

*Seeking cost-effective tail-risk hedging opportunities across multiple asset classes*

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## Taking the Sting out of the Tail: Hedging Against Extreme Events

Investors are still smarting from losses that—according to widely held statistical assumptions—should have been almost impossible. And they want protection against a repeat of such shocks in the future. We believe that the right tail-risk hedging strategy can offer a solution.

In our experience, many investors remember 2008 as the year when diversification failed. The global financial crisis caused historical relationships between many asset classes to break down and correlations to rise, so that even carefully diversified portfolios suffered. Since then, recurring volatility has driven investors to seek strategies that provide better protection, particularly in periods of extreme market stress or “tail risk.”

The notion of tail risk refers to the “tail” associated with a normal (“bell curve”) distribution of returns. Most returns are clustered around the average, but some fall well beyond the average (*Display 1, next page*). A tail-risk event is defined as

the probability of an investment’s return moving more than three standard deviations above or below the average in a given period. Assuming a normal distribution of returns, the likelihood of a three-standard-deviation event is roughly 0.3%, or three times in every 1,000 occurrences. And the probability of a negative tail event is half that number.

The idea of buying protection against such a rare occurrence seems counter-intuitive, but history shows that real-world returns have not always behaved like a normal distribution. This is illustrated by the pattern of daily returns for the S&P 500 from January 1928 through July 2011. In a normal distribution, a negative tail event should have

occurred on about 28 days since 1928. In reality, extreme losses occurred about seven times as often, on 198 days.

Portfolios are traditionally structured to cope with “normal” levels of volatility, usually in line with a long-run historical average, so portfolio construction and sources of diversification often fall short of expectations in periods of extreme market stress. The average 60/40 portfolio lost more than 29% in the year ending February 28, 2009.<sup>1</sup> Compounding the pain was the challenge of winning back lost ground: when a \$100 investment declines to \$70 (a loss of 30%), investors need to generate a 43% return just to break even.

In recent months, more of our clients have been asking about protection strategies—whether they own traditional stock-and-bond portfolios or more complex asset classes such as hedge funds. We think that when diversification falls short, tail hedging can be a solution. There are many ways to approach tail hedging, ranging from a simple purchase of “insurance” via put options to a portfolio of volatility-focused strategies that spans multiple asset classes.

<sup>1</sup>60% S&P 500 and 40% Barclays Capital US Aggregate Index, rebalanced monthly  
Source: Barclays Capital, S&P and AllianceBernstein

## Equity Put Options Are Straight-forward but Can Be Costly

One popular way of hedging tail risk is to purchase equity put options. These give the owner of the contract the right to sell at a specified price—effectively helping to put a floor under potential losses if stock prices fall significantly. A

common approach is a “buy and hold” strategy with out-of-the-money put options (the strike price is below current equity prices).

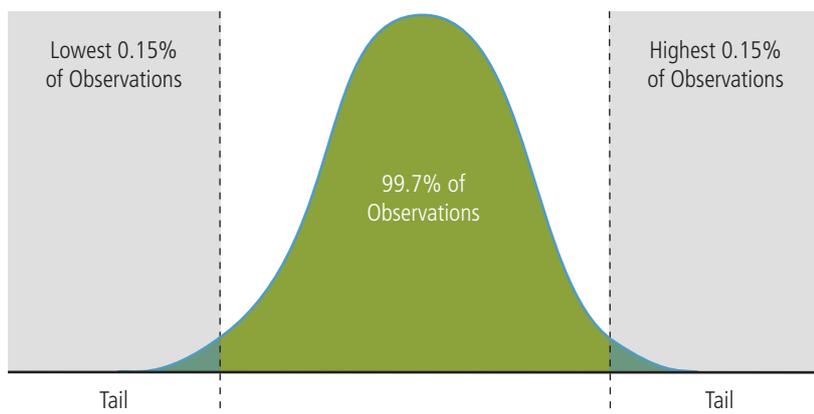
The value of a put option is driven by price movements and volatility. A fall in equity prices below the strike price or a

rise in volatility would increase the value of the option.

Put options can be an expensive way to hedge because the seller requires a risk premium. The option also has a time-value component, becoming less valuable as it approaches expiration (this makes intuitive sense: as time passes, the probability of stocks making a major move decreases). This decay accelerates as the contract gets closer to expiration.

Display 1

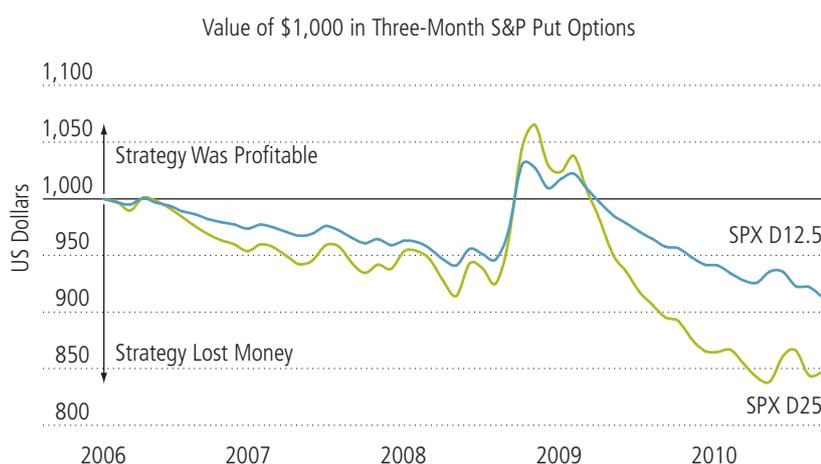
### Tail Risk in Theory: A Normal Distribution



Source: AllianceBernstein

Display 2

### Put Options: A Naive Buy and Hold Strategy Can Be Expensive



February 2006–September 2010

SPX D25 represents a passive strategy where an investor buys and holds a three-month 25 Delta put option on the S&P 500, holding until maturity and enters a new transaction on each consecutive expiration date. SPX D12.5 represents a passive strategy where an investor buys and holds a three-month 12.5 Delta put option on the S&P 500, holding until maturity and enters a new transaction on each consecutive expiration date.

Source: Bloomberg, S&P and AllianceBernstein

Because of this decay effect, a buy and hold strategy that entails rolling from one contract into the next on expiration has not always yielded the results an investor might expect. *Display 2* shows the value of a \$1,000 investment in two out-of-the-money put option strategies. From February 2006 through February 2008, a buy and hold strategy would have detracted from portfolio performance. While falling share prices and rising volatility made the option position more valuable during the depths of the crisis, a “return to normal” saw those gains given back by the first quarter of 2009. So this was a relatively inefficient way of achieving a few months’ worth of downside protection.

### A More Nuanced Approach: Identifying Shared Drivers of Risk

In some ways, returns are about difference while risk is about similarity. For return-focused managers, success often lies in identifying differentiating factors between investments. Traditional long-only investors look at distinct opportunities in and between different asset classes.<sup>2</sup> And they focus on different fundamentals: for example, equity investors might look at earnings growth while corporate bond investors are more interested in the ability to repay debt.

<sup>2</sup>For a more detailed discussion of this subject, see *Seeking Asymmetric Returns: Improving the Odds of Investment Success*, JJ McKeon, Director of Absolute Return Strategies and Michael Ning, Senior Quantitative Analyst, July 2011, [www.alliancebernstein.com/solution/risk](http://www.alliancebernstein.com/solution/risk).

But for managers with a risk focus, the answers often lie in the similarities. For example, as recent events illustrate, volatility is a common link between asset classes (*Display 3*), and the returns on different asset classes can be highly correlated in times of crisis.

Under normal circumstances, different asset classes are driven by different sets of factors, which is what makes them good diversifiers. But there is usually an overlap; for example, the prices of most assets are influenced by macroeconomic factors such as interest rates and GDP growth. In a crisis, the usual drivers of performance may be superseded by new factors that affect all asset classes in a similar way.

For example, changes in market liquidity can affect multiple asset classes at once. And given that many assets exploit some kind of risk premium—such as the value premium in equities or the interest-rate differential (“carry”) between currencies—when risk aversion spikes, the returns from most active strategies suffer.

As a result of these relationships, we believe one of the keys to success is to be volatility centric—in other words, to identify cost-effective ways in which an investor can be “long volatility.”

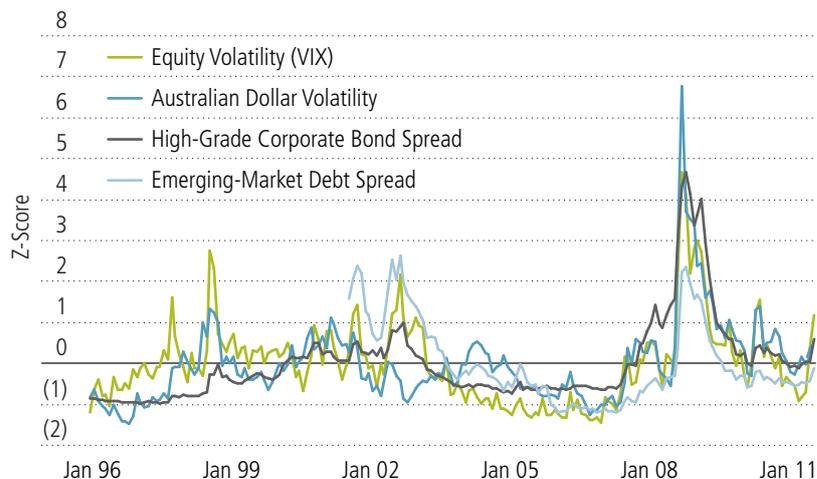
### Ways to Go “Long Volatility”

When investors own assets that carry a risk premium, such as emerging-market currencies or high-yield bonds, we think of them as being “short volatility” because when volatility rises, they are likely to lose money.

The goal is to identify investments and instruments that are highly price sensitive and can be used to balance these exposures. In this way, when volatility spikes, gains from tail-risk hedging should help to offset losses that accrue in

Display 3

### Volatilities Are Highly Correlated



Through March 31, 2011

Historical analysis is not a guarantee of future results.

All time series are shown in Z-score units, standardized for the period January 1996–August 2011. A Z-score is a measure of the distance from the mean of a distribution normalized by the standard deviation of the distribution.

Z-scores help quantify how different from normal a recorded value is.

Equity volatility is represented by the CBOE Volatility Index (VIX), Australian dollar volatility by one-month implied volatility on AUD/USD, and debt volatilities by option-adjusted spreads on the Barclays Capital US Corporate Index and Barclays Capital Emerging Markets Index.

Source: Bank of America Merrill Lynch, Barclays Capital, Bloomberg and Chicago Board Options Exchange

a portfolio during periods of market turbulence. We believe that the best results can be achieved by seeking hedging strategies across multiple asset classes, dynamically allocating funds across these opportunities in a way that seeks to minimize the cost of implementation. Examples of such strategies include:

- In equities, put options benefit when equity prices fall and volatility rises. As discussed earlier, a pure buy and hold strategy can be expensive. But there are more cost-effective ways to use put options. For example, unnecessary costs can often be avoided by taking a more active approach, in which the manager continuously monitors volatility curves and rolls out of one position into another well before the expiration date.
- Call options on equity volatility (such as options on the Chicago Board Options Exchange VIX index) benefit when volatility rises.
- In currencies, options can be used to construct strategies. One example is an “anti-carry” trade that takes a long position in low-yielding currencies like the Japanese yen and a short position in a high-yielding currency like the Australian dollar. The idea is that higher-yielding currencies typically underperform safe-haven currencies when market participants get more risk averse.
- In fixed income, interest-rate swaps can be used to take interest-rate exposure (duration) so that the portfolio benefits when yields fall, for example when panic triggers a flight into Treasuries.

Interest-rate swaps can be used to construct a yield-curve flattener—for example, a short position in two-year yields and an equal long position in 10-year yields. Yield curves tend to flatten in an economic crisis, with

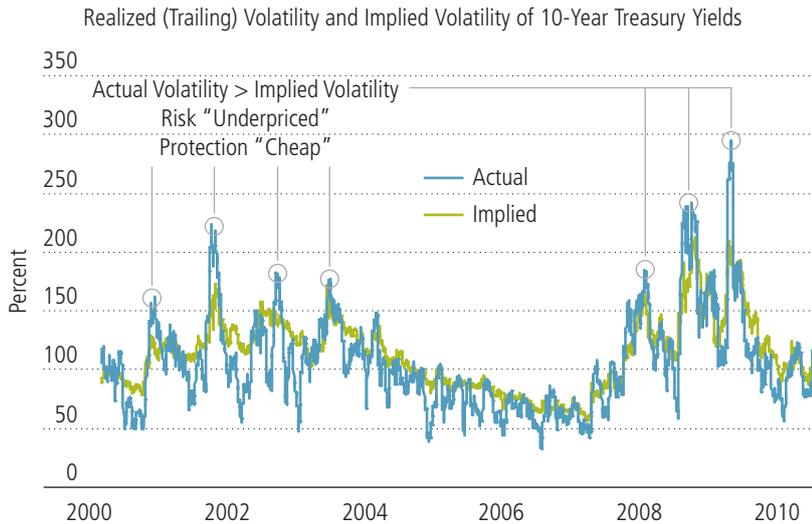
longer maturities outperforming as growth and inflation expectations fall.

In credit, credit default swaps (which function like put options) benefit if corporate bond values fall. Credit

default swaps can also be purchased to insure against default in different tranches of a basket of liquid securities. Insurance against the first five defaults costs more than insurance against defaults by the next five and so on, because the likelihood of many companies failing is lower. In a stable economy, it can be very cost-effective to buy insurance against an extreme scenario.

Display 4

**Implied and Actual Volatility Can Diverge Significantly**



April 2000–September 2010  
 Implied volatility as represented by three-month options on 10-year swap rates  
 Source: Bloomberg and AllianceBernstein

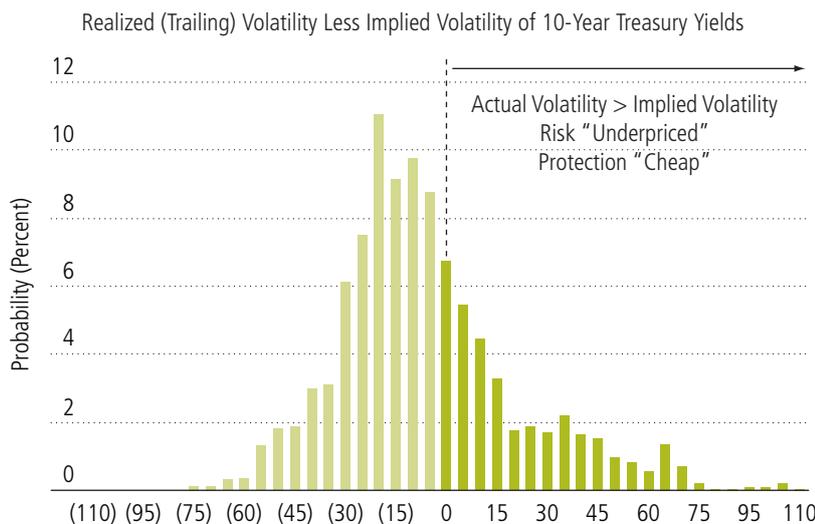
**Protection at the Right Price**

Like any other asset class, some of the instruments that provide protection are more expensive than others, and in-depth research can identify pricing anomalies and opportunities.

While different asset classes tend to experience similar levels of volatility at times of extreme market stress, there can be a wide dispersion under more normal market conditions. This implies that while all forms of tail-risk protection become expensive in a crisis, for the rest of the time the cost of tail hedging strategies can vary greatly. So it is a question of identifying where protection is most reasonably priced.

Display 5

**Distribution of Differences Shows That Tail Risk Can Be Cheap**



April 2000–September 2010  
 Implied volatility as represented by three-month options on 10-year swap rates  
 Source: Bloomberg and AllianceBernstein

Taking an example from the interest-rate options market, *Display 4* shows the actual volatility of 10-year Treasury yields since 2000, compared with the level of volatility implied by option pricing beforehand. At many points in time, actual volatility turned out to be higher than implied volatility. This suggests that risk was underpriced and protection was relatively cheap. At other times, implied volatility was higher than actual volatility, suggesting that protection was expensive and that, effectively, the risk premium was too high.

This ebb and flow of costs highlights how important it is to seek opportunities across multiple asset classes, rather than relying on a single strategy.

*Display 5* arranges the same data in a different way, showing the percentage of time that actual volatility turned out to be much lower (the left side of the curve) or higher (the right side) than implied volatility. The distribution of the data is skewed, with more extreme values falling to the right. In other words, especially at times of turbulence, the interest-rate options market has tended to underestimate how volatile yields are going to be, and “tail options” (insurance against extreme losses) have been priced too cheaply.

The skewness also implies that because the market is not perfectly efficient in pricing risk, investors can use strong research to gain an edge.

### **Identifying Cost-Effective Strategies**

We have researched and implemented ways to manage the cost of tail risk by constructing strategies that allow investors to be “long volatility” in a very cost-efficient manner.

One way to do this is making an exchange, in which one can trade off (sell) insurance against higher-frequency/low-impact events in order to fund the purchase of insurance against the much

more damaging lower-frequency/high-impact events. This opportunity presents itself in many different markets.

This could be compared to an automobile insurance premium with a high deductible. In insurance, the higher the deductible, the lower the annual premium charged by the insurance company. If you have a high deductible, you are willing to cover the costs of dents, scratches and other minor incidents (high frequency, low impact) in order to have a lower premium for collision and other major accidents (low frequency, high impact).

Another example would be the credit tranche strategy discussed previously. Buying protection on riskier tranches is expensive (and selling it is lucrative) because the market expects a few names to default even in normal conditions. Buying protection on the least risky tranche is cheaper because the market doesn’t expect many defaults unless a extreme scenario unfolds. Put options on these “super senior” tranches become more valuable at times of market stress because people start worrying about the potential for high numbers of correlated or systematic defaults.

There are many other ways to hedge in a cost-efficient manner, including exploiting term structures in rates markets. For example, earlier we referred to a yield-curve flattener. If yield curves are particularly steep, this position can pay for itself because long maturities compensate investors so well in the form of yield and roll return.

### **In Summary**

While portfolio diversification has served investors well under “normal” market conditions, it may fall short in periods of extreme market stress. The challenge is to protect against tail risk at times of crisis, while actively managing any negative carry costs associated with the protection.

We believe that an effective tail-risk hedging strategy can help investors by buffering their portfolios when extreme events occur. We recommend maximizing the opportunity set by researching strategies across asset classes.

For best results, we advocate an agile, active approach that dynamically allocates funds between strategies depending on current market pricing and prevailing conditions.

**Notes and Disclosures**

Prospective investors should take into account the following considerations in making an investment decision regarding AllianceBernstein Tail Risk Hedge Fund (the "Fund"). This is not intended to be a complete description of relevant factors, and a comprehensive discussion of risk factors and conflicts of interests can be found in the Fund's Confidential Memorandum. Please read it carefully before you decide to invest.

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**No Operating History**

The Fund is a newly formed entity and does not have any operating history upon which prospective investors can evaluate the anticipated performance of the Fund.

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