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Viewpoint

# Enhancing the risk/return profile of High Equity Income solutions through a Minimum Variance portfolio construction coupled with a derivative overlay

## Key takeaways

**1. Delivering a higher yield in the long run is the key feature of the High Equity Income solution, but when considered within the scope of the common equity risk factors, its risk-adjusted profile looks less attractive.**

High Equity Income (HEI) solutions are a popular allocation within investors' portfolio. They tend to provide a steadily high total return to yield-seeking investors and are sometimes perceived as a good alternative to the fixed income asset class in the long-run.

However, those attractive features may come with additional risk, which is embedded in those solutions: they can exhibit high volatility and performance drawdowns.

**2. Minimum Variance High Equity Income solutions can be a more "risk-efficient" alternative but this more defensive type of solution tends to lag market indices in periods of sharp rebounds.**

To mitigate those risks, portfolio managers could be tempted to mix those High Equity Income solutions with more defensive approaches, such as a Minimum Variance portfolio construction. The "low volatility" add-on may improve the risk mitigation of the initial solution. However, it may also hamper the ability of the hybrid solution – referred to hereafter as Minimum Variance High Equity Income solution (MVHEI) – to take full advantage of strong rebounds.

Hence, during particularly sharp rebounds, this more defensive solution may lag broad market indices, and during crisis events, its natural defensiveness may be weakened in the face of rising cross-sector correlations. This performance lag has been noted in global markets periodically, but especially in the market rally of 2009 following the Global Financial Crisis and in 2020 following the post-Covid market rebound.

**3. Adding an options-based overlay may improve the upside capture of the MVHEI solution without distorting its defensive characteristics, and may lead to a more regular performance over the long-term.**

To overcome such shortcomings, an options-based solution can be added to the overall portfolio. This overlay is intended to hedge the likelihood of underperformance during a sharp rebound in markets following a shock event.

We find that the integration of a derivative overlay to these High Equity Income Low Volatility solutions, when actively managed, may improve the upside capture of the strategy without distorting its defensive characteristics, and may lead to a more regular performance over the long-term.

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# Enhancing the risk/return profile of High Equity Income solutions through a Minimum Variance portfolio construction coupled with a derivative overlay

## 1/ Delivering a higher yield in the long run is a key feature of the High Equity Income solution, but when considered within the scope of the common equity risk factors, its risk-adjusted profile looks less attractive.

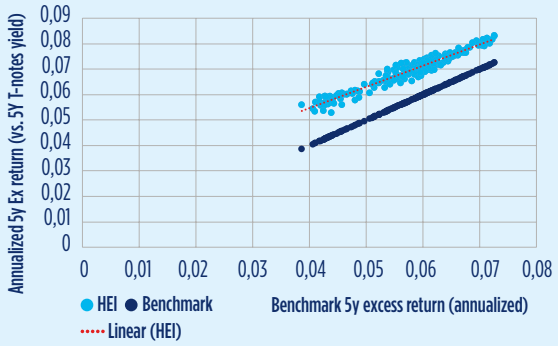
The objective of High Equity Income solution (HEI) is to provide a steadily high total return to yield-seeking investors. However, **some bias can be embedded in these solutions,** especially with regards to their risk characteristics. To illustrate this concern, we analyze the case of the MSCI World Total Shareholder Yield Index that we believe is a representative example of these solutions. The HEI solution wrapped in this index is based on the MSCI World Index, its parent index (the "benchmark").

**The first characteristic we examine is the profile of the long-term income,** which corresponds to the total return delivered by the High Equity Income solution. Figure 1 shows the empirical payout patterns of the solution[1]. As we can observe, the payout of the High Equity Income solution is quite steady in the long run and tends to dominate the payout of the benchmark. **Delivering a higher yield in the long run is indeed a key feature of the High Equity Income solution.**

**The second characteristic to analyze is the structure of the High Equity Income solution's risk-adjusted returns.** Figure 2 represents the statistical distributions of the excess returns (left-hand chart) and the alpha (right-hand chart) of the solution[2]. The light-blue curve on the left-hand chart demonstrates an attractive feature of the solution: skewness towards very positive outcomes. However, once the contributions of risk factors are accounted for, the profile of the distribution changes materially (right-hand chart), denoting a significantly higher negative-alpha risk. **Those patterns mainly show that when the High Equity Income (HEI) Solution is considered within the scope of the common equity risk factors, its risk-adjusted profile looks less attractive.**

Figure 1.

**High Equity Income (HEI) Solution payout**

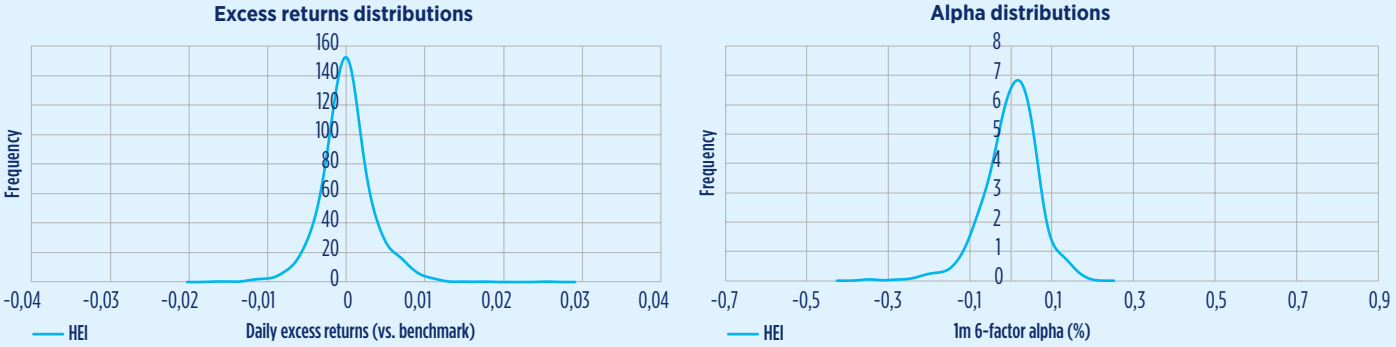



***Notes:*** *This figure shows the payout patterns of HEI strategy. The payout is proxied by the 5y year excess returns of the strategy relative to the 5y T-notes yield. Returns are computed over 5y moving time-windows over the period from 31/10/2005 to 29/09/2023 using daily time steps. Each point in the scatter plots thus represents a time point in the sample linking the excess return of the benchmark to the contemporaneous ex return of the strategy.*

Source: Factset database end September 2023..

Figure 2.

**Risk-adjusted returns empirical distributions**




***Notes:*** *Source: Amundi, end September 2023. This figure shows the empirical distributions of excess returns (left-hand plot) and alpha (right-hand plot) of the HEI strategy. Daily excess returns are computed against the benchmark of the strategies over the period from 31/10/2005 to 29/09/2023. The model is estimated based on an OLS regression applied to daily returns over 20-day rolling periods. The alphas are determined based on a 6-factor regression analysis applied to daily returns over 20-day moving time windows. The factors considered in this analysis are the Fama-French 5 factors augmented with the Momentum factor. The alpha should be interpreted as a risk-adjusted return determined in excess of the contributions of the stated risk factors namely market (Mkt), value (HML), size (SMB), high profitability (RMW), conservative investments (CMA) and momentum (UMD).We use daily returns of developed markets factors from Kenneth R. French data library. The empirical density functions in plots are determined based on a Gaussian kernel density estimation.*

1. We define the payout as the long-term excess returns of the strategy taken as a function of the benchmark's excess returns.
2. Those empirical distributions are estimated based on a Gaussian kernel adjustment approach.

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**Thirdly, we perform a risk factor-based analysis using the Fama-French model over the whole period studied[3].** We assess the risk profile of the solution based on its exposure to common risk factors (see Figure 3).

As we can see, **the solution generates a nil 6-factor alpha and loads significantly on all factors, which help explain more than 90% of the variability of its returns.**

Figure 3.

**Descriptive statistics of risk-adjusted returns**

| | Skew | Kurt. | Vol (%) | TE (%) | SR | MDD (%) | Alpha (%) | Mkt | SMB | HML | RMW | CMA | UMD | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEI | -0,40 | 1,17 | 10,77 | 5,42 | 0,37 | -26 | 0,00 | 0,819*** | -0,045*** | 0,249*** | 0,048*** | 0,188*** | -0,039*** | 0,93 |

***Notes:*** *This table shows features of the HEI strategy based on several risk and performance criteria. Volatility (Vol) and ex-post tracking error (TE) figures are annualized. MDD is the Maximum Drawdown based on daily return observations. SR, Skew and Kurt are respectively the Sharpe ratio, and the skewness and the kurtosis of the excess returns. The risk-adjusted returns (Alpha) are determined based on the Fama-French 6-factor model applied to daily returns over the period from 31/10/2005 to 29/09/2023. The factors considered in this analysis are the Fama-French 5 factors – market (Mkt), value (HML), size (SMB), high profitability (RMW), conservative investments (CMA) – augmented with the Momentum factor (UMD). R2: R-squared of the regression, which measures the strength of the regression (ranges between 0 and 1, 1 being a strong regression quality).» We use daily returns of developed markets factors from Kenneth R. French data library. The statistical significance of the factor loadings (betas) is indicated as follows: ***Significance level at 1%, two-tailed test; **Significance level at 5%, two-tailed test; *Significance level at 10%, two-tailed test. Source: Factset database, end September 2023.*

**Given those patterns, how can we improve the risk attributes of the High Equity Income solution and mitigate some of its embedded biases?**

3. 30/10/2005 to 29/09/2023.

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## 2/ Minimum Variance High Equity Income solution may be a more "risk-efficient" alternative but this more defensive solution tends to lag market indices in periods of sharp rebounds.

One approach for mitigating risk aspects of the High Equity Income solution would be **shifting its allocation to a defensive profile, towards high-income stocks with lower correlations and volatilities.** To explore this, we apply a Minimum Variance optimization to our High Equity Income solution stock universe, maintaining similar constraints and rebalancing frequency prevailing in the design of the native solution[4]. We reiterate the analyses described earlier to examine the features of this **Minimum Variance High Equity Income solution** ("MVHEI" hereafter), compared to its parent solution. Our findings are summarized below:

- **The risk profile of the MVHEI simulated strategy is softened:** the strategy has materially lower volatility, maximum drawdown and market beta over the period (see Figure 4). The amount of returns variability explained by the risk factors is also lower, meaning **the solution has other return drivers beyond common factors.** However, MVHEI does not exhibit any alpha improvements, and even has a lower Sharpe ratio.

Figure 4.

**Descriptive statistics of risk-adjusted returns**

| | Skew | Kurt. | Vol (%) | TE (%) | SR | MDD (%) | Alpha (%) | Mkt | SMB | HML | RMW | CMA | UMD | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEI | -0,40 | 1,17 | 10,77 | 5,42 | 0,37 | -26 | 0,00 | 0,819*** | -0,045*** | 0,249*** | 0,048*** | 0,188*** | -0,039*** | 0,93 |
| MVHEI | -0,23 | 0,66 | 8,27 | 7,90 | 0,35 | -16 | 0,00 | 0,624*** | -0,108*** | 0,095*** | 0,088*** | 0,307*** | -0,023** | 0,80 |

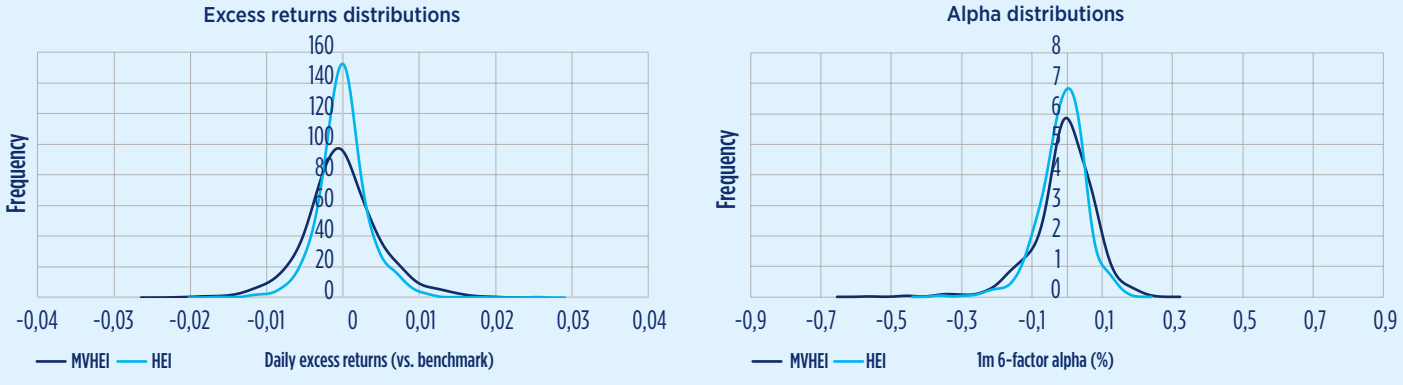
Source: Factset database, end September 2023.

***Note:*** *This table compares the HEI and the MVHEI solutions based on several risk and performance criteria.*

**- There is an improvement in the risk attributes of the solution** (Figure 5 left-hand chart). The distribution of MVHEI has thinner tails, showing more occurrences of mid-range excess returns. However, the distribution of alpha has a fatter left-hand tail (right-hand chart), **meaning the MVHEI simulated strategy has a higher risk of negative risk-adjusted returns.** Those patterns are representative of adverse market scenarios for defensive strategies – strong bull markets for instance – where they tend to underperform and may deliver materially negative alphas.

Figure 5.

**Risk-adjusted returns empirical distributions**




***Note:*** *This figure compares the empirical distributions of excess returns (left-hand plot) and alphas (right-hand plot) of the HEI and the MVHEI solutions. Source: Amundi, end September 2023.*

4. See the methodology of the MSCI World Total Shareholder Yield Index: https://www.msci.com/eqb/methodology/meth_docs/MSCI_Total_Shareholder_Yield_Indexes_April_2015.pdf

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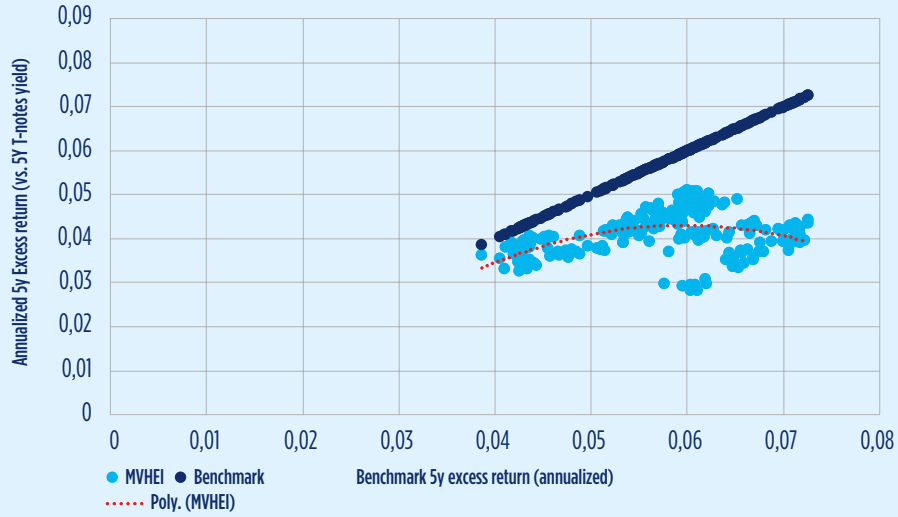
**- We observe adversity effects of bull market configurations in the payout patterns of the strategy.** In Figure 6, the payout of the MVHEI solution is dominated by that of the benchmark in the long-run. Its concavity feature (adjustment curve in red) **denotes the tendency of the solution to underperform under strong market performance:** the stronger the benchmark's performance, the more MVHEI lags in terms of returns.

Figure 6.

**MVHEI solution payout**




***Notes:*** *This figure shows the payout patterns of the MVHEI solution. The payout is proxied by the 5 year excess returns of the solution relative to the 5y T-notes yield. Returns are computed over 5y moving time-windows over the period from 31/10/2005 to 29/09/2023 using daily time steps. Each point in the scatter plots thus represents a time point in the sample linking the excess return of the benchmark to the contemporaneous excess return of the solution. Source: Factset database.*

Source: Factset database, end September 2023.

**To improve this feature of the MVHEI simulated strategy without altering its risk profile, we propose adding a dynamic listed options overlay, which we develop in the next section.** ■

## 3/ Adding an options-based overlay may improve the upside capture of the MVHEI simulated strategy without distorting its defensive characteristics, and may lead to a more regular performance over the long-term.

**An options-based overlay necessitates a number of parameters:** the option underlying, the strike price and the maturity being the main considerations. The frequency of rolling, as well as the size of the position are important as well, and can vary depending on client objectives and market conditions.

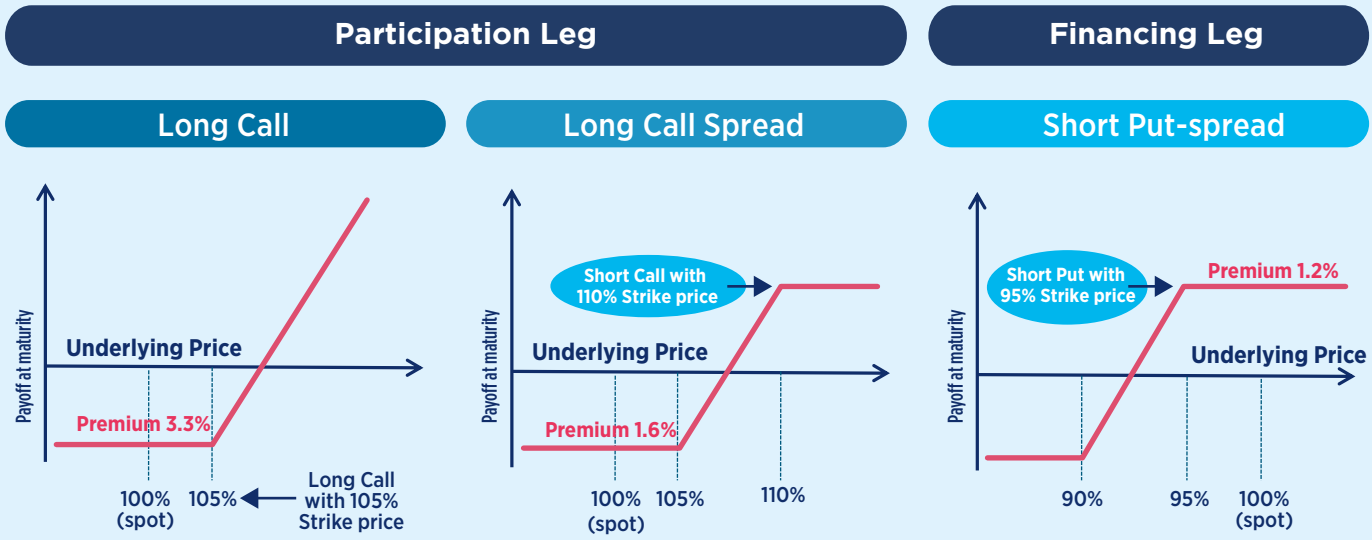
Importantly, the intrinsic defensive profile of the underlying portfolio should not be altered. It is here that one finds the interest in using options (versus futures).

In theory, the overlay should be optimized to increase participation in the right tail, with the least possible increase in volatility.

In practice, a number of additional parameters are considered depending on investor needs, the most typical being cost efficiency.

Figure 7.

**Example building blocks of upside participation overlay**




***Notes:*** *Premium is calculated for 6M options. The call-spread structure exposes the portfolio to market gains while reducing cost compared to a pure long call. Put-spreads can be sold to further reduce cost, while exposing the portfolio to potential additional (but limited) downside. Source: Amundi.*

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## Implementing a dynamic overlay

To correct the underperformance of the MVHEI simulated strategy during sharp market rebounds, **we study the application of a dynamic overlay using options on the Nasdaq and the S&P 500.** This combination ensures sufficient correlation and addresses the structural underweight to technology and US equities present in the Global High Equity Income Low Volatility ("GHEILV" hereafter) simulated strategy[5].In normal market conditions, a limited notional amount of call spreads is implemented on these indices, with a maturity of six months. The strike prices can vary but are always OTM[6]. This permanent protection provides a constant exposure in the case of a market rally that does not follow a crisis.

**A more dynamic use of the overlay can be implemented based on the level of implied volatility** as measured by the VIX Index[7] as well as the level of market drawdown (MDD). The notional exposure as well as the type of options would be indeed adapted depending on the volatility regime in order to better manage the trade-off between the cost and the level of protection embedded in the derivative overlay.

Figure 8.

**VIX/MDD Signal since May 2005. In the higher volatility regime, the threshold to add leverage is increased.**


Source: Amundi.

## Results: The simulated overlay strategy adds around 1% gross annualized performance over the studied period, at the cost of roughly 0.7% additional annualized volatility.

Over the past five years, which includes the Covid-19 period, **the simulated strategy would have added 2.6% of gross annualized alpha,** eliminating all of the underperformance suffered by the GHEILV simulated strategy and rendering a superior Sharpe Ratio to the benchmark. The overlay accentuates only very slightly the maximum drawdowns (see Figure 10), keeping the defensive nature of the core GHEILV simulated strategy intact.

Figure 9.

**Simulated performance and Sharp ratio since 2005**

| Gross performance as of 29/09/2023 (Annualized) | 1 year | 3 years | 5 years | 10 years | Since May'05 |
|---|---|---|---|---|---|
| MSCI World | 20,0% | 6,5% | 5,5% | 6,2% | 5,1% |
| GHEILV Simulated Strategy | 7,9% | 5,0% | 4,3% | 7,2% | 7,8% |
| GHEILV Simulated Strategy + Overlay S&P/Nasdaq (VIX/MDD) | 9,2% | 5,2% | 7,0% | 8,7% | 8,7% |

| Sharpe Ratio | 1 year | 3 years | 5 years | 10 years | Since May'05 |
|---|---|---|---|---|---|
| MSCI World | 1,02 | 0,30 | 0,20 | 0,34 | 0,22 |
| GHEILV Simulated Strategy | 0,27 | 0,27 | 0,17 | 0,47 | 0,46 |
| GHEILV Simulated Strategy + Overlay S&P/Nasdaq (VIX/MDD) | 0,37 | 0,29 | 0,32 | 0,56 | 0,51 |

Source: Amundi simulation, since 2005.

5. More complex combinations of underlying indices could be used to further reduce basis risk.
6. Out of the Money
7. The VIX index measures volatility by tracking trading in S&P 500 options.

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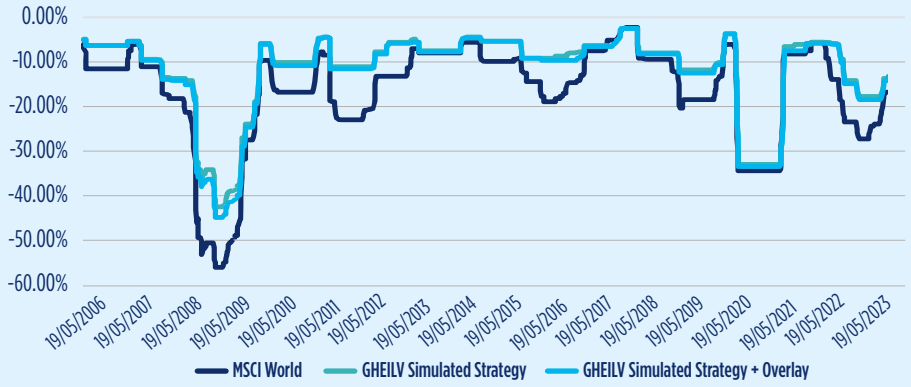
**Results: The addition of the upside overlay keeps intact the defensive nature of the Custom Index, which is resilient across market scenarios, with the exception of a black-swan-like event such as Covid-19 where equity sector correlations converge in a flight to safety.**

In the post-financial crisis period, the overlay steadily adds to the cumulative outperformance of the core solution, capitalizing on market rallies in 2009 and 2012-2013.

During the zero interest rate period and particularly after the Covid-19 crisis**, the overlay succeeds in hedging against a decline in relative performance,** preserving and adding to gains made since 2016, the year when the GHEILV simulated strategy begins to underperform. Whereas the standalone GHEILV solution gives back almost 20% of its cumulative alpha since May 2005, the enhanced solution with upside overlay experiences only a roughly 10% retracement from its peak and a 5% retracement from its 2016 level.

Figure 10.

One-year rolling maximum drawdown

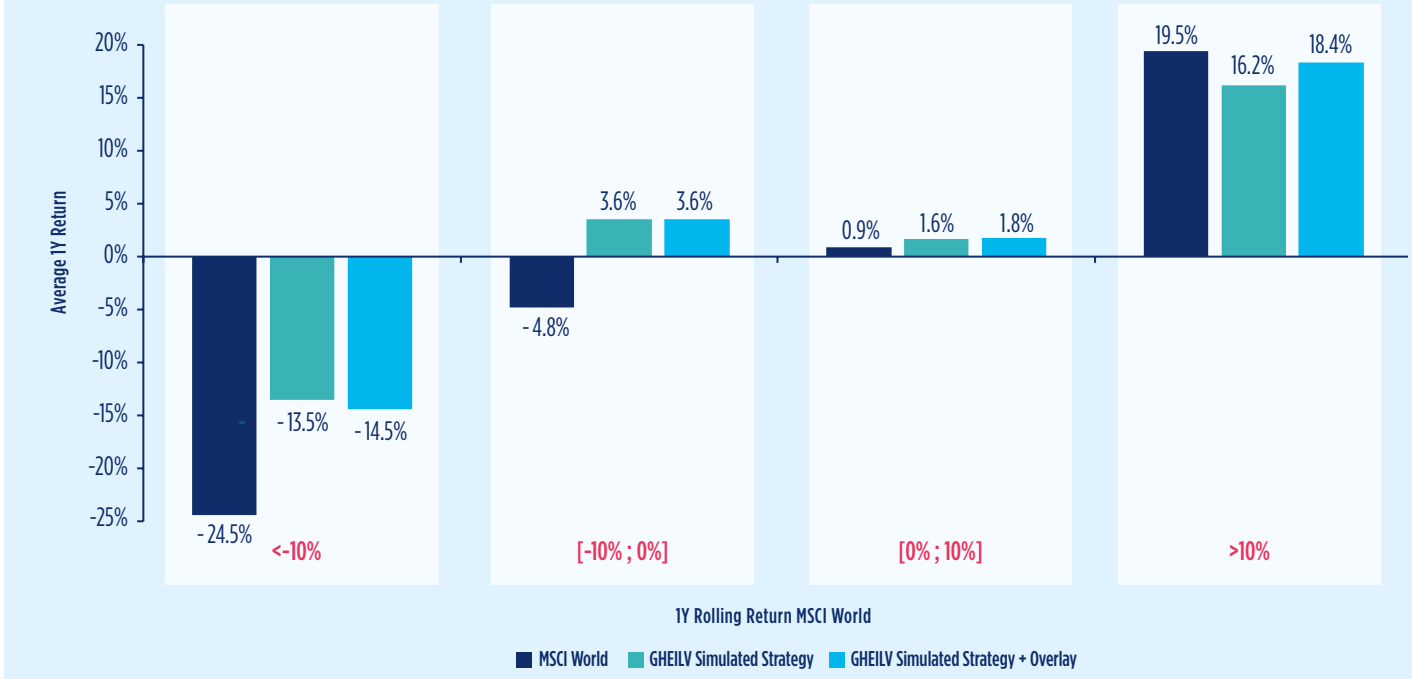



Source: Bloomberg, Amundi.

**Most importantly, the asymmetry provided by the GHEILV simulated strategy is not degraded** – it is, in fact, enhanced, with the ratio between large gains to losses improving from 1.2 for GHEILV to 1.3 for GHEILV with the overlay (vs. 0.8 for the benchmark).

Figure 11.

Average yearly return in bull and bear markets of MSCI World and GHEILV Simulated Strategies




Source: Bloomberg, Amundi.

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## Conclusion

**In conclusion, High Equity Income Low Volatility strategies may be an efficient way to get exposure to high dividend yield stocks while mitigating the equity volatility and market downside movements.**

However, this type of hybrid solution – combining the selection of high dividend stocks with Minimum Volatility portfolio construction – can suffer from a lack of participation to market upside movements, especially during sharp market rallies.

**The integration of a derivative overlay to these High Equity Income Low Volatility solutions may improve the upside capture of the strategy without distorting its defensive characteristics.** When actively managed, this options-based overlay may enhance the return asymmetry of the strategy and may lead to a more consistent performance over the long-term.



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