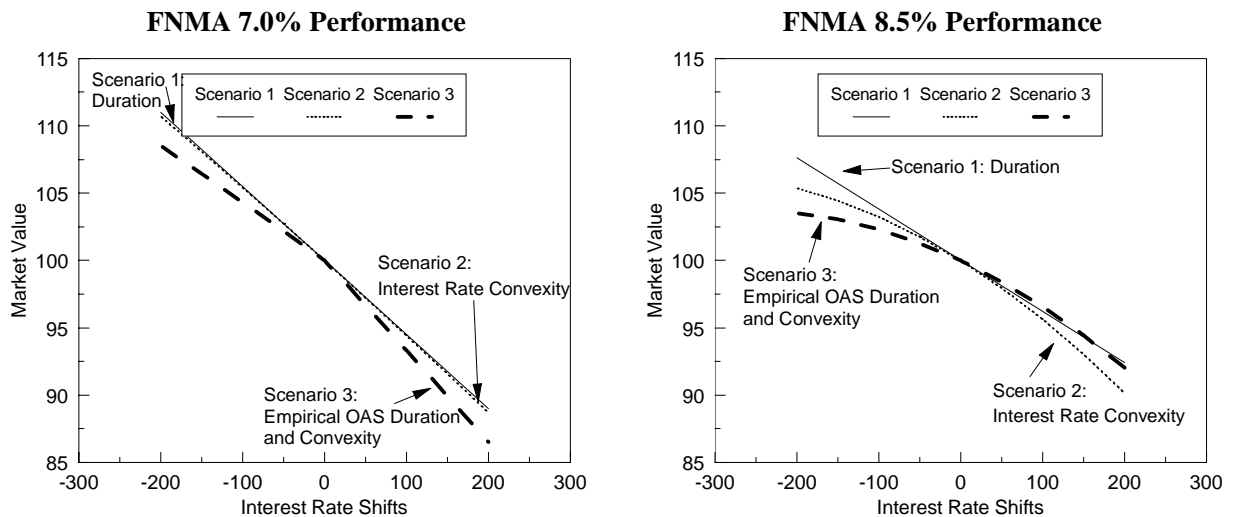# Market Focus

Spread Convexity

In discussing the risks of discount pass-throughs, we have referred to the concept of "spread convexity" and we would like to develop this concept further. Spread convexity can be thought of as the additional impact on the price of an MBS due to changes in spreads. In general, mortgages widen when a dominant prepayment risk is present, and this pricing of risk makes OASs directional.

We show the price performance of FNMA 7s and 8.5s across different interest rate making three scenario assumptions: (1) assuming zero convexity, (2) introducing interest rate convexity (constant OAS), and (3) assuming interest rate convexity and OAS directionality. For FNMA 7s, a positive duration, slightly negatively convex asset, the OAS directionality patterns indicate a widening in both a rally and a sell-off scenario as the 7s fall victim to either call risk fears or extension risk fears. In the first graph below, we illustrate the slight underperformance between scenarios 1 and 2 — which results from the negative interest rate convexity. In addition, the assumption that spreads will widen across both interest rate rallies and sell-offs creates an additional underperformance, measured by the difference between scenarios 2 and 3. ***This additional underperformance is what we call spread convexity***.

By contrast, in the case of FNMA 8.5s, our most reasonable OAS directionality assumptions indicate that spreads should be directional — widening in a rally but still having room to tighten in a sell-off. In the second graph below, we again illustrate the negative convexity of 8.5s as the differential between scenarios 1 and 2. However, first and foremost, the directionality of spreads creates in scenario 3 an asymmetric underperformance in a rally and an outperformance in a sell-off. This effectively shortens the FNMA 8.5s from their theoretical option-adjusted duration to their empirical OAS duration, but turns out not to imply much spread convexity. A comparison of scenario 3 with a comparable (shorter) duration, zero-convexity asset would measure the total convexity of 8.5s (interest rate convexity and spread convexity).

FNMA 7.0% Performance

FNMA 8.5% Performance

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The observed behavior pattern of the discount security coincides with the OAS "smile" shown in the first graph below. In this case, FNMA 7s widened at both market extremes — first because of structural relocation risk dominating in a discount market, and then because of structural refinancing risk dominating in a premium market. A 50 bp move in either direction from the current level will probably lead to wider spreads. Discounts can be more negatively convex than expected, which dampens returns and causes underperformance relative to current and higher coupons.

In contrast, the premium security performs better in a sell-off and worse in a rally scenario owing to its predicted OAS behavior of tightening and widening, as shown in the second graph below. Unlike TBA discounts, higher coupons still have some room for tightening in the wake of a sell-off from current levels, and when hedged versus empirical OAS durations, have a stronger bias to outperform.

FNMA 7.0% OAS "Smile"

FNMA 8.5% OAS Directionality