

Portfolio protection strategies – The magic formula for risk-averse investors?

The stock market crash caused by the outbreak of the COVID-19 pandemic has raised the call for professional risk management in order to limit extreme losses. It is well known that there are no investment concepts that limit losses while allowing full participation in positive market environments. However, portfolio protection strategies can offer significant value for specific groups of investors willing to forego part of their performance in exchange for the avoidance of extreme losses.

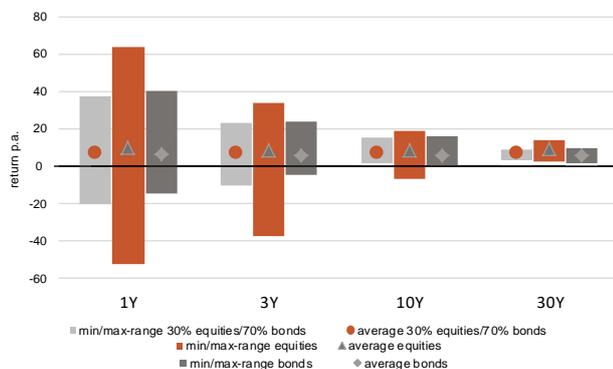
Investment prospects in a low interest rate environment

In the first quarter of 2020, Germany's blue-chip index DAX collapsed by 40% in a very short period of time. As a result, more and more investors are asking for professional risk management solutions to limit such losses. After all, the hunt for yield naturally involves risks. In the current low-interest environment, it is no longer possible to achieve a positive return with bonds that have top credit ratings such as German government bonds which have a negative yield to maturity. Those investments are loss-making. So, what options do exist? To achieve a positive return, at least taking some risk seems inevitable. In times of rising markets, such as 2019, this approach may be successful. But what about risk appetite when prices fall – even temporarily? It is often the case that investors take too much risk out of necessity. Frequently, their risk exposure is reduced near market lows, leading to the realisation of significant losses when severe drawdowns put their risk appetite to the test.

Basic risk considerations

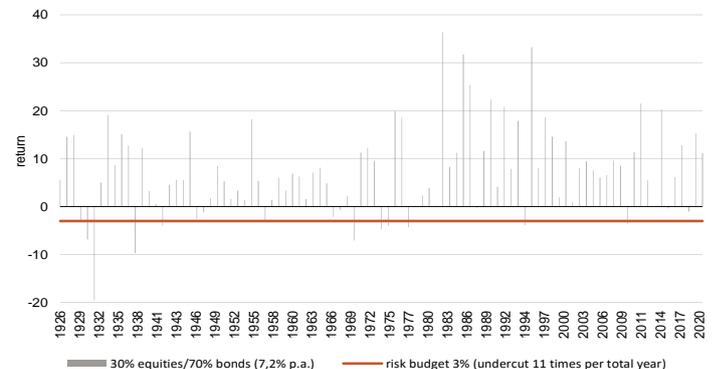
Many investors are primarily interested in expected returns and use these as the critical selection criterion for their respective investments. If they have a long-term investment horizon, this procedure is reasonable, as with an increasing investment horizon the average realised returns approach their expected values.

Fig. 1: The volatility of equities and fixed income decreases as investment horizons expand and approach the long-term average



Period: 01.01.1926 -31.07.2020, annual data, Source: Bloomberg, own calculations, database: US equities and US government bonds

Fig. 2: At irregular intervals, even a diversified portfolio may deliver negative returns over a one-year horizon



Period: 01.01.1926 -31.07.2020, annual data, Source: Bloomberg, own calculations, database: US equities and US government bonds

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*Within **Insights** we provide you with a deeper understanding of our investment philosophy and thinking.*

The hunt for yield in a low interest rate environment inevitably involves risks.

High drawdowns put the risk appetite of risk-averse investors to the test.

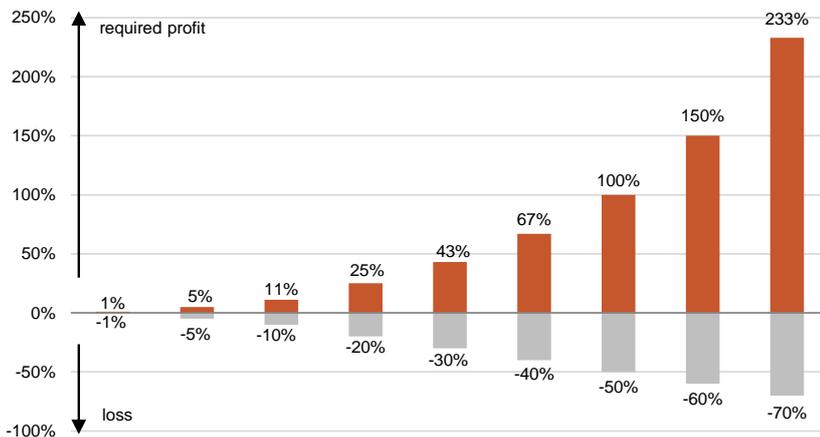


Over the short term, however, e.g. one year, the realised return can deviate considerably from its expected value – the more, the greater the risk or volatility of the investment. Thus, investing in equities with an expected return of 7% pa may still result in years in which a loss of 40% or more is recorded (see Fig. 1). Even portfolios with a conservative strategic allocation of 30% equities and 70% bonds experience losses that exceed a tolerance level of, e.g. -3% from time to time (cf. Fig. 2).

For a long-term investor, a short-term loss may not be statistically significant, but the timing of the loss can be critical to whether the investment objective will be achieved. As such, an equity portfolio's sharp decline in value just before retirement is highly detrimental, as is an extreme initial loss shortly after a significant one-off investment. For example, an initial loss of 50% requires the investment to double its value from the new basis to regain its initial value (cf. Fig. 3). However, since downturns in capital markets usually occur during faster time sequences than advancing markets, initial losses are therefore often “carried” far into the future.

The timing of a significant loss is critical to whether or not the investment objective can be achieved.

Fig. 3: Profit required to offset losses



Source: Berenberg, own calculations

Institutional investors are primarily concerned with an additional level of complexity. They find themselves in a conflict of interests with regard to the investment horizon: on the one hand, they have to achieve their long-term investment goals, on the other hand, they have to justify themselves in committees for the short-term risks they have taken. In addition, some types of investors, e.g. companies, have to publish investment results in their profit and loss statement. In this way, negative results can dilute the company's actual operating success. In these cases, a pre-defined maximum loss level could be beneficial, as no management team enjoys to see an ordinary operating result being spoiled by losses from capital investments.

Long-term investment goals of institutional investors are often in conflict with annual loss limits.

Portfolio protection strategies mitigate the risk of significant losses

A portfolio protection strategy enables an investor to invest in risk assets while at the same time limits the risk of losses over a pre-defined period. The specific investment strategy depends on the respective individual investor's requirements. It is crucial that the defined loss limit, as part of the portfolio protection strategy, is always aligned with the underlying risk of the investment strategy.

A simple approach is the integration of a strict loss limit into the investment strategy. The simplest form is the definition of a minimum portfolio value and the implementation of a stop-loss strategy. It is reassuring for investors to always know

Portfolio protection concepts are an optional supplement to the existing investment strategy.



the maximum loss in advance. However, is the definition of a simple stop-loss sufficient for a sophisticated investment strategy? How can investors re-enter into risky assets later after the stop-loss has triggered a complete sale of the portfolio holdings? This leads to the question whether it really makes sense to wait during a clear downtrend until the stop-loss level is reached or whether it would be beneficial to gradually reduce risks on the way down? This is where professional portfolio protection strategies come into play.

How portfolio protection strategies work

A portfolio protection strategy reduces the portfolio risks in periods of stress. If prices fall during an investment period, the risk management process ensures that the risky positions are reduced in several steps to avoid for the portfolio value to fall below its lower limit in the event of further losses.

This theoretical approach initially appears quite simple but can turn out to be a complex undertaking with various unknowns regarding the ex-ante uncertainty of risky assets' price developments. The lower portfolio limit generally forms the guard rail for portfolio protection strategies over a predefined period.

Portfolio protection strategies can be divided into trend-following and static approaches. The latter are continuously implemented in the portfolio and limit unforeseen risks and losses, whereas the former are activated as negative developments set in. Their design and implementation can be divided into a number of categories and approaches, e.g. according to the type of investment strategy (rules-based versus discretionary), implementation (dynamic versus static), implementation level (overlay versus portfolio level) or the instruments used. Which of these strategies meet investors' needs depends on the complexity of the portfolio, the investor's objectives and the specified risk budget.

The simplest approaches are static protection strategies, e.g. through stop-loss orders or a long put position. The former bears the risk that the loss threshold cannot be maintained due to a lack of market liquidity or that the lower portfolio limit is exceeded due to overnight gaps. With the second approach, the exact hedge ratio is very difficult to determine and must be adjusted constantly, which leads to high hedging costs over time. Dynamic overlay strategies can offer added value if the underlying portfolio contains mostly risks which can be hedged with derivatives. In this context, credit and liquidity risks represent a challenge.

Efficient portfolio protection strategies are characterised by a tailor-made approach, an appropriate implementation and rules-based execution. This ensures that the portfolio protection strategy is replicable, based on non-emotional investment decisions and that interventions are limited to periods of stress¹. More specifically, this means that the lower portfolio limit must be harmonised to the long-term risk of the underlying portfolio to limit interventions to the necessary minimum.

Berenberg's portfolio protection solutions

The concept of integrated portfolio protection, which serves as an add-on to manage the underlying investment portfolio and to monitor compliance with the maximum loss, is explained in detail below. Berenberg offers two individual portfolio

Portfolio protection strategies reduce risk in periods of stress before a lower limit is breached.

Portfolio protection concepts can be divided into static and trend-following approaches.

Static protection strategies might cause significant costs.

Dynamic portfolio protection strategies that follow trends must be designed in an efficient manner.

Berenberg offers two bespoke trend-following portfolio protection concepts: systematic and discretionary portfolio protection.

¹<https://www.boersen-zeitung.de/index.php?li=1&artid=2020083807&titel=Wertsicherung-bringt-dem-Investor-einen-realen-Mehrwert>

protection concepts in this segment: the **systematic and the discretionary approach**. Both concepts are rules-based, systematic, trend-following and based on the same basic principles but differ in their concrete implementation.

Risk management is carried out in three steps:

1. Risk measurement – portfolio stress-testing

The first step is to calculate the expected loss of the portfolio value in the risk event. For this purpose, a risk measure is determined for the underlying portfolio which takes into account the distributional characteristics of capital market returns and the weaknesses of the assumption of normal distribution. In both concepts, this risk indicator is the conditional value at risk (CVaR). This is the central risk measure and parameter for the portfolio protection strategies. CVaR describes the potential loss that will occur at a certain probability over a predefined period of, for example, two days (Fig. 4). At a confidence level of 99%, CVaR is the average loss that can be expected in the 1% most extreme negative cases for the respective period.

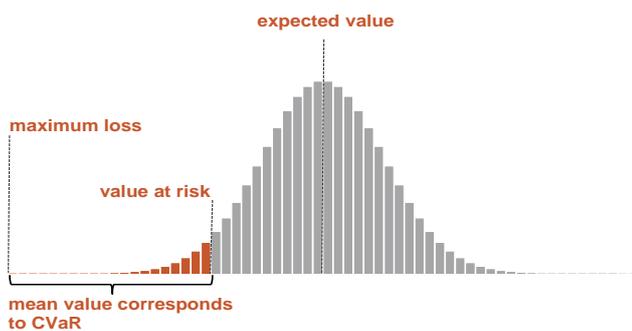
The conditional value at risk (CVaR) is the key risk indicator for both concepts.

2. Risk monitoring – reconciliation of potential losses and risk-bearing capacity

In the second step, the risk-bearing capacity of the portfolio is determined. The potential loss from the first step is deducted from the current portfolio value, thus determining the remaining portfolio value in the risk scenario in order to assess whether the loss threshold is breached in the stress scenario. This would result in partial or full utilisation of the available risk budget. If this is the case (see Fig. 5), rules begin to take effect to reduce the risk in the portfolio to an acceptable level in accordance with the utilisation of the risk budget. These rules are defined in advance and can already intervene if some of the risk budget is depleted partially following a smaller initial decline in the capital markets. However, at the latest at full utilisation, when the portfolio value in the risk scenario threatens to fall below the portfolio protection limit and the risk budget would thus be completely exhausted, the portfolio risk must be reduced. The portfolio risk is therefore monitored at all times by continuously calculating the stress scenario (step 1) and determining the risk-bearing capacity (step 2).

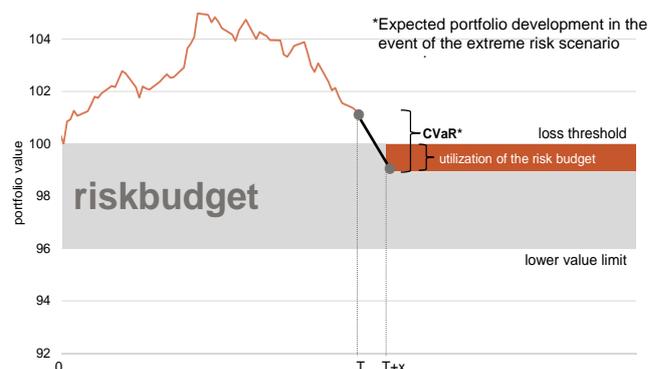
As part of the risk management process, a stress test is implemented to determine whether the portfolio value is above the loss level in the stress scenario.

Fig. 4: Conditional value at risk as central risk measure in portfolio protection concepts



Source: Berenberg, own calculations

Fig. 5: Risk management process in portfolio protection concepts



Source: Berenberg, schematic representation of the value guarantee component with a lower value limit of 96%.



3. Risk reduction – rules-based adjustment of portfolio risk

If the risk budget could be exceeded – based on the stress scenario – the portfolio risk must be reduced. By reducing risky portfolio positions, a rules-based adjustment of the portfolio risk takes place before the portfolio falls below the predefined protection limit. If the risk budget is exhausted, the portfolio consists only of cash or money market investments.

If the capital markets recover before the risk budget is completely exhausted, the portfolio can be rebuilt by increasing the allocation to risky assets again. The risk-bearing capacity of the portfolio determined by the stress test defines the maximum for this reallocation to risky assets.

The main difference between these two portfolio protection strategies as offered by Berenberg is determined by the varying portfolio allocation processes. On the one hand, Berenberg offers a systematic approach that is independent of forecasts, and on the other hand, it offers a discretionary approach with an explicit market expectation – especially as long as the rules-based risk management does not intervene. Apart from technical differences, the approaches also differ in terms of the risk reduction process and the reinvestment process regarding new risk positions. In both portfolio protection concepts, risks are reduced in the event of negative market developments. The systematic approach reduces risk equally across all asset classes if the portfolio value threatens to fall below the protection limit, according to the stress scenario. In the discretionary approach, risks are reduced as soon as more than 50% of the risk budget is depleted. The portfolio manager decides which positions will be sold. Positions with high risk contributions are eliminated first. During the reinvestment process, the discretionary strategy has leeway in the selection of assets and the allocation of risk, while the systematic approach builds up the portfolio equally across all asset classes independent of market forecasts. Which of the two concepts is best for an investor depends on individual investment goals and needs. With the discretionary approach, the manager's expectation how the capital markets will develop plays a central role, while the systematic strategy is more suited for investors seeking a process that is rules-based and independent of market views.

Special characteristics of portfolio protection strategies

Portfolio protection strategies seek to bridge the gap between a long-term investment horizon and short-term risk mitigation. Of course, achieving both goals at the same time is not completely free of charge. A comparison with insurance policies is obvious here. These policies charge fees for insurance coverage. In the investment world, these insurance premiums are not directly visible for investors, however; they correspond to implicit costs resulting from risk-reducing interventions by the portfolio protection strategy.

If a negative market period with a defensive and risk-reduced portfolio allocation is followed by a relief rally, the investor will not fully participate in this development. This presumably lower investment performance is equivalent to the cost of insurance. In the case of damage, the insurance company compensates for the loss incurred. Applied to an investment portfolio, this means that losses are reduced significantly in the event of a severe market drop, although there is no guarantee that the loss limit of the portfolio will be met exactly by the portfolio protection strategy. Despite conservative assumptions, overnight risks or a lack of liquidity

The portfolio risk is reduced at least to the extent that the remaining risk budget is sufficient in the stress scenario.

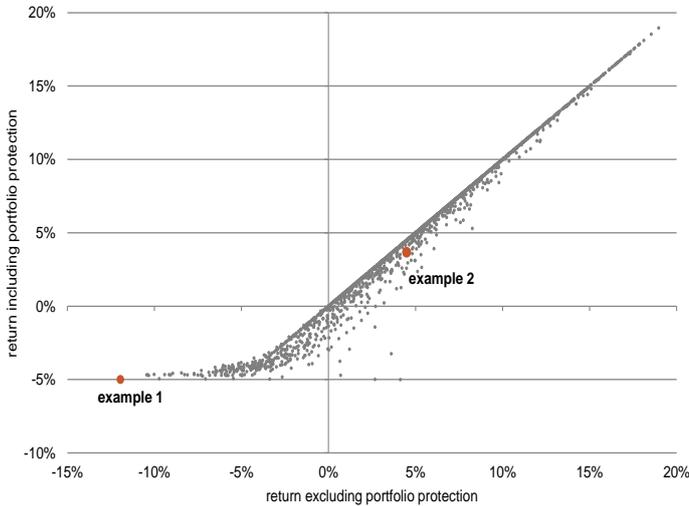
The speed of reinvestment depends on the remaining risk budget.

Different characteristics of the Berenberg portfolio protection strategies: systematic, independent of forecasts, or a discretionary approach with regards to both the risk reduction and the reinvestment process.

When using a portfolio protection strategy, the investor pays implicit insurance costs.

can lead to the floor being breached. The long-term success of a portfolio protection strategy depends on its specific parameters. Figure 6 shows these characteristics in detail.

Fig. 6: Comparison of annual returns of a balanced portfolio with and without protection



Source: Berenberg, bootstrap simulations of a portfolio of 20% equities, 60% government and 20% corporate bonds.

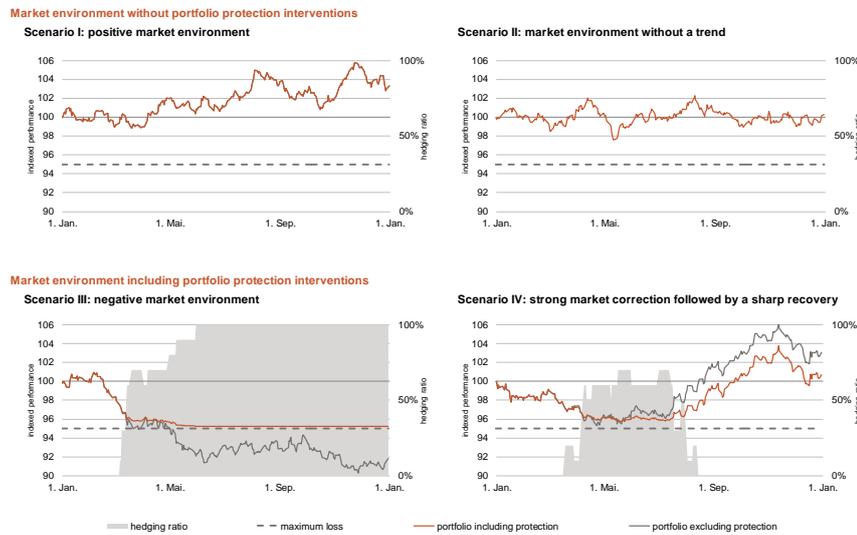
The simulation of 2,000 one-year periods of a balanced portfolio (cf. Fig. 6) shows the distribution of annual returns (X-axis). In the best case, the annual performance is over 20%, in the worst case, there is a loss of 12%. If we implement a portfolio protection strategy with a protection level of 95% over each of these one-year periods, the payout profile changes significantly because losses below 5% are avoided (cf. Fig. 6). At the same time, there are periods in which the return is lower than that of the unsecured approach. Both highlighted examples show the influence of the portfolio protection strategy. In example 1, the loss without hedging is 12%, with hedging it is just 5%. Example 2 shows an intervention that leads to a lower return (3.7% with hedging, 4.7% without hedging). In this simplified simulation, the protection approach intervenes in four out of 10 years. About 80% of the interventions result in a 0.7% lower return on average. For the remaining 20%, the interventions increase returns by 1.3% on average compared to the unsecured approach. In practice, strategy parameters play the crucial role in the analysis of the benefits and costs of an individual protection strategy.

Consequently, the question arises of how a portfolio with a portfolio protection strategy generally behaves in the face of various market developments compared to an unsecured one. Of course, the question of when the concept shows its strengths as well as weaknesses is of particular interest. Fig. 7 shows some idealised performance paths in different market environments. The actual path, however, depends on the portfolio protection concept's specifics.

A portfolio protection strategy avoids losses below a lower floor, nonetheless the return can be lower in some years than those of a strategy without protection.

The advantages and disadvantages of portfolio protection strategies have a visible effect in different market environments.

Fig. 7: Schematic performance with regards to specific market movements



Source: Berenberg, own calculations

In a positive market environment (Scenario I) such as in 2019, the protection concept does not need to intervene. The performance of the unsecured strategy is equal to that of the protected portfolio.

A sideways market without a clear trend should also not trigger any intervention of the protection strategy, given it is usually characterised by moderate volatility (Scenario II). However, higher volatility or more pronounced market moves in both directions make an intervention more probable and may lead to performance disadvantages, as the protection strategy begins to eliminate risks in the case of setbacks and is underinvested in subsequent recoveries (for example: 2016)².

In Scenario III, in the event of a sharp decline with a permanently depressed price level that is not followed by a recovery (an “L-shaped” correction) but possibly even by a continuing market decline, e.g. after the events of 11 September 2001, the protection strategy shows its full strength and prevents further painful losses below the defined maximum loss level.

If, however, a sharp drawdown is followed by a rapid, strong recovery (a “V-shaped” correction), such as in early 2020, protection strategies – if there is any risk budget left at all – will underperform initially and its participation rate will lag (Scenario IV). It simply takes time until a new risk budget has build up again, as it is generated by rising share prices. Only if the risk budget is sufficiently large again risky positions can be purchased. One version of the “V-shaped” correction that is particularly dangerous for protection strategies is a “W-shaped” development. It is precisely when, with a time lag, the protection strategy is just fully invested again that another slump occurs, as for example in 2002/2003. By then at the latest, the risk budget is typically exhausted, and the portfolio will not participate in any subsequent recovery. If, however, a slump is followed by a slow, steady recovery as in

As a rule of thumb for a sideways market: the higher the market volatility, the more likely an intervention by the protection strategy which may create implicit costs in terms of lower performance.

After a sharp decline, the added value depends significantly on the subsequent market developments.

² This example shows how decisive the exact point in time within the one-year period is. While in 2018 the correction ended at the end of December and an investor could participate in principle fully in the recovery from the beginning of 2019 thanks to the freshly available risk budget, the correction in 2016 started at the beginning of the year to a similar extent as at the end of 2018. Due to the partial consumption of the risk budget at the beginning of the year, the portfolio protection strategy was clearly underinvested in the subsequent recovery phase and could participate only to a lower extent.

2011/2012, the portfolio risk can be increased in step with rising prices and the portfolio protection strategy will participate to a large extent.

Advantages and disadvantages of portfolio protection approaches

In the context of the characteristics of these strategies described above, it is clear that the use of these strategies comes with specific advantages and disadvantages. Both are balanced, and the decision to use those solutions depends on individual investment objectives and specific market conditions.

There are advantages and disadvantages associated with the use of such investment strategies.

Fig. 8: Advantages and disadvantages of portfolio protection concepts at a glance

 Advantages	 Disadvantages
<ul style="list-style-type: none">• The lower value limit can be defined on the basis of an investors individual risk aversion• Portfolio losses during a specific period are limited up to the predefined level and are reduced systematically and are therefore calculable• The investor receives an asymmetrical payout profile• Lower portfolio volatility in the long term	<ul style="list-style-type: none">• In the long term, implicit insurance costs are incurred• Once the risk budget has been used up completely, it is no longer possible to participate in subsequent market recoveries• In the event of an unfavorable chronological sequence of drawdowns, multiple subsequent negative years might lead to a lower performance than the predefined lower value limit• The investment approach is procyclical – the sale of risky positions might lead to the realization of accounting losses

By using a protection strategy, investors increase their planning security. They know with a high degree of certainty how much the portfolio value they will lose in a difficult market environment – especially since they have defined this lower value limit themselves. All in all, the investor receives an asymmetrical payoff – an investment strategy that allows them to participate in positive capital market developments with a diversified portfolio and which limits losses from a predefined level onwards while reducing the portfolio's overall volatility. It seems to be the perfect investment solution every investor.

The major advantage is the pre-defined maximum loss and the asymmetric pay-off profile.

However, portfolio protection strategies exhibit characteristics that prevent them from being ideal for all types of investors. Portfolio protection strategies are very well suited to eliminate portfolio risk gradually in declining capital markets. However, once the risk budget has been used up, it is no longer possible to participate in subsequent market recoveries (the so-called cash lock), as the investor has built up 100% liquidity already to protect against further losses.

The major disadvantages are implicit insurance costs and the risk of lower participation rates in rising markets.

As the COVID-19 pandemic has clearly shown, capital market recoveries are often just as strong as capital market slumps. At the trough, only a small amount of allocation is still invested in risky assets that participate in the subsequent price recovery resulting in an underperformance compared to a non-protected investment strategy. The implicit insurance costs must be borne by the investor.

In addition, there is a risk that severe market corrections may occur in unfavourable intervals. Hence it is possible that the overall loss may be higher than the agreed maximum annual loss despite a protection strategy that meets its goals during the protection period. Due to the link of separate protection periods, in which the portfolio remained within its risk limits and did not fall below the lower threshold, the overall loss might exceed the loss per period due to new risk budgets being used up again in consecutive periods.



Conclusion: When are portfolio protection strategies beneficial?

Professional protection strategies can bridge the gap between long-term investment horizons and short-term needs to limit losses, improve investors' planning security and support obvious investment expectations. Despite these attractive features, they are not a panacea that works equally well in each market environment and they are not the silver bullet for every investor. They exhibit certain beneficial and adverse characteristics. In particular, the timing of capital market declines and recoveries is highly relevant and determines the extent to which these strategies add value in comparison to an unsecured portfolio.

Apart from the effectively quantifiable value added in form of higher returns or lower losses, in practice it has been shown that protection against temporary draw-downs can create costs in the form of lower performance. Thus, protection strategies represent a type of insurance in which risk-reducing interventions can cause lower performance compared to unsecured strategies. In addition, there is the risk of a cash lock when the risk budget is exhausted. However, in return, the investor receives the guarantee that extreme losses will be avoided.

Portfolio protection strategies work in a low interest environment, too. However, the reinvestment process takes more time as returns from high-grade bonds and cash investments are unusually low and thus it takes more time to build up new risk budgets which are generated by the continuous interest income. The absence of current income, combined with capital markets' increased velocity, highlights the challenges which portfolio protection strategies face. More frequent interventions may increase the insurance costs in the long term.

The strategic allocation is crucial for investors with a long-term investment horizon who can withstand price setbacks – both in terms of accounting and emotions – and a portfolio protection strategy is of limited benefit. However, especially for institutional investors that (for regulatory or economic reasons) have a limited risk budget in a given time period and a long-term investment objective which cannot be achieved with low-risk investments, portfolio protection strategies can, if implemented professionally, be the right choice. In this way, a bridge is built between the long-term achievement of investment goals and the regular justification of the risks taken. If the implemented portfolio protection strategy is tailor-made for the investor's specific needs, it can provide significant advantages.

Portfolio protection strategies are not the universal solution – but they offer significant added value, especially for investors with limited risk-bearing capacity.

The low interest rate environment increases the challenges for portfolio protection strategies.

Portfolio protection strategies can bridge the gap between long term investment and short term risk for investors with a limited risk budget.

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