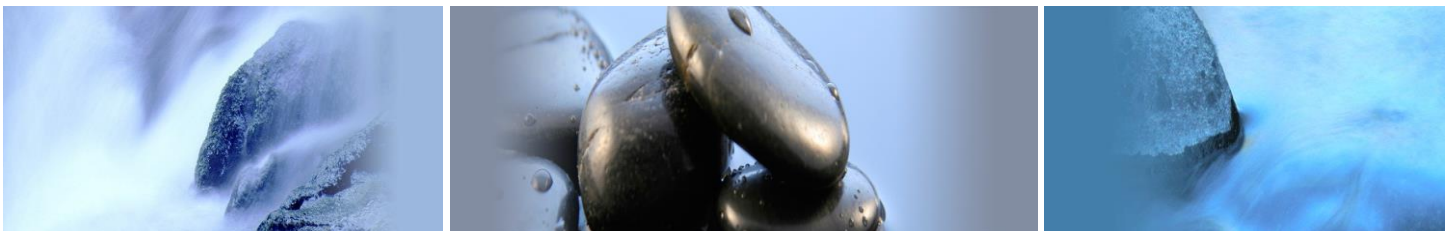




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BRIEFING
TAIL-RISK HEDGES

Tail-risk hedging lessons from the corona crisis

● The coronavirus crisis illustrates that equity collar strategies may still have a place for pension funds

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On 16 March, the Dow Jones Industrial Average declined by 9.99%, one of the biggest day-to-day drops in the index's 124-year history. Daily losses were higher only on Black Monday in 1987 and on three days in the 1920s.

As of 23 March, just one month after the lockdown of northern Italy, global equity markets had accumulated a loss of more than 35%. Owing to massive financial and fiscal policy interventions, an unprecedented rapid recovery took place. On a year-to-date basis, the effects of the COVID-19 crisis are almost completely absent from equity markets.

Still, many pension professionals might feel that they only just escaped. They could be wondering what would have happened to the financial stability of their funds if markets had not mean reverted this, quickly.

Unsurprisingly, investors are asking whether they should have been more concerned about tail-risk hedging. Here, two common approaches to tail risk hedging – value at risk (VaR) concepts and collar strategies – are discussed. Besides evaluating their effectiveness during the coronavirus crisis their costs and long-term impact on pension portfolios are considered.

Value at risk

When following a value-at-risk (VaR) concept, the portfolio is managed subject to a maximally acceptable loss over a specific period of time, often a fiscal year. The higher the loss already realised, the lower the tolerance to absorb additional losses. The percentage of risky assets permitted in the portfolio is therefore negatively related to realised losses. When losses reach the



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predefined maximum (VaR), all risky assets must be sold or hedged, respectively.

The rate and magnitude of the market decline during the crisis led to the exhaustion of loss limitations in many VaR-managed portfolios and substantial selling of equity and risky assets in general.

During the first half of March 2020, VaR-managed portfolios typically suffered less from the decline in equity markets. However, the same portfolios also forewent most of the steep recovery of equity markets in the second half of March and the month thereafter. In consequence, VaR-managed portfolios significantly underperformed portfolios with a static investment strategy.

In fact, the crisis is a textbook example of a scenario that illustrates

the cost of VaR concepts. While early losses at the beginning of a crisis are locked in, the portfolio cannot (fully) benefit from an eventual market recovery since risky assets have been (partially) sold during the decline. With VaR concepts, hedging against losses in excess of the VaR comes at the price of realising losses up to the VaR.

Collars

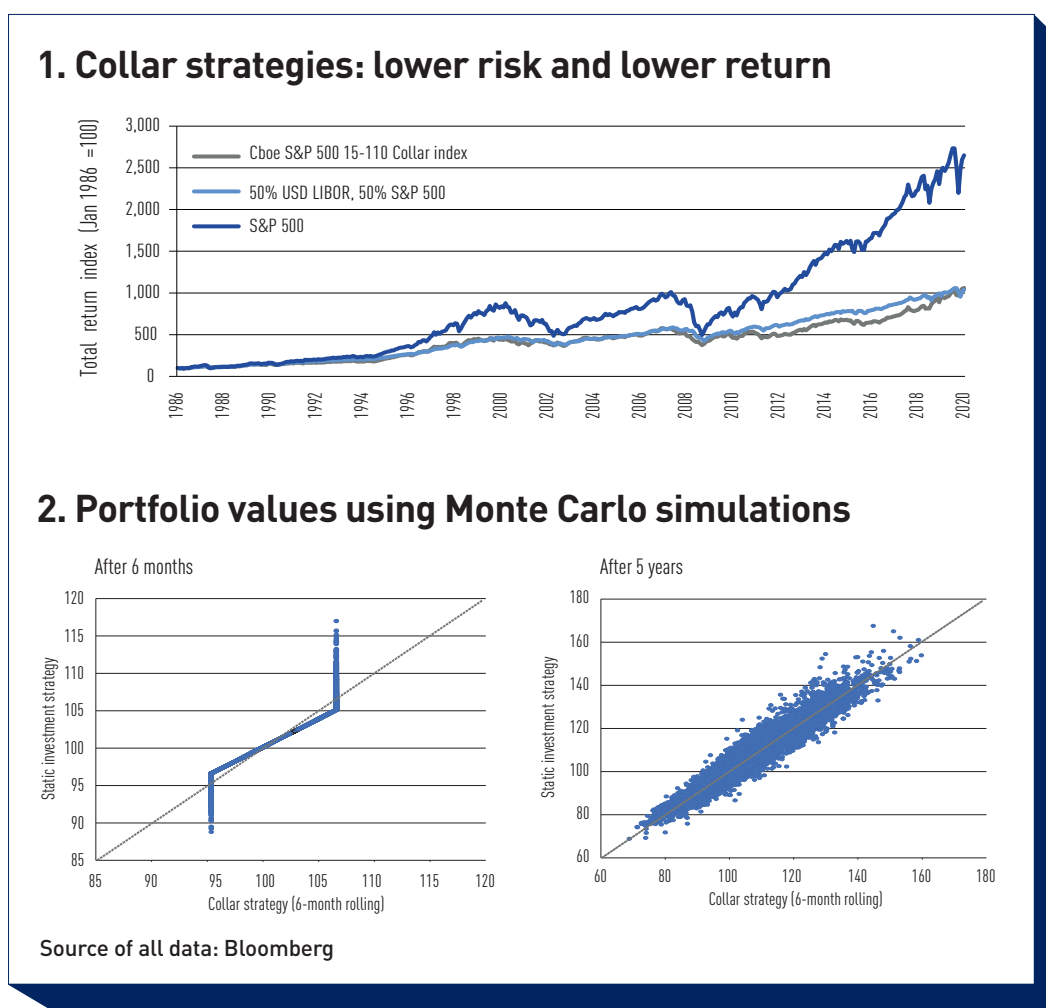
Another way of hedging tail risk is buying put options. At the price of the option premium, the investor receives protection from market declines that exceed the option's strike. Since many investors are not willing to constantly forgo portfolio performance by paying put premiums, they combine their buying of puts with selling calls. The idea of such collar strategies is to trade high portfolio gains for insurance against high portfolio losses, while benefitting from a steady market development between the two extremes.

The coronavirus crisis is a good example of a scenario where collars have succeeded. Pension funds that had implemented a collar strategy were not only protected from large losses but could also participate in the subsequent recovery.

In the case of zero-cost collars, where the premium paid for the puts is exactly compensated by the premium received for the calls, the down-side protection could have even been achieved without explicitly paying for it. Unfortunately, this short-term perspective overestimates the benefits of collars. The reason is that collars reduce the expected long-term portfolio return because the forgone up-side from selling call options is, on average, larger than the avoided downside from buying puts.

Figure 1 compares total returns of the S&P 500 index, the Cboe S&P 500 95-110 Collar index (CLL) and a strategy of 50% cash and 50% S&P 500 from 1986 to date.

The long-term risk-return characteristics of the collar strategy largely differ to a pure equity portfolio, but are very similar to a static portfolio of 50% cash and 50% equity. Although collar strategies clearly reduce risk, they come at the price of significantly lower returns.



In the end, collar strategies are therefore equivalent to a reduction of risky assets in a static investment strategy.

Does this mean that collars are obsolete in pension risk management? Not quite. Using Monte Carlo simulations, we compare the distribution of the value of a static investment strategy with the distribution of the value of a collar strategy. In the very short term (figure 2, left chart), the static investment strategy clearly has a more widespread distribution of portfolio values than the collar strategy, whose value is truncated by the strike prices of the two options.

However, after five years, the distribution of portfolio values becomes nearly indistinguishable between the two strategies (figure 2, right graph).

While collar strategies do not mitigate long-term portfolio risk, they do help to prevent substantial short-term losses, such as at the peak of the coronavirus crisis. The question now is whether the latter is relevant for pension funds.

Pension funds have long-term obligations. It is thus the uncertainty of the long-term portfolio value that should be the primary concern of pension risk management. Whether a decline in portfolio value

unfolds as a shock over a few days or gradually over several years is irrelevant for the fund's capability to meet its obligations.

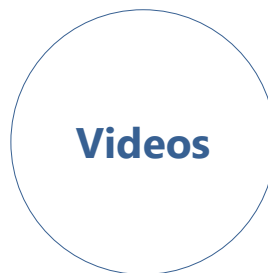
However, the sponsoring firm of the pension fund might have a different view. If the pension funded status has a significant impact on the firm's financial reporting, short-term loss aversion of corporate managers might, in fact, be the key rationale for pension managers to implement a collar strategy or any other short-term tail risk hedge.

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