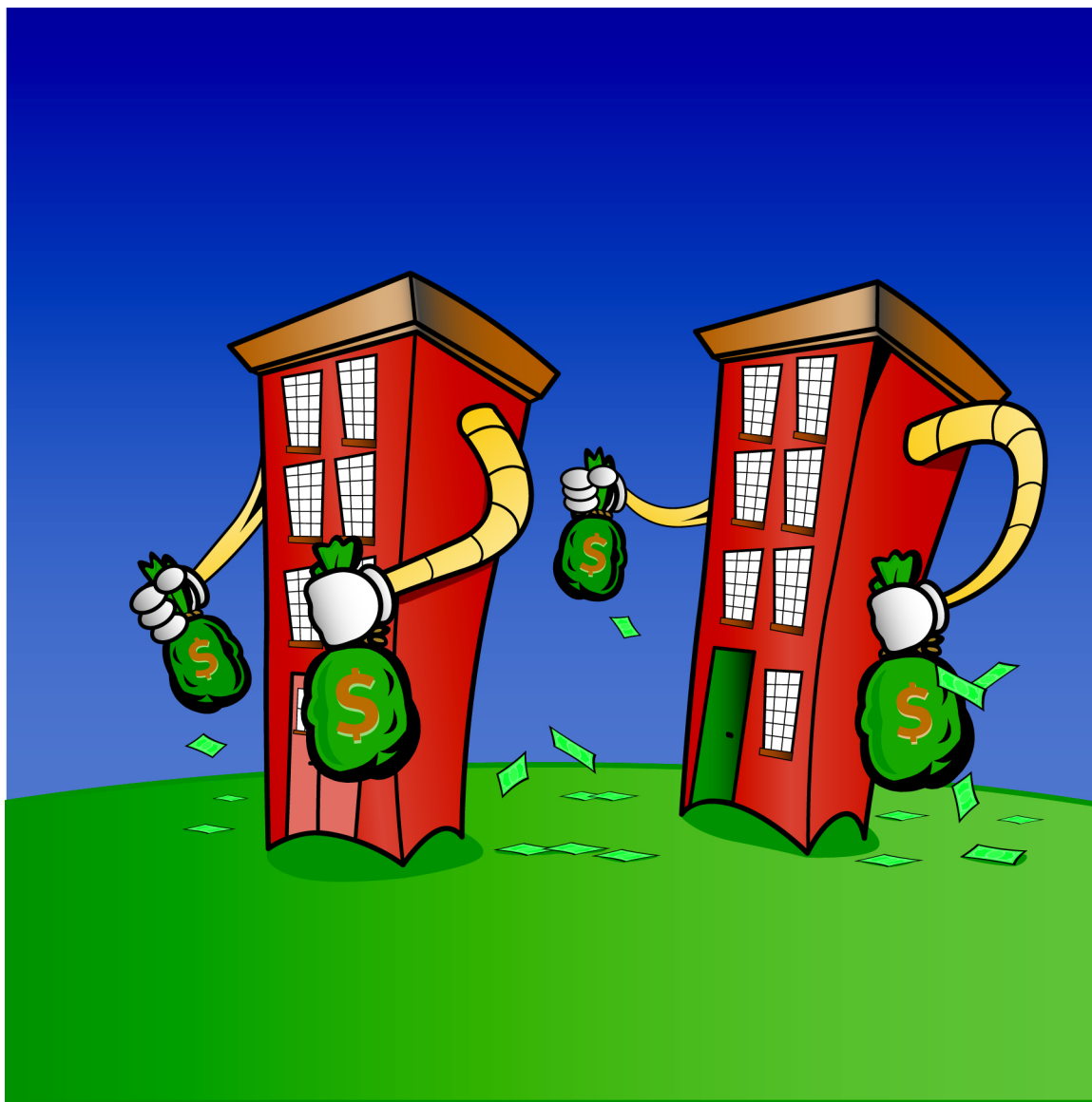




April 2003

## Excess Returns and the BAS AAA Index



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### **Introduction**

Reviewing the fundamental determinants of excess returns on CMBS is a particularly valuable exercise in the current environment given the stellar performance of this asset class in 2002. Our benchmark CMBS indices show 10-year AAA CMBS outperforming comparable duration Treasuries by an astonishing 401 bps during 2002, while the BBB sector posted even more spectacular results and generated 465 bps of excess return.<sup>1</sup> Thus our analysis of CMBS returns tries to answer the very natural question: To what extent do we expect history to repeat itself this year? Other reasons for understanding the risk/reward profile of this asset class include its increasing liquidity,<sup>2</sup> maturity and intrinsic appeal as an asset class with an interest rate and credit profile that is relatively uncorrelated with the prepayment and credit risks embedded in the residential agency and nonagency mortgage markets. To this end, our analysis of CMBS returns should provide investors with important inputs for their portfolio allocation decisions, namely an enhanced understanding of risk/reward profile associated with the CMBS asset class.

### **History**

A brief history of trends in CMBS spreads is useful in terms of gaining a qualitative feel for some of the factors that drive CMBS spread movements and therefore returns. Figure 1 displays nominal spreads<sup>3</sup> on CMBS 10-year AAAs and BBBs relative to the interpolated point on the Treasury curve with the same weighted-average life (WAL). The seed crystal for the modern CMBS market was the RTC's success in disposing of the commercial real estate of failed thrifts through the securitization process. The steady spread tightening from 1992 to 1997 was driven by increasing liquidity, a rebound in commercial real estate and greater investor comfort with the risks associated with investing in CMBS. Over this period, issuance ramped up from approximately \$15 billion in 1992 to \$44 billion by 1997. The CMBS market experienced severe dislocations in the liquidity crisis of autumn 1998. Stress factors included significant losses by CMBS conduits that were hedging commercial real estate pipelines using Treasuries, overleveraged investors in the unrated pieces of CMBS transactions and the demise of LTCM, which held a large CMBS position.

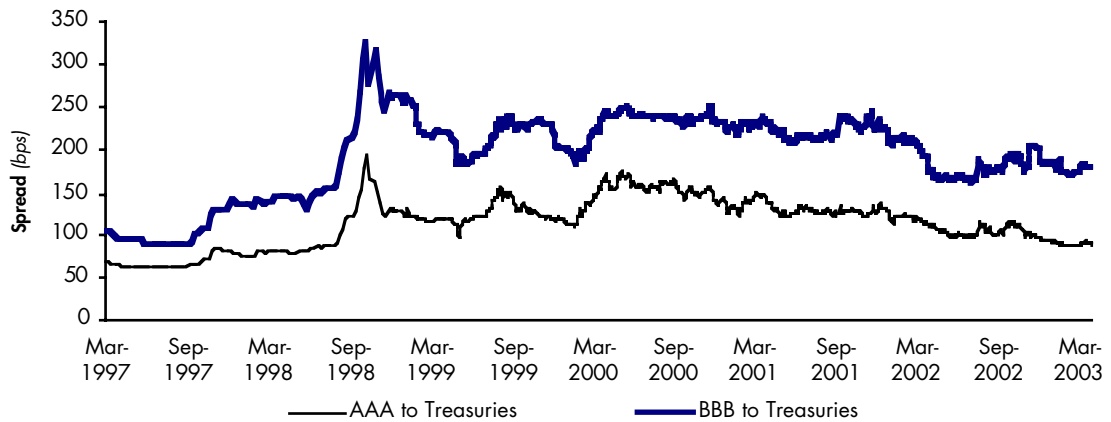
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<sup>1</sup> A discussion of our indices and return calculations is presented in the Appendix on pages 9–11.

<sup>2</sup> Domestic CMBS issuance totaled \$70 billion in 2002, just below 2001's total of \$74 billion.

<sup>3</sup> All CMBS spread quotations in this report reflect a 0% pricing speed assumption.

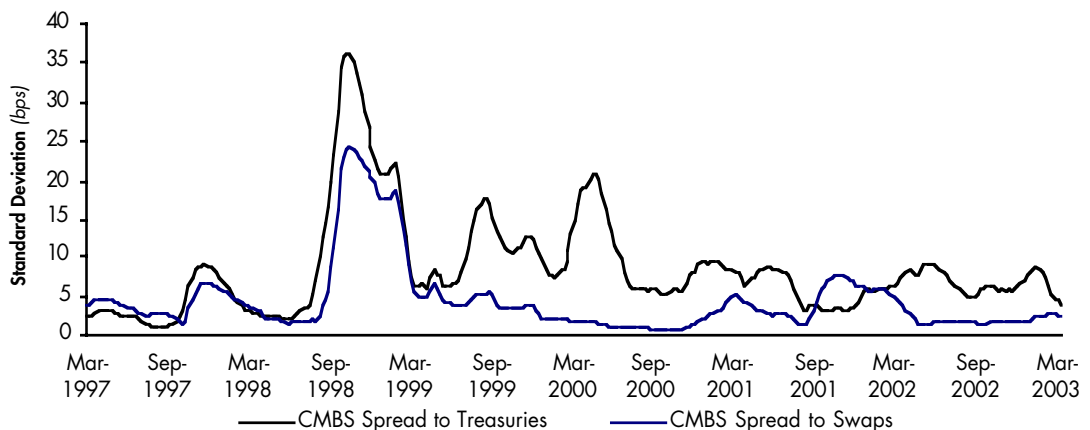
**Figure 1. CMBS 10-year AAA and BBB Spreads to Treasuries, March 1997-Feb. 2003**



Source: Banc of America Securities LLC.

The CMBS market recovered slowly from the fall 1998 crisis with investors and conduits searching for more effective hedge instruments for their CMBS positions. In general, swaps have fulfilled that need and have served as a very effective hedge for CMBS in most situations. Figure 2 illustrates the hedging effectiveness of swaps by graphing the volatility (standard deviation) of AAA CMBS spreads to swaps and Treasuries. Note that the relationship of CMBS to swaps has been much more stable, with the exception of a period of approximately six months following 9/11. Spread dynamics for this period were driven by heavy demand for fixed-rate swaps as mortgage portfolios scrambled to add duration. Recently, some CMBS conduits have found an even more effective hedge than swaps for their pipeline and currently hedge portions of it by paying CMBS returns on a total-rate-of-return swap on the CMBS Index.

**Figure 2. Standard Deviation of AAA CMBS Spread to Treasuries and Spread to Swaps, March 1997-Feb. 2003**

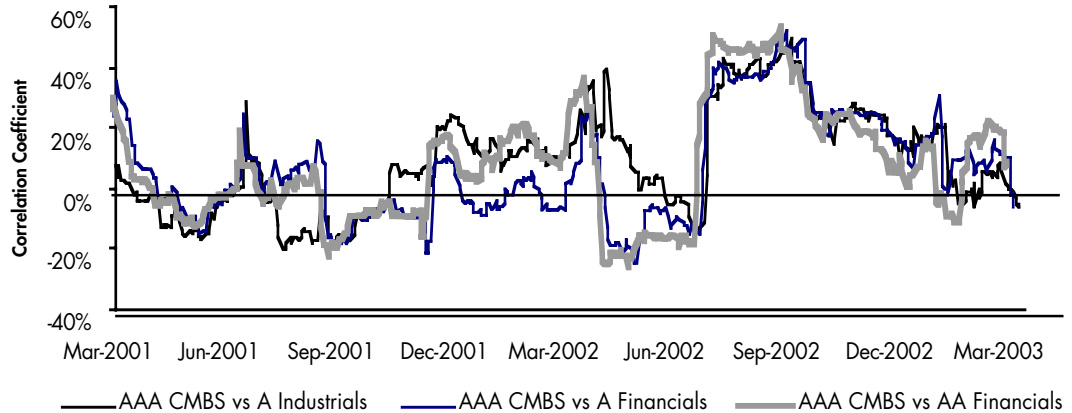


Note: Standard deviation is based on weekly observations for 20 weeks.  
Source: Banc of America Securities LLC.

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While CMBS have tracked swaps very closely, the relationship with other spread sectors has not been particularly close. In particular, recent history has changes in CMBS spreads showing little relationship to changes in corporate spreads.

**Figure 3. CMBS-Corporate Spread Correlations, March 2001–Feb. 2003**



Note: Correlation based on daily changes over three months.  
Source: Banc of America Securities LLC.

The above correlations guide us toward the conclusion that, at least for recent history, movements in CMBS spreads have mirrored the movements in credit spreads as captured by the differential between swap and Treasury rates. Other factors appear to play a less important role because, even though an investor in CMBS debt is short a call and a put option to the commercial mortgage loan borrower, the cost of the call option is significantly lowered by the fact that most CMBS are effectively noncallable for long periods of time by virtue of lockout, defeasance and yield maintenance provisions. Similarly, while commercial loan borrowers do default, these defaults are driven by a complicated and hard to predict set of macro and borrower/property-specific variables. In addition, AAA CMBS are structured to withstand severe credit stresses without loss of principal. In summary, our brief qualitative review of CMBS spreads seems to suggest that the CMBS returns over Treasuries will likely be largely determined by changes in nominal spreads of CMBS over swaps plus the demand for credit spreads as captured by movements in swap spreads.

### Return Analysis

To formalize this intuition, we performed a simple regression-based return attribution on the holding period returns of CMBS investors. To obtain a proxy for CMBS investor returns, we analyzed the daily excess returns over Treasuries of the Banc of America Securities AAA CMBS Index from July 1999 to February 2003. This index includes the AAA classes of conduit transactions with average lives greater than eight years and less than 10 years, the most liquid part of the CMBS universe. The following variables were included in the final version of the attribution model:

- 10-year swap spreads
- Weighted average spread versus swaps of the index bonds
- Carry: Index spread to Treasuries multiplied by the fraction of the year between index closes

We assumed a coefficient value of one for the carry variable (which we confirmed in our statistical analysis) and regressed the remaining excess return versus the two spread variables. Both enter through first differences. Our regression has an R-squared of 71.6%. Swap spreads and index spreads were very significant.

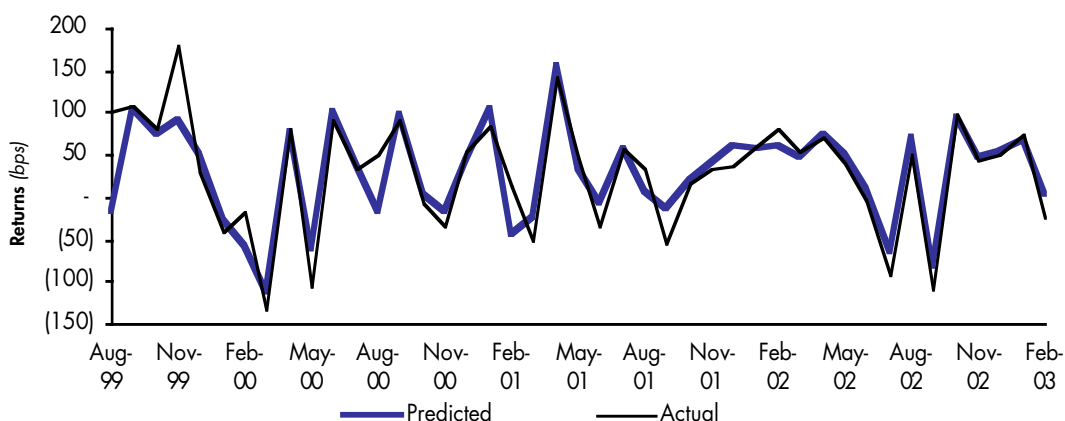
**Figure 4. Summary of Excess Return Regression Results**

	Coefficient	t-Stat	P-Value
Change in 10-Year Swap Spread	-5.42	44.6	<0.0001%
Change in Index Spread vs. Swaps	-5.73	22.9	<0.0001%
Carry	1.00	NA	NA
Constant	0.50	2.1	3.2%

Source: Banc of America Securities LLC.

In Figure 5, we show predicted performances versus actual performance for the 43 months ended February 2003. Residual error averaged 21 bps with a maximum of 117 bps in August 1999. The signs of the regression coefficients are consistent with intuition.

**Figure 5. Predicted vs. Actual AAA CMBS Index Returns, August 1999–Feb. 2003**



Source: Banc of America Securities LLC.

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**10-year swap spreads:** Changes in 10-year swap spreads play the most significant role in explaining excess returns on CMBS. Since the liquidity crisis in the fall of 1998, the correlation between generic AAA CMBS spreads and 10-year swap spreads has been 91%, as reflected in the t-statistic of over 30. In fact, the strong correlation between these sectors has led some investors using AAA CMBS as a swap surrogate.<sup>4</sup>

Explanations for the strong correlation range from the practical to the theoretical. On the practical side, CMBS have been largely hedged with swaps since 1998 and are therefore quoted versus them as well. Next, because CMBS pools are diversified across a large number of loans, micro-level credit information emerges fairly slowly through monthly loan status and quarterly income numbers. Similarly, at the macro level, changes in economic conditions tend to affect real estate in a lagged and gradual manner. Also, because AAA CMBS have minimal loss risk it would take a substantial and immediate shock to the outlook for commercial real estate to produce a sudden shift in the risks associated with investing in CMBS. Lastly, because increases in swap spreads reflect greater risks in the financial system, the strong correlation also suggests a relationship between CMBS and the overall health of the capital markets. As a relatively highly leveraged industry, the health of commercial real estate depends on continued access to capital and therefore would suffer if lender health deteriorates. However, in the final analysis, these causes are not completely convincing, and the use of swaps as a benchmark appears to be a product of habit as much as anything. This raises the prospect of decoupling of CMBS and swaps if differences in their risk exposures become particularly pronounced, although this risk is common to a number of fixed income products hedged with swaps.

**Index spreads to swaps:** Not surprisingly, changes in index spreads were a major determinant of excess returns. Index spreads reflect credit concerns for individual deals, capture the technical pressures of supply and demand and also capture the effect of dollar price on bond pricing. While defeasance and lockout provisions on commercial loans limit prepayments, principal can be received early due to default or by early payoff with a yield maintenance penalty. As a result, the market generally requires 1 bp or 2 bps of additional spread per dollar over par. The correlation of price change to spread change was 33% over the analysis period and has been 53% since September 2000. Because this effect was included in the index spread, it did not appear independently in our model.

**Carry:** As already noted, we assumed a coefficient value of one for our carry measure and our analysis did not indicate that the coefficient is significantly different from that.<sup>5</sup> Because of its obvious relevance—holders would expect higher returns with spreads of 150 bps over Treasuries than with a spread of 100 bps—we have retained it in the analysis.

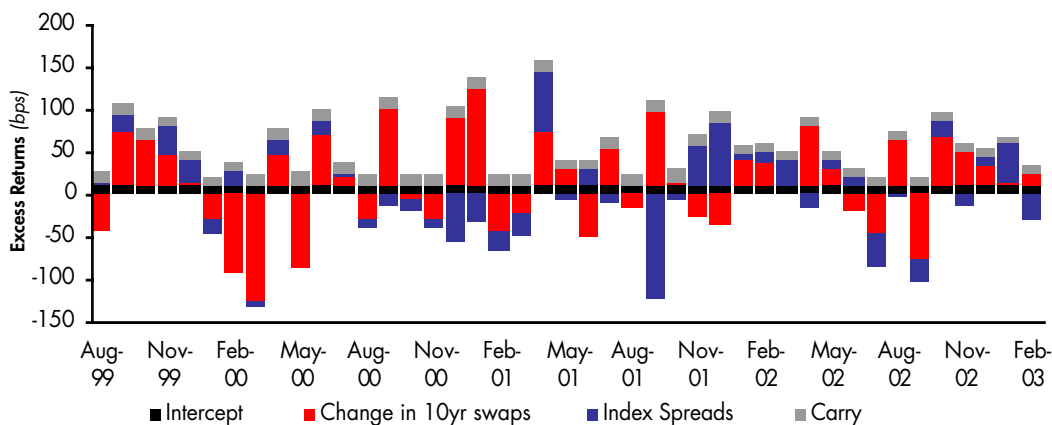
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<sup>4</sup> Execution is similar in the two sectors because of similar bid-ask spreads. In addition, CMBS offer better carry.

<sup>5</sup> With a standard error of 0.69, the coefficient is somewhat uncertain, but 1.0 was the logical default value.

What is the relative effect of the components of the model? In Figure 6, we show the contribution of each one for the past 43 months. As Figure 6 makes clear, swap and index spread changes accounted for the largest share of the excess returns explained by the model. The standard deviations of their respective contributions were 54 bps and 33 bps. Excess returns attributable to carry were relatively stable, consistently delivering 10 bps–18 bps of excess return per month. In Figure 7, we present the effect of the different components in 2002, which illustrates the source of last year's strong performance. Tightening swap spreads and the carry component together accounted for 71% of the predicted excess returns and 85% of the actual returns.

**Figure 6. Components of Predicted Excess Return of AAA CMBS Index, August 1999–Feb. 2003**



Source: Banc of America Securities LLC.

**Figure 7. Summary of Predicted Excess Returns, 2002 (bps)**

	Day Count Adj'd. Constant	Change in 10 Yr. Swaps	Change in Index Spreads to Swaps	Carry	Predicted	Actual	Error
Dec-02	10.56	21.68	10.67	9.35	51.14	52.26	1.12
Nov-02	9.55	40.66	(11.78)	9.15	43.45	47.58	4.13
Oct-02	11.06	55.57	18.63	10.53	97.77	95.78	(1.99)
Sep-02	10.05	(75.89)	(27.03)	10.27	(108.89)	(82.61)	26.28
Aug-02	11.06	52.85	(3.70)	9.62	49.73	69.82	20.10
Jul-02	11.06	(46.08)	(40.19)	9.90	(92.26)	(65.31)	26.95
Jun-02	10.05	(18.97)	11.20	8.10	(3.07)	10.38	13.45
May-02	11.06	20.33	9.33	8.83	40.38	49.55	9.17
Apr-02	11.06	69.12	(18.01)	10.52	70.04	72.69	2.65
Mar-02	10.05	(1.36)	30.51	9.09	52.21	48.31	(3.90)
Feb-02	9.55	27.11	11.90	10.84	82.39	59.39	(22.99)
Jan-02	10.56	28.46	6.43	10.71	61.19	56.15	(5.03)

Source: Banc of America Securities LLC.

### **Other Variables**

**Volatility:** We tested both realized and implied volatility. The former was found to be significant in combinations with certain variables, although it was not significant in the final version of the model. When it was significant, it had a negative sign indicating that higher volatility was correlated with lower excess returns.

**Swap curve slope:** The slope of the swap curve had a negative effect on excess returns. That is, a steepening of the curve corresponded to weaker performance of the AAA CMBS Index versus Treasuries. This was somewhat counterintuitive as we expected the better roll-down and wider spread between short-term financing and CMBS yields in a steeper yield curve environment to raise demand and produce CMBS outperformance. We attribute the opposite result to the correlation between curve steepening and price increases. Curve steepening usually produces higher dollar prices that can be accompanied by spread widening when the CMBS Index is priced over par. We found that the slope/excess return relationship is negative when the dollar price exceeds par and positive when less than par. Given that the CMBS Index was priced at a premium during most of the period covered, the yield slope/dollar price effect has predominated in our analysis.

**CMBS credit spreads:** The difference between AAA CMBS spreads and A CMBS spreads showed a small negative affect on excess returns. This suggests a credit component effect on AAA spreads and excess returns. Single-A CMBS are more sensitive to credit conditions in commercial real estate markets, and therefore will widen more than AAA classes if fundamentals are perceived to be deteriorating. However, an increase in the expected speed of defaults would also affect AAA CMBS despite the minimal likelihood of a loss of principal. Because CMBS generally had premium prices in the period covered, the early return of principal due to defaults would lower returns. Because the effect is correlated with spread movements and the effect was relatively small, we chose to exclude the variable. We note that the CMBS Index would be one of the least credit-sensitive sectors in the universe given its minimal seasoning and high rating.

**Spread to alternative sectors:** Despite testing numerous different combinations, the differential between CMBS spreads and corporate spreads was not a significant factor in excess returns.

**Dollar price:** As mentioned earlier, the effect of dollar price on returns is embedded in the weighted average index spread and therefore neither dollar price nor change in Treasury yields (which was also captured the premium price effect) was significant in the final model.



### **Outlook for 2003**

**Swap spreads:** Based on forward rates, 10-year swaps are projected to increase to approximately 55 bps. However, BAS interest rate strategist Eric Hiller expects the curve to remain steeper than forward rates indicate, resulting in a year-end swap spread of approximately 50 bps, which represents a 15–20-bp increase from current levels. This would result in 80 bps–110 bps of index underperformance versus Treasuries.

**Index spreads to swaps:** We are positive on the outlook for new issue AAA spreads versus swaps. Coming into the year, we expected relatively wide corporate spreads to limit interest in CMBS. Spreads were also restrained in the first quarter as the large March calendar loomed over the market. Despite these limitations, new issue AAA spreads tightened briskly in January, surrendered some of those gains in February and stabilized in March, to record a few basis points of improvement thus far in 2003. We attribute the relatively strong performance to the increased confidence in the sector and growing buyer base following last year's strong performance. In addition, while we believe there is the potential for defaults to ratchet up as the economy stalls, we expect the number of defaults to remain near the levels seen in 2002. We do not believe this would be high enough to alter investor's confidence in the sector and widen spreads. Given the robust demand we have seen, we believe the typical range of new issue AAA CMBS spreads will trend down from 40 bps–50 bps of the past 18 months to 35 bps–45 bps range. Spreads should also be aided by rising dollar prices. Banc of America economists project a 10-year Treasury rate of approximately 4.8% at year-end. Combined with widening swap spreads, this equates to an increase in swap yields of approximately 100 bps, which would produce an index spread decrease of approximately 7 bps. Combined with 3 bps of new issue spread improvement, we see a total 10 bps of tightening in the index spread, which would contribute 55 bps–60 bps of outperformance.

**Carry:** As already noted, the contribution of carry to excess returns is relatively consistent. We expect it to be slightly lower this year as falling swap spreads leave AAA spreads to Treasuries at low levels. We expect carry to contribute 65 bps to excess returns.

Combining the three elements, we expect the BAS AAA index to outperform Treasuries by 25 bps–30 bps in addition to the 80 bps thus far in 2003.

### **Appendix A: Description of the CMBS Index**

#### **Banc of America Securities LLC Commercial Mortgage-Backed Securities**

Indices are designed to provide the total rate of return of a portfolio of new and recently issued classes of CMBS. We examine the rationale, index criteria and calculation methodology of the indices in this report. The indices are structured to include only generic conduit CMBS that provide superior call protection. The homogeneous quality and duration of the indices enable a fund manager to refine and compare CMBS strategies to other asset classes such as Treasuries or corporates.

#### **Index Features**

The purpose of the CMBS Index is twofold: to measure the total rates of return of constituent securities and to reflect the composition of a specified yet generic segment of the CMBS market. To realize these objectives, the index is designed to meet the following specific criteria:

- **Reliably priced.** Banc of America Securities LLC provides hand-marked daily yield spreads for each security, which is the basis for the calculation of yields, prices, returns, excess returns, and other parameters of value for all classes included in the indices.
- **Transparent.** The Banc of America CMBS indices are fully transparent to our customers. We provide all the bonds and their closes to our CMBS Index swap customers. Index results are posted on Bloomberg and in Commercial Mortgage Alert, Commercial Real Estate Direct and various originator websites.
- **Comprehensive.** As of February 21, 2003, 45 classes met the AAA 10-year index criteria, with unpaid principal balances totaling \$24 billion.
- **Singly counted.** The indices include only one return on any day for any individual class and weights that return by the market value of the class. Hence, it excludes select derivative classes and all classes from certain deals.
- **Replicable in practice.** The indices do not formally consider the liquidity or availability for purchase by investors of any constituent class. Thus, they conform to the practice of most total rate of return indices as well as fixed income and equity indices. Given the size and liquidity of the CMBS sector, investors should be able to replicate our indices, analytically or in practice, over time.
- **Compliant with modern portfolio theory.** We will provide daily, monthly, quarterly, and annual historical returns of the Banc of America CMBS indices to enable investors to apply the principles of modern portfolio theory, for example, mean-variance or other optimization methods.

### **Selection Criteria**

The Banc of America CMBS Index guidelines include the following classes:

- **Rated classes.** Bonds with the appropriate ratings from at least two of the four nationally recognized statistical rating agencies are included. The ratings are specific. BBB- and BBB+ would not be included in a BBB index.
- **Most issuer types.** Dealer, commercial bank, insurance company, finance company, thrift institution, pension fund, REIT, and developer are among the issue types allowed in the index.
- **All fixed-rate classes.** The AAA CMBS indices include fixed-rate classes with weighted-average lives of at least eight years, and not more than 10 years.
- **Principal balance.** Minimum original principal balance must be within reasonable standards for Conduits.
- **Call protection.** Only deals with strong call protection are included in the CMBS indices. The constraint we impose is that the WAL may not drop more than one year when moving from a zero to a 100% CPY (Constant Prepayment after Yield Maintenance) assumption.

The Banc of America CMBS indices guidelines exclude the following classes:

- **Wrapped deals.** CMBS that have guarantees by agencies or other sureties are excluded.
- **Special security types.** Large loans are discouraged through a minimum loan count. Deals with high concentrations of credit term lease and sell leaseback loans are removed. Single borrower deals are also excluded from the indices.
- **CMBS issued before 1997.** CMBS issued before January 1997 are excluded from the CMBS indices.
- **CMBS issued by the Resolution Trust Corporation (RTC).** CMBS issued by RTC have structures that are inconsistent with current deals.
- **Re-REMIC, interest only (IO) and principal only (PO) securities.** These are excluded because they represent a separate sector of the CMBS market.
- **Seasoning.** Those transactions with a weighted average collateral seasoning greater than 18 months on the securitization date are excluded from the indices.
- **Non-US collateral.** To enable the indices to supplement the domestic total rate of return indices, we exclude all CMBS with substantial underlying mortgage loans on properties located outside the United States and its territories.

### **Calculation Methodology**

**Computation:** The CMBS indices are constructed conventionally to permit direct comparison with the various domestic investment grade and non-investment grade total rate of return indices. They represent the aggregate of the market-weighted total returns of all included classes. The market weight is the product of the current price and the unpaid principal balance of each class divided by the sum of the market values of all included classes. The total return of a class is the sum of the daily change in price, the accrued interest and the effect of prepayment on premium or discount in price divided by the prior price.

**Frequency:** Banc of America Securities LLC Real Estate Research hand-marks and calculates its CMBS indices daily, using spreads, yields and prices determined as of 3:00 p.m. EST each day. We report consistent daily, monthly, quarterly, and annual total rates of returns as of their respective 3:00 p.m. closes.

**Re-weighting and issue addition/subtraction:** Changes to the weighting and composition of the CMBS indices occur on the last business day of each month to reflect rating changes, new issuance, scheduled and unscheduled repayment of principal, redemption of classes, or compliance/noncompliance with any other index rule. When a class is added to the index, it will be included in the total rate of return (TRR) for the month just commencing. When a class is removed from the index, the class is included in the TRR of the current month that is just ending, but will not be included in the subsequent month.

**Reinvestment:** The index will not include interim reinvestment of receipts into money market instruments. Rather, all receipts are reinvested into the index.

**Excess return calculation:** Excess return calculations are done daily based on the difference between index returns and an equal-duration Treasury portfolio. The modified duration of the index is calculated assuming no defaults and no prepayments. The Treasury portfolio is a blend of five- and 10-year on-the-run Treasuries. The Treasury portfolio is reset daily and the relative weightings of the five- and 10-year varied from 27%/73% to 43%/57%.

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