might improve coverage tests and permit the distribution of proceeds to subordinated tranches that would otherwise be restricted. But has the trade actually improved the credit quality of the CDO? Such trading scenarios, and their significance, must be placed in the context of the CDO's trading restrictions as a whole.

Balancing Asset Risk and Structural Protection

The purchaser of a cash flow CDO debt tranche must balance the default characteristics of the assets against subordination levels and the effectiveness of the coverage, quality, and concentration tests that redirect asset cash flows and control trading. As with market value CDOs, the investor must also consider how asset characteristics might change because of trading.

Table 10

Cash Flow Asset Risks and Structural Protections

Asset Risk

Default probability
Default correlation
Default loss

Structural Protections

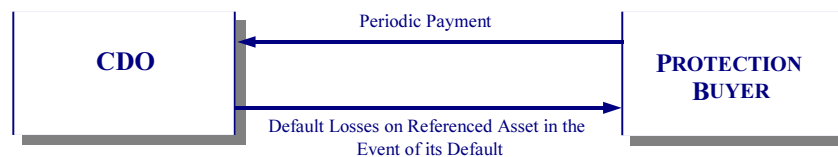
Subordination
Cash flow distribution before breach of coverage tests
The trigger levels and effectiveness of coverage tests in re directing cash flows
Protection afforded by quality and concentration tests

Sources: JPMorgan.

Synthetic CDOs

As an alternative to purchasing bonds or loans, a CDO might gain market exposure to an obligor synthetically by entering into a credit default swap. In a credit default swap, the CDO receives a periodic payment from a counterparty that seeks protection against the default of a referenced asset. The payment is based on the credit spread of the referenced asset. In return for this payment, the CDO must pay the protection buyer default losses on the referenced asset if the obligor of the referenced asset defaults. An analogy can be made to insurance where one party pays premiums and the other provides loss coverage. The exact definitions of “default” and “default losses” can be customized to suit the desires of the CDO and the protection buyer, but typically follow standard ISDA definitions. The tenor of the swap can be shorter than the tenor of the referenced asset.

Chart 10
Credit Default Swap



Source: JPMorgan

Synthetic Balance Sheet CDOs

In a synthetic balance sheet CDO, the protection buyer entering into the credit default swap with the CDO owns the referenced asset, or has exposure to the referenced obligor via, for example, a letter of credit or a swap receivable position. The protection buyer is trying to offset a credit loss it might sustain with a payment from the CDO in that event. As the CDO assumes credit exposure to the referenced obligor without buying an asset, the protection buyer gets rid of credit risk to the referenced obligor without selling an asset. These are balance sheet transactions only in that they reduce the protection buyer’s economic and regulatory required capital; they do not remove assets from the balance sheet.

The credit default swap in a balance sheet CDO can reference more than one asset or underlying obligor. It can also be structured to incorporate loss thresholds that must be exceeded before the CDO makes a payment. This threshold might be expressed on a per-asset basis (losses exceeding X amount per asset) or on an overall portfolio basis (losses exceeding X amount over the entire portfolio). The protection buyer essentially has to meet a deductible before being protected from credit losses on the referenced assets.

Credit default swaps are a popular means of hedging credit risk from loans because of the difficulty or reluctance commercial banks have in selling loans they have extended. In many circumstances, loans cannot be sold without notifying or gaining the approval of the borrower and other lenders. In other cases, loans are simply not saleable at all. Finally, as discussed below in the Legal Considerations section, the purchase or participation in loans might create credit complications from the point of view of the CDO.

Credit default swaps also separate the funding of an asset from the assumption of its credit risk. A bank can use a credit derivative to shed risk while still maintaining funding advantages it might have.

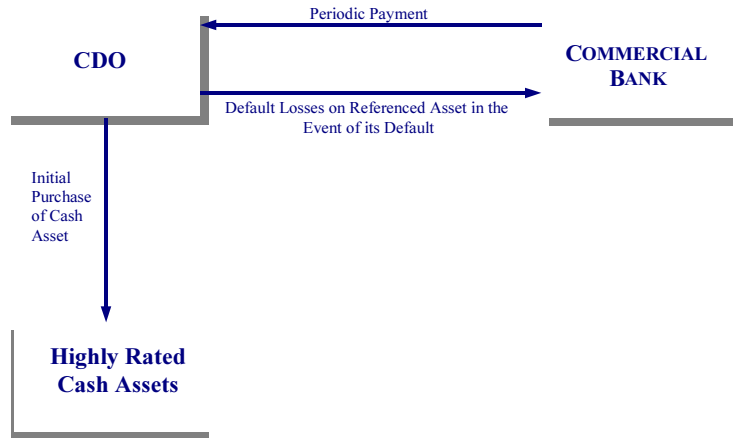
Synthetic Arbitrage CDOs

Credit default swap-backed CDOs are increasingly associated with arbitrage CDOs. The motivation for a synthetic arbitrage CDO typically comes from a party that seeks leveraged credit exposure to a portfolio of names. It might be the case that the CDO cannot achieve exposure to the names other than through a credit derivative. To date, almost all synthetic CDOs have been based on static reference portfolios. In the future, we anticipate active trading of underlying reference names in synthetic arbitrage CDOs. Synthetic arbitrage CDOs will enter into a number of individual credit default swaps with different counterparties.

Funded and Unfunded CDOs

An important aspect of credit default swaps is that they do not require cash investment by the CDO. In cases where investors want to buy a funded note, the CDO must therefore find other uses for the cash it receives from tranche investors. The method of JPMorgan Bistro transactions of 1997 and 1998 was for the CDO to purchase a highly credit worthy asset, such as triple-A rated credit card-backed securities as shown in Chart 11.⁵ The asset is selected to mature at the termination of the credit default swap. If referenced obligors have defaulted under the swap, proceeds from the security are used to pay the counterparty. Residual amounts are then available to tranche holders. Another alternative is to create a funded position by embedding the credit default swap in a credit-linked note of a well-rated issuer.

Chart 11
Synthetic CDO with Highly-Rated Asset and Credit Default Swap

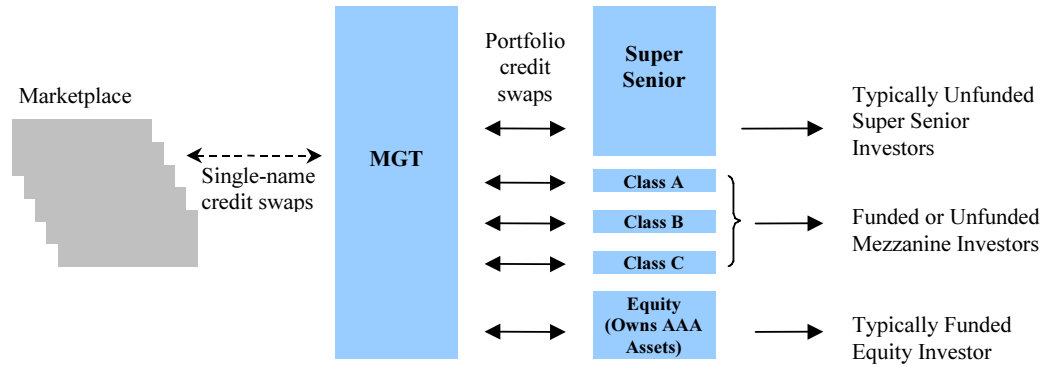


Source: JPMorgan

⁵ See the Glossary entry under *credit-linked note* for a description of an alternate method of investing cash proceeds.

In more recent synthetic CDOs, cash investment has become optional and the CDO investor can simply enter into a credit default swap with the sponsoring financial institution. In chart 12, investors in the super senior, mezzanine, or equity tranches can take tranche exposure to the referenced portfolio on either an unfunded or funded basis.

Chart 12
Synthetic CDO with Funded and Unfunded Tranches



Source: JPMorgan.

Parties to a CDO

Asset Manager

The focus of a cash flow manager is often said to be to avoid defaults while the focus of a market value manager is to achieve price appreciation. Certainly the market value structure, with its wider array of assets and easier trading rules is a more efficient vehicle to realize price appreciation. At the same time, the credit manager who can avoid defaults does not want to rely on other parties agreeing with its credit assessment in order to realize value. For that manager, the cash flow structure is ideal since assets are not typically sold prior to maturity. Yet it is obvious that the market value manager does not want to experience defaults and that the cash flow manager may wish to realize the benefit of price appreciation.

Debt and equity tranche investors take care in reviewing the asset manager. Besides expertise in the CDO's underlying assets, the manager must understand the intricacies of CDO trading rules and be able to comply with them. The manager may also need expertise in derivative instruments and interest rate or foreign exchange hedging. Some CDO investors prefer a small management company that will be focused on the CDO. Others prefer a large manager that has available back-up personnel and clout in gaining access to allocations. A larger firm might also have formal internal risk controls and audit procedures.

The argument about the best manager can take other twists as well. One investor might spurn discussion of the size of the asset management firm as irrelevant, and stress that all that really matters is the manager's historical risk-adjusted performance. But an answer to this argument is that managing a CDO is not like managing a normal portfolio because of the CDO structure and trading restrictions.

The rating agency view of asset managers is ambivalent. As a policy and marketing issue, they have to base their CDO analysis on the ratings their organizations place on the underlying collateral. They cannot give a manager a lot of credit for being able to improve upon rating agency credit assessment. However, ratings analysts are also aware that there is great variability in the default probability of credits in the same rating category. The nightmare of the CDO rating agency analyst is the manager who buys the most risky credits within rating categories.

In some cases, Moody's will adjust debt tranche target expected loss in view of their assessment of the manager's capabilities. The adjustments are more significant on the downside than the upside. Fitch differentiates between managers via trading limits and other structural provisions. S&P adjusts its model recovery assumptions on the theory that managers with demonstrated work out experience will reap higher recovery values.

Neither equity nor debt tranches want the asset manager to forget their interests. The compromise that is often reached is that the asset manager purchases a meaningful part of the CDO's equity tranche or subordinates a significant portion of its fee to debt and equity tranches. Debt tranche investors are satisfied that the manager has a first loss position in the collateral while equity investors appreciate that the asset manager will share in equity tranche gains and losses.

It can be argued that the debt tranche investors are getting the worst part of this arrangement. The equity tranche holders' position is analogous to owning a call on the

value of the CDO portfolio struck at the par value of the debt tranches. The “value of the CDO portfolio” for a cash flow CDO is the after-default cash flow of the CDO portfolio. When CDO equity is deep in the money, equity holders are ambivalent about the volatility of the CDO’s after-default cash flow. (In the language of options, their delta is high and their vega is low.) Equity holders would appreciate higher CDO asset yields, but to have them they would have to put up with higher default probabilities and potential losses. As potential gains go along with potential losses, prudence is a relevant virtue.

But suppose the intrinsic value of the equity tranche option has already been eroded by defaults, such that equity’s option is at the money or out of the money. In this case, the potential change in the value of equity’s option is one-sided and it craves volatility. Unfettered, equity would like the CDO to purchase the most yieldy, credit risky portfolio: equity can’t lose more than it already has, and the potential for upside is only possible if the CDO takes chances. (In the language of options, their delta is low and their vega is high.)

This view of asset manager motivation suggests that debt holders should understand how CDO collateral coverage, quality, and concentration tests restrict trading activity if the CDO portfolio deteriorates. It also may argue for CDO managers who do not want their CDOs to fail and affect their other businesses outside the CDO.

Bond Insurer

Sometimes a CDO structure incorporates bond insurance (financial guarantee insurance) on senior tranches. Tranche holders then have two sources of payment: the CDO and, if the CDO fails, the bond insurer. Triple-A-rated bond insurers usually insure tranches that would have been rated single- or double-A or higher without their guarantee. Typically, bond insurance is used with new asset classes or new CDO managers until investors become familiar and more generous in their bids for unenhanced tranches.

Rating agencies appreciate the monitoring and structuring involvement of bond insurers in transactions. They will require a bond insurer to hold less capital to insure a CDO than they would require a CDO to hold internally. From the perspective of the CDO equity tranche, bond insurance makes sense if the reduction in senior tranche yield with bond insurance is greater than the bond insurer fee.

Co-Issuer

When the CDO is located offshore, a Delaware corporate co-issuer is often used. The co-issuer has a passive role in the overall CDO structure but is sufficient U.S. connection to qualify the CDO as a U.S. corporate issuer under National Association of Insurance Commissioners (NAIC) guidelines applicable to U.S. insurance companies.

Rating Agencies

S&P pioneered market value CDO ratings in 1987 and cash flow ratings in 1988. By 1990, however, Moody’s dominated the rating of cash flow structures due to rating standards that more flexibly addressed a wider range of portfolio credit quality and diversity. Beginning in 1996, Fitch began rating the second generation of market value CDOs. Moody’s and S&P came out with revised market value requirements in 1998 and 1999, respectively, and became more active in that market.

Table 11
Rating Agency Market Shares: By Number of Rated CDOs

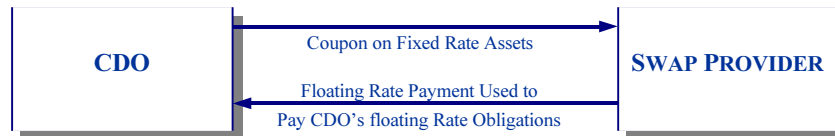
	Moody's	S&P	Fitch
1987 - 2000	66%	45%	30%
2000 only	68%	46%	38%

Source: JPMorgan.

Swap Provider

CDOs sometimes enter into interest rate or currency options or swaps to match the cash flow of their assets to the requirements of their liabilities. For example, many CBOs issue floating rate tranches backed by fixed rate bonds. To bridge the interest rate mismatch, the CBO might enter into a fixed-for-floating interest rate swap or purchase an interest rate cap. The CBO would pay a fixed interest rate on a notional amount to a counterparty in exchange for a floating interest rate on the same notional amount. In this example, the fixed coupons on its bonds would support the fixed rate payments the CBO makes to the swap counterparty. The floating rate the CBO receives from the counterparty would be used to make payments on its floating rate tranches. A currency swap or option might be used if CDO assets and liabilities are in different currencies.

Chart 13
Interest Rate Swap



Source: JPMorgan.

In these circumstances, the CDO, and by extension the CDO tranche holders, take on credit risk to the swap or option provider. If the swap provider terminates or defaults, the CDO also faces the risk to its liquidity of having to make a termination payment to the swap provider. The CDO must also then find a replacement counterparty for the defaulted swap or cap. These risks are addressed by requiring the swap provider to be of high credit quality and writing other protective provisions into the derivative documentation.

Trustee, Collateral Custodian and Servicer and Paying Agent

Usually the same entity, the trustee is responsible for issuing the CDOs, maintaining and servicing the collateral, short-term cash reinvestment, payments (from the collateral and to the tranches), and compliance testing. The various collateral coverage, quality, and concentration tests makes this last task more complicated than a trustee role in a typical asset backed securitization. Active trading also makes this role more difficult. Adherence to the CDO waterfall when distributing payments to tranche holders is critical. The trustee usually issues a monthly report detailing the status of the CDO portfolio and cash distributions made by the CDO.

Underwriter and Placement Agent

Usually a Wall Street securities firm that balances the differing objectives of tranche investors while satisfying the requirements of regulators and rating agencies and reconciling the advice of legal, tax, and accounting experts. The firm may advise prospective managers, produce cash flow models and results, negotiate with rating agencies, engage other professionals, market the tranches, monitor completed transactions, and produce relevant, timely, insightful, and helpful research.

Legal Considerations⁶

Basic Transaction Structures and Documentation

Arbitrage CDOs. In a typical arbitrage transaction, the CDO (usually a Cayman Islands company) is newly established as a “special purpose vehicle” or “SPV” that is structured, as described further below, to be “bankruptcy-remote.” The CDO issues a nominal amount of common equity, which is owned by a charitable trust, and issues and offers to investors “economic” equity (which may be in the form of subordinated notes, but is more likely to be in the form of preferred shares) and one or more tranches of fixed or floating rate notes.

The CDO’s securities are offered and sold pursuant to exemptions from, or in transactions not subject to, the registration requirements of the U.S. Securities Act of 1933 (the “33 Act”). In most cases, the CDO’s securities are offered only to U.S. persons that are “qualified institutional buyers” under Rule 144A of the 33 Act or to non-U.S. persons in offshore transactions in reliance on Regulation S (“Reg S”) of the 33 Act, although in some transactions, the class of potential investors is sometimes expanded to include “accredited investors” under Rule 501 of the 33 Act. The CDO will typically rely on the exemption from registration as an investment company afforded by Section 3(c)(7) of the U.S. Investment Company Act of 1940 (the “40 Act”) and its U.S. investors will be limited to “qualified purchasers” under the 40 Act.

The CDO issues its notes pursuant to an indenture between a trustee, the CDO, and a U.S.-domiciled co-issuer (if the CDO is established as an offshore vehicle). Under the indenture, the CDO grants a security interest to the trustee for the benefit of the CDO’s noteholders and other secured parties, including the trustee itself, the paying agent with respect to the CDO’s equity (which is usually the same financial institution that serves as trustee), the asset manager, the swap provider, and the bond insurer (if any). The indenture sets forth the “waterfall” provisions that govern the priority of payments to be made by the CDO to its secured parties and equity investors and also contains provisions relating to the perfection of the secured parties’ security interest in the CDO’s assets, restrictions on the CDO’s investment activities, representations and covenants of the CDO, and remedies available to the trustee and noteholders in the event of the CDO’s default. The CDO also enters into a number of other transaction documents, including a management agreement with its asset manager and a collateral administration agreement with the trustee.

The CDO uses the proceeds from the issuance of its securities to purchase assets in open-market transactions from one or more broker-dealers or other financial institutions on the date the CDO first issues securities to investors (its “closing”) and during a post-closing “ramp-up” period. In many cases, the CDO purchases assets at closing from the securities firm that serves as initial purchaser or placement agent with respect to the offering of the CDO’s securities (which firm has typically acquired those assets at the direction of the CDO’s asset manager and warehoused them for a brief period in anticipation of the CDO’s closing).

Balance Sheet CDOs. A number of balance sheet CDO transactions have utilized a “two-tier” transfer structure in which the sponsor bank or financial institution (in many cases, a New York branch of a foreign bank) transfers loans held by it to a newly established SPV (usually a Delaware statutory business trust, corporation, or limited liability company)

⁶ Our thanks to Edward Mayfield for this analysis.

owned by the sponsor or one of its affiliates. The “intermediate” SPV transfers the loans to the balance sheet CDO, which is also a newly established SPV (usually a Delaware statutory business trust). Balance sheet transactions involving sponsors that are FDIC-insured banks have also utilized a “one-tier” transaction structure in which the sponsor banks transfer loans directly to the issuing CDOs (however, because of positions recently taken by FASB, transfers of assets in one-tier structures may not be treated as sales for accounting purposes, which would limit the continued utilization of one-tier structures by FDIC-insured banks).

The loans may be assigned to the CDO so that it replaces the sponsor as lender of record and has contractual privity with the loan obligors, but in most transactions, the sponsor transfers ownership interests or “participations” in the loans to the intermediate SPV while retaining bare legal title to the loans and privity with the loan obligors. The transfer of the participations from the sponsor to the intermediate SPV is made pursuant to a participation agreement and the transfer of the participations from the intermediate SPV to the CDO is made pursuant to a sub-participation agreement.

The CDO issues equity and debt and uses the issuance proceeds to purchase the loan participations from the intermediate SPV, which, in turn, uses the proceeds to purchase the participations from the sponsor. If the CDO is a Delaware business trust, it issues equity in the form of trust certificates pursuant to a trust agreement and issues one or more tranches of fixed or floating rate notes pursuant to an indenture. The CDO grants a security interest to the trustee under the indenture for the benefit of its noteholders and certain other secured parties, such as the trustee and any swap provider. The indenture contains provisions related to perfection mechanics, priority of payments, representations and covenants, and remedies upon the CDO’s default. The CDO also enters into a servicing agreement with the sponsor or one of its affiliates, pursuant to which the sponsor agrees to act as servicer with respect to the loans.

The CDO’s securities are offered to U.S. persons that are qualified institutional buyers pursuant to Rule 144A or to non-U.S. persons in offshore transactions in reliance on Reg S.

Bankruptcy-Remoteness

If bankruptcy proceedings (either voluntary or involuntary) were commenced with respect to a CDO under the U.S. Bankruptcy Code, the CDO’s noteholders, as secured creditors to the CDO with a perfected security interest in the CDO’s assets, should ultimately be able to realize on the CDO’s assets. However, provisions of the U.S. Bankruptcy Code would cause the noteholders to experience delays in payment and, under certain circumstances, receive less than the full value of their collateral. For example, under the “automatic stay” provisions of the U.S. Bankruptcy Code, the filing of a bankruptcy petition with respect to the CDO would automatically stay noteholders from proceeding against the CDO’s assets for an indeterminate period of time.

In addition, if a CDO or its assets were to become the subject of the bankruptcy or insolvency proceedings commenced with respect to any non-bankruptcy remote transferor of those assets — either as a result of the “substantive consolidation” of the CDO and the transferor or because the transfer of assets by the transferor is characterized as a transfer for collateral purposes rather than as a “true sale” of those assets — the CDO’s noteholders

could be exposed to potential delays in payment and loss in collateral value resulting from the transferor's insolvency or bankruptcy. Such potential payment delays could occur even if the transferor were not eligible for relief under the U.S. Bankruptcy Code and were instead subject to an alternative insolvency regime (generally, entities eligible for relief under the U.S. Bankruptcy Code include corporations, statutory business trusts, or limited liability companies that are domiciled, or that conduct a business or own property, in the U.S., but do not include banks or insurance companies). For example, U.S. insolvency regimes applicable to banks typically either have automatic stay provisions comparable to that found in the U.S. Bankruptcy Code or give bank receivers and conservators (*e.g.*, the FDIC, in the case of an FDIC-insured bank, or the banking regulator of the state in which the bank is domiciled or has a branch, in the case of a non-FDIC insured bank) the ability to obtain judicial stays to prohibit creditors from proceeding against the assets of insolvent banks.

To minimize the potential for such payment delays and loss in collateral value, each CDO transaction is structured, as described further below, so that the CDO is a "bankruptcy-remote" entity whose own bankruptcy risk is minimized and whose assets are isolated from the bankruptcy or insolvency risk of any non-bankruptcy remote transferor of those assets.

Reduction of CDO Bankruptcy Risk. A CDO's bankruptcy risk is minimized by setting it up as an SPV, thereby limiting the universe of potential creditors with claims against the CDO, and by building into the CDO transaction structural impediments and disincentives to those creditors commencing bankruptcy proceedings against the CDO.

To limit the universe of an SPV's potential creditors, it is usually a newly established entity, with no operating history that could give rise to prior liabilities. The SPV's business purpose and activities are limited to only those necessary to effect the particular transaction for which the SPV has been established (*e.g.*, issuing its securities and purchasing and holding its assets), thereby reducing the likelihood of the SPV's incurring post-closing liabilities that are in addition or unrelated to those anticipated by rating agencies and investors. For example, restrictions on its corporate or trust powers may be set forth in the SPV's organizational documents, and the SPV may be required to agree to corresponding covenants in its indenture, as well as to covenants not to merge with another entity or issue additional debt without obtaining, among other things, confirmations from the agencies rating its notes that such actions will not result in a downgrade of their ratings.

Impediments to an SPV's voluntary bankruptcy filing may take the form of requiring all the members of the SPV's board of directors to approve any voluntary petition and requiring the SPV to have at least one board member who is independent of the SPV's parent and who is charged with considering the interests of the SPV's rated notes in voting to approve a voluntary bankruptcy petition.

A number of impediments and disincentives with respect to involuntary filings are built into the CDO transaction structure. The transaction is structured to impede the ability of holders of the CDO's subordinated securities to file involuntary petitions against the CDO by requiring the terms of the CDO's subordinated securities to provide that amounts become due in respect of such securities only to the extent that the CDO has sufficient funds to pay such amounts after paying amounts then due in respect of its senior securities. In addition, non-investor creditors such as the trustee or swap provider are required to covenant not to petition the CDO into bankruptcy until a year after all the CDO's notes have been repaid.

Finally, the CDO transaction is structured so that holders of rated notes have a first priority perfected security interest in the CDO's assets to create a disincentive to the CDO's parent or the parent's creditors, any other equity investors in the CDO, or any creditors of the CDO to file an involuntary petition against the CDO. A legal opinion that the CDO's noteholders have a first priority perfected security interest in the CDO's assets is typically rendered at closing.

Isolation From Transferor Insolvency Risk — True Sale. Transfers of financial assets often have attributes that make it difficult to distinguish whether they are transfers for collateral purposes, made in connection with secured financings, or whether they are absolute transfers, made in connection with “true sales” of those assets. The distinction is an important one, since an asset that has been transferred for collateral purposes is part of the bankrupt or insolvent transferor's estate and its transferee a secured creditor, subject to the risks of payment delays and losses in value described above.

No judicial authority offers definitive guidance on this issue for purposes of analyzing the sorts of complicated transfers that can be involved in CDO and other structured transactions. Some courts have given presumptive weight to whether the transferor and transferee intended their transfer to be a true sale. Other courts have sought to identify the “true” nature of asset transfers and to determine whether the transfers bear greater resemblance to sales or to secured loans by weighing their sale-like attributes against their loan-like attributes. In order to ascertain whether transferors of assets have truly transferred the “risks and rewards” of ownership of those assets, as would be the case in sales of those assets, or whether the transferors actually retained such risks and rewards, as would be the case in transfers for collateral purposes, these courts have examined such factors as whether the transferee had recourse back to the transferor in the event of the asset's default, whether the transfer was irrevocable, whether the transferor continued to service the asset and otherwise deal with the obligor under the asset, and whether the transfer was characterized as a sale for accounting or tax purposes.

As a general matter, the terms of each transfer of an asset from a non-bankruptcy remote entity to an SPV in a CDO transaction, whether it is the intermediate SPV in a two-tier transaction or the CDO itself in a one-tier transaction, must constitute a true sale under the principles established in such case law. Depending upon the transaction, a true sale opinion or other legal comfort as to the nature of a transfer may or may not be required at closing. For example, true sale issues typically do not arise, and opinion comfort is not required, in connection with an arbitrage CDO's purchase of loan assignments, bonds, and other securities in open-market transactions from broker-dealers or other financial institutions that are not affiliated with the CDO and that have held the assets only briefly in anticipation of their resale, since the indicia supporting characterization as a transfer for collateral purposes — *e.g.*, recourse back to the transferor upon the related obligor's default and revocability of the transfer — are absent from such transactions.

In contrast, transfers of loan participations can present particularly difficult true sale issues since a non-bankruptcy remote transferor remains lender of record with respect to the loans and continues to service the loans after the transfer of the participations and the CDO has no contractual privity with the loan obligors. Accordingly, in balance sheet transactions involving a transferor eligible for relief under the U.S. Bankruptcy Code or a non-FDIC insured bank (*e.g.*, a New York branch of a foreign bank), a legal opinion is delivered

at closing that provides legal comfort that the transfer of loan participations from the transferor constitutes a true sale under applicable case law. In transactions involving a non-FDIC insured bank, appropriate regulatory comfort is also obtained from the state banking regulator that it will treat the transfer of loan participations as a sale of the loans and will not treat the loans as property of the bank in the event of the bank's insolvency.

However, in balance sheet transactions involving FDIC-insured transferors, it has not generally been necessary to structure asset transfers from such transferors as true sales. Because of statements by the FDIC that it would not seek to void an otherwise legally enforceable and perfected security interest granted in assets transferred to an SPV by an FDIC-insured transferor, some securitization transactions involving an FDIC-insured transferor have been structured so that the transfer from the FDIC-insured transferor constitutes a first priority perfected security interest in the transferred assets.

Isolation From Transferor Insolvency Risk — Substantive Consolidation. Substantive consolidation is an equitable doctrine under the U.S. Bankruptcy Code by which a bankruptcy court, in the exercise of its equitable powers, will consolidate separate, but related, entities (*e.g.*, parents and subsidiaries) and their respective assets and liabilities so that their combined assets and liabilities are treated as those of one, single entity and the entities' respective creditors become the creditors of the consolidated entity able to reach those combined assets and liabilities. It is a remedy that is used sparingly to ensure the equitable treatment of all creditors of the consolidated entities in circumstances where the interrelationships between members of a corporate group are so obscured they cannot be disentangled. Some of the factors courts have cited to support decisions to substantively consolidate related entities are (i) difficulty in segregating assets and liabilities of each company, (ii) commingling of assets and business functions, (iii) existence of intercorporate guaranties on loans, and (iv) asset transfers without corporate formalities. While the remedy is an equitable doctrine under the Bankruptcy Code and a bank may not seek relief under the Bankruptcy Code, it is possible for a receiver of an insolvent bank to jointly administer a substantively consolidated insolvency proceeding for a bank and its subsidiary.

Arbitrage transactions, if structured as described above, do not typically present substantive consolidation issues. However, they can arise in balance sheet transactions. For example, in two-tier transactions, a true sale of assets from the non-bankruptcy remote transferor to the intermediate SPV may be insufficient to shield the assets from the insolvency risk of the transferor if it wholly owns or owns a significant interest in the intermediate SPV and an overly familiar relationship between the two would support their substantive consolidation, since the assets would never effectively be sold away from the transferor. If the second tier transfer from the intermediate SPV to the CDO were structured as a perfected security interest rather than as a true sale then the CDO's noteholders would become creditors to the consolidated entities. If the non-bankruptcy remote transferor were an FDIC-insured bank, the CDO's noteholders could obtain comfort from the FDIC statements referred to above that they would have the continued benefit of the CDO's assets as collateral; however, if the transferor were not an FDIC-insured bank, the noteholders could experience delays in payment and could be stayed from proceeding against the CDO's assets.

To minimize the risk of substantive consolidation, SPVs in all structured transactions, including CDOs and intermediate SPVs, are required to abide by "separateness covenants," whereby, among other things, they agree to maintain separate books, records,

accounts, and financial statements from all other persons, to conduct business in their own names, to observe corporate formalities, to hold themselves out as separate entities, to maintain arm's-length relationships with their affiliates, and not to commingle assets with those of other entities. In addition, a non-consolidation opinion and written comfort from the applicable state banking regulator may be required as a condition to closing in many balance sheet transactions.

Certain Loan-Specific Legal Issues

Set-off. Under common-law principles and some state statutes, a borrower under a loan that has deposits with a transferor bank (or is otherwise owed any amounts by the transferor) may be entitled, in the event of the transferor's insolvency, to "set off" the amount of those deposits (or other amounts owed to the borrower) against the amount of the loan and thereby reduce its payments made under the loan. Set-off risk can arise in connection with transfers by assignment as well as by participation. In addition, it is a risk for arbitrage CDOs that purchase loans as well as for balance sheet CDOs.

Many loan agreements contain explicit waivers of set-off rights by borrowers, and these waivers may provide sufficient comfort to rating agencies in deciding not to require a CDO maintain reserves to cover potential set-off risk. In some cases, rating agencies may require an opinion of counsel as to the enforceability of such waivers.

There is some concern that in an insolvency of an FDIC-insured transferor, the FDIC would encourage borrowers, notwithstanding their express waivers of set-off rights, to offset deposits against their loans and thereby cancel outstanding deposits in order to reduce the FDIC's liability to repay depositors under the federal deposit insurance regime. Accordingly, reserves or credit enhancement may be necessary to cover set-off risk in transactions involving FDIC-insured transferors.

Lender Liability. In recent years, a number of judicial decisions in the United States have upheld the right of borrowers to sue lenders or bondholders on the basis of various evolving legal theories (collectively, termed "lender liability"). Generally, lender liability is founded upon the premise that an institutional lender or bondholder has violated a duty (whether implied or contractual) of good faith and fair dealing owed to the borrower or issuer or has assumed a degree of control over the borrower or issuer resulting in the creation of a fiduciary duty owed to the borrower or issuer or its other creditors or shareholders. Although it would be a novel application of the lender liability theories, a CDO could be subjected to allegations of lender liability.

In addition, under common-law principles that in some cases form the basis for lender liability claims, if a lender or bondholder (a) intentionally takes an action that results in the under-capitalization of a borrower to the detriment of other creditors of such borrower, (b) engages in other inequitable conduct to the detriment of those creditors, (c) engages in fraud with respect to, or makes misrepresentations to, those creditors, or (d) uses its influence as a stockholder to dominate or control a borrower to the detriment of other creditors of such borrower, a court may elect to subordinate the claim of the offending lender or bondholder to the claims of the disadvantaged creditor or creditors, a remedy called "equitable subordination."

Accounting Considerations⁷

The three “interesting” CDO accounting issues under U.S. Generally Accepted Accounting Principles (GAAP) are: how should investors account for credit-impaired tranches, do securities issued by CDOs contain embedded derivatives which need to be bifurcated and marked-to-market, and should the CDO be consolidated on any entity’s balance sheet? We will discuss these issues in terms of U.S. accounting standards although International Accounting Standards and U.K. GAAP end up in much the same place on these issues as U.S. GAAP. The following is intended to raise relevant issues rather than be definitive or prescriptive.

Accounting for Credit-Impaired Tranches

CDO tranches can be classified as held-to-maturity securities, available-for-sale securities, or trading securities.⁸ Many companies do not use held-to-maturity accounting and those that do tend to do so only for the highest rated CDO tranches.⁹ A CDO tranche that is classified as a trading security is recorded at fair value with changes in value recorded in the Asset section of the balance sheet and the Trading Income (or its equivalent) section of the income statement.

A CDO tranche that is classified as an available-for-sale security is recorded at fair value (i.e., marked-to-market) with changes in value recorded in the Asset and Other Comprehensive Income¹⁰ sections of the balance sheet. Accordingly, mark-to-market changes do not affect the income statement unless the available-for-sale security suffers an “other-than-temporary” decline in value. Under EITF 99-20, an available-for-sale security needs to be tested for other-than-temporary declines in value and if such a decline exists, then the security must be written down. This other-than-temporary decline write down is recorded in the income statement. As a result of applying EITF 99-20, you can end up with some part of the mark-to-market on an available-for-sale security still on the balance sheet in Other Comprehensive Income and the other-than-temporary decline mark-to-market in the income statement. EITF 99-20 also describes how interest income should be recognized on asset-backed securities. In summary, EITF 99-20 requires you to calculate an expected yield on the security and book interest income based on that yield. If the estimated cash flows on the security change, you need to decide (1) if you have an other-than-temporary decline write-down and (2) if you should prospectively adjust the yield you are using to book interest income. The table that follows summarizes the provisions of EITF 99-20.

⁷ Our thanks to Marie Stewart for this analysis.

⁸ FAS115 is the GAAP that describes how you classify securities as held-to-maturity, available-for-sale or trading. Held-to-maturity securities are recorded at amortized cost; available-for-sale securities and trading securities are recorded at fair value.

⁹ FAS115 requires the positive intent and ability to hold a security to maturity before it can attain held-to-maturity accounting. Additionally, FAS140 states that securities that can be prepaid or settled in such a way that the holder might not recover substantially all of their investment can only be classified as trading or available-for-sale.

¹⁰ Other Comprehensive Income is a component of the Shareholders Equity section of the balance sheet.

Table 13

Has there been a change in the timing or amount of estimated cash flows as measured by a change in the present value of the estimated future cash flows (using the most recent yield to recognize interest income)?		
Increased	<i>Interest Income recognition:</i> Increase the yield prospectively (to the IRR of revised estimate of cash flows discounted to the current amortized cost) <i>Other-than-temporary decline:</i> None	
Stayed the same	<i>Interest Income recognition:</i> Continue to apply the most recent yield to recognize interest income <i>Other-than-temporary decline:</i> None	
Decreased	Is the current fair value lower than the carrying value on the books?	
	Yes	No
	<i>Interest Income recognition:</i> Change the yield prospectively (to the current market yield used in the fair value determination) <i>Other-than-temporary decline:</i> Test for impairment and if it exists, writedown the investment to its fair value as a charge to current earnings	<i>Interest Income recognition:</i> Decrease the yield prospectively <i>Other-than-temporary decline:</i> None

Source: Deloitte & Touche: Securitization Accounting Under FASB 140: The Standard Formerly Known as FASB 125. 1st edition, January 2001.

Emebded Derivatives

FAS 133 requires the separation of an embedded derivative from its host contract if all of the following criteria are met: (1) the economic characteristics and risks of the embedded derivative instrument are not clearly and closely related to the economic characteristics and risks of the host contract, (2) the hybrid instrument is not remeasured at fair value under GAAP with changes in fair value reported in earnings as they occur (i.e., the instrument is not booked as a trading asset), and (3) a separate instrument with the same terms as the embedded derivative instrument would meet the FAS 133 definition of a derivative instrument.

The phrase “clearly and closely related” focuses on the question of whether the underlying economic characteristics and risks of the embedded derivative are clearly and closely related to the economic characteristics and risks of the host contract. In other words, are the factors that cause the derivative to fluctuate in value clearly and closely related to the features of the host contract? A derivative that embodies the economic characteristics of interest rate risk (e.g., a LIBOR coupon subject to a cap or a floor) that is embedded in a debt instrument **would not** have to be bifurcated, since the economic characteristics of the derivative (interest rate risk) and the host contract (interest rate risk) are the same. A derivative that embodies economic characteristics of a credit default swap (e.g., a return tied to credit losses in a specified portfolio) that is embedded in a debt instrument **would** have to be bifurcated, since the economic characteristics of the derivative (credit risk) and the host contract (interest rate risk) differ.

FAS 133 requires all derivatives to be on-balance sheet at fair value (i.e., marked-to-market). There are detailed procedures for deciding if you have an embedded derivative and how you mark it to market. An embedded derivative is generally ascribed a fair value of zero at inception (i.e., the day you bifurcate it from the host instrument). How you mark an embedded derivative to market after bifurcation is an interesting question. Some people use market spreads/prices; others model the cash flows of the CDO to arrive at a “fair value.”

Consolidation of the CDO

Under FAS 140, the transferor of assets to a CDO that is a Qualifying Special Purpose Entity (QSPE) does not have to consolidate the CDO on its balance sheet. (The transferor must still meet the other sales criteria of FAS 140 in order for the transfer of assets recognized as an accounting sale.) Only CDOs that are essentially “brain dead” can achieve the QSPE designation. To be a QSPE, the CDO must sell assets only in response to quantifiable credit deterioration of the assets (default, downgrade, decline in fair value of a specified amount.) Furthermore, the CDO must dispose of the credit deteriorated assets in prescribed, mechanistic ways. Arbitrage CDOs generally will not be QSPEs because of the asset manager’s ability to actively trade the CDO’s assets. Balance sheet CDOs are often structured as QSPEs so that the selling bank can retain the CDO’s equity but still get sale treatment for the assets and not have to consolidate the QSPE.

Parties to a CDO other than the asset transferor cannot rely on the CDO’s QSPE designation to avoid consolidation. The QSPE designation only insulates the transferor of assets to the CDO from consolidation. The party that might be at risk for consolidation of a non-QSPE CDO is the transaction’s sponsor. “Sponsor,” unfortunately, is not well defined in the accounting literature. Some indications that a party might be a sponsor are whether they transferred assets to the CDO, are the asset manager, provide credit support, received brokerage and structuring fees, own more than 50% of the CDO’s equity, and even whether their name is on the CDO. Owning one of a CDO’s debt tranches, by itself, is not an indication of being the CDO’s sponsor. Unfortunately, accounting standards in this area are not clear and are not becoming clearer. Some indications that a CDO will not be consolidated by the transferor or the sponsor are the activities of independent third parties, i.e., not someone who might be considered a sponsor. It is positive if such independent parties:

- own legal form equity equal to 3% or more of the fair value of assets, including any derivatives to which the SPE is counterparty;
- own the majority of equity;
- have control of the CDO;
- have the risk and rewards of ownership of the CDO.

Accounting standards are continually changing and being reinterpreted and accountants often have difficulty in understanding the pronouncements of the SEC and the FASB and applying them to specific circumstances. Accordingly, you need to proceed with extreme caution when determining how you account for CDO tranches and who should consolidate a CDO.

Tax Considerations¹¹

CDO tax considerations can be divided into those that might affect CDO credit quality and those that definitely do affect the taxation of equity tranche holders.

CDO Credit Quality

With respect to CDO credit quality, three relevant tax considerations arise:

- Will the CDO be subject to U.S. entity-level income tax?
- Will dividends and coupons on CDO investments be subject to U.S. withholding tax when they are remitted to the CDO?
- Will the CDO be subject to local taxes and local withholding?

With respect to entity-level U.S. income tax, a U.S.-domiciled CDO will organize itself as a partnership or a limited liability company to achieve flow-through tax treatment. International-based CDOs are operated in such a way as to qualify for either a statutory trading exemption from U.S. taxation or so that they will not be considered to be engaged in a U.S. trade or business. For example, they will be careful to purchase loans, not make loans to U.S. obligors. Other restrictions on the CDO's activities so as to avoid being engaged in a U.S. trade or business typically include: (1) no negotiation of loan terms; (2) cannot engaged in "origination" activities; (3) percentage limitations on the inclusion of revolvers and delayed draw-down loans; and (4) specific limitations if the portfolio manager or an affiliate originate loans. The issue of U.S. entity level income tax treatment is addressed by counsel's opinion at closing and disclosed in the offering memorandum. Counsel opinions assume ongoing compliance with the CDO's organizational documents.

Any U.S. withholding tax applied on payments to the CDO would be at a 30% rate, since the CDO entity is typically not resident in a tax treaty country. Such withholding tax would be wasted since the CDO, as discussed below, is not subject to foreign income tax and there is no ability by the CDO entity to recover the withholding tax as a tax credit. Withholding would greatly affect the ability of the CDO to pay its liabilities. Depending upon the CDO's asset composition, there may also be non-U.S. withholding tax issues. U.S. withholding tax treatment depends on the nature of CDO investments. The CDO is expected to avoid debt investments that do not qualify for the portfolio interest exemption and thus be subject to U.S. withholding tax. Generally, for qualifying debt instruments under the portfolio interest rule, there is no U.S. withholding tax on interest payments provided that appropriate documentation is given by the CDO to the paying agent of the CDO investment. A CDO may enter into credit default, interest rate or other swaps with U.S. counterparties. While swap payments received by the CDO will generally not be subject to U.S. withholding tax, it is possible that withholding could apply in limited cases. A CDO may also receive payments for consenting to amendments to credit agreements or indentures, and such payments may be subject to U.S. withholding tax. CDO offering memorandums typically address U.S. withholding tax issues and, if applicable, non-U.S. withholding issues.

¹¹ Our thanks to Andrew Chalnick and Lenny Zuckerman for this analysis.

Recently, the IRS, as part of its business plan for 2000, has opened a regulatory project to provide guidance on the portfolio interest exemption for payments to tax haven residents. It is supposed that this public signal is meant to spark better disclosure on the part of local tax authorities with respect to the activities of U.S. taxpayers in tax havens. The OECD has similar concerns. Developments in this area will need to be monitored to see what changes may be required to new or existing CDOs.

Local tax and withholding issues are the subject of negotiation between the CDO and the local taxing authority. The CDO usually receives certification from the local authority that it will have no or low taxes under current tax law and that changes in local tax law will not be effective upon the CDO. The certification usually covers local tax withholding also.

Equity Tranche Treatment

The tax treatment of U.S. CDO equity tranche holders in an offshore vehicle depends on the entity's tax classification and, if a corporate classification, whether it is a "controlled foreign corporation," or a "passive foreign investment company" and if the latter, whether or not the taxpayer has made a "qualified electing fund" election. For a domestic or foreign partnership or limited liability company CDO, the tax treatment of U.S. equity tranche holders is on a flow-through basis. The relevant issues for U.S. equity tranche holders relate to income timing and the characterization of income as either ordinary or capital gains.

Equity tranches should also determine whether they might experience phantom income, or taxable income without corresponding cash flow distribution. This could happen when, for example, CDO interests proceeds are used to pay down debt tranches or when gains from trading are reinvested in new assets.

Senior CDO debt securities are generally subject to the regular federal income tax rules governing conventional debt instruments. Under those rules, stated interest on senior notes is taxable as ordinary income as the interest is received or accrued, for cash and accrual method taxpayers, respectively.

The tax treatment of CDO mezzanine tranches may vary. In many circumstances it will not be entirely clear whether such tranches should be treated as debt or equity for U.S. federal income tax consequences. As interest on such securities is typically subject to deferral, holders may, if the securities are treated as debt, experience phantom income, or taxable income without corresponding cash flow distribution. If the securities are considered equity for U.S. tax purposes, the treatment of the interest will vary depending upon the CDO's tax classification and, if a corporate classification, whether the CDO is a controlled foreign corporation or a passive foreign investment company. If the CDO is a passive foreign investment company it may not be possible for a holder of a mezzanine tranche to make a protective "qualified electing fund" election, which could have adverse consequences to U.S. holders of such securities.

Offering memorandums will disclose relevant tax issues to tranche holders who should consult their tax advisors on general issues and their particular tax situation.

Glossary and Notes

Advance rate: In a market value CDO, the amount of tranche debt supportable by an asset type, expressed as a percent of the market value of the asset type. Varies according to the characteristics of the asset type and the desired rating of the tranche. Please see page 16.

Amortization period: The period, after the reinvestment or revolving period, in which new collateral purchases are not allowed and principal cash flow is used to pay down tranche principal.

Arbitrage CDO: A CDO whose purpose is to allow a money manager to expand assets under management and equity investors to achieve non-recourse leverage to CDO assets. There is no “arbitrage” in the classic sense of the word. Rather, equity holders hope to capture the difference between the after-default yield on the assets and the financing cost due debt tranches. Assets are purchased over a *warehousing* period before closing and a *ramp-up* period after closing. Arbitrage CDOs and repackagings are exceptions to the usual *balance sheet* purpose of *securitizations*. See page 5.

Asset manager: Party responsible for trading CDO assets. See page 27.

Balance sheet CDO: A CDO whose purpose is to allow a commercial bank or other entity to reduce their balance sheet or free up economic or regulatory capital. An existing portfolio (or the risk of the portfolio) is transferred to the CDO and the transferor usually purchases CDO equity. Compare to *Arbitrage CDO*. See page 5.

Bond insurance: An external guarantee of debt tranche performance from a financial guarantor insurance company. See page 28.

Cash flow CDO: A CDO where subordinated tranches are sized so that senior tranches can be paid from after-default cash flow with a high degree of confidence. If portfolio quality deteriorates, asset cash flow may be redirected from subordinated tranches to senior tranches. See page 18.

Collateral coverage tests: Cash flow CDO tests that divert cash flows from subordinated tranches, prevent reinvestment in new CDO assets, and cause senior tranches to be paid down. The two main collateral coverage tests are the *over-collateralization test* and the *interest coverage test*. Sometimes a ratings based test is also used. See page 19.

Collateral quality tests: Cash flow CDO tests that restrict portfolio trading. Tests may include objective measures of portfolio diversity, average rating, average life, prospective average recovery, and minimum weighted average coupon or spread. See page 21.

Collateralized bond obligation (CBO): A securitization of corporate bonds. Refers to the *special purpose vehicle* (SPV) that holds the asset portfolio and issues liabilities and also to the obligations the SPV issues. See the definition of *collateralized debt obligation*.

Collateralized debt obligation (CDO): A securitization of corporate bonds, bank loans, ABS, RMBS, CMBS, or almost any non-consumer obligation. Refers to the *special*

purpose vehicle (SPV) that holds the asset portfolio and issues liabilities and also to the obligations the SPV issues.

In the late 1980s, when high yield bonds were first securitized, two nomenclatures vied for supremacy. The alliterative “bonds-backed bonds” had the advantage of being descriptive and similar to the names of other securitizations like mortgage-backed securities and asset-backed securities. In contrast, “collateralized bond obligation” is off-target. It better describes a debt obligation secured by specific physical assets, like a mortgage bond secured by land and buildings or an equipment trust certificate secured by airplanes.

But high-yield bonds, or more pejoratively, junk bonds, carried a stigma. Meanwhile, collateralized *mortgage* obligations (CMOs) enjoyed acceptance and esteem due to their pristine credit quality and government agency affiliation. The CBO moniker borrowed the respectability and popularity of CMOs and won out in usage over the arguably better “BBBs.”

The CBO terminology also enabled a clever marketing analogy: “a CMO divides 30 years of first mortgage cash flows into maturity ranges that appeal to investors with different time horizons; a CBO divides the credit risk of a pool of high yield bonds into different classes that appeal to investors with different credit risk tolerances.”

Having settled on “CBO” for the securitization of high-yield bonds, it was natural for “collateralized loan obligation” to be used for the securitization of commercial loans. And when bonds and loans were mixed into the same vehicle, “collateralized debt obligation” described the conglomeration. Now, having trounced the upstart and unfortunate moniker “kitchen sink bonds,” “CDO” is also the firmly entrenched name for the securitization of emerging market corporates and sovereigns, and the middle tranches of ABS, RMBS, and CMBS securitizations.

Collateralized loan obligation (CLO): A securitization of bank loans, usually commercial and industrial loans. Refers to the *special purpose vehicle* (SPV) that holds the asset portfolio and issues liabilities and also to the obligations the SPV issues. See the definition of *collateralized debt obligation*.

Concentration tests: Addresses the presence in the portfolio of a single issuer, loan participations, non-U.S. obligors, triple-C credits, deferred interest instruments and the like. See page 21.

Credit default swap: A contract where one party pays a fee and the other party has the contingent obligation to make a payment if a referenced entity defaults. The structure incorporates flexibility with respect to the definition of default and the calculation of the default payment. See page 24.

Credit derivatives: A derivative whose underlying is a credit event or credit measure such as default, credit spread, or rating change of a referenced asset or obligor.

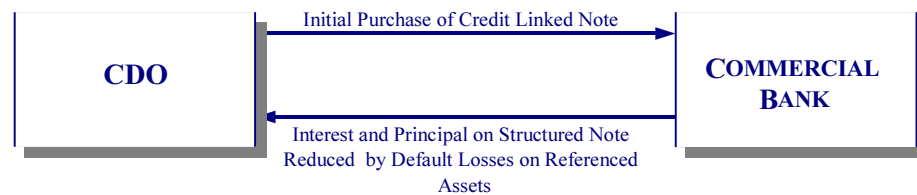
Credit impaired or improved assets: Designation used to determine flexibility in selling and reinvesting sale proceeds.

Credit-linked note: A note whose cash flow depends upon a credit event or credit measure of a referenced entity or asset such as default, credit spread, or rating change. See page 25.

A CDO might purchase a credit-linked note issued, for example, by a commercial bank that embeds the terms of a credit default swap. For each of the referenced loans that default, the principal of the credit-linked note is reduced. The bank has shed credit risk because what it might lose from the default of the loan it makes up through the diminishment of its obligation to the CDO under the credit-linked note. The CDO receives a coupon on the credit-linked note that compensates the CDO for the combined credit risk of the bank and the referenced loans. This was the method of Union Bank of Switzerland's Glacier transaction.

Chart xx

Synthetic CLO with Credit Linked Note



Source: JPMorgan.

Debt tranches: Tranches ranking in seniority above the equity tranche. See page 4.

Default correlation: The phenomenon that companies tend to default together. The state of the general economy or of specific industries affect companies and lead to correlated defaults. See page 18.

Default probability: The likelihood that an obligor or asset will default over a given time period. See page 18.

Default severity: The loss in the event default occurs. See page 18.

Disintermediation: The process of eliminating intermediaries between ultimate users of capital and ultimate providers of capital. It is brought about by better communication, transparency, and securitization technology. See definition of *securitization*.

Diversity score: Moody's index of a portfolio's diversity based on the insight that a number of correlated credits will exhibit the same return variance as a smaller number of uncorrelated credits. For example, ten credits in ten industries have a Moody's diversity score of ten while ten credits in the same industry have a diversity score of four. Besides industry diversity categories, Moody's has geographical diversity categories for emerging market obligors and asset categories for ABS and MBS assets.

Emerging market CBOs (EMCBOs): A securitization of bonds or bank loans from obligors domiciled in emerging markets. Refers to the *special purpose vehicle* (SPV) that holds

the asset portfolio and issues liabilities and also to the obligations the SPV issues. See the definition of *collateralized debt obligation*.

Equity tranche: The most subordinate tranche, regardless of whether the instrument is structured to look like equity or debt or issued in the legal form of equity or debt. Sometimes referred to as junior subordinate notes, preference shares or income notes. Please see page 4.

Fast pay/slow pay: The sharing of principal repayment among tranches simultaneously but with a bias to senior tranches. Not used much now. See page 19.

Final or legal maturity: While the exact amortization of CDOs is not known for cash flow CDOs because it depends on defaults and calls, the latest maturity date on the underlying CDO assets provides this outside limit.

Fraudulent conveyance: Under Section 548 of the U.S. Bankruptcy Code, a fraudulent conveyance can be found to occur if a transfer by a person of an interest in its property, made within one year of the commencement of a bankruptcy case with respect to such person, either (i) is made with an actual intent to hinder, defraud or delay such person's creditors or (ii) constitutes a "constructive fraud" on such person's creditors. A "constructive fraud" can be found to occur if the transferor receives less than "reasonably equivalent value" in exchange for the transfer and was insolvent at the time of (or became insolvent as a result of) such transfer, was engaged in a business for which its property remaining after the transfer constituted unreasonably small capital or intended to incur debts that would be beyond its ability to repay as they matured.

Interest coverage test: One of the collateral coverage tests that diverts cash flows from subordinate tranches, prevents reinvestment in new CDO assets, and causes senior tranches to be paid down. Please see page 20.

Lender liability: Lender liability is a collective reference to various evolving legal theories used to uphold the right of borrowers to sue lenders under certain circumstances. Generally, lender liability is founded on the premise that an institutional lender has violated a duty (whether implied or contractual) of good faith and fair dealing owed to the borrower or has assumed a degree of control over the borrower resulting in the creation of a fiduciary duty owed to the borrower or its other creditors or shareholders. See page 36.

Liquidity risk: An asset's price risk that is not related to fluctuations in its theoretical or intrinsic value but rather the ability of the seller to get a "fair" price. See page 17.

Market value CDO: A CDO where the haircut market value of assets is compared to tranche par and accrued interest. If there is not a superiority of the first quantity, the CDO's assets must be sold and tranches repaid in seniority until the prescribed ratio is achieved. See page 15.

Net worth test: A market value CDO test of the equity tranche value that, if breached, causes the CDO to sell its assets and retire debt tranches. See page 15.

Notional amount: The amount that interest rates or currency rates are multiplied by to calculate the cash flow of a derivative.

Open-market transaction: An arm's-length non-recourse sale of financial assets between unaffiliated entities in which the seller receives payment in full at the time of the sale and takes such payments in the form of cash, rather than in the form of the buyer's securities.

Origination CDO: A term coined in this paper and not in use. A CDO created to purchase assets specifically originated for it. See page 6.

Overcollateralization test or par value test: For a cash flow CDO, one of the collateral coverage tests that diverts cash flows from subordinated tranches, prevents reinvestment in new CDO assets, and causes senior tranches to be paid down. See page 23. For a market value CDO, the test that causes CDO assets to be sold to retire the senior-most tranche outstanding. See page 15.

Perfected security interest: A secured party's security interest in a financial asset is "perfected" once it has taken all the steps required under applicable law (*e.g.*, filing a UCC financing statement or taking possession of the asset) that affords the secured party maximum secured creditor protections in terms of being able to take the asset from or to the exclusion of third parties upon the debtor's default.

Preference: Under Section 547 of the U.S. Bankruptcy Code, a preference can be found to occur upon a transfer by a person of an interest in its property to a creditor, in respect of an antecedent debt owed by such person prior to the transfer, during the relevant "preference period" preceding the filing of a bankruptcy petition with respect to the debtor, if at the time of the transfer, such person was insolvent and if the effect of the transfer was to improve the position of the creditor at the expense of other similarly situated creditors. Under the U.S. Bankruptcy Code, the preference period is one year prior to the date of the bankrupt's petition filing if the creditor is an "insider" with respect to the bankrupt and otherwise 90 days prior the date of its petition filing.

Principal-protected note: A structuring and credit rating device to achieve a higher rating for an investment. A high yield instrument, such as an equity CDO tranche, is combined with a high credit quality zero coupon security, often a stripped Treasury bond. The rating agency limits their credit assessment solely to the cash flow supported by the zero coupon bond and is silent to the upside potential contributed by the more risky asset. Generally this is done when regulatory or capital requirements restrict or penalize the purchase of the two assets separately.

Priority in bankruptcy: The intended seniority of claimants in bankruptcy which can be partially overthrown, especially in the U.S., by the bankruptcy judge's powers of equitable distribution and the negotiating power of subordinated investors. See page 19.

Priority in cash flow timing: The credit protection afforded senior tranches relative to subordinated tranches in a cash flow CDO by the redirection of cash flows to pay

down debt tranches via the operation of the waterfall and collateral coverage tests.
See page 19.

Priority of payments, or “waterfall”: The schedule that determines distribution of interest and principal proceeds to cash flow CDO tranches taking into account *collateral coverage tests*. See page 20.

Pro-rata distribution: The distribution of principal repayment to tranches simultaneously.
See page 19.

Ramp up: Period after CDO closing in which assets are purchased. Associated with arbitrage rather than balance sheet CDOs. See page 6.

Recovery amount: The market value of the asset after it defaults or the present value of all after-default cash flows See page 18.

Referenced asset or obligor: The asset or obligor whose performance determines cash flows in a total return or credit default swap. See page 24.

Reinvestment or revolving period: In a cash flow CDO, the period in which principal proceeds can be reinvested in new assets so long as *collateral coverage tests* are met.

Repackagings: CDO-like structures with one liability tranche and one asset are called repackagings. In such a structure, an interest rate swap or a currency rate swap changes the cash flow characteristics of the asset into the cash flow characteristics of the liability. The swap might transform the currency of the underlying asset, or a fixed rate coupon into floating, or even a zero coupon into a current pay coupon. This structure is employed when, for perhaps regulatory or credit reasons, the investor cannot enter into the transactions separately.

Securitization: The process and the result of pooling financial assets together and issuing liability and equity obligations backed by the pool of assets. The entity that issues the obligations and purchases the assets is generically called a special purpose vehicle (SPV) or Special Purpose Entity (SPE). The SPV is set up solely for the purpose of the securitization and might be a trust, limited liability company, partnership or a corporation. The obligations of the SPV are typically tranching into multiple classes with different maturities and seniorities.

First mortgages on residential property were the first asset class to be securitized, beginning with a Ginnie Mae sponsored transaction in 1970. Today, first mortgages are still the most prevalent securitization. But since the mid-1980s almost every other imaginable type of consumer debt has also been securitized: credit card, auto, boat, second mortgages, home equity lines, manufactured housing, RV, student loans, time share payments, and even property tax liens.

Non-consumer assets that have been securitized include: equipment leases, mortgages on commercial property, small business loans, franchise payments, loans for taxi-cab medallions, and even the future royalty stream on record and CD airplay and sales, playfully called “Bowie Bonds” after the first recording artist to be so securitized. Securitization goes hand-in-hand with the *disintermediation* of commercial banks,

finance companies, and other traditional holders of credit assets. Over the last two decades, many of these institutions have gradually transformed themselves from originators, servicers, and *holders* of credit assets to originators, servicers, and *distributors* of credit assets. The result is that the chain between ultimate borrower and ultimate lender has shortened as these links have fallen out.

The success of CDOs, particularly of commercial loan-backed CDOs, is analogous to the disintermediation of consumer credit.

Sequential principal paydown or sequential pay: Repayment of principal to tranches in order of seniority. See page 19.

Set-off: The term “set-off,” when used in connection with a loan in respect of which a lender has sold a participation interest, refers to the borrower’s reduction, in connection with the lender’s insolvency, of amounts payable under the loan to the lender by amounts owed by the lender to the borrower in respect of unrelated obligations (e.g., deposits of the borrower held by the lender). See page 36.

Special purpose vehicle (SPV) or special purpose entity (SPE): See definition of *securitization*.

Structured note: A note, which, for example, embeds a total return or credit default swap and whose cash flows depend on some referenced asset or obligor. See page 25.

Substantive consolidation: Substantive consolidation is the principle of law under which a bankruptcy court, in the exercise of its equitable powers, will consolidate the assets and liabilities of separate, but related, entities so that their combined assets and liabilities will be treated as those of one, single entity. See page 35.

Synthetic CDO or CLO or CBO: A CDO that gains exposure to credit-risky assets via derivative transactions rather than cash purchase of the assets. See page 24.

Total return swap: A derivative whose underlying is the total return of a referenced asset, i.e., all coupons plus appreciation/depreciation.

Tranched: Set in a senior or subordinate position relative to one another. See page 4.

True sale: A transfer of financial assets that, for purposes of U.S. bankruptcy or insolvency laws, constitutes a sale of such assets, rather than a transfer of the assets as collateral in connection with a secured financing in which the transferor is the debtor and the transferee is the secured creditor. See page 34.

Warehousing: The purchase of assets before a CDO closes. See page 6.

Waterfall or priority of payments: The schedule that determines distribution of interest and principal proceeds to cash flow CDO tranches taking into account collateral coverage tests. See page 20.

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Asset Managers and Sellers since 1987

ABN AMRO	Bankgesellschaft Berlin	Conning
Aeltus	Banque Arjil	Conseco
AIG	Banque Indosuez	Credit Agricole
AIMCO	Barclays	Credit Lyonnais
Alliance	BEA	Credit Suisse
Allmerica	Beacon Hill	Cypress Tree
American Express	Bear Stearns	David L. Babson/Mass Mutual
American General	BHF	Deerfield
American Money Management	Black Diamond	Delaware Investment Advisors
Angelo Gordon	BlackRock	Deltec
Antares Capital Corp	BNP	Deutsche
ANZ	Bone, Smith & Bard	Dilmun
Ares	Brinson Partners, Inc.	DKB
Asahi Bank	Cargill	Dresdner
Asset Allocation & Management	Carillon	Duff & Phelps
Atlantic Asset	Carlson	DWS Finanz-Service
Axa	Carlyle	Eaton Vance
Bahrain International Bank	Caywood	Elliot and Page
Banca Commerciale Italiana	CDC	Enron
Banca di Roma	Centre Pacific	Equitable
Banco Bilbao Vizcaya Argentaria	Cerberus	Export Import Bank of Korea
Banco De Credito Local de Espana	CGA	Falcon Asset Management
Bank Austria	Chancellor	Federated
Bank of America	Chartwell	Financial Management Advisors
Bank of Montreal	Chase	First Dominion (CSFB)
Bank of Nova Scotia	CIBC	First Exective
Bank of Tokyo-Mitsubishi	CIGNA	First Source Financial
Bank One	Citigroup	First Union
BankBoston	Clinton	Fisher, Francis, Trees & Watts
	Colonial	
	Commonwealth Bank of Australia	
	Connecticut Mutual Life	

Asset Managers and Sellers since 1987 (Continued)

FIT GP	MassMutual	Summit
Fleming Investment	MBIA	Sun Capital
Forstmann-Leff	Merrill Lynch	SunAmerica
Fort Washington	Metropolitan Life	T. Rowe Price
Fortress	MFS	TCW
Fountain	Morley Fund	Tennenbaum
Franklin	Muzinich	TimesSquare
Fuji	Natexis Banques Populaires	Trainer Wortham
Gen Re	New England	Transamerica
Ghent	Nicholas Applegate	Triton
Gleacher	Nomura	Triumph
GLX	Northwestern	UBS
Goldman Sachs	Oak Hill	United Overseas Bank
Grouperment des Industries Agricoles	Octagon	Van Kampen
Gulf International Bank	Orix	W.R. Huff
HarbourView	Overseas Union	Wafra
Harch	Peterson	Wellington
Highland	Phoenix	Wells Fargo
HSBC	Pilgrim	Westdeutsche Landesbank
HypoVereinsbank	PIMCO	Zais Group
IBJ	PPM America	
IDM	Principal	
IKB Deutsche Industriebank	Prospect Street	
Income Partners	Provident	
ING	Prudential	
Intermediate Capital	Putnam	
International Finance Corp	Rabobank	
INVESCO	Rand Merchant Bank	
J&W Seligman	Robeco	
JH Whitney	Royal Bank of Scotland	
John Hancock	Sakura	
Jordan	Sankaty (Bain)	
JP Morgan	Santander	
Kohlberg & Co	Sanwa	
KBC Bank	Saudi International Bank	
KDPCM, LLC	SBC	
Kidder, Peabody	Scudder Kemper	
Korea Asset Management	Seneca	
Lehman Brothers	Shenkman	
Lexam	Societe Generale	
LibertyView	Stanfield	
Long Term Credit Bank of Japan	Stein Roe & Farnham	
Madison Park	Sterling	
Preferred Funding	Strong	
	Structured Credit Partners	
	Structured Finance Advisors	
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