Convexity Maven

A Commentary by Harley Bassman

September 6, 2018

"Not the Sharpest Knife in the Drawer"

Bob Kramer – Damascus Steel https://kramerknives.com

It is sage advice to refrain from bringing a knife to a gun fight; and it surely demonstrates equally bad judgement to carve a slice of bread for yourself with an axe. Yet despite significant advancements in artificial intelligence, so many of our financial decisions are still divined upon archaic macro formulations.

As a preamble, please let me vent for a moment.

In 1956 a Stanford engineer and a mathematician teamed up to form Fair, Issac & Company. The consumer credit scoring system they introduced soon took on the moniker: FICO

The FICO score became the lingua franca of credit in 1995 when Fannie Mae and Freddie Mac first began using this measure to help determine which American consumers qualified for mortgages to be stamped with their imprimatur. The score ranged between 300 and 850, and a rating of at least 720 was needed to be considered a "Prime" borrower. If you clocked in at 719 or lower, you were rated "Sub-prime". (OK, now you know where that term originated.)

So it came to pass recently that a 23-year old University of Chicago graduate, gainfully employed in NYC with a one-year history of W-2 earnings applied for a credit card at the local branch of Citibank; a financial institution where for a decade he had maintained both a savings and checking account. His paycheck goes into the latter via direct deposit. His application was declined.

A meeting with the branch manager soon followed. The manager's chagrined explanation was deflating. He is not involved in credit decisions, he explained; decisions were now based upon a personal credit scoring system, dominated by FICO. Moreover, the recent graduate received a demerit for being debt-free.

The manager's earnest suggestion was to open a new non-interest-bearing account and deposit a wad of cash to support a fully collateralized credit card for six months and then re-apply. (Isn't that what they used to call a debit card linked to a checking account?)

In a world where a thrice-bankrupted businessman can be lauded for his financial acumen and ex-Fed Chairman Ben Bernanke can be denied a mortgage because he could not supply the name of a current employer, I suppose this all makes perfect sense. Similarly, this explains why my wife, who gave up her medical practice two decades ago, has a FICO rating better than mine.

FICO was a huge advance in computational science half a century ago. Its robust analysis was built upon a landscape of unionized and somewhat static employees who spent a score of years at a single firm that promised a comfortable defined-benefit retirement. Bank accounts did not cross state lines and most mortgages were thirty-year fixed rate.

While I am not an expert, it seems that **antique metrics will not suffice** when Millennials hopscotch employers, transact via Venmo, don't own a landline and have snail mail sent to their parents' address.

As noted in past publications, I have been called a dinosaur, but riddle me this:

How is it that Google can scan my emails and Samsung TVs can listen to my bedroom chatter (both true), yet the sum total of FICO's collected data has scored my credit at a 790? (Yes, the Mongolia investment I suggested in 2012 did end in tears, but they shouldn't hold a grudge.)

Do I have a point? Indeed.

However much of an advance FICO was at inception, it is not sufficiently fine-grained enough for institutions to use as the final arbiter of credit. Similarly, the Sharpe Ratio (and its relative the Information Ratio) was a breakthrough idea surely worthy of the Nobel Prize earned by its creator, William Sharpe. However, its frequent use as the divining rod for investment selection is not only problematic, but may also soften the foundation of the investment landscape as it often encourages leverage over diversification.

Unlike my last missive, this commentary will eschew wonkish computation. As such, let's dispense with analyzing the distribution of returns as well as the selection of a proper risk-free rate. Notwithstanding these core assumptions, let's apply some top-down wisdom.

Sharpe's novel idea was to take the return of an asset class and divide it by its risk. Now it should not take a rocket scientist (Sharpe's first job was at RAND) to figure out that one should receive a greater expected return for investing in a riskier asset. Yet like Post-it Notes, great ideas are only obvious after the patent is issued.

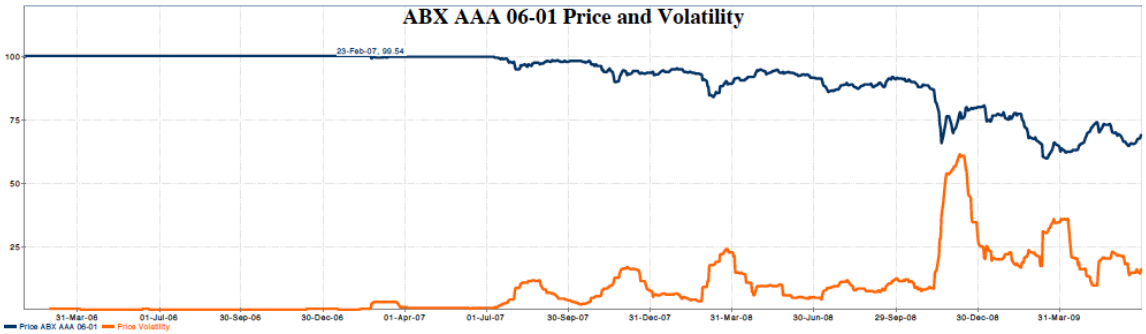
I will stipulate that estimating the return of an investment, ex ante, is not terribly challenging; especially if the asset has a fixed-coupon. And with a few assumptions about growth, costs and margins, even an equity-type investment can be zip-coded. The much harder nut to crack is the "Risk" metric.

Sharpe used the realized daily mark-to-market volatility as a proxy for risk. When dealing only in large homogenous asset classes in 1966 this made sense. Indeed, stocks exhibited more volatility than bonds, and go-go growth stocks were more volatile than blue chips that paid a handsome dividend. If you were a large pension or insurance company, use of a relative risk measure would be a vast improvement for macro asset allocation.

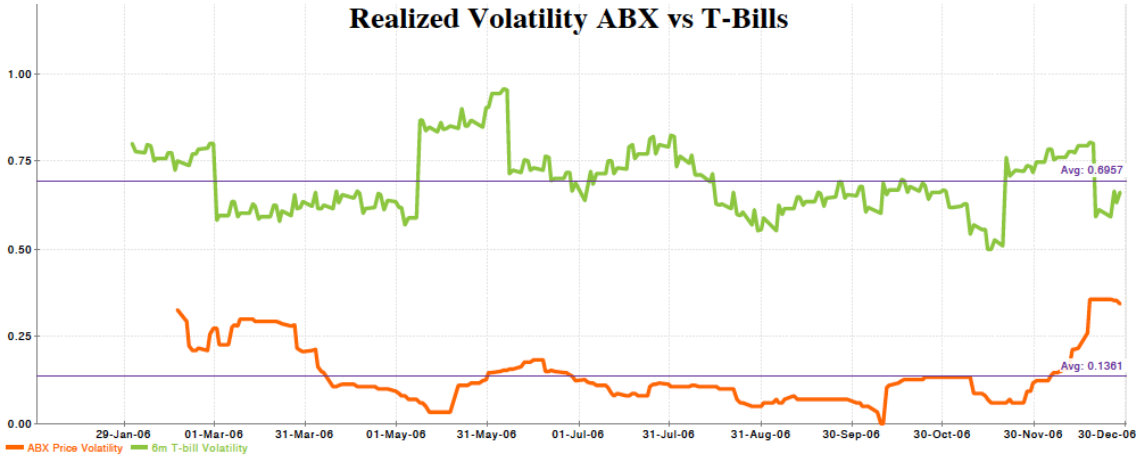
(It was only a few years later that "Inside the Yield Book" was published, the bond Bible that first described the concept of 'duration'.)

A ten-year government bond usually experiences a daily price change 4.5 times greater than a two-year bond. Similarly, Tesla is about three times more volatile than the utility Consolidated Edison. And here I can accept that their relative price volatilities reflect some degree of relative risk. However, this is not true for many assets or narrow strategy investments.

Let's consider AAA Sub-prime bonds (ABX AAA 06-01). The -delphinium line- is the price of this (S&P/Moody's vouched) rock-solid asset while the -protea line- is the daily realized price volatility from early 2006 to mid-2009.



What's not to love about these bonds? For calendar 2006, with a spread of about 20bps over its index (and 75bps over US T-bills) these –tiger lily line- gems offered a coupon of about 5.50% with a -noina line- realized daily volatility 80% less than that of six-month Treasuries. (This is not a typo.)



Viewing these bonds from the back-end of a telescope, AAA Sub-prime Home Equity floaters offered unparalleled risk metrics - so long as you suspended disbelief that bonds collateralized by soiled mortgages issued to borrowers who often could not even cover their closing costs were nearly risk-free.

How else can one rationalize why the senior managers of Merrill Lynch (with the greed of Croesus and a moral compass so twisted that our current political class would blush) could keep in portfolio $45bn CDO's when the entire firm had only $39bn of equity capital?

But let's not be diverted by the few bad apples. The real issue is that Sharpe-type ratios can misdirect even a good-willed and well-mannered financial professional (and no, that is not an oxymoron).

Consider these two investments: Would you prefer to buy an asset with an expected 15% return and a 30% volatility or an asset with a 5.1% return and a 3.4% volatility? The former has an Information Ratio (IR) of 0.5 while the latter's is 1.5. Seemingly, the second investment is better, especially if we lever it three times to produce a 15.3% return (with a lower volatility). However, extreme leveraging of low-volatility strategies is somewhat similar to selling a deep out-of-the-money put; usually a winner until it isn't. (See LTCM, 1998)

The current proclivity for "quant investing" may lead to an over-reliance on Sharpe/Information Ratios in portfolio construction. While IR is a valuable tool, it has quirks that can be under-appreciated. Of course, the greater concern is that **IR managed portfolios tend to increase leverage at the wrong time**.

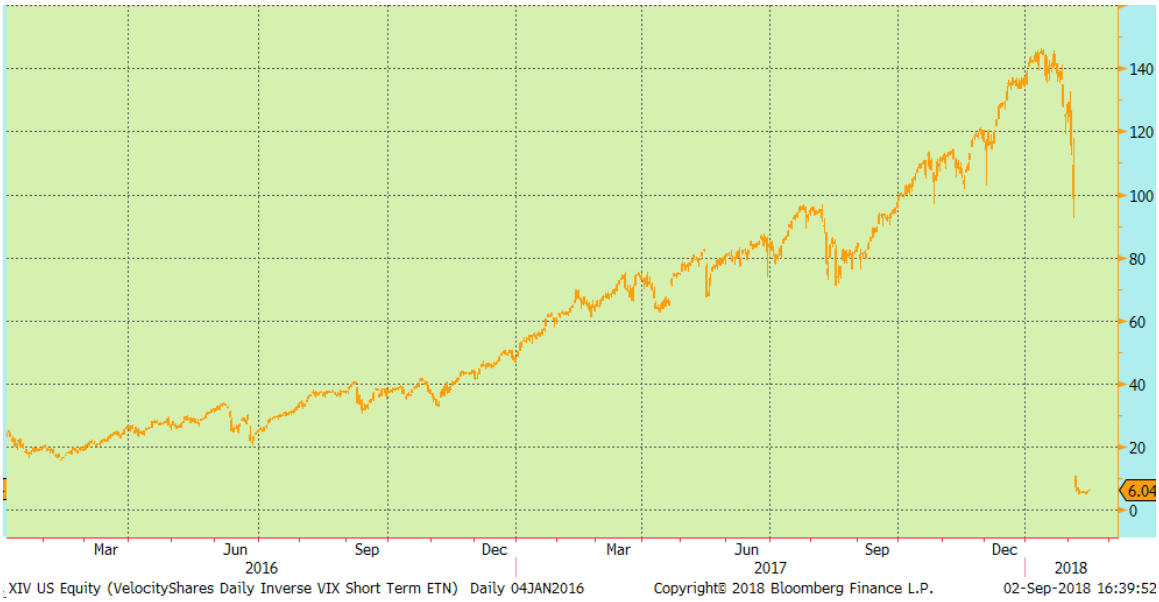
When volatility declines, leverage can be increased while still remaining within portfolio risk guidelines. This may be a fine idea when a Volatility measure declines from an abnormally high level, such as the VIX declining from 40 to 30. However, it is an entirely different proposition when such measures are already at the lower end of their historical ranges.

Let's consider the shooting star known as XIV, an ETF that returned the inverse of the VIX. In calendar 2016 this ETF posted an 81% return and realized an annual daily price volatility of 70%; thus, an IR of about 1.15. Not bad.

But if 2016 was good, 2017 was incredible. That year the XIV clocked a 188% return with a volatility of only 49%. This was surely financial alchemy as an IR of 3.81 is unlikely for an exchange-listed investment.

The under-appreciated quirk was that the VIX averaged 23.4 in the opening month of 2016, well above its five-year average of 14.6. This is in contrast with the January 2017 VIX average of 11.6, a mere kiss from its all-time lows.

Open interest continued to expand as Quants, Uber-drivers, and perhaps even 400-pound hackers chased these metrics; and of course, we know how this ended. It took barely two weeks for the -plutonium line- XIV to collapse from a high of 144 to 6.



An ancillary impact from reliance upon these ratios is that they can discourage investments in less liquid but solid ideas; the Sharpe Ratio can signal a false negative when illiquidity (local price volatility) masquerades as real risk.

As previously noted, while estimating the return component is relatively straightforward, the ex ante measurement of the risk (and its source) is more challenging. Does the asset's volatility truly reflect its risk, or is it just the case that the daily price change is a symptom of illiquidity as it closes on the bid-side Monday and the offer-side on Tuesday? The quick and dirty solution is to use weekly or monthly volatility, but this still does not address the core problem of discerning the Signal-to-Noise ratio.

Let's consider the most recent addition to my portfolio:
A ten-year expiry call option on the USD vs JPY currency struck at 100.00
Offering indication at 3.75%

This is interesting for a number of reasons:

1) The spot USD/JPY rate is 111.16; (11% above the strike of 100.00);
2) A five-year expiry option with the same strike costs 4.5%, (positive carry);
3) I detailed this trade in *"Money for Nothing"* – July 29, 2014 with an offering price slightly above 6.0% when the spot Fx was 102.11.
   [http://convexitymaven.com/images/Convexity_Maven_-_Money_for_Nothing_.pdf]

The last item deserves examination, how is it possible that the spot Fx rose by nine points, yet the price for a same strike option declined by nearly 38%?

Pricing for ultra-long-dated options (available on Bloomberg) includes inputs for:

1) Spot USD/JPY Fx;
2) USD 10-year rate;
3) JPY 10-year rate;
4) Cross-currency basis;
5) Ten-year ATM implied volatility;
6) Skew to adjust for an OTM strike.

Four years later, the USD rate has increased, the JPY rate has declined, and the cross-currency basis (the cost to borrow dollars) has tightened. These factors contributed to the forward rising only two points (78.63 to 80.71) while the spot increased by nine (102.11 to 111.16). However, the key driver is that ten-year ATM volatility collapsed from 14.25% to 10.25%.

My point is not to convince you that this is a terrific investment (although it is). Rather I want you to consider why this trade has a lousy profile via the standard risk metrics of a macro hedge fund.

As per above, the first four inputs are required to determine an arbitrage-free forward price; and each of these variables has a transaction cost (bid/offer) that a dealer must absorb (hedge). Consequently, despite a spot currency bid/offer spread of a single basis point (111.15 to 111.16), the ten-year forward currency

price could be as wide as 50bps (80.50 to 81.00). One then must value the bid/offer of the implied volatility, which at the ten-year point is an additional 50bps (9.75% to 10.25%). In sum total, the fully baked spread on this option will exceed 50bps, although some dealers may quote as tight at 40bps to be competitive (3.35% to 3.75%).

A risk-managed investor has two immediate concerns. The first is that even if a tight 40bps market is quoted, one will take a 20bp "loss" on the first day as this option will likely mark at the "mid-level" of 3.55%. This can be a significant deterrent for a 'hard payout' trader.

The second, and more salient to this topic, is that this asset could experience over a 10% daily volatility solely by the risk vectors crossing their bid/offer spread. Specifically, the **noise** from the various inputs can be greater than the **signal** from the fundamental risk of the USD/JPY metric.

This topic will not be news to most professional managers, yet they will likely not adjust their investment profiles. Investment guidelines for most macro funds promote tight stops and narrow volatility, which limit their motivation to search for interesting ideas. As such, you should not wonder why returns for such funds have been abysmal over this past decade.

Private Equity funds are the interesting contrast since there is no mark-to-market price (risk) to measure until their denouement. Nonetheless, capital keeps pouring in. The conundrum I find hard to untangle is that there are plenty of investments available in the public markets via long-dated derivatives that offer PE-scale returns, yet the most qualified investors cannot stomach the volatility. (If they saw how the "sausage is made" in PE they would be equally disturbed.)

Ultimately, **mark-to-market volatility reflects both the fundamental risk of an asset as well as the vagaries of its illiquidity**; thus, it is not the best indicator of whether an investment will realize its expected return. While the Sharpe Ratio is still valuable, it is too often employed as a marketing tool rather than an 'under the hood' measure of risk vs return.

Typewriters and Fax machines shook the world, and mine are now residing at the back of my closet. Perhaps it is time to reconsider FICO and Sharpe Ratios.

PS: My son was issued cards soon afterward from Capital One and Barclays.

Your comments are always welcome at: harley@bassman.net

Harley S. Bassman
September 6, 2018

The Convexity Maven ("CM") is a publisher, not a registered investment advisor, and nothing in CM's Commentary is intended, and it should not be construed, to be investment advice. CM's Commentary is for informational and entertainment use only. Any mention in CM's commentary of a particular security, index, derivative, or other instrument is neither a recommendation by CM to buy, sell, or hold that security, index, derivative, or other instrument, nor does it constitute an opinion of CM as to the suitability of that security, index, derivative or other instrument for any particular purpose. CM is not in the business of giving investment advice or advice regarding the suitability for any purpose of any security, index, derivative, other instrument or trading strategy, and nothing in CM's Commentary should be so used or relied upon.

CM hereby expressly disclaims any and all representations and warranties that: (a) the content of its commentaries are correct, accurate, complete or reliable; (b) any of its commentaries will be available at any particular time or place, or in any particular medium; and (c) that any omission or error in any of its commentaries will be corrected.

Although from time to time CM's commentaries may link to or promote others' websites or services, CM is not responsible for and does not control those websites or services.

At any given time, CM's principals may or may not have a financial interest in any or all of the securities and instruments discussed herein.