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UNCOVERING THE EQUITY INSURANCE PREMIUM

A COMPARISON OF COVERED PUT RETURNS VERSUS INDEX TOTAL RETURNS

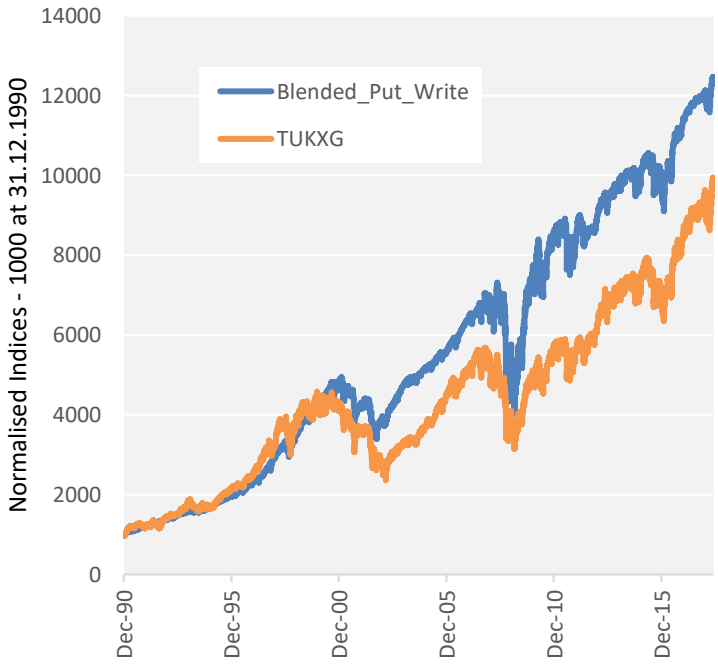
INTRODUCTION

In this paper we focus on the returns that investors may get and the risks that they face from a strategy that explicitly looks to earn the Equity Insurance Premium. This is the return that investors receive if they are prepared to underwrite the risk of a decline in the level of equity markets. As with any insurance-based strategy investors receive regular premiums and will be required to pay out when equity markets fall below the protected value. We can look at the long term returns of this strategy through a comparison of the performance of a covered put strategy (the Blended Put Write Strategy or Strategy) versus the performance of the FTSE 100 Index including dividends. (TUKXG). We show that the Blended Put Write Strategy offers several attractive benefits:

- Higher return / lower risk
- The returns are the results of behavioural, economic and structural factors that are likely to be persistent
- The strategy offers the opportunity for investors to earn diversified risk premia
- The strategy offers attractive portfolio enhancing characteristics when included with other assets

THE BLENDED PUT WRITE STRATEGY

PERFORMANCE FOR BLENDED PUT WRITE



BLENDED PUT WRITE STRATEGY IS CBOE PUT INDEX UNTIL 2007-11-02 FOLLOWED BY IPR UK AUTOCALL INDEX

	1Y	YTD	INCEPTION
RETURN	5.70%	3.00%	1144.80%
TUKXG RETURN:	8.80%	3.70%	889.60%
VOLATILITY:	3.50%	5.30%	13.90%
TUKXG VOLATILITY:	10.00%	12.40%	17.70%
DOWNSIDE DEVIATION:	2.20%	3.30%	9.20%
TUKXG DOWNSIDE DEVIATION:	5.90%	7.60%	10.80%
SHARPE:	1.53	1.42	0.48
TUKXG SHARPE:	0.81	0.73	0.33
SORTINO:	2.45	2.29	0.73
TUKXG SORTINO:	1.35	1.19	0.54
MAX DRAWDOWN:	4.60%	4.60%	44.70%
TUKXG MAX DRAWDOWN:	10.50%	10.50%	48.30%
TUKXG CORRELATION:	83.4%	88.3%	64.4%

Source: IPR, Bloomberg

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USING COVERED PUTS TO ESTIMATE THE EQUITY INSURANCE PREMIUM

It is important to note that the Equity Insurance Premium is a combination of a short volatility strategy and exposure to the equity risk premium. Ultimately the thing that matters most is the level of the underlying when the put option expires versus the strike level. The path that the market has taken is less relevant.

We can illustrate the historic returns from underwriting equity market risk (the Equity Insurance Premium) by looking at a strategy where investors hold cash and sell protection against a fall in the level of the underlying market. This type of strategy is commonly referred to as a Covered Put or Put-Write strategy. In some instances, this strategy can be implemented overtly through holding cash and selling put options. In other instances the strategy is implicit. There are several assets where the Equity Insurance Premium is the real driver of returns. This includes many types of structured product, zero-coupon shares of investment trusts and corporate bonds.

To illustrate the long-term performance of a covered put strategy versus the total return from UK equities we have created the Blended Put Write Strategy. This is an amalgam of two very similar indices:

- The CBOE Put Writing Index[1] and
- The IPR FTSE Autocall Index.

The Blended strategy is clearly a compromise. Although the two components are on face value different they share enough common features so that they can reasonably be combined into a single index that is representative of the returns that a covered put strategy may have generated. What they have in common is greater than the differences between them, and combining the indices allows us to look at the performance of the strategy over a longer period. When we compare these two indices they have many features in common.

- Both indices are based on the returns from a combination of cash and short puts
- In both cases the returns are a function of the equity risk premium and the volatility premium

CBOE PUTWRITE INDEX

The CBOE PutWrite index measures the performance of a hypothetical portfolio that sells S&P 500 Index (SPX) put options against collateralized cash reserves held in a money market account. The daily historical data for the PUT Index now extends back to June 30, 1986. The PUT strategy is designed to sell a sequence of one-month, at-the-money, S&P 500 Index puts and invest cash at one- and three-month Treasury Bill rates. The number of puts sold varies from month to month, but is limited so that the amount held in Treasury Bills can finance the maximum possible loss from final settlement of the SPX puts.

IPR AUTOCALL INDEX

IPR have created the FTSE Autocall Index to illustrate the generic returns that investors have received from this type of structured product. Autocalls are the most popular form of structured product. They are investments where the payoff, maturity date and maturity value are determined by reference to the level of an underlying asset. They offer a high return because investors may not receive the payoff and the capital value may be reduced if the underlying asset falls below a set level. So, these assets offer a high return because they are in effect a way to implement a short-put strategy.

[1] http://www.cboe.com/products/strategy-benchmark-indexes/putwrite-indexes/cboe-s-p-500-putwrite-index-put

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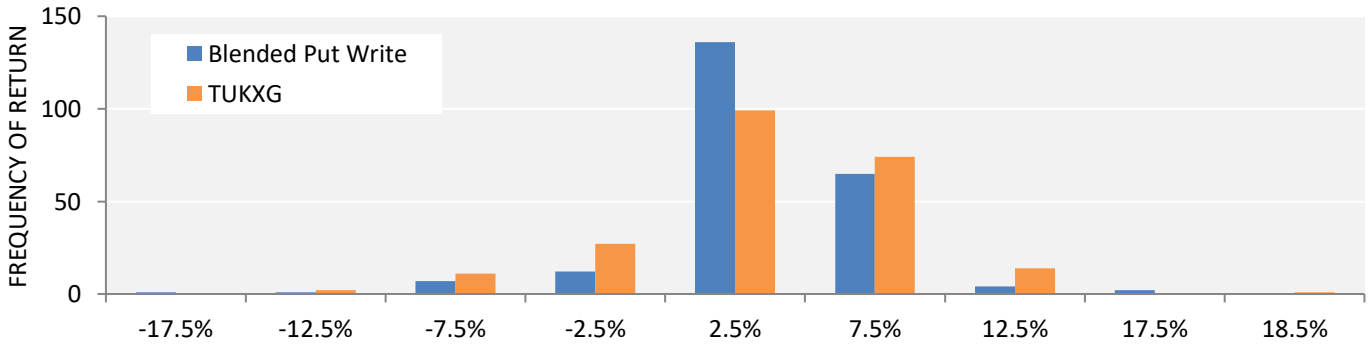
HIGHER TOTAL RETURN, FOR LOWER RISK

When we compare the risk/return profile of the Blended Put Write Strategy and the FTSE Total Return we can see that they are quite different:

- The Strategy has offered a higher return than TUKXG with lower volatility
- The Strategy Sharpe ratio is better
- The Strategy downside measures are better:
  - The Strategy downside deviation is lower
  - The Strategy Sortino Ratio is higher and
  - The maximum drawdown of the Strategy is lower

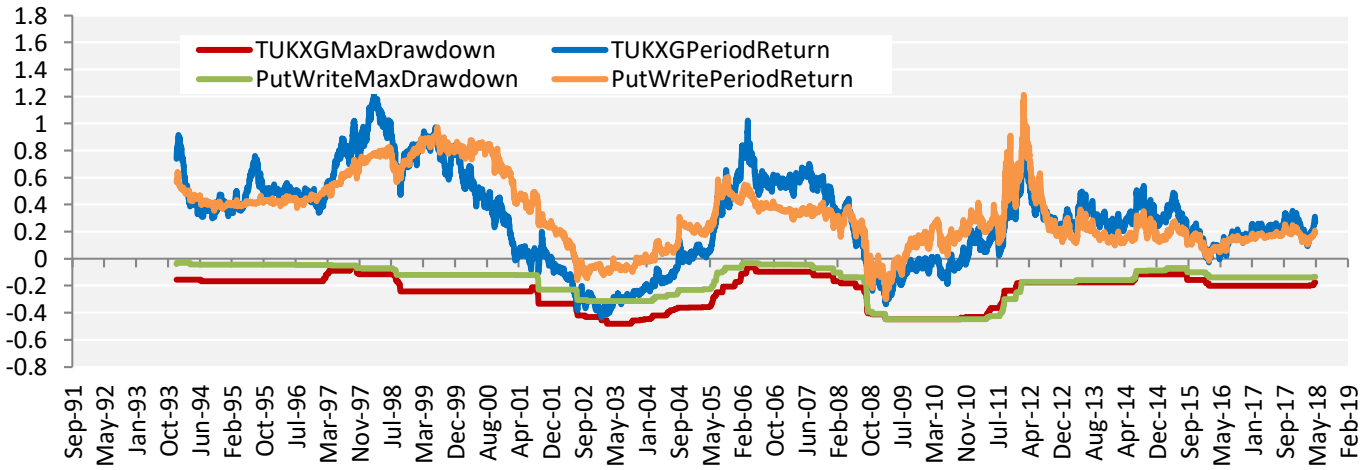
Looking at the distribution of returns in the chart below we can see that the difference between the Strategy and TUKXG is reasonably symmetric. There are fewer instances of very low and very high returns. This is probably not what investors would expect. The underperformance on the upside is in line with our understanding of the expectation of most investors. We anticipate that many investors will expect that the strategy will underperform when returns for the underlying market are very low. The defensive nature of the Strategy is perhaps unexpected.

HOLDING PERIOD RETURN OVER 30 DAY WINDOWS (DATA FROM 31.12.1990)



Source: IPR, Bloomberg

DRAWDOWN AND RELATIVE PERFORMANCE ARE ATTRACTIVE - HOLDING PERIOD RETURN AND MAX DRAWDOWN OVER 3Y WINDOWS (DATA FROM 31.12.1990)



Source: IPR, Bloomberg

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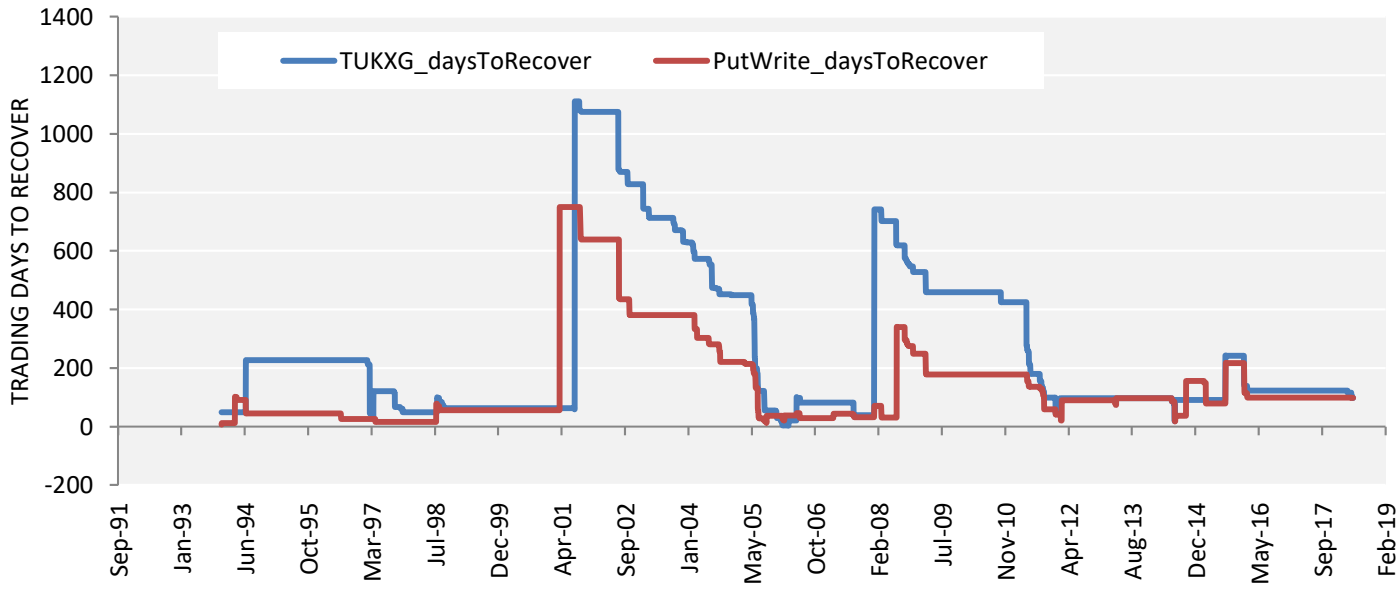
The attractive profile of the Blended Put Write Strategy is evident when we look at the returns and drawdown over rolling 3 year return periods, over this time horizon we can observe that the Blended Put Write Strategy:

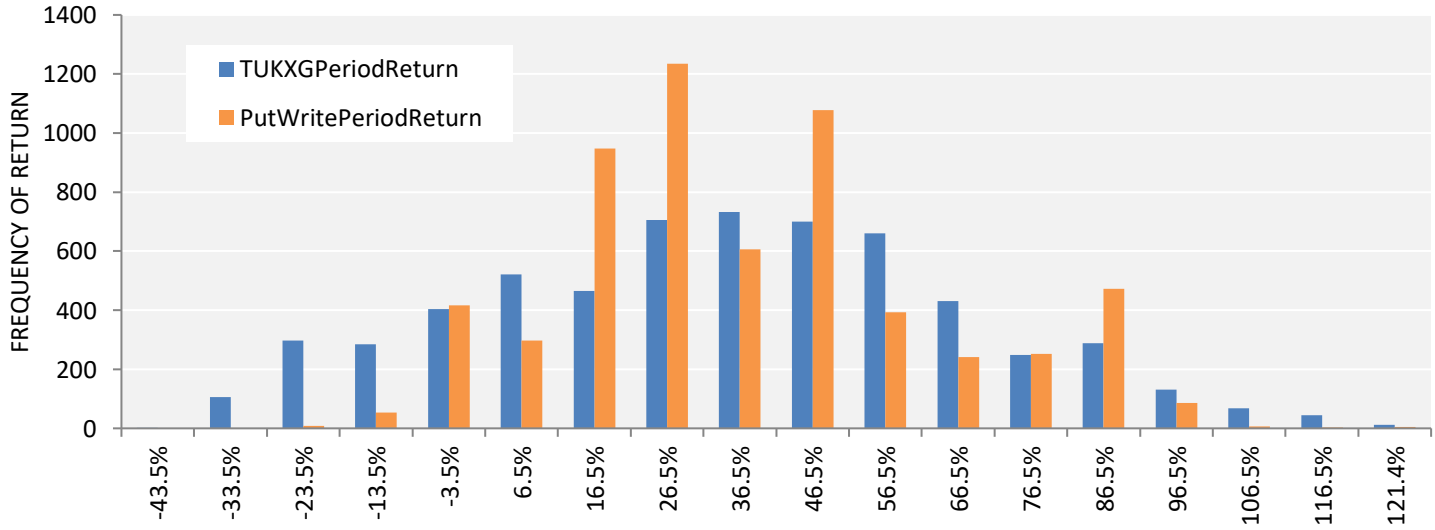
- Outperforms TUKXG most of the time
- Underperforms when TUKX returns are high
- Invariably has smaller drawdowns than TUKXG,
- Recovers faster, as shown in the chart below:

TRADING DAYS TO RECOVER FROM MAX DRAWDOWN DURING 3Y WINDOWS STARTING AT 12.12.93



Source: IPR, Bloomberg

HOLDING PERIOD RETURN OVER 3Y WINDOW STARTING FROM 12.12.93



Source: IPR, Bloomberg

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EQUITY INSURANCE PREMIUM

The Equity Insurance Premium generated by the Blended Put Write Strategy is 5.3% per annum over the whole period.

If we break this down, the Strategy has a beta of 0.50 to TUKXG so, in addition to earning "half" the equity risk premium, its excess return earns additional premia, namely volatility, term structure and skew premia. The table below shows that of the 5.3% average excess return over the risk-free rate generated by the Blended Put Write Strategy, 2.2% was a result of the exposure to the Equity Risk Premia. The remaining 3.1% comes from volatility.

BLENDED PUT WRITE EXCESS RETURN	TUKXG EXCESS RETURN	BETA	EQUITY RISK PREMIUM EARNED	OTHER RISK PREMIA
5.3%	4.4%	0.5	2.2%	3.1%

Source: IPR, Bloomberg

UNDERSTANDING THE CAUSES OF THE EQUITY INSURANCE PREMIUM

To understand why the Strategy offers an attractive return it is important to understand the drivers of the return. The Blended Put Write Strategy earns two main risk premia

- Equity risk premium
- Volatility risk premium,

The volatility risk premium can be broken down into three parts

- Implied versus realised volatility risk premium
- Skew risk premium; low strike options have a higher implied volatility than higher strike options
- Term structure risk premium; the implied volatility for longer dated options is more stable and can be much higher than shorter dated options when realised volatility is low.

THE EQUITY RISK PREMIUM

In the context of the Strategy the Equity Risk Premium can be considered as the difference between the level of the index at the end of a period versus the "forward" value of the index at the start of the period. This is important because the forward level of the index is one of the most important factors in the pricing of put options. The forward level represents a hurdle or target level for each index if the return from that index is to be higher than the risk-free rate. Investors considering any equity-based strategy need to anticipate that the level of the index will exceed the forward value.

The chart below illustrates the rolling one-year return of FTSE 100 Index versus the 1 year forward at the start of each period. On average the realised return has been 8% higher (using data since June 2012) than the forward.

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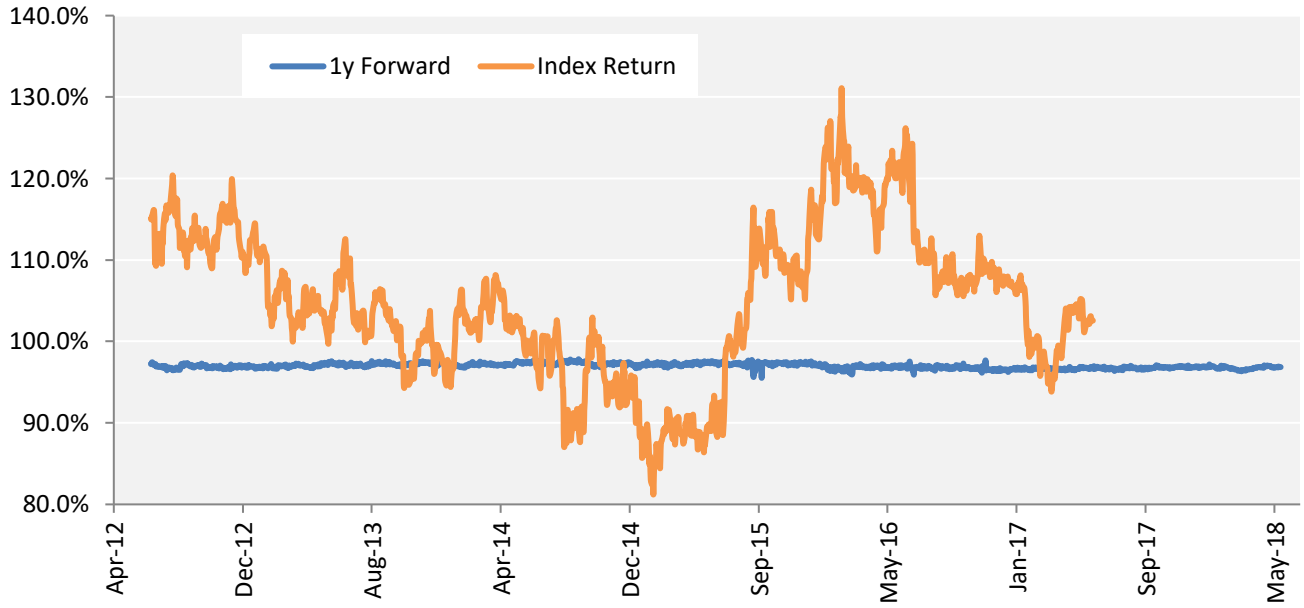
UKX 1YR FORWARD PRICE vs 1YR REALISED UKX RETURN



Source: IPR, Bloomberg

Currently, because interest rates are very low, the forward levels of some indices are significantly below the current levels. The table below shows the current and forward levels of the main equity market indices.

INDEX	CURRENT INDEX LEVEL	FORWARD LEVEL IN 5 YEARS	FORWARD AS A PERCENTAGE OF CURRENT INDEX LEVEL
S&P 500	2786	2881	103.4%
EUTOSTOXX 50	3476	2954	85.0%
FTSE 100	7703	6708	87.1%
NIKKEI 225	22878	20739	90.7%

Source: IPR, Bloomberg

The forward level is calculated using interest rates and dividends and represents the arbitrage free level at which the index can be bought and sold at a future date.

VOLATILITY RISK PREMIUM

The Volatility Risk Premium is the persistent tendency for implied volatility to trade above realised volatility. There are three commonly accepted sources of the Volatility Risk premium or VRP.

- Behavioural bias
- Economic Factors
- Structural constraints

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BEHAVIOURAL BIAS

Loss aversion has become well documented. Investors are not indifferent to gains and losses. Investors feel more pain for a unit of loss than joy for each unit of gain. This is reflected in the price that they are prepared to pay for downside protection versus upside participation.

Irrational concern; numerous studies have shown that investors over-estimate the chance and scale of market corrections. The occasional, rare occurrence of a significant bear market results is a disproportionate fear of a recurrence of a similar event.

Risk aversion; when faced with two investments with the same expected return, rational investors will choose the one with the lower volatility. The implication of this is that investors are prepared to give up some return to reduce volatility.

ECONOMIC FACTORS

Compensation for risk; sellers of options accept specific risks. We can look at realised volatility as the "cost" of this risk. Sellers will naturally demand a premium over this cost to accept the risks.

Protection against unfavourable price movements; there are large investor groups that demand protection because they are unwilling or unable to make up for losses. An example would be investors that rely on their accumulated assets for retirement income that are in, or close to retirement. They would suffer a permanent reduction in their standard of life if they suffered a large loss. Other examples would include defined benefit pension schemes whose assets are equal to or less than the liabilities.

The providers of products that meet the needs of these investors and the managers of institutional assets that provide set benefits must implement a protection strategy which provides protection against unfavourable price movements. A key element of this will be demand for put options.

STRUCTURAL FACTORS

Over the last 30 years regulations have changed so that large institutional investors now have obligations to ensure that their asset base is sufficient to meet their liabilities if there is a significant fall in the level of equity markets.

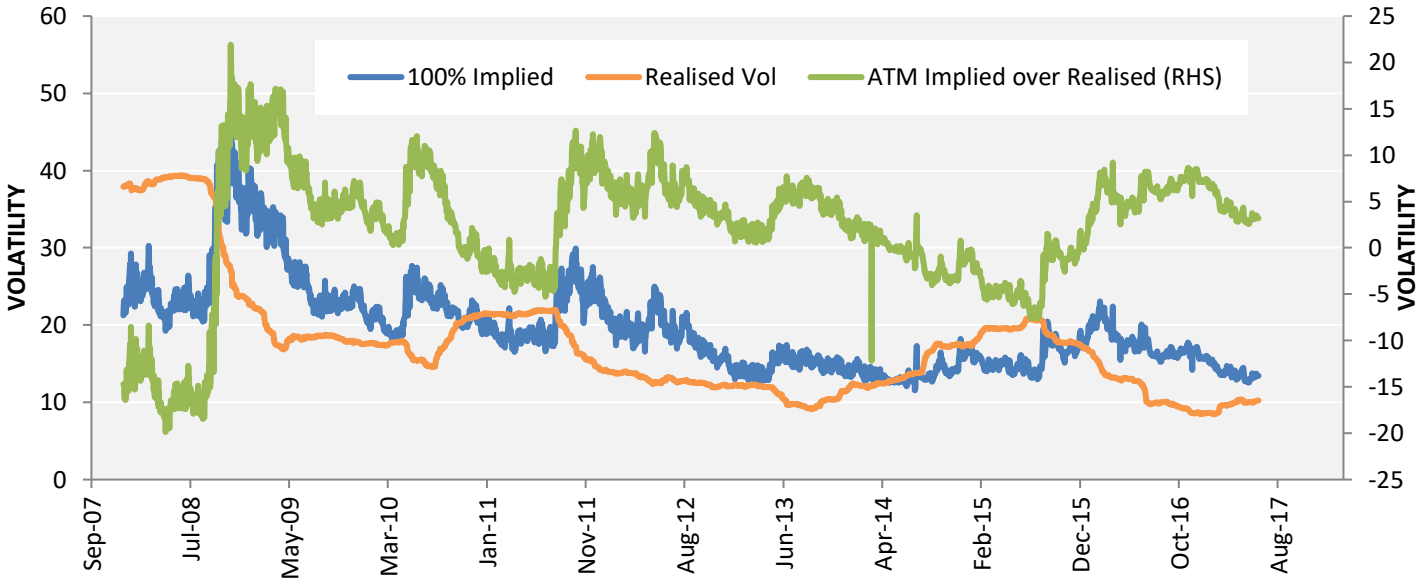
- Solvency II enshrines the exposure and actions that insurance companies must take.
- Basel II requires banks to protect their tail risk. This may be a VaR calculation or another downside risk.
- Pension regulators require schemes to retain sufficient assets to meet their liabilities.
- UCITS rules limit the maximum risk that regulated funds can take

The cumulative effect of these regulations is that these large institutions are all likely to be buyers of puts.

The other angle on the structural shift has been the demise of the use of actuarial risk management of long term institutional assets in favour of a market-neutral, Black Scholes mark to market approach. The actuarial reliance of a dividend discount model to value equity portfolios allowed schemes to look through the current value of equity portfolios and encouraged schemes to buy when markets were lower. As a result, these schemes actively looked to underwrite markets. The move to a mark to market approach reversed they dynamic of these investors and changed them from put sellers to put buyers.

Because of the three sources above, implied volatility generally exceeds realised volatility as shown in the chart below:

IMPLIED VOLATILITY IS GENERALLY ABOVE HISTORIC VOLATILITY



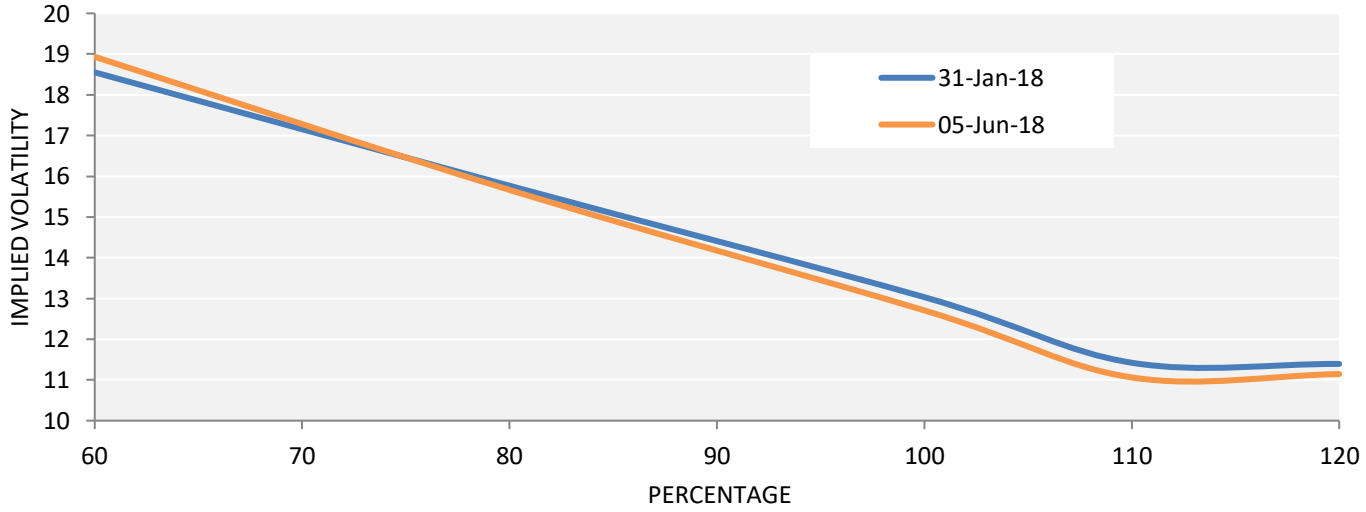
Source: IPR, Bloomberg

The chart shows the implied volatility of at the money 3-month options and the subsequent realised annual volatility over the next 100 days. The average premium of implied volatility over realised volatility is 2% over the period.

SKEW RISK PREMIUM

The demand for protection is also reflected in the difference in implied volatility of low strike versus high strike options, or the Skew. (Protection buyers typically buy low strike puts that have lower premiums and can offset this cost by selling higher strike calls). The skew may also reflect the fact that realised volatility tends to be higher when markets fall and lower when they rise. Consequently, low strike options trade at a higher implied volatility than high strike options:

UKX INDEX 12M SKEW COMPARED TO -3CM



Source: IPR, Bloomberg

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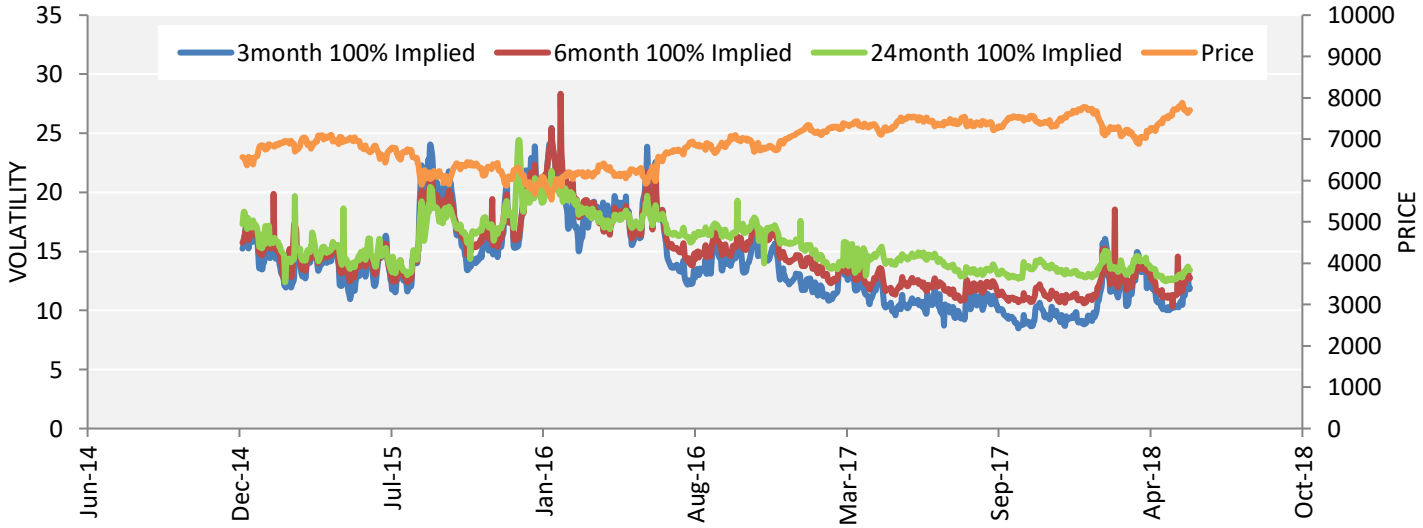
TERM STRUCTURE PREMIUM

The CBOE Put Write Strategy uses short dated index options. The UK Autocall Index reflects the returns from selling longer dated, lower strike options. In our opinion the strategy benefit from using the longer dated, lower strike options that are embedded in structured products.

- The implied volatility of longer dated options is generally higher – index volatility term structures are typically upward-sloping, providing a mixture of uncertainty and liquidity premia and supply-demand imbalance
- The pricing of these options is more stable, exhibiting a muted response to changes in market regimes

UKX INDEX 100% STRIKE IMPLIED VOL AT DIFFERENT TENORS



Source: IPR, Bloomberg

The steep term structure of volatility has been a persistent factor over the last few years when short term volatility has been below average. The screen shot below from Bloomberg shows the term structure of volatility at various dates. At each point in time, the longer dated options trade at a higher implied volatility than the shorter dated options. This term structure has been one of the drivers of return for the short VIX ETN's and the cause of the high cost of carry of the long VIX products.

Source: Bloomberg

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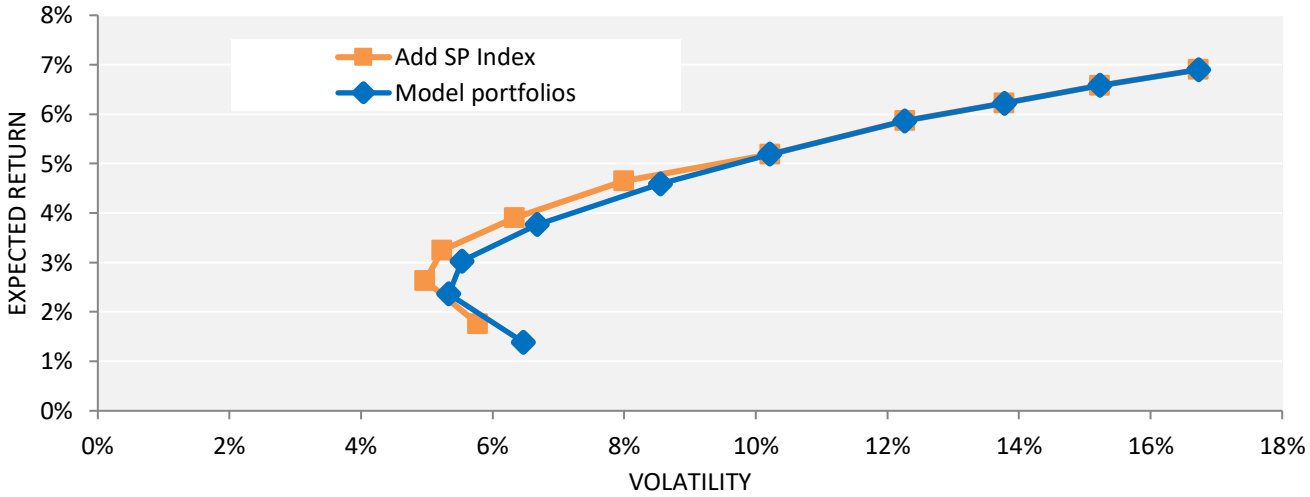
PORTFOLIO ENHANCING CHARACTERISTICS

Since inception on 1990-12-31 the Blended Put Write Strategy has a 0.5 beta and 64% correlation against TUKXG, plus it earns alternative risk premia, all of which produce considerable diversification benefits.

To illustrate, we look at the impact[2] on the mean-variance efficient frontier of allowing up to 10% allocation to our UK Autocall Index, for a range of global model portfolios, while maintaining the relative weights of the remaining portfolio constituents:

MEAN VARIANCE 5 YEAR DATA FORECASE RETURNS, MAINTAIN ASSET CLASS PROPORTIONS



Source: IPR, Bloomberg

The chart shows how, for the lower risk model portfolios the inclusion of an allocation to the UK Autocall Index improves the risk/return profile.

FURTHER INFORMATION

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[2] results are for a mean-variance optimisation with these inputs:

a. Returns are an average of publicly-available 5-year forecasts from 10 asset managers
b. Risk is the last 5-years of covariances between the asset classes and our UKAutocallIndex

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