

# The Winter's Tail - Protecting Against Equity Selloffs

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## Abstract

The health crisis that started its grip on the world at the beginning of 2020 shook the financial markets in February and March, leading to sudden and massive declines in the equity markets. Investors with long equity exposure saw gains that had accrued over years wiped out in mere weeks. While the markets have recouped a significant amount of these losses in the medium term since, the crisis has brought renewed interest to investments and investment strategies that can offer effective portfolio protection in such tail risk events. In this note we compare and contrast several investment approaches by assessing their long-run and crisis performance. We find that all of them deliver protection to some extent, allowing an investor to determine which approach is most suited as an addition to their particular portfolio.

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## 1. Introduction

While sudden market selloffs are difficult if not impossible to predict, it is all but certain that - eventually - the next one will occur. Such relatively rare dramatic market moves are typically termed *tail events*, and generally they refer to selloffs in the equity markets as the most ubiquitous financial asset. We can define historical crises using equity market drawdowns of a certain magnitude. In Table 1, using the Dow Jones Industrial Average (DJIA) as a proxy, we show the duration and magnitude of historical crises that were accompanied by drawdowns of at least 20%. Note that the latest crisis stands out in the speed with which the drawdown occurred.

Drawdowns of such large magnitude are relatively infrequent, with 'only' three instances in this millenium. Lowering the threshold to 9%, which still represents a significant market decline, we find ten drawdowns of this magnitude or larger since 1995. At this rate, protecting one's portfolio against equity market selloffs becomes more than a nice-to-have. In this note we will take a look at some common hedges against tail events.

Date	Duration	Magnitude
November 1916	269	40%
November 1919	456	47%
September 1929	849	89%
December 1961	135	27%
February 1966	1053	37%
January 1973	482	45%
August 1987	39	36%
July 1990	62	21%
January 2000	686	38%
October 2007	356	54%
February 2020	33	37%

**Table 1.** Characteristics of historical crises, defined as equity market selloffs using the DJIA as a proxy. Tabulated are the duration, in days, and the depth of the drawdown from peak to trough.

## 2. Hedging Tail Risk

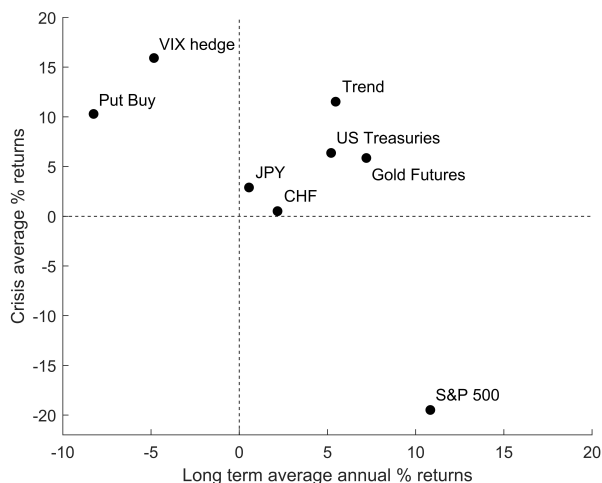
A diversified portfolio balances the risks arising from its various components to generate a higher and more consistent return than any of these components alone. If equities form part of a portfolio, history suggests that it is beneficial to hedge portfolio exposure against extended declines in the equity markets.

A variety of different approaches can be pursued to achieve diversification. Considering a baseline simple long equity portfolio, represented by the S&P 500, we can sort all considered strategies into five potential categories:

- *Bonds* could be a suitable complement to an equity investment. We consider the Bloomberg Barclays U.S. Treasury Bond Index.
- *Safe havens* such as the Yen and the Swiss Franc, as well as Gold, often deliver relatively uncorrelated returns.
- *Equity options* are a direct hedge against market declines. By adding put options to their portfolio, investors profit when equities sell off. We use the CBOE S&P 500 PutWrite Index to derive returns for its mirror 'Put Buy' strategy.
- *Volatility products* provide protection by virtue of the negative correlation between equity returns and equity volatility. We include a VIX (which references the S&P 500) hedge in our analysis, providing a negative delta on a rolling basis.
- *Trend-following* is symmetric in that it can deliver positive returns in both rising and declining markets. The SG Trend Index is representative of the ten largest trend-followers in the managed futures space.

## 3. Analysis

To assess the effectiveness of a range of investments in providing portfolio protection during equity market declines, we calculate their average total return during market crises - defined by DJIA



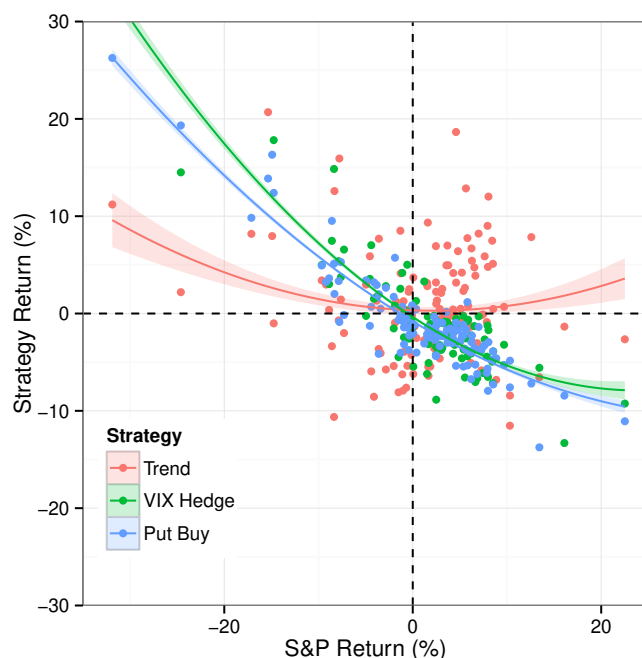
**Figure 1.** Average crisis returns and long term average annual returns for a variety of investments.

drawdowns of at least 9% - going back to 1995. For a given level of downside protection, a larger average long term annual performance is of course desirable; we thus plot these average crisis total returns against long term annual returns in Figure 1. We include the performance of the S&P 500 itself, which is around 11% annually, but of course is fully exposed in times of crisis, averaging losses of nearly 20% across these events.

US Treasuries, represented by the Bloomberg Barclays U.S. Treasury Bond Index, provide reasonable protection during crises, with an average total return of 7%. Despite the bond rally over the last decades, which arguably may not persist for the same amount of time going forward, their long term return is lower than that of the equity index, a direct result of their lower volatility of 4.7% in our data, compared to 18.9% for the S&P 500 (all volatilities are annualized). In a risk-parity portfolio the bond position would be increased compared to the equity position, to balance this mismatch in volatilities. Note also that the protection provided in our data sample is driven by the ‘typical’ negative correlation between equities and bonds. While oft cited, this correlation structure is not necessarily present, and can revert. In that case equity drawdowns in a portfolio would be exacerbated by the presence of bonds.

The safe haven currencies Yen and Swiss Franc are similar, yielding only modest long term returns and protection. For the data considered, the Yen outperforms the Swiss Franc in providing better protection, but this comes at the cost of lower long term returns. Their volatilities are very similar, at 9.9% and 10.8%, respectively. To many investors Gold is maybe the ultimate safe haven - born out here by good performance in the long run, as well as downside protection of comparative magnitude to the US Treasuries, outperforming both currencies. Note that the volatility for Gold is higher at 17.3%, however.

Considering the option hedge, we find that our Put Buy strategy does deliver during times of crisis, but has significant negative long term performance (its volatility is 12.9%). This is not surprising, as put options expire worthless when the underlying is out-of-the money at maturity, making them an expensive hedge.



**Figure 2.** Strategy returns versus S&P 500 returns for trend-following, the Put Buy and the VIX hedge. The fitted line is convex, reflecting the protection these strategies provide when the S&P 500 posts negative returns.

The VIX hedge stands out in the average return it provides during equity market drawdowns. As noted above this is a result of the negative correlation between the VIX and the S&P 500, which is almost structurally given, meaning that it will persist going forward. Its long term performance is still negative, but less so than for the Put Buy. Its volatility is 11.8%.

Finally, trend-followers have performed well during market crises, with average returns of 11% at a volatility of 13.1%, as they are able to go short in downward trending markets. They can of course also realize positive returns when equities are trending up, leading to similar long term returns as for US Treasuries.

Another way of looking at the protection these approaches afford, is to view their returns against those of the S&P 500 in a scatter plot. Ideally we would like to see a ‘smile’ emerge, indicating that the strategies make money regardless of the sign of the returns of the S&P 500. This is illustrated in Figure 2 for trend-following, the Put Buy and the VIX hedge.

#### 4. Conclusion

We studied several representative financial indices and instruments from different asset classes, which all typically provide tail risk protection in the event of an equity selloff. Analyzing their total returns during crises, and comparing with that of the S&P 500, we find that all considered strategies offer downside protection when needed. While they generally do so at the cost of sacrificed long term performance when compared to the equity index itself, there is some differentiation in the balance between long term performance and crisis protection, suggesting that some approaches may be more suitable for certain investors than others.

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