# The Convexity Maven

A Commentary by Harley Bassman

**April 13, 2021**

## "The Marshmallow Test"



Walter Mischel and Ebbe B. Ebbensen – Stanford University 1972

Fifty years ago, it was demonstrated that the ability to delay gratification was an attribute correlated with life successes – at least as measured by one's eventual SAT score, Body Mass Index (BMI) and educational attainment. (Spousal selection was not included, which I would note as my greatest achievement.)

The famous Marshmallow Test offered five-year-old children the option of a single marshmallow immediately, or two marshmallows fifteen minutes hence. While unclear if this was biased by one's environment (the initial group was selected from the Stanford University pre-school), the evidence did support the ecclesiastic notion (James 5:7 among others) that "patience is a virtue".

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Let's dispense with the Modern Monetary Theory (MMT) nonsense that the massive expansion of Central Bank balance sheets (money printing) has not created inflation.  Of course there is inflation; just not sourced from the intended location of middle-class wages and captured by the Consumer Price Index (CPI).

With justification, our politics have been roiled by notion that Government actions since the Great Financial Crisis (GFC) have mostly benefited the Top 1%, who owe their expanding wealth to the price of assets (both financial and real). Thus, the familiar relationship between the -fulvous line- growth of the FEDs (Federal Reserve) balance sheet and the level of the -calypso line- S&P 500.
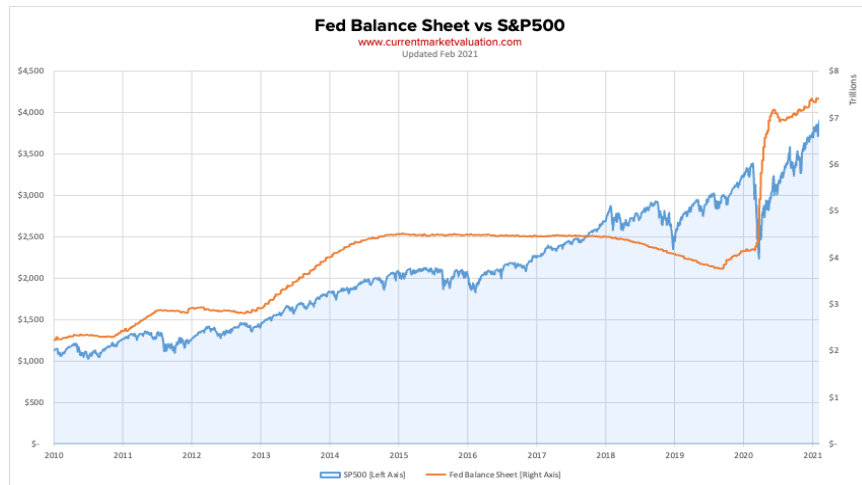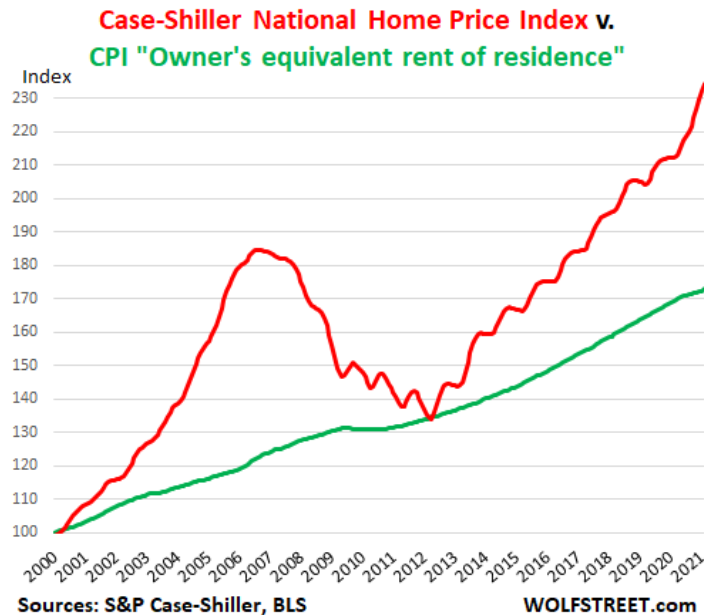


Since money is fungible and respects few national boundaries, perhaps it is better to compare the balance sheets of the -harbour line- G-3 (US, Europe, Japan) Central Bank balance sheets with the -santa line- S&P 500 (SPX), which offers an even tighter correlation.
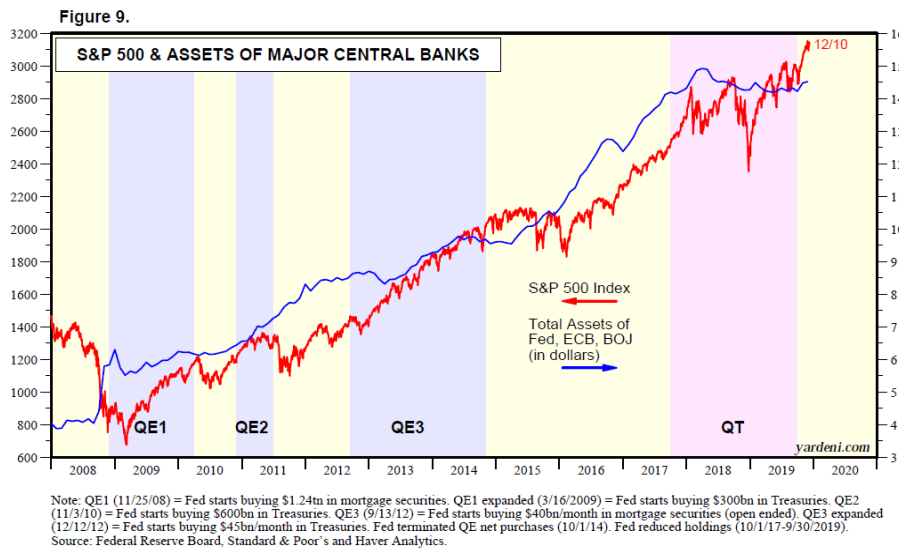
While it is true that many people have a stake in the stock market, often via corporate retirement plans, equity market wealth is relatively concentrated at the top.  More diverse is residential real estate, which is why the largest asset owned by most people is their home.

Just as CPI does not recognize the inflation of financial assets, so too does it not fully capture the rise in home values.  CPI uses the convoluted -festive line- of Owner's Equivalent Rent instead of the more direct -falu line- of house prices.

**Case-Shiller National Home Price Index v.**
**CPI "Owner's equivalent rent of residence"**

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Sources: S&P Case-Shiller, BLS                    WOLFSTREET.com

To be clear, I cannot offer a more stable and practical measure of inflation than CPI as it reasonably mimics the shopping basket of the median citizen; rather I want to push back hard on the notion that the Government can "print money" at a faster pace than the underlying growth of the economy with no consequences.

Thus, I will circle back to the top, where I will propose that while a short-term day trader may do well over a limited horizon, and will certainly be more entertaining at a cocktail party, it is the patient investor with a longer-term view who will reap the greatest rewards.

This holds true for both investors and regulators; too often Government officials offer short-term solutions instead of more patient policies.  Sadly, the worst of these quick-fix policies exacerbate excesses that feed public euphoria.

William McChesney Martin became Chairman of the FED soon after the Accord of 1951 delineated its independence from the Treasury Department.  He famously said it was the job of the FED "to take away the punch bowl just as the party gets going"; such a pity the current FED is spiking the Kool-aide with 151.

3

Coincident to the original Financial Crisis in 1929 were "Blind Pools", offered by investment banks and often supported by margin loans from their affiliated commercial banks. The current incarnation of these speculative vehicles is -klein bar- SPACs (Special Purpose Acquisition Companies), also known as "blank check" shell companies designed to take private companies to the listed (public) market by avoiding the traditional regulatory process. SPACs are well supported by the FEDs Zero Interest Rate Policy (ZIRP) which eliminates the opportunity cost of effectively making interest-free loans to unregulated financiers.
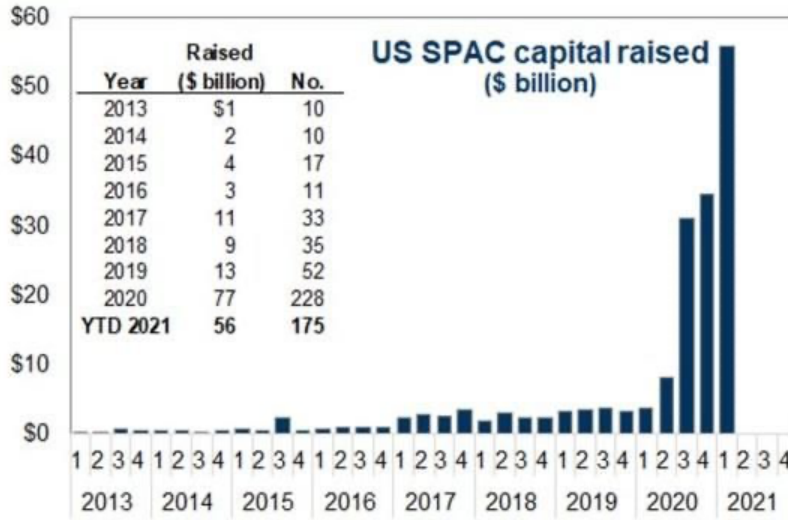


Amazon's IPO occurred in 1997, and earnings were scant for nearly two decades. (I am still choking on sour grapes.) The "bear" story was that Amazon could sell every book in the world and still not support its P/E ratio. What was not considered was that Amazon might sell everything in the world.

Tesla -roscoe curve- is fundamentally a SPAC, a blind pool supported by ZIRP and Quantitative Easing (QE); is this a bubble, or will they sell more than cars ?



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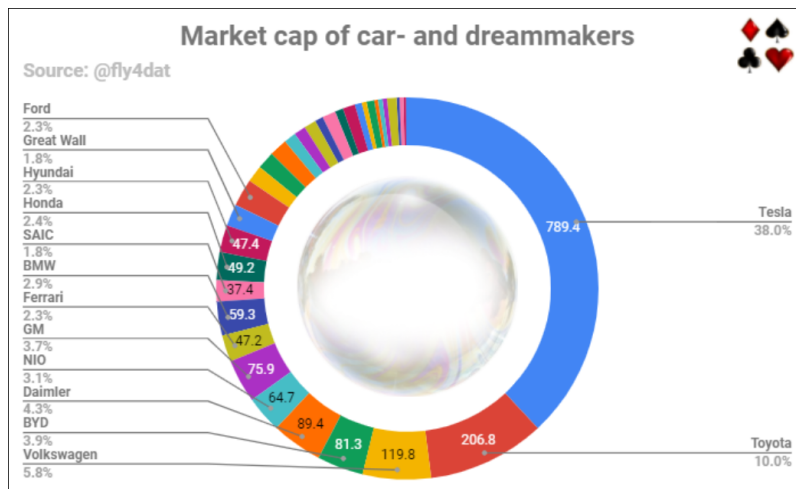
Many pundits will cite the above as evidence of wild financial speculation that will soon end in tears; but I will not bray with that chorus.  While financial markets may reverse course, I am equally comfortable with the notion that they can continue to rise on a tide of liquidity from a twin Fiscal and Monetary tsunami.

You might recall I offered long-dated bullish (listed) option investments for this exact reason in *"With a Mighty Hand"* – June 30, 2020 (with the SPX at 3000) and again in *"A Model Portfolio"* – December 15, 2020 (with the SPX at 3650).

Strangely, the mouth-breathers on cable TV have failed to notice an incongruity that is terrifically opportunistic; specifically, the collapse in ultra-long-dated option Implied Volatility (IVol).

It was the clear intent of the synchronous Central Bank polices of ZIRP and QE to revive Western economies by pushing investment out of near-term safety and into those that were dependent upon "animal spirits".  In theory, one would expect the term surface of IVol to steepen as future uncertainty would follow the current calm; yet this has not occurred.

Compare the -geyser line- term surface for SPX options in June 2016 relative to the -cerise line- of April 2021.  Notice the decline for the more distant expiries.
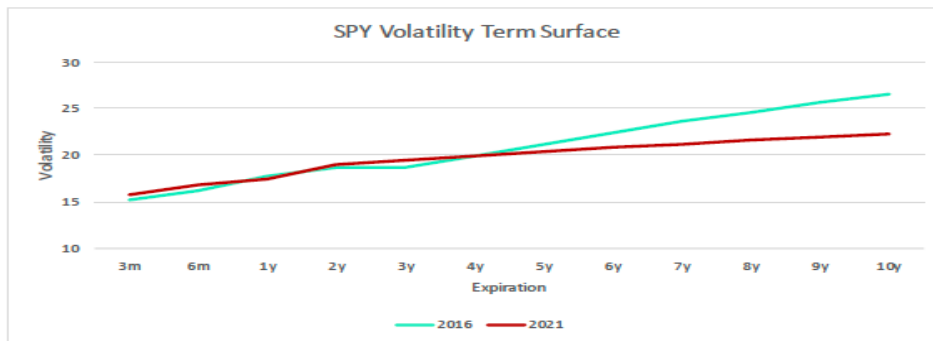


This term surface "flattening" is more pronounced for European equities (SX5E) where the 2021 -honey line- has declined relative to the -brink line- of 2014.
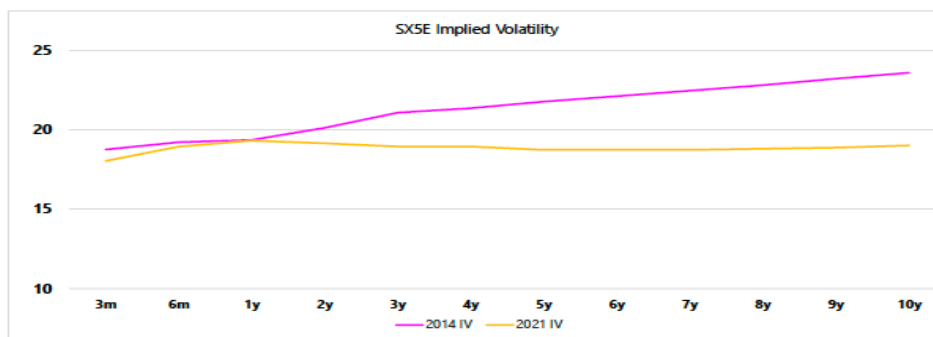
Similarly, long-dated options on the Japanese yen have collapsed. Compare the -aegean line- of 2014 relative to the current -grotto line- of 2021.



USD vs JPY Volatility Term Surface
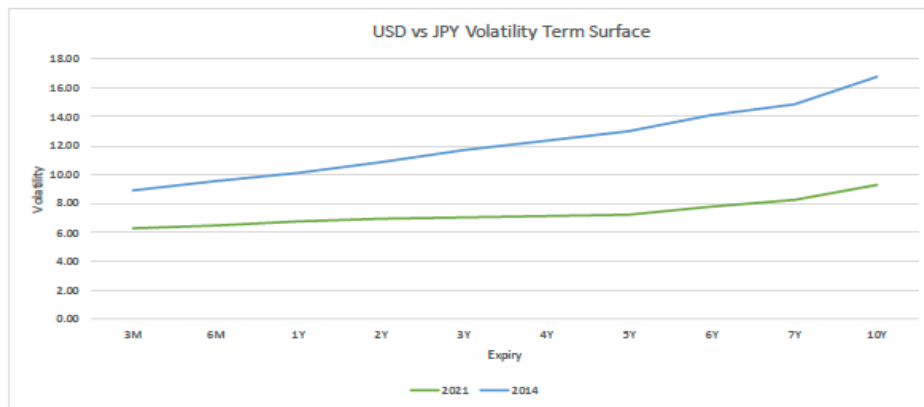
Implied Volatility for almost all assets has declined.  What is anomalous is an even greater decline in the Implied Volatility for long-dated options, despite the fact that an "Apocalypse Now" fleet of helicopters is about to drench the market in conjured fiat currency.


**Buckle up – It's about to get heavy....**

I write frequently about the relationship between Implied Volatility and the shape of the Yield Curve, best detailed in *"Your Ace in the Hole"* – July 16, 2014. There, I used a heuristic story that relates future uncertainty (as captured by a steep Yield Curve), and the price of uncertainty (as measured by Implied Volatility).

However, it is also possible to analytically assess this relationship, and thus curate some interesting investment opportunities.

The use of the word "investment" with respect to options does seem orthogonal because their time decay (theta) often outpaces the denouement of a good idea. And since "lunch" should not be free, there must be a cost for positive convexity; so the question is can we define some sort of boundary that we can use to screen for possible "option investments".

Trigger warning, there is some math here; but I will play nice...

Let's work with a totally clean slate. You buy a $10,000 bond that has a 3% coupon, it pays $300 per year. You have to borrow all the money at 1% to buy it, so that costs you $100 per year.  So, net/net, you earn $200 per year, or 2%. In an unchanged world, you will earn $200 every year – this is a **linear relationship** that is mapped by the 45 degree -papaya line- on the next page.

Now let's consider a call option on this bond.  Using an Implied Volatility of 13.7%, a one-year expiry option will cost roughly $550.  However, <u>a two-year option is not double the price</u> at $1100, but rather costs only $778.  This is because options follow a **Concave relationship** via the square root of time, as mapped by the -lunara line- below.  Thus the $550 price is multiplied by the square root of time (2 years), so $550 * 1.414 = $778.
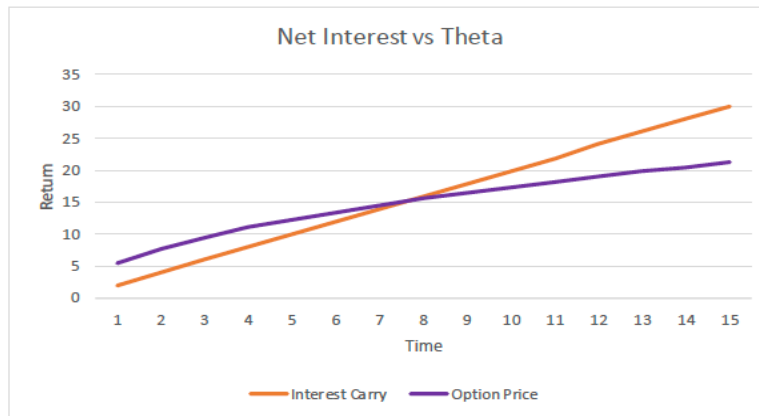


Following along, assuming the same 13.7% Implied Volatility, a three-year option would cost $953 ($550 * 1.732), a four-year option $1100, and so on.

You must be wondering what happens if the lines cross, as shown; and <u>the answer is investment opportunity</u>.  This sort of event is relatively rare, because it means you can own an option with positive theta.  Can this occur in real life: YES

**Buy USD call // JPY put;  Spot Fx level = 109.25;  Strike = 100.00**

5-year expiry,  $1mm notional;  Price = $77,500
7-year expiry,  $1mm notional;  Price = $64,000
10-year expiry, $1mm notional; Price = $47,500

These prices are real; if you buy the 7yr option and nothing changes, the option price will rise by $13,500.  Indeed, one is long gamma and earning theta.

How is this possible ?

1)  The Bank of Japan (BOJ) has pinned their 10yr rate at 0.10%;
2)  Excess USD vs JPY demand adds an additional exchange rate fee;
3)  FED QE and ZIRP crushes Ivol as investors sell options for yield;
4)  Regulation encourages banks to sell residual risk from Structured Notes.

These sorts of relationships should not occur in an unfettered market; External forces, such as Central Bank activity or regulation, is usually required.

**Long-dated options as an "Investment"**

Most option activity is concentrated in expirations from one to three-months; thus, they are functionally a "trade"; this is in contrast to an "investment" which tends to connotate a more distant horizon.

Historically, portfolio managers have shunned long-dated options because of the heavy cost of time decay (theta) associated with the elevated Implied Volatility of a steep Term Surface; but this cost has been substantially reduced. Strange but true - <u>unprecedented Fiscal and Monetary stimulus has widened the range of distant outcomes, yet it has been accompanied by a reduction in long-dated Implied Volatility.</u>

I have strong convictions about Interest and Exchange rates, as well as considered thoughts on Equities; but I cannot assure you that I will be right. As such, **I use long-dated options not because I know I'm right, but rather because it costs so little to be wrong**. Long-dated options offer the patient investor the risk profile of unlimited gains for a limited cost.

**Enjoy your pair of marshmallows, I'm taking the entire bag in 5 years.**

My best ideas (which I own in some variation):

SX5E December 2024 call (vs 3978); Strike = 4000; Price = 325
*Limited loss with all of the upside after an 8.7% rally.*

USD/JPY December 2028 call (vs 109.25); Strike = 100.00; Price = $60k/1mm
*Significant positive carry with a terminal break-even above 106.40*

April 2028 put option on 20yr rate (vs 2.465%), Strike = 4.25%; $28k/1mm
*Insurance against financial doom as stock/bond correlations flips near 4.00%.*

**These investments have generally been unavailable to "civilians" (non-professionals); however, this may change in the near future.**

Harley S. Bassman
April 13, 2021

Follow me on Twitter: @ConvexityMaven

Your comments are always welcome at: harley@bassman.net
If you would like to be added to my distribution, just ping me.

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