



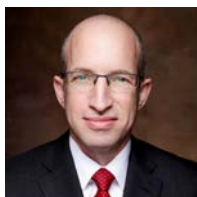
PRICE
POINT

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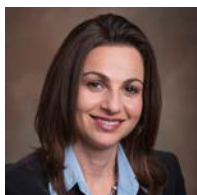
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Multi-Asset Investing

TURN RISK FROM FOE INTO FRIEND: A LOOK AT MANAGED VOLATILITY



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KEY POINTS

- A managed volatility strategy changes exposure to risky assets (mainly equities) based on forecast volatility. When forecast risk is high, the strategy reduces exposure to equities. When forecast risk is low, the strategy increases exposure.
- The strategy's main benefits are: Mitigating downside risk; keeping a portfolio in line with an investor's risk tolerance in fluctuating market conditions; systematically changing the portfolio's asset allocation; and reducing sub-optimal investor behaviour.
- By forecasting risk based on its predictable behaviour, a managed volatility strategy can turn risk from something to fear into something to be embraced—from foe into friend.

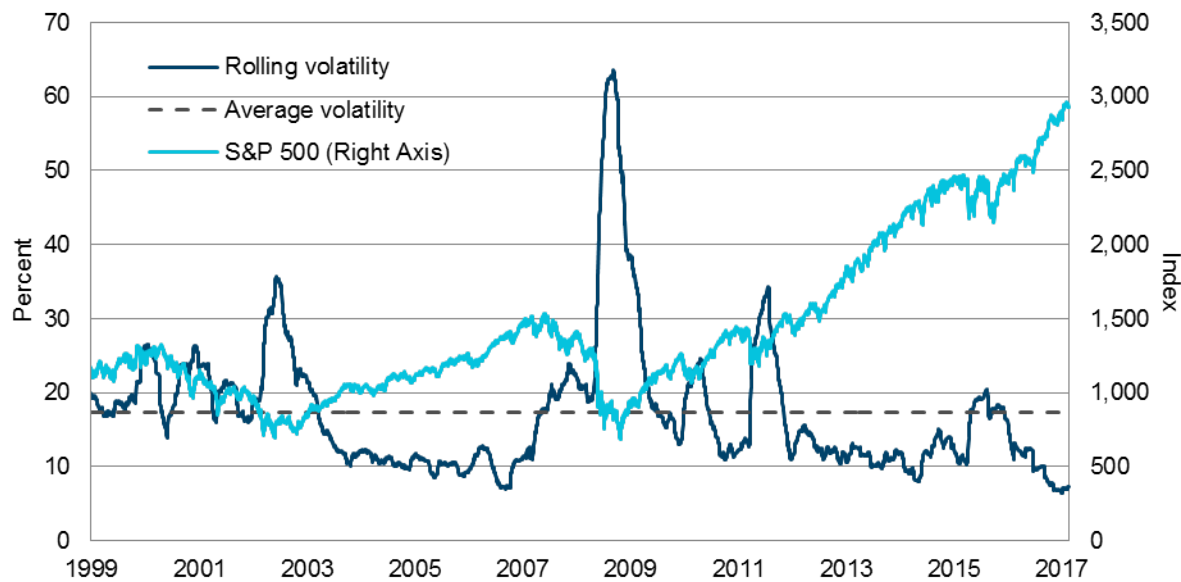
INTRODUCTION TO MANAGED VOLATILITY

A fundamental principle of investing is that return comes with a corresponding risk—as the saying goes: “*no pain, no gain.*” Investors are often preoccupied with trying to forecast future returns, but this is notoriously difficult because returns depend on many unknown variables, both fundamental and sentiment-related.

In a “risk off” scenario when jitters hit the markets, unsure sellers and buyers inject price instability as they trade. Volatility, a measure of the dispersion of prices, tends to rise, as does the risk of severe and abrupt market falls or drawdowns. So, falls in financial markets are likely to coincide with high volatility. High volatility also tends to persist, making further extreme events more likely.

In a “risk on” scenario, the opposite tends to occur. Investors relax and greed wins over fear. With steady investors come steadier prices, as well as a lower propensity for markets to crash. So, when rising financial markets follow periods of low volatility, increasing exposure to risky assets presents a good opportunity to harvest the risk premium, benefiting from positive returns.

Figure 1: The S&P 500 Index and Its Rolling Annualised Volatility



Past performance is not a reliable indicator of future performance
S&P 500 Index daily cumulative total return (right-hand side) 1 January 1999 to 30 June 2017. Rolling volatility (left-hand side) is 90-day annualised volatility. Average volatility is the mean of the 90-day rolling annualised volatilities over the entire time period. Source: Bloomberg and T. Rowe Price. Copyright© 2017, Bloomberg Index Services Ltd. Used with permission.

Figure 1 shows how, historically, returns and volatility have been contemporaneously correlated. It shows the level of the S&P 500 Index since January 1999 and its rolling 90-day volatility. Clearly, volatility is cyclical, tending to spike when the equity market falls and drop when the equity market rises.

While **Figure 1** draws a compelling picture, investors should not jump to the conclusion that observed volatility can be used as a market timing strategy. While heightened volatility is simultaneously associated with negative equity returns, what matters is whether future risk-adjusted returns are associated or correlated with currently observed, or better yet, forecast volatility. This is not the case.

While this lack of correlation seems unfortunate at first blush it is, in fact, an advantage. Because forecast volatility is uncorrelated with future risk-adjusted returns, reducing exposure to risky assets during times of heightened volatility should not reduce the reward for taking on risk. And as long as a strategy takes, on average, the same amount of risk over time, taking on more or less risk in different market environments should not reduce its overall risk-adjusted return.

What if, instead of trying to forecast elusive future returns, we were to shift the focus to forecasting more predictable future volatility? Near-term volatility is persistent (low risk follows low risk and high risk follows high risk). The current volatility environment is likely to continue for days, weeks or even longer. While incoming news can swing investors towards a different environment, the current environment contains relevant information useful in predicting near-term future volatility. And, because severe drawdowns are more likely when risk is elevated than when risk is low, investors may be able to enhance outcomes by positioning the portfolio's exposure to risky assets according to the forecast risk level, potentially mitigating drawdowns. Instead of fearing risk, by forecasting it based on its predictable behaviour, investors can turn it from something to fear into something to embrace—from foe into friend.

THE MECHANICS OF MANAGED VOLATILITY

A managed volatility strategy aims to forecast future volatility by observing current volatility. When expected volatility is high, the strategy reduces exposure to risky assets, and when expected volatility is low, the strategy increases exposure.

The intuition behind this approach is based on three observations:

1. When volatility is high, equity markets are more prone to large drops, and when volatility is low, equity markets tend to be less susceptible to severe drawdowns.
2. Volatility is persistent. When volatility is high it tends to remain so for a period of time, and when volatility is low it tends to stay low for a period of time.
3. The reward for taking on risk (the Sharpe ratio) is approximately constant in different risk environments. Varying exposures within an investor's given risk parameters should not reduce a strategy's risk-adjusted return relative to a static portfolio. As long as a strategy is calibrated in such a way that its long-term risk profile is similar to that of a benchmark, then dynamically readjusting exposures based on risk should not reduce the strategy's expected return.

A well-designed managed volatility strategy changes exposure to risky assets by trading liquid financial instruments based on forecast near-term risk. These changes in exposures are typically implemented using listed futures contracts on equity and bond indices, although other liquid instruments, such as exchange traded funds (ETFs) can be effective as well. This liquidity means exposure can be altered quickly—on a daily basis if necessary. Transaction costs due to trading are kept to a minimum, as the strategy does not buy and sell the less liquid cash securities. By implementing a managed volatility strategy as an overlay, it can be attached to any portfolio without disturbing it.

Take the example of a portfolio of 65% stocks and 35% bonds. Consider a volatility target strategy with volatility bands that seek to keep the portfolio's volatility within a range of 10% to 14%. As long as its forecast volatility is within the prescribed range, the managed volatility strategy does nothing. If forecast volatility breaks the upper 14% threshold, the managed volatility strategy de-risks the portfolio by reducing its equity exposure by selling (going short) futures on an equity index and buying (going long) futures on a government bond index. The managed volatility strategy maintains this positioning until market volatility subsides, the portfolio's volatility falls back to within the range and the futures can be unwound.

If the portfolio's volatility falls below the lower 10% threshold, the managed volatility strategy re-risks the portfolio by buying futures on an equity index and selling futures on a government bond index to increase the portfolio's volatility so that it is within the range. The managed volatility strategy keeps this positioning until volatility rises back to within the range, at which point the strategy recalibrates the futures positioning.

THE BENEFITS OF MANAGED VOLATILITY

A managed volatility strategy can **mitigate downside risk**. By quickly reducing risk when a risk off scenario begins and then quickly increasing risk when a risk on scenario takes hold, the strategy can help mitigate drops in the portfolio's value while maintaining exposure to risky assets over the long term.

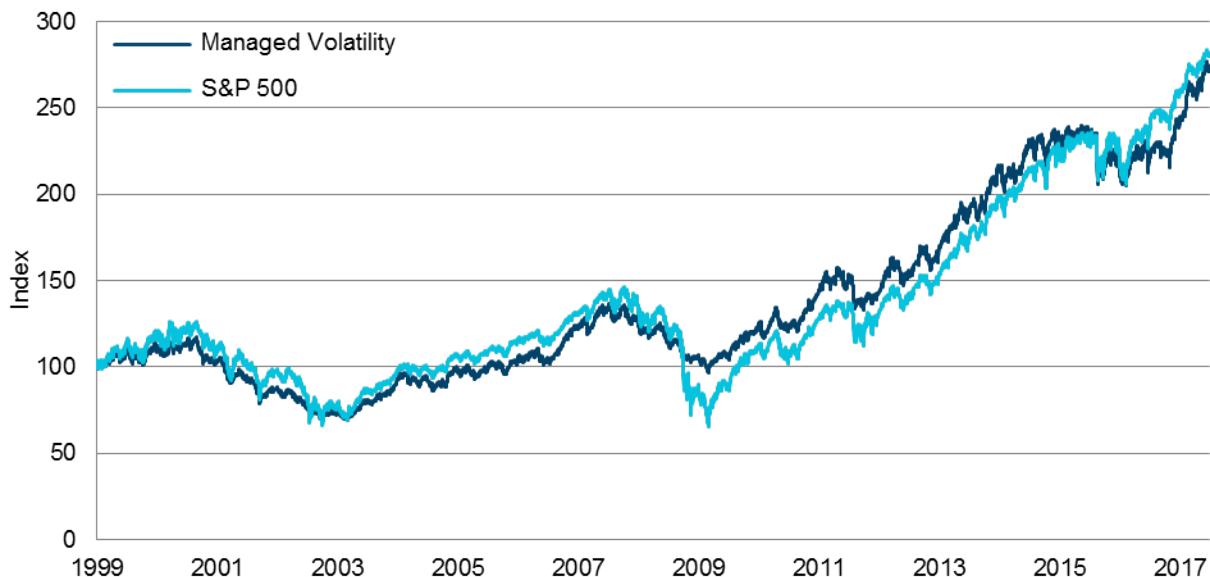
While a buy-and-hold approach to equities should be profitable in the long run, the outcome may be improved by a strategy that seeks to invest in the stock market in good times while underweighting it in bad times. It is participation in good times that is key for the strategy's success, not just cutting risk in bad times. Investment risk is a source of return and should be embraced by investors. It is only when investment risk does not pay off investors should aim to shy away from it.

A managed volatility strategy can increase exposure to equity markets in low volatility environments, enabling it to keep up with the equity market over time, while also reducing exposure to equities in high-volatility environments. While some investors prefer a strategy to focus only on downside risk reduction, a strategy that is limited to reducing equity exposure in high-risk regimes will not keep up with the equity market.

While direct methods to mitigate downside risk involve costs (e.g. the premium for buying equity put options), an effective managed volatility strategy does not involve an explicit reduction in the expected total return.

Figure 2 compares the performance of the S&P 500 index with that of a managed volatility strategy. While the index returned 5.7% per annum with a volatility of 19.4% over the period, the managed volatility strategy returned 5.6% per annum with a volatility of 13.8%—virtually the same return with considerably lower risk. What is striking is the drawdowns during the 2008 global financial crisis: While the S&P 500 Index fell 55.2% from peak to trough, the managed volatility strategy fell 41.3%—13.9% less than the equity market.

Figure 2: The S&P 500 Index and a Managed Volatility Strategy

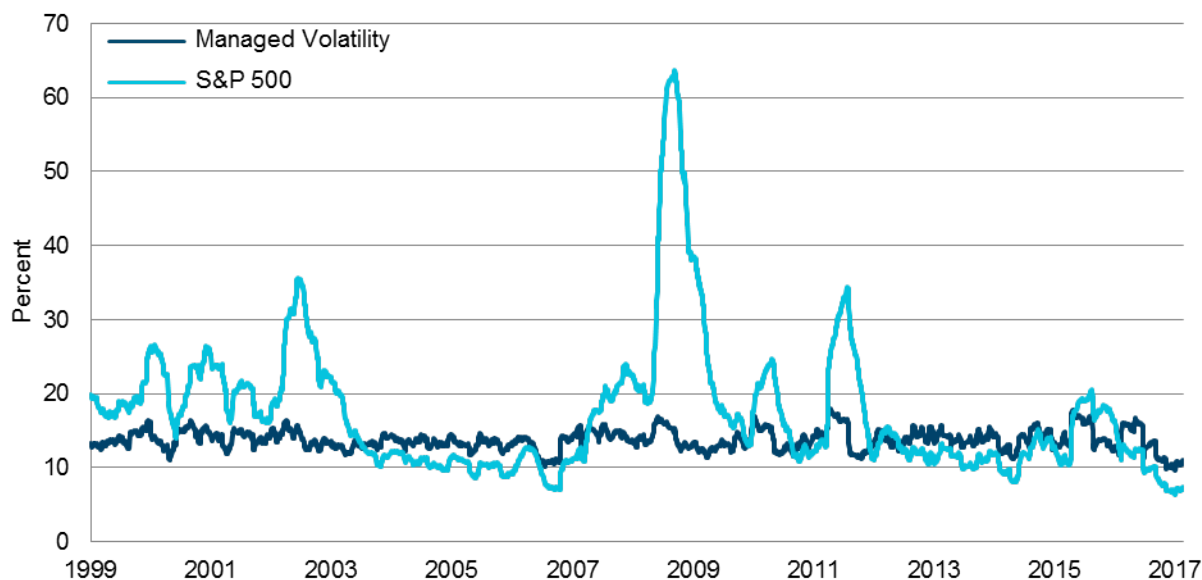


Past performance is not a reliable indicator of future performance

Source: T Rowe Price and Bloomberg. S&P 500 Index and an illustrative managed volatility strategy with daily returns from 1 January 1999 to 30 June 2017. The underlying of the managed volatility strategy is S&P 500 Index; its overlay is composed of S&P 500 Index Excess Return (to represent a historical series of rolled front-month S&P Index futures returns) 3-month constant maturity Treasury Bills; it uses volatility signal of trailing 21-day volatility; and its portfolio's equity exposure is capped at 150%.

The second benefit of managed volatility is that it can help **maintain suitability** by keeping volatility within a prescribed range. By anchoring volatility irrespective of market environment, investors can have confidence that their portfolio remains suitable to their risk tolerance. If, for example, a portfolio is defined as conservative and conservative is aligned with a certain range of volatilities, managed volatility seeks to increase the likelihood that the portfolio indeed remains conservative, even when stock market volatility jumps.

Figure 3: Rolling Volatility of the S&P 500 Index and Managed Volatility Strategy



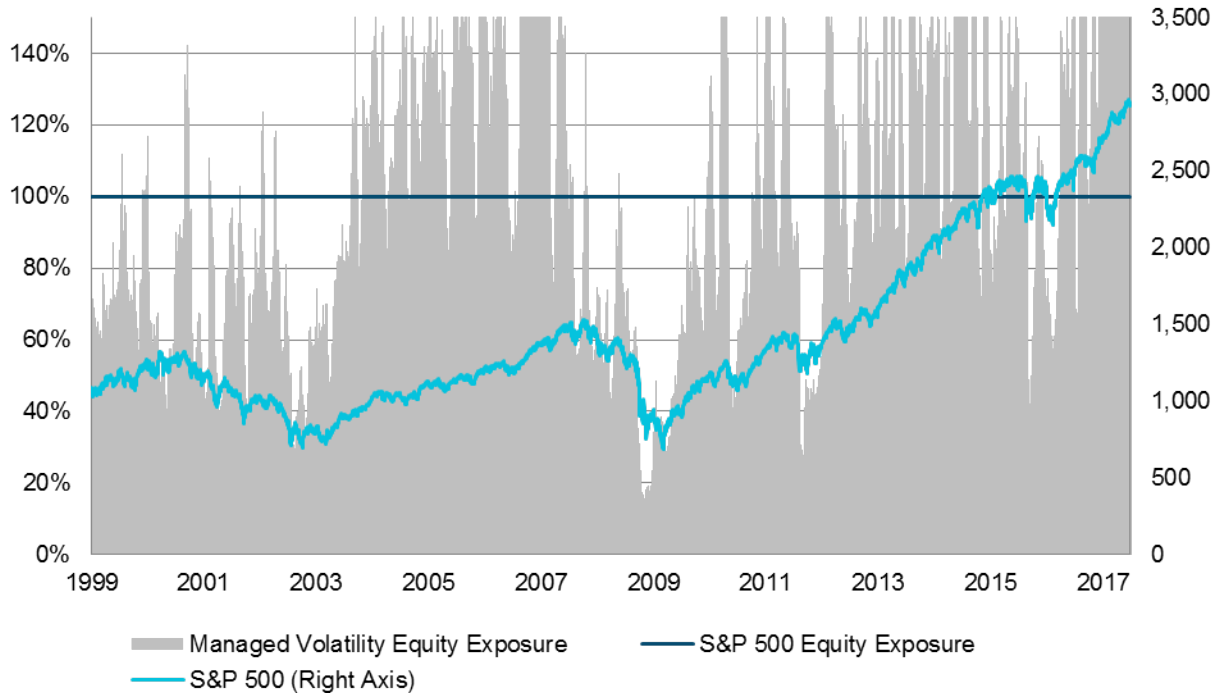
Source: T Rowe Price and Bloomberg. S&P 500 Index and managed volatility strategy daily returns 1 January 1999 to 30 June 2017. Rolling volatility is 90-day annualised volatility.

Figure 3 plots the 90-day rolling volatilities of the S&P 500 Index and of a managed volatility strategy. While the US equity market's average volatility is below 20%, at times of stress it has jumped as high as 60%. The volatility of the managed volatility strategy, on the other hand, is much tighter, not exceeding the 18% level. This can be customised by setting the strategy's parameters as desired.

A third benefit of managed volatility is **systematic asset allocation**. Managed volatility is an active, transparent, rule-based strategy. When forecast volatility rises above a certain level, the strategy seeks to react (depending on its parameters), de-risking the portfolio systematically. This can offer an advantage over more fundamental processes of tactical asset allocation where people drive decisions. Commonly, humans do not react quickly when markets fall. After a drop in markets people often refrain from selling risky assets, afraid to crystallise losses and miss a rebound. Because prices are more attractive in the moment they may view this as a buying opportunity. Managed volatility reacts to a market fall provided that the volatility outlook has sufficiently increased as a result, and reacts again to a market rebound if forecast volatility has subsided.

Figure 4 shows the exposure to the S&P 500 Index of a managed volatility strategy (grey area), ranging between 15% and 150%—a dynamic allocation indeed. By setting the parameters of the strategy, investors can tailor it to fit their specific needs.

Figure 4: Allocation to Equities of Managed Volatility Strategy and Performance of the S&P 500 Index



Past performance is not a reliable indicator of future performance

Source: T Rowe Price and Bloomberg. S&P 500 Index daily cumulative total return (right-hand side) and allocation to equities of managed volatility strategy (left-hand side) 1 January 1999 to 30 June 2017.

The fourth benefit of managed volatility is **improved investor behaviour**. While the most common measure of investment risk is volatility, the true risk of investing is permanent loss of wealth, not volatility *per se*. However, volatility can turn into a true risk because of the way it affects investor behaviour. Once every few years, financial markets experience a time of extremely high volatility, typically coinciding with severe market falls—a crisis. Such an experience, which may take unseasoned investors by surprise if it is beyond their risk tolerance and expectations, may deter them from investing again for many years to come. For long-term savers, one of the biggest risks of investing is not investing. Staying out of financial markets could carry a large opportunity cost, which could leave investors with insufficient funds at retirement to sustain their desired standard of living, or with a lower standard of living than they might otherwise have enjoyed.

Managed volatility, which controls the risk of a portfolio and reduces portfolio turbulence, seeks to address this risk. By keeping the portfolio more in line with expectations and keeping its risk under control, managed volatility can help maintain investor confidence in financial markets, reduce panic, and help investors stay the course and invest for the long term.

THE COSTS OF MANAGED VOLATILITY

There are no free lunches in investing, and managed volatility, too, has its shortcomings. This is not a strategy that will add value in all market conditions.

The obvious example of an environment where managed volatility does not add value is when markets slowly bleed down over time while volatility remains low. A well-designed managed volatility strategy would be unlikely to de-risk in this market environment. In a downward trending market with low volatility, a managed volatility strategy could lose more than the benchmark by overweighting risky assets during a market decline.

The second environment where managed volatility might fail to add value is where the market moves sideways with frequent ups and downs. When low returns follow low volatility and high returns follow high volatility, managed volatility will overweight risk only to underperform due to subsequent low returns, and underweight risk only to miss subsequent high returns. In such sideways-moving markets, managed volatility could struggle.

The cost of a strategy may be measured as its performance relative to a benchmark. A managed volatility strategy could introduce a deviation between the performance of the portfolio and that of the benchmark (tracking error). The conditions described above are when the tracking error has a negative expected value.

However, in environments when high returns follow low volatility and low returns follow high volatility, managed volatility should add value. So the added value of a managed volatility strategy in a sideways-moving market depends on the nature of the market's behaviour.

Fortunately, there have historically been at least as many environments when managed volatility has outperformed relative to environments when it has faltered. In our view, if managed volatility is capable of de-risking the portfolio at times of extreme market stress, even once or twice during a long investment horizon, it can potentially add considerable value.

CONCLUSIONS

A managed volatility strategy offers a number of potential benefits. It can help mitigate downside risk without being a serious drag on performance; it can maintain the portfolio's suitability to a risk tolerance even when market conditions shift; it is systematic in the way it changes the portfolio's asset allocation, and it can help avoid counterproductive investor behaviour. While it does not necessarily add value in all market conditions, managed volatility is an example of an innovation in portfolio management that can both help mitigate risks and maintain risk-adjusted returns.

Today's market conditions—a combination of expensive asset prices and many uncertainties about the future—are challenging. Markets will fall; perhaps not tomorrow, next week or next month, but eventually they will. This is the nature of markets. When they do fall, investors may appreciate having a managed volatility strategy in their portfolios.

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