

Synthetic CMBS Primer

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5 September 2006

I. Introduction

Synthetic CMBS are tools for harnessing and exploiting commercial mortgage and real estate expertise. They can be viewed as lenses through which an investor can focus and amplify his ability to act based on his analysis of opportunities in the commercial mortgage loan and CMBS markets. Using synthetic CMBS, an investor can gain leverage for aggressive speculation or apply sophisticated hedging strategies to manage risk.¹

Synthetic CMBS encompass a wide range of products and facilitate a wide range of strategies. An example of a basic synthetic CMBS is a credit default swap (CDS) that references an actual CMBS class.² This type of synthetic CMBS allows an investor to take exposure to a CMBS class that may be unavailable in cash form because others own it. This type also permits increased investment leverage through unfunded transactions, where an investor can assume the risk of owning a CMBS without paying-in principal at the inception of the trade (*i.e.*, the investor "sells protection" on the credit risk of the CMBS). This type of synthetic CMBS also facilitates "shorting" by allowing an investor to buy protection. With shorting, an investor can pursue long-short strategies that call for holding combinations of long and short positions in correlated credit exposures.

¹ The term "synthetic" is both vague and severely overused in finance. Synthetic products often are derivative contracts designed to mimic cash instruments. For example, a total return swap (TRS) on a security can be viewed as a synthetic form of a security because it mimics the economics of holding the actual security. However, the term "synthetic" sometimes applies to products that have no closely analogous cash counterpart. Additionally, in the CMBS context, market participants sometimes use the term synthetic in describing the CMBX indices. Whetten, M. and J. Manzi, *The CMBX: the Future is Here*, Nomura fixed income research (23 Mar 2006).

² Whetten, M., M. Adelson, and M. van Bemmelen, *Credit Default Swap (CDS) Primer*, Nomura fixed income research (12 May 2004).

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Another example of synthetic CMBS – but one that had not actually occurred yet – is a derivative contract that references commercial mortgage loans held by third parties but for which information is readily available (e.g., from Trepp LLC). This kind of trade allows an investor to create a customized synthetic pool, representing exposures to loans that may have been included in different CMBS deals in the past. The actual loans may have been originated over a span of many years by different lenders. Such a trade permits an investor to artificially construct a pool of credit exposures that might be impossible to obtain in cash form.³

A third example of synthetic CMBS – and one that is more elaborate still – is a multi-layered derivative in the form of a synthetic, resecuritization of CMBS. Such a structure resembles a static, synthetic CDO that references CMBS or other commercial real estate assets.⁴ The resecuritization layer (i.e., the synthetic CDO structure) does not actually own its underlying reference credits. Rather, it is a derivative contract that refers to them. Moreover, the underlying reference credits themselves may be synthetic. A synthetic CMBS resecuritization allows an investor to customize the pool of reference obligations to which he takes exposure and also to fine-tune the leverage on that exposure. One way for an investor to gain leverage is to use mezzanine and subordinate CMBS tranches as the underlying reference credits. The investor then further fine-tunes leverage by choosing the attachment and detachment points for his tranche in the resecuritization structure.

On the whole, synthetic CMBS are powerful tools for real estate professionals. Like some other kinds of credit derivatives, they are both complex and powerful. Using them wisely requires detailed knowledge of their features as well as a high level of expertise in commercial real estate and CMBS.

In this paper, we begin by discussing certain aspects of traditional cash CMBS, such as investment characteristics, basic loan and deal features, how to assess relative value within different transactions, what types of commercial properties serve as the underlying collateral for these deals, etc. With these sections of the report (sections II – VI), we hope to provide the reader with a basic understanding of the cash CMBS market as well as some basic (and a few "advanced") tools to analyze a cash CMBS transaction. In the second part of the paper (sections VII - IX), we advance to the synthetic CMBS sector. There, we address documentation on single-name and portfolio-type synthetic CMBS transactions, and we offer our opinions on how to analyze the unique risks and possible returns within certain types of synthetic re-securitizations. To illustrate our analysis, we constructed two sample deals which are similar to transactions already in the market. In contrast to the first part of the paper, which is geared mainly towards the traditional CDO and derivative investors rather than cash CMBS investors, the second part of the paper is intended for the entire audience of structured finance professionals.

II. Investment Characteristics of Traditional (Cash) CMBS

Commercial mortgage-backed securities or "CMBS" are a type of fixed income investment. They can be appealing to investors because they offer high credit quality, a reasonable degree of credit stability, cash flow stability, and low spread volatility. CMBS are backed by commercial mortgage loans. That is, the underlying mortgage loans are secured by commercial, rather than residential, real estate. In contrast to residential mortgage loans, most commercial mortgage loans in the U.S. do not allow for unrestricted prepayments by the borrowers. Accordingly, a key distinction between CMBS and residential MBS is that CMBS embody little or no "prepayment" risk.⁵

³ Jacob, D., M. Adelson, and J. Manzi, *Boosting Geographic Diversification of Bank Commercial Mortgage Loan Portfolios*, Nomura fixed income research (1 August 2006)

⁴ Whetten, M. and M. Adelson, *"The Bespoke [bispók]" – A Guide to Single-Tranche Synthetic CDOs*, Nomura fixed income research (17 Nov 2004); M. Whetten and J. Manzi, *The Evolution of Commercial Real Estate (CRE) CDOs*, Nomura fixed income research (4 Jan 2006).

⁵ Some recent CMBS deals have included loans that permit early prepayment, but the total amount of such loans in the market remains negligible.

A typical CMBS is a "pass-through" security that represents partial ownership of an underlying pool of commercial mortgage loans. An investor who owns the CMBS is entitled to receive collections of interest and principal on the loans. In CMBS jargon, the payments on the loans are "passed-through" to the investors. However, a small portion of the interest collections is not passed-through. Instead, it is used to cover expenses of the deal. Thus, a CMBS has a "pass-through rate," which is the *net* rate at which investors receive interest on the balance of the mortgage loans backing the security.

Unlike Treasury securities or regular corporate bonds, a typical CMBS is an amortizing security. That is, a typical CMBS returns principal to investors incrementally during its life. Monthly distributions to investors ordinarily include both interest and principal. Accordingly, for purposes of pricing CMBS, market participants frequently use a security's weighted-average life or WAL⁶ instead of its final maturity.

Every CMBS has at least one "servicer." A servicer is a company that collects payments from borrowers and handles the administrative task of aggregating the collected funds and transmitting the funds to a deal's trustee for distribution to investors. Naturally, the servicer receives a fee for its services. In most CMBS, the fees to the servicer consume all or nearly all of the difference between the interest rate on the mortgage loans and the pass-through rate on the security. Many CMBS have more than one servicer. In such a case, a "primary servicer" handles routine servicing functions and a "special servicer" takes over on loans that become seriously delinquent.

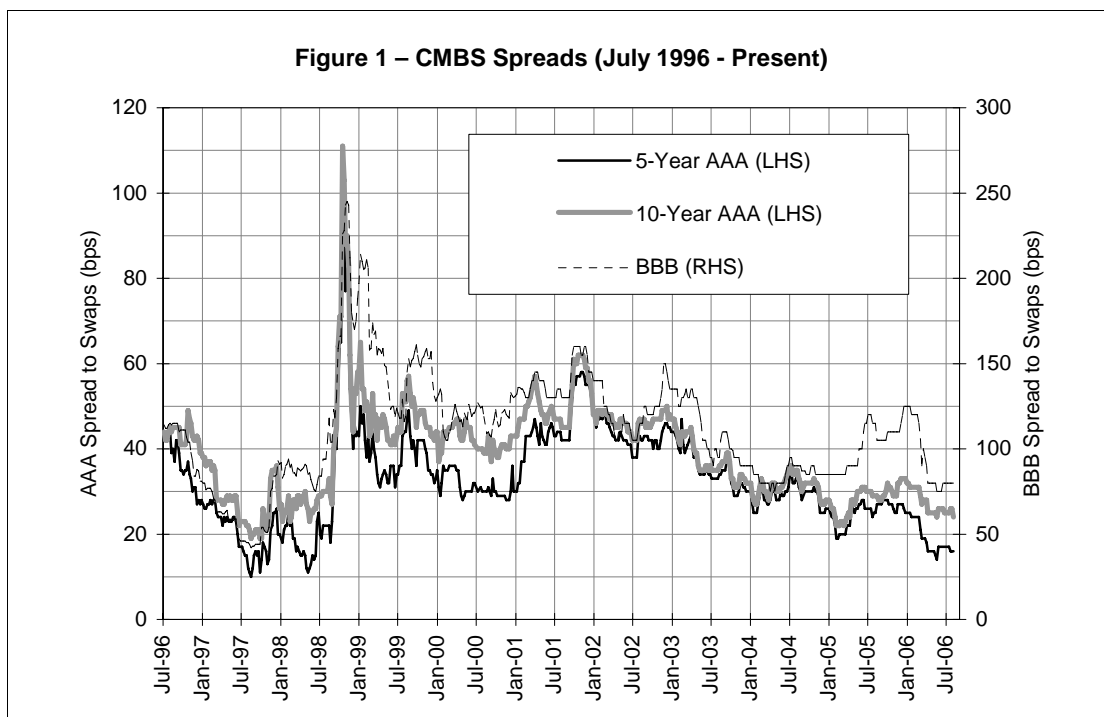
Unlike most residential MBS, most CMBS do **not** carry guarantees from the U.S. government or from government sponsored entities (GSEs).⁷ Accordingly, a typical CMBS transaction uses "credit tranching" as a form of credit enhancement to counterbalance the risk of defaults and losses on the underlying loans. Credit tranching creates multiple classes (or "tranches") of securities, each of which has a different seniority relative to the others.⁸ Senior classes receive protection from junior classes that bear amplified exposure to credit risk. Rating agencies measure the credit strength of a transaction's different tranches and assign ratings accordingly. In a typical CMBS deal, around 85% to 88% of the issued securities can attain ratings at the triple-A level from Moody's and S&P.

For the past few years, spreads for triple-A-rated CMBS tranches with 5-year weighted-average lives have tended to fluctuate between 15 and 30 basis points above swaps, and recently have been around the lower end of that range. Spreads on triple-A-rated CMBS tranches with 10-year weighted-average lives have tended to fluctuate between 25 and 35 basis points above swaps. Spreads on lower rated tranches, such as triple-Bs, have ranged from swaps plus 75 to swaps plus 160 over the last 5 years (and currently stand at the lower end of that range).

⁶ The weighted-average life of a security is the weighted-average time to the return of principal on a security. In calculating a security's WAL, each payment date is expressed as the interval (in years) between the time of calculation and the payment date. Each interval is weighted by the estimated or projected amount of principal that will be distributed on the corresponding payment date.

⁷ A small portion of all CMBS – consisting exclusively of deals backed by loans on multifamily properties (*i.e.*, apartment buildings) – carry guarantees from the federal government or GSEs.

⁸ The word tranche comes from the French word for slice. In CMBS, the terms "tranche" and "class" are synonymous.

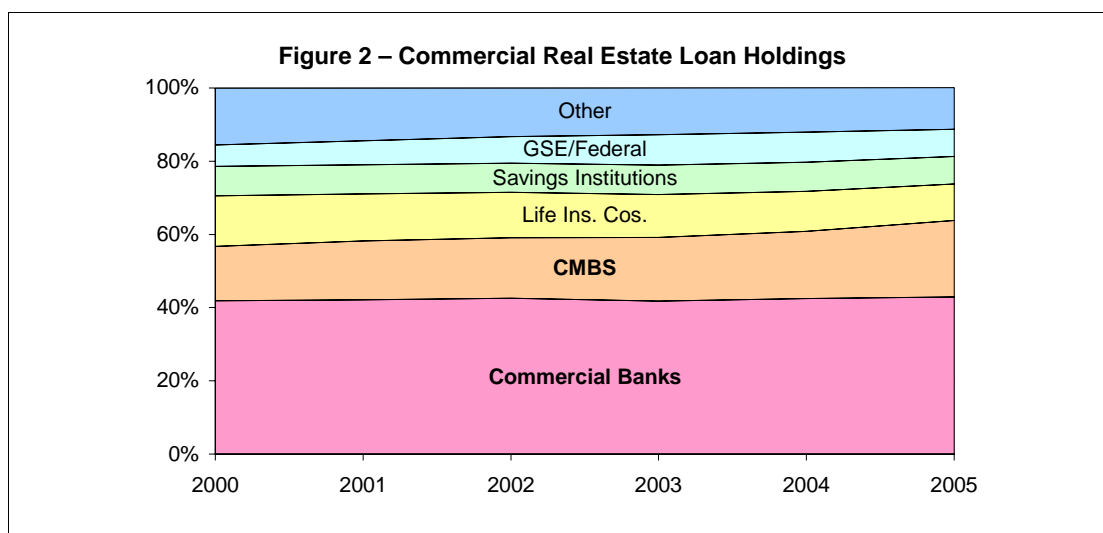


Finally, a major distinction between CMBS and RMBS deals is the role of the buyers of the junior (non-investment grade) bond classes. In a CMBS, no deal is done without first finding the buyers for the junior classes. The potential buyers first review the proposed pool, and may 'kick out' loans that they do not like. This provides an extra layer of security for the senior buyers, particularly because the buyers of the junior classes tend to be real estate experts. For their extra credit work, the junior buyers generally seek yields in the range of 10% to 15%, or more.

III. CMBS Market in Context

CMBS are an important feature on the landscape of the U.S. capital markets. U.S. CMBS issuance was roughly \$169 billion during 2005. At the end of 2005, total outstanding U.S. CMBS stood at roughly \$574 billion, comprising about 2.27% of the \$25.3 trillion U.S. bond market.

CMBS provide an important source of funding for commercial mortgage loans in the U.S. Total commercial mortgage loans in the U.S. were roughly \$2.72 trillion at the end of 2005. Outstanding CMBS (\$574 billion) funded approximately 21% of that amount (Figure 2).



Source: Federal Reserve, Nomura

The \$2.72 trillion of commercial mortgage loans provided financing for roughly \$3.9 trillion of commercial real estate. *Unencumbered* commercial real estate in the U.S. had a value of slightly more than \$4 trillion, as of the end of 2005. Thus, the aggregate value of all commercial real estate in the U.S. is in the area of \$8 trillion (not counting government real estate worth around \$6 trillion). For comparison, the value of all U.S. residential real estate was roughly \$17.2 trillion at the end of 2004, while the value of the U.S. stock market was around \$15 trillion at the same time.

IV. Basic Commercial Loan & CMBS Deal Features

A. Typical Loan Features

The most typical commercial mortgage is a non-recourse, fixed-rate loan with a 7-10 year balloon payment, although shorter maturity loans, such as 5-year balloons, have gained popularity as well. A typical loan provides for partial amortization prior to the balloon date on a schedule corresponding to full amortization over a period of 25 to 30 years. Another recent trend, due to the overwhelming amount of capital available in the market and competition among lenders, is an increase in loans with interest-only (IO) periods, sometimes for the entire term of the loan (to the balloon date). Almost three-fourths of the loans securitized to create CMBS in 2006 had at least a partial IO period. Since these loans do not amortize during the IO period, their inclusion in CMBS pools increases the risk that a borrower will not be able to make the balloon payment. Negatively amortizing loans are rare (except with construction loans). Additionally, there have been loans where the amortization rate is accelerated as well as some loans with payment schedules designed to match lease payments.

B. Cash Flow

Cash flows arising from a typical commercial mortgage include monthly interest, principal, and possibly prepayment penalties, and default or extension penalties. CMBS deals have mechanisms to allocate all such cash flows to the respective bond classes. Loans in CMBS deals have ranged in size from just about \$1 million to several hundred million dollars. As for the deals themselves, almost all recently issued, fixed rate deals have combined large loans and small loans and are typically referred to as "conduit/fusion deals." Looking at the deals issued thus far in 2006, an average loan pool encompassed 185 individual loans (including some multi-property loans) totaling \$2.37 billion.

Most commercial mortgages are fixed rate, although there are floating-rate mortgages as well. Generally, fixed- and floating-rate mortgages are not mixed in the same pool. To the extent that there is a great disparity in the interest rates among the loans in a pool, the weighted-average coupon (WAC) can vary considerably over time. The difference in coupon at the inception of the deal can

arise due to the loans having been originated over time as interest rates have changed, or due to varying degrees of risk of the loans. Over the life of the deal, even more dispersion can occur. This is true even if the amortization or principal occurs as expected. It gets more complicated if there are unanticipated principal pay downs due either to prepayments, defaults, or extensions.

C. CMBS Bond Structure

CMBS use subordination for credit enhancement. Figure 3 below shows the typical structure of a 2006 conduit/fusion transaction.

Figure 3 – Typical Conduit/Fusion Deal (JPMCC 2006-LDP6)							
Class	Size (\$MM)	Rating	Credit Support (%)	Average Life (yrs)	Coupon	Principal Window (Months from Issue)	Notes
A1	59.9	Aaa	30.00	3.01	5.160	1-58	super duper senior
A2	155.9	Aaa	30.00	4.90	5.379	59-61	super duper senior
A3B	55.7	Aaa	30.00	7.14	5.559	81-96	super duper senior
A3FL	100.0	Aaa	30.00	6.71	L+16	81-81	floating rate
A4	819.3	Aaa	30.00	9.85	5.475	110-120	super duper senior
ASB	103.7	Aaa	30.00	7.08	5.490	58–110	amortization bond
A1A	205.0	Aaa	30.00	8.28	5.471	1-120	multifamily carve-out
AM	214.2	Aaa	20.00	9.96	5.525	120-120	mez. super senior
AJ	163.3	Aaa	12.38	9.96	5.565	120-120	junior triple-A
B	48.2	Aa2	10.13	10.02	5.702	>120	
C	18.7	Aa3	9.25	10.04	5.722	>120	
D	34.8	A2	7.63	10.04	5.775	>120	
E	21.4	A3	6.63	10.04	5.775	>120	
F	29.5	Baa1	5.25	10.04	5.775	>120	
G	21.4	Baa2	4.25	10.04	5.775	>120	
H	21.4	Baa3	3.25	10.04	5.775	>120	
J	10.7	Ba1	2.75	10.04	5.155	>120	"B" Piece
K	10.7	Ba2	2.25	10.04	5.155	>120	
L	5.4	Ba3	2.00	10.04	5.155	>120	
M	5.4	B1	1.75	10.04	5.155	>120	
N	5.4	B2	1.50	10.04	5.155	>120	
P	8.0	B3	1.13	10.11	5.155	>120	
NR	24.1	NR	0.00	12.53	5.155	>120	
X1 (Comp)	2,142.1*	Aaa	N/A	8.58	0.040		
X2 (PAC)	2,096.7*	Aaa	N/A	5.53	0.255		IO class

* signifies notional balance

Source: Bloomberg, Nomura Securities International

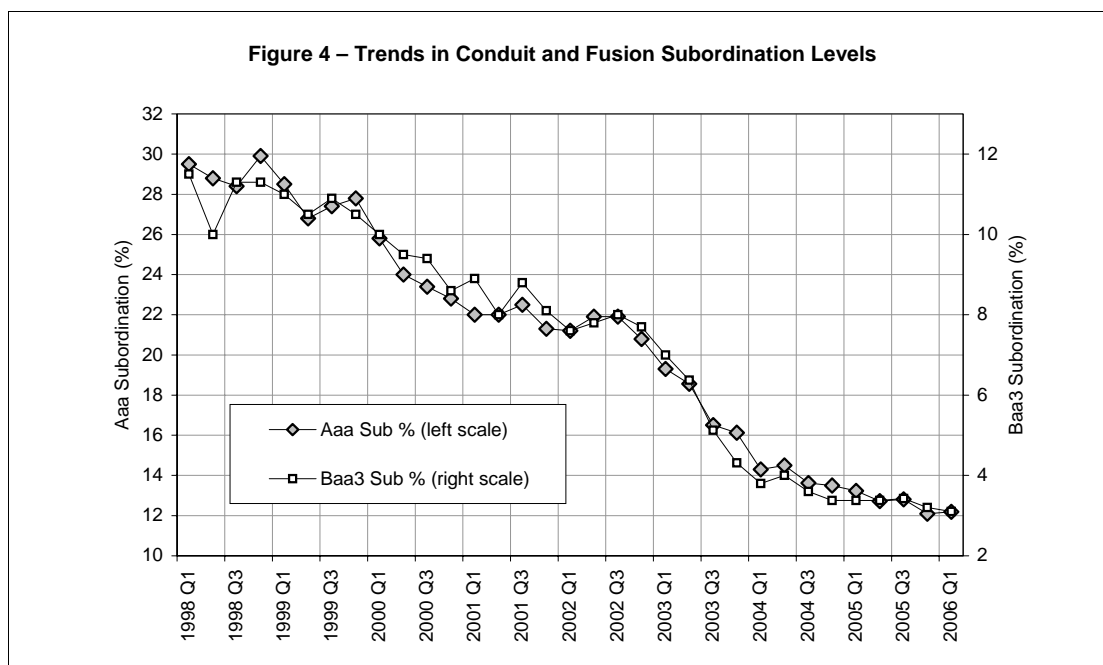
The senior-subordinate structure creates senior and junior interests in the underlying asset pool. In Figure 3, each tranche, from AM down to NR, provides protection to (*i.e.*, is subordinate to) each other tranche listed above it and receives protection from (*i.e.*, is senior to) each other tranche listed below it. The structure requires that all principal payments, both scheduled and from recoveries on defaulted loans, be used to retire the most senior outstanding bond. In addition, the structure allocates losses to the most junior outstanding classes. In a typical deal, most of the bond classes

have fixed coupons, but the IO classes⁹ (X1 and X2) and a few of the bonds near the bottom of the capital structure are weighted-average coupon (WAC) bonds.¹⁰

The A1A Class: The practice of "carving-out" a multifamily tranche started in approximately 1998, and still happens in selected deals today. The collateral is split into two groups, and a AAA-rated bond is created that is primarily backed by 100% multifamily loans.¹¹ Freddie Mac and Fannie Mae are the only known buyers of this tranche, and the bond is created to conform to the investment rules specified in their charters.

1. Super-Senior & Super-Duper Senior Bonds

Due to the superior credit performance of CMBS over the past ten years, the rating agencies have steadily lowered subordination levels (Figure 4).



Source: Moody's, Commercial Mortgage Alert, Nomura

However, some investors believe that the credit enhancement levels have dropped too low. In response to investor worries about falling subordination levels in CMBS conduit/fusion deals, dealers started to break up the triple-A rated class into super-senior, "mezzanine," and "junior parts. In the structure shown in Figure 3, classes A1, A2, A3B, A3FL, A4, ASB, and A1A have 30% credit support from subordination and are called "Super Duper Seniors." Class AM is the mezzanine triple-A-rated

⁹ Interest-only (IO) classes are created in order to avoid having to issue bonds at prices above par. Without IO classes or some other structure, the senior bonds would be priced above par, because the yields on these investment grade bonds are substantially below the coupons of the loans in the pool. One could strip interest off of the loans and create a pool strip. This will reduce the premium price of the bonds. Alternatively, interest can be stripped off of the bond classes to create bond classes with prices as close to par as desired. The latter method is the one almost exclusively (if not always) used in current deals. Also, IO classes can be sequential or pay simultaneously with certain priorities (the so called "PAC IO/Companion" structure).

¹⁰ Essentially, a WAC bond pays a varying coupon over time, based on the weighted-average interest rate of the loans in the pool. As the balances on the loans change, their relative weightings change, which results in a changing coupon on the WAC bond. The creation of WAC bonds generally is necessary (for a greater number/amount of bonds on the capital structure) when rates increase sharply during the aggregation/accumulation phase of CMBS deals.

¹¹ Because of its position on the capital structure, if there are defaults in the multifamily loans, generally the bond will get cash from other property types as well, so the name "multifamily carve-out" can be slightly misleading. Also, if other property types default, cash may be taken from the "multifamily carve-out" to help make other AAA-rated bonds whole.

tranche. It has 20% credit enhancement from subordination and is called the "Super-Senior" class. Class AJ is the junior triple-A-rated tranche and has approximately 12.4% credit enhancement. With this structure, investors who are worried about future CMBS credit performance (for example, the effects of another prolonged real estate recession like that of the early 90s) can buy bonds with more protection. Those who are comfortable with the current triple-A subordination levels and the added extension risk (relative to the super duper seniors), can invest in the mezzanine or junior triple-A classes, and receive a small amount of incremental compensation in the form of a slightly wider spread on their bonds.

D. CMBS Relative Value

1. Drivers of CMBS Spreads

CMBS spread levels are highly dependent on the balance of supply and demand within the sector, as well as spreads on competing investments, such as residential MBS and corporate bonds. Bonds from seasoned deals may trade with varying spreads depending on the credit performance of the underlying collateral. Information on the CMBS market has become readily available to investors, contributing greatly to the market's strong liquidity. Organizations such as Trepp, Intex, and Bloomberg collect extensive data on the secondary market while publications such as Commercial Mortgage Alert provide updates on issuance as well as information on the "pipeline" of upcoming deals (as far as three months ahead). All other things being equal, when the market is flooded with new deals or when the pipeline projects heavy issuance, spreads tend to widen. On the other hand, at times when there is a lull in issuance and investors do not have many deals to choose from, spreads generally tighten. Movements in spreads of other investment products, namely corporate bonds and residential MBS, also tend to drive CMBS spreads. This is true predominantly for the top of the capital structure (classes rated single-A or higher) as investors may cross over between these products in search of higher yield.

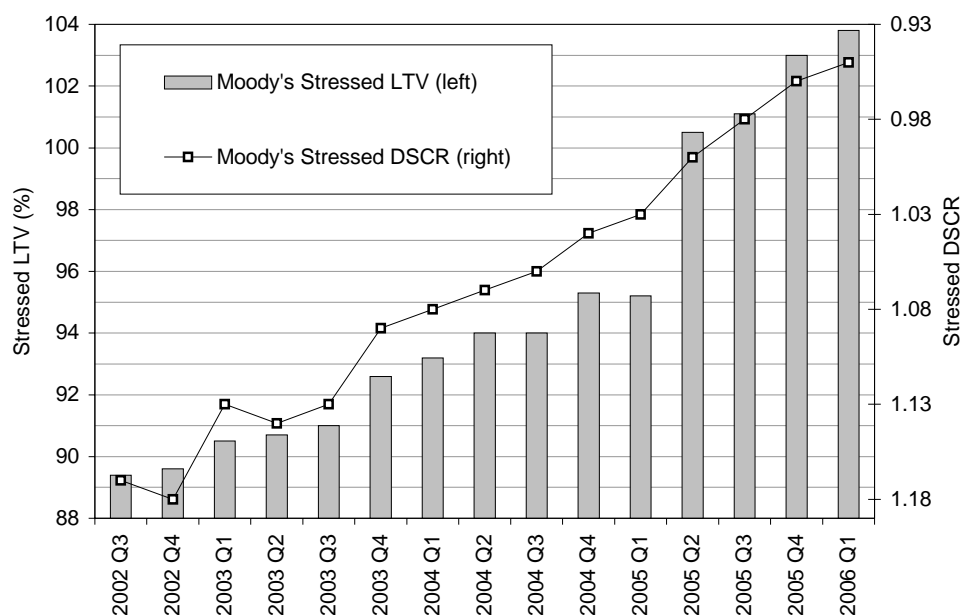
2. Deal Selection

With similar vintage deals generally pricing within a few basis points of each other at the top of the capital structure and offering similar credit enhancement levels, how do investors decide which deal or tranche to buy? Thanks to the increasing transparency of the CMBS market, investors willing to carefully scrutinize deals have access to extensive information, such as rating agency pre-sale reports. Naturally, investors who buy riskier tranches (*i.e.*, lower in the capital structure) typically spend far more time analyzing a collateral pool than those who invest in the senior triple-A-rated tranches that have 30% credit support. Some deal features to focus on include:

- **Stressed Loan-To-Value Ratio (LTV) & Debt Service Coverage Ratio (DSCR):** Each rating agency calculates a "stressed" loan to value (LTV) for each deal that it rates using its own definition of sustainable cash flow and "consistent" capitalization rates.¹² This is useful in discerning how aggressive or conservative the loan originator's underwriting may have been even if the reported LTVs are all around 70-75%. As shown in Figure 5, conduit loans in recent CMBS deals have somewhat weaker credit characteristics than loans in older deals.

¹² A "capitalization rate" or "cap rate" is the discount rate applied to the projected income from a property for purposes of estimating the property's value. A lower cap rate produces a higher estimate of value while a higher cap rate produces a lower estimate of value.

Figure 5 – Moody's Stressed LTV and DSCR for Conduit Portion of Rated Deals



Source: Moody's

- IO Loans:** Partial-term IO loans composed roughly 48% of the deals issued in the first half of 2006 while full-term IOs accounted for 23% of the new issuance. An IO loan presents greater risk than an amortizing loan because the full original principal amount of the loan is due on the balloon date – there is no amortization during the life of the loan to reduce the balloon risk. In a deal, the greater share of IO loans, the greater the exposure to balloon risk.
- Top 10:** Many investors are wary of "lumpy" deals, where several big loans make up a significant portion of the pool. The inherent risk of such deals is that the deterioration of just a few large loans can jeopardize the entire deal. In a typical conduit/fusion deal, the top 10 loans make up approximately 40% of the underlying pool.
- Property Mix:** As the real estate market undergoes cycles, different property types tend to encounter difficult periods. In recent years, the multi-family sector suffered high delinquency rates and its portion of CMBS deals withered, from 22.9% in 2002 to 14.9% in the first half of 2006. Currently the retail sector is feeling a pinch from rising energy costs and interest rates. We recommend caution in deals that are heavily anchored in a property type that appears to be headed for slumps. Also, deals with concentrations of collateral in economically booming metropolitan areas (MSAs) are likely to perform better than those backed by properties in more troubled regions.

V. Risk Characteristics of Commercial Real Estate Collateral

A. Property Types

During 2005 and 2006, the "big 5" property types — office, retail, multifamily, industrial, and hotels — made up roughly 95% of conduit/fusion CMBS pools on a weighted average basis.¹³ While the performance of the individual property types are interrelated and subject to "macro" risk variables

¹³ The remaining 5% are Self Storage, Mixed Use, Manufactured Housing/Mobile Homes, and a few others.

such as interest rates and inflation, each sector also has certain idiosyncratic risks. For example, job growth, outsourcing, and the growth of "telecommuting" are factors usually associated with office properties, while high levels of consumer spending and disposable income, in part due to home price appreciation, were recently linked with strength in the retail and lodging sectors. Typically, to judge the health of a particular market and property type combination, CMBS professionals look at recent trends in supply (completions/construction), demand (absorption), effective rent (property income), and vacancy (occupancy).

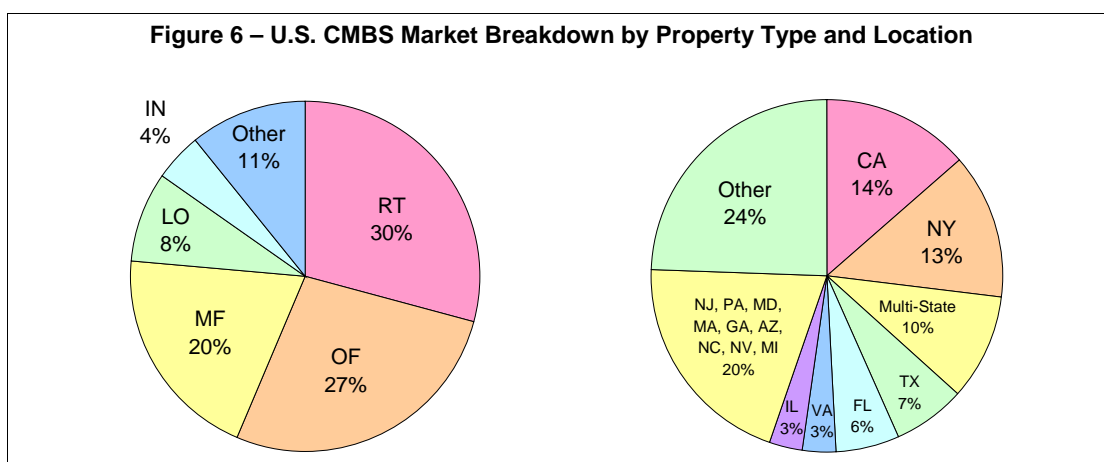
In addition, trends in capitalization rates,¹⁴ and the recent levels of sales/transactions (both number and dollar value) may be used in conjunction with the previously mentioned "fundamentals" to measure property values, and whether they are forecasted to appreciate or depreciate.

B. Diversification

One of the main advantages to investing in conduit/fusion CMBS is the diversity of the collateral pools. As noted above, during 2006 (thus far), the pool backing an average deal contains 185 separate loans, several of which may be multi-property loans. Additionally, there are typically seven or eight different property types represented in a transaction, though office, multifamily, and retail make up the lion's share of the collateral (generally around 80%). While this "concentration" may seem worrisome at first, several rating agency loss and default studies have shown that loss severities in the "core" property types (multifamily, retail, industrial, and office) tend to be lower than those of "non-core" property types. In addition, there are several other types and measures of diversity related to CMBS transactions.

1. Geography

Diversification by geography protects against downturns in specific real estate markets, and the fact that different markets may be at different phases of their real estate "cycles" at the same time. A typical CMBS transaction contains loans from most of the 50 states, with about 75% of the collateral located in the top 50 Metropolitan Statistical Areas by population (about 55-60% in the top 25 MSAs). Thus, it should come as no surprise that roughly 25% of the domestic CMBS market is made up of loans secured by properties in New York and California (Figure 6).



Source: Trepp

While this apparent lack of diversity may seem to be a cause for concern – as with the concentration in a limited number of property types – based on historical performance, it is also likely a benefit to investors. Rating agency studies have shown that defaulted loans in smaller secondary and tertiary markets generally experience higher loss severities than defaulted loans in larger, primary markets.

¹⁴ See note 10.

We believe that the amount of available land on which to build is one of the primary reasons for this phenomenon.

2. Measurement & Analysis of Diversification

In addition to geographic and property type diversity, the rating agencies (and the rest of the market) typically utilize Moody's Herfindahl score and the "top 10" percentage to measure the concentration risk (by loan balance) in a collateral pool. Moody's Herfindahl score measures a pool's lumpiness and is calculated as

$$\text{Herfindahl_score} = \frac{1}{\sum_{i=1}^N (p_i / P)^2}$$

where n is the number of assets, p_i is the principal balance of each asset, and P is the aggregate principal balance. "100" is considered a credit-neutral score, while scores, on average, have ranged between 40 and 140 over the past seven years (they currently stand at 60 for pools issued during 2006Q2). Concentration measures are of particular interest to buyers at the lower end of the capital structure, as lower-rated tranches in transactions with "lumpy" collateral are more exposed to the default of a relatively smaller number of large loans.

C. Prepayments

One crucial difference between residential and commercial mortgages, which tends to give CMBS securities better cash flow stability and positive convexity, is strict rules regarding prepayments. Most commercial mortgages prohibit or severely limit voluntary prepayments through a lock-out period, combined with defeasance and yield maintenance provisions. In other words, if the loan does not contain a lock-out feature, it will likely have features designed to discourage the borrower from making a prepayment and to compensate the lender in the event of a prepayment. Often, the prohibitions are for the majority of the life of a loan, with a small "open" period lasting three to six months before the balloon date. The short open period is designed to give the borrower the opportunity to re-finance the balloon. By far, the most common feature discouraging prepayment in recent loans is defeasance. About 95% to 98% of the balance of recent collateral pools contain defeasance provisions – with a small percentage of yield maintenance provisions present in the remainder. The two prepayment "deterrents" contain important differences regarding the amount and timing of the cash flows.

1. Defeasance

Under the defeasance approach, the borrower is required to purchase U.S. Treasury securities whose cash flows equal or exceed the remaining payments of the mortgage loan. In this case, the cash flow to securities backed the loan remains identical to what it would have been without the defeasance. As stated before, defeasance has become the most popular form of prepayment protection because of the virtual elimination of credit risk that it affords the investor, and the simplicity of the structure. Also attractive to lenders is the fact that the cost of defeasance to the borrower is, on average, quite high – which strongly discourages prepayments.

2. Yield Maintenance

The concept of yield maintenance is to make the lender indifferent to the prepayment of a loan with a cash "premium" equal to the future value of the loan's cash flows. Unlike defeasance, yield maintenance provisions require a one-time, lump-sum, cash payment, rather than replication of the cash flows of the mortgage loan. As such, issues may arise over the correct discount rate to be applied in calculating the lump-sum payment. Additionally, each deal's structure dictates the allocation rules regarding the "penalty" cash flows. The allocation of these penalties among the bond classes can vary considerably between deals. The specifics of the allocation can have a significant impact on the performance of the different bond classes. In a multi-class deal, while the penalty still

serves as a deterrent to the borrower prepaying, it may not be sufficient to fully compensate all of the bonds within the transaction.

VI. Structural Nuances of CMBS¹⁵

A. ARD Loans

In the mid-1990s a variation to the balloon loan was developed, known as an ARD (anticipated repayment date) loan. The anticipated repayment date is similar in many respects to a balloon date, except for one important difference. Failure to fully repay principal on a loan's balloon date is an event of default. In contrast, failure to retire a loan on its anticipated repayment date is not an event of default. The borrower could keep on paying scheduled principal and interest after the anticipated repayment date. However, in order to motivate the borrower to pay-off the loan on the anticipated repayment date, the loan's interest rate would rise sharply and all excess cash flow (above the debt service, insurance, taxes, funding of reserves, etc.) would be applied to pay down principal (a situation known as "hyper-amortization"). From a credit perspective, the ARD feature alleviated the pressure caused by the required balloon payment, with some protection against interest-related balloon extension. Lately, some of these protections against non-payment at the anticipated repayment date have been relaxed, but a full discussion is beyond the scope of this paper.¹⁶

B. Appraisal Reduction

When a loan meets certain criteria for being troubled, such as being delinquent for 120 days or experiencing foreclosure of its collateral (*i.e.*, becoming REO or "real estate owned"), it may trigger an "appraisal reduction event" within a CMBS transaction. In such a case, the principal balance of the first loss class(es) is written-down in anticipation of a future loss, effectively re-allocating the interest cash flow to the senior-most tranche. Thus, the senior bond-holders are better protected against a scenario where a troubled property undergoes a long, drawn-out, workout before the loan can be fully resolved.¹⁷

Appraisal reductions are interesting from the standpoint of derivatives. An appraisal reduction is an actual writedown of a security. The use of appraisal reductions in the CMBS sector arguably eliminates the need for "implied writedowns" as used in the standard documentation of CDS on CMBS.

C. Servicing & Conflicts of Interest

The responsibilities of the servicer and special servicer in a CMBS deal are as follows. The servicer is responsible for supervising the regular cash flow aspects of the loan. It keeps track of the reserves, the insurance payments, the tax payments, and similar items. The servicer is also responsible for

¹⁵ We attempt to cover just the highlights here. For a more detailed explanation of CMBS bond structuring, see Jacob, D, J. Manzi, and F. Fabozzi, *The Impact of Structuring on CMBS Bond Class Performance*, THE HANDBOOK OF MORTGAGE-BACKED SECURITIES: (6th Ed., F. Fabozzi ed.) (2006).

¹⁶ For further detail, see: Jacob, D. and Manzi, J., *CMBS Credit Protection and Underwriting Standards: Have They Declined too Far?*, J. OF PORTFOLIO MGT. (2005 Special Real Estate Issue).

¹⁷ Some deals are exceptions. In a recent case, a portfolio of properties backing a loan was underperforming, and subsequently, was sent to special servicing. The special servicers believed that the best way to maximize the net present value of the collateral was to sell off the properties one by one. But, the deal was structured so that the principal balance of the loan wouldn't be written down until all of the properties were sold. This led to a somewhat surprising result. While it was clear that the loss from this loan would wipe out the balance of several classes near the bottom of the capital structure, these classes continued to receive interest payments (covering any shortfalls, save for the most subordinate class) while the properties were being sold (which could take months, even years). The excess cash from the sales, after the shortfalls were covered, was paid through the top of the waterfall, as would be expected. However, the senior bondholders were still put in a disadvantage, as money that arguably "should" not have been paid to the lower classes was paid due to a structuring anomaly. Note that a case like this would generally be considered the exception, and not the rule.

advancing principal and interest through foreclosure of a loan, for as long as it deems the advances "recoverable." A loan is moved to the special servicer only when the borrower is in default, imminent default, or in violation of covenants. The special servicer is charged with the responsibility of working-out the loan. Ideally, the special servicer can restore the loan to performing status. The special servicer has the authority to take the loan through the foreclosure process and is supposed to be guided by the principle of maximizing the present value of proceeds from the property. Sometimes, however, conflicts of interest can arise because the special servicer is often the owner of the junior (first-loss) classes.

Consider a potential balloon default as an example, where the special servicer can choose between extending the loan, or foreclosing and selling the property. From a credit perspective, the senior class usually views an extension as an adverse event (unless there is little or no subordination left) because the real estate collateral could continue to deteriorate and thereby lessen the proceeds at a subsequent foreclosure. On the other hand, from a rate-of-return perspective, the senior bondholder could be better off with the extension in a falling interest rate environment. Conversely, an extension in a rising rate environment would negatively impact the performance of the senior bondholder. All else equal, we think loan extensions are more likely in a rising-rate environment.

In contrast to a senior bondholder, a junior bondholder may prefer an extension. If the property value has deteriorated to the point where foreclosure proceeds would be less than the loan balance (plus unpaid interest), the junior class would surely suffer a loss. In this case the junior bondholder would prefer that the borrower be granted an extension, to keep the loan cash-flowing. On the other hand, if the property value in foreclosure is large enough to fully pay the junior class, the junior bondholder would likely align himself with the senior bondholder to push for foreclosure as quickly as possible. One would not expect the latter situation to occur often because if foreclosure proceeds would be sufficient permit a full recovery for both senior and junior bondholders, the borrower might do better to sell the property and pay off the loan.

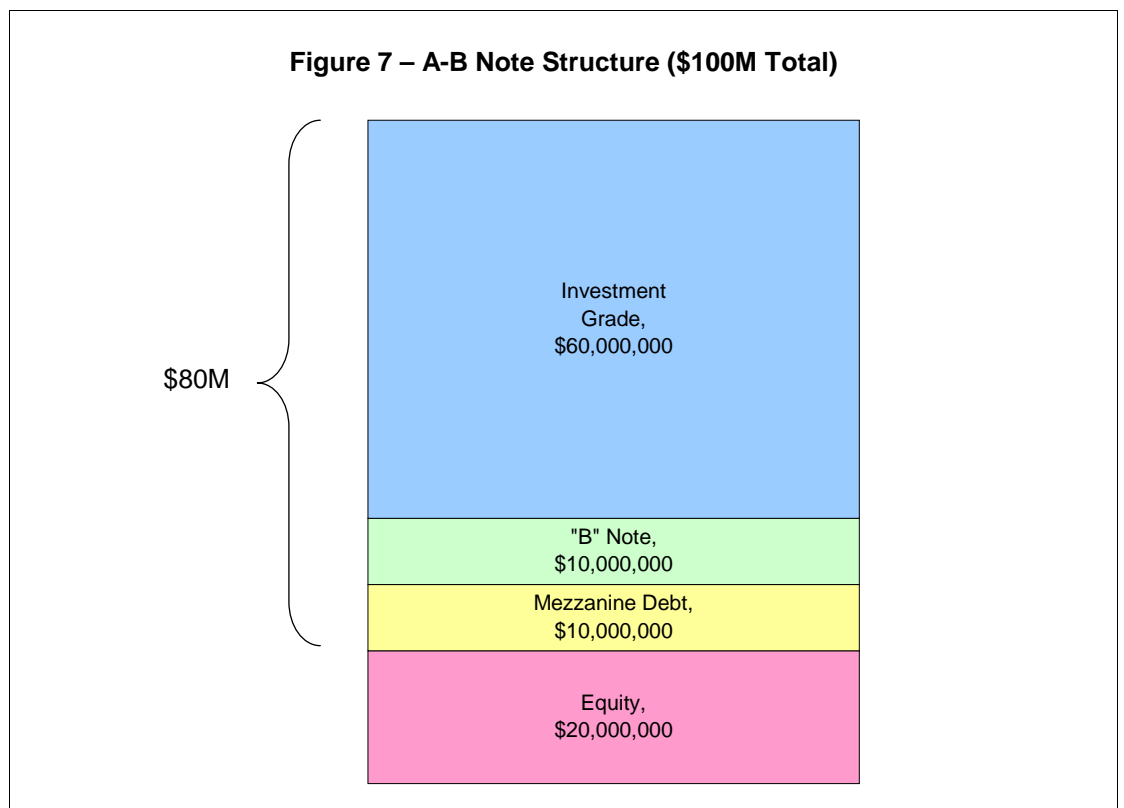
D. Interest Shortfalls & Recovery of Advances

As noted above, if a securitized commercial mortgage defaults during its term, the servicer is required to advance principal and interest through foreclosure, provided that it deems the advances to be recoverable. This enhances the timeliness of distributions to holders of the securities even when there are interruptions in the inflow of property income. The servicer is compensated with interest on these advances and is first in line to recover his advances upon the liquidation of the property. In the case of a prolonged foreclosure, where the servicer continues to advance principal and interest, the proceeds from a sale may not be enough to fully compensate the servicer for his advances, plus interest. The result can be an interest shortfall to the bonds in a deal. Interest shortfalls on subordinate tranches are reasonably common. Interest shortfalls have occurred on CMBS tranches rated triple-A, though such events are very rare.¹⁸

E. A/B Notes & Mezzanine Loans

A CMBS loan may be divided into senior and junior interests. Figure 7 illustrates a generic \$100 million dollar property financed with (1) a \$60 million dollar investment grade "A-Note," (2) a \$10 million dollar "B-Note," (3) 10 million dollars in mezzanine debt, and (4) \$20 million dollars in hard equity. Typically, only the A-Note will be included within a conduit/fusion deal. The B-Note ordinarily would not be included in a CMBS trust. However, we have seen cases where both an A-Note and its related B-Note are securitized within the same CMBS transaction. Recently, B-Notes and mezzanine debt have been popular collateral types for inclusion within commercial real estate (CRE) CDOs.

¹⁸ Adelson, M. and J. Manzi, *CMBS Credit Migrations 2005 Update*, Nomura fixed income research (30 Nov 2005).



In the event of default, the B-Note holder's right to principal and interest payments is subordinate to the rights of the holder of the A-Note. Also, the A-note holder will generally have greater, if not exclusive, control over any bankruptcy proceedings dealing with the workout of a troubled loan. Typically, for the B-note holder to obtain greater control over the workout of a troubled loan, he will have to exercise the option usually granted the B-Note holder of buying out the A-Note holder's participation in the loan, at par plus accrued interest. Other important rights that the B-Note holder may have include:

- The right to hire and fire the special servicer
- The right to cure defaults in order to keep the senior lender from foreclosing (usually, there is a limit to the number of times this right can be exercised)
- Approval rights associated with the property budgets, leases, and property managers

A mezzanine loan is not secured by a lien on the related property. Instead it is a pledge of stock in the special purpose entity that owns the property and that is the borrower on the A-Note and on the B-Note. In effect, the mezzanine lender is subordinate to the first-mortgage (the A-Note and the B-Note) and senior to the hard equity holder. If the mezzanine loan gets into trouble, the holder cannot foreclose on the property directly. Rather, the mezzanine debt holder can foreclose on the equity interest of the first mortgage borrower, in effect, taking over the borrowing entity, and therefore controlling the property in question.

F. Additional Debt

A common feature of older loans is a prohibition on additional debt against the real estate after the inception of the loan. This is important because adding extra debt can immediately raise the leverage against the property and increase the debt service burden. Many recent commercial mortgage loans permit borrowers to take additional debt. It is now quite common to see CMBS deals in which as much as 40% (or more!) of the underlying loan pool (by principal balance) allows additional debt. Although most such loans require mitigating factors – the loan must meet certain tests, such as maintaining a specified combined DSCR and combined LTV ratio – this is still a worrisome trend.

VII. The "Synthetic" Side of Synthetic CMBS

Single-name CDS on CMBS: A credit default swap (CDS) on a single CMBS tranche is reasonably straightforward. ISDA, the International Swaps & Derivatives Association, supplies model documentation for CDS on CMBS.¹⁹ The ISDA documentation includes several samples of alternative language specifically tailored for CMBS. In a typical application, the parties to a CDS on CMBS would select the following options in the standard form:

Interest shortfall cap:	applicable
WAC cap interest provision:	applicable
Step-up provisions:	not applicable
Interest shortfall cap basis:	fixed

This choice of options gives the protection buyer limited protection for interest shortfalls other than ones that occur because of WAC caps in the underlying reference CMBS. Significantly, reimbursements of servicing advances have been a notable cause of interest shortfalls in CMBS deals and the protection buyer receives limited protection for those shortfalls. The maximum protection that the buyer can receive in any period is the amount of the premium payment under the CDS during that period (*i.e.*, the fixed cap).

A CDS-CMBS transaction between a Wall Street firm and its customers generally would use the ISDA form of documentation with few, if any, alterations. In contrast, CDS-CMBS transactions between Wall Street firms are more likely to have customized provisions negotiated by the parties. For example, a customized transaction might delete the normal provisions allowing physical settlement at the option of the protection buyer. In all cases, parties to a CDS should closely scrutinize the documentation to identify and fully understand any variations from the standard ISDA form.

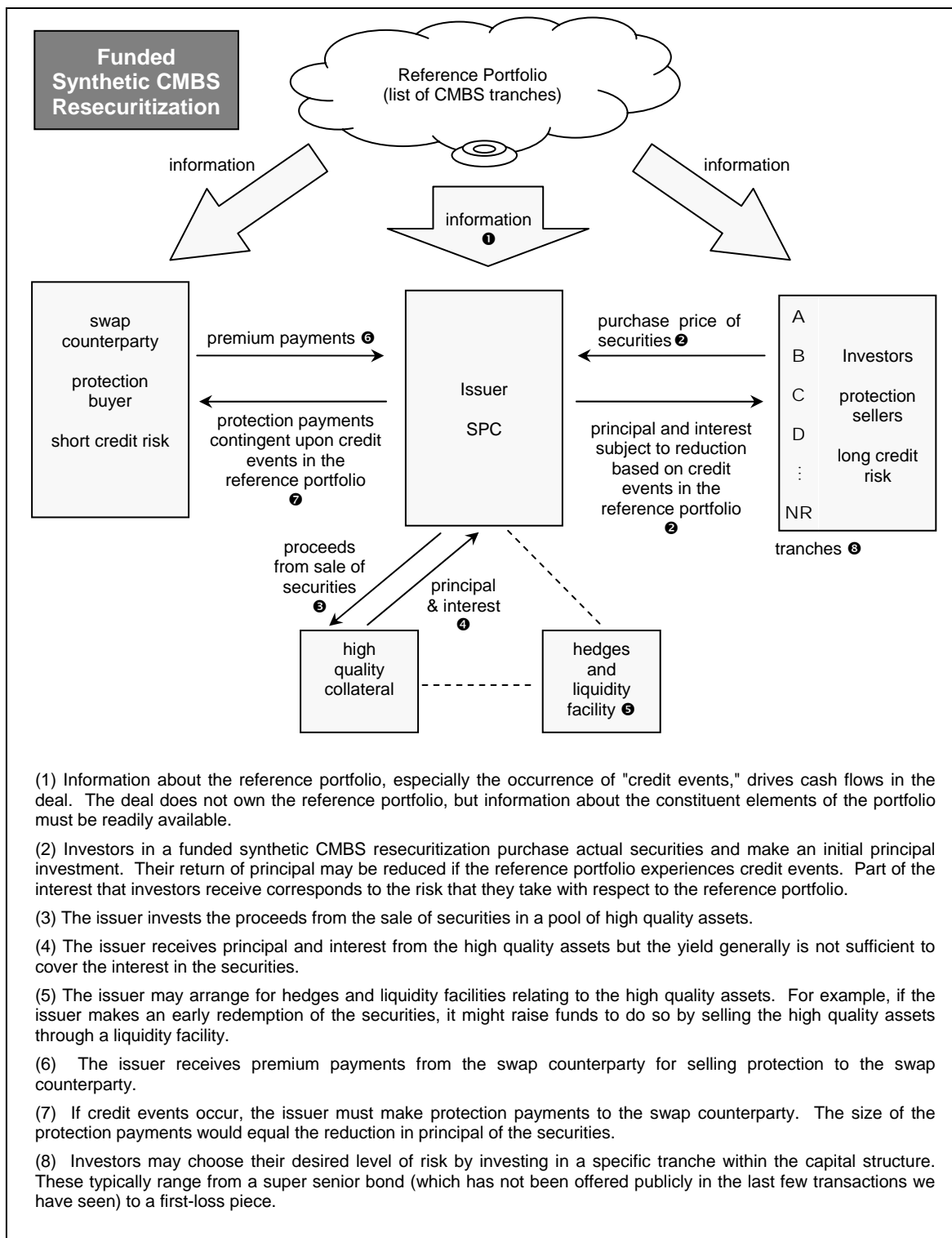
Synthetic CMBS Resecuritization: A synthetic CMBS resecuritization is essentially a synthetic CDO that references a static pool of CMBS. In such a deal, the underlying portfolio is synthetic. That is, the deal does not actually own the subject CMBS, rather it "refers" to them through one or more derivative arrangements similar to CDS. The main risk that investors take in a synthetic CMBS resecuritization is through its "reference portfolio." For investors in the deal, the occurrence of a credit event (*e.g.*, a failure to pay principal) under any CMBS in the reference portfolio essentially has the same effect as if the deal had purchased a bond that subsequently defaulted.

Like most structured financings, a typical synthetic CMBS resecuritization uses credit tranching to create multiple classes of exposure to the underlying reference pool. Each class has different relative seniority to the others and is defined by an "attachment point" and a "detachment point." The attachment point denotes the level of losses – expressed in percentage terms – at which a tranche would suffer its first dollar of loss. The detachment point for a tranche denotes the level of losses on the reference pool at which the tranche will be completely wiped-out. For example, suppose a tranche has an attachment point of 3% and a detachment point of 5%. Suppose further that that reference portfolio has a notional balance of \$1 billion. The tranche would be unaffected until losses on the reference portfolio reach \$30 million (*i.e.*, 3% of \$1 billion). Beyond that amount, that tranche would lose a dollar for each dollar of loss on the reference portfolio. If losses on the reference portfolio reach the detachment point of \$50 million (*i.e.*, 5% of \$1 billion), the tranche would be wiped-out.

A synthetic CMBS resecuritization can be executed in either funded or unfunded forms. In the funded form, investors purchase actual notes and receive interest payments. The interest payments can be

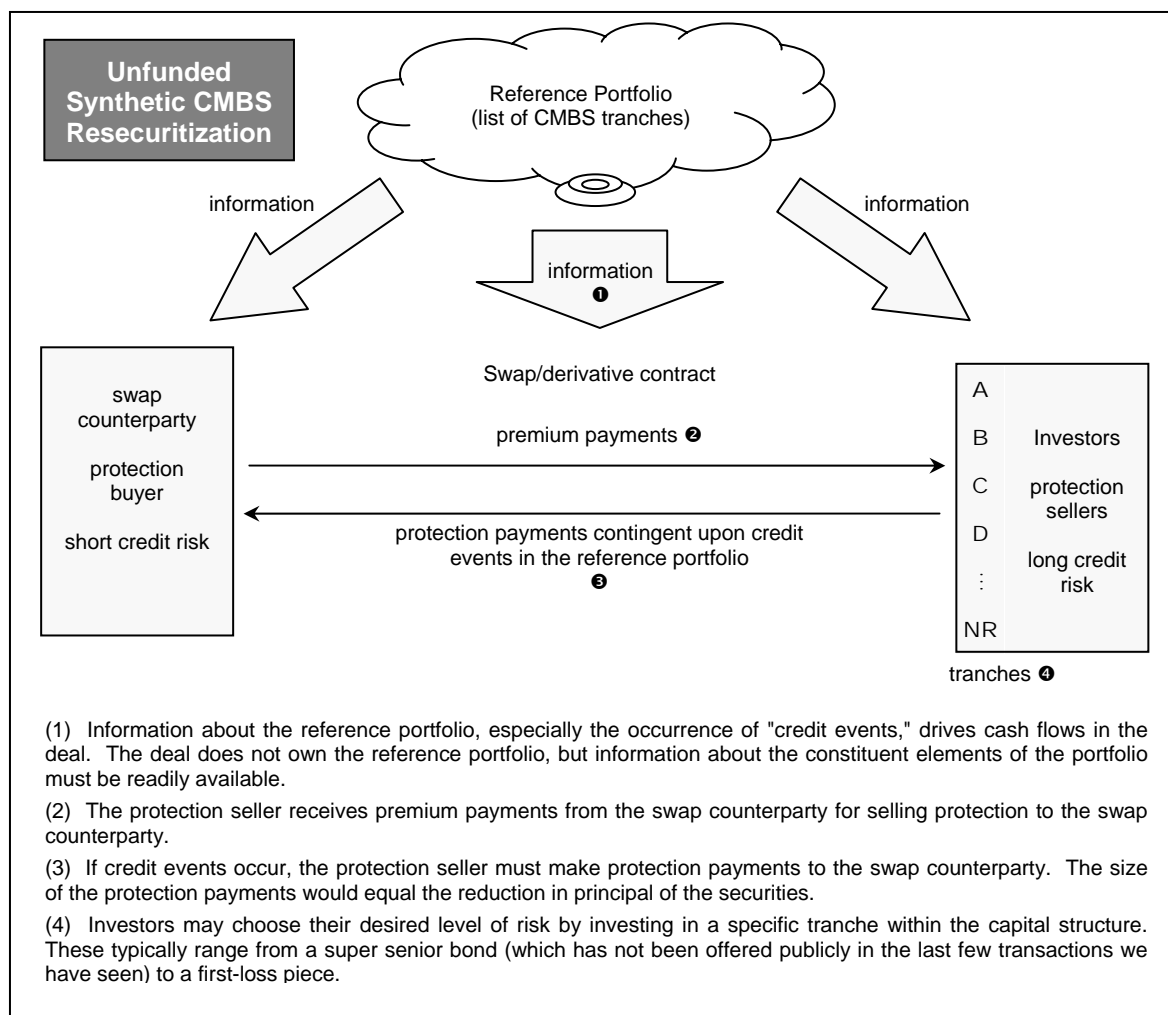
¹⁹ International Swaps & Derivatives Association, *Form of Confirmation for Credit Derivative Transaction on Mortgage-Backed Security with Pay-As-You-Go or Physical Settlement (Form I) (Dealer Form)* (11 Apr 2006) (<http://www.isda.org/publications/docs/ISDADealerForm1supercedes.doc>).

viewed as consisting of two parts: (1) a "riskless" return on the invested principal (e.g., LIBOR) and (2) a spread corresponding to the premium for taking credit risk on the reference portfolio. Losses allocated to an investor's tranche reduce the principal of his note.



In the unfunded form, an investor (the seller of protection) does not deliver principal at the inception of the trade. Rather, the investor promises to make protection payments if losses are allocated to his tranche in the future. Because the unfunded investor does not deliver principal, the periodic payment that he receives consists solely of a premium for taking risk. Thus, if a funded investor would receive

LIBOR plus 65 bps on a given tranche, an unfunded investor in the same tranche (*i.e.*, a tranche defined by the same attachment and detachment points) likely would receive simply 65 bps.



Documentation for synthetic CMBS resecuritizations is not standardized. Adapting the documentation for a single-name CDS on CMBS to a synthetic CMBS resecuritization requires the addition of two major concepts and the deletion of one. Documentation for a resecuritization must include both (1) a reference portfolio consisting of multiple reference obligations and (2) tranching of credit risk within the structure of the deal. Conversely, a synthetic CMBS resecuritization generally would *not* provide for physical settlement at the option of the protection buyer. Therefore, it is impractical to approach the documentation for a synthetic CMBS resecuritization as though it is simply an adaptation of the standard ISDA documents for CDS. Instead, an investor must pick through a deal's documentation line by line to extract all the relevant details.

In our view, familiarity with derivatives documentation can help an investor a lot in assessing a synthetic CMBS resecuritization. The documentation for such deals is intricate and complicated, and can be a minefield for inexperienced investors.

VIII. Typical Synthetic Deal Structures and Analysis

During the past six to nine months, several dealers have issued synthetic CMBS resecuritizations that reference pools of CMBS at varying levels of credit quality ranging from subordinate CMBS tranches rated double-B through senior tranches rated triple-A with credit enhancement of 30%. We have observed synthetic CMBS resecuritizations that have reference portfolios composed of 30 to 80

CMBS securities with aggregate notional balances between a few hundred million and a few billion dollars. Most of the deals have a call provision that allows the issuer to call particular tranches between three and five years after the closing date. Some deals issue full capital structures, creating and issuing an aggregate amount of securities that roughly equals the full notional balance of the reference pool. Other deals issue only selected tranches in a manner similar to a synthetic, single-tranche CDO.

To illustrate common deal structures in the market, we created two sample issues, one backed by subordinate CMBS classes and the other backed by triple-A-rated classes. In the first case, the reference portfolio comprises tranches rated either triple-B or triple-B-minus from 60 CMBS transactions. In the second case, the reference portfolio comprises triple-A-rated "AJ" tranches from 50 CMBS transactions.²⁰ Figures 8 and 9 below illustrate the capital structure of the two sample issues.

Figure 8: Sample Deal with Reference Portfolio of Triple-B and Triple-B-Minus Subordinate Tranches

Class	Estimated Rating	Balance (\$mm)	Credit Enhancement	Attachment Point	Detachment Point	Approx. Spread	Breakeven CDR
SS	AAA	\$337.5	44.00%	44.00%	100.00%	10	1.8
A	AAA	\$120.5	24.00%	24.00%	44.00%	35	1.5
B	AA+	\$38.4	17.63%	17.63%	24.00%	40	1.4
C	AA	\$8.3	16.25%	16.25%	17.63%	45	1.4
D	AA-	\$9.0	14.75%	14.75%	16.25%	50	1.3
E	A+	\$9.0	13.25%	13.25%	14.75%	65	1.3
F	A	\$9.0	11.75%	11.75%	13.25%	70	1.3
G	A-	\$6.0	10.75%	10.75%	11.75%	80	1.3
H	BBB+	\$9.0	9.25%	9.25%	10.75%	130	1.3
J	BBB	\$7.5	8.00%	8.00%	9.25%	160	1.3
K	BBB-	\$8.1	6.65%	6.65%	8.00%	190	1.2
L	BB+	\$7.5	5.40%	5.40%	6.65%	300	1.2
M	BB	\$6.0	4.40%	4.40%	5.40%	400	1.2
N	BB-	\$4.5	3.65%	3.65%	4.40%	500	1.2
P	B+	\$3.9	3.00%	3.00%	3.65%	600	1.1
Q	B	\$4.5	2.25%	2.25%	3.00%	700	1.1
R	B-	\$1.5	2.00%	2.00%	2.25%	850	1.1
NR	NR	\$12.0	0.00%	0.00%	2.00%	1000	1.0

Note: Estimated ratings are expressed using the S&P rating scale. Breakeven CDR is the constant default rate for loans underlying the reference portfolio (expressed as an annual rate) at which a tranche starts to suffer principal write-downs. Assumes 35% loss severity and a 12-month recovery lag. The sample transaction includes only tranches that pay sequentially, though we have seen a recent deal where the structure changes from *pro rata* to sequential once certain conditions (such as a certain amount of losses or principal paydown) apply to the reference pool.

Sources: Intex, Nomura Securities International

²⁰ The "AJ" designation denotes the most junior tranche in a CMBS that attains triple-A ratings. A CMBS with an AJ class always has at least one other class that is senior to the AJ.

Figure 9: Sample Deal with Reference Portfolio of Triple-A-Rated "AJ" Tranches

Class	Estimated Rating	Balance (\$mm)	Credit Enhancement	Attachment Point	Detachment Point	Approx. Spread	Breakeven CDR
SS1	AAA	\$600	50.00%	50.00%	100.00%	2	8.4
SS2	AAA	\$516	7.00%	7.00%	50.00%	7	5.9
A	AAA	\$60	2.00%	2.00%	7.00%	35	5.3
B	AA	\$12	1.00%	1.00%	2.00%	65	5.1
C	A	\$6	0.50%	0.50%	1.00%	105	4.9
D	BBB	\$6	0.00%	0.00%	0.50%	135	3.9

Note: Estimated ratings are expressed using the S&P rating scale. Breakeven CDR is the constant default rate for loans underlying the reference portfolio (expressed as an annual rate) at which a tranche starts to suffer principal write-downs. Assumes 35% loss severity and a 12-month recovery lag. The sample transaction includes only tranches that pay sequentially, though we have seen a recent deal where the structure changes from *pro rata* to sequential once certain conditions (such as a certain amount of losses or principal paydown) apply to the reference pool.

Sources: Intex, Nomura Securities International

Observations:

1. At current spread levels, the bottom (first-loss) class of the synthetic resecuritization of triple-A-rated AJ tranches (Figure 0) is attractive compared with fusion CMBS pricing. At L+135, it offers roughly the same risk premium as tranches rated triple-B-minus from new fusion CMBS deals. Due to lax underwriting and low credit enhancement levels in a new issue CMBS, we believe that the bottom class of the resecuritization is likely safer, from a credit perspective, than a BBB- fusion position.
2. The credit quality of the reference portfolio has a significant effect on the amount of stress needed to cause principal losses in the sample deals. A constant default rate (CDR) of only 1.0 will cause a write-down on the first-loss piece of the deal with the reference portfolio composed of riskier credits (Figure 8), while a CDR of almost 4 is necessary to cause a loss on the first-loss class in the deal with the reference portfolio of triple-A-rated credits (Figure 9). This illustrates the point about how synthetic CMBS "technology" allows real estate and CMBS to leverage their knowledge! Because of the greater risk inherent in the deal with the riskier reference portfolio, very high spreads will be available at the bottom (and even the middle) of the capital structure. The investor who is wise in choosing his collateral pool can potentially achieve great rewards.
3. Although it is a useful screening tool, CDR analysis can be a bit misleading, since defaults and losses in CMBS tend not to follow a uniform pattern. For example, in the real world, defaults have historically peaked during years two through seven. Thus, we re-emphasize the point that it is imperative for investors to do their credit homework when investing in synthetic CMBS resecuritizations.
4. When the reference portfolio for a synthetic CMBS resecuritization comprises mezzanine or subordinate positions, the deal may display certain similarities to a CDO-squared (CDO²).²¹ In particular, such a deal may be vulnerable to performance cliffs, where seemingly small changes in the performance of the underlying reference credits translate into large performance differences in the synthetic resecuritization. Accordingly, such deals arguably demand a greater measure of expertise from investors because the consequences of mistakes can be amplified. For example, in the table below, we show the discount margin (DM) of particular tranches of our sample deal referencing BBB/BBB- rated collateral given varying constant default rates:

²¹ See generally Whetten, M. and M. Adelson, *CDOs-Squared Demystified*, Nomura fixed income research (4 Feb 2005).

Figure 10: Sample Deal with Reference Portfolio of Triple-B and Triple-B-Minus Subordinate Tranches – Analysis of Discount Margins at Various Default Rates

Class	Estimated Rating	0% CDR	1.0% CDR	1.5% CDR	1.6% CDR	1.7% CDR	1.8% CDR	1.9% CDR	2.0% CDR	2.1% CDR
A	AAA	35	35	35	35	35	35	35	2	-179
C	AA	45	45	45	45	45	45	TL		
F	A	70	70	70	70	70	TL			
J	BBB	174	174	174	174	TL				

Note: Ratings are expressed using the S&P rating scale. Assumes 35% loss severity and a 12-month recovery lag. "TL" denotes a total loss.

Sources: Intex, Nomura Securities International

As can be seen by the results of the simulation, even a seemingly small 0.1% change in constant default rate (CDR) can lead to large performance differences in our sample deal. This is likely due to the fact that the tranches are quite thin, and a default in one reference obligation backing the deal can conceivably wipe out an entire class, or even two or three classes, depending on the location within the capital structure.

5. Finally, we have seen some deals mixing CMBS with ABS collateral and even with existing CRE CDOs. This adds another layer of complexity to the analysis of the deals, especially with ABS home equity reference pools, as the investor must consider both credit, and prepayment, risk.

IX. Conclusion

Synthetic CMBS offer exciting opportunities for investors with the requisite knowledge and expertise. The challenge is that working with synthetic CMBS demands expertise in both (1) commercial real estate and (2) derivatives. This report offers an introduction to a product with layers of subtlety and nuance. Although it provides an introduction to the product area where commercial real estate and derivatives intersect, it is a comprehensive treatment of either subject. We encourage investors who plan to become active in synthetic CMBS to educate themselves in both relevant areas. Ignorance in either subject can lead to costly mistakes. Real estate professionals should apply greater effort toward learning about derivatives while derivatives professionals should apply greater effort toward learning about commercial real estate.

Although it has not yet happened, we expect the most sophisticated use of synthetic CMBS will come from the creation of synthetic loan portfolios, as described in the third paragraph of this report. That application would allow investors to fine-tune the underlying risk of a loan portfolio based on geographic and property-type diversification (see Figure 6). That application arguably would allow an investor to optimize his exposure based on his outlook for both (1) the stand-alone risk of different property types and geographic areas and (2) the correlation of risk between different property types and area.

We expect the pace of synthetic CMBS activity to accelerate over the next few years. Ultimately, we expect it to enhance the efficiency and transparency of the commercial mortgage loan sector and to permit improved hedging and trading strategies.

— E N D —

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