

MBS, Convexity Vortex, and a Silver Lining for Bonds

Many investors fail to understand the nuances and complexities of Mortgage-Backed Securities (MBS). As a result, few can appreciate institutional MBS investors' role in the recent bond market rout. Instead of complaining about recent bond losses, our time is better spent exploring the machinations of MBS investors to help assess where yields might be going.

This somewhat wonky article explores the unique qualities distinguishing MBS from other bond types. Importantly, these characteristics help us appreciate how MBS investors contributed to the recent yield surge. **Further, it should also give bond investors optimism that a good opportunity is approaching with a big group of bond sellers out of the way.**

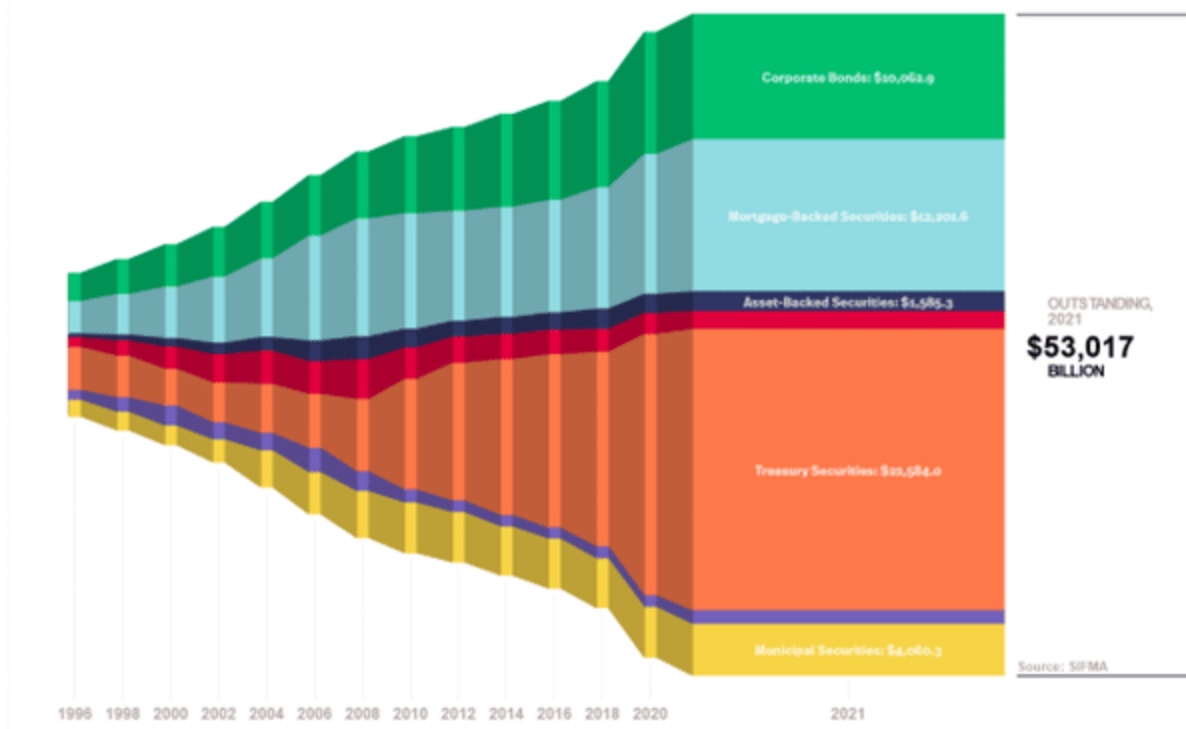


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MBS 101

MBS are bonds secured by individual mortgages having similar characteristics. The graph below from SIFMA shows that MBS is the second largest fixed-income security behind U.S. Treasuries.



The prepayment option attached to the underlying mortgages makes MBS distinctive from other bonds. A mortgagee can partially or fully pay off their remaining balance at any time and for no

reason. Further, mortgages pay a small amount of principal monthly. These traits make investing in MBS challenging but rewarding.

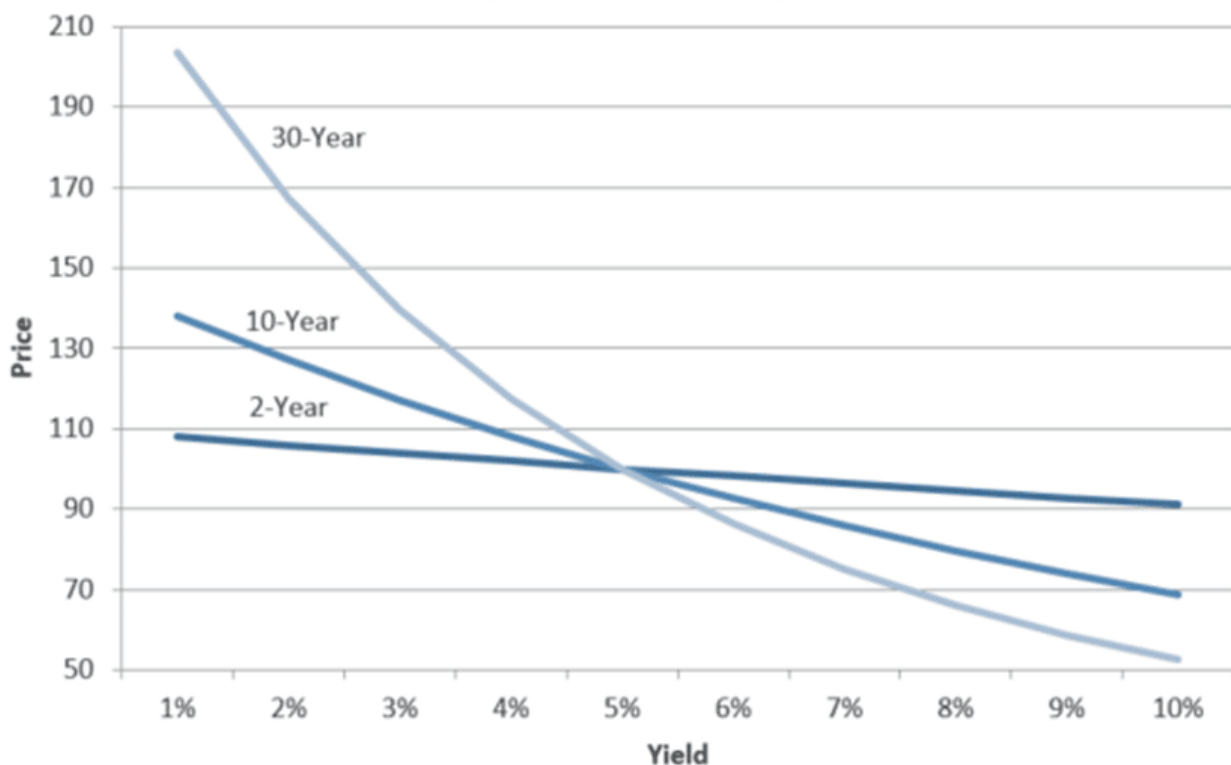
Adding to MBS complexity, the timing of mortgage prepayments is not solely a function of the level of interest rates. For many reasons, individuals do not refinance mortgages when interest rates suggest they should.

As a result of its unique and less predictable prepayment option, MBS cash flows are markedly different from those of other bonds. When mortgage rates are very low, many mortgagees pay off their loans due to attractive refinancing options. Also, low mortgage rates promote more housing transactions, resulting in early prepayments of mortgages as mortgagees sell their existing houses and pay off their loans. In low-rate environments, the expected life of an MBS is considerably shorter than in a higher-rate environment.

Duration and Convexity

In bond market parlance, the life of a bond is duration. Duration measures how long it will take for an investor to be repaid by a bond's cash flows. Duration is also a measure of the sensitivity of the bond's price to changes in its yield. For example, a duration of 5 means that if yields rise by 1%, the bond price will fall by 5%.

The graph below from Raymond James shows how sensitive bond prices are to changes in yields as a bond's duration increases.



As if the variable duration of an MBS is not enough to manage, the rate of change in its duration is not linear. In other words, as duration changes, the price may fall even more or rise less than one would expect, given its original duration. Investors refer to the nonlinearity of duration for MBS as convexity.

As interest rates decline, MBS prices increase less than a bond without prepayment options because the mortgage's expected maturity becomes shorter. Conversely, when interest rates rise,

MBS can decrease in price by a greater amount than non-callable bonds because the mortgage's expected maturity lengthens. Both are examples of negative convexity.

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MBS Investors

With a basic understanding of MBS duration, convexity, and its unique return structure, let's focus on the most prominent mortgage investors.

The Fed currently owns \$2.7 trillion in MBS, less than a quarter of the \$12.2 trillion outstanding MBS. Of the MBS outstanding to the public, the GSEs (Fannie Mae and Freddie Mac) and the commercial banks hold most of the remainder.

The GSEs and banks borrow money to acquire MBS. **As such, they must constantly hedge to avoid material mismatches between the mortgage asset and the loan liability.**

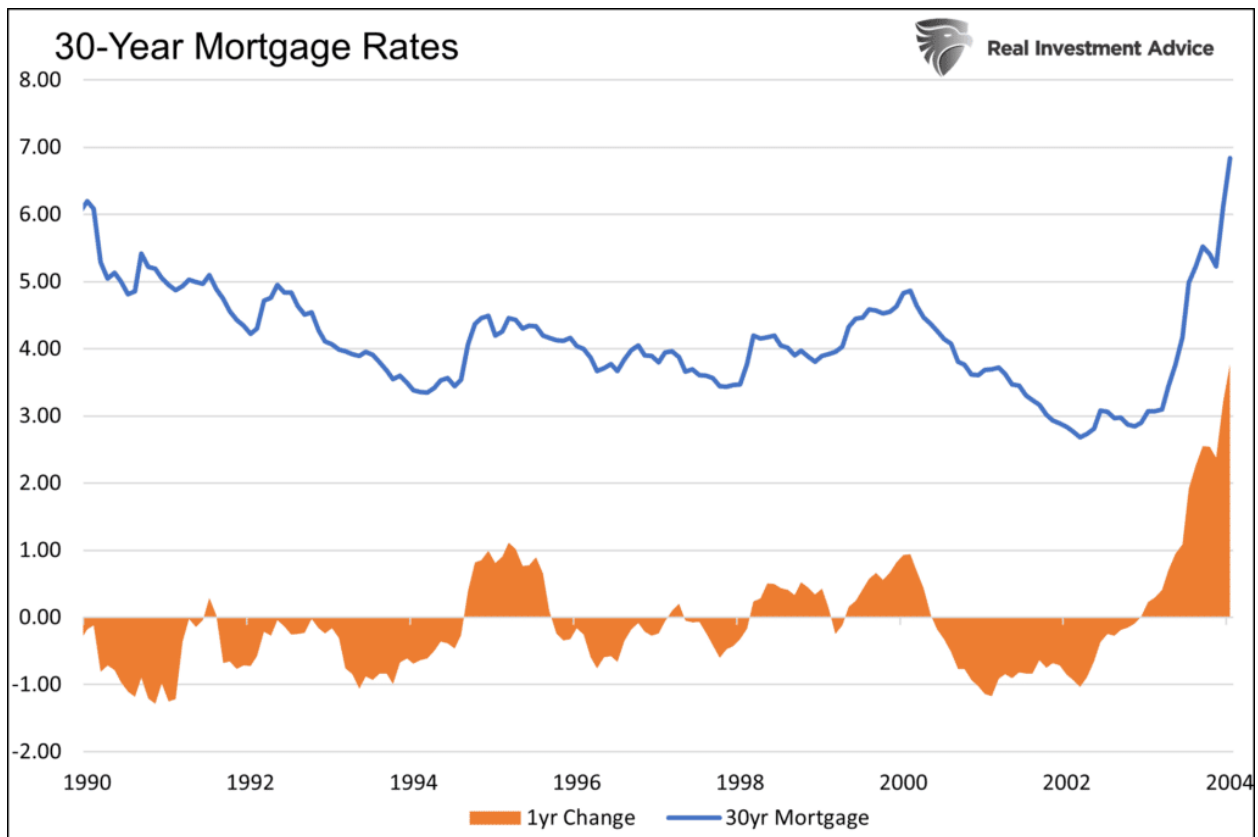
For example, if a bank buys an MBS with a duration of five and funds it by issuing a five-year CD, they are duration neutral. As long as the duration remains five, the bank should profit as they initially expected by the yield differential between the MBS and the CD.

Unfortunately for our bank, yields are always changing. Therefore, duration is constantly shifting. For instance, if yields rise appreciably, the duration of an MBS will increase, but the CD will still have a five-year duration that will shorten predictably as time passes. In this case, the MBS investor has a duration mismatch. The mortgage price will fall more than the theoretical price of the CD. In this case, the MBS investor will lose money because of the mismatch. Given the nature of leverage, the gains or losses are much larger than the difference between the MBS yield and the rate of the CD.

MBS investors use interest rate swaps, shorting U.S. Treasury bonds/futures, and options to manage duration. These instruments effectively adjust the duration of the mortgage. **The critical point is that these instruments ultimately result in the selling of U.S. Treasuries when the duration of mortgages extends and buying of them when it declines.**

Surging Interest Rates

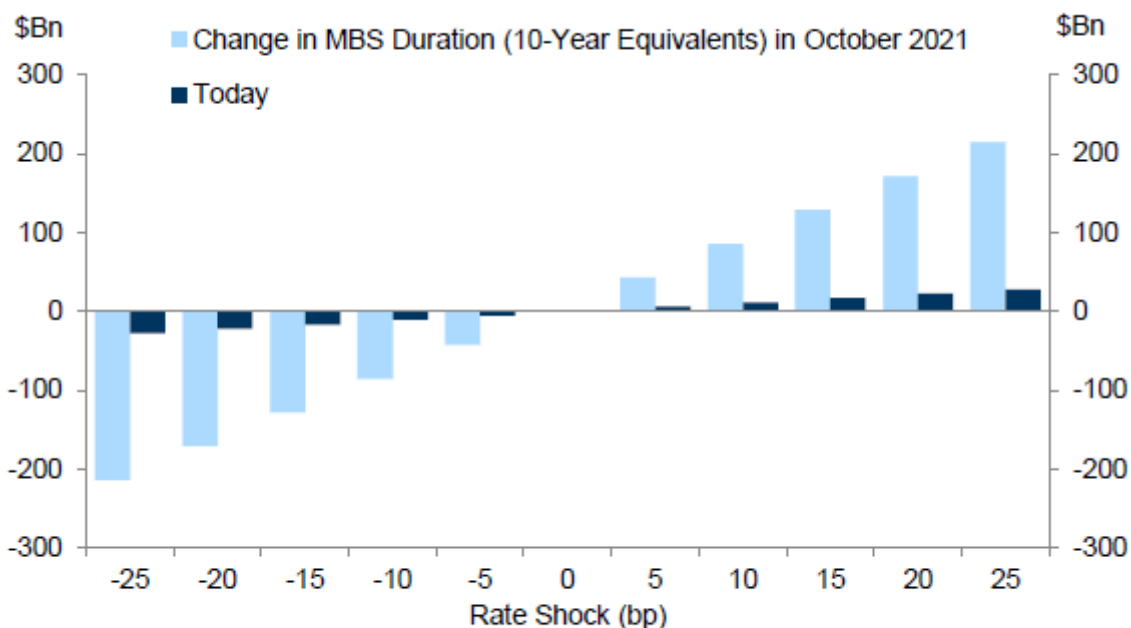
As mortgage rates shot up by 4% over the last year, Banks and the GSEs were forced to aggressively hedge their rapidly widening duration mismatches. They shorted U.S. Treasury bonds, directly and indirectly, fueling the higher yield surge. MBS legend Harley Bassman refers to this type of feedback loop as a convexity vortex. **Essentially, increasing hedging needs drive yields higher which beget more hedging and higher yields.**



Mortgage Durations Are Maxed Out

With an explanation of a critical factor behind this year's bond rout, we share a silver lining.

Almost no one is refinancing mortgages at today's prevailing mortgage rates. Further, the number of home sales is falling rapidly. As a result, MBS prepayments are minimal, and MBS durations are nearly fully extended. Even if yields continue upward, MBS durations should only trickle higher. As a result, the hedging needs for banks and GSEs to protect against higher durations will be minimal.



Source: Goldman Sachs Global Investment Research

The graph above estimates how much in ten-year treasury notes an MBS investor would need to hedge with versus a year ago. Per Goldman Sachs, a year ago, a .25% increase in yields required banks and GSEs to conduct approximately \$200 billion worth of hedging activity (shorting bonds). Today, a .25% move requires about a tenth of that amount.

Institutional mortgage investors are no longer the bond market's problem. Importantly, when yields decline, they will need to exit their hedges. **Ultimately, those collective actions will help push yields lower, reversing the recent abrupt rise in yields.**

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Summary

MBS hedgers are certainly not the only investors to blame for the recent sharp increase in yields. But they are a large and known commodity.

Bond yields may keep rising, but we are comfortable that a significant influencer of yields is done selling. Further, if and when bond yields start falling, these same investors will need to hedge in the opposite direction. **MBS vortices work both ways. Soon, mortgage hedgers may be tripping over each other to buy bonds.**