

## **Crisis Risk Offset: Limited Protection, Persistent Drag**

By Ronald Lagnado, Ph.D., Director—Research

### **Summary**

The Crisis Risk Offset (CRO) strategy is widely promoted to public pension funds as a method to mitigate equity market risk. This paper highlights the ineffectiveness of CRO implementations. Using daily total return data from January 2015 to June 2025, including major drawdowns such as the COVID-19 crash (2020) and the 2022 bond market selloff, we examine portfolio outcomes under various rebalancing strategies focusing on long-duration U.S. Treasuries and trend-following CTAs, which dominate most portfolios. We find they have not been cost-effective—they have cost more per unit of a portfolio than they have reduced risk.

### **Key Findings**

- CRO allocations have been portfolio “drags” and have been both expensive and unreliable. Long-duration Treasuries only modestly reduced portfolio drawdowns in 2020 but critically failed to provide protection during the 2022–2023 selloff, while consistently dragging on long-term returns by 200–250 basis points per year.
- Trend-following CTAs slightly outperformed Treasuries in reducing volatility but offered limited downside protection, with 80/20 returns still 110–190 basis points below the all-equity portfolio.
- Calendar-based and threshold-based rebalancing had minimal impact on performance; path dependency and timing challenges made “optimal” rebalancing parameters practically unattainable.
- Diversified portfolios achieved lower volatility, but risk-adjusted returns were not meaningfully improved without substantial opportunity costs.

## Overview

The Crisis Risk Offset (CRO) strategy is an approach that consultants promote to public pension funds to improve equity market risk management. It is intended to provide protection during severe market downturns and typically combines long-duration U.S. Treasuries, trend-following strategies via CTAs, alternative risk premia, and other defensive alternatives such as long-volatility positions. In practice, most implementations are dominated by Treasuries and trend-following, which are the focus here.

As a partial hedge, most public pensions using CRO allocate roughly 90/10 or 80/20 between equities and CRO. For example, CalSTRS, the second-largest U.S. public pension fund with approximately \$370 billion in assets, targets 55% to public and private equity and 10% to its equivalent of CRO, called Risk-Mitigating Strategies (RMS)—about an 85/15 mix. The objective is to limit the impact of large market drops while maintaining participation in long-term equity growth. By concentrating on the main components—Treasuries and trend-following—we can examine how CRO is intended to smooth portfolio outcomes.

This analysis considers the performance of these two CRO components over January 2015 to June 2025, focusing on the COVID-19 crash in 2020 and the 2022 period of rapidly rising rates. The compound annual growth rate (CAGR) and maximum drawdown portfolio measures are used to assess whether they provided meaningful downside protection without significantly reducing returns. The evaluation also examines systematic rebalancing strategies, including calendar-based and threshold-based approaches with typical parameters. As the analysis shows, the results of rebalancing are sensitive not only to parameters such as rebalance frequency and trigger levels but also to the exact start date of the backtest, which can materially affect conclusions about its effectiveness.

We find that CRO strategies have not been particularly effective over the past decade. They have dragged on returns, provided only modest reductions in drawdowns, and yielded limited benefit from rebalancing, raising questions about the value of these consultant-promoted strategies in today's pension portfolios.

## Portfolio Backtesting: Methodology and Results

We backtest 80/20 portfolios using daily total return data, with the S&P 500 Index as the equity component and the Bloomberg US Long Treasury and the SG Trend Indices as proxies for the long-duration Treasury and trend-following CTA components.

We consider portfolios with no rebalancing, as well as calendar-based and threshold-based rebalancing. The calendar-based strategies rebalance either monthly (every 21 trading days) or quarterly (every 63 trading days). Threshold-based rebalancing is triggered when the equity weight hits the edge of a band centered on the 80% target weight. For example, a 5% band means a portfolio rebalance is triggered when the equity weight first reaches or rises above

85% or falls below 75%. All rebalancing is assumed to occur at the market close of a single trading day, with no transaction costs, lag or slippage.

Annual portfolio turnover for these rebalancing strategies ranges between about 20% and 80%, suggesting the transaction costs would likely be negligible. However, for large institutional investors the scale of trades could result in significant slippage and lag, particularly when adjusting allocations across multiple managed futures programs. Nevertheless, we ignore these frictions and evaluate CRO strategies in the most favorable possible way. This simplification does not alter the conclusion: these CRO diversifiers have been inefficient equity risk mitigators.

The period from January 2015 through June 2025 provides a particularly useful window for testing risk-mitigation strategies. The S&P 500 delivered a compound annual growth rate (CAGR) of 13.1% -- above the long-term average, but still reflective of the equity risk premium that inefficient risk mitigation erodes. Importantly, this period included several notable drawdowns of varying depth, duration, and speed of recovery (see Figure 1) occurring in 2018, 2020, 2022, and 2025. These episodes offer a meaningful test of risk mitigators, capturing both sharp, short-lived shocks to more prolonged selloffs and allowing for a more comprehensive assessment of whether long-duration Treasuries and trend-following CTAs can meaningfully reduce downside risk without unduly dragging on long-term returns.

We begin with long-duration Treasuries. Table 1 reports the compound annual growth rate (CAGR) and maximum drawdown for portfolios incorporating Treasuries during the most challenging periods—2020 and the extended 2022–2023 drawdown. In addition to the no-rebalancing case, we include monthly and quarterly calendar-based rebalancing, as well as threshold-based rebalancing with bands of 5%, 7.5%, and 10%, which are representative of common practice.

Table 1 shows that adding long-duration Treasuries reduced the CAGR of the 80/20 portfolio from 13.1% for the S&P 500 alone to a range of 10.6%–11.4%, depending on the rebalancing method. In other words, over the full period, the return drag was roughly 200–250 basis points annually.

During the 2020 drawdown, Treasuries provided some protection, cutting the S&P 500's –33.8% loss to about –24% to –27%. However, in the more extended 2022–2023 decline, portfolios with Treasuries performed slightly worse than equities alone, with losses clustering around –25%. This weakness was, of course, a consequence of rising inflation and aggressive Federal Reserve rate hikes, which drove bond prices lower while equities were selling off. It was also a stark reminder of the basis risk involved in hedging equities with bonds.

Differences across rebalancing approaches—monthly, quarterly, and threshold bands of 5%, 7.5%, and 10%—were minimal. While the exact figures vary slightly, the broad picture is the same: Treasuries modestly reduced drawdowns in 2020 but failed to mitigate losses in 2022–2023, while consistently reducing long-term returns.

The diversified 80/20 portfolios exhibited reduced volatility relative to equities alone, though differences across rebalancing strategies were minimal. Volatility declined from 18.2% for the S&P 500 to roughly 14–15% for the diversified portfolios, which modestly improved risk-adjusted returns as measured by CAGR/Volatility.

Of course, the improvement in risk-adjusted returns from long Treasuries has historically been much larger, highlighting the exceptional dislocation of bond markets in 2022.

**Yet even a significant boost in risk-adjusted return at the substantial cost of long-term compound return represents a Pyrrhic victory of Modern Portfolio Theory. As we often say at Universa regarding risk mitigation: the cure should not be worse than the disease.**

Turning now to 80/20 portfolios incorporating trend-following CTAs, Table 2 shows that diversification reduced the CAGR from 13.1% for the S&P 500 alone to a range of 11.2% – 12.0%, depending on the rebalancing method. This is an improvement over long Treasuries, though still with material drag in the range of 110 - 190 basis points annually. Before drawing conclusions, it is worth noting that the 27.3% total return of the SG Trend Index in 2022 was the strongest in its history dating back to 2000 – and possibly the best year for trend-following CTAs since 1990. Some managers in the late 1970s and 1980s inflation cycles posted even larger gains, but those programs were less diversified and typically far more volatile than today's benchmarked CTA programs.

The exceptional 2022 performance reflected a perfect storm of runaway inflation and a simultaneous decline in both stocks and bonds – the worst joint performance in the past century. One cannot count on such conditions repeating soon, and despite the phenomenal 2022 CTA returns, the diversified portfolio over the full period still exhibited meaningful performance drag.

Trend-following proved a limited risk mitigator over the 2015–2025 period, offering little protection during the 2020 crash and failing to capture gains in the subsequent recovery. As shown in Table 2, the trend-following allocation reduced the 33% drawdown of the all-equity portfolio to about 28%, whereas long Treasuries cut it by roughly 10%. It is well known that trend-following CTAs cannot respond quickly enough at both ends of a sharp equity drawdown cycle. In addition, flat performance in the lead-up to 2020—the so-called ‘lost decade’—and weak returns in 2024–2025 further contributed to the underperformance of the diversified portfolio.

### **Focus on Rebalancing; Can CRO strategies be monetized effectively?**

The true aim of equity risk mitigation should be to enhance compound returns relative to an all-equity portfolio. This requires monetizing hedge gains during equity selloffs to create buy-low opportunities. Achieving this effectively demands essentially near-perfect timing: a systematic strategy must trigger a rebalancing signal very close to the trough of the equity

drawdown, precisely when the hedging asset has realized gains. Over this period the only potential opportunity with long Treasuries arose during the 2020 drawdown, and, even then, exploiting it with simple rebalancing rules fared poorly—even under idealized conditions with no transaction costs and other frictions. In practice market conditions in 2020 would have made it impossible.

It goes without saying that perfect timing under a calendar-based rebalancing scheme would require sheer luck. In the case of long Treasuries, the threshold-based results are equally discouraging: both the CAGR figures in Table 1 and Figure 2 (CAGR versus various rebalancing band widths) show that, over 2015–2025, the most effective strategy was not to rebalance at all.

Figure 3 shows the evolution of the equity weight for 80/20 SPX / Long Treasury portfolios under the different rebalancing strategies. No rebalancing was the clear winner, supported by strong equity rallies, rapid recoveries, and the high equity CAGR. Frequent calendar-based rebalancing consistently sold equities into rallies and failed to trigger a well-timed rebalance at the March 2020 trough. Threshold-based rebalancing produced similar results, though wider bands allowed equities to run further during rallies.

By contrast, Table 2 shows that for trend-following CTAs the wide 10% band produced the best outcome. Beyond 10%, CAGR reverted to the no-rebalancing case. How can we explain the difference? Setting the band too wide can prevent rebalancing, but there is trade-off: a loose band lets equity weight drift higher during bull markets, while a tighter band increases the likelihood of rebalancing during drawdowns. What works best depends not only on the nature of the equity drawdown but also on the path of portfolio weights leading up to it.

Rebalancing is inherently path dependent: the same rules can produce very different outcomes depending on the starting date. Table 3 compares long-Treasury portfolio results for the full 2015–2025 window with the shorter 2020–2025 period. Table 4 provides a parallel comparison for trend-following CTAs. For long Treasuries, no rebalancing was the superior over 2015–2025, whereas a 10% band performed best when the portfolio started in 2020. In contrast, for trend-following CTAs, the 10% band was best over 2015–2025, while, surprisingly, a 5% band outperformed during 2020–2025.

Examining the evolution of equity weight clarifies these patterns. For an 80/20 SPX/Long Treasury launched in 2015, the 10% rebalancing band allowed equities to drift to 85% just before the March 2020 crash. Despite the roughly 30% S&P 500 drawdown, the equity weight never fell below 70% and no profitable rebalance occurred. Launching in January 2020, by contrast, the equity weight remained near 80% going into the crisis (Figure 4), and a 10% band triggered a near-perfect rebalance on March 23, 2020. This shifted 10% from bonds into equities, locking in profits during the recovery and producing a 12.5% CAGR through 2025.

Figures 5 and 6 show comparable equity-weight evolution for trend-following CTAs. A portfolio launched in 2015 with a 10% band triggered a near-perfect rebalance in 2022, allowing equities to drift beneficially to 90% and then, almost miraculously, return to 80% just prior to

the equity downturn. Launching in 2020, a 5% band proved optimal, as the equity weight never exceeded 10% during the steady selloff.

These results underscore how strategies that appear ineffective over a long horizon can seem favorable—or unfavorable—when measured from a different starting point, highlighting the fragility of backtest-based conclusions.

**Searching for an “optimal” rebalancing parameter is little more than data mining; without a stroke of luck, past performance is unlikely to predict future success. Once again, Modern Portfolio Theory’s prescription for equity risk mitigation—via diversifiers and rebalancing—risks destroying, rather than creating, wealth for investors.**

## Conclusions

**Over the 2015–2025 period, CRO strategies reduced long-term compound returns for a portfolio, while only providing limited risk mitigation.** Long-duration Treasuries offered some protection during the sharp but short-lived drawdown in 2020, yet both failed to protect as interest rates rose in 2022 and imposed extreme opportunity costs in rising markets. Trend-following CTAs delivered modest smoothing of equity volatility but could not reliably capture gains during crises or recoveries, while incurring similar opportunity costs in rising markets.

Systematic rebalancing strategies proved largely ineffective, as portfolio outcomes were highly path-dependent and required near-perfect timing to materially enhance returns. These results suggest that the widespread adoption of CRO allocations may offer a false sense of protection, and investors should carefully weigh the trade-off between modest drawdown mitigation and the persistent drag on long-term equity performance.

Figure 1

### SPX Drawdowns 2015 - 2025

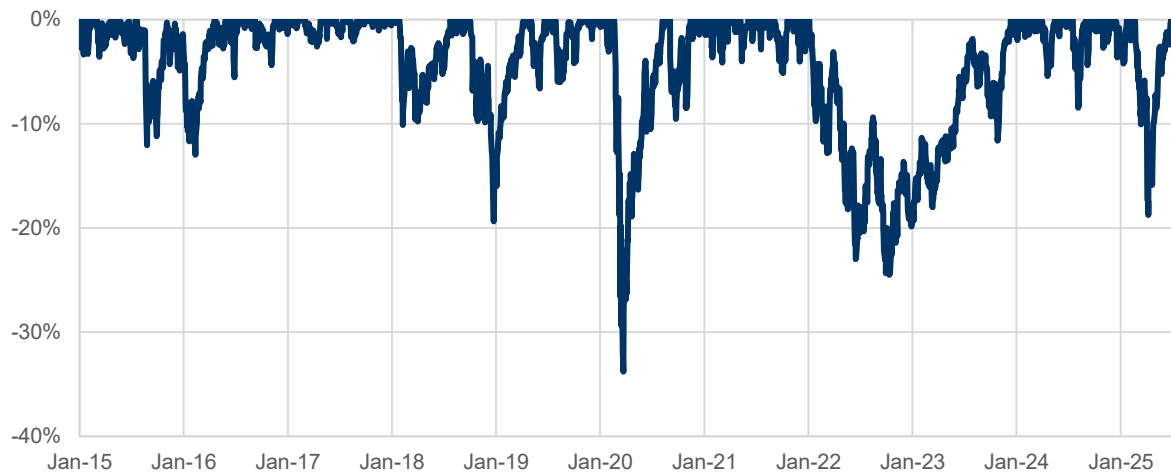


Table 1

| 80/20 SPX / Long Treasury: 2015 - 2025 |        |              |                   |                     |                   |                     |                    |
|----------------------------------------|--------|--------------|-------------------|---------------------|-------------------|---------------------|--------------------|
|                                        | SPX    | No Rebalance | Monthly Rebalance | Quarterly Rebalance | 5% Band Rebalance | 7.5% Band Rebalance | 10% Band Rebalance |
| <b>CAGR</b>                            | 13.1%  | 11.4%        | 10.6%             | 10.8%               | 10.7%             | 10.7%               | 10.9%              |
| <b>2020 Drawdown</b>                   | -33.8% | -26.7%       | -25.4%            | -24.4%              | -25.4%            | -26.7%              | -26.7%             |
| <b>2022-2023 Drawdown</b>              | -24.5% | -25.1%       | -25.5%            | -25.6%              | -25.4%            | -25.5%              | -24.6%             |
| <b>Volatility</b>                      | 18.2%  | 15.1%        | 14.2%             | 14.1%               | 14.3%             | 14.6%               | 14.8%              |
| <b>CAGR/Volatility</b>                 | 0.72   | 0.75         | 0.75              | 0.76                | 0.75              | 0.74                | 0.74               |

Table 2

| 80/20 SPX / Trend Following: 2015 - 2025 |        |              |                   |                     |                   |                     |                    |
|------------------------------------------|--------|--------------|-------------------|---------------------|-------------------|---------------------|--------------------|
|                                          | SPX    | No Rebalance | Monthly Rebalance | Quarterly Rebalance | 5% Band Rebalance | 7.5% Band Rebalance | 10% Band Rebalance |
| <b>CAGR</b>                              | 13.1%  | 11.6%        | 11.2%             | 11.3%               | 11.3%             | 11.2%               | 12.0%              |
| <b>2020 Drawdown</b>                     | -33.8% | -30.0%       | -27.8%            | -27.5%              | -28.6%            | -27.6%              | -30.0%             |
| <b>2022-2023 Drawdown</b>                | -24.5% | -18.8%       | -15.1%            | -15.1%              | -15.0%            | -15.2%              | -13.7%             |
| <b>Volatility</b>                        | 18.2%  | 15.8%        | 14.7%             | 14.6%               | 14.9%             | 14.8%               | 15.4%              |
| <b>CAGR/Volatility</b>                   | 0.72   | 0.73         | 0.76              | 0.77                | 0.76              | 0.76                | 0.78               |

Figure 2

**80/20 SPX - Long Treasury  
CAGR vs. Rebalance Band: 2015 -2025  
100% SPX CAGR = 13.1%**

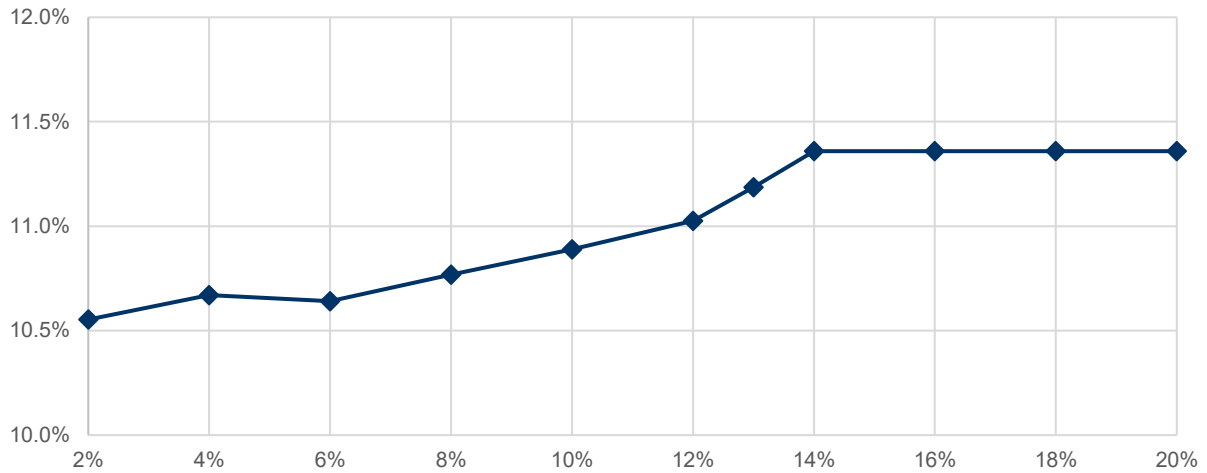


Table 3

| 80/20 SPX / Long Treasury |       |              |                   |                     |                   |                     |                    |
|---------------------------|-------|--------------|-------------------|---------------------|-------------------|---------------------|--------------------|
|                           | SPX   | No Rebalance | Monthly Rebalance | Quarterly Rebalance | 5% Band Rebalance | 7.5% Band Rebalance | 10% Band Rebalance |
| 2015 -2025 CAGR           | 13.1% | 11.4%        | 10.6%             | 10.8%               | 10.7%             | 10.7%               | 10.9%              |
| 2020 – 2025 CAGR          | 14.3% | 11.6%        | 10.8%             | 11.1%               | 11.1%             | 11.7%               | 12.5%              |

Table 4

| 80/20 SPX / Trend Following |       |              |                   |                     |                   |                     |                    |
|-----------------------------|-------|--------------|-------------------|---------------------|-------------------|---------------------|--------------------|
|                             | SPX   | No Rebalance | Monthly Rebalance | Quarterly Rebalance | 5% Band Rebalance | 7.5% Band Rebalance | 10% Band Rebalance |
| 2015 -2025 CAGR             | 13.1% | 11.6%        | 11.2%             | 11.3%               | 11.3%             | 11.2%               | 12.0%              |
| 2020 - 2025 CAGR            | 14.3% | 12.7%        | 12.9%             | 13.1%               | 13.3%             | 12.7%               | 12.7%              |



Figure 4

**80/20 SPX - Long Treasury  
Equity Weight: 2015 -2025**

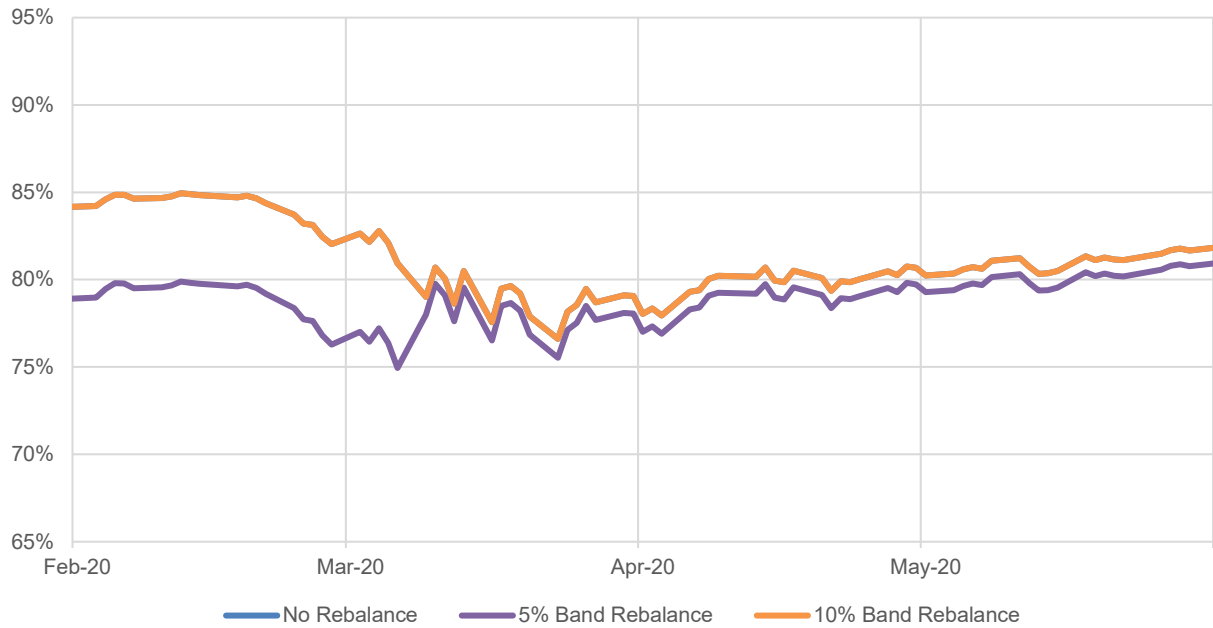


Figure 5

**80/20 SPX - Long Treasury  
Equity Weight: 2020 -2025**

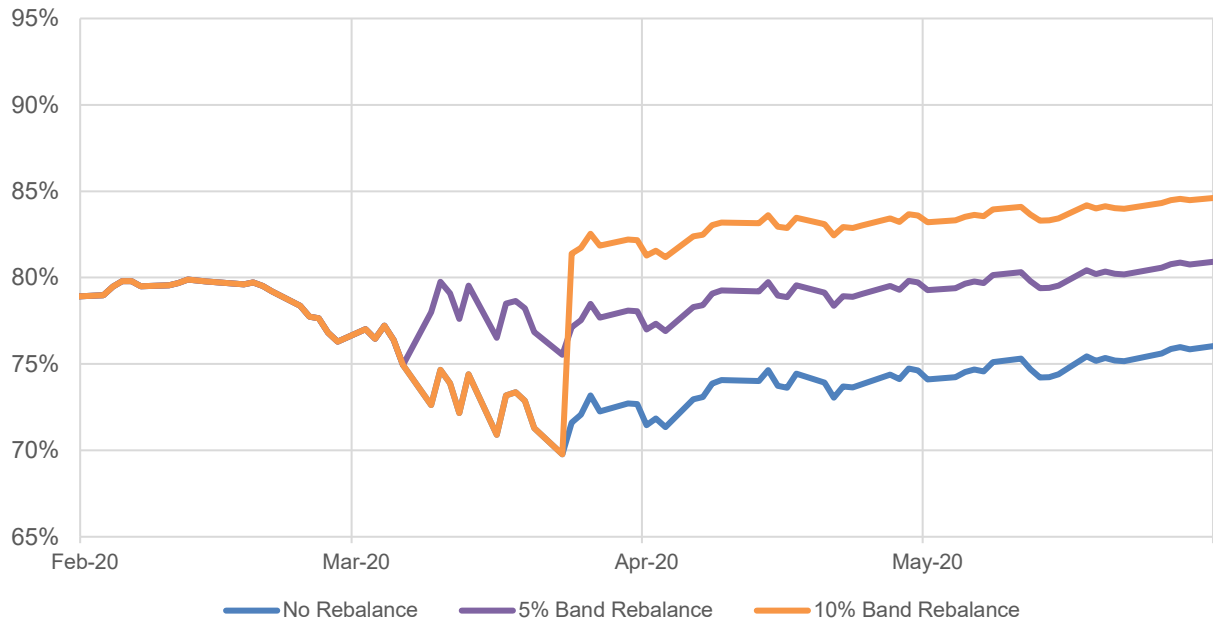


Figure 6

**80/20 SPX - CTA**  
**Equity Weight: 2015 - 2025**



Figure 7

**80/20 SPX - CTA**  
**Equity Weight: 2020 - 2025**



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