EQUITY DERIVATIVES STRATEGIES: USING AN OPTIMAL HEDGING PORTFOLIO TO IMPROVE RISK-ADJUSTED RETURNS

July 2019

At the tail end of a protracted cycle with equity markets setting new highs, how can investors protect their portfolio against equity downturns without forgoing long-term growth? In the short run, cash is always the safest asset, helping investors to manage their risk exposures and meet short-term liabilities. However, with interest rates remaining below inflation in most G10 currencies, a high cash allocation poses a major challenge for meeting long-term return objectives. Derivatives can help to overcome this problem by allowing investors to manage their risk exposures without increasing their cash allocation significantly.

At Unigestion, we have developed a complementary set of hedging strategies that protect against various types of market stress to help asset owners improve the risk-return efficiency of their equity allocation. In this paper, we focus on how to improve risk-adjusted equity returns by using an optimal hedging portfolio of futures combined with a low risk equity strategy.

Removing Unrewarded Risks

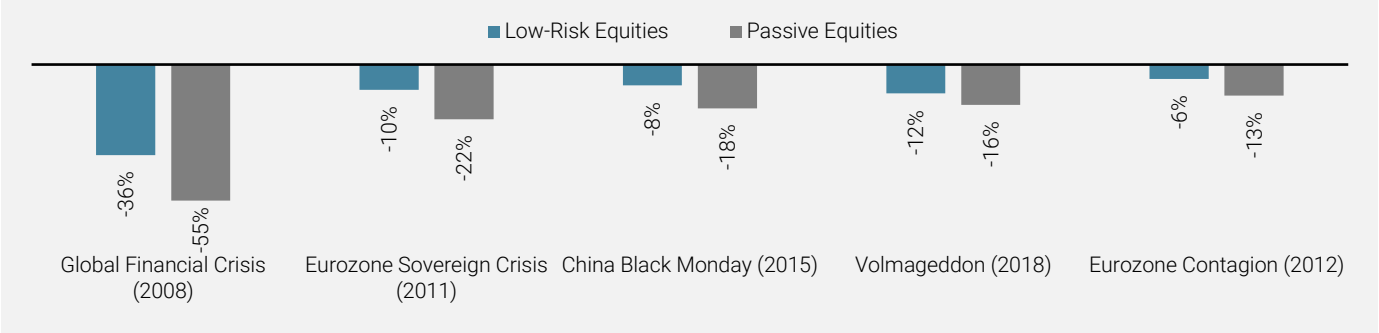
One way of reducing the risk in equity investments to achieve better risk-adjusted returns is to invest in low risk equity strategies, in the form of minimum variance or low volatility portfolios. The aim of these strategies is to outperform market capitalisation-weighted indices by producing a portfolio designed to exhibit lower overall volatility than the broader market.

At Unigestion, rather than relying solely on past volatility, our risk-managed equity strategy follows a multi-disciplinary investment process that considers a wide spectrum of risks, taking a 360-degree view. It combines both rigorous systematic analysis with discretionary, forward-looking estimates of future downside risks, with the aim of delivering better downside protection. By aiming to reduce downside risks, low risk equity portfolios are not only more efficient from a standalone perspective, but also reduce the need for hedging and the associated cost.

Reducing Market Exposure with an Optimal Hedging Portfolio

Once unrewarded risks are removed, the residual market risk (beta) can be seen as truly undiversifiable. The next question is whether this market risk, which typically ranges between 0.6 and 0.8, is still appropriate given the investor's specific risk budget. Although low risk portfolios have historically outperformed the market by a wide margin during bear markets, they have still fallen in value in absolute terms, in particular during the worst crises.

Figure 1: Five Largest Market Drawdowns Since 2008



Simulated past performance includes back-tested data and is not a reliable indicator of future performance, the value of investments can fall as well as rise and there is no guarantee that your initial investment will be returned. Source: Unigestion, Bloomberg.

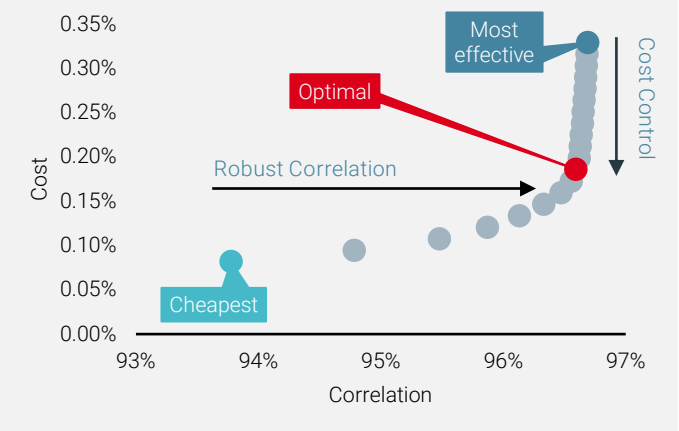
If we assume an expected shortfall for equities of 40%, a residual market exposure of 60% to 80% means a downside risk of between 24% and 32%. Investors who face tighter risk budgets should consider entering into a market risk hedging strategy using futures and options. Hedging an equity portfolio with futures instead of simply reducing the allocation ensures it has a better risk-adjusted return profile (Sharpe ratio) than a capitalisation-weighted index, such as the MSCI AC World index.

Determining the Trade-off between Cost and Efficiency

Hedging market risk with futures involves a trade-off between cost and effectiveness. The cost of hedging with futures reflects the slippage from holding and rolling the futures continuously. It consists of three components: 1) the bid-ask spread the investor pays at each roll-over 2) the liquidity and open-interest to reflect the cost of a potential increase or decrease at any point in time and 3) the price of the future relative to its fair value, which is a function of supply and demand at roll-over time. From a cost perspective, the S&P 500 is probably the most liquid and cheapest index to roll, but what if the asset portfolio is very different from the index?

Hedge effectiveness is the extent to which changes in fair value of the hedging instruments offset the changes in the fair value of the hedged item, in our case the asset portfolio. Under international accounting standards, there is a requirement to test hedge effectiveness on both a prospective and a retrospective basis using either qualitative or quantitative methods. The two most widely used quantitative methods are the Dollar Offset Method and statistical Regression Analysis. With a Regression Analysis, it is generally accepted that a slope parameter, i.e. the beta, within a range of negative 0.8 to 1.25, and an R-Squared parameter equal to, or greater than 0.8, is considered highly effective. In other words, an R-Squared of 0.8 means a correlation of 90% between the hedging and the asset portfolios.

Figure 2: Optimal Trade-off Between Cost and Effectiveness



For illustrative purpose only. Source: Unigestion, Bloomberg

The most effective hedging portfolio corresponds to the maximum achievable correlation between the asset and hedge portfolios with no cost consideration. It can be expensive as, to ensure a high correlation, one may need to roll regional or sector indices with much wider spreads. Focusing on cost means overweighting the most liquid instruments such as the S&P 500, Euro Stoxx 50 or Topix indices. Although this hedge portfolio may be highly liquid, a low correlation is potentially unstable over time and the risk of mis-hedging increases.

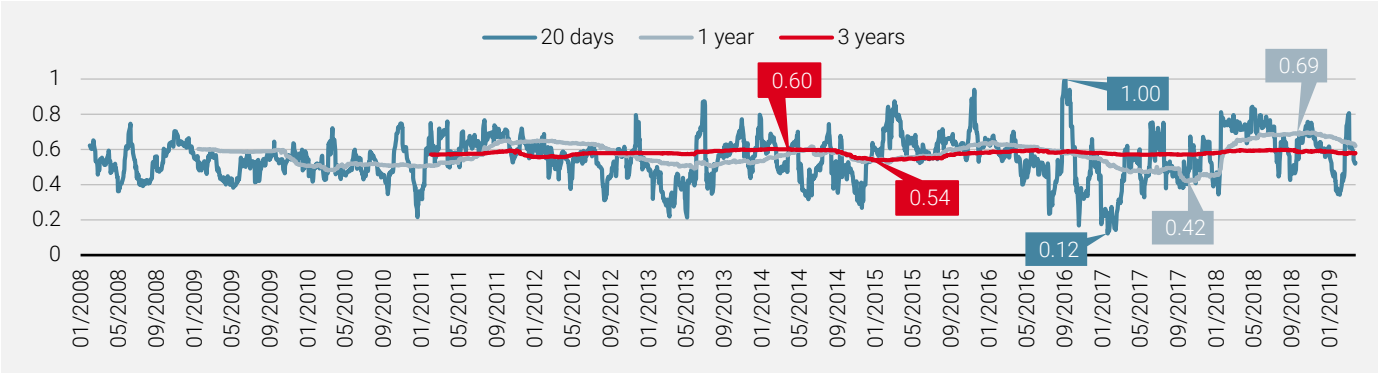
The optimal hedging portfolio lies somewhere in between. In short, there is no optimal index and investors need to select the portfolio of index futures that exhibits the best trade-off at each roll-over date.

Reducing Timing Risk by Defining the Optimal Long-term Hedge Ratio

While tactical hedges may work well around known events, investors face significant timing risk when applying such tactics to hedging market downturns. To reduce this risk, one should first define the strategic hedge ratio. This is particularly important for active low risk strategies as a hedge ratio below 100% can already be excessive.

The minimum variance hedge ratio (MVHR), also known as the optimal hedge ratio, is nothing more than the beta of the hedged portfolio to the hedging portfolio. Even if the beta is broadly stable over the long run, it can vary significantly over a short period. Defining the hedge ratio dynamically is in fact a market timing problem. As shown in Figure 3, while 20-day rolling beta ranges from 0.12 to 1.0, the long-term strategic MVHR is stable between 0.54 and 0.60. A time window of 3 to 5 years is therefore appropriate to define the strategic hedge ratio.

Figure 3: Rolling Beta vs Optimal Hedging Portfolio



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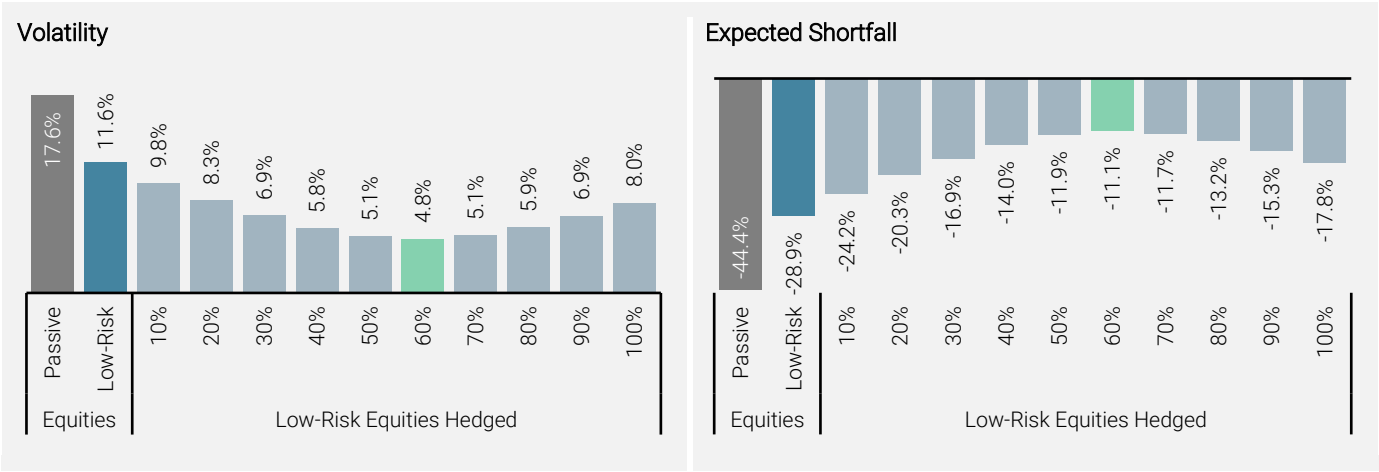
As its name implies, the MVHR is the hedge ratio that exhibits the lowest volatility once combined with the hedged portfolio and so is optimal from a risk perspective. The MVHR is robust in the sense that a 60% level is the minimum risk hedge ratio regardless of whether we consider average levels of risk (Volatility) or extreme ones (Expected Shortfall) (see Figure 4).

Figure 4: Risk and Return Statistics with Various Strategic Hedge Ratios



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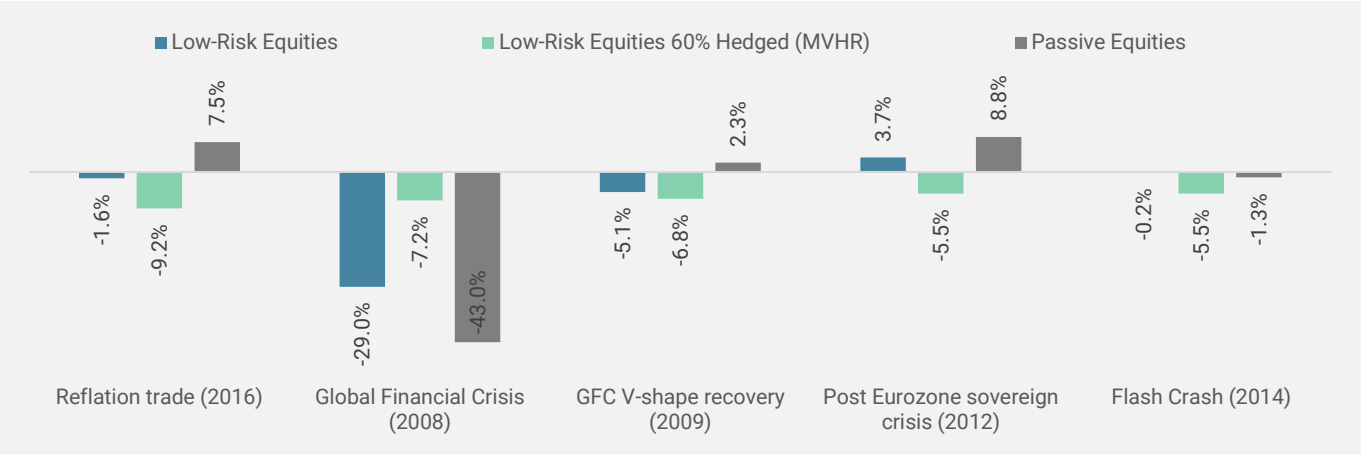
From a return perspective, the picture is different as it depends on the profile of the equity allocation. As low risk equity portfolios are usually overweight low risk and quality styles, outperformance tends to be concentrated around periods of high uncertainty, while risk-on markets are usually a source of underperformance. Therefore, a hedged portfolio using MVHR can experience the worst drawdowns not only in bear markets but also during bull and mean-reverting markets (see Figure 5).

Figure 5: Five Worst Drawdowns of Low-Risk Equities Hedged at 60% (MVHR)



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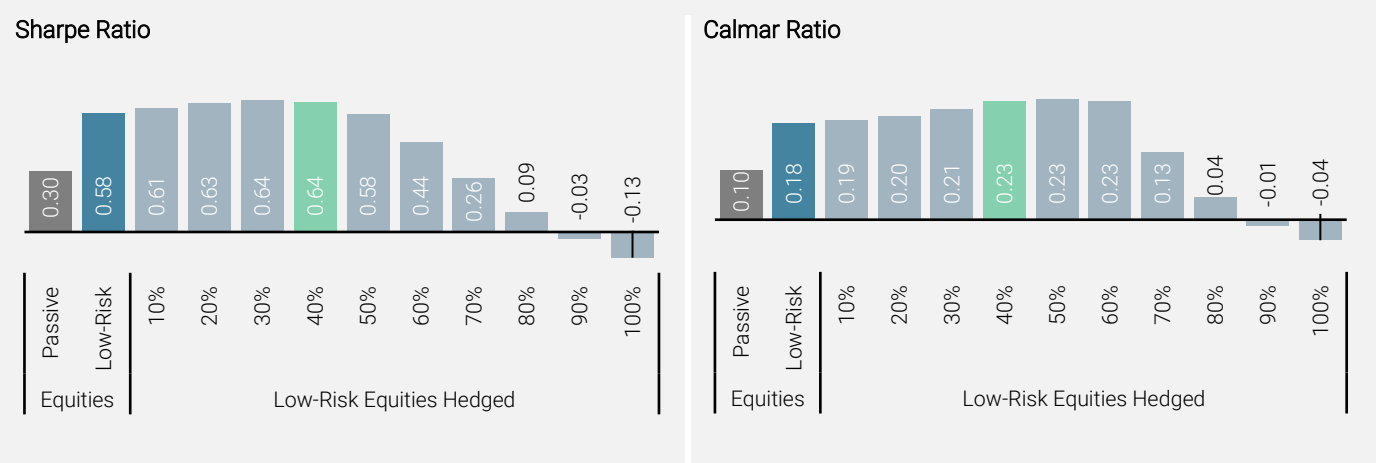
Given the low risk nature of the equity allocation, running a strategic under-hedging makes sense from a risk-adjusted return perspective (see Figure 6). Starting from a 40% hedge ratio (i.e. under-hedged by 20%), the risk of the residual beta is more than offset by the performance behaviour of the excess return. Consequently, the "Maximum Sharpe Hedge Ratio" lies around 40%.

Figure 6: Return Risk and Return Statistics with Various Strategic Hedge Ratio



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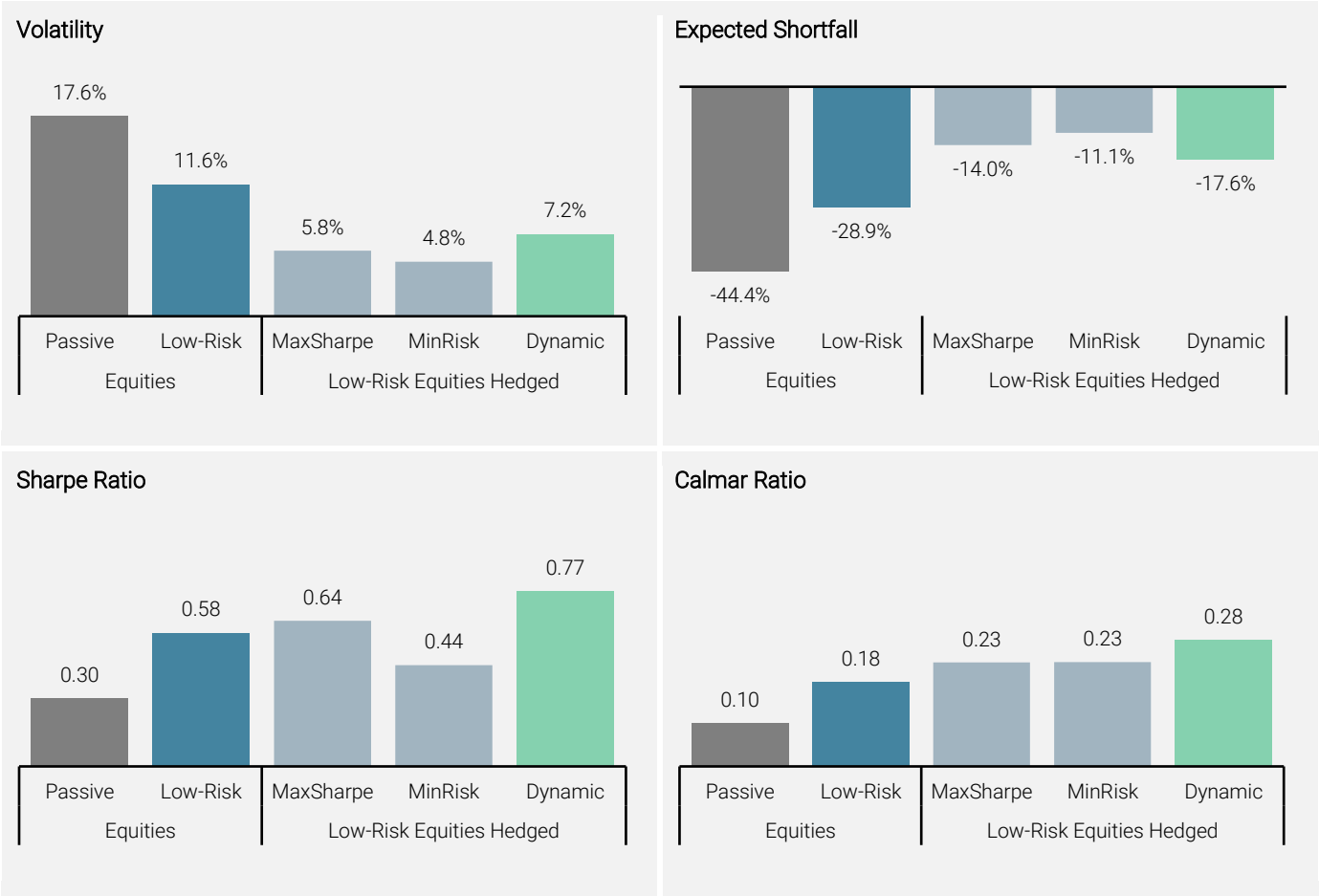
In brief, defining the strategic hedge ratio depends on both the investor's objective and the style of the equity allocation. For investors with strict risk-targeting preferences, a strategic hedge ratio around the MVHR is appropriate. However, for investors looking to maximise risk-adjusted returns, a residual beta of between 0.2 and 0.3 is optimal.

Dynamic Hedge Ratio: A Macro-based Approach to Market Timing

Market timing is a difficult exercise and should be implemented very cautiously, in particular when it relates to hedging. As a general principle, a dynamic hedging model ('Dynamic' in Figure 7) can help to allocate dynamically between a return and a risk objective, in our case between the Maximum Sharpe Hedge Ratio (MaxSharpe is 40%) and the Minimum Variance Hedge Ratio (MinRisk is 60%).

To do this, we rely on our proprietary Nowcaster indicators, which assess the current state of the economy in real time. The more the economy is supportive for growth assets, the more we tend to hedge down to the MaxSharpe. Conversely, if the economy is showing signs of recession, we increase the hedge ratio up to the MinRisk.

Figure 7: Risk and Return Statistics with Various Strategic Hedge Ratio



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Summary

With equity markets at the tail end of a prolonged cycle, the risk of market stress episodes is increasing. There are a number of derivatives hedging strategies available to help investors manage their risk exposures and improve the risk-adjusted returns of their equity allocations. At Unigestion, we offer a range of hedging solutions that can be tailored to investors' specific requirements. Contact us at clients@unigestion.com for more information.

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Data set used for backtested simulations are all in USD, gross of management fees and net of estimated transaction costs, from 17.01.2008 to 31.03.2019. Passive Equities represents the MSCI All Country World Index TR Net in USD. Low-Risk Equities is a backtested simulation that replicates Unigestion's expertise in managing risk-based equity strategies on an all country universe. Futures Hedge Portfolio represents a combination of Bloomberg generic futures on S&P 500, Euro STOXX 500 and TOPIX, in USD, gross of fees, net of estimated transaction costs. Options strategies represents backtested simulation in USD, gross of fees, net of estimated transaction costs using Morgan Stanley data.

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