A guide to portfolio hedging

Derivatives Strategy

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Recent history shows that stock market crashes and bear markets happen on a fairly regular basis. Equity drawdowns can quickly wipe out years of gains, but thanks to hedging investors can mitigate these losses.

Various instruments and asset classes have provided good protection in past market corrections. However, reliable hedging strategies, that constantly offset equity losses, are difficult to implement and often their costs can impair the return potential of a portfolio.

In this report, we define a stylized framework to compare different protection strategies and highlight key characteristics of hedging instruments. Our methodology provides a tool to investors to reduce hedging costs, improve protection and lower the risk of unexpected portfolio losses during times of market stress.

In 2020, financial markets sent investors a clear reminder that large equity drawdowns can happen. The longest expansionary cycle in modern history, which started after the financial crisis of 2008-09, ended abruptly when fears about the COVID-19 pandemic escalated. In March, several countries were forced to introduce strict lockdown measures to slow the spread of the virus. The outcome was a rapid decline of economic activity and a broad equity market sell-off. Safe-haven assets such as government bonds or precious metals were initially under pressure due to investors’ forced-selling activities, questioning their effectiveness as portfolio diversifiers. Volatility spiked to levels last seen when Lehman declared bankruptcy in 2008.

In our view, hedging must play a critical role in portfolio construction. A solid hedging strategy can improve the stability of a portfolio, as it typically reduces drawdowns, shortens the recovery time and ultimately gives the freedom to add risk during market recoveries. In this report, we provide an easy-to-apply way to evaluate and compare hedging solutions. We introduce a scorecard based on effective metrics to measure the efficiency, reliability

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and costs of various hedging instruments. We first look at proxy hedges such as government bonds, safe-haven currencies and gold, and then turn to protection strategies based on derivatives. The goal is to give investors a tool to better understand the characteristics of various hedging instruments and to select the most suitable hedging strategy based on their needs and expectations.

The report should be considered as a broad study on portfolio hedging. For a deeper analysis on derivative-based protection strategies, we highlight the publication "Hedging guidebook" from 9 April 2019.

Portfolio sensitivity to market drawdown

With falling interest rates, investors have increasingly embraced riskier assets in their hunt for positive returns. The shift to more speculative assets involves a higher risk of experiencing losses. Although increasingly central banks’ interventionism indirectly supports financial markets, market downturns remain unavoidable. Equity setbacks in excess of 10% can easily erase gains accumulated over years and force investors to adjust their investment strategy in a suboptimal way. Often in times of heightened market volatility, trading activity declines and asset liquidity deteriorates.

In the past 20 years, large equity corrections have been a recurring theme (see Fig. 1). Reducing the sensitivity of a portfolio to such drawdowns would directly translate into lower volatility, a higher Sharpe ratio and ultimately potentially better long-term returns.

Figure 1 - Historical drawdowns of global equities and a balanced portfolio

Grey periods indicate equity drawdowns worse than 10%. As bond and equity proxy, the Bloomberg Barclays Global-Aggregate index and the MSCI World index, both in USD, have been used. The 60/40 portfolio is monthly rebalanced.

Source: Bloomberg, UBS, as of 30 September 2020

Given their attractive return potential, stocks remain the main contributors to return and risk in most portfolios. Diversifying the exposure, including
uncorrelated asset classes, helps mitigate some equity risk. Investors forgo some higher expected returns from risky assets like stocks in return for lower portfolio volatility and lower drawdown sensitivity. Designing a well-balanced portfolio is increasingly challenging and perfect diversification is difficult to obtain. Correlation is not constant and often rises exactly when investors need it, as different investments become more correlated during market stress. Moreover, low correlation does not mean negative correlation. Fig. 1 clearly shows that even a balanced portfolio composed by uncorrelated asset classes such as global equities and bonds incurred significant losses in past market downturns. Diversification helped to reduce the overall portfolio drawdown, but the bond appreciation was not enough to fully compensate the losses in equities.

A thoughtful hedging strategy can help fill the gap left by diversification by significantly reducing portfolio vulnerability in volatile markets. Hedges are instruments or asset classes that are inversely correlated with equities (see Fig. 2). They increase their value during episodes of market stress, ultimately offsetting part of the equity losses. While counter-cyclical assets such as safe-haven currencies or government bonds typically show negative correlation to stock markets, derivative securities can provide strong negative correlation to equities, as they allow building short exposure to the underlying asset.

Figure 2 - Sensitivity to equity drawdowns

![Sensitivity to equity drawdowns](image)

Source: UBS, as of 30 September 2020

Similar to diversification, adding a hedge to a portfolio may reduce the return of a portfolio. Hedging typically involves paying a price, which in some cases can affect the return objectives of an investment strategy. Understanding the major characteristics of a hedging instrument and identifying the correct timing when and how to apply it is therefore of paramount importance.

**When is protection needed?**

Due to its inherent costs, hedging over the longer-run risks impairing the return objectives of an investment strategy and should therefore be used only in specific cases. In general, the introduction of a protection strategy should be triggered when the risk tolerance of an investor is not aligned with the risk-return profile of the portfolio. This usually occurs when:
• Market conditions deteriorate with an increase in asset volatility. In turn, the risk of a portfolio exceeds the investor’s expectation.

• The indirect exposure of a portfolio to single risk factors (e.g. USD strength, emerging market recovery, oil price, etc.) changes and the concentration to one factor becomes too dominant.

• The probability of a negative event rises significantly. This does not strictly correspond to a change of the investor’s baseline scenario. A simple shift of the probability distribution can already justify a more cautious investment approach, especially if the investor sees a higher risk of an unfavorable development than the market is accounting for.

• The value of an investment portfolio cannot be lower than a certain threshold level e.g. total liabilities, planned expenses. Should the portfolio value approach this limit, as alternative to an outright reduction of risks, hedging may be introduced to avoid breaching this limit.

Hedging scorecard

By purchasing a hedging instrument, the investor is willing to pay or to allocate a part of the portfolio to an instrument that ideally provides sufficient positive returns during times of market distress. Ultimately, this should compensate for the negative performance of the rest of the portfolio without being a significant drag on performance during periods of market calm. But how to compare different hedging instruments? Which metric should we apply to measure their qualities and ultimately assess their potential to protect a portfolio in the next equity drawdown?

Traditional financial indicators like volatility or risk-adjusted returns are not optimal in our view, as they cannot capture key characteristics of hedging instruments such as correlation, sensitivity and cost. We therefore developed a simple but effective hedging scorecard based on three metrics. These metrics help us identify strengths and weaknesses of each hedging instrument and should be carefully evaluated by investors who are looking for a protection strategy:

1. Sensitivity: Ideally a hedging instrument generates very large positive returns when equity markets fall. We therefore compute sensitivity as the realized return of the instrument during a risk-off event divided by the drawdown in global equities. A high sensitivity means that the instrument provides effective protection, as it is able to compensate for the losses in equities. As reference, a value of one would correspond to a perfect hedge—i.e. one unit of the hedge instrument perfectly offsets one unit of equities in that particular sell-off. The sensitivity score is the average of the instrument sensitivity in past equity drawdowns (see Table 1). As we will see later, a sensitivity score between 0.5 and 1 is equivalent to a good hedging performance.

2. Costs: The ability to offset equity losses typically does not come for free. As for the buyer of an insurance, who is asked to pay a premium to protect against a specific event, hedging involves an opportunity cost —e.g. direct cost or potential return forgone by holding it rather
than equities. Ideally we would like to have a higher sensitivity at lower costs (high convexity or bang for your buck), but often there is a positive correlation between the two metrics. Hedging instruments that are very sensitive usually cost more and can even become more costly during market crises. As a proxy for hedging costs, we measure the average monthly return of an instrument over the past 20 years excluding the drawdown periods of Table 1. In our view, this value provides a fair estimate of what investors would have paid for holding the asset in their portfolios during periods of market calm. While a positive value corresponds to higher costs, a negative value means that the instrument would have generated a positive return on average.

3. **Consistency:** There are several potential causes for an equity sell-off, implying different reactions of other asset classes. This is also true for hedges. What worked well during one risk-off shock may not provide the best protection during a different event. We therefore define as consistency the reliability of a hedging instrument to protect unconditionally. Instruments that in most of the selected sell-offs over the past two decades were able to offset some part of the equity losses (i.e. positive sensitivity), have a high consistency score approaching 100 percent. A score of 50% indicates that the instrument provided protection in only half of the past equity corrections. Ultimately, consistency captures the basis risk of a hedge, providing a fair assessment of its reliability during previous crisis periods. Given their ability to provide negative exposure to an asset, derivatives-based hedging strategies typically have very-high-to-perfect consistency.

We compute the three metrics of our scorecard using data starting in 2001. A risk-off event is defined as a period during which global equities, proxied with the MSCI World index in USD, fell more than 10%. Table 1 shows the
selected periods and their duration. The full results of our analysis can be found in the tables at the end of the document.

We decided to classify the instruments using sensitivity, costs, and consistency to identify and highlight the key characteristics of hedging. As for the decision to buy a new security or to overweight an asset class in a portfolio, investors looking for protection should include in their selection process other indicators such as valuation, fundamentals or long-term return expectations.

Table 1 - Global equity drawdowns in excess of 10%

<table>
<thead>
<tr>
<th>Start date</th>
<th>End date</th>
<th>Length in weeks</th>
<th>Global equity drawdown</th>
<th>Event</th>
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<td>Mar-01</td>
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<td>-15.6%</td>
<td>Dot-com bubble I</td>
</tr>
<tr>
<td>May-01</td>
<td>Sep-01</td>
<td>18</td>
<td>-25.9%</td>
<td>Dot-com bubble II - 9/11</td>
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<tr>
<td>Mar-02</td>
<td>Jul-02</td>
<td>20</td>
<td>-23.0%</td>
<td>Dot-com bubble III</td>
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<tr>
<td>Aug-02</td>
<td>Oct-02</td>
<td>6</td>
<td>-14.6%</td>
<td>Dot-com bubble IV</td>
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<tr>
<td>Oct-07</td>
<td>Mar-08</td>
<td>23</td>
<td>-16.0%</td>
<td>US credit housing worries</td>
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<td>May-08</td>
<td>Oct-08</td>
<td>23</td>
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<td>Global financial crisis I</td>
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<td>Mar-09</td>
<td>9</td>
<td>-26.3%</td>
<td>Global financial crisis II</td>
</tr>
<tr>
<td>Apr-10</td>
<td>Jun-10</td>
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<td>-13.5%</td>
<td>Greece downgrade - US flash crash</td>
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<tr>
<td>May-11</td>
<td>Sep-11</td>
<td>21</td>
<td>-21.2%</td>
<td>EU sovereign dept crisis I</td>
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<td>Nov-11</td>
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<td>EU sovereign debt crisis II</td>
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<td>Apr-12</td>
<td>Jun-12</td>
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<td>-11.2%</td>
<td>EU sovereign debt crisis III</td>
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<td>Sep-15</td>
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<td>-11.8%</td>
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<tr>
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<td>Feb-16</td>
<td>16</td>
<td>-12.9%</td>
<td>EM risk-off - Oil depreciation II</td>
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<tr>
<td>Sep-18</td>
<td>Dec-18</td>
<td>13</td>
<td>-16.6%</td>
<td>Growth shock</td>
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<tr>
<td>Feb-20</td>
<td>Mar-20</td>
<td>5</td>
<td>-32.1%</td>
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</table>

Source: Bloomberg, UBS, as of 30 September 2020

Hedging instruments

In this section we apply the hedging scorecard to different hedging instruments. We classify hedges in two major categories: proxy hedges and derivatives. Proxy hedging involves taking a position in assets that on average show strong negative correlation to equities during risk-off events. With respect to derivatives, we mainly focus on securities that provide negative exposure to equities with a non-linear payoff at expiry. A vanilla put option is the classic derivative contract used by investors to protect their equity position. A put gives the buyer the right, but not the obligation, to sell the underlying security at a predefined price.

Proxy hedging

Proxy hedging involves using a financial instrument that is negatively correlated to a particular risk, in our case the risk of an equity sell-off. Counter-cyclical assets can be considered as proxy hedges for risk assets, as they typically increase their value in times of market turbulence. As opposed to equities, these assets tend to be negatively correlated to the business cycle. So-called safe-haven investments are assets with defensive characteristics that clearly fall into this category. Typical examples are gold, cash and high-quality government bonds. We classify these assets as proxy hedges as they can proxy the payoff of an insurance.

Given the extent of this analysis, within proxy hedging we also investigate solutions that provide negative exposure to pro-cyclical assets through a short
position. A strong proxy hedging solution can indeed result from a long position, or overweight, in a counter-cyclical asset and a short position, or underweight, in a more cyclical asset. Buying a safe-haven currency versus a cyclical currency is a typical example. Thanks to the hedging scorecard, we are able to estimate their costs and understand their behavior in falling markets. We selected the most common proxy hedging solutions that are widely tradable. We decided to omit alternative asset classes, such as hedge funds or real estate, due to their liquidity issues in market stress. In Fig. 4, we classified proxy hedges in each of the three metrics of our scoring methodology. For a detailed view of the instruments’ performance in past equity sell-offs, please refer to the tables at the end of the document.

**Figure 4 - Results of the sensitivity, costs and consistency scores for major proxy hedges**
The larger the circle, the higher the consistency score (i.e. higher reliability).

**Fixed income:** History tells us that allocating part of a portfolio to high-quality bonds increases diversification and improves the overall risk profile of a portfolio. As we can see in Fig. 4, over the past 20 years, US Treasuries and high grade USD bonds have scored extremely well in each metric of our scorecard. Moreover, the longer the duration (e.g. 20y+ Treasuries), the better the sensitivity in markets sell-offs. The very high hedging efficiency of US Treasury bonds can be explained by the strong bull market of sovereign bonds in recent decades and the constant decline of interest rates. However, in 2020 central banks have further moved their reference rates into negative or near-negative territory to support the post-pandemic economic recovery. Investors are therefore questioning the room for yields to move lower from the current low levels. Will bonds have enough capacity to offset equity losses in the next downturn?
Although low yields diminish the protective power of bonds, we still believe that allocating part of a portfolio to government bonds can help reduce portfolios sensitivity to market sell-offs. Nevertheless, investors should remember that rates will eventually go up and bond prices can fall. Consequently, the opportunity cost for holding bonds in a portfolio has increased. With the risk of rising inflation investors may also experience a loss of purchasing power in the long term. In such an environment, inflation-linked bonds might be a valid alternative, albeit less efficient in sensitivity and consistency according to our methodology.

**Currencies:** Beyond doubt, the US Dollar is the world’s reserve currency. The majority of international foreign exchange reserves held by central banks are in USD. The USD is also the principal means of payment for cross-border transactions. Over the past 20 years, the USD has kept its safe-haven characteristic. Our analysis confirms that the currency tends to appreciate against peers during global financial market stress. Although its appreciation against pro-cyclical currencies in past equity drawdowns was remarkable, holding USD in a portfolio also generated significant costs, in particular against high-yielding currencies. But the rapid response of central banks to support the post-pandemic economic recovery compressed the yield differential.

Similar to the US Dollar, the Swiss franc and the Japanese yen are safe-haven currencies that tend to appreciate during times of stress. While the yen tends to strengthen when volatility rises mainly due to money repatriation, the upward pressure that the franc faces is also a consequence of the stability of the Swiss financial and political system. Over recent years, however, both currencies have been a less than reliable hedge against market turmoil. Negative interest rates, central banks’ interventions and economic relationships with China and the Eurozone have questioned the role of the JPY and CHF as safe havens. That said, we believe that the two currencies will remain safe-haven alternatives to the US dollar, in particular now that US rates are so low.

**Equities:** Shares of companies that consistently pay dividends and have stable earnings are usually regarded by markets as defensive. Because the demand for their goods or services is not affected by the economic cycle, they are able to weather weakening economic conditions. Although their share price also comes under pressure during equity sell-offs, they typically outperform the broader market when economic growth slows. Defensive stocks typically belong to sectors as consumer staples, healthcare and utilities, while energy, industrials or consumer discretionary stocks are considered as cyclical. According to our methodology, a strategy that goes long defensive versus cyclical sectors in the US market was able to protect fairly well during past equity corrections. Similar results, would have been obtained by a strategy that is long the Swiss equity markets—a healthcare and consumer staples heavy market—versus the more cyclical Eurozone stock market. Unfortunately, the relatively high hedging sensitivity of defensive stocks comes at a high cost during calm or rising markets. Investing in defensive stocks must therefore be diligently managed by investors to avoid impacting long-term portfolio performance.
Gold: The most prominent safe-haven asset is probably gold. Thanks to its physical properties, gold is considered a reliable store of value and, on numerous occasions, it has served as insurance against downturns in financial markets. Although the “cheapest” hedge according to our scorecard—it has generated a positive return on average over the past 20 years, gold scored poorly in consistency. In the post-Lehman period of the GFC and in more recent equity sell-offs, gold wasn't able to reliably protect against falling equity markets. In risk-off events that are accompanied by liquidity shortages such as in March 2020, gold even suffered significant losses, as investors sold the asset to generate cash. Nevertheless, we believe that gold offers value as a hedging instrument, in particular given the prevailing backdrop of easy monetary policy and negative real interest rates. Other prominent commodities such as silver, platinum, or copper did not show attractive hedging characteristics, according to our analysis.

Derivatives
Option markets on major equity indices are generally very liquid and widely used by investors. Thanks to their asymmetric payoff, index put options are often used to insure a portfolio against adverse market movements. In our analysis, we looked at the most popular option-based protection strategies. We applied such strategies to major stock indices such as the S&P 500, the Euro Stoxx 50 and the SMI. The US, Swiss and Eurozone stock markets are largely represented in balanced portfolios, as they reflect a large portion of global equities—more than 75% according to the MSCI World index. Their option market is also fairly liquid.

Investors’ preference for hedging equities through index options lifted the price of out-of-the-money (OTM) put, i.e. puts with an exercise price (strike) below the underlying asset’s price at inception. Puts are usually more expensive than OTM calls and often require a large downward move in the underlying index to offset their cost. We therefore extended our analysis to option structures that reduce cost of an OTM put by combining long and short option positions. In particular, we looked at the following four strategies:

• vanilla puts,
• put spreads,
• collars,
• put-spread collars.

While the costs for puts and put spreads are known from the beginning, collar structures expose the buyer to unlimited losses, should the underlying asset rise significantly. Collars and put-spreads collars are therefore suitable for clients that believe the upside potential for markets is limited. Please refer to the implementation box for further details regarding the four option strategies.

Vanilla options are contracts that give the owner the right to buy or sell the underlying asset at a specified price (the strike) on a specified date. The tenor of the option, also called time-to-maturity, is a key parameter. Longer-term
put options can protect over a longer horizon but have lower convexity at inception (see also "Hedging guidebook" from 9 April 2019). Short-term options offer higher convexity but need to be rolled more frequently. To see how the tenor of an option affects the hedging characteristics, we used three-month and one-year tenors.

**Implementation:** In each strategy, the strike of the long put option has been set to 95% of the underlying’s spot price at inception, hence offsetting drawdowns in excess of 5%. We used a 85% strike for the short put in put spreads and put-spread collars, while the strike of the short call in the two collar structures was set to 105% of spot. We used rolling strategies that constantly trade a fraction of the full notional in the options each month – one-third of notional for three-month strategies and one-twelfth of notional for one-year strategies. This way, we were able to diversify strikes and expiry dates across time, reducing entry-point dependency. To limit the risk of capping upside participation, each collar strategy sells on a monthly basis the 105%-strike call with one-month tenor.

Fig. 5 shows the sensitivity and costs of the various option-based hedging strategies.

Figure 5 - Results of the sensitivity and costs scores for option-based protection strategies

As each option strategy achieves the maximum consistency score, the circle size is the same.

![Sensitivity costs graph](image)

Source: UBS, as of 30 September 2020

We omitted the consistency score, as all strategies achieved 100% reliability (i.e. they always increased their value when equities sold-off). We present the results of our hedging scorecard by comparing first the four option structures, then the two tenors and last the three equity markets. For a detailed view of the structures’ performance in past equity sell-offs, please refer to the tables at the end of this document.
**Structure:** For obvious reasons, the most expensive derivative hedging strategy is the outright long put. In each of the three indices, independently of the tenor, puts score poorly on costs. Investors that are looking for a cheap option-based hedge should therefore look at put spreads and put-spread collars as an efficient way to mitigate expenses. A collar is the best strategy according to the sensitivity score. The short call leg generates an additional source of return in equity downturns that increases the overall protection efficiency of collars. On the contrary, put spreads have low sensitivity, given their limited protection band, with their protection limited to the short put strike, which in our analysis corresponds to -15%. Overall, the solutions with the highest convexity (i.e. sensitivity over costs) are put-spread collars, followed by collars and put spreads.

**Tenor:** Across each structure and market, using short-term options generates higher costs compared to longer tenors. This is consistent with the lower average time-value decay of longer-term options. Sensitivity is higher in one-year collars and puts, whereas for put spreads and put-spread collars the three-month structures have higher sensitivity. In general, rolling longer-dated options usually provides the best convexity, although it is associated with higher trading costs due to the liquidity premium.

**Underlying market:** High-beta equity indices exhibit greater volatility than the broader market and typically underperform in equity sell-offs. This explains why, according to our analysis, option structures on the Euro Stoxx 50, a high-beta cyclical market, show the highest sensitivity score, regardless of tenor and structure. In terms of costs, the situation is less uniform, as other aspects play an important role. Level of implied volatility, skewness or steepness of the term structure affect the cost of optionality. High levels of implied volatility, which determines the cost of an option, translate into higher costs for Euro Stoxx 50 strategies. This is particularly evident for outright puts. Worth noting is that the elevated volatility skew of the S&P 500 makes strategies that use put-spreads significantly cheaper compared to puts. In general, the option strategies achieve the highest convexity when applied on the Euro Stoxx 50 and the lowest convexity on the S&P 500, according to our analysis.

**Can one hedge "rule them all"?**

As we have seen in the previous chapter, the perfect hedge does not exist. Long-term US Treasuries scored strongly in our three metrics, but the current ultra low yield challenges their effectiveness in the next market downturn. Investors must therefore remember that the overall portfolio is often better than its single parts. Although difficult to achieve and not free of charge, diversification remains the first choice for investors to reduce risks in a portfolio.

Hedging against market volatility involves paying a price. The cost is usually higher when the protection is reliable and effective. The other way around, cheap hedges are often less sensitive and may not work all the time. To avoid potential disappointments, investors should therefore understand this trade-off and carefully assess several hedging solutions before committing.
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to a strategy. Often the combination of hedges can compensate for the weaknesses of single instruments. A good approach is to apply diversification alongside hedging. Instead of relying on one single hedge, investors should split their protection across multiple hedging solutions, ideally with different characteristics. As history and our analysis show, hedging due diligence is very important—what appeared to be a good hedge in one downturn was often less efficient in the following downturn.

Hedge to increase risk?

Interest rates are at historic lows. Over USD 17 trillion of global debt has a negative yield as of September 2020. As a consequence of this low interest rate environment, returns on more risky asset classes will be lower than in the past.

Investors may need to increase allocation to risky assets, such as equities, in order to meet their required return target. An investor with a classical 60/40 portfolio, with 60% allocated to equities and 40% to bonds, might look to increase the equity allocation within her portfolio. A higher allocation to equities will not only increase the expected return of the portfolio, but also increase the risk of the portfolio.

While an increased equity allocation should achieve higher returns over the medium- to long-term, the additional risks can be more challenging over shorter time horizons. Especially in challenging market environments, such as in March 2020, it may be demanding to remain invested and keep a high equity allocation.

Increasing equity exposure, but simultaneously partially hedging it provides a viable alternative. For example, an investor could choose an 80% exposure to equities, of which she could hedge 50%. The hedged portion of the equity allocation would achieve a lower return in upward trending markets, as option premiums need to be spent in order to protect the equity portfolio. But it will suffer less in adverse market environments.

Fig. 6 shows that such a strategy would have performed well over the past five years. Partially hedging equity exposure would have put a drag on performance during a strong bull market, as in 2016 and 2017. In drawdowns, the hedged equity portion manages to reduce drawdowns. In March 2020, the hedged equity portfolio would have reduced the drawdown by almost 30% compared to an 80/20 portfolio. Over the past five years, the hedged 80/20 portfolio has performed well and has provided similar returns to an unhedged 80/20 portfolio, but with the lower annualized volatility of a 60/40 portfolio. While these results provide compelling risk adjusted returns, it remains important to acknowledge that the hedged portfolio benefited from the steep drawdown in March 2020, as the hedges typically perform very well in such a drawdown.

Such an approach could be of increased importance in the future. Not only because investors need to increase allocation to risky assets to compensate for reduced return expectations, but also because bonds may provide less diversification with interest rates near zero. The long-term correlation
between equity returns and bonds might provide some evidence. While a one-year correlation has typically been negative, it has been positive for the relationship between European equities and bonds over the past few years. Interest rates in Europe have been very low for several years. If US equities and bonds follow this pattern, diversification will most likely provide less benefit than in the past.

Figure 6 - Hedged equity exposure performed well over the past 5 years

Comparison of three portfolios investing in US equities and bonds. We use the S&P 500 as an equity proxy and the Bloomberg Barclays US Aggregate as the bond proxy.

Conclusions

Diversification alone is not sufficient to protect a balanced portfolio from severe market downturns. Specific hedging strategies should be considered to reduce portfolio sensitivity to equity sell-offs. Over the past decades, high quality government bonds proved to be the best hedging instrument, as they provided strong negative correlation to equities in risk-off events, while generating positive returns during periods of market calm. Given current depressed yield levels and limited potential for interest rates to move lower, investors should rethink if government bonds will offer the same level of protection during the next market sell-off.

We presented an easy-to-apply methodology to assess the major characteristics of hedging instruments. This analysis can be easily extended to other protection strategies, as it highlights strengths and weaknesses of different hedging solutions. Investors looking for portfolio protection can therefore use our scoring methodology to compare different hedging instruments and ultimately select their preferred strategy.
Finding the best hedge for the next market downturn is challenging. Proxy hedges can be relatively cheap, although their ability to protect is not guaranteed. Option-based protection strategies may be used by investors that need a higher degree of protection and are less sensitive to costs. Furthermore, while the opportunity cost of a proxy hedge is not known in advance, option strategies provide a certain degree of confidence regarding costs and consistency.

In our view, the concept of diversification can be extended from traditional portfolio construction to hedging. With the help of our scorecard, investors can select the most suitable combination of hedging instruments optimized for protection, reliability and costs.

Appendix

In the following tables, we provide a wider list of hedging candidates with their return during the selected past equity drawdowns. In the last three columns, we also show the score of the instrument or asset class in sensitivity, costs and consistency. Historical data cover the period from 1 January 2001 to 30 September 2020.
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<th>MSCI World in USD</th>
<th>Bonds vs USD</th>
<th>UST 7-10y</th>
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**Sensitivity:** The average ratio of the asset return and the drawdown of global equities. A positive value indicates a negative average monthly return during calm periods, which is negative. A negative value is positive during calm periods.

**Costs:** A negative value is positive during calm periods, which is negative. A positive value is negative during calm periods.

**Consistency:** The hit ratio of the asset with respect to positive return in the equity drawdowns.

**Note:** We used the following indices as proxy for the related asset classes on a total return base: the MSCI USA Cyclical Sectors-Defensive Sectors return spread USD index for MSCI USA Defensive vs Cyclical, the JPM ELMI Plus Composite index for EM currencies versus the US Dollar, the Bloomberg Barclays Global Aggregate index in USD as proxy for global bonds, the Bloomberg Subindices for the selected commodities.
### Derivatives Strategy

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### Average Return Sensitivity Costs Consistency

- **Average Return**: 19.8%
- **Sensitivity**: 3.2%
- **Costs**: 1.2%
- **Consistency**: 100%

### Notes

- **Sensitivity**: The average ratio of the asset return and the drawdown of global equities.
- **Costs**: A positive value indicates a negative average monthly return during calm periods, while a negative value indicates a positive average monthly return.
- **Consistency**: The hit ratio of the asset with respect to positive return in the equity drawdowns.

Note: The returns of option strategies have been computed using implied volatilities extracted from mid-prices of listed contracts. In the simulation, each option is held until its expiry date. We used the Bloomberg Barclays global aggregate index in USD as proxy for global bonds.
Appendix

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