Alternatives

Volatility as an Asset Class

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Any strategic investment decision usually centres around risk diversification. Nowadays, however, it is becoming increasingly difficult to diversify in conventional assets. Added to which, the current low interest environment and expensive – in some cases very expensive – equity markets are increasing the pressure to identify sources of return in alternative instruments not related to the conventional asset classes. Against this backdrop, more and more investors are turning to alternative, highly liquid risk premiums. In the process, volatility is increasingly attracting investor focus as an alternative asset class.

Volatility as an asset class is investable …

Investors used to see volatility primarily as a source of risk. In their experience, the risk that fluctuations in valuations might jeopardize earnings increased relative to the brevity of the investment horizon of a portfolio. This view of risk is, however, too short-sighted. Volatility – the phenomenon of fluctuating asset valuations on capital and money markets – has meanwhile evolved into its own asset class offering attractive attributes.

To describe the core elements of a volatility asset strategy, we must first define what is meant by volatility and its risk premium. Volatility basically comes in different shapes and sizes. A distinction is made, particularly, between realized and implied volatility. Realized volatility is defined as the standard deviation of the (logarithmized) returns generated by an investment. Historical return time series are used to compute realized volatility – which is why it is also referred to as historical volatility. Implied volatility, by contrast, is a term that stems from option price theory and describes the volatility that leads straight to the market price of the option when used in an option pricing model – usually the Black-Scholes model. Implied volatility is often also understood as the future realized volatility expected by the market. This interpretation is only correct, however, if the assumptions underlying the Black-Scholes model also prove to hold true in real life, which is regularly not the case. Because in real markets, unlike the theoretical universe, transaction fees are charged, equity prices are not normally distributed, interest rates are stochastic, etc. And these violations of the Black-Scholes assumptions ultimately lead to the volatility structures known as

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volatility smile and term structure of volatility. These terms describe functions of implied volatility that are dictated by the base price (smile) and the residual term (term structure).

… and provides a long-term opportunity of positive risk premium

The difference between realized and implied volatility is generally known as the volatility risk premium. Comparing the risk premiums on equities and (equity) volatility reveals that the risk premium on equities is dependent on the realized return, whereas the volatility risk premium is influenced by the squared returns. As such, the risk premium on (equity) volatility can be seen as the logical extension of the equity risk premium as it responds in equal measure to both high positive and negative equity returns. From this, we can already start to conclude that volatility as an asset class offers potential diversification advantages over traditional asset classes.

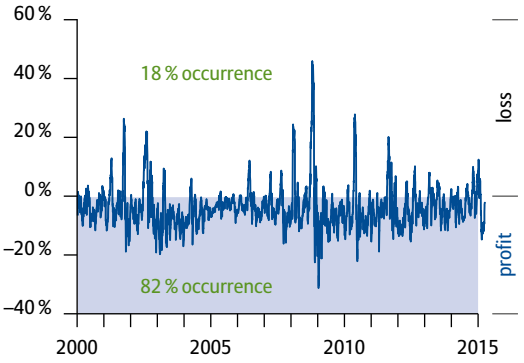
Selling volatility is key

We can even observe a fundamentally negative correlation between the equity market and its volatility. In other words, when prices fall on the stock market, (implied) volatility regularly increases significantly. This negative correlation suggests that the maximum diversification effect can be achieved by purchasing (implied) volatility. In doing so, the strong increase in volatility that would occur if the stock market were to crash would compensate for the price losses in an equity portfolio. Investors should not, however, let themselves be blinded by the positive diversification attributes of volatility. The key issue is the price they must pay to reap the benefits of the diversification. Since this price constitutes a negative volatility risk premium, direct investments in volatility can become very expensive over the long term. This is also clearly demonstrated in Figure 1, which tracks the systematically negative volatility risk premium on the EuroStoxx 50 over the past 15 years.

This difference was –3.7 volatility points on average. That is why there are numerous other studies, apart from our own research, which also demonstrate that – from a cost / benefit perspective – this hedge price does not justify buying volatility. Rather, it makes more sense from a portfolio perspective to earn a further risk premium in the portfolio by selling volatility. In this respect, it is important to stress that the risk premium is economically motivated, and

Figure 1: Volatility as an Asset Class is Investable and Provides a Long-Term Opportunity of Positive Risk Premium

Variance Risk Premium* for the EuroStoxx 50 from 03/01/2000 – 31/03/2015



*) Difference between the realized variance, calculated on the basis of the daily index levels, and the implied variance, derived from option prices. The variance premium is usually negative (here: in 82 % of all observations there is a gain), so selling variance swaps (short positions) will result in gains. The average risk premium for the EuroStoxx 50 during the period 01/2000 – 03/2015 was –3.7 %.

Source: risklab GmbH. risklab GmbH is a subsidiary of Allianz Global Investors. DJ EuroStoxx 50 data for the period 03/01/2000 – 31/03/2015. Implied variance is proxied by the VSTOXX.
Past performance is not a reliable indicator of future results.

not based on inefficient markets. More precisely, the variance risk premium is the result of a risk surcharge for estimating unknown future volatility. This surcharge – and with it the implied volatility – increases strongly for out-of-the-money put options, in particular, as these options represent a sort of insurance against severe slumps on the stock market. As these market slumps occur more frequently than suggested by normal distribution – as evidenced by numerous studies – sellers of such options demand an additional premium in the shape of increased volatility. Consequently, the full risk premium is dependent, not just on the level of at-the-money volatility, but also largely on the steepness of the volatility curve. As a result, the full volatility risk premium can generally not be earned simply by selling options, but only by selling so-called variance swaps. The payoff function of a variance swap in this case is exactly equal to the difference between realized variance and implied variance, i. e. the squared volatilities, and thus constitutes a precise definition of the volatility risk premium.

Although variance swaps are only traded over the counter, they are highly liquid, especially on equity indices with a liquid underlying options market, such as the S&P500 and EuroStoxx 50.

Factoring in the characteristics of volatility …

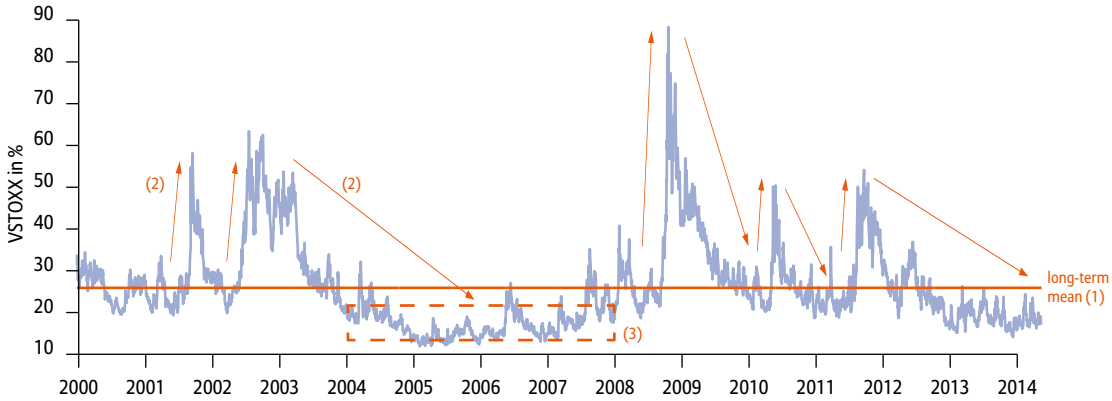
Based on the attributes of the volatility risk premium, we have developed an index to earn this risk premium by systematically selling variance swaps on the S&P500 and EuroStoxx 50 in a procedure governed by specific rules, and thus to enable investors to access volatility as an asset class. A control mechanism that factors in the characteristic attributes of volatility and its risk premium manages the terms of the variance swaps, the timing of the trades and the respective trading volumes. The term of the swaps, for example, is kept very short as the residual term structure of the risk premium shows that risk-adjusted premiums for short terms are much more attractive. In contrast, the timing and volumes of trades are dictated by other attributes of volatility that are both known and widely documented in research. As illustrated in Figure 2, we factor in the following characteristics:

- Volatility always returns to its long-term mean (mean reversion effect) (1)
- Volatility tends to bounce briefly (usually when the stock market slumps), followed by lengthier downward trends (2)
- Volatility forms volatility clusters (regimes) (3)

What is important, however, is the effects of these attributes on the volatility risk premium. Taking the cluster behaviour of volatility as an example, we initially note that negative premiums prevail at all levels of volatility. On average, however, higher market volatilities lead to higher risk premiums but also to more uncertainty (distribution) surrounding the premiums, and vice versa. This is evidenced, for example, by the volatility's volatility as well, which also increases as volatility grows. When crossing over from a low volatility regime to a high regime, a strong increase in volatility reduces the risk premium. The effect of this is particularly marked when volatility suddenly surges, which also constitutes the greatest risk posed by volatility as an asset class. Conversely, risk premiums are even more opulent when volatility returns to a lower level. What makes the asset class so attractive in the process is the mean reversion effect of volatility, which causes the cycles of high and low volatility to alternate and thus balances out the effects caused by increasing and decreasing volatility. Since premiums can be earned in any regime, the asset class can be very attractive over the medium to long term. If we take these attributes into consideration when deciding the timing and volume of trades, we can even expect the risk/return profile of volatility as an asset class to improve further by applying our rule-based investment approach. Essentially, the index aims to reduce exposure in periods characterized by rising volatility and, on the other hand, to increase exposure when volatility returns to normal or low levels.

Figure 2: Characteristics of Volatility

VSTOXX performance from 01/01/2000 – 30/09/2014



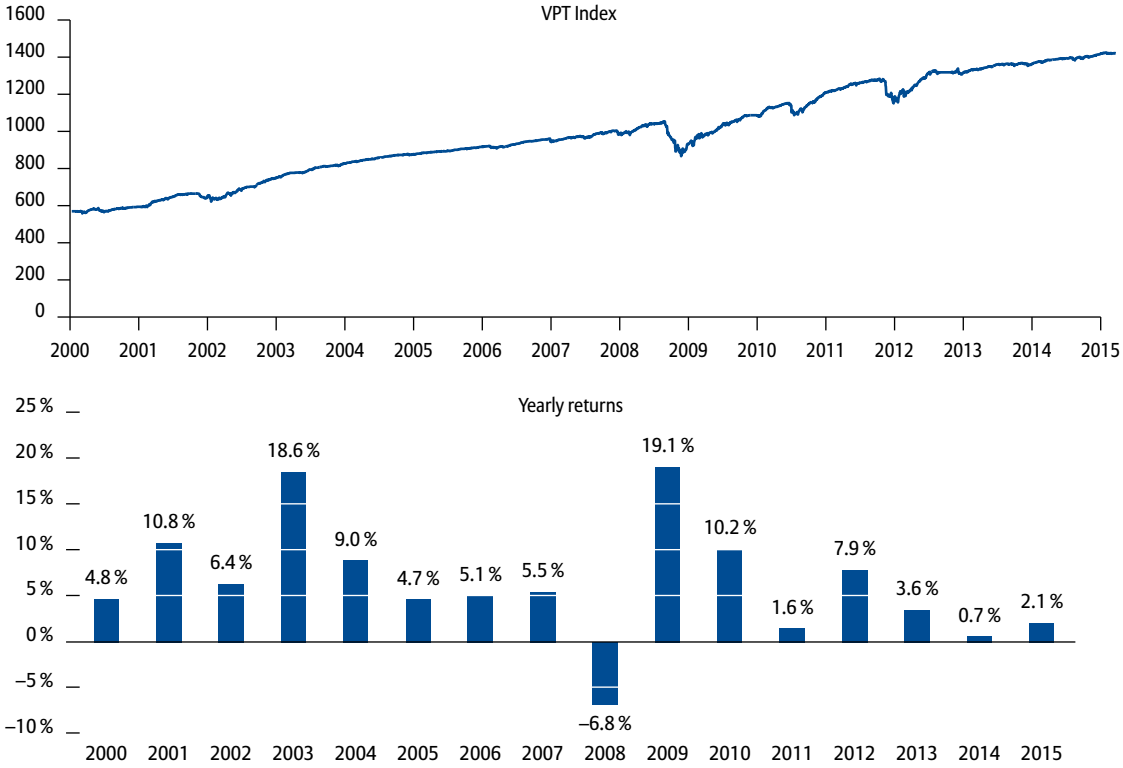
Source: risklab GmbH. risklab GmbH is a subsidiary of Allianz Global Investors. DJ EuroStoxx 50 data for the period 03/01/2000 – 31/03/2015. Implied variance is proxied by the VSTOXX. Past performance is not a reliable indicator of future results.

… within a rule-based investment approach

This rule-based strategy is calculated in index form. Figure 3 shows the performance of the risklab Variance Risk Premium-Index (VPT-Index) over time, together with the annual returns.

The typical curve for volatility as an asset class is easily recognizable and resembles the sale of insurance policies: Lots of small gains interspersed with a few, but fairly severe losses when the markets slumped. On aggregate and over longer periods of time, however, the gains clearly outweigh the losses.

Figure 3: Simulation of the Variance Premium Trading Index™ (VPT) from 03/01/2000 – 31/03/2015



Source: risklab GmbH. risklab GmbH is a subsidiary of Allianz Global Investors. Bloomberg. Simulation for the period shown. VPT Index in EUR. The returns of the money-market part of the portfolio are equivalent to the EONIA rate. Past performance is not a reliable indicator of future results.

Figure 4: Diversification Potential: Correlation Analysis of the VPT Index in Simulation from 03/01/2000 – 31/03/2015

		Equities				Alternative Assets		Fixed Income
	VPT	MSCI World	DAX	Nikkei 225	EuroStoxx 50	DJ UBS	Tremont	JPM GBI Global
VPT	1	0.59	0.49	0.45	0.50	0.38	0.59	0.00
MSCI World		1	0.81	0.67	0.86	0.48	0.69	0.14
DAX			1	0.55	0.94	0.19	0.52	–0.18
Nikkei 225				1	0.58	0.31	0.55	–0.16
EuroStoxx 50					1	0.25	0.53	–0.12
DJ UBS						1	0.57	0.27
Tremont							1	0.15
JPM GBI Global								1

Correlation	< 0.2	>+0.2 to +0.6	>+0.6

Source: risklab GmbH. risklab GmbH is a subsidiary of Allianz Global Investors. Bloomberg. Simulation for the period shown. The returns of the money-market part of the portfolio are equivalent to the EONIA rate. Past performance is not a reliable indicator of future results.

Diversification benefits from a portfolio perspective

As an asset class, volatility is also a promising option from a portfolio perspective as it offers additional diversification advantages, as demonstrated by the correlation to other asset classes shown in Figure 4. Above all, it is its immunity to interest rate trends that makes this asset class attractive regardless of whether interest rates are low or rising.

Imprint

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