



**COMMERCIAL MORTGAGE  
SECURITIES ASSOCIATION**

Commercial Mortgage Securities Association  
(CMSA)

# **In Search of the Fair Value for CMBS**

A CMSA White Paper  
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# In Search of the Fair Value for CMBS

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### Summary of Findings

- **This credit crunch is the worst in the history of commercial mortgage-backed securities (CMBS). The severe dislocation in pricing of both CMBS and commercial mortgage whole loans wreaked havoc on issuer and investor balance sheets alike. To the good, however, it has yielded one of the best environments in which to invest in CMBS in several years.**
- **Commercial real estate fundamentals are healthy, with a balanced market and limited new construction nationally, although there are pockets of over-supply for particular assets in certain locations.**
- **The housing market correction, liquidity crunch, and slowing economy will create some pain. However, most fixed-rate, investment-grade conduit CMBS, the focus of this study, should do well in realistic credit stress scenarios with minimal defaults, credit losses, or yield degradation.**
- **Fear and the liquidity crunch have driven CMBS and CMBX<sup>1</sup> spreads excessively wide: CMBX spreads imply very unreasonable default and loss expectations that are out of the realm of historical experience.**
- **The Fed's rescue of Bear Stearns marked the bottom of the year-long credit cycle. Liquidity has improved since then and will continue to improve.**
- **Many CMBX indices are undervalued based on the worst credit loss experience in history, presenting arbitrage opportunities even after the recent rally.**

### Introduction

We human beings are rational until we are tempted by greed or deterred by fear. Edmund Burke, an Anglo-Irish philosopher, once observed that “no passion so effectually robs the mind of all its powers of acting and reasoning as fear.”<sup>1</sup> Since the meltdown of the subprime market began in spring 2007, fear has penetrated every corner and shaken the very foundation of our financial system. CMBS have sustained repeated attacks from short-sellers and the media. If the dotcom and housing bubbles can be ascribed to irrational exuberance, the current state of the CMBS market can be easily attributed to irrational fear.

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<sup>1</sup> CMBX are credit default swap indices on baskets of CMBS bonds. There are four series of CMBX indices outstanding, and another due to be introduced in May 2008. Each contains 25 CMBS deals and covers most of the capital structure, from super senior AAAs to BB (except CMBX.NA.1, which goes down to only BBB-).

Between January 2007 and March 2008, spreads soared 17-fold on the Lehman Brothers 8.5+ Year AAA CMBS Index and 25-fold on Lehman's long BBB CMBS index. On a trailing 12-month basis, the spread volatility increased more than 50-fold for both indices. Risk was re-priced as if the sky would fall: The CMBX spreads at their widest levels in March implied default and loss levels many times the worst case in history.

Investors in CMBS have paid dearly. In the first three months of 2008, CMBS was the second-worst-performing sector, after subprime ABS, in the Lehman Aggregate Bond Index. The spread widening has squeezed funding for commercial real estate. CMBS issuance was down 87 percent in the first four months of this year from the same period in 2007. Without financing, commercial real estate transaction volume has declined dramatically.

The objective of this study is to quantify CMBS credit risk by subjecting various CMBS credits to various stress tests. We look at CMBS performance under the average CMBS stress by property type over the past 12 years. We also evaluate CMBS performance under a plausible recession scenario. Under a worst-case scenario, we run the bonds through a severe housing stress by aggressively lowering net operating income (NOI) for retail properties in the worst 39 housing markets for the next two years. Finally, we address the issue of fair value for CMBX.

In this study, we focus on fixed-rate CMBS; specifically, the fixed-rate bonds in the four CMBX indices. Fixed-rate CMBS represent 80 percent of the CMBS universe, and those in the CMBX indices are supported by about \$300 billion of collateral, or one-third of the CMBS outstanding. The benefits of using the component bonds of the CMBX indices include daily index pricing, good coverage of the most concerning vintages (i.e., those issued during 2005–2007), ability of market participants to efficiently long and short these bonds, liquidity, and large universe of bonds (675 bonds).

## **The Storm of Fear**

The subprime meltdown is a storm that many anticipated, but most were caught off guard by its strength and reach. For much of 2006, people talked about the bursting of the housing bubble. What was expected to be a localized thunderstorm has turned into a global hurricane that shocked the financial industry from its very foundation and wiped out hundreds of billions of dollars from bank balance sheets and investors' pockets.

## **What Happened in Vegas DID NOT Stay in Vegas**

The storm started in late February 2007, around the time of the ABS West conference in Las Vegas. The February subprime remittance report released around the weekend of February 24 and 25, 2008 indicated that the subprime mortgage delinquency rate was rising very fast. The ABX.HE.07-1<sup>2</sup> BBB-spread jumped 283 basis points (bps) on Friday, February 23, and 65 bps on Monday, February 26. The mood at the conference turned decisively negative. Serious questions were raised and no satisfactory answers were given during many heated discussions. Concerns about subprime mortgage performance

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<sup>2</sup> ABX.HE.07-1 was the then on-the-run derivative index in a basket of subprime mortgage-backed securities.

and the viability of ABS collateralized debt obligations (CDOs) quickly spread among investors and traders. On Tuesday, February 27, the ABX.HE.07-1 BBB- index widened another 275 bps. On that very same day, the Lehman Brothers 8.5+ Year BBB CMBS index spread jumped by 20 bps, a rare event in the then rather benign world of CMBS. It marked the beginning of spread widening and the era of fear.

In the ensuing month, a domino effect occurred in subprime ABS and CDO markets, with repeated cycles of failure, false hope, and greater failure. With unforgiving mark-to-market rules, margin calls, and subsequently forced liquidation/de-leveraging in an increasingly illiquid market, each business failure triggered more liquidations, more spread widening and more failures. Soon fear began to overcome reason.

### **Collateral Damage from the Subprime Meltdown**

CMBS was a victim of the problems in the subprime mortgage market. Rising subprime mortgage delinquencies caused the failure of many hedge funds, structured investment vehicles (SIVs), asset-backed commercial paper conduits (ABCP conduits), ABS CDOs, and enhanced cash funds. Some noticeable examples include:

- On May 3, 2007, UBS shut down its hedge fund operation, Dillon Read, after it incurred large losses from subprime mortgages.
- On June 13, 2007, Bear Stearns Asset Management's two high-yield hedge funds failed to meet their margin calls. In the ensuing weeks, lenders seized most of the collateral and began to liquidate \$3.8 billion of assets from one of the hedge funds.
- On July 31, 2007, MGIC and Radian lost a combined \$1 billion from their subprime investments in C-Bass, a subprime and CDO issuer, as a result of unprecedented margin calls.
- On August 13, 2007, several ABCP conduits failed to roll and would have to be liquidated.
- On October 19, 2007, Rhinebridge, a \$1 billion SIV, defaulted.
- On October 22, 2007, Cheyne, another SIV, defaulted.
- On February 28, 2008, Peloton, a hedge fund, failed after losing \$17 billion.

Most of the failed hedge funds, SIVs, ABCP conduits, and CDOs had some exposure to CMBS. In their attempt to recover their loans, lenders seized the assets from failed institutions and had to sell CMBS into increasingly illiquid markets. With most buyers on the sidelines licking their wounds from mark-to-market losses, there was very little demand for cash bonds. Few CMBS cash bonds traded, causing lenders' exposure to CMBS to swell.

Two actions by lenders and investors helped push CMBS and CMBX spreads into the stratosphere:

1. Investors and lenders began to use CMBX spreads to mark their cash bonds. By marking cash CMBS positions to CMBX spreads, investors and lenders ceded control of the nearly \$1 trillion CMBS market to a small, newly developed, and thinly traded derivative market. A trade of a comparatively small notional amount would impact the value of billions of dollars of CMBS.
2. Lenders and investors began to use CMBX to hedge their exposures to CMBS. As banks accumulated more and more CMBS from failed hedge funds, SIVs, ABCP conduits, and CDOs and

couldn't sell them, they were forced to buy protection against future spread widening from the CMBX market. Some investors also used CMBX to hedge their portfolio exposure to CMBS.

With few protection sellers and too many protection buyers, CMBX spreads soared. This situation created a vicious cycle of more spread widening, greater mark-to-market losses, new failures, more CMBS to sell, less liquidity in the cash bond market, more hedging needs, and wider CMBX spreads. Before long, speculators joined the bandwagon and began to short CMBX, pushing the spreads even wider.

It took a year for this cycle to run its course. On March 14, 2008, Bear Stearns failed spectacularly and was taken over by JP Morgan with a \$29 billion loan from the Federal Reserve. This event is important because it marked a key turning point in the credit crunch. The Federal Reserve intervened and took the role of a lender of last resort. This unprecedented action was followed by the Fed's decision to extend credit not just to commercial banks, but also to the brokers/dealers (i.e., investment banks). The Fed also expanded the list of eligible collateral for its lending programs. With the explicit support of the Federal Reserve, liquidity is gradually returning.

## **The Damage Report**

CMBS spreads peaked in mid-March 2008, around the time when rumors about Bear Stearns' problems surfaced. These spreads exceeded all previous records (Exhibit 1):

- The Lehman 8.5+ Year AAA CMBS index spread widened to 420 basis points (bps) over swap on March 10, 2008. This spread was more than 17 times its level before the subprime meltdown and 8.4 standard deviations from its long-term average.
- The Lehman 8.5+ Year BBB CMBS index spread widened to 1,897 bps over swaps. This spread was 25 times its level before the subprime meltdown and 7 standard deviations from its long-term average.

For portfolio and risk managers, this situation was devastating: Realized risk was many times what was promised to their investors. For example, between March 2007 and March 2008, the trailing 12-month spread volatility soared more than 50-fold for both Lehman's AAA and BBB CMBS indices (Exhibit 2). Many hedge funds and proprietary trading desks with exposure to securitized products left the market because they could not manage the risk. The investment mandates of some CMBS and securitized credit fund managers require that they be fully invested in CMBS and/or ABS. Faced with a market meltdown, they were unable to diversify or to hedge. The performance of these funds was poor and many were liquidated. For example:

- State Street Global Advisors is liquidating its SSgA Yield Plus fund after a dismal performance (-13.4 percent in 2007 and -17.96 percent in the first four months of 2008).
- The Standish Mellon Yield Plus Fund and the Midanek/Pak Ultra Short Duration Fund are also being liquidated.

- The assets in Charles Schwab's YieldPlus Investor Fund fell from \$13.5 billion in June 2007 to \$1.65 billion on April 26, 2008, with a performance of -1.2 percent in 2007 and -25.6 percent in the first four months of 2008.

CMBS underperformed on an absolute basis as well as on a relative basis. In the first quarter of 2008, CMBS in the Lehman Aggregate Bond Index delivered an excess return of -7.74 percent, vs. -5.94 percent for ABS, -4.27 percent for Credit, and -1.83 percent for the overall index over U.S. Treasury bonds (Exhibit 3).

In the first four months of 2008, CMBS issuance volume was down 87 percent year over year. Origination shops, high-yield investors, rating agencies, and trading desks have been struggling because of the decline in origination volume. Many have begun to lay off staff. The industry is in danger of losing key pieces of the infrastructure that was developed over the last decade.

### **Thunder, But So Far No Rain**

Is the market's fear justified? The recent extreme spread widening occurred during a period when CMBS collateral has been performing superbly. As of May 19, 2008, the nonperforming rate for CMBS collateral was 0.30 percent<sup>3</sup>, less than a rounding error of the subprime mortgage delinquency rate (Exhibit 4).

The excessive fear is evident in the CMBX market. Exhibit 5 shows the implied annual default rates for different components of the CMBX.4 Index from the market spreads on March 20, 2008. Assuming 35 percent loss severity after default and a recovery lag of 12 months, the CMBX pricing spreads imply an annual constant default rate (CDR) of 6.3 percent for A, 12 percent for BBB, and more than 100 percent for super-senior AAA CMBS (Exhibit 5). Given that the worst CDR ever registered for commercial mortgages (the 1986 vintage) is 3.65 percent, it seems that we have a severe case of market overreaction.

### **History Indicates That the Market Has Overreacted**

Many studies on the historical performance of CMBS have been conducted by rating agencies and the research departments of investment banks. One of the most recent studies comes from Wachovia Bank's CMBS Research Department and is published in the summer 2008 issue of *CMBS World*<sup>ii</sup>.

### **Historical CMBS Default and Loss Experience**

In their study, Brian Lancaster, Anthony G. Butler, and Stephen P. Mayeux analyzed 85,000 loans from 526 fixed-rate conduit/fusion deals that were originated between 1995 and 2007. Their key findings are as follows (Exhibit 6):

- The 10-year cumulative default rate for CMBS collateral was 7.9 percent, or 0.73 percent CDR.

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<sup>3</sup> The nonperformance rate includes 90+ days delinquencies, in foreclosure, and real estate owned.

- The average cumulative losses after default were 1.72 percent, or an average severity of 33.5 percent.
- The average time to recover or liquidate a defaulted loan is 19 months.
- Healthcare loans had the highest default rate of 2.25 percent per year, followed by hotel loans of 1.51 percent per year.
- Self-storage loans had the lowest default rate of 0.18 percent per year, with retail and office loans as a distant second (0.47 percent) and third (0.49 percent).
- Healthcare loans also had the highest loss severity of 49 percent after default, followed by hotel loans of 40.6 percent.
- Self-storage loans had the lowest loss severity of 15.9 percent after default, with apartment loans as a distant second (24.8 percent).

Of course, the future will not necessarily be a repeat of the past. However, the past 12 years include some stressful credit events, including:

- 1998: Collapse of Long-Term Capital Management and the subsequent credit crunch.
- 2000–01: The bursting of the technology bubble, a severe credit crunch, a recession, the 9/11 attack, and the collapse of the hotel market.
- Late 1990s and early 2000s: Overbuilding in assisted-living facilities and nursing homes, and the reduction in Medicaid and Medicare reimbursement rates, which decimated the senior housing market.

The experiences of the past 12 years provide enough economic and capital market stress to benchmark current pricing levels.

## Profile of Conduit CMBS

Before we dive into credit analysis, it is helpful to get a snapshot of the subject that we study. Exhibit 7 provides a summary of the sector exposure of the conduit CMBS and CMBX component bond. Here are some quick takeaways:

- A majority of loans are concentrated in three property types with relatively good past credit performance: office, retail, and multifamily residential (78 percent).
- CMBS have very small exposure of 0.29 percent to healthcare loans, one of the most volatile and thus riskier property types.
- Overall, the deals in CMBX are similar to the average deals in the CMBS conduit universe.
- CMBX components tend to have slightly higher exposure in office, lodging, and self-storage; they tend to have slightly lower exposure in retail and multifamily residential.

Exhibit 8 provides a credit profile of conduit CMBS and CMBX components. Here are some highlights:

- There are 69,753 loans in conduit CMBS, with \$740 billion of outstanding balance; CMBX indices account for approximately 39 percent of these loans by principal balance outstanding.
- The weighted average loan-to-value ratio is about 69 percent. There are slight upticks in the weighted average leverage and shares of higher leverage loans (LTV>75%) in the more recent vintages of CMBX indices.
- The weighted average debt service coverage ratio is 1.55x for conduit loans, and it is slightly lower for CMBX loans at 1.50x. The debt service payments on commercial mortgages come from rent-paying tenants, some of which are investment-grade companies. Well-established processes are in place to document and capture lease payments. This situation is in striking contrast to Alt-A and many subprime residential mortgages, which were made with little documentation of borrower income or assets. However, one should note a slight decline in the debt service coverage ratio of the more recent vintages of CMBX indices.
- About 60 percent of conduit loans are partially or fully interest only (IOs), compared with 80 percent of loans in CMBX indices. Larger shares of IO loans would likely cause higher balloon defaults in the future.
- CMBS collateral performance is very strong, with a nonperforming rate of around 0.30 percent. Given their lack of seasoning, deals in CMBX indices perform slightly better than the conduit average.

### **CMBS Performance under Average CMBS Stress**

How would CMBS perform if we subject them to the stress of the past 12 years? The answer: pretty well!

We ran all 19,583 loans in the four CMBX indices through the credit stress of the past 12 years:

- If a loan is an apartment, healthcare, hotel, industrial, office, retail, or self-storage loan, we applied its sector-specific credit experience.
- If a loan belongs to other categories, we applied the average credit stress.

The impact on the 675 bonds in the four CMBX indices was calculated and tallied. We focused on three metrics: rating downgrade probability, average bond loss rate, and yield degradation. The results are summarized in Exhibit 9.

### **No Downgrade Risk for Bonds Rated A or Above**

We start with perhaps the toughest test possible: rating downgrade risk. For traders and short-term investors, rating downgrade risk is important because it imposes significant mark-to-market risk and influences the liquidity of a bond.

A bond is assumed to be downgraded if its credit enhancement level under stress drops below 80 percent of its original credit enhancement level during its lifetime<sup>4</sup>. We made two assumptions:

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<sup>4</sup> Rating agencies have become more proactive in response to the on-going capital market dislocation. For example, S&P recently downgraded A- or lower rated bonds from MSC 2006-IQ12 (a component of CMBX.3)

- Rating agencies did their job at issuance, and the original credit enhancement levels incorporate all relevant deal and bond credit risk factors.
- A 20 percent decline in credit enhancement would trigger a revision of the agencies' ratings.

The results are encouraging: On average, CMBS rated A or above have little risk of being downgraded under the average CMBS stress scenario. For BBB rated bonds, 17 out of 100 will experience a 20 percent or more decline in their credit enhancement levels and are vulnerable to rating downgrades during their lifetime. For BBB- and BB rated bonds, the probability of a rating downgrade rises to 48 percent and 95 percent, respectively.

It is important to note that, for most bonds, credit enhancement decline occurs only in the distant future. Exhibit 10 shows a scatter plot of changes in credit enhancement levels from stress and the timing of the lowest credit enhancement level for the 275 BBB, BBB-, and BB bonds. The timing of the lowest credit enhancement for all bonds with significant credit enhancement decline occurs after 2014, approximately six years from now—not an immediate concern for short-term investors and traders.

### Lower Loss Rate than Corporate Bonds

For long-term investors or buy-and-hold investors such as life insurance companies, the lifetime default risk and expected lifetime loss from a bond are far more important factors for consideration. For purposes of this discussion, a bond is considered to be in default if it incurs any losses.

Under the stress scenario of the past 12 years, only BB rated CMBS are vulnerable to default. Two out of the 75 BB rated CMBS would likely incur losses in their lifetime, with an average loss severity of 48 percent, or a recovery rate of 52 percent after default. This amounts to an one percent average loss rate for the BB rated CMBS, far lower than the average loss of 11 percent for BB rated corporate bonds. Under the average CMBS stress scenario, CMBS outperform corporate bonds by a significant margin in terms of expected credit losses.

### Minimal Yield Losses

The next performance measure is yield degradation: how much yield you would lose as a result of stress if you hold your investments to maturity.

Under the average stress, CMBS rated A or above would incur no losses in yield if investors hold them to maturity. For BBB and BBB- investors, the average yield degradations are 31 bps and 54 bps, respectively, rounding errors when compared with their pricing yields. For BB investors, the expected loss in yield would be 216 bps, which is small when compared to the mid-20 percent pricing yields on BB CMBS today.

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because the deal has incurred slightly higher than expected delinquencies (1.98%) and would likely experience decline in credit enhancement levels in the future. It is important to note that the credit enhancement levels for these bonds are higher today than at securitization.

In summary, CMBS would perform well from the perspective of rating stability, expected losses, and yield degradation under a stress scenario comparable to the experience of the last 12 years (1995 to 2007).

## **Little to Be Feared**

Of course, no two cycles are alike and it is the unknown that drives investors to seek cover. The Greek philosopher Epictetus once remarked, "It is not death or pain that is to be dreaded, but the fear of pain or death."<sup>iii</sup>

Investors have many reasons to be optimistic about current conditions in the commercial real estate market. The fundamentals are solid, with occupancies at or near long-term averages (Exhibit 11). There has been no overbuilding or overleasing. The ongoing credit crunch has turned off the capital spigot for new projects, which will further reduce the future pipeline of commercial real estate developments. What is to be feared about CMBS today?

## **An Aggressive Fed Should Shorten the Recession**

Uppermost in many people's minds is the possibility of an economic recession. Burdened by the housing crisis and the liquidity crunch, the economy grew only 0.6 percent in the first quarter of 2008. Recession or not, the economy is slowing and most economic indicators are flashing red. Consumer confidence is at its lowest level in 28 years, according to the University of Michigan Consumer Sentiment Survey. The economy has lost jobs for four consecutive months. Home sales are down and consumer spending has been battered. Housing foreclosure rates in the first quarter were up 112 percent from the same period last year, according to RealtyTrac. Government tax receipts also declined.

How bad could it get? Exhibit 12 provides a summary of the past seven recessions, with data from the National Bureau of Economic Research. The average recession lasts about 10.7 months, with an average GDP decline of -1.9 percent and job loss of -2.1 percent.

As the exhibit shows, the past two recessions were much shorter and shallower than others. They lasted only eight months, with GDP declines of -1.5 percent and -0.6 percent, respectively. The economy also lost fewer jobs in the last two recessions (-1.4 percent and -1.3 percent, respectively), when compared with previous recessions. The credit for these results belongs to Alan Greenspan, the former chairman of the Federal Reserve System. Under his stewardship, the Fed was extremely responsive and proactive in providing monetary stimulus and liquidity to the economy when needed.

Charles Kindleberger, an economic historian, once observed that "a lender of last resort does shorten the business depression that follows financial crisis."<sup>iv</sup> Ben Bernanke, the current chairman of the Federal Reserve, has clearly taken this lesson to heart. Bernanke has outdone all of his predecessors by acting as a lender of last resort in this liquidity crisis. To date, Bernanke has:

- Cut the federal funds rate by 325 bps, from 5.25 percent to 2.00 percent, in eight months. By doing so, Bernanke has lessened the much-publicized rate reset problems for hundreds of billions of dollars of adjustable rate mortgages. He has also given banks and thrifts a favorable

steep yield curve to repair their balance sheets by lending at higher rates and borrowing at lower rates.

- Sold/lent \$300 billion of U.S. Treasury securities through its discount windows, Term Auction Facility and Term Securities Lending Facility, and expanded the list of eligible collateral.
- Extended credit to not just banks, but also investment banks.
- “Rescued” Bear Stearns by providing \$29 billion of financing to JP Morgan.

Bernanke is an expert on the Great Depression. He holds the view that the central bank should be the lender of last resort when the private market fails. In a speech in honor of Milton Friedman’s 90<sup>th</sup> birthday, Bernanke commented that “regarding the Great Depression, you’re right. We (central bankers) did it. We’re very sorry. But thanks to you, we won’t do it again.” With credit market sentiment already turned and a very proactive Fed, it is unlikely that we will face a prolonged recession.

### **Recessions Have Mild Impact on Space Demand**

Should we be fearful about the commercial real estate market in a slowing economy or a shallow recession? Except for the hotel sector, which is tightly linked to GDP trends, most property sectors have experienced only a mild impact on space demand from the past recessions (Exhibit 13). For example, apartment demand on average increased by more than 2 percent in the first year and 3.45 percent per year in the first two years after a recession began. This demand increase makes sense, since recession reduces the ability of people to buy/own homes, pushing rental demand higher. Demand for industrial, office, and retail space remained positive in most past recessions. Long-term leases also protect landlords from fluctuations in space demand.

The only exception was the 2001 recession. During the tech bubble, strong demand, extremely low vacancies, and skyrocketing rents encouraged companies to lease space in anticipation of future growth. Office demand in 1999–2000 was twice the average of the preceding 10 years. When the tech bubble burst, many companies failed and returned their space to their landlord. Those who survived had more space than they needed and tried to sublease their surplus. As a result, absorption turned negative for both office and industrial space.

We have seen no evidence of over-leasing in today’s market. Markets are in relative balance and companies have been cautious about their space needs. Besides, companies have little advantage in locking in space far into the future because rent growth has been relatively modest in most markets. For the past two years, office net absorption has been around 2 percent, very close to the growth rate of office jobs. It is unlikely that we would see significant space giveback should a recession occur. As long as the recession is not prolonged, some weakness in demand will not greatly impact the commercial real estate market.

### **Long-Term Leases Help Cushion Short-Term Shocks**

Office, industrial, and retail properties tend to have long-term leases. Most lease terms range from five to seven years. Long-term leases stabilize property income streams.

Let's use New York's office market as an example (Exhibit 14). In the past four years, occupancy and rents have risen dramatically in New York's office market. On a mark-to-market basis, revenue has increased by 65 percent. However, for a typical office building with five-year leases in place, the revenue increase was much smaller because most space was locked into long-term leases with below-market rents. If the New York office market were to experience a decline comparable to the post 9/11 downturn, mark-to-market revenue would decline 21 percent in the next four years while in-place revenue for the property would be up slightly, because rents on expiring long-term leases would still be below market rates. In other words, long-term leases limit and spread the upside for property revenue in an up market over time, but they cushion the shocks in a down market.

### **No Overbuilding This Time**

The factor that will keep the commercial real estate market strong in this cycle is an absence of overbuilding. New construction has been modest: The average annual addition of space for the past five years was less than 1 percent per year for most property types, with retail being the highest at 1.6 percent per year on average. This figure is sharply lower than in the past (Exhibit 15).

As a comparison, in the five years before the 1991 recession, inventory grew by 5.6 percent per year in apartments, 3.9 percent in hotels (prior three years), 2.8 percent in industrial, 7.6 percent in office, and 7 percent in retail. The construction level was far more modest in the years before the 2001 recession, ranging from a low of 1.6 percent per year in industrial to a high of 3.3 percent in hotels—a rate that is still about twice the inventory growth rate today.

For 2008, some real estate research firms have predicted inventory increases of 1 percent for apartments and industrial, 1.4 percent for office and retail, and 2 percent for hotels. Given the current severe credit crunch, some of these projects will likely be delayed, scaled down, or canceled altogether.

### **Valuation: Area of Challenge**

One of the much-publicized concerns in commercial real estate is valuation: After several years of compression, cap rates are now low relative to historic averages. Given the credit crunch, cap rates have already risen slightly and will likely increase further. How much will cap rates rise over the next two years? One place to find an indication is the total return swap market for the National Council of Real Estate Investment Fiduciaries (NCREIF) Property Indices.

NCREIF is a nonprofit consortium of real estate investment managers whose main mission is to collect, analyze, and disseminate commercial real estate performance information. As of the end of 2007, the NCREIF Property Index database contained information on approximately \$300 billion of institutionally owned and managed commercial real estate. Performance data is available for the aggregate portfolio and by major property sectors and metropolitan areas. Some of the data series go as far back as the first quarter of 1978.

A total return swap market has been created by six dealers for the NCREIF Property Index and some of its sub-indices. The market price of a contract provides a vast amount of information about the market expectations on future price and cap rate changes .

Exhibit 16 shows a summary of implied cap rate changes for the aggregate index and the major property type sub-indices on May 19, 2008. The market expects cap rates to rise by a low of 88 bps for apartments and to a high of 178 bps for hotels. Such increases in cap rates imply property value declines of 16 percent to 20 percent.

## How Would CMBS Perform in A Recession?

How would CMBS perform in an average recession? To answer that question, we looked back at the NOI performance of different NCREIF property sub-indices during the last four recessions. We took the average NOI decline and length of decline during the last four recessions as basis of our recession scenario<sup>5</sup>. The hotel sector is the only exception, which is based solely on hotel performance during the 1990–1991 recession. We don't use the post-9/11 hotel experience because it is too extreme (Exhibit 17).

In our recession scenario, the NOI decline ranges from a low of -1.0 percent per year for retail to a high of -9.5 percent per year for hotels. However, hotels have the shortest decline—four quarters—because of their lack of long-term lease protection, while the NOI decline in the office sector stretches the longest—13 quarters on average. For property valuation purposes, we have used the implied cap rates from the NCREIF total return swap market on May 19, 2008. The stress results are summarized in Exhibit 18<sup>6</sup>.

## Little Downgrade Risk for A or Higher Rated Bonds

We again start with perhaps the toughest test possible: rating downgrade risk. The rating downgrade risk is only marginally higher for higher rated CMBS than the average CMBS stress of the past 12 years. CMBS rated A or higher have very low risk of being downgraded under the recession stress scenario: 2 out of 100 AA rated CMBS and 6 out of 100 A rated CMBS would experience a 20 percent or greater decline in their credit enhancement levels during their lifetime, at risk for a rating downgrade.

Moving down the capital structure, 31 out of 100 BBB rated CMBS will experience a 20 percent or more decline in their credit enhancement levels during their lifetime. For BBB- and BB rated CMBS, the probability of a rating downgrade rises to 47 percent and 63 percent, respectively. As with the earlier stress test, the most severe credit enhancement decline occurs in the distant future. Exhibit 19 shows a scatter plot of the changes in credit enhancement levels from the recession stress and the timing of the

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<sup>5</sup> Properties in the NCREIF index tend to be of slightly higher quality than in the CMBS universe. The past experience of the NCREIF indices may not be perfectly representative of the future performance of the properties in the CMBS universe.

<sup>6</sup> For recession and housing stress tests, we have used non-ruthless default models with property-type specific term and balloon default triggers on Trepp. Losses after defaults are calculated from stressed cash flows, stressed cap rates and a fixed transaction cost.

lowest credit enhancement levels for the 275 BBB, BBB-, and BB CMBS. The most severe decline in credit enhancement still occurs in the distant future.

### **Lower Loss Rate for Most Investment-Grade CMBS Than Corporate Bonds**

Under the recession stress, most investment-grade CMBS outperform corporate bonds in terms of expected losses. No CMBS rated AA or higher incur any losses, while only 1 out of 100 A rated CMBS would incur a small loss. The lifetime default rate increases to 14 percent for BBB CMBS, 33 percent for BBB- CMBS, and 47 percent for BB CMBS. The average recovery rate ranges from a low of 1 percent for BB CMBS to a high of 96 percent for A rated CMBS. The expected losses are 9.6 percent for BBB CMBS, 17.7 percent for BBB- CMBS, and 46.4 percent for BB CMBS. CMBS rated BBB or lower underperform the corporate bonds under the recession stress.

### **Minimal Yield Losses**

Under the recession stress, AAA rated CMBS would earn their expected yields, while AA, AA-, and A rated CMBS would incur small yield degradation as a result of slightly longer average lives for discount bonds. For BBB and BBB- investors, the average yield degradations are 265 bps and 455 bps, significantly higher than those from the average CMBS stress scenario but still very low for their high teens and low 20 percent going-in yields. For BB investors, the expected loss in yield would be 1,132 bps. On a loss-adjusted basis, however, BB investors can still realize a return of over 17 percent on their investments.

In summary, under recession stress, most investment grade CMBS would still perform well from the perspective of rating stability, expected losses, and investment yield.

### **Extra Housing Stress**

A big overhang in the CMBS market (and in all markets, in fact) is the question of how long and how deep the housing recession will be. So far, the housing market has not bottomed. Exhibit 20 shows home price trends. As of February 2008, the S&P/Case-Shiller Composite 10 Market Home Price Index declined by 13.6 percent year over year, the largest decline since its inception in 1987.

Home price declines and the credit crunch have led to more foreclosures. According to RealtyTrac, the number of homes in foreclosure increased to 649,917 in the first quarter of 2008, a 112 percent increase over the same period last year and a 23 percent increase over the fourth quarter of 2007<sup>v</sup>. This increase is the seventh consecutive quarter of rising foreclosure activity. Nevada posted the worst foreclosure rate in the nation, followed by California, Arizona, and Florida.

Declining home prices and rising foreclosures could reduce local retail sales through the wealth effect. Given the fact that the housing market has yet to stabilize and the full impact of rising foreclosures is not yet fully understood, we have applied a housing stress test for CMBS bonds:

- We stress all retail loans in the at-risk markets by reducing their NOI/CF by 5 percent in the first year, 7 percent in the second year, and 0 percent in the third year; 2 percent per year NOI growth thereafter.
- For valuation, we use the long-term average cap rate of 7.74 percent for retail properties.

- We use the recession stress as the base case and overlay housing stress on top of it.

We consider 39 markets to be at risk. They include 30 markets registering the greatest home price decline (Exhibit 21) based on data from the Office of Federal Housing Enterprise Oversight (OFHEO)<sup>7</sup>. As of the fourth quarter of 2007, home prices in 16 metropolitan areas had dropped by more than 10 percent.

The OFHEO list misses some known at-risk markets, such as Miami, Florida. To capture the most problematic housing markets, we include the 10 metro areas with the greatest increase in homeowner vacancy rates (Exhibit 22). Interestingly, only one market appears in both lists—Sacramento, California.

### **Little Downgrade Risk for A or Higher Rated Bonds**

Not surprisingly, the rating downgrade probability increases slightly under the extra housing stress, as opposed to under the recession stress alone (Exhibit 23). The rating downgrade risk again reaches AA classes, although only 5 out of 100 AA CMBS would experience a 20 percent or greater decline in credit enhancement over their lifetime. For A rated bonds, 14 out of 100 would be downgraded over their lifetime in this scenario, as would 41 percent of BBB bonds, 56 percent of BBB- bonds, and 68 percent of BB bonds.

Exhibit 24 shows a scatter plot of changes in credit enhancement levels from the extra housing stress and the timing of the lowest credit enhancement levels for the 275 BBB, BBB-, and BB CMBS. Although the most severe decline in credit enhancement still occurs in the distant future, some bonds experience more credit enhancement decline much earlier than they do under recession stress alone.

### **Lower Loss Rate for A or Higher Rated Bonds than Corporate Bonds**

Under the extra housing stress, CMBS rated A or above outperform corporate bonds in terms of expected losses. No CMBS rated AA or higher would lose principal or interest income, while only 1 out of 100 A rated CMBS would incur losses. The lifetime default rate increases to 28 percent for BBB CMBS, 46 percent for BBB- CMBS, and 60 percent for BB CMBS. The average recovery rate ranges from a low of 0 percent for the only defaulted A rated CMBS to a high of 35 percent for BBB- rated CMBS. The expected losses are 20 percent for BBB CMBS, 30 percent for BBB- CMBS, and 54 percent for BB CMBS, underperforming comparable corporate bonds under this extreme scenario.

### **Minimal Yield Losses**

Under the housing stress, AAA bonds would again earn their expected yields, while AA, AA, and A rated bonds would incur small yield degradation. For BBB and BBB- investors, the average yield degradations are 448 bps and 720 bps, higher than those from the recession stress alone but still low for their high teens and low 20 percent going-in yields. After the expected loss of 1,369 bps, BB investors would still realize mid-teen returns for trades on May 19, 2008.

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<sup>7</sup> OFHEO compiles quarterly historical prices from conforming mortgages that Fannie Mae and Freddie Mac originate. The data covers more than 380 markets as far back as 1975.

In summary, under housing stress, most investment grade CMBS would still perform well in terms of rating stability, expected losses, and risk adjusted returns.

## **In Search of the Fair Value for CMBS**

What we have done so far is to demonstrate that there are no skeletons in the CMBS closet: The downside risk is limited in most investment-grade CMBS and, at today's pricing levels, CMBS would offer attractive returns. But are the values and the returns fair relative to the risk profile of CMBS?

To answer that question, one needs only to look at CMBX pricing. In theory, CMBX spreads should reflect the risk of the indices. Even after the recent rally, some CMBX spreads still imply default risks that are out of line with historical experience. Just how off-target is the CMBX market? We can actually put a dollar value on it.

Exhibit 25 provides an example—a summary of the future cumulative cash flows for a hypothetical protection buyer on a \$10 million contract on the CMBX.4 BBB index on May 20, 2008. Assume that the trade was done at the mid-spread of 1,098 bps, as compiled by Markit, and that the future will mimic the worst case in the commercial mortgage history—the 1986 vintage, in which 31 percent of all commercial mortgages originated in that year defaulted and incurred 33 percent in losses.

In this trade, the protection buyer would pay the protection seller an upfront fee of \$ 3.192 million to buy down the spread. For the ongoing protection, the buyer would have to pay about \$42,000 (\$10 million notional x 5% coupon/12 months) of risk premium per month. Even as collateral defaults pick up and losses accumulate, the protection buyer continues to pay the full risk premium until the BBB bonds begin to default (around 2015), and the buyer won't recoup the entire investment until 2017. Discounted with the sum of a swap-forward curve and the trade spread, the cash flows to the protection buyer have a present value of -\$2.80 million. In other words, if the future mimics the worst-known past experience, the protection buyer would have lost 28 percent of the notional amount of the contract. The odds are against the protection buyer ever making money on this trade.

What is the fair spread for the CMBX.4 BBB index? The answer depends on one's credit outlook. One solution is to ask what the maximum spreads should be in the worst-case scenario, or the experience of the 1986 vintage of commercial mortgages. These spreads should establish the ceiling for maximum spreads for CMBX indices in a rational market.

Exhibit 26 shows a summary of the future cumulative cash flows for a protection buyer of \$10 million CMBX.4 BBB index in a fair-spread trade based on the 1986 stress. At a fair spread of 634 bps, the upfront payment drops to \$834,516 and the monthly fixed protection fee to the protection seller remains the same. After peaking in June 2015, the cash flow begins to turn in the protection buyer's favor. By September 2016, the protection buyer recoups the face value of the entire investment and goes on to earn \$4.4 million from 2016 to 2019. However, on a present-value basis, the buyer just breaks even. The transaction has zero NPV.

What if the market spread differs from the fair spread in the worst-case scenario? If the market spread is higher than the fair CMBX spread, then the CMBX is too cheap and the protection seller can be very confident that he will be able to realize positive NPV from selling protection on the index.

Since March 20, 2008, the CMBX market has rallied dramatically, a testament to the value in the CMBX indices. However, we are not yet near where the market spreads should be based on the worst credit loss experience in history. Exhibit 27 is a summary of market spreads on May 19, 2008, and the fair spreads under the worst-case scenario for the BBB CMBX indices. For most vintages, the market spreads on May 19 were still wider than their fair spreads, indicating that CMBX still provide value to investors.

## Concluding Remarks

The market has cycles. Greed creates booms that fear destroys. Now seems to be a time to take an objective look at CMBS as potential investments.

Commercial real estate fundamentals are strong and commercial mortgage delinquencies are near record lows. There is no skeleton in the closet: The markets are in balance, with construction low and demand still solid. Under these conditions, the impact of a short and shallow downturn should be modest, with a commensurate modest increase in commercial mortgage defaults.

In many cases, fear has made CMBS relatively cheap. Our analysis demonstrates that even if the economy goes into a recession and the subprime meltdown negatively impacts properties in at-risk areas, most investment grade, fixed-rate CMBS should perform well. Despite the recent rally, CMBS and CMBX remain undervalued relative to their historical trading levels, their risk, and their fair values.

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<sup>i</sup> Edmund Burke. 1999. *A Philosophical Enquiry into the Sublime and Beautiful*. Penguin Classics.

<sup>ii</sup> Brian Lancaster, Anthony G. Butler, and Stephen P. Mayeux of Wachovia Bank. 2008. "The 2008 CMBS Default and Loss Study." *CMBS World*, Summer, Vol. 10, No. 2.

<sup>iii</sup> Epictetus. 2006. *The Discourses of Epictetus*. Nu Vision Publications, LLC.

<sup>iv</sup> Charles Kindleberger. 2000. *Manias, Panic, and Crashes*. John Wiley and Sons, pp. 17-18.

<sup>v</sup> Alex Veiga. "Homes Facing Foreclosure More Than Doubled in 1Q from 2007." Associated Press, April 29, 2008.