

Market Focus

Yield Curve Flattening: Historical and Current Perspectives

With yield curve flattening this past week to the point where the yield curve one-year forward inverted two-years to 30s, the flattening curve is starting to have an impact on mortgage performance. The last yield curve inversion, in 1989, was accompanied by a significant underperformance of mortgages, in part because of the thrift crisis. Because the fundamental condition of banking is much healthier today, it is dangerous to presume mortgages will underperform in any flattening in 1995. But it is likely that their nominal spreads to Treasuries will widen.

Mortgage-backed securities are particularly sensitive to the shape of the yield curve, because of the barbelled nature of mortgage cash flows, with principal payments occurring throughout the life of the mortgage. Curve shape affects the rates at which these cash flows are discounted. Curve shape also influences mortgage cash flows themselves, to the extent that the shape affects prepayment incentives across mortgage types and optionality around implied forward rates. Finally, the shape of the yield curve can significantly alter the supply and demand technicals of the mortgage market.

Fundamental Impact

Curve flattening is likely to have two prominent effects on pass-through valuation: (1) Nominal spreads to Treasuries will widen; and (2) the spreads of short-duration collateral will widen the most. That has to happen just to preserve fundamental value. If the curve flattens and 15-year mortgages maintain a constant nominal spread to five-year Treasuries, the mortgages are actually outperforming on a fundamental basis! For 30-year conventional 8s, a good rule of thumb is that nominal spreads to the 10-year Treasury should widen by about 5 bp for every 50 bp of flattening from 2s to 10s in order to preserve the fundamental value of the mortgage. For 15-year mortgages or other pass-throughs with more front-loaded cash flows, the widening will be larger than this, but will depend on the exact reshaping of the Treasury curve around the five-year point.

Nominal spreads tend to widen in a flattening because they take into account only a single point on the yield curve, not its entire shape. Better measures, such as **static spreads, ZVOs, and OASs**, are spreads over the entire term structure and take into account the exact timing of the mortgage cash flows and forward discount rates, thereby capturing much of the impact of changes in the shape of the yield curve. In order for OASs to remain unchanged in a flattening, the nominal spreads will generally have to widen.

Besides affecting the value of barbelled cash flows, a flatter curve will also affect option values. A flatter curve will reduce extension risk and increase call risk. Because extension risk is a larger concern than call risk today, the flatter curve may actually benefit the bulk of the mortgage market.

Another important implication is that hedging portfolios with 10-year Treasuries is not sufficient in times of substantial changes in yield curve shape. One solution is to hedge portfolios with appropriate amounts of two- and 10-year Treasuries, thereby controlling for changes in both the level and slope of the yield curve. We solve for the par **hedge ratios** of two- and 10-year Treasuries by replicating the price change of a mortgage as we shift the level and slope of the yield curve, assuming constant OAS.

Technical Impact

A flattening yield curve has significant implications for the supply of different types of MBSs. As the contract rate spread between 30-year mortgage products and shorter-term mortgage products tightens, supply of shorter-term mortgages should decrease. Even ARMs will lose their appeal to homeowners as their contract rates come closer to those for fixed rate products. Although falling supply may have positive implications for some sectors, there may come a point at which these sectors begin to suffer from liquidity concerns and underperform.

All else equal, the supply of CMOs should also decrease as the yield curve flattens. This should not have an immediate impact on the mortgage market, as issuance of CMOs is already extremely low. A flatter yield curve may make CMOs even harder to create, however, as investors will be generally less interested in longer-duration securities if they can get shorter-duration securities at higher yields. In fact, if anything, a flattening yield curve tends to have the effect of widening out nominal spreads on longer-duration CMOs.

Finally, a flattening yield curve decreases the margin over financing for many short-funded investors, notably banks. This could result in additional selling pressure, which could negatively affect all

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mortgage products. Bank selling would have especially negative implications for ARMs and balloon mortgages, the values of which are currently closely tied to bank activity.

Historical Perspective

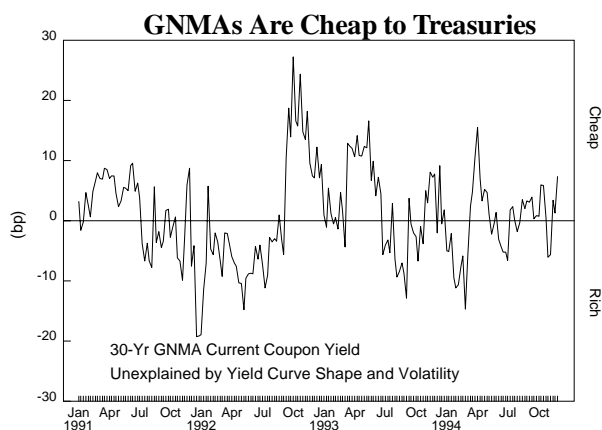
Mortgages widened during the last inversion in 1989 by far more than they should have on a fundamental basis. The reason was that the 1989 curve inversion was accompanied by the thrift crisis and low levels of liquidity. Short-duration collateral tended to underperform, partly because its liquidity fell most, and partly because bearish sentiment was concentrated in the front end of the curve. CMO issuance dropped and, in contrast to collateral, long-duration CMOs underperformed. CMO buyers apparently felt no need to stay long on the curve if they could obtain similar yields with lower durations.

If the curve inverts in 1995, the investment implications could depend as much on the relative liquidity of different parts of the market as on the actual behavior of the term structure. Mortgage sectors that decline in liquidity will probably underperform. If history repeats itself, short-duration pass-throughs (including premiums, 15-years, and ARMs) will suffer, and long-duration CMOs (including PACs and Zs) will cheapen also. The performance of discount collateral will depend on a combination of reduced extension risk fears and the barbelled nature of the cash flows, as well as changing liquidity.

The major distinction between early 1995 and 1989 is that the financial condition of the banking industry today is dramatically superior to that of 1989. While pass-throughs should have widened somewhat on a nominal spread basis owing to the fundamentals of yield curve inversion, the thrift crisis magnified the widening several times over. With no thrift crisis to battle and with very healthy levels of liquidity at banks, it is unlikely that we will see the levels of mortgage widening experienced in 1989.

Are All 30-Year GNMA's Cheap?

In the wake of the sharp yield curve flattening of the last two weeks and the concurrent widening of mortgage spreads, it is an appropriate time to update our readers on the value of 30-year GNMA's relative to their conventional counterparts. We have previously stated our preference for selected discount GNMA coupons, but we note that current coupon GNMA's are now also attractive relative to conventionals. In addition, we find that with the recent widening experienced by both conventional and GNMA premiums, several premium coupons have also come back much of the way to fair value. Overall, the best values across almost all 30-year coupons are now in the GNMA sector, as we discuss below. However, among GNMA's, we continue to prefer discount coupons, especially GNMA 6.5s - 7.5s, as discussed in the *Market Focus* articles from November 11, 1994. In contrast, we believe that shorter-duration products with more front-loaded cash flows and more exposure to the front end of the yield curve (15-year pass-throughs, premium 30-years, etc.) will underperform if the curve flattens further.



The fundamental value of current coupon GNMA's can be seen in the graph above, which shows a regression of current coupon GNMA yields on the shape of the yield curve and implied volatility. The data indicate that GNMA's are about 8 bp cheap, equivalent to one standard deviation. (In contrast, a similar regression for current coupon FNMA's shows only a slightly positive residual that is well within its standard error.) To put this into perspective, GNMA's have not been cheaper on a sustained basis since early 1993.

Current Coupon GNMA's

OAS History

The relative cheapness of current coupon GNMA's can also be seen from the graph on the following page, which shows the OAS relationship between current coupon GNMA's and FNMA's from the beginning of 1994. GNMA OAS's are currently at their widest; since GNMA's typically trade 3-5 bp