

## Analyzing Yield Maintenance Provisions in Callable Commercial MBSs

- Yield maintenance provisions, which are common in callable commercial mortgages (CMBSs), protect investors by reducing the prepayment risk of callable securities, by imposing penalties on the exercise of prepayment options, making them onerous for mortgagors to exercise.
- Yield maintenance penalties usually benefit bond holders, effectively increasing the "call price" in the event of prepayments. They are usually structured to compensate the investor for anticipated losses from being forced to reinvest, presumably, in a lower interest rate environment.
- Commercial MBSs with yield maintenance provisions typically outperform non-callable corporate bonds as well, as the penalties are usually worth more than the economic value of the reinvestment risk. In addition, commercial MBSs yield significantly more than corporates, further enhancing their returns, even in the case where the bonds are not called.
- **In this paper, we analyze the yield maintenance provisions of a recently issued AA-rated multifamily commercial MBS. We compare anticipated returns on this security, under different interest rate scenarios, with anticipated returns on a hypothetical AA-rated callable corporate bond, and show that the yield maintenance provisions allow the commercial MBS to consistently outperform the corporate bond.**

### A typical yield maintenance penalty

- As mentioned above, yield maintenance penalties on prepayments are structured to make lenders "whole", by compensating them for anticipated reductions in returns as a result of the prepayments.
- Since the investor can reinvest prepayments in Treasuries with the same remaining maturity, anticipated losses are the result of the difference in coupons between the commercial MBS and the reinvestment instrument.
- **The prepayment penalty is therefore usually computed as the present value of the difference between the mortgage rate and the yield on a Treasury with a comparable remaining maturity.**
- If the mortgage rate on the loan is greater than the coupon on the MBS, the prepayment penalty will be greater than the economic value of the coupon difference foregone. If the entire penalty amount is passed through to bondholders, it would more than compensate them for any economic loss.
- Yield maintenance penalties therefore give CMBSs stable and attractive duration and convexity characteristics, giving them attractive return characteristics under most scenarios. This is illustrated in the following analysis.

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## Comparing a recently issued Commercial MBS with a Hypothetical Callable Corporate Bond

### The Commercial MBS

Coupon:	7.64%
Price:	106-28
Yield:	+120/7-yr (5-10 UST blend)
Cashflow Frequency:	Monthly
Rating:	AA
Months to Maturity:	84 months
Months to First Call:	36 months
Yield Maintenance Period:	36 months to 72 months

### The Callable Corporate Bond

Coupon:	6.00%
Price:	100-08
Yield:	+75/7-yr (5-10 UST blend)
Cashflow Frequency:	Semi-Annually
Rating:	AA
Months to Maturity:	84 months
Months to First Call:	36 months
Call Price:	Par

- We compute 84 month total returns for each security in the following tables, under different prepayment (call) and interest rate scenarios. The prepayment scenarios vary the call date, and assume that the entire bond is prepaid on that date, with the call proceeds including yield maintenance proceeds. The interest rate scenarios instantaneously shock the current yield curve, and assume that its shape remains constant. The yield level of the appropriate Treasury is used to determine the yield maintenance proceeds in scenarios where the CMBS is called.
- In the scenarios in which the bonds are called, we assume reinvestment of the proceeds (principal, yield maintenance proceeds, and cashflow received to date) into a Treasury with maturity equal to the remaining maturity of the bonds on the call date, thus maintaining an 84 month total return horizon under all scenarios. This allows us to maintain consistency with the yield maintenance penalty calculation, and allows us to estimate the cost or benefit of calls and prepayments. We assume parallel shifts of the yield curve as of 1/31/94.
- Table 1 shows the CMBS's performance under the different scenarios. Looking down the columns, we observe that, in most cases, the total returns *increase* if the bond is called, relative to the total returns to maturity. This is a result of the yield maintenance penalty being worth more than the economic value of the coupon flows.
- Under these scenarios, the CMBS's total returns are consistently higher than those of the corporate bond's, in Table 2, even when the corporate bond is not called. The relative outperformance tends to be greatest when the bonds are called in falling rate environments, reflecting the greater yield maintenance penalties. This illustrates our expectation that the CMBS is likely to outperform even non-callable corporate bonds, which is seen in Table 3.

**Table 1**  
**AA-rated Commercial MBS**

**84 Month Total Returns, under Different Prepayment and Interest Rate Scenarios**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	5.47%	5.73%	6.00%	6.27%	6.55%	6.84%	7.13%
<b>72</b>	5.80%	5.91%	6.03%	6.16%	6.29%	6.43%	6.58%
<b>60</b>	5.59%	5.85%	6.12%	6.39%	6.67%	6.97%	7.33%
<b>48</b>	5.64%	5.91%	6.18%	6.46%	6.75%	7.04%	7.51%
<b>36</b>	5.70%	5.97%	6.24%	6.52%	6.82%	7.11%	7.78%

**Table 2**  
**AA-rated Callable Corporate Bond**

**84 Month Total Returns, under Different Prepayment and Interest Rate Scenarios**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	5.18%	5.33%	5.48%	5.63%	5.79%	5.95%	6.11%
<b>72</b>	5.02%	5.13%	5.24%	5.36%	5.47%	5.59%	5.71%
<b>60</b>	4.44%	4.80%	5.17%	5.55%	5.92%	6.30%	6.68%
<b>48</b>	4.11%	4.60%	5.09%	5.58%	6.07%	6.57%	7.06%
<b>36</b>	3.86%	4.46%	5.08%	5.69%	6.31%	6.92%	7.54%

**Table 3**  
**Total Return Pickup - Commercial MBS over Callable Corporate Bond**

**84 Month Total Returns, under Different Prepayment and Interest Rate Scenarios**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	0.29%	0.40%	0.52%	0.64%	0.76%	0.89%	1.02%
<b>72</b>	0.78%	0.78%	0.79%	0.80%	0.82%	0.84%	0.86%
<b>60</b>	1.15%	1.04%	0.94%	0.84%	0.75%	0.67%	0.65%
<b>48</b>	1.53%	1.31%	1.09%	0.88%	0.68%	0.48%	0.45%
<b>36</b>	1.84%	1.50%	1.17%	0.83%	0.51%	0.19%	0.24%



- Table 4 shows the "effective call price" of the CMBS under different rate environments. We compute the "effective call price" by adding to par the ratio of the yield maintenance penalty to the principal prepaid. The call price is higher if rates decline, and if the bond is called sooner, reflecting larger yield maintenance penalties under such scenarios. The call price is also higher than par in high rate environments, reflecting the upward sloping yield curve.

**Table 4**  
**AA-rated Commercial MBS**  
**Effective Call Price with Yield Maintenance Penalty**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	100.00	100.00	100.00	100.00	100.00	100.00	100.00
<b>72</b>	106.28	105.26	104.25	103.25	102.26	101.29	100.32
<b>60</b>	111.09	109.05	107.04	105.07	103.14	101.25	100.00
<b>48</b>	115.71	112.63	109.63	106.73	103.90	101.16	100.00
<b>36</b>	119.35	115.25	111.32	107.53	103.88	100.36	100.00

- Tables 5, 6, and 7 show the yields of the 2 securities under the different scenarios. The increase in yields of the CMBS when it is called, in spite of the 6-28 point price premium, again reflects its superior convexity characteristics.

**Table 5**  
**AA-rated Commercial MBS**  
**Yield to Maturity/Call**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	6.46%	6.46%	6.46%	6.46%	6.46%	6.46%	6.46%
<b>72</b>	7.13%	7.00%	6.87%	6.73%	6.60%	6.47%	6.34%
<b>60</b>	7.87%	7.55%	7.23%	6.91%	6.59%	6.27%	6.06%
<b>48</b>	8.99%	8.37%	7.76%	7.16%	6.56%	5.97%	5.71%
<b>36</b>	10.64%	9.53%	8.44%	7.36%	6.29%	5.23%	5.12%

**Table 6**  
**AA-rated Callable Corporate Bond**  
**Yield to Maturity/Call**

Prepay Month	Interest Rate Scenarios						
	-200	-100	0	100	200	300	400
<b>Maturity</b>	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%
<b>72</b>	5.95%	5.95%	5.95%	5.95%	5.95%	5.95%	5.95%
<b>60</b>	5.94%	5.94%	5.94%	5.94%	5.94%	5.94%	5.94%
<b>48</b>	5.93%	5.93%	5.93%	5.93%	5.93%	5.93%	5.93%
<b>36</b>	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%	5.91%

**Table 7**  
**Yield Pickup - Commercial MBS over Callable Corporate Bond**

<b>Prepay Month</b>	<b>Interest Rate Scenarios</b>						
	<b>-200</b>	<b>-100</b>	<b>0</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>
<b>Maturity</b>	0.51%	0.51%	0.51%	0.51%	0.51%	0.51%	0.51%
<b>72</b>	1.18%	1.05%	0.92%	0.78%	0.65%	0.52%	0.39%
<b>60</b>	1.93%	1.61%	1.29%	0.97%	0.65%	0.33%	0.12%
<b>48</b>	3.06%	2.44%	1.83%	1.23%	0.63%	0.04%	-0.22%
<b>36</b>	4.73%	3.63%	2.53%	1.45%	0.38%	-0.67%	-0.78%