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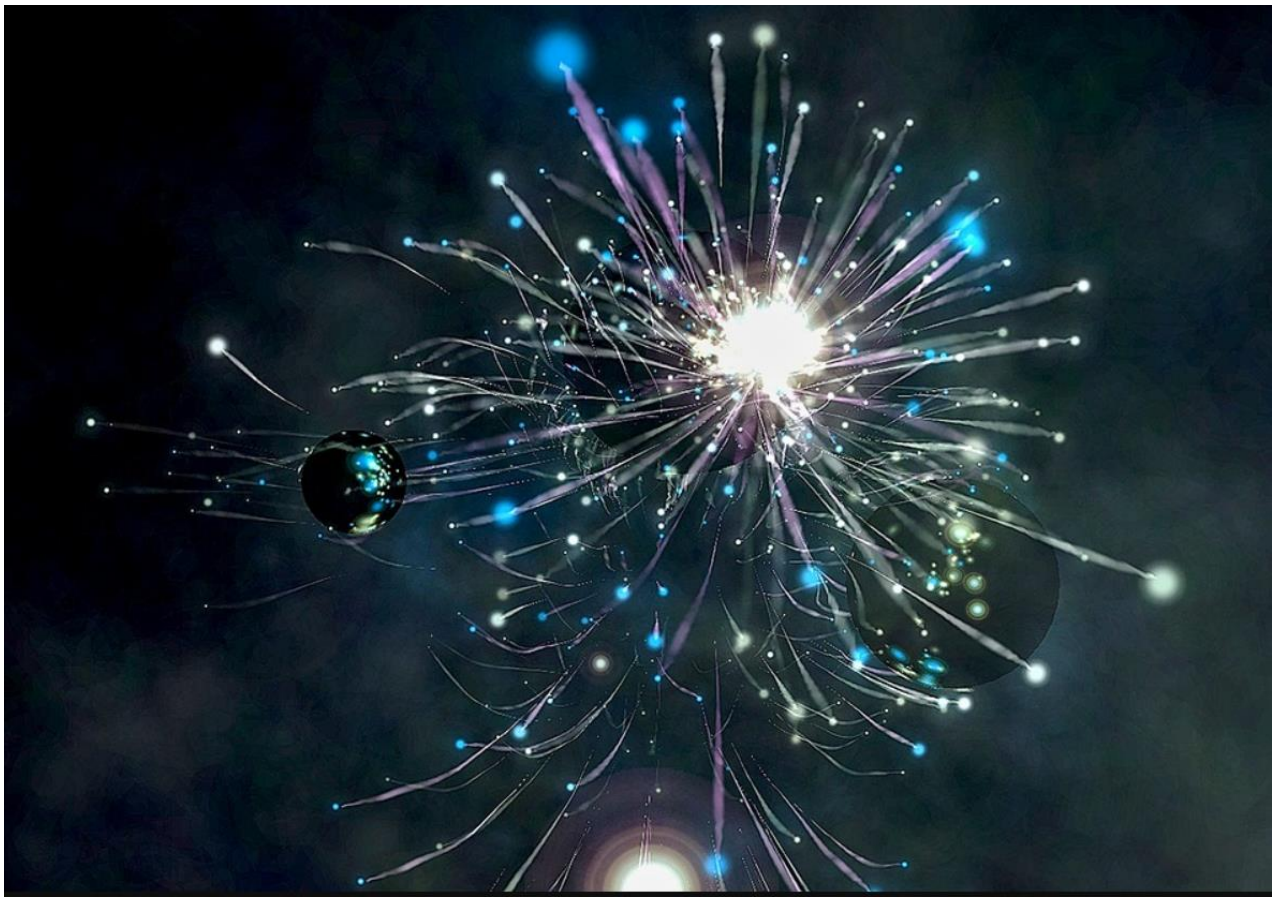

Quant Lab

Is VIX Overvalued?

Equity volatility valuation after the crisis

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Introduction

A large number of research pieces have been published lately on the subject of overvalued VIX or equity volatility in absolute terms and relative to credit and equity markets. In this note, we will be trying to break down the price of equity options and their relative value compared to other instruments.

We are now well past the US elections and new COVID-19 vaccines with high efficiency rates are being introduced every month. Additionally, developed markets' central banks and their respective governments have been supporting the economies and markets with exceptional action plans. But despite clearer skies, VIX remains well above its long-term average and above historical realised volatility.

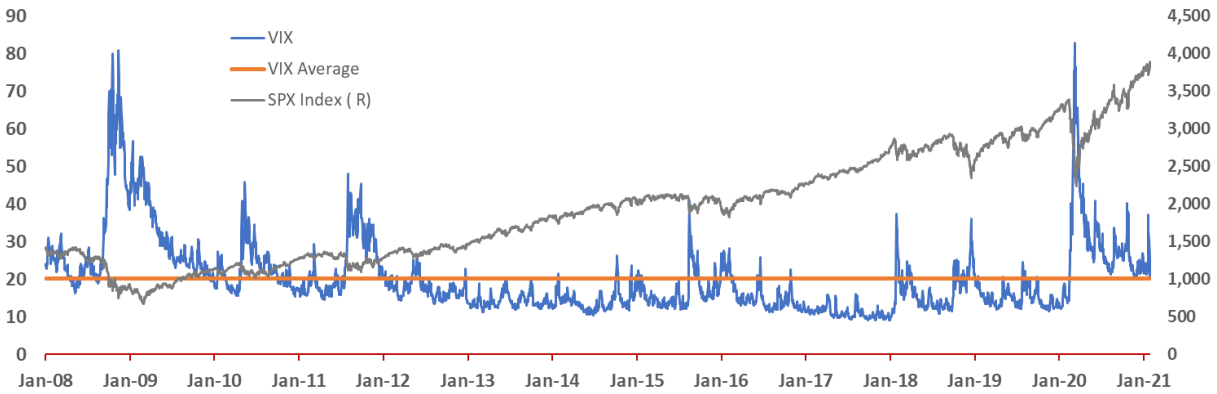
The main focus of most analysts has been:

- **Isn't VIX overvalued relative to credit spreads which keep tightening?**
- **Equity volatility remains expensive for a rising stock market**

To answer those questions, we will be looking at:

- **Equity volatility smile or skew**
- **Correlation between equity volatility and credit spreads**
- **VIX as a hedging strategy**

Figure 1: Historical SPX Index and VIX



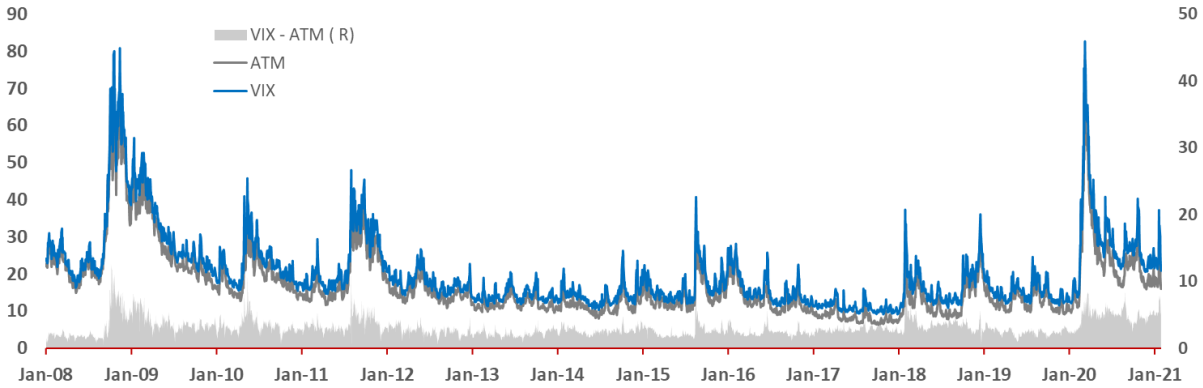
Source: Bloomberg, Investcorp-Tages

Calculation of VIX Index Values

VIX index is calculated using the CBOE-traded standard SPX options (that expire on the third Friday of each month) and using the weekly SPX options (that expire on all other Fridays). Only those SPX options are considered whose expiry period lies within 23 days and 37 days.

As VIX calculation includes the entire volatility skew, it is affected by high downside volatility as well. That is why many market participants consider VIX as an OTM (out of the money) volatility index on SPX. Below is a historical chart of the difference between VIX and 1month ATM (at the money) SPX options.

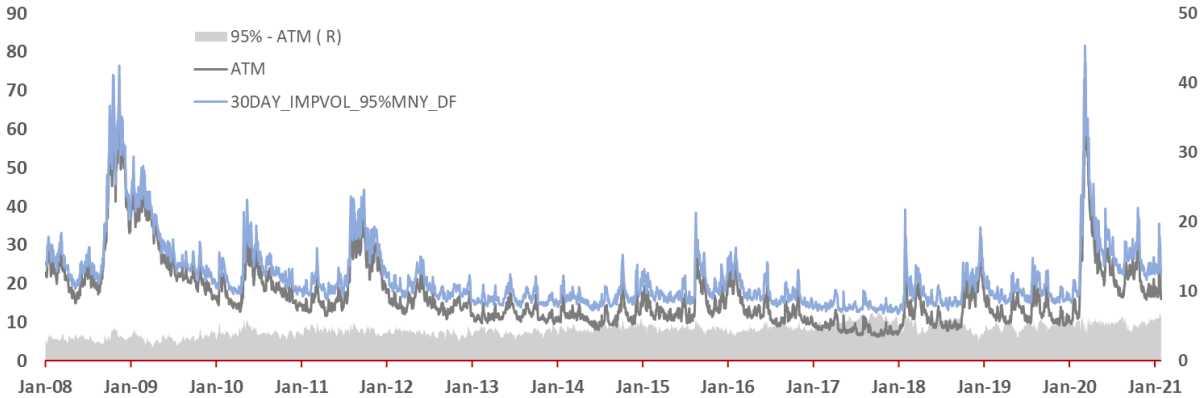
Figure 2: Historical VIX vs SPX 1 Month ATM Implied Volatility



Source: Bloomberg, Investcorp-Tages

For the sake of clarity, we are comparing in Figure 3 below 1m ATM against 1m 95% moneyness (with SPX at 3500, the strike would be 95% of 3500, i.e. 3325) SPX volatilities. This is a clearer comparison as we now compare similar expiry options for clear strikes:

Figure 3: Historical SPX 1 Month ATM and 95%M OTM Volatility

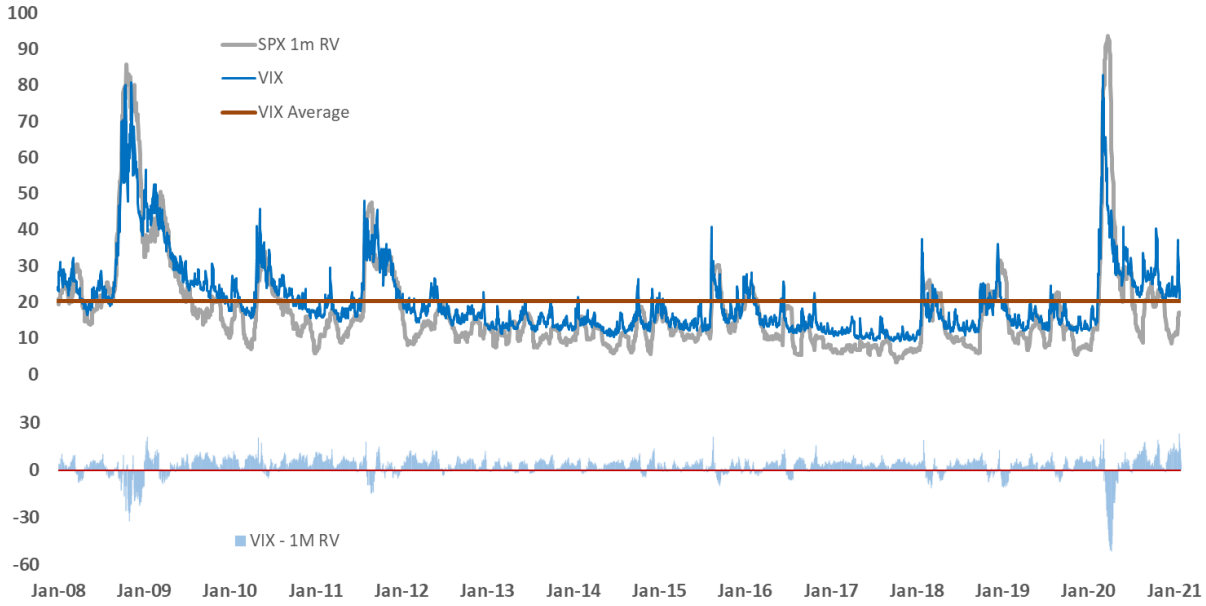


Source: Bloomberg, Investcorp-Tages

We observe a similar pattern on both graphs as out of the money volatility looks historically expensive to at the money volatility.

VIX seems also expensive relative to SPX 1 month realised volatility, the volatility risk premia, as demonstrated in Figure 4 below. It is interesting to note that volatility risk premia has historically been elevated in periods where VIX and realised volatility were relatively low which is not the case at present.

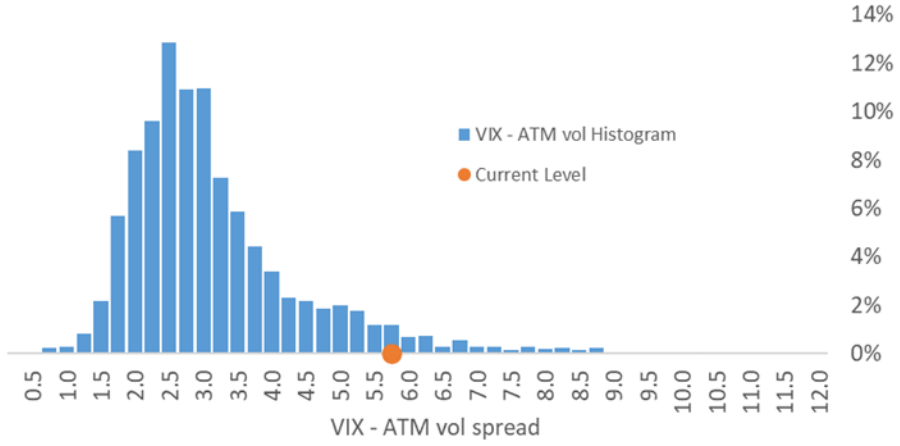
Figure 4: Historical VIX vs 1 Month Realised SPX Volatility



Source: Bloomberg, Investcorp-Tages

The skew seems to be responsible for a good part of what many might consider as an overvaluation of VIX.

Figure 5: Distribution of VIX vs ATM Implied Volatility



Source: Bloomberg, Investcorp-Tages

The greater volatility premium is also the result of a limited return of short volatility flows. The dramatic drawdowns experienced by investors in recent years, with the 2018 volatility spike and Covid-19 crisis may have tempered the appetite to harvest this risk premium. In fact, the March 2020 losses in short variance strategies were three times larger than in 2008.

Its impact is partly visible in the following chart that highlights the asset managers' gross short positions in VIX futures. Lower volume in variance swaps and outflows from call overwriting Exchange Traded Funds also point to lower supply of volatility.

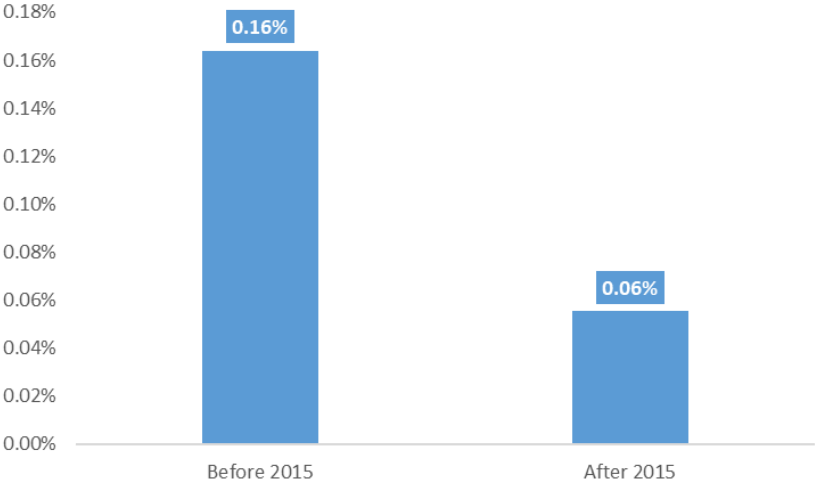
Figure 6: Asset Managers Gross Short Positions in VIX Futures Contract

Source: Investcorp-Tages, Macrobond

Bonds offer lower diversification benefits at the lower bound, raising the risk of equity investments.

Beyond flows, it may be that multi-asset investors are justifiably assigning greater risk to their equity portfolios in a world where government bonds are unlikely to offer the same diversification benefits. As the next chart shows, government bonds have offered much lower protection in periods of equity market volatility. On average, European government bonds have only delivered 6bps of performance during negative weeks for the STOXX Europe 60 after German ten-year yields crossed the 1% threshold versus three times as much in the ten preceding years. With short-end rates anchored at the zero-lower-bound and mixed results from the ECB or BoJ's experience with negative rates, there is only so much interest rates can rally from current levels.

Figure 7: EU Government Bonds Performance During Negative STOXX Europe 60 Weeks



Source: Bloomberg, Investcorp-Tages

Our understanding is that investors have been buying large amounts of out of the money options and other tail risk hedging instruments since the 2020 crisis. There is anxiety surrounding COVID, economy, inflation, debt issuance and whether extreme valuations and aggressive search for yield by investors have not pushed us into a risk-asset bubble.

Figure 8: SPX 1 Month Volatility Skew

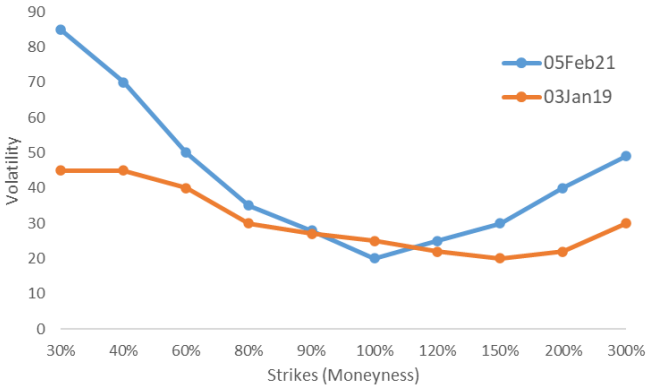
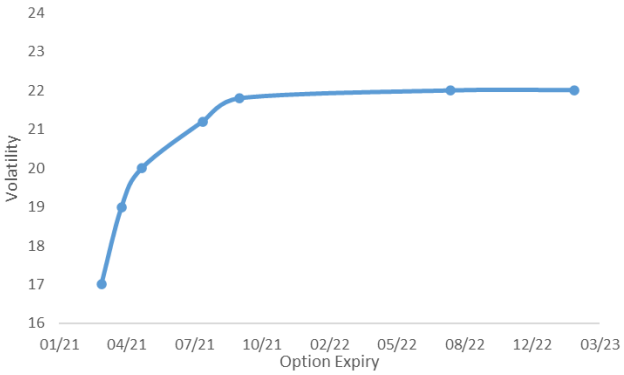


Figure 9: Term Structure of SPX 100% Vol (ATM) as of Feb 5th 2021



Source: Bloomberg, Investcorp-Tages

Figure 8 represents the present volatility smile in blue against levels 18 months ago. Out of the money options, more particularly downside strikes, puts are more expensive where as at the money volatility seems fairly priced. The other interesting feature in Figure 9 is that forward expiries of at the money options are more expensive and then a stabilisation can be observed beyond three months as if market expects the current levels of volatility to persist for some time.

After the 2008 crisis, VIX remained high for some time and only decreased to today's level of 23.5 in June 2009 but remained very reactive to market corrections for over 2 years. At this point, we need to add that selling volatility to enhance yield was not such a popular activity then as bond yields were more generous then.

Correlation Between Equity Volatility and Credit Spreads

With regards to credit spreads and VIX, there is a natural correlation obviously as both are very sensitive to the value of the underlying stocks. Figure 11 going back to 90s demonstrates the close relationship between equity volatility and credit spreads.

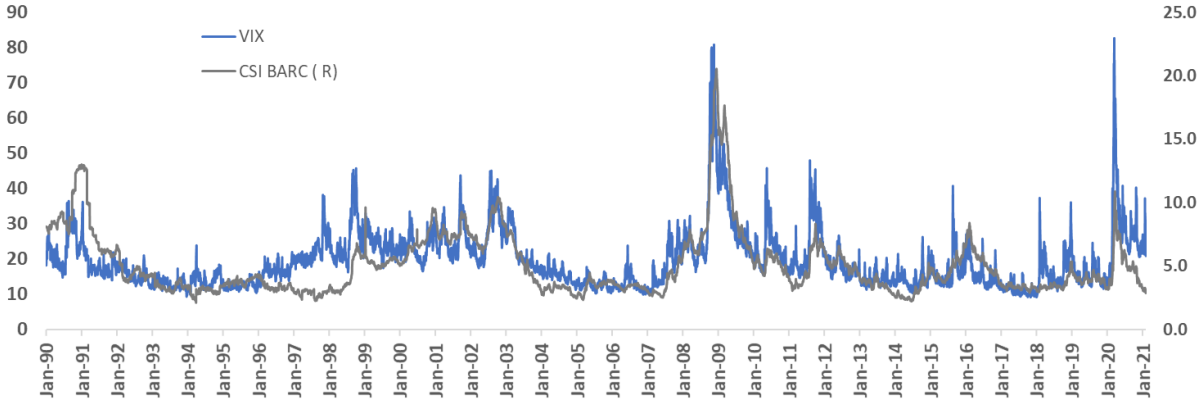
Figure 10: Historical VIX vs CSI BARC

Source: CSI BARC: BarCap US Corporate HY YTW – 10 Yr Treasury Spread

Figure 11 displays a similar divergence in 1996 after the FED had delivered a series of rate cuts and the market was concerned about overheating economy, inflationary pressures and the possibility of a correction in risk asset prices. That was not too different from today's environment.

A more in depth analysis shows that extremely low credit spread were often followed by spikes in equity volatility within a year.

Figure 11: Historical VIX vs CSI BARC



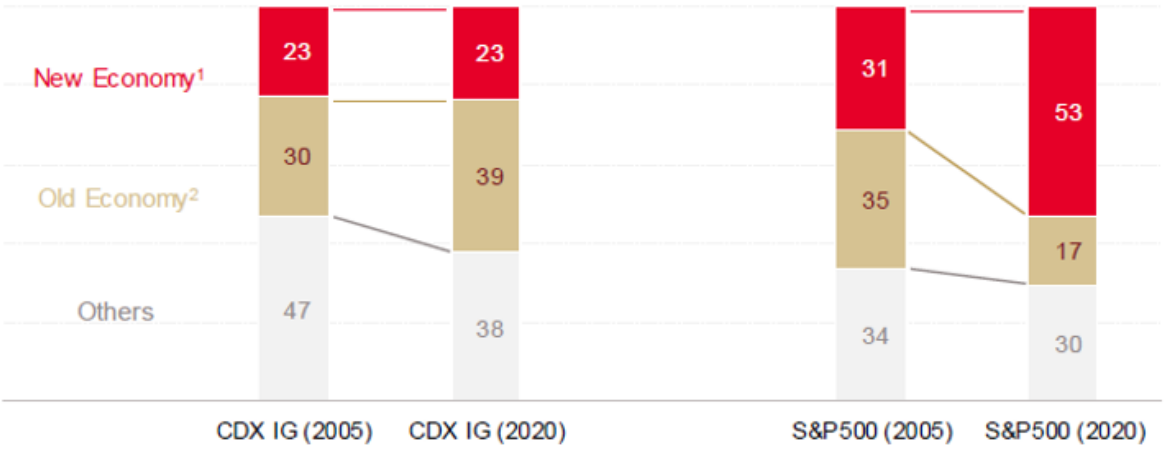
Source: CSI BARC: BarCap US Corporate HY YTW – 10 Yr Treasury Spread

The composition of equity and credit indices is another very important factor to consider in the analysis of the underlying correlations.

The current compositions are quite different as highlighted by our friends at Société Générale. "While CDX IG index consists mostly of old economy sectors such as financials and energy, the S&P 50 index is dominated by new economy sectors, such as technology and healthcare."

Therefore, we are clearly not looking at capital structure risks across the same basket.

Figure 12: Composition of Credit and Equities are Quite Different



Source: SG Cross Asset Research/Derivatives, Bloomberg Old economy includes Financials, Materials, Utilities and Energy. New economy includes Tech, Communication Services and Healthcare.

Finally, extremely low interest rates, government aid packages and central banks' corporate bonds buying have helped credit spreads reach historically low levels. Those unusual activities have incentivized investors holding more credit in their portfolios.

Alternative Hedges

While the above analysis attempts to provide an explanation and a breakdown of the so-called richness of equity volatility, one can also conclude that buying options remains even more of an expensive defensive hedge for investors at present.

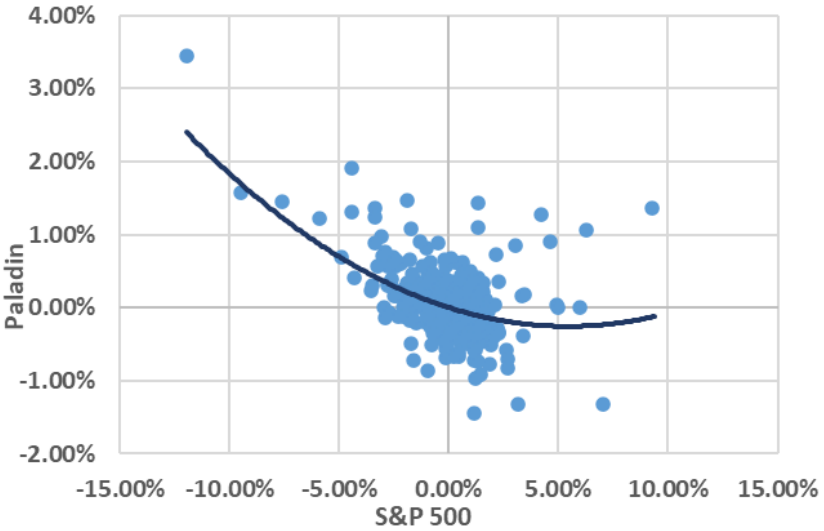
The richness of puts and the relative richness of equity volatility bodes well for a diversified portfolio of strategies including opportunistic exposure to volatility as well as other defensive strategies based on equity, fixed-income and credit indices.

It is through this combination of strategies (please see our publication "Smart Volatility") that Tages Paladin has managed to match the performance of equity options in distressed markets at a much lower cost of carry in flat to up markets. The above observations would suggest that the difference in cost of carry should be even more in favour of the strategy during the next 6-12 months.

Figure 13: Tages Paladin vs S&P 500 1 Year Rolling Put

Source: Bloomberg, Investcorp-Tages

Figure 14: Tages Paladin vs S&P 500



Source: Bloomberg, Investcorp-Tages

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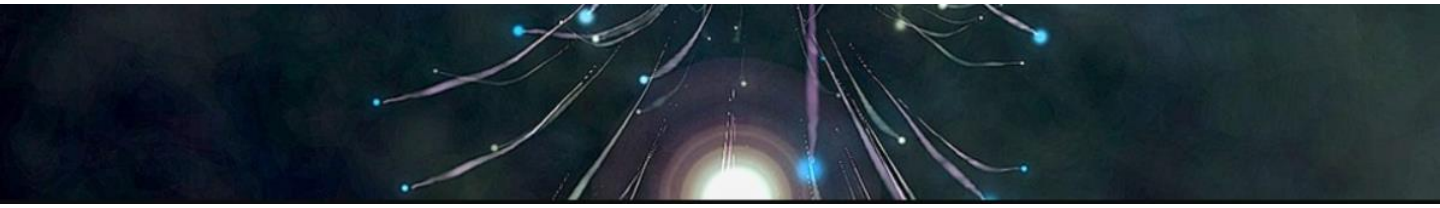

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