credit scoring, property appraisals, and title searches inevitably increase the efficiency of refinancing, the prepayment curve is bound to rise further. These improvements in refinancing efficiency are *not* in place yet, but they probably will be within two or three years, and sooner if a rally launches a large-scale refinancing wave before then. Mortgage investors are justified in requiring somewhat higher OASs than usual as compensation for these risks; spreads that look extremely cheap today are only moderately cheap with these risks taken into account.

When Does Negative Convexity Really Hurt?

Performance Cushion

Mortgages are now cheap enough that they stand a good chance of outperforming Treasuries in moderate market moves. For rallies of 50 bp or less over a six-month horizon, mortgages should outperform Treasuries by a reasonable cushion. OASs could widen by 5-10 bp above and beyond their recent directionality before mortgages start to underperform. For example, conventional 30-year 8s have traded recently with an OAS directionality of 8 bp for a 50 bp rally. But they could widen by 15 bp before they underperform Treasuries in such a rally (see table below). In price terms, mortgages could lag today's Treasury hedges by 7-11 ticks before they underperform on a total return basis (see last column).

The Performance Cushion in a 50 bp Six-Month Rally

FNMA	Emp		OAS Widening (bp)				Price Performance		
Coupon	OAS Dur	OAS	Emp *	Breakeven	Cushion	Price	Emp **	Breakeven	Cushion
6.0	5.8	51	0	5	5	95-13	98-10	98-01	0-09
6.5	5.3	55	2	8	6	97-17	100-05	99-27	0-10
7.0	4.5	65	4	10	6	99-19	101-24	101-13	0-11
7.5	3.7	75	6	13	7	101-13	103-02	102-23	0-11
8.0	2.7	81	8	15	7	102-26	103-27	103-17	0-10
8.5	1.7	81	10	19	9	103-26	104-14	104-04	0-10
9.0	0.9	78	13	23	10	104-22	105-06	104-28	0-10
9.5	0.7	64	10	18	8	105-22	106-06	105-31	0-07

* The anticipated OAS widening for a 50 bp rally based on recent empirical directionality.
** The expected horizon price corresponding to the assumed OAS widening.

Negative Convexity Dominant in Moves of 50-100 bp

For slightly larger rallies, however, the negative convexity of mortgages really starts to kick in, and it dominates the directionality of OAS. In a 100 bp rally over six months, many mortgages would actually need to tighten on an OAS basis before they would match the performance of today's Treasury hedges (see table below). What is happening is that as Treasuries have touched recent highs, mortgage negative convexity has become more important (see the graph at the end of this article) and is now dominating duration as a factor influencing relative performance in market moves of more than about 50 bp; in other words, duration shortens at an accelerating pace for much of the mortgage market as Treasuries rally. Note that based on the implied volatility of six-month options on the 10-year Treasury, a one standard deviation move in Treasury yields over six months is a little over 70 bp; therefore, the inherent negative convexity of mortgages is likely to be a very significant factor influencing incremental returns from a mortgage versus Treasury position.

Breakeven OAS Widening

FNMA		Treasury Yield Change (bp)		
Coupon	OAS	0	-50	-100
6.0	51	7	5	-1
6.5	55	8	8	-2
7.0	65	11	10	-4
7.5	75	15	13	-2
8.0	81	19	15	-1
8.5	81	22	19	5
9.0	78	23	23	17
9.5	64	19	18	14

Market Focus

Mortgage Overweight Means Option Exposure

Accordingly, the increased negative convexity of mortgages makes it more and more important to manage that embedded option exposure. An investor who is overweighted in mortgages is implicitly short something else such as Treasuries, and the securities he is implicitly short are likely to have better convexity than the mortgages he owns. The conclusions are that any mortgage overweight *must* be very actively managed, preferably by holding options against it (see "Capture the Value of Mortgages Using Options," *Mortgage Market Comment*, October 20, 1995) or by dynamically hedging the duration of the mortgage holdings. An investor with an overweight in mortgages who has not bought options needs to buy duration in Treasuries during a rally to offset the rapidly falling duration of his overweight. And this strategy must be pursued with great discipline, buying upticks and selling declines, which is likely to be no less expensive than buying options.

Projected and Historical Aggregate Gain From Convexity

(1/1/95 to Present)