

# The Convexity Maven

A Commentary by Harley Bassman

February 1, 2022

## "Fire Insurance - Revisited"



As much as it is an aspirational goal to sell at the top, or buy at the bottom, it is in fact highly unlikely. Similarly, it is a blessing that it is equally hard to sell the lows or buy the highs, although it does seem to be a much easier task.

I can brag that as a senior trader at Merrill Lynch I once bought the low print; but I must confess that this only occurred because I was trying to sell and pressed the wrong button by accident.

In this vein, today I will detail the stupendously unfortunate timing of introducing an Interest Rate Hedge Strategy at \$50 last May 2021, and how it promptly declined to its present \$40 value.

Previewing the conclusion: If you liked it at \$50, you will love it at \$40.

The conundrum that perplexes many investment managers is how to reconcile the -kaffir line- Spot 20yr rate that closed at 1.992% on May 11, 2021, and its subsequently close within a basis point of that level on January 25, 2022, yet the Interest Rate Hedge Strategy is hovering near \$40; down ~20%.



Source – Unless noted, all charts are Credit Suisse LOCUS

The answer is a tad complex, but the colorful charts will make the story a bit easier to digest. Nonetheless, if you have little interest in financial math, please skip ahead. But before you do, let me assure you all is well; the Strategy is working as originally designed and described.

The Strategy took 75 days to design, and we introduced it on day 76, which happened to coincide with the May CPI release that topped interest rates.

As a brief reminder, the Strategy consists of \$25 of the (originally five-year) USTreasury that matures in April 2026, and an interest rate “put option” struck at 4.25% on \$800 of the 20yr rate that expires in May 2028, seven years from its introduction. The Strategy is static and proportional; thus, it is easy to model.

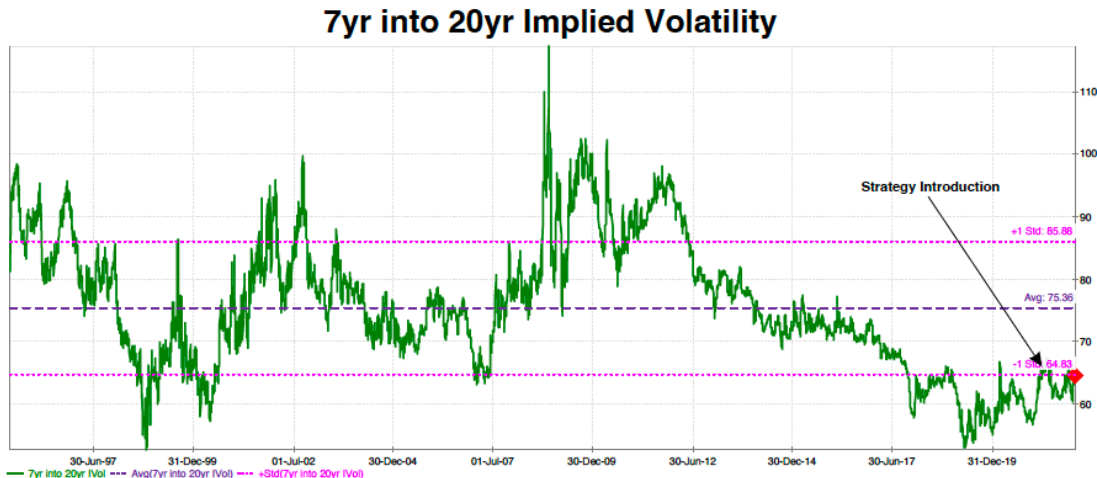
When the Strategy was introduced, the cost of this option was about \$25, which when combined with the \$25 UST created the \$50 total Net Asset Value (NAV).

Presently, the UST is worth about \$24.20 reflecting the increase in shorter-dated interest rates, and the option is worth about \$15.80, which creates a total NAV of about \$40.00.

So, the curiosity is how the option declined by 37%, from \$25 to \$15.80, over not quite nine months when the Spot 20yr rate is effectively unchanged.

In a nutshell, it has been the flattening of the Yield Curve (the spread between short-term and long-term rates), but let’s slow down and detail the process.

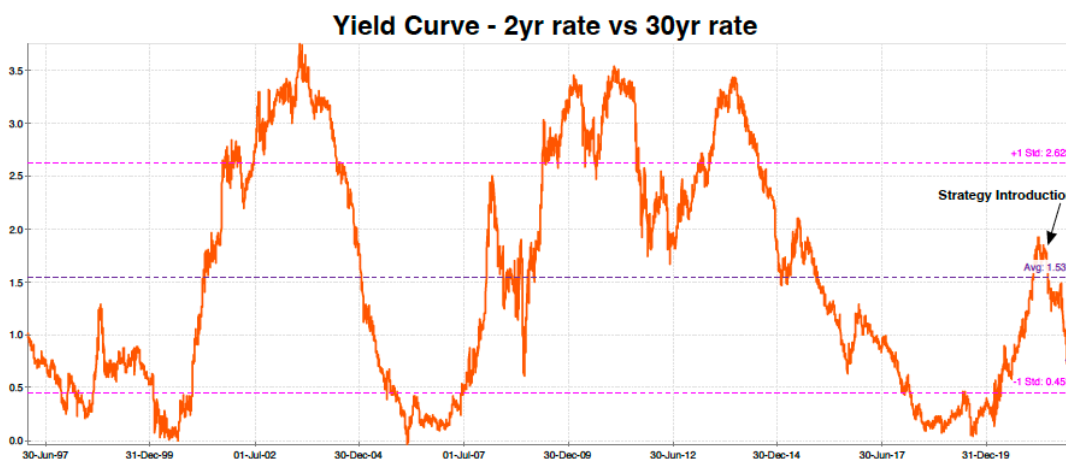
A key feature of the Strategy was the low level of **-glauca line-** Implied Volatility, the most important vector in pricing an option. Then, as now, Implied Volatility (IVol) on long-dated interest rate options is fully one standard deviation below its 25-year average; a result mostly due to Quantitative Easing (QE).



A low level of Implied Volatility not only lowers the price of the option, which of course reduces the “burn rate” of time decay, but also it increases the profit potential from a rise in this risk vector.

IVol has declined by a smidge, worth only a 60-cent depreciation of the NAV.

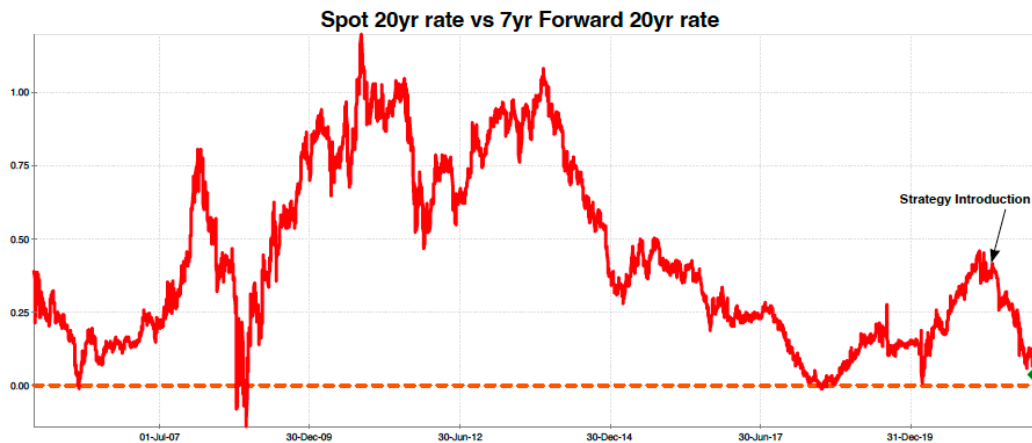
Vastly more impactful has been the flattening of the **-tangelo line-** Yield Curve. When introduced, the 2yr rate closed at 0.26% while the 30yr rate closed at 2.05%, creating a Yield Curve spread of 179 basis points.



In reaction to potential shift in Federal Reserve Bank (FED) policy, the 2yr rate has recently jumped to 1.16% while the 30yr rate has declined to 1.93%. This has compressed the Yield Curve to only 77bps.

It is the shape of the Yield Curve that creates what is known as the Forward Rate. If you want to roll in the financial mud, I will direct you to my [Maven's Classroom](#) for my August 12, 2013, Commentary; but at high level, a Forward Rate is simply a cashflow discounted by the spread between two Spot rates.

The steeper the Yield Curve, the greater the **-acerola line-** difference (spread) between the current (Spot) interest rate, and the Forward interest rate.



Notice the **-acerola line-** spread when the Strategy was introduced was 39bp, and when added to the **-kaffir line-** Spot rate of 1.99%, the result can be seen on the **-scorzonera line-** Forward rate, which was 2.38% at the time.



Set aside the charts for a minute. Here is the important part... the ONLY interest rate that matters for option pricing is the Forward Rate. Since the Strategy was introduced, this rate has declined from 2.38% to 2.03%, or 35bps lower – almost entirely due to the 102bp compression of the Yield Curve.

This 35bps change in the Forward Rate reduced the NAV by about \$6.00 and is the main reason the Strategy has declined in value.

To complete the analysis, let's note the two other reasons responsible for the decline in the Strategy's value.

Unmentioned, so far, is the standard cost of owning an option – its time decay. Here, the Strategy has performed exactly as predicted with a NAV depreciation of about \$2.35 over 37 weeks (implying about \$3.30 annually).

Finally, there has been an additional 25 cent reduction in the NAV due to the discounting impact of higher short-term rates. These pennies are not lost but will be slowly recouped as time passes.

In summary: The Original option value ~ \$25.00

Lower Implied Vol ~ 60c

Lower Forward Rate ~ \$6.00

Time decay (theta) ~ \$2.35

Rate discounting ~ 25c

Total decline in NAV attributable to these four factors ~ \$9.20

Current option value = \$15.80

Current UST value = \$24.20

Current NAV = \$40.00

Notwithstanding the impact on early entrants, the good news is that the risk profile of the Strategy has improved. More options can be purchased for an equal dollar investment, which increases the leverage (Convexity).

## Updated modeled profile

The table below is a **MODELED** profile of how the Strategy could perform, contingent upon a few important assumptions (\*), as rates vary. **This is not a prediction**, but rather a modeled pricing projection using a \$40 initial price.

<u>-50bp</u>	<u>Unchanged</u>	<u>+50bp</u>	<u>+100bp</u>	<u>+150bp</u>	<u>+200bp</u>	<u>+250bp</u>	<u>+300bp</u>
\$34.16	\$40.00	\$49.39	\$63.40	\$83.04	\$109.11	\$142.00	\$181.64
\$30.50	\$34.73	\$42.43	\$55.03	\$73.99	\$100.43	\$134.96	\$177.46

The -aero line- is an "instant" snapshot as rates vary and Implied Volatility is held constant

The -begonia line- is the Strategy, **two years hence**, with Implied Volatility held constant

**Note:** The Strategy will likely move less than modeled +/-50bp since Implied Volatility will move; locally IVol will move inversely to rates as skew transitions. However, Implied Volatility will almost certainly expand if (1) rates rise significantly, or if the (2) Yield Curve steepens.

## Implementing the Strategy

Let's be clear, the only perfect hedge is found in a Japanese garden.

That said, some ideas are superior to others. In the past, we have suggested a weighting of \$50,000 of the Strategy (so 1250 units at \$40) per \$1,000,000 of interest rate exposure.

Interest rate risk would obviously include longer dated bonds but could also include interest rate sensitive equities such as the FANG stocks. It would also include real estate or construction loans that have not yet been "rate-locked".

Below is a straightforward example. The **-brunner line-** is the price of an ATT investment grade BBB-rated bond issued in 2007 with 16 years remaining.

The **-hellebores line-** is the total return profile for a portfolio that consists of only \$1mm (face) of this security with a current value of \$1,344,400 which is priced at 140bp above the US Treasury 20-year bond.

The **-ranunculus line-** includes \$50,000 of the Strategy relative to the \$1mm original face amount of the investment, and the **-cockscomb line-** includes \$65,000 of the Strategy, which is proportional to its current market value.

### ATT 6.30% 1/15/2038 (Cusip 00206RAG7)

-50bp	Unchanged	+50bp	+100bp	+150bp	+200bp	+250bp	+300bp
142.03	134.44	127.28	120.64	114.44	108.67	103.27	98.22
2.98%	3.48%	3.98%	4.48%	4.98%	5.48%	5.98%	6.48%
Two year Total Return (price change + coupon annualized)							
5.94%	3.43%	1.07%	-1.14%	-3.22%	-5.17%	-7.00%	-8.74%
\$159,700	\$92,200	\$28,900	-\$30,600	-\$86,500	-\$138,900	-\$188,300	-\$234,900
Two year Total Return with \$50,000 Strategy hedge (price change + coupon annualized)							
5.30%	3.07%	1.14%	-0.42%	-1.35%	-1.77%	-1.75%	-1.35%
\$147,820	\$85,609	\$31,931	-\$11,810	-\$37,530	-\$49,402	-\$48,920	-\$37,747
Two year Total Return with \$65,000 Strategy hedge (price change + coupon annualized)							
5.12%	2.97%	1.17%	-0.22%	-0.81%	-0.80%	-0.25%	0.76%
\$144,256	\$83,632	\$32,840	-\$6,173	-\$22,839	-\$22,553	-\$7,106	\$21,399

Circling back to the top, there is no "right answer", only better answers. While the Strategy contains only two static assets that maintain a fixed proportion (the 5yr UST and the fixed-expiry option), there are many moving parts that can adversely bend this **modeled** profile.

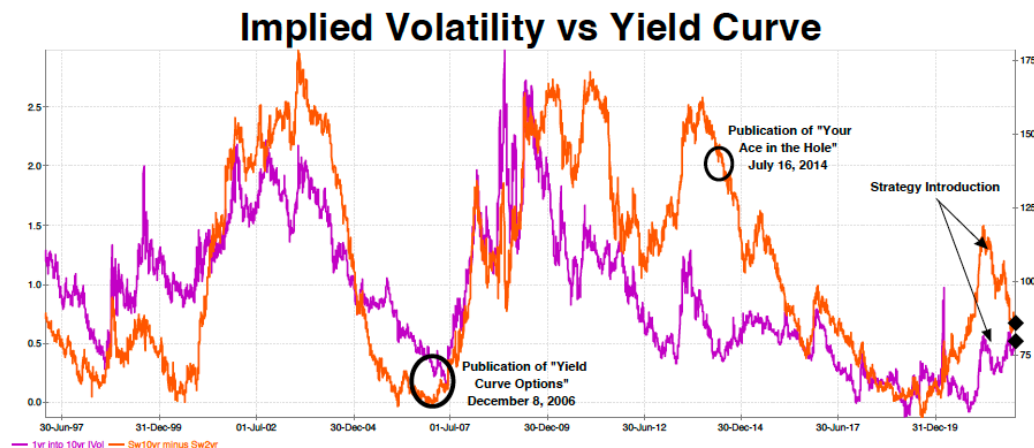
However, there are also paths going forward where the Strategy can outperform the modeled profile and act as an effective risk mitigant.



## Macro Comments

Below is my all-time favorite chart where the **-chiogga line-** is the shape of the Yield Curve, while the **-jamuni line-** is the level of Implied Volatility.

As detailed in "[Your Ace in the Hole](#)" – July 16, 2014, the relationship between the Yield Curve and Volatility is fundamentally tight. As such, it was easy to predict that the gap between the two on the Strategy launch date would converge. Such a pity the Yield Curve flattened instead of Volatility jumping !!



The underperformance of the Strategy is now a sunk cost for some, but an opportunity for others. A flat Yield Curve with low Implied Volatility is inherently unstable as the market waits for the next event.

**This Strategy is a financial Insurance Policy;** I can assure you that a 200bp increase in rates will almost certainly depress your net worth. While the Strategy can be used for speculation, it was designed to be held for a longer horizon. Its gains can be much greater than the limited loss of its cost (positive Convexity).

Us UChicago monetarists have been warning for a decade that the FEDs helicopter money would someday have consequences. Now the gears are grinding as a jolted FED realizes that the "deficits don't matter" Modern Monetary Theory (MMT) philistines spiked the punch bowl well into the party.

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

Harley S. Bassman  
February 1, 2022

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Your comments are always welcome at: [harley@bassman.net](mailto: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>



*"I'm looking for a hedge against my hedge funds."*

Robert Mankoff – The New Yorker



## **(\*) Assumptions for a MODELED Performance Profile**

Any (modeled) projected performance profile requires a few assumptions, and there is myriad more for long-dated options. As a 35-year Wall Street professional, I am well aware of how to slant a profile with “tricks”; but I believe the assumptions used here are both reasonable and conservative.

- 1) Excluded are all fees, commissions, and transaction costs.
- 2) I assume the initial portfolio ratio is fixed, with no adjustments.
- 3) I use Wall Street standard (Bloomberg) instant “parallel shifts”; this is conservative since long-term rates will likely rise more than FED controlled short-term rates.
- 4) All prices calculated on Bloomberg SWPM or BC1.
- 5) I assume “roll down” for USTs
- 6) I use mid-market pricing for all risk vectors.
- 7) Excluded is the interest income of the UST allocation.
- 8) I assume the spread between USTreasuries constant versus Swap rates.
- 9) I hold Implied Volatility flat in the base case at 75nv
- 10) Implied Volatility for the “2yr hence” case rides the current term surface, presently 5yr options are about 4nv higher than 7yr options.
- 11) I assume no slippage in managing the Strategy over time.
- 12) I assume a “buy and hold” from issuance.

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