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## **MBS Price Changes and OAS Widening: Some Nuances and Complexities**

There has been some debate on exactly how much MBSs widened during the first half of February. For FNMA 7.5s, for example, we show a widening in OAS of about 8bp, while a simple comparison of the FNMA 7.5% price change with Treasury price changes implies a much smaller OAS widening. We discuss some of the difficulties with such simple comparisons, and show why the widening is greater in OAS terms than suggested by simple price comparisons.

**Comparing MBS and Treasury changes.** We will use the FNMA 7.5s as our example. Figure 4 shows market moves for the 7.5s.

**Figure 4. FNMA 7.5% Price Changes, 31 Jan 97-14 Feb 97**

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FNMA 7.5% Price for 1/31/97 close: 100-06
FNMA 7.5% Price for 2/14/97 close: 100-29
Price Change = 23/32nds
% Price Change = 0.717

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Source: Salomon Brothers Inc.

Figure 5 shows the projected price change using partial durations and Treasury model curve yield changes.

**Figure 5. Projected Price Change for the FNMA 7.5% Using Partial Durations**

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Tsy. (Yr.)	1	2	3	5	10	20	30
Partial Dur. for FN 7.5%	.12	.25	.48	1.18	1.33	1.14	0.04
Yield Change for Tsy.	-.116	-.140	-.166	-.194	-.202	-.208	-.212
Implied Px Chg.	.01392	.03500	.07968	.22892	.26866	.23712	.00848
Implied Price Change for the 7.5s = 0.01392 + . . . + 0.00848 = 0.872							

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Source: Salomon Brothers Inc.

Hence, from Figures 4 and 5

$$\text{MBS Underperformance} = 0.872 - 0.717 = 0.155$$

The spread duration for the 7.5% is about 4.8, so

$$\text{Implied OAS widening} = 0.155/4.8 = 3.2\text{bp}$$

The actual OAS widening (using fixed volatilities and the Treasury model curve) was 8bp. Why the discrepancy? There are several reasons:

**OASs Are Based on Carry-Adjusted Prices.** The prices shown above, or shown in the Key Issue Package or on the Yield Book,<sup>®</sup> are for forward settle. Our OAS calculations use *carry-adjusted prices* to make MBSs comparable to corporates or Treasuries. We use dollar roll drops to calculate an implied financing rate, and then "gross up" the forward price to represent next-day settlement (the method also factors in cash-flow differences — if we settle in February, for example, we will receive the February prepayment, whereas if we settle in March, the first cash flow will be in April, representing March prepayments).

The carry for half a month on 7.5s is worth about 3+ ticks — in other words, about 3+ of the increase in the 7.5% price is just a result of carry, independent of market moves. Thus, the underperformance using carry-adjusted prices is:

$$0.155 \text{ (from above)} + 3.5\text{ticks}/(100-06) = 0.264,$$

$$\text{so implied OAS widening} = 0.264/4.8 = 5.5\text{bp}$$

**OASs Are Affected by Changes in Current-Coupon Spreads.** We use parity current-coupon rates, obtained by interpolating from the MBSs on either side of the parity price,<sup>7</sup> to obtain initial 30-year mortgage rates to

<sup>7</sup> The parity price is the price at which the yield of an MBS is unaffected by speeds. If there was no delay, the parity price would be 100. The delay makes it lower - for FNMA's, it is typically just below 99-16

feed into the OAS model. From January 31, 1997 to February 14, 1997, the parity current-coupon rate declined from 7.313% to 7.166%, a drop of 14.7bp, compared with a drop of 20.2bp in the ten-year point of the Treasury model curve. This widening of roughly 6bp in current-coupon MBS spreads is worth about 1.5bp in OAS for the 7.5s (i.e., it explains about 1.5bp of the OAS widening, giving us a total OAS widening of 7bp).

Using carry-adjusted prices and factoring in changes in current-coupon spreads gives us an implied widening of 7bp, compared with the actual widening of 8bp. Where does the extra 1bp come from?

Other factors that can play a part, but seem relatively unimportant in this case, include **volatility**, **convexity**, and **accrued interest** (especially if the yield is significantly different from the coupon rate). The residual widening in the OAS is probably a result of **a change in on-the-run Treasury yields due to a new issue**. On Thursday, February 13, 1997, a new ten-year on-the-run issue meant that the spread between the MBS parity current-coupon yield and ten-year increased by about 3bp. While the initial 30-year mortgage rate is derived from the parity current-coupon yield (and hence independent of the Treasury curve), 30-year mortgage rates along the yield curve paths generated for OAS calculations depend on the initial spread between the parity coupon and the on-the-run ten-year (this is true even if we use the Treasury model curve). The arguably spurious widening in this spread on February 13 led to approximately a 0.8bp widening in the FNMA 7.5% OAS.<sup>8</sup>

### **Summary**

Care has to be taken when using MBS prices to gauge performance relative to Treasuries. Although the introduction of a new ten-year on-the-run Treasury caused a roughly 1bp spurious widening in OASs on February 13, 1997, FNMA 7.5s still widened by about 7bp in OAS in the first half of February, even though a simple price comparison would imply an OAS widening of about 3bp.