

# Seeking Asymmetric Returns

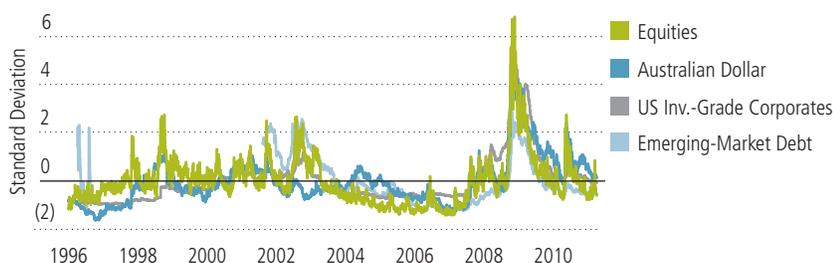
## Improving the Odds of Investment Success

“The essence of investment management,” said legendary investor Benjamin Graham, “is the management of risks, not the management of returns.” Indeed, the 2008 global financial crisis—and the accompanying spike in volatility across a multitude of asset classes (*Display*)—served as a reminder that as well as an investment process for the upside, a strategy to protect investors’ capital from downside risk, too, is of critical importance.

The market crash—and the subsequent sovereign-debt crisis in Greece and other peripheral European nations—has led many investors to reexamine some of the key assumptions that lie at the heart of modern portfolio theory: the notion that markets are efficient and always liquid; the belief that diversification among asset classes can provide shelter in a crisis; and even the idea that there is such a thing as a “risk free” asset.

*(continued)*

### Volatility Is Highly Correlated



*Through March 31, 2011*

*Historical analysis is not a guarantee of future results.*

*Equities’ volatilities are 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-Market Bond Index.*

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

### IN THIS PAPER

The 2008 financial crisis has led many investors to reexamine some of the key assumptions that lie at the heart of modern portfolio theory. As researchers rethink theoretical models of the investment world, we anticipate that a key trend in portfolio management will be a focus on “asymmetric returns”—investment strategies that maximize upside potential while capping downside risks. The key to such strategies—and to achieving sustainable positive returns over time—is a dynamic risk-management process that limits the probability of large portfolio losses.

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**RISK**  
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*(continued from cover)* As researchers reexamine theoretical models of the investment world, we anticipate that a growing trend in portfolio management will be a focus on “asymmetric returns”: investment strategies that maximize upside potential while capping downside risks. The key to such strategies—and to achieving sustainable positive returns over time, in our view—is a robust and dynamic risk-management process that limits the probability of destructive portfolio losses.

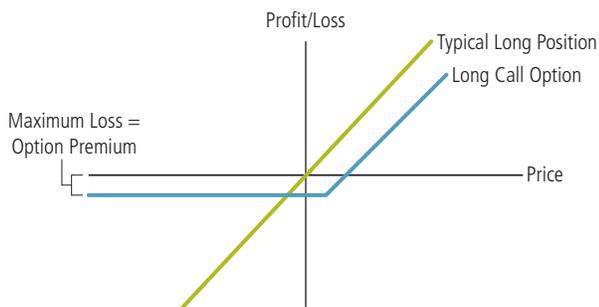
### Bending the Return Profile

For the traditional long-only investor, alpha—or the return earned in excess of the overall market—is elusive. Generating alpha is a classic zero-sum game; one investor’s gain is another investor’s loss. And that’s even before taking fees and transaction costs into account. In order to consistently beat the market as a long-only investor, it is necessary to have an edge over the competition in fundamental or quantitative research. But in a digital age when investors have instant access to information that would previously have been difficult or impossible to find, maintaining such an edge is no simple task.

For most typical assets, the payout profile of an investment is linear; for example, an investor buying a stock at \$100 stands an equal chance of making a large gain as a large loss. The investor would lose 100% of his investment if the price falls to zero, or double his money if the price rises to \$200.

Display 1

#### Options Can Provide Downside Protection



Highly simplified example for illustrative purposes only  
Source: AllianceBernstein

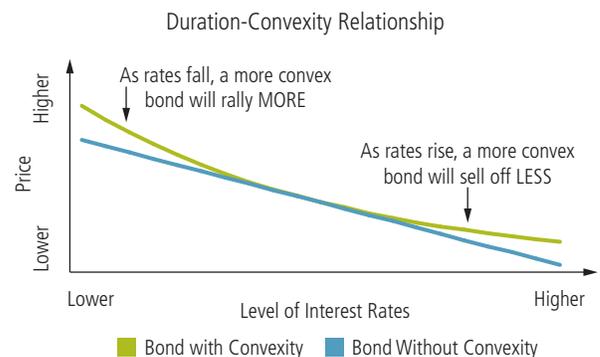
But what if it were possible to bend the line of this return profile, so that the investor could preserve most of the upside potential when the market rises, but limit his downside risk when the market falls? One way to do this—and improve upon the typical zero-sum outcome—would be to buy a call option on the underlying asset. A call, which gives the buyer the right to buy an asset at a predetermined strike price, would maintain most of any upside gains while, on the downside, restricting the maximum loss to the size of the premium paid for the option (*Display 1*).

Many investments have similar option-like characteristics and nonlinear return profiles. In the fixed-income markets, this important property is known as convexity. Positive convexity is a highly sought-after property, since a strategy with positive convexity has an asymmetric payoff profile; the upside potential is greater than the downside risk (*Display 2*).

The search for positive convexity is at the heart of generating asymmetric return profiles. Such return profiles have traditionally been difficult to attain for the long-only, buy-and-hold investor. But for those open to a multi-asset, global opportunity set and the use of derivatives, a variety of effective strategies is available. Many of these strategies can be expensive; the challenge is how to introduce convexity into investment portfolios at a reasonable cost.

Display 2

#### Convexity Is Valuable to Bond Investors



Highly simplified example for illustrative purposes only  
Source: AllianceBernstein

# Common Options Strategies

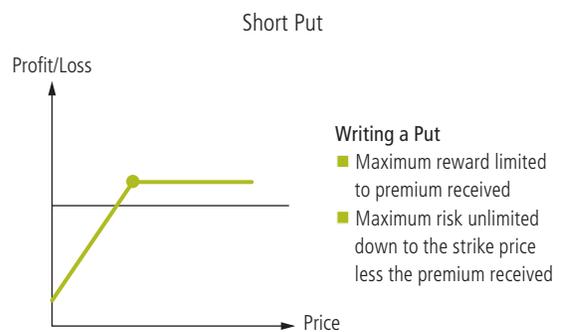
## What Are Options and How Are They Used?

Options are financial instruments that give their owners the right, but not the obligation, to buy or sell an underlying asset at a specified "strike price" on or before a certain expiration date. Options are a type of derivative, since their price is derived from the value of the underlying asset.

There are two main types of options: American options can be exercised at any time between the date of purchase and expiration, while European options can be exercised only upon their maturity.

An option that gives its owner the right to buy an asset is called a call, while an option that grants the right to sell an asset is called a put. In return for writing the option, the originator collects a fee, called a premium, from the buyer.

By combining four basic types of option trades (see below), it is possible to construct a variety of strategies and risk profiles to either speculate on, or hedge against, movements in the value of the underlying asset. Put options, which rise in value when markets are falling, are a common strategy used to hedge against severe market downturns.



Source: AllianceBernstein

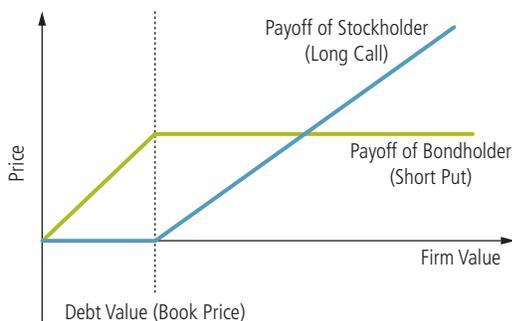
## Volatility Is a Common Link

The traditional long-only investor looks at the investment universe and sees distinct opportunities within different asset classes such as stocks, bonds and currencies, or sees opportunities from shifting among them. Investors in each of these asset classes typically focus on different fundamentals. Equity investors are generally most concerned with the ability of the firm to grow its earnings over time; corporate debt investors are more interested in the strength of the firm's balance sheet and its capacity to repay its debts; and currency investors look carefully at macroeconomic indicators such as interest-rate differentials and inflation.

But, as recent events illustrate, volatility is a common link between asset classes, and the returns on these different asset classes can be highly correlated in times of crisis. There are several reasons for this. For one, the prices of most assets are influenced by macroeconomic factors such as interest rates and GDP growth. Changes in market liquidity can also affect multiple asset classes at once, particularly in crises. Whether exploiting the value premium in equities or the interest-rate differential—or “carry”—between currencies, the returns from most active strategies suffer when volatility spikes.

Display 3

### Options Link Equities and Credit



Source: AllianceBernstein

From a theoretical point of view, the options market also provides a link between different asset classes. For example, Nobel Prize winner Robert Merton showed in the 1970s that the equity and corporate credit markets are intimately connected: Holders of risky corporate bonds can be thought of as owners of risk-free bonds who have issued put options—which give their owners the right to sell at a predetermined strike price—to the holders of the firm's equity. Similarly, equity holders can be thought of as holders of a call option on the value of the firm, with a strike price equal to the face value of the firm's debt (*Display 3*).

In fact, as a more general result, options theory (assuming a European-style option) shows that a long position in any physical asset can be replicated with a long call option, a short put option and a cash position (*Display 4, next page*). Without delving into the mathematics behind these results, they have important implications: Since volatility is highly correlated across asset classes, in some cases investors can replicate an asset by assembling puts and calls from different underlying assets. Viewing the world through this options lens opens up a wide range of investment opportunities to profit from pricing anomalies across markets.

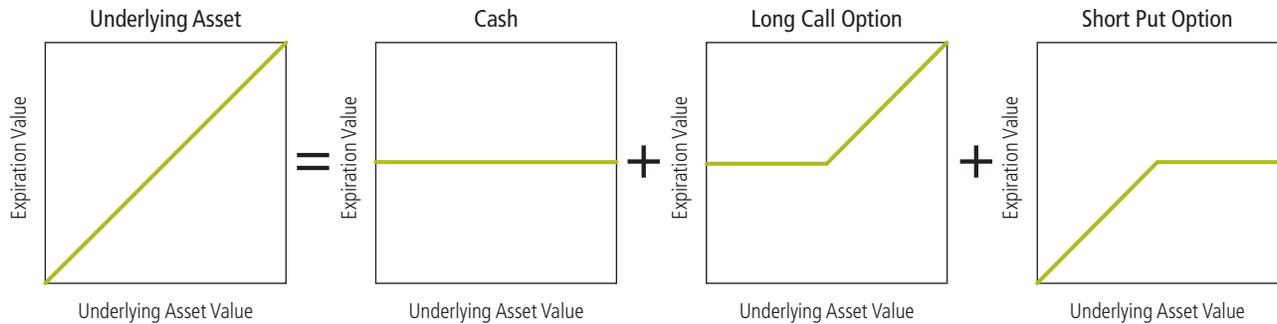
## Improving the Odds

As we examined earlier, the typical investment outcome is a zero-sum game closely resembling a coin toss: “tails I win, heads I lose.” A far more attractive proposition is the “positive-sum game” in which the actions of one group of investors—for example, a pension fund forced to sell its bonds after they are downgraded—can benefit another group of investors that is unconstrained enough to take advantage of the opportunity. Even more attractive are asymmetric opportunities—which are often event-driven and require a catalyst to capture value—that offer the prospect of outsize gains in the case of success, with limited risk to the downside. A variety of anomalies and market inefficiencies lies behind these opportunities.

## Utility Preferences

For example, different investors have different utility functions or preferences. In some markets, certain players can be relied upon to consistently take one side of a trade; for example, US multinational companies with substantial operations in Europe

**Put-Call Parity**



Source: AllianceBernstein

will likely want to hedge their euro exposure to mitigate the risk that currency swings will reduce the value of their earnings in dollar terms; such players may be happy to pay a premium for options that protect them from such adverse movements.

Because investors are highly risk-averse, they are often willing to pay hefty premiums for the portfolio insurance afforded by put options. For this reason, in many markets put options are more expensive to buy than call options. Similarly, since investors are generally more concerned with protecting themselves against near-term events, short-dated options are often overpriced relative to longer-dated options. All these anomalies can potentially be exploited by investors with different utility preferences who are willing to take the other side of the trade. For example, an investor concerned about a downturn in the economic cycle could buy insurance by loading up on low-priced, long-dated options before the cycle turns.

**Constraints**

The various constraints faced by many large institutional investors such as insurers and pension funds—including benchmarks and credit-rating guidelines imposed voluntarily or by regulations—can also introduce market inefficiencies. One notable example is that of “fallen angels”—bonds that were rated investment grade at the time of issue but have subsequently been downgraded to high yield by the rating agencies.

Many investors in corporate bonds are prohibited by regulations from allocating substantial portions of their portfolios to non-investment-grade debt. Insurance companies, for example, face restrictions on the amount of high-yield debt they may hold as well as harsher capital requirements on the portion of their portfolio held in such bonds. Thus, insurers face strong regulatory pressure to sell bonds that have become fallen angels. After a negative credit event, investment-grade bond prices often fall sharply before the official downgrade to high yield occurs. Since the bulk of the price decline has already occurred at this point, investors who are compelled to sell by ratings constraints are essentially locking in large losses.

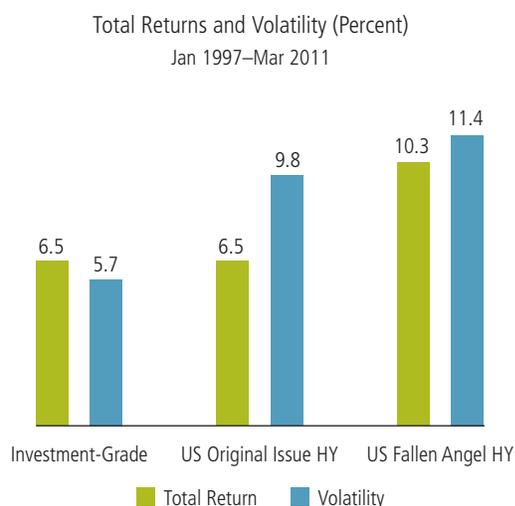
Our research indicates that, on average, after falling into junk-bond territory, fallen angels start to significantly outperform the rest of the credit universe (*Display 5, next page*). This anomaly can create opportunities for investors who are unconstrained by ratings guidelines to buy fallen angels at distressed prices.

**Liquidity and the Availability of Financing**

Differences in liquidity and the availability of financing can also explain pricing anomalies between markets. For example, credit risk should, in theory, be priced identically in the cash bond and the credit default swap (CDS) markets. But this is not always the case. For a variety of reasons, including the inability to finance

Display 5

## Fallen Angels Have Outperformed



*Historical analysis is not a guarantee of future results.*

*Fallen angels are represented by the Bank of America Merrill Lynch Fallen Angel Index.*

*Source: BAML Capital Partners*

positions and an unwillingness by investors to take losses, some cash bonds have limited liquidity compared with the CDS that references the same corporate entity. As a result, it may be difficult to sell the cash bond after a negative credit event, and in such cases, the CDS market can become the sole means of hedging out credit risk. CDS spreads then tend to gap wider than the spreads on cash bonds, creating a “positive basis.”

Conversely, when the issuance of a cash bond increases, supply and demand can cause bond spreads to widen relative to CDS spreads, causing a “negative basis.” A negative basis can also arise when financing becomes scarce, causing some investors to liquidate their cash positions. When such pricing discrepancies occur, investors with access to funding can capture the spread between the two markets by buying the cash bond and buying CDS protection (or vice versa) on the expectation that the basis will return to its normal range. This is a classic arbitrage opportunity in which the investor is not exposed to credit risk because, in the case of default, the bond (long credit risk) and the CDS position (short credit risk) offset each other. Nevertheless, as we will examine later, there are other important risks to consider in such trades—most notably, the risk that the CDS counterparty in the transaction will fail to fulfill its obligation.

## Putting the Theory to Work

For investors who have the skills and experience to identify the kinds of anomalies above, it is often possible to construct investments with attractive, asymmetric return profiles that maintain significant upside potential while limiting downside risk. Unlike typical long-only strategies, many of these strategies are not directional bets, and their success is typically not dependent on “getting it right” on the fundamentals. In addition to strong return potential, such strategies also tend to have low, or even negative, correlations to broad market indices.

While some of these strategies can also be utilized to generate convexity in typical long-only portfolios, unconstrained investors who can access a full, multi-asset, global opportunity set and who are open to the use of derivatives are best placed to exploit the inefficiencies and anomalies that we have examined.

## Shorting a Foreign Currency: Improving on the Zero Sum

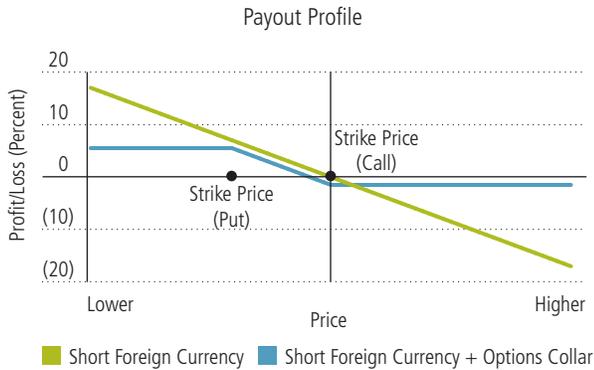
From time to time, economic turmoil or widespread deleveraging can lead to significant volatility in the foreign exchange markets. With some \$1.5 trillion traded daily in spot markets alone, the foreign exchange markets are highly liquid compared with other asset classes. Since currencies are traded in pairs, they are also simple to short. Furthermore, due to high liquidity in the currency options markets, derivatives strategies can be employed to mitigate risk and potentially enhance returns.

Let us take the example of a currency that is facing fundamental issues, perhaps due to a banking crisis that has raised expectations for interest-rate cuts. In this case, an investor could potentially generate attractive returns by shorting the foreign currency. However, in periods of high volatility, this strategy is risky, as a sudden reversal in the currency’s downtrend could generate large losses.

In such cases, an investor could combine a short position in the foreign currency with a call option, which would limit the maximum possible loss on the trade to the premium paid for the hedge. To limit the cost of this hedge, the investor could sell a put option on the foreign currency at the same time. In this strategy—known in options terminology as a “collar”—the premium received for writing the put helps offset the premium paid for the call. In the event that the spot exchange rate rises, the call option ensures that the short foreign currency position

Display 6

### Short Foreign Currency Trade with Options Collar



Highly simplified example for illustrative purposes only  
Source: AllianceBernstein

can be bought back at the strike price. If the spot level decreases—as the investor was expecting—then the trade would be profitable, although any profits below the strike price of the put option would be forfeited (*Display 6*). This results in an attractive asymmetric structure in which the maximum gain is far greater than the maximum loss.

Such a trade would be particularly effective if the relative pricing of call and put options was in the investor's favor, limiting the cost of the hedge. This is sometimes the case when many market players are expecting further volatility, and puts—which are often used for portfolio insurance—become expensive relative to calls. Since the strategy involves collecting the premium on a put while paying the premium on a call, such a market environment would be to the investor's advantage.

#### Tier 1 Banks: A Positive-Sum Opportunity

One very popular trade in 2009 was buying investment-grade corporate bonds. After a massive sell-off, corporate spreads had widened by hundreds of basis points, and markets were pricing in default rates that reflected doomsday scenarios that even the most pessimistic of fundamental analysts saw as unlikely to materialize. Investors who bought credit during the panic were rewarded handsomely as markets recovered. And in general, the more credit they bought, the better they performed. But was there a more effective way to take advantage of the opportunity?

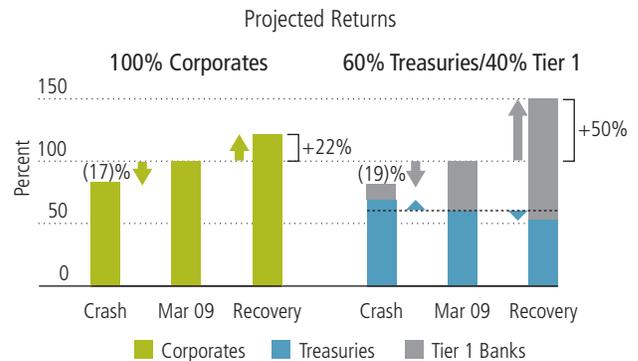
At the time, the extreme cheapness of corporate bonds was mirrored by the richness of government bonds. Yields on government debt were at all-time lows, and barring an Armageddon, it was difficult to see how a portfolio of investment-grade corporate bonds could possibly underperform government bonds. Many investors saw significant return potential in taking well-diversified positions in investment-grade corporate debt without assuming what seemed to be undue risk. And optimizers—which are quite similar across investment managers, given the similarity in risk models in use today—were calling for the wholesale liquidation of government bond holdings in favor of corporates.

Not surprisingly, within the investment-grade corporate sector, financials were particularly cheap. And within the financial sector, Tier 1 bonds—which are at the riskier end of debt in the spectrum of a bank's capital structure—were trading at extremely low prices of nearly 30 cents on the dollar. Such bonds were shunned by most investors at the time since they were seen as very risky, given the ongoing financial turmoil.

But in fact, an investor who put 40% of his portfolio in these very risky, distressed bonds, and allocated the remainder of his portfolio to expensive US Treasury bonds, could have generated a more attractive risk/return profile than a well-diversified

Display 7

### A 60/40 Portfolio Outperforms



As of March 31, 2010

Historical analysis is not a guarantee of future results.

Corporates refers to the corporate component of the Barclays Capital Global Aggregate Index; Treasuries refers to US bonds of 25 years or more; Tier 1 Banks refers to Baa/BBB-rated Tier 1 bonds.

Source: Barclays Capital, Bloomberg and AllianceBernstein

portfolio consisting entirely of investment-grade corporates. The 60/40 mix had 50% greater upside potential; in a scenario of economic recovery, our analysis suggested that the Tier 1 bonds would more than double in price, easily compensating for the modest decline in Treasury prices that would occur. In a “crash-type” scenario assuming greater financial turmoil, the Tier 1 debt would default and return just 10 cents on the dollar, but Treasuries would likely gain strongly in a flight to quality, mitigating total portfolio losses. As a result, the downside risk would be little different from that of a 100% corporate portfolio (*Display 7, previous page*).

In 2009, the market recovered significantly as the financials sector stabilized. As many investors were expecting under a recovery scenario, investment-grade corporates did well, returning 19%. But a 60/40 portfolio returned 42%—despite US Treasuries, which represent more than half the portfolio, suffering a negative return. Thus, by challenging some widespread assumptions about portfolio management, investors could, in this case, have generated significantly higher returns without any meaningful increase in risk, bending the return profile in their favor.

For those investors who are able to take short positions and implement derivatives strategies, a variety of other strategies are available for generating asymmetric return profiles.

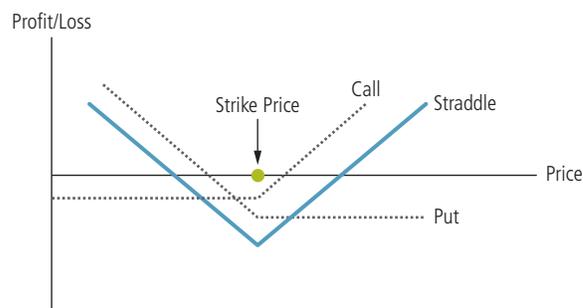
### High-Yield Basis Trades: An Asymmetric Return Opportunity

As we examined earlier, in normal market environments, the credit spread of cash bonds usually closely tracks CDS spreads. However, due to various technical factors, the spreads can often diverge, creating compelling opportunities for investors with access to funding. One extreme example of this phenomenon was after the collapse of Lehman Brothers in late 2008, when spreads on both cash bonds and CDSs widened considerably, particularly in the troubled mortgage and financials sectors.

But this widening was not in sync. Thanks to a wave of ratings downgrades that prompted forced selling, spreads on cash bonds widened by a lot more than those on CDSs, creating a substantial negative basis. As the availability of financing dried up, many banks, hedge funds and other investors were forced to rapidly deleverage, liquidating their holdings of cash bonds and other assets. The CDS market was less affected by this

Display 8

### Creating an Options Straddle



Source: AllianceBernstein

turmoil since, unlike cash bonds, CDSs are derivatives that do not incur funding costs.

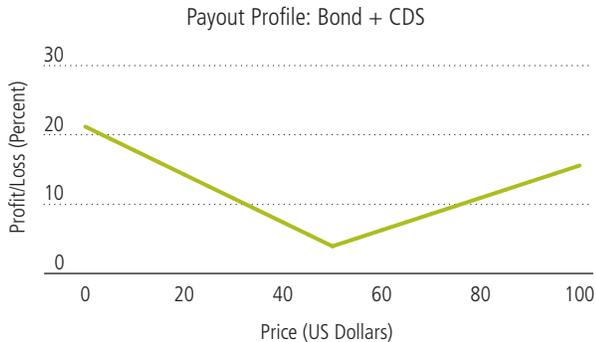
The turmoil created some unusually attractive opportunities for basis trades in distressed high-yield companies. Let us take one example of a distressed company with a high risk of near-term default whose bonds were trading at 50 cents on the dollar. Due to the negative basis, the spread on this company's cash bonds was considerably wider than that on its CDSs.

The payout profile of a distressed bond closely resembles that of a call option, while the payout profile of a CDS resembles that of the protection afforded by a put option. By combining the cash bond and a CDS of the same maturity, an investor could have created a highly attractive structure that looks a lot like what is known in options terminology as a “straddle”—the combination of a call and a put option (*Display 8*). Typically with a straddle, there is a cost involved—and thus the possibility of a loss—if markets don't move either way. But the recent financial crisis created some rare opportunities to enter trades in which the expected payoff was positive in all scenarios.

In this particular case, whether the bond defaulted and the investor received payment from the protection seller, or if the company did not default and the investor collected coupons until the bond matured, the strategy offered extremely attractive return potential (*Display 9, next page*). In other words, investors were guaranteed to make an arbitrage profit

Display 9

### A High-Yield Basis Trade



Highly simplified example for illustrative purposes only  
 Source: Bloomberg and AllianceBernstein

if they were able to hold the position to maturity. However, such a strategy is not without risk. If investors were unable to ride out potential short-term mark-to-market losses and were forced to unwind the position before maturity, they may have suffered significant losses.

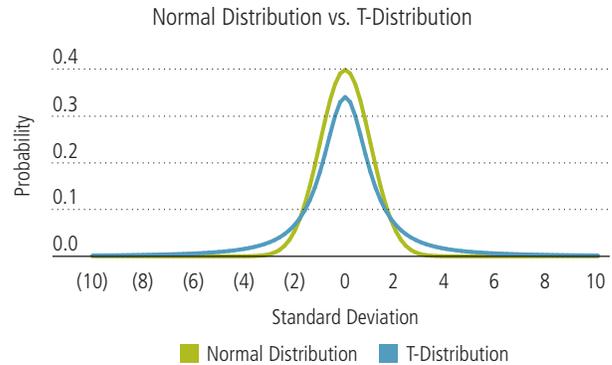
### Dynamic Risk Management: Winning by Not Losing

Indeed, while the strategies that we have outlined all offer compelling return profiles, they are not without risk, nor are they likely to be effective in all market conditions or macroeconomic environments. A sound, active risk-management process is an essential component of any trading strategy, as large losses can have a catastrophic effect on the long-term returns of investment portfolios. Although a great investor may have a long stretch of winning years in a row, a handful of large losses could wipe out all these gains if there were no strategy to protect profits and limit losses. After all, a loss of 50% in a portfolio requires a subsequent gain of 100% just to break even again.

Furthermore, as the recent financial crisis illustrates, the downside risk of the market is much greater than what one would expect from theory. At the heart of modern portfolio theory is a bell-shaped curve that shows a symmetrical "normal distribution" of portfolio returns around a mean. However, in reality, the tails of the distribution are much fatter than what this theory predicts. The daily distribution of stock returns on the S&P 500 Index, for example, has been shown to more closely fit a "T-distribution" with relatively fat tails (*Display 10*).

Display 10

### Alternatives to Normality

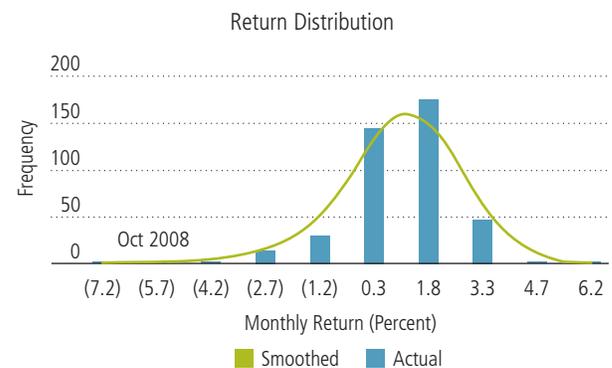


Source: AllianceBernstein

To cite another example, our analysis shows that a currency trader employing a "balanced carry strategy"—buying the highest-yielding G10 currencies and shorting the lowest-yielding ones—would have witnessed three "once in a million" events in the years since 1975. Over this period, the distribution of monthly returns is heavily skewed, with a small probability of highly destructive outcomes in the left tail (*Display 11*). In fact, more than 40% of the total losses experienced by such a strategy over the period are concentrated in these three bouts of high volatility.

Display 11

### Return Distribution of a Balanced Carry Strategy



January 1975 through March 2011  
 Historical analysis is not a guarantee of future results.  
 Balanced carry is represented by a foreign exchange strategy that is long the highest-yielding G10 currencies and short the lowest-yielding G10 currencies.  
 Source: Thomson Datastream and AllianceBernstein

A currency trader who managed to survive these devastating crashes would have significantly better long-term returns. A dynamic risk-management strategy to limit the impact of extreme events is therefore a key component of portfolio management. As sports fans are aware, it is often defense that wins the championship.

Ideally, it would be desirable to obtain an early warning signal before a crisis takes place. However, tail events tend to be triggered by unpredictable factors, and market crashes all follow different paths. What we learned from the Enron scandal, for example, would not have helped us avoid losses after Lehman Brothers' collapse. Furthermore, once a crisis occurs and investors are rushing for the exits, it is too late to buy insurance, as the cost of protection becomes prohibitive. The cost of insuring an investment-grade bond portfolio spiked sharply from late 2007, well before the Lehman shock (*Display 12*).

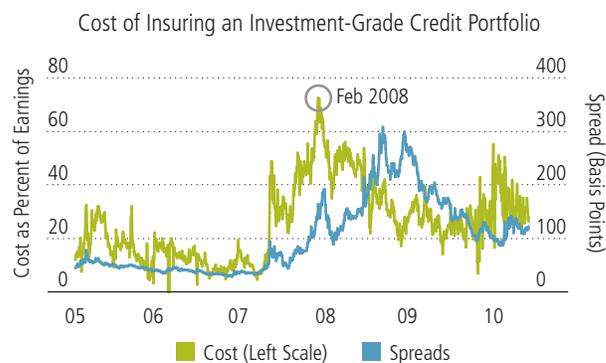
## Addressing Counterparty Risk

In the case of hedges that do not clear through an exchange, one important consideration is counterparty risk: the risk that a counterparty will fail to fulfill its contractual obligations. It is crucial to select only counterparties that are in good financial health with the ability to execute on their commitments. With this in mind, end users should consider diversifying derivatives exposures among a variety of high-quality dealer counterparties. In cases where there are concerns about a particular counterparty, investors can address this risk by buying protection via put options or the CDS market.

The posting of collateral is another powerful way in which counterparty credit risk is addressed in the swaps market. Standard single-name CDS contracts require the daily posting of collateral (typically cash or Treasury bills) to offset changes in the mark-to-market value of the CDS. In other words, as the CDS spread widens—indicating that the reference entity is getting progressively closer to default—the protection seller is required to post more and more collateral to compensate for the increased risk of default by the reference entity.

Display 12

### The Cost of Insurance Spikes in Crises



Through July 30, 2010

*Historical analysis is not a guarantee of future results.*

Measures cost of insuring an investment-grade credit portfolio with the Dow Jones CDX North America Investment Grade Index (five-year)

Source: Bank of America Merrill Lynch and AllianceBernstein

### Diversification

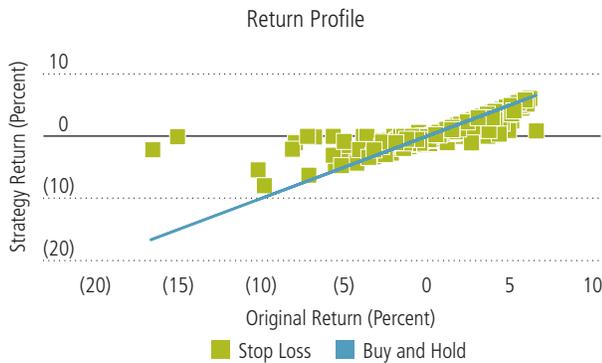
A time-tested way to protect portfolios from losses is diversification; by adding assets with low, or even negative, correlation to the rest of the portfolio, we can lower its overall risk. One way of doing this within a single asset class is to go global; since economic cycles and earnings trends are not perfectly synchronized across countries, the diversification afforded by global stocks, or bonds, for example, can reduce volatility when compared with a single-country portfolio. The addition of other weakly or negatively correlated asset classes to a portfolio can also help. For example, a manager of a credit or multisector bond portfolio could take advantage of the fact that the returns on credit and government bonds have been negatively correlated in most historical periods. When risk aversion rises and credit spreads widen, government bonds tend to rally.

### Stop-Loss Strategies

However, although diversification is a useful tool for reducing portfolio risk, there is no guarantee that such hedges will be effective in extreme market conditions, when historical correlations often come unstuck. One additional technique that is commonly used at the trade and portfolio level is the stop loss. Stop-loss strategies can prevent investors from holding their losing investments for too long by automatically prompting

Display 13

### Stop-Loss Strategy Reduces Downside Risk



January 1975 through December 31, 2010

Historical analysis is not a guarantee of future results.

Buy-and-hold return profile and stop-loss return profile are represented by a foreign exchange carry strategy that overweights the highest-yielding G10 currencies and underweights the lowest-yielding G10 currencies.

Source: Bloomberg and AllianceBernstein

sales. These strategies can greatly reduce crash risk; our research indicates that stop-loss strategies can systematically reduce risk in portfolios and create a more “normal” distribution of returns with thinner tails. As a result, the payout profile is greatly improved, taking on options-like qualities (*Display 13*).

Nevertheless, like diversification, stop-loss strategies are not entirely foolproof. In a crash scenario, when market liquidity vanishes and volatility spikes, a stop-loss order may fail to be executed if there are no buyers or sellers at the limit price.

#### Dynamic Tail-Risk Hedging

To protect against extreme events, a portfolio manager may choose to add an extra layer of protection and actively hedge the portfolio by buying protection against spikes in volatility.

Since, as we have examined, volatilities are priced almost uniformly across asset classes, the risk in a portfolio can often be reduced by taking a derivative position in a different asset class. This technique is known as “macro hedging.”

Among the many derivatives available, we have found that put options on the S&P 500 Index are the most effective and liquid instrument available for dynamically hedging tail risk. To protect against low-probability tail-risk events, investors can buy far out-of-the-money options to reduce the cost of protection. Other strategies include purchasing CDSs in high-grade tranches or purchasing options in currencies that benefit in a flight to quality. Such hedges must be closely monitored, as changing market conditions can require adjustments in hedging ratios.

#### Conclusion

The recent financial crisis has led many investors to question some of the key assumptions on which the portfolio-management industry is based. In particular, investors have become more mindful of the correlations of risky assets during crises and the dangers of catastrophic “tail risks.” In the coming years, researchers will likely be improving upon many of the models we use to look at the investment world. In the meantime, we believe that a key trend in the future of portfolio management will be a focus on generating asymmetric return profiles—investments that maximize upside potential while capping downside risks.

One key to the success of such strategies, in our view, is a dynamic risk-management process that limits the probability of large losses in the portfolio. Those investors who can access a full, multi-asset, global opportunity set and who are open to the use of derivatives are best placed to exploit the myriad inefficiencies and anomalies that we have examined. ■

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