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Why OASs Change

On Thursday, October 1, 1998, the OAS on FNMA 6.5s widened by 6bp (to fixed vols). At first glance, this seems a little off; the duration of the 6.5s is just over two years, and the price change on the 6.5s (up six ticks) was only slightly less than that on the two-year Treasury (eight ticks). Why, then, did the 6.5s underperform by 6bp? We answer this question by reviewing the factors in MBS prices/OASs.

Figure 39 shows pertinent information on the 6.5s.

Figure 39. TBA FNMA 6.5s											
		Carry Imp. Vol.		Eff	Eff	Treasury Partial Durations				Spd	Curr
	Price	Adjusted	OAS	Dur	Convx	2-Yr.	5-Yr.	10-Yr.	30-Yr.	Dur	Cpn Dur
9/30	101-22	101.735	98	2.3	-3.6	0.8	1.0	0.2	0.4	3.7	-0.18
10/1	101-28	101.917	101	_	_	_	_	_	_	_	_

Durations from MB728. Carry Adjusted Prices from MB825. Supplemental Mortgage Key Issue Information). Source: Salomon Smith Barney.

6.5s are most sensitive to the five-year part of the Treasury curve.

Yield Curve Partial Durations

The first thing to note is that, although the 6.5s may have an effective duration of around two years, they are affected by parts of the Treasury yield curve other than the two-year. It is more accurate to use the appropriate partial durations for the change in each part of the curve. Note, for example, that the largest partial duration of the 6.5s is the five-year component, not the two-year.

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	3-Mo.	6-Mo.	1-Yr.	2-Yr.	5-Yr.	10-Yr.	30-Yr.
9/30	4.36	4.49	4.40	4.29	4.23	4.42	4.98
10/1	4.23	4.38	4.29	4.16	4.09	4.31	4.89
Change	-0.14	-0.11	-0.11	-0.13	-0.14	-0.11	-0.09

Source: Salomon Smith Barney.

The two-year partial duration really represents the entire short end of the yield curve up to and including the two-year point. Averaging the yield changes of the three-month, six-month, one-year, and two-year shown in Figure 40 gives the approximate rate change (0.12%) to apply to the two-year partial duration. So the partial duration related price effect (durations are applied to the carry adjusted price) is:

101.735*(0.12*0.8 + 0.14*1.0 + 0.11*0.2 + 0.09*0.4)/100 = 0.301

or about ten ticks. Hence, the Treasury curve changes imply a price increase in the 6.5s of about ten ticks, compared with the actual change of six ticks.

Parity Coupon and Current Coupon Spread

Mortgage rates are at historic lows, so OASs are sensitive to even small changes in the spread between current coupon yields and Treasuries. The Salomon Smith Barney Prepayment Model estimates primary market mortgage rates based on the yield of the *parity coupon*. The parity coupon is the coupon whose yield is not affected by prepayments. If there were no payment delay, the coupon priced at par would have a fixed yield equal to its coupon (assuming monthly compounding) regardless of the prepayment assumption. Because of the payment delay, the price of the parity coupon is obtained by discounting par by the coupon rate for a period of time equal to the delay. Although there is a (weak) dependence on coupon, for Fannie Maes, for example, the parity price tends to be around 99-16. The base 30-year mortgage rate (shown at the bottom of each OAS report) is equal to the monthly compounding equivalent of the parity coupon yield plus a servicing spread.

The widening in mortgage spreads made mortgages relatively less refinanceable and so had a positive effect on price.

The parity coupon is the

coupon whose yield is

not affected by

prepayments.

The *current coupon spread duration* measures the impact of changes in the spread between mortgage rates (or current coupon yields) and the ten-year Treasury. The negative sign of this duration indicates that prices increase as this spread widens (for Fannie Mae 6.5s, the price should go up by 0.18% for every 10bp of widening in this spread). Thus, as mortgages widened on Thursday, this had a positive effect on prices, since the widening made mortgages less refinanceable than they would otherwise have been if the spread had remained constant (in which case, mortgage rates would have been moving in lock step with the ten-year yield). The current coupon spread widened 7bp on Thursday, so the price effect is:

$101.735^{*}(0.07^{*}10)^{*}0.18/100 = 0.128$

or about four ticks. In other words, the widening in current coupon spreads implied that the 6.5s should have increased a further four ticks, in addition to the ten ticks implied by Treasury curve changes.

Our analysis thus indicates that the 6.5s should have increased about 14 ticks, whereas the actual price increase was six ticks. Since the *spread duration* of the

6.5s was 3.7, the eight-tick price underperformance implies a widening in OAS of roughly:

(8/32)/101.735/3.7

This comes to approximately 6bp, which by a happy coincidence happens to be the actual widening.

Note that the widening in implied vol OAS was 3bp, reflecting higher vols and hence lower OASs (for a given price). A discussion of vol duration and other factors can be found in previous publications.¹⁶

¹⁶: See *Effective and Implied Durations of Mortgage Securities*, Lakhbir Hayre & Hubert Chang, September 1996 and Bond Market Roundup: Strategy, February 21, 1997.