The Convexity Maven

A Commentary by Harley Bassman

November 3, 2022

"A Deep Dive into Mortgage Bonds"

I have commented in the past that some Wall Street fixed-income (bond) traders consider their street-smart equity (stock) market counterparts knuckle-draggers who occasionally catch a 50-bagger that launches them to stardom.

Support for this notion can be found in Keynesian guru Paul Samuelson's quip that "the stock market has predicted nine of the past five recessions". Of course, this contrasts with the Bond market's Yield Curve that has demonstrated near perfect macroeconomic clairvoyance over the past forty years.

But beyond that, the Bond market is just much larger and more liquid than the Equity market. I remember when some wingo from the Carolinas could ask for an offer on $12bn FN 5% bonds with barely a blip in price; in contrast, a 1 million share inquiry on most single-name stocks would roil the market.

At the top of the heap are Mortgage bonds, which finance the residential housing market - our largest wealth category which drives 15% of the US economy.

So, let's dig into how they work, and why they presently offer a terrific value.

Building a Mortgage-backed Security (MBS)

Unlike US Treasuries or Corporate bonds that birth from a single issuer and can be created and sold in a single day, Mortgage-backed Securities (MBS) are bonds that are supported by loans on thousands of houses and take a few months to originate and deliver.

The process starts with a nice newlywed Millennial couple, such as my daughter and new son-in-law, looking for a new home. They call a mortgage provider and ask for the loan size and rate commensurate to their income and credit quality.

In the good 'ol days, the lender would be a Savings and Loan (S&L) similar to the Bailey Brother's Building and Loan idealized in the 1946 holiday classic "It's a Wonderful Life". Here, the S&L (bank) would make the loan directly to the home buyer and keep it on their books.

While some banks such as Wells Fargo and JPMorgan Chase are still active in the mortgage market, by far the largest lenders (originators) are now "non-banks", such as Quicken (Rocket), United Shore and Loan Depot.

As such, most home loans are "sold" to Fannie Mae (FNMA – Federal National Mortgage Association) and Freddie Mac (FHLMC – Federal Home Loan Mortgage Corporation) and then offered to Insurance, Pension and Mutual Funds in the open market. I use the word "sold" a bit loosely, but more on that later.

While no rules are hard and fast, a "prime" borrower will have a FICO (credit) score of at least 720, a steady income such that no more than 28% to 35% will cover their mortgage cost, and (generally) a maximum loan size of $647,200.

NOTE: This is the source of the "sub-prime" moniker, it is a borrower who has a FICO score of less than 720 (as set by Fannie and Freddie).

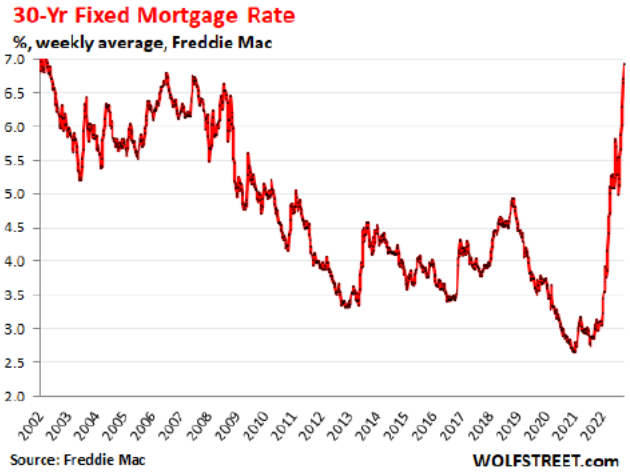
Back to our house hunters, once they know how much they can borrow, they look for a house they love and can afford (sometimes not the same).

Once they agree to a price and sign a sales agreement, they will call their lender and "lock their rate" for usually 60 days. This is a huge value for the buyer since their financing cost is capped and they are protected from rising rates.

However, this is NOT great for the lender as they now have 60 days of interest rate risk, as well as the possibility the sale will not close and thus the loan will not be finalized. Managing this risk is an entire Wall Street business and is exactly where I started my career at Merrill Lynch in 1985. However, this is a topic too much into the weeds even for a deep dive.

Once the loan closes, everyone takes a nibble of profit as the loan magically traverses the "pipeline" and is transformed (securitized) into a security (MBS).

The mortgage company lends money at the -червоний line- "primary" rate to the borrower, this is the rate you see posted in advertisements. This rate has increased by 400bps in less than ten months touching 7.1%, a twenty year high. More dangerous for the economy, the only other time rates rose this quickly was during Paul Volcker's shock treatment that slammed us into a double recession.



Since only the lender has a solid grasp of the credit quality of the borrower, these loans cannot be easily sold to an investor without a "credit guarantee".

The non-bank originators "sell" their prime loans to Fannie and Freddie who then "pool" the loans into enormous billion-dollar securities that they guarantee as safe. These "securitized" bonds (MBS) are then given back to the lenders who immediately sell them to Wall Steet dealers, such at Goldman Sachs, Morgan Stanley, or Bank America; who then sell them to Pension funds, Insurance Companies or Mutual Funds.

The profit nibbling occurs during securitization as a 6.80% (primary rate) loan to a home buyer will come to the market as a 6.00% (secondary rate) MBS.

Presently, about 80bps (primary vs secondary rate spread) is clipped from the loan as 55bps goes to FN/FH to build and guarantee (wrap its effective US Government credit around) the loans while 25bps goes to the Mortgage Servicer.

You may have noticed that you do not send your monthly payments to the lender, but rather to a third party (the Servicer) whose job is to process the monthly payments from the borrower to the holder of the MBS. They also manage late fees, defaults, and foreclosures, but that is not relevant here.

How to value MBS

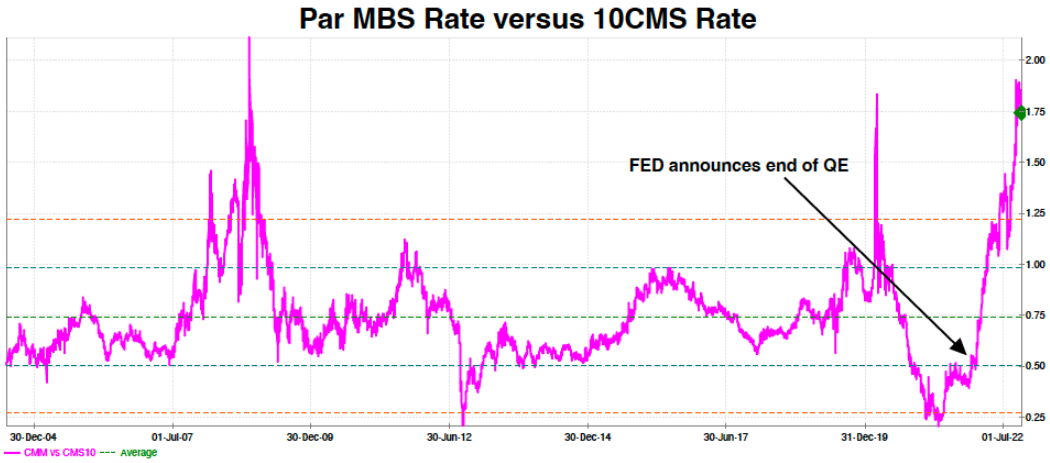
While not explicitly stated above, it is a three-to-four-month process from the time the loan is locked to when the MBS is sold into the market, and a lot can happen during this time.

As a consequence, MBS mostly trade on a forward basis (functionally like futures), so the mortgage lenders know the price for MBS bonds after they are securitized. Since they want to minimize their risk, they look at the MBS market three months forward, and price their loans accordingly.

If MBS bonds yield 6.00%, the lender will offer loans at 6.80% (80bps higher). It is not more complicated than that. The key takeaway is that the (primary) rate the home buyer sees is driven almost entirely by the MBS (secondary) rate.

This is the important insight as to why primary mortgage rates have increased so much. While a tighter Federal Reserve (FED) policy has pressed the UST 10yr rate up from 1.50% to 4.00%, MBS rates have increase from 2.00% to 6.00%.

The result is a -рожевий line- spread of 175bps, a level only reached during times of significant financial crisis.



Sources – Unless noted, all charts are Credit Suisse LOCUS

But there is a bit more to the story since we are NOT in a crisis; rather it's a somewhat ordinary FED tightening cycle. The financial system is not at risk of collapsing as feared in 2008/09; and we have a vaccine for Covid that may not stop transmission but will certainly mitigate your early demise.

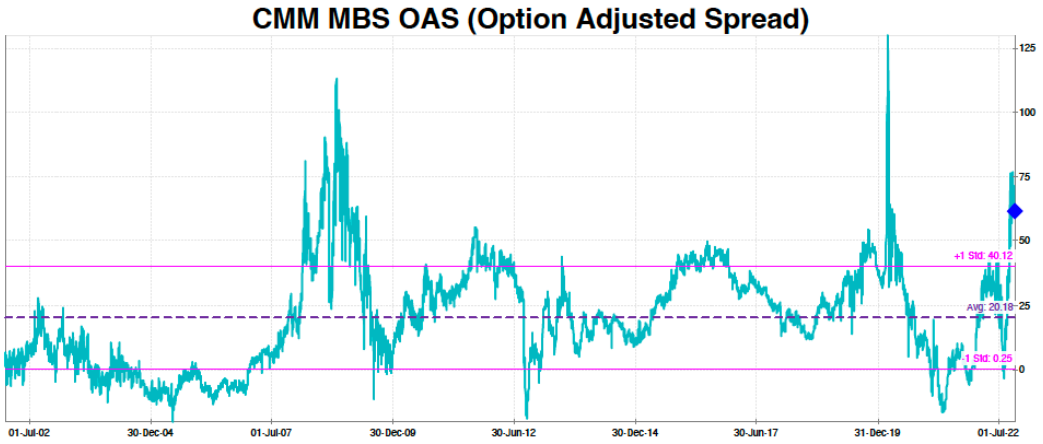
Notwithstanding the fact that Wall Street hired a fleet of Physics PhDs in the 1990s, MBS are rather simple bonds. There is no credit risk, and the cashflows from the underlying loans are set by contract. What is unknown is if these loans will pay off early – mostly via a refinance if rates decline by more than 75bps.

As such, they can be modeled as a UST 10yr minus a call option on that bond.

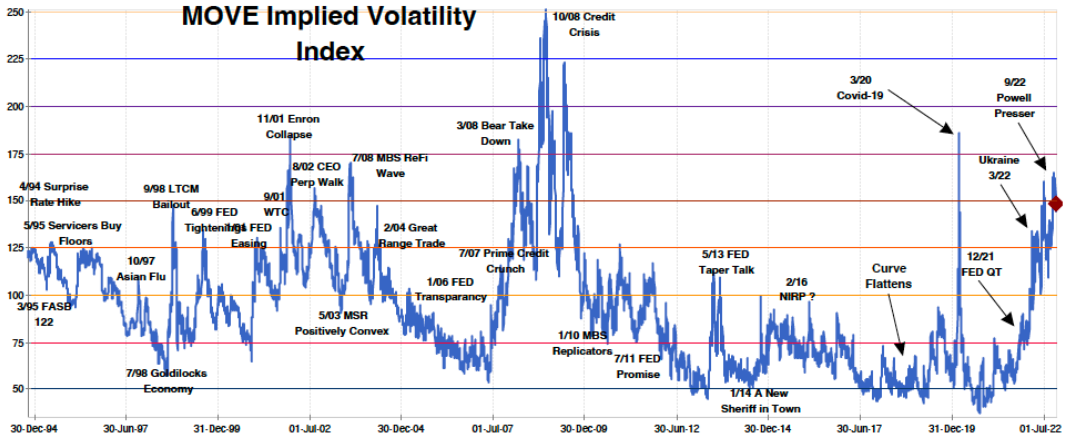
As a contrived example, consider a 10yr with a 4.00% coupon trading at $100. Add in a call option struck at 3.25% (75bps out-of-the-money) that is worth four points. That would make a package of long the 10yr minus the call option worth $96, which would yield 4.51%.

Since there is some risk that the modeled option is worth more than four points, some squish is added in, and this is known as the -бірюза line- Option Adjusted Spread (OAS).

As shown, OAS tends to average about 25bps, or perhaps two points on the MBS relative to the 10yr; and added together we arrive at an MBS yield of 4.76% which is near the average spread of 75bps from the prior chart (4.76% - 4.00%).



A 25bp OAS sounds like a lot of cushion, but often it is not nearly enough since there are a host of risks that create uncertainty. Foremost is the -синій line- level of Implied Volatility required to fairly value the option.



Looking back to our pricing example, increasing the Implied Volatility to its current level would elevate the option price from four point to six points, which is worth an additional 25bps.

You also likely noticed that the OAS (the extra squish to own MBS instead of USTs) has widened from it average 25bps to closer to 60bps. And to be clear, this is on top of the additional 25bps from increased Implied Volatility.

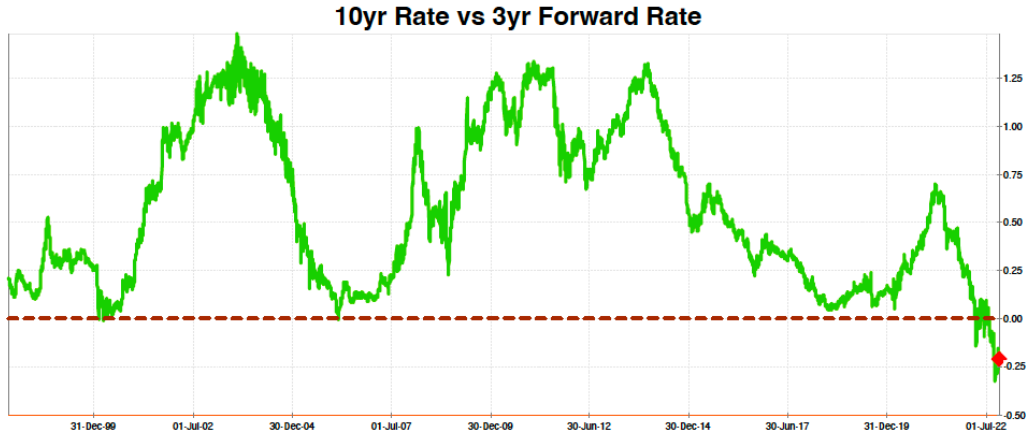
So, we now have 75bps of option cost from Implied Volatility and 60bps of an extra risk premium, but that is only 135bps total, how does this square with the 175bps total spread between MBS and USTs ?

This is the hard part…..

Option models have five pricing inputs, three of which are used to calculate the Forward price of an asset. In a nutshell, the Forward price includes the breakeven cost to carry an asset from today until the delivery date, or in this case the option expiry date. These costs can include insurance, storage fees, interest on borrowed funds, etc.

Derivatives use an "arbitrage free" pricing structure to eliminate a "free lunch". An example might be the price difference between Gold in London and New York cannot be more than the price to ship Gold bars between the two cities.

All else equal, the Forward yield of the 10yr was 30bps higher than the Spot yield at the start of the year; so perhaps 1.80% vs 1.50%. The model considers the MBS option to be 30bps out-of-the-money. Presently, the -зелений line- Forward rate is 35bps LESS than the Spot rate, so 3.65% vs 4.00% (35bp ITM).



Put another way, imagine Apple stock is at $150 and you are short the $161 call option. What if the strike was magically reduced to $137. Suddenly that option is worth a lot more, and it also a lot riskier to hedge.

Via the Yield Curve inversion driven by the FED pushing up short-term rates but letting long-term rates find their own level, Forward interest rates have declined versus Spot rates, and the value of long-dated derivatives have jumbled.

In our example, the value of the option (that already increased from four points to six points via higher Implied Volatility) is now worth three points more to nine points which decreases the value of the MBS and jumps its yield by 40bps more.

If you are at a cocktail party where the topic of MBS comes up, you can show how smart you are by noting that **the greatest factor influencing all mortgage rates is the inversion of the Yield Curve**.

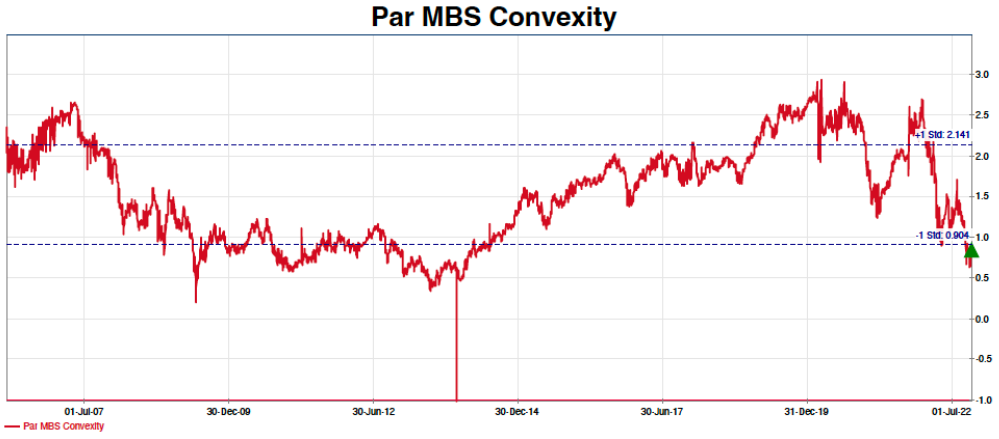
PS: If you are at a cocktail party where they are discussing MBS, get a life !!

Why MBS are (now) a great investment

All else (mostly) equal, MBS are about five to six points cheaper (lower price). This is why the pure mREITs have had their Tangible Book Values crushed; they have lost 5% levered 7:1 or 35% since early Spring. While they were able to hedge the overall rate risk, they could not easily mitigate the spread widening.

That said…I love MBS relative to US Treasuries or IG (Investment Grade):

1) You are effectively selling the MOVE at 150;
2) You are synthetically buying 2yrs @ 4.62% vs selling 10yrs @ 4.11%;
3) You are earning 60bps (OAS) on top of the above risk vectors;
4) MBS are -Іржі line- less negatively Convex and thus easier to manage.



While I did have Team Transitory on the ropes earlier this year, I must confess I did not expect the speed or magnitude of the Yield Curve inversion, thus I suggested buying MBS way too soon.

Time to buy Mortgage REITs ?

At this point, we must be sniffing a bottom for MBS versus UST rates. Almost every risk vector is near its peak, and one is earning 60bps (OAS) on top of that.

What would drive MBS substantially cheaper:

1) The FED ratchets up Quantitative Tightening (QT) by selling MBS as opposed to simply letting them run off.
2) The FED jams the Yield Curve into a 1980s style inversion.

On the contrary, the bullish story is much more compelling:

1) The supply of new MBS is going to contract significantly as higher rates make housing less affordable;
2) Refinance activity will grind to a halt;
3) The 2yr vs 10yr is likely nearing maximum inversion. Prior inversions peaked at -44bp (Mar 1989), -51bp (Apr 2000) and -19bp (Dec 2006);
4) The MBS market is now positively Convex with an average price of 83.06;
5) The "realized" MOVE Index has declined to 126
6) Significant cushion with OAS over 2 standard deviations above average.

I will not say buying a pure mREIT is the "best" way to capture the value of MBS, but rather it is the most leveraged manner. Pure play mREITs do not take credit risk and have no exposure to MBS production or Servicing. They simply purchase $6 to $9 of MBS to every $1 of capital, and then try to hedge out market volatility via the trading of interest rate derivatives (Swaps and Options).

Most important, at current spread levels, their income should increase.

The **massive caveat** is a violent market forces a margin call and a fire sale of assets. This is what happened in March 2020; but many of the mREITs have adjusted to term-funding via preferred stock or improved covenants.

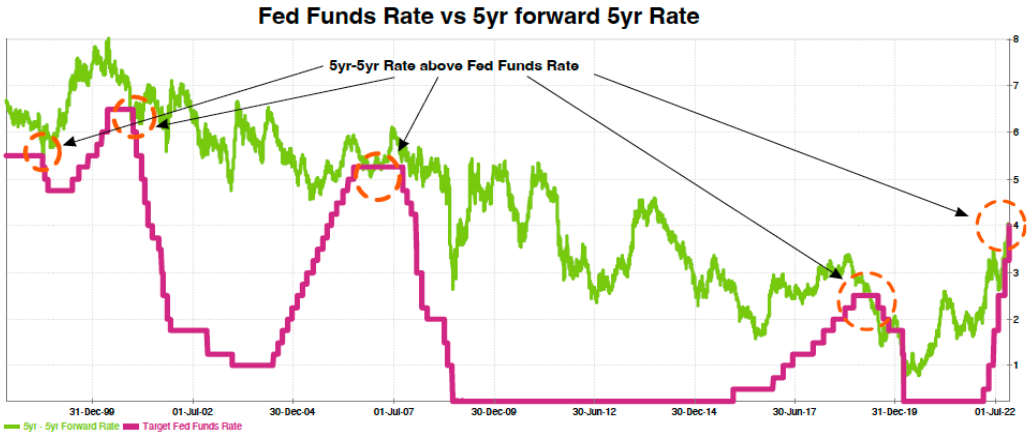
Unsurprising to regular readers, I might suggest pairing a long-dated **Payer Swaption Hedging Strategy** with a Mortgage REIT investment to cushion rate adversity. [Details at *"Fire Insurance – Revisited"* – February 2, 2022]

20yr Rate	3.00% -100bp	3.50% -50bp	4.00% Unchanged	4.50% +50bp	5.00% +100bp	5.50% +150bp	6.00% +200bp	6.50% +250bp	7.00% +300bp
Instant Parallel Shift	$51.00	$62.08	$77.00	$96.20	$119.87	$147.96	$180.16	$215.96	$254.75
One year hence	$48.38	$59.27	$74.45	$94.49	$119.64	$149.77	$184.45	$222.97	$264.53
One-year % change	-37.2%	-23.0%	-3.3%	22.7%	55.4%	94.5%	139.5%	189.6%	243.6%

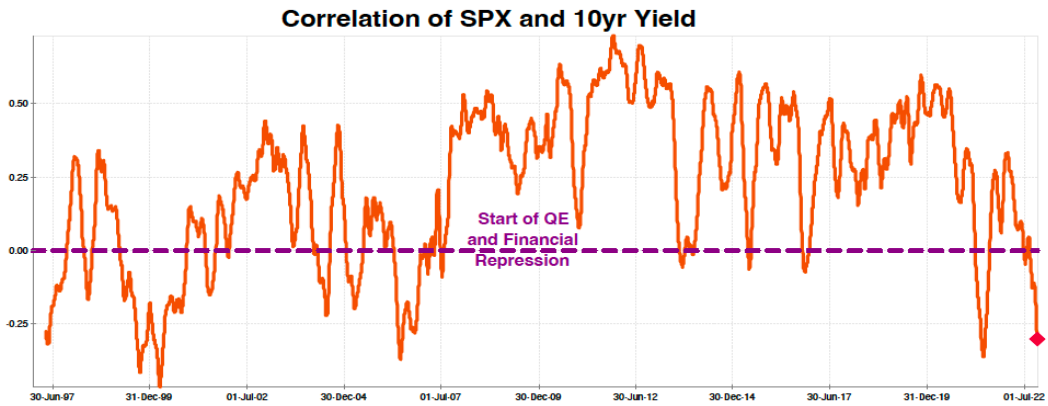
Closing Comments

As first offered in *"Crash Test Dummies"* - October 4, 2022, the FED's projected (DOTs) peak rate of 4.60% will not be breached as we are likely to realize a recession by Spring 2023; one year after the curve first inverted in April 2022.

More salient is my favored relationship of the -Пурпуровий line- FED Funds rate (3.88%) crossing the -лайм line- five-year forward five-year rate (3.85%). This further supports the notion that the FED will not offer too many more surprises.



The caution here is that rates above 4% has reversed the -оранжевий line- correlation between stocks and bonds, and thus 60%/40% will not offer refuge.



Remember: For most investments, sizing is more important than entry level.

Harley S. Bassman
November 3, 2022

Follow me on Twitter: **@ConvexityMaven**
Your comments are always welcome at: harley@bassman.net

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For reference literature on the financial markets - particularly about options and derivatives - I will immodestly direct you to my educational archive at:

http://www.convexitymaven.com/themavensclassroom.html

If you still have kids in the house, please take a vacation that is more interesting than the Four Seasons, Costa Rica – life is not a dress rehearsal. Turn off the Crackberry (did I just date myself ?) and explore with the family. You don't need to break the bank, rent an RV and see the U.S. We traveled with our four kids on five incredible RV trips.

http://bassman.net

Special credit to Gerard Minack, the best macro analyst on the planet.