Viewpoints

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Is Now the Right Time to Hedge Tail Risk?



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The recent financial turmoil has brought the issue of tail risk back into the spotlight. Many investors realize the importance of putting a strategy in place which offers some measure of downside protection in the event of a large, unforeseen market shock. However, the recent volatility has driven up the price of tail risk hedges, leaving many investors to wonder if this is a good time to buy tail risk instruments. Are options currently too expensive to make tail risk hedging worthwhile?

We suggest investors consider the broader context, and focus on three key questions when assessing the cost of tail hedging:

1. Should tail risk hedging be part of the strategic asset allocation?
2. How much downside risk can you tolerate after the recent market moves?
3. Is tail risk hedging expensive on a forward-looking basis?

Addressing these questions will help investors create a robust analytical framework to facilitate their tail risk hedging decision-making. It is our belief that most institutional investors will conclude tail risk hedging makes sense as part of their strategic asset allocation. Depending on risk tolerances and market views, investors may decide to either start implementing hedges now, phase the tail risk strategy in over a period of time, or put the infrastructure in place now and defer implementation until market conditions change.

The cost of hedging has indeed increased over recent months, but it still remains significantly lower compared to the end of 2008 (see Figure 2). Furthermore, if we are undergoing a longer-term structural change then current pricing might turn out to be fair or even cheap. Additionally, not all hedges have equally increased in value, giving investors the option to reduce the cost of their hedges by considering both direct and indirect hedges. It is therefore questionable if tail risk hedging is too expensive currently. We believe that for many investors, it may be the right time to implement a hedging strategy.

Should tail risk hedging be part of strategic asset allocation?

It is important to recognize that while traditional diversification strategies may help investors reduce volatility in normal market conditions they generally fail during extreme events when asset class correlations increase and render diversification strategies less effective. We believe explicit tail risk hedging should be an integral part of asset allocation not just to mitigate the effects of a tail event but to perhaps even benefit from it. Tail risk hedging may allow certain investors to maintain an allocation to risk assets where they might otherwise deem the position to be too risky and it can also help stabilize portfolios on a mark-to-market basis. It can create liquidity should the value of the portfolio increase in periods of market stress, which may allow investors to switch from defensive to offensive strategies to take advantage of distressed asset prices.

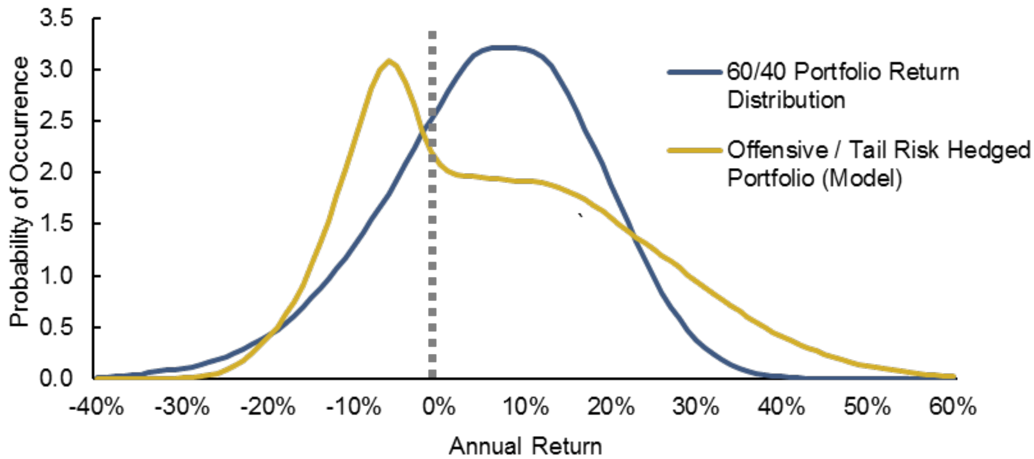
If managed effectively, we believe tail risk hedging can add value to portfolios over a longer investment horizon. This involves actively managing the portfolio of hedges, continuously looking for hedges that align with an investors cost budget, and provide effective protection in the tails while actively monetizing any gains.

Recent history has demonstrated that tail events occur with more frequency than most risk models would suggest. Quantitative risk models typically rely on normal return distribution patterns, which do not capture “fat” tails where the probability of extreme events is greater than indicated by a normal distribution. This creates a conundrum for most investors because on the one hand they want and need to take risk to generate excess returns but on the other hand they do not have the capacity to absorb significant portfolio losses. Traditional approaches tend to either chase returns and bear the risk or de-risk and accept the lower rewards. Unfortunately, most investors adopt the first approach when times are good and markets are calm and de-risk when markets selloff. As a result, investors often end up holding risky assets when returns are low and transition to relatively safer assets when they tend to be expensive.

PIMCO has written several articles on the potential benefits of tail risk hedging. In a paper published in April 2010 entitled, *Offensive Risk Management: Can Tail Risk Hedging be Profitable?,* Vineer Bhansali and Josh Davis explain how tail risk hedging affords the opportunity of awarding investors a larger allocation to equities while retaining a similar downside risk profile as a typical 60/40 stock/bond portfolio.

This is illustrated in Figure 1, which shows that a hypothetical portfolio incorporating a tail risk hedging strategy has a higher estimated return (7% versus 6%) for the similar amount of volatility.

Comparison of Portfolio Return Distributions



	60/40 Portfolio[1]	Offensive / Tail Risk Portfolio[2]
Estimated Return	6%	7%
Volatility	12%	16%
Downside Volatility	8%	5%
Upside Volatility	8%	12%
10th Percentile	-11%	-11%
90th Percentile	21%	30%

[1] Based on an allocation of 60% equities (S&P 500) and 40% Treasuries (Citigroup 3-Month T-Bill), with a risk premium on equities of 5% per year, 1 January 1990 – 1 March 2010.
[2] Based on an iterative optimization (varying increases of equity allocation above 60% and different strikes on an S&P put option hedge) to match estimated value of losses greater than 5% in the first portfolio (blue line). Estimated value of losses is defined as the probability of losses greater than 5%, multiplied by the magnitude of those returns. While the median return of the second portfolio (yellow line) is lower, its estimated return (probability multiplied by magnitude of returns) is higher, with a fatter right tail compensating for the shift of the median to the left.

Source: PIMCO, "Offensive Risk Management: Can Tail Risk Hedging Be Profitable?", April 2010, Vineer Bhansali and Joshua M. Davis.
Hypothetical example for illustrative purposes only, January 1, 1990 -March 1, 2010. (Fees and/or expenses are not included in the annual return).

Figure 1

Based on PIMCO's long-standing experience managing tail risk portfolios, we believe such strategies may be useful in providing liquidity in times of market stress, should the underlying hedge position gain in value and the investor chooses to liquidate it. This could allow an investor the opportunity to take advantage of other investment opportunities and buy while other investors may be forced to sell. We think hedging can add value to a portfolio by being both a defensive and offensive play.

Despite the benefits tail risk hedging may provide, investors sometimes fear that the cost will be a drag on performance and therefore undo the benefits. A tail risk hedging program involves a cost budget (typically 0.5% to 1% of the total portfolio depending on portfolio composition and level of protection) each year to purchase hedges against an extreme event. In years where no such event occurs, the investor forfeits this cost budget but in the years where an extreme event does occur, the payoff has the potential to be several multiples of the cost budget. Therefore, although tail risk hedging may be a drag on returns over the short term, over the longer term it may pay for itself or even act as a source of positive returns (should a tail event occur and dependent on the hedges held). Furthermore, the cost of hedging can be reduced through active management (this savings may be reduced or eliminated based on active manager fees) using both direct and indirect hedges as it allows for the flexibility to monitor relative value between hedges and monetize any gains.

At any point in time, direct hedges such as equity put options to hedge equity portfolios may be more expensive than other indirect hedges such as credit derivatives that are likely to be highly correlated to equities in the tails. This is because during periods of systematic stress, correlation and volatility is heightened, forcing indirect hedges to move in the same direction as direct hedges. In other words, indirect hedges can often better mitigate the cost of tail risk hedging. An active manager such as PIMCO may be able to identify cost effective hedging solutions to create an effective mix based on market conditions.

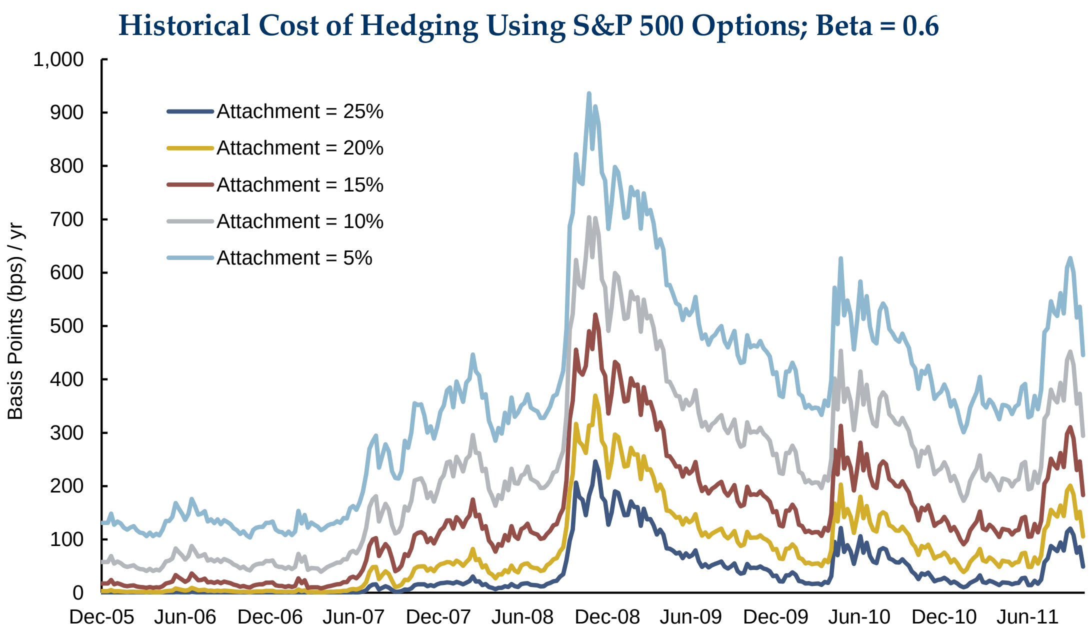
How much downside can you tolerate?

While many investors may agree with the concept of tail risk hedging, most are still sensitive to the entry levels. PIMCO believes this ought to be considered in a similar fashion to any other allocation. As with all investment opportunities, there will be times when an asset class looks relatively rich or cheap compared with historical levels. However, in the current climate where many portfolios have experienced significant volatility for the year and pension funding positions have deteriorated, can investors withstand an additional 10, 15 or even 20% decline? The answer will no doubt differ from investor to investor but for many, the recent market selloff has inadvertently reduced their pain threshold. Tail risk hedging has the potential to produce a better risk/return trade-off than reducing risk by selling equities and other risky assets despite its higher option premiums.

Is tail risk protection expensive on a forward-looking basis?

Option prices have increased from earlier this year, yet premiums are still trading significantly below their 2009 highs. In Figure 2, we look at how the cost of a direct (equity) hedge of a 60/40 portfolio differs depending on the level of protection required (attachment points). For example, a 15% attachment point will hedge the portfolio against losses greater than 15%. It clearly shows the price of hedging increases with a spike in volatility and a selloff in risk assets. This can also be seen in the most recent market turmoil as the cost of the direct hedge has increased from about 1.5% in June to close to 2.0% at the end of October (for a 15% attachment point). This, however, is still significantly lower than the costs of protection in late 2008 to early 2009 when costs rose as high as 5%.

It is also worth noting that not all hedges have moved uniformly. For example, the implied volatility of deep out-of-the-money puts has risen by more than at-the-money puts. Additionally, implied volatilities on different equity market segments have moved differently while the cost of hedges in other asset classes has not risen as much. Although the cost of direct hedges has grown meaningfully there are ways to lessen the cost. For example, an investor might consider buying put spreads instead of outright puts, or buying hedges on different equity indices, credit default swaps index tranches or foreign exchange. Of course each investment option has its own unique risks which need to be carefully managed.



Source: PIMCO, Bloomberg, 28 October 2011

Figure 2

The cost is based on the S&P 500 put options with 1 year maturity, S&P level of 1150, S&P 500 beta of 0.60, and strike price.

Do we think hedging costs are excessive? Only the future will tell for sure but we do believe that market volatility will be higher in the post-financial crisis New Normal environment. There are clear downside risks in the current environment, with policymakers in the U.S. and Europe divided and the developed world at risk of slipping back into recession. A tail event is by no means our central expectation but we believe the probability of such an event happening has definitely increased. So it is justified that hedging costs have moved higher, and if we are undergoing a secular structural change then current costs may turn out to be fair or perhaps even cheap.

About The Authors

Vineer Bhansali, Ph.D., is a managing director and portfolio manager in the Newport Beach office. He currently oversees PIMCO's quantitative investment portfolios. From 2000, he also headed

PIMCO's firmwide analytics department. Prior to joining PIMCO in 2000, he was a proprietary trader in the fixed-income trading group at Credit Suisse First Boston and in the fixed income arbitrage group at Salomon Brothers in New York. Previously, he was head of the exotic and hybrid options trading desk at Citibank in New York. He is the author of numerous scientific and financial papers and of the books "Bond Portfolio Investing and Risk Management," "Pricing and Managing Exotic and Hybrid Options," and "Fixed Income Finance: A Quantitative Approach." He currently serves as an associate editor for the International Journal of Theoretical and Applied Finance. He has 21 years of investment experience and holds a Ph.D. in theoretical particle physics from Harvard University. He has a master's degree in physics and an undergraduate degree from the California Institute of Technology.

Tina Adatia, CFA, is a vice president and product manager in the London office focusing on investment solutions. She joined the firm as an account associate supporting PIMCO's client servicing team in the London office and subsequently moved to Newport Beach as a global product associate. Prior to joining PIMCO in 2004, she was on the consultant relationship team at Henderson Global Investors and was also an investment associate at Hewitt in London. She has nine years of investment experience and holds an undergraduate degree from the University of Southampton.

Jeroen van Bezooijen is a senior vice president and product manager in the London office. He is responsible for PIMCO's European solutions business which includes strategies such as liability-driven investing and tail risk hedging. Prior to joining PIMCO in 2008, he was an executive director in the pensions and insurance strategy group at Goldman Sachs where he focused on developing asset-liability solutions for pension funds and insurers in the Benelux. Prior to that, he worked at Morgan Stanley and at Mercer Investment Consulting. He has 15 years of investment experience and holds master's degrees in both economics and econometrics from Erasmus University Rotterdam.

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