

# Demystifying Hedge Funds

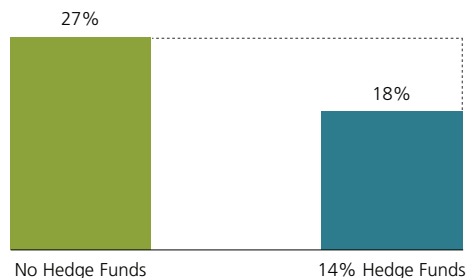
## Taking a Rigorous Research Approach

It's easy to understand the allure of hedge funds. Some legendary hedge fund managers have delivered gross returns of 60% or more in some years. And widely cited databases show that hedge funds on average have provided higher returns with less volatility than stocks, as well as gains in some bear markets. It's also easy to understand the fear they inspire. There have been several high-profile cases of trading disasters or fraud.

We have conducted rigorous research in an effort to separate fact from hype. After cleaning the performance databases of biases that come from self-reported data, we found that historically, hedge funds have generated superior returns to stocks, with considerably less volatility. Hedge funds have also had a fairly low correlation to stock and bond returns over time, which makes them valuable diversifiers. Though hedge funds pose other risks that volatility does not capture and their diversification benefit is inconsistent, our research suggests that a modest hedge fund allocation *reduces* the odds that an investor's overall portfolio will incur large short-term losses (*Display*). Still, good execution is crucial.

### Our Research Suggests that Adding a Modest Allocation of Hedge Funds Would Reduce the Odds of a Very Large Short-Term Loss in the Overall Portfolio

Probability of a 20% Peak-to-Trough Decline Within 30 Years  
(Based on a 60% Stock/40% Bond Investor)



As of December 31, 2011

Projections are based on the Bernstein Wealth Forecasting System<sup>SM</sup>. Stocks are modeled as 21% US diversified, 21% US value, 21% US growth, 7% US small and mid cap, 22.5% developed international, and 7.5% emerging markets. Bonds are modeled as intermediate-duration diversified municipals. Hedge funds are well diversified. See Asset Allocation discussion on page 7 and Notes on Wealth Forecasting System on page 10.

Source: AllianceBernstein

### IN THIS PAPER

We explain our findings about historical hedge fund returns, risks, and correlations, as well as our conclusions about executing a hedge fund strategy and hedge funds' place within an investor's broad asset allocation.

## What Are Hedge Funds?

Strictly speaking, hedge funds are not an asset class: They are actively managed investment pools that can invest in any asset class. There are many categories of hedge funds (see “The Varieties of Hedge Funds” on page 3), but typically, hedge funds aim to deliver positive absolute returns in all market environments and are subject to far looser constraints than traditional long-only portfolios. Most importantly, hedge funds typically can use leverage, and they can sell short investments that they expect to lose value, as well as take long positions in investments they expect to gain value. Hedge funds usually can also invest in a wider array of instruments than most traditional long-only portfolios can.

These additional freedoms allow hedge funds to reduce their sensitivity to broad market movements, capture some security mispricings more effectively than most long-only managers can, and pursue some risk premiums not available to most long-only managers. Among the latter are the risk premiums from currency-carry and commodity-roll strategies.<sup>1</sup> As a result,

manager skill drives a larger share of the returns of hedge funds than of traditional investment portfolios.

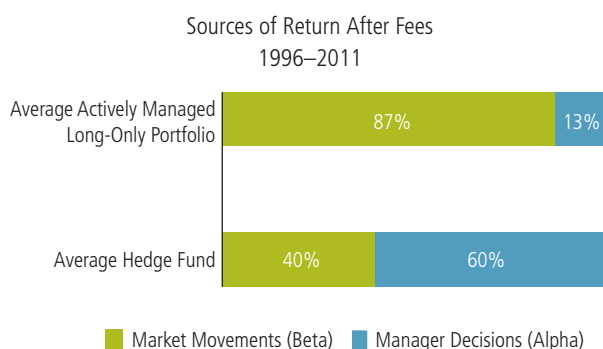
Over the 16 years for which we have reasonably reliable data, 40% of the variability of a typical hedge fund’s return after fees came from exposure to the markets, or beta. The remaining 60% of its return variability came from manager decisions, or alpha (*Display 1*). By contrast, 87% of the return variability of the median actively managed long-only portfolio came from beta, and 13% from alpha.

Hedge fund sensitivity to market movements varies widely by hedge fund category. Hedge funds that aim to be market neutral are the least sensitive to the market but still receive some of their return variability from stock-market exposure, because the success of some of their alpha strategies depends in part on favorable markets.

Although hedge funds retain some market exposure, the higher portion of their return from alpha makes them useful

Display 1

### Hedge Fund Returns Come Mostly from Manager Decisions



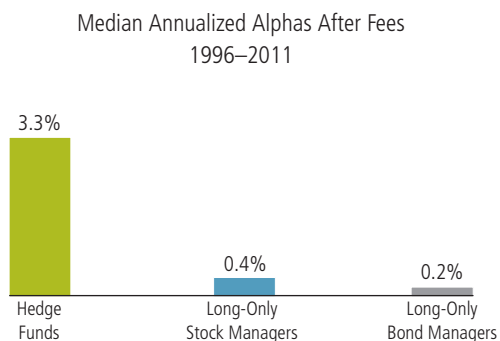
**Historical data are used for illustrative purposes only. Past performance is not necessarily indicative of future results.**

Average variations in monthly returns attributed to market movements or manager decisions. The average actively managed long-only portfolio and the average hedge fund are analyzed versus a blend of market exposures. See Notes on Sources of Asset-Class and Manager Data on page 9. Hedge fund data reflect AllianceBernstein adjustments to Lipper TASS data to reduce biases.

Source: Lipper TASS, Mercer, and AllianceBernstein

Display 2

### The Median Hedge Fund Delivered More Alpha than the Median Stock Manager and the Median Bond Manager



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Alpha is defined as the part of the return that is not attributable to market factors. See Market Factors Used in Analyzing Sources of Returns on page 9. Hedge fund data reflect our adjustments to Lipper TASS data to reduce biases. Source: Lipper TASS, Mercer, Russell Investments, and AllianceBernstein

<sup>1</sup>Currency-carry strategies buy high-interest-rate currencies and short low-interest-rate currencies; commodity-roll strategies buy some commodity futures at a discount to spot and sell others at a premium to spot.

## The Varieties of Hedge Funds

There are about a dozen well-known categories of hedge funds. We describe the major ones below. Some are equity-oriented, some are bond-oriented, and some are multi-asset-class, but they all access opportunities not available to traditional long-only managers.

*Long/short equity strategies* invest on both the long and short sides of the market, without seeking to be market neutral.

*Market-neutral equity funds* seek to balance long and short investments to eliminate overall exposure to the stock market.

*Dedicated short bias equity funds* may have some long positions but maintain a constant short bias.

*Event-driven strategies* seek to capture price movements generated by a corporate event. *Risk arbitrage strategies* simultaneously take long and short positions in firms involved in a merger or acquisition. *Distressed securities strategies* invest in the stocks, bonds, or trade claims of firms in financial distress or bankruptcy, in anticipation that the companies will be reorganized.

*Emerging-market strategies* invest only in emerging-market stocks or bonds, or both.

*Fixed-income arbitrage strategies* seek to profit from exploiting anomalies between the pricing of related fixed-income securities, while limiting volatility.

*Convertible arbitrage strategies* typically buy a convertible bond and short the common stock of the same firm.

*Global macro strategies* take long and short positions in stocks, bonds, currencies, commodities, and derivatives around the world to capture major economic trends or events, such as a currency devaluation. ■

diversifiers. From 1996 to 2011, the median hedge fund manager generated alpha of 3.3% per year, versus 0.4% for long-only stock managers (*Display 2*).

### Hedge Fund Return and Risk Data

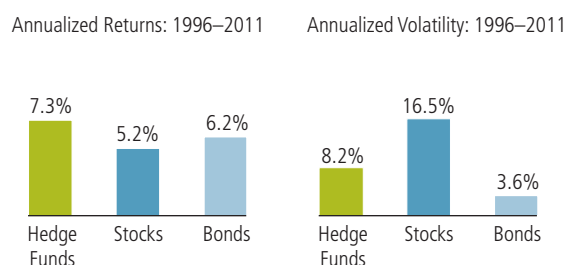
We took a skeptical look at hedge fund results, because the track record for the category is much shorter than for stocks or bonds, and hedge funds offer much less transparency. Also, hedge fund performance databases are biased because funds can submit results—or not—for as long as they choose.

We analyzed the data available and adjusted for the biases that arise from self-reported results (see “Rooting Out Biases in the Performance Data” on page 6). We arrived at an adjusted annual hedge fund return of 7.3% from 1996 to 2011, well below the unadjusted return of 9.8%, but still appealing compared with stocks and bonds (*Display 3, left side*).

We also found that hedge funds have been far less volatile than stocks over the 16-year period. The annualized volatility of the asset-weighted index of all hedge funds in the database was 8.2%, about half the 16.5% volatility of the MSCI World Index of global stocks, but above the 3.6% volatility of the Barclays Capital US Aggregate Bond Index (*Display 3, right side*). Hedge funds seem to offer a more attractive risk and return trade-off than traditional asset classes, even after adjusting for biases.

Display 3

### Hedge Funds Have Offered Strong Risk-Adjusted Returns



**Historical data are used for illustrative purposes only. Past performance is not necessarily indicative of future results.**

Hedge funds are represented by the Lipper TASS database, as adjusted by AllianceBernstein to reduce biases; stocks, by the MSCI World Index; and bonds, by the Barclays Capital US Aggregate Bond Index.

Source: Barclays Capital, Lipper TASS, Morgan Stanley Capital International (MSCI), and AllianceBernstein

Lastly, we found that hedge funds diversified stocks effectively over this 16-year period, but not as well as bonds: Hedge funds' correlation with stocks was about 0.6; bonds' correlation with stocks was about 0.2. With higher returns, lower volatility, and good diversification benefits, hedge funds would seem to be a slam-dunk investment. No wonder many investors have been tempted to throw out the stock/bond paradigm and put most of their money in hedge funds!

### Reasons for Caution

Of course, no one should take such drastic action based on 16 years of self-reported data. There are also several reasons to be cautious about embracing hedge funds.

*Manager skill is hard to identify.* Good performance may reflect luck, rather than skill. And even a skilled manager's strategy may be out of favor for years at a stretch. That's also true for long-only managers, but for hedge funds, return from skill (alpha) is a much larger part of total return.

*Manager results vary widely.* Hedge fund performance varies enormously from manager to manager in any one year and over time (*Display 4*). From 1996 to 2011, extremely successful

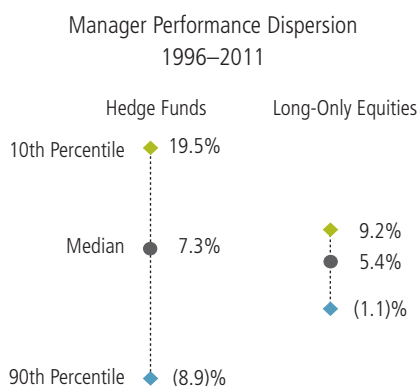
long-only equity managers (those ranking at the 10th percentile) returned 9.2% per year on average, and extremely unsuccessful long-only equity managers (those at the 90th percentile) returned (1.1)%. Extremely successful hedge fund managers returned 19.5% and extremely unsuccessful hedge fund managers returned (8.9)% in the same period. We also found a wide dispersion of returns within hedge fund categories. Since there is no investable hedge fund index, the very wide dispersion of hedge fund managers' results makes effective diversification of managers critical to success in this investment category.

In our view, the uncertainty of alpha is crucial to understanding how rewarding hedge fund investments are likely to be. This factor should weigh as heavily as volatility and potential returns in investor deliberations about whether, how, and how much to invest in hedge funds. The uncertainty of alpha is a crucial element in our conclusions about the need for rigorous due diligence, broad diversification, and hedge funds' place in an overall asset allocation.

*Hedge funds' diversification benefit is conditional.* Over the 16 years for which we have data, hedge funds had a relatively low

Display 4

### Diversification Across Managers and Strategies Is Critical



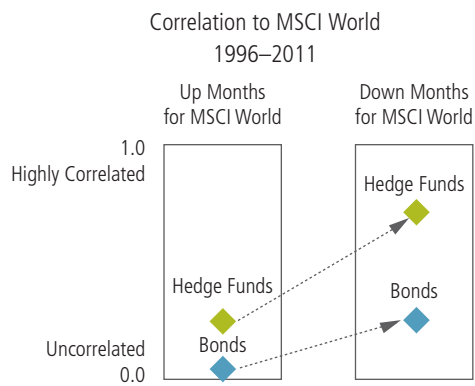
**Historical data are used for illustrative purposes only. Past performance is not necessarily indicative of future results.**

Hedge funds are represented by the after-fee returns reported to the Lipper TASS database, as adjusted by AllianceBernstein to reduce biases; and long-only equities, by the after-fee returns reported to the Mercer database.

Source: Lipper TASS, Mercer, and AllianceBernstein

Display 5

### Correlation Between Hedge Funds and Stocks Has Risen in Down Markets



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Hedge funds are represented by the Lipper TASS database, as adjusted by AllianceBernstein to reduce biases; and bonds, by the Barclays Capital US Aggregate Bond Index. Hedge funds are well diversified. See Notes on Sources of Asset-Class and Manager Data on page 9.

Source: Barclays Capital, Lipper TASS, MSCI, and AllianceBernstein

correlation to stocks, but it wasn't stable. In months when the stock markets rose, hedge funds' correlation to stocks was almost as low as the correlation of bonds to stocks (*Display 5, left side*). In months when the stock markets fell, hedge funds' correlation to stocks was much higher (*Display 5, right side*).

It makes sense that high-quality bonds tend to protect portfolios better than hedge funds do during bear markets for stocks. During periods of economic and stock-market stress, interest rates tend to fall, which boosts bond prices. By contrast, the aggregate performance of hedge funds is, at best, independent of economic and stock-market conditions.

Until the 2008 credit crisis began, many investors believed that certain types of hedge funds could be used to replace bonds completely. Our findings on hedge fund performance during stock-market drops suggest that this use would be imprudent.

*Leverage can amplify losses as well as gains and may make a fund vulnerable to a liquidity squeeze.* Funds that finance illiquid investment with short-term debt may lose access to debt in a market crisis and be forced to sell assets at distressed prices. Even normally liquid instruments can become illiquid in a market crisis, so simply matching the duration or expected liquidity of assets to funding may not protect against a liquidity squeeze.

### Executing a Hedge Fund Strategy

Many of the enduring principles that govern traditional investments govern hedge funds, too. In particular, due diligence, diversification, and rebalancing are critical.

*Due Diligence.* In the world of long-only investing, investors and their consultants perform extensive due diligence that far exceeds checking for a history of positive alpha. Among other things, they seek to understand whether a manager has an experienced team and investment philosophy and strategy that exploit a known pricing anomaly or a risk premium that is likely to persist. They also check for sound risk and liquidity management, operating processes, and fair treatment of all investors.

The same considerations apply to hedge funds, although their managers offer far less transparency, which makes due diligence more difficult. The complex arrangements between hedge funds and their prime brokers and administrators, and the complica-

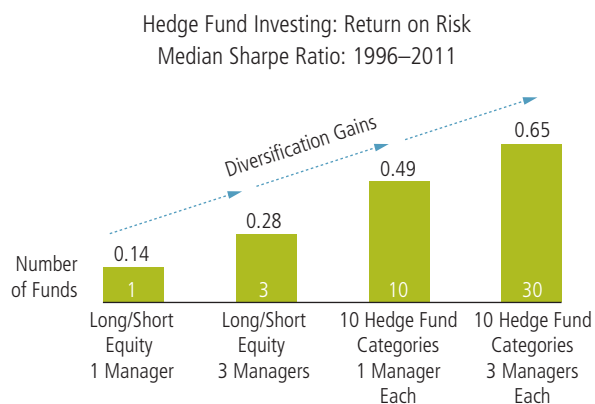
tions that arise from shorting and leverage, make additional procedural safeguards important. Excellent liquidity management and risk management are crucial. Nonetheless, we believe that with appropriate due diligence investors can reduce the chances of fraud and improve their odds of selecting managers who will deliver alpha over time.

*Diversification.* Investors in long-only portfolios typically make strategic allocations to diverse strategies. They diversify by asset class (among stocks, bonds, and real assets), by geography (among developed and emerging markets), and by style (such as value and growth). Our research suggests that hedge fund investors would benefit from having strategic allocations to diverse categories of hedge funds and diversifying within each of these broad categories.

*Display 6* shows that the median return on risk (Sharpe ratio) for a single long/short equity strategy over the last 16 years was 0.14, while a portfolio of three randomly chosen long/short equity strategies would have a return on risk of 0.28. Adding (continued on page 7)

Display 6

### Diversifying Hedge Fund Categories and Managers Has Added Value



**Historical data are used for illustrative purposes only. Past performance is not necessarily indicative of future results.**

*Hedge fund categories included are multi-strategy, managed futures, long/short equities, global macro, fixed-income arbitrage, event-driven, market-neutral equity, emerging markets, convertible arbitrage, and "other." The analysis above does not reflect actual investment results. The underlying methodology has many inherent limitations and cannot completely account for all risks associated with the diverse investment programs of alternative investment managers. Hedge fund data reflect AllianceBernstein adjustments to Lipper TASS data. See Disclosure on Historical Hedge Fund Portfolio Simulations on page 10. Source: Lipper TASS, Mercer, and AllianceBernstein*

## Rooting Out Biases in the Performance Data

A great investment has three desirable characteristics: attractive returns, low volatility, and low correlation to other investments. Thus, we analyzed the data on hedge fund performance along these dimensions.

We started with the Lipper TASS hedge fund database, which has 1,419 hedge funds that are currently reporting results, and 3,502 funds that have stopped reporting. For funds that are currently reporting, we calculated compound average returns of 9.8%. Then we adjusted the results to correct for two important biases: survivorship bias and backfill bias (*Display*). There are also two biases we can't correct for: small sample sizes and unreported final-period results.

- **Survivorship Bias.** Many indices exclude the historical returns of funds that were once in their database but are no longer reporting, frequently because of poor performance. (To be fair, some funds stop reporting because very good performance has led to so much growth in assets under management that they have stopped marketing to new investors.) The Lipper TASS database maintains a separate database of so-called graveyard funds. We added back the returns of these funds, which had stopped reporting, so that performance data wouldn't be inflated by excluding the funds that didn't survive. This reduced the index returns by 1.4 percentage points.

- **Backfill Bias.** Many indices include returns that were reported retroactively (backfilled), in order to provide a more comprehensive series of historical returns. But many hedge fund managers report performance for new funds only after they have a few quarters or years of success under their belts; they don't report the results of new funds with poor results. To correct for this bias, we included fund returns only from the point the managers began reporting to the database, which cut the index's results by another 1.1 percentage points, to 7.3%.

- **Sample Size.** The Lipper TASS database has over 20 years of data, but in the early 1990s there were very few funds in the universe. When we corrected for backfill, there were even fewer. We therefore began our performance history in 1996, the point at which we felt we had a reliable sample of funds. After making these adjustments to the data, we found very few funds with long track records. Even today, more than 39% of the hedge funds reporting have track records of less than three years; another 23% have records of more than three years but less than five years. Only 11% of the funds could report 10 years of results, and only 0.7% have track records for the full 16 years of our adjusted database.

- **Unreported Final-Period Results.** While hundreds of new hedge funds have been launched in some years, funds with poor results tend to stop reporting. On average, in their last 12-month periods, funds that stopped reporting performed seven percentage points worse than the index average. Their actual results may be even lower than we can measure: Many funds don't report the final periods of performance before closing. ■

### Hedge Funds Offer Equity-Like Returns, Despite Biases in Data

| Adjusting Returns for Biases<br>1996–2011                                   |             |              |
|---|-------------|--------------|
|   | Return      | No. of Funds |
| Full history of funds currently reporting                                   | 9.8%        | 1,419        |
| Include returns of funds no longer reporting (adjust for survivorship bias) | -1.4%       | +3,502       |
| Remove returns that were "backfilled" (adjust for backfill bias)            | -1.1%       | -155         |
| <b>Adjusted Returns</b>   | <b>7.3%</b> | <b>4,766</b> |

Source: Lipper TASS and AllianceBernstein

managers can improve the return on risk if their trades differ significantly. For example, one of the strategies might go long and short within the US stock market, another within the Japanese market, and the third, globally. Even two US long/short equity strategies might differ materially if one focused on pairs of stocks within a given industry, and the other took broad bets across industries or went long large-cap stocks while shorting small-cap stocks. Furthermore, one manager might retain far more market exposure than the other.

Display 6 also shows that the improved return on risk from diversifying across hedge fund categories is also substantial. Diversifying from a single hedge fund to one fund in each of 10 categories would have increased the return on risk from 0.14 to 0.49, and diversifying further to three managers in each of the 10 categories would have increased the return on risk to 0.65. Thus, we deem it prudent to make investments with at least 10 hedge fund managers; investments with 30 or more make sense to maximize risk-adjusted return. Our asset-allocation optimizations assume a well-diversified hedge fund portfolio.

An investor who wants to diversify hedge fund exposures can select a group of funds he or she believes to be first-rate or can opt for the ready-made format, called a “fund of funds.”

Direct investment offers two principal advantages: control over manager selection and lower fees. However, most hedge funds typically require minimum investments of \$500,000 or more; that puts direct investment in 30 or more hedge funds out of reach for smaller institutions and for all but the wealthiest individuals.

A fund of funds pools investor capital, collecting enough to give each investor access to multiple funds—often 40 or more. Its manager selects the funds and may provide access to funds closed to all but the most well-connected investors; he or she also provides due diligence. Funds of funds charge an additional layer of fees for these services, but our research found that the median fund of funds had attractive risk-adjusted returns after fees. Significant dispersion in performance makes due diligence in choosing a fund of funds critical, in our view.

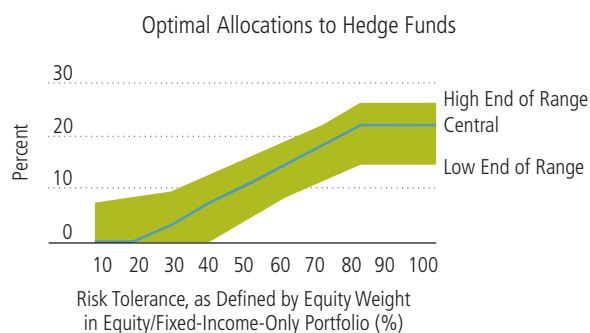
## Asset Allocation

Our research suggests that while a well-diversified allocation to hedge funds might improve portfolio returns, their greatest benefit is the risk reduction that comes from their low correlation to stocks. We have found that while most investors can accept a 10% decline in their wealth, they find losses on the order of 20%—which may force them to consider lifestyle changes—excruciatingly painful. After two bear markets in the past 10 to 12 years, many investors have significantly de-risked their portfolios, primarily by shifting a significant part of their portfolio from stocks to bonds or cash.

So, we looked at the probability of a 20% peak-to-trough loss for portfolios with allocations to various types of investments. For an investor with 60% of assets invested in equities and 40% in bonds, the odds of a 20% peak-to-trough decline at some point over the next 30 years was 27%. Allocating 14% of the portfolio to hedge funds would reduce the risk of a 20% peak-to-trough decline in assets to 18%, as shown in the display on the front page. Thus, in our view, liquid hedge funds can be an attractive addition to many long-term portfolios.

Display 7

### Investors' Objectives and Risk Tolerance Drive Our Optimal Allocations to Hedge Funds



As of May 31, 2012

Hedge funds are intended for investors with certain characteristics; these optimizations should not be construed to represent the appropriate allocation for every investor. Equities are assumed to be globally diversified; fixed income is represented by intermediate-term bonds. Hedge funds are well diversified. See Notes on Our Optimal Asset Allocations to Hedge Funds on page 10.

Source: AllianceBernstein



To determine the optimal allocations, we took the risk, return, and correlation outputs of our Wealth Forecasting System and applied a mean-variance optimization to identify the hedge fund allocations that would maximize the portfolio return on risk. We took into account the diminishing benefits of low correlations as portfolio weights increase.

The allocations to hedge funds that we recommend grow with an investor's risk tolerance, as shown in *Display 7, previous page*. There is, as always, an artificial precision to these recommendations. As you get to the high end of the range (18% for a 60/40 investor), the risk specific to hedge funds begins to outweigh the diversification benefits they offer. Below the range (below 8% for a 60/40 investor), the hedge fund allocations are not likely to have a meaningful impact on the portfolio.

When building our optimal portfolios, we sourced the allocations to hedge funds from the allocations to all other investments on a pro rata basis, because this adds to potential return while reducing risk. But investors have a range of

choices. To reduce risk even more, an investor could source the entire hedge fund allocation from stocks. We generally do not recommend sourcing the entire hedge fund allocation from bonds, because it would add substantially to portfolio risk.

In sum, our research suggests that a well-diversified, moderate allocation to hedge funds reduces the likelihood of a 20% peak-to-trough loss of the overall portfolio. This feature is particularly useful today, when extremely low bond yields make substantial investments in higher-returning assets crucial to funding long-term spending goals, and equity volatility remains daunting for many investors.

However, hedge funds pose particular risks not captured by their volatility, including the uncertainty of alpha, an unstable correlation to stocks, and potentially higher illiquidity in a market crisis, particularly if the funds are highly leveraged. Rigorous due diligence and broad diversification across managers and categories are essential to mitigating these risks. ■



## Notes and Disclosures

### Lipper TASS Database and Category Definitions

The Lipper TASS database includes the net-of-fee performance of individual hedge funds whose managers have elected to report to the database. In constructing our hedge fund, and fund of fund, indices, we included the performance of funds only after their managers decided to report to the database, and only for those funds that had at least \$10 million in assets under management. We also included the performance of all funds in the database that are no longer currently reporting. Based on the above selection criteria, there were 4,766 distinct hedge funds in the database during the 1996–2011 period. The indices are asset-weighted.

### Mercer Database of Equity and Fixed-Income Managers

In analyzing traditional, active, long-only equity manager and fixed-income manager returns, we used the Mercer database of US large-cap equity managers and US fixed-income core managers. The database includes the net-of-fee performance of individual managers. As of December 2011, about 1,300 investment services were included in the US large-cap equity manager database and about 370 in the US fixed-income core manager database. In both cases, we included the performance of all services in the database that were no longer currently reporting.

### Note on MSCI Data

Morgan Stanley Capital International (MSCI) makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This paper is not approved, reviewed, or produced by MSCI.

### Market Factors Used in Analyzing Sources of Returns

For each hedge fund category, we determined the market factors that drive that category's index returns. Using the selected market factors, we then analyzed each individual hedge fund's returns based on the category to determine what portion of return is attributable to these market factors (beta). Then we aggregated the betas of the individual hedge funds to determine the beta of each category and for the average hedge fund. We deem any return not attributable to beta to be alpha.

For hedge funds and long-only stock managers, the factors we used were the total returns of the S&P 500 Index and the Barclays Capital US Intermediate Treasury Index. For long-only bond managers, we used the total return of the Barclays Capital US Aggregate Bond Index.

### Notes on Sources of Asset-Class and Manager Data

Unless otherwise specified, throughout this paper we use MSCI World Index data for historical data on equities; the Barclays Capital US Aggregate Bond Index for bonds; and three-month US Treasury bills, rolled, for T-bills. For historical manager data we use the Lipper TASS database, as adjusted by AllianceBernstein to reduce biases, to represent hedge funds. We use Mercer databases to represent traditional long-only equity and fixed-income managers.

## Notes on Our Optimal Asset Allocations to Hedge Funds

We arrived at our optimal asset allocations using the standard technique of mean-variance optimization, which analyzes key projections from our asset-class research (expected return, volatility, and correlations) to identify the asset mix that best meets the investor's need. This technique assumes that investors seek rationally to maximize potential gain while minimizing risk. To determine the appropriate allocation to hedge funds, we first calibrate the investor's risk tolerance using only stock and bond assets (say, 60% stocks/40% bonds); then, we use that risk tolerance to evaluate incremental allocations to hedge funds. Note that optimization is not an exact science. While it pinpoints a single "optimal" portfolio, in practice other similar portfolios are likely to prove desirable, too.

## Disclosure on Historical Hedge Fund Portfolio Simulations

**Adjusted Databases:** We used the Lipper TASS hedge fund database and the Mercer databases, adjusted for survivorship and backfill bias, based on the criteria described in "Lipper TASS Database and Category Definitions" and "Mercer Database of Equity and Fixed-Income Managers" on page 9.

**Sampling Method:** Each trial consists of randomly picking a fund(s) for the portfolio from the database and holding it for two years. At the end of two years, the fund is replaced by another random pick that satisfies the same selection criteria. If the fund does not survive until the end of two years, it is replaced by another random pick that satisfies the same selection criteria for the remaining term.

**Trials:** We ran 1,000 trials in each simulation. A repeat of the analysis would yield slightly different results. Sharpe ratios have a standard error of +/- 0.01.

**Performance Calculation:** Performance is calculated monthly on an asset-weighted basis, and then each month is time weighted.

**Taxes:** Taxes have not been taken into account.

**Sharpe Ratio:** The Sharpe ratio is the overall performance of the fund(s) less the performance of cash divided by volatility.

**Rebalancing:** Because we resample portfolios every two years, results are influenced in part by a rebalancing benefit. Each resample is an equal-weighted portfolio across managers and/or segments.

**Other Important Disclosures:** The projections or other information generated by the simulation are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Financial models have many inherent limitations. For example, no model can completely account for the impact of the market, trading, and other risks associated with the diverse investment programs of alternative investment managers. There are frequently sharp differences between modeled results and actual results subsequently achieved, which could involve a complete or significant loss in an investment in any investment program. No representation or warranty is made as to the reasonableness of the assumptions made, that all assumptions have been stated, or that all relevant factors affecting performance metrics have been taken into account. Results of this financial model may vary with each use and over time.

## Notes on Wealth Forecasting System

The Bernstein Wealth Forecasting System<sup>SM</sup>, driven by the Capital Markets Engine, uses a Monte Carlo model that simulates 10,000 plausible paths of return for each asset class and inflation and produces a probability distribution of outcomes. The model does not draw randomly from a set of historical returns to produce estimates for the future. Instead, the forecasts (1) are based on the building blocks of asset returns, such as inflation, yields, yield spreads, stock earnings, and price multiples; (2) incorporate the linkages that exist among the returns of various asset classes; (3) take into account current market conditions at the beginning of the analysis; and (4) factor in a reasonable degree of randomness and unpredictability.

## Securing Your Financial Future

Building and preserving wealth across generations requires expert planning, unbiased advice and highly disciplined investing. Our clients are individuals and families, business owners, family trusts and foundations, and other financial guardians. We work in concert with their accountants, tax planners, trust and estate attorneys, and other expert advisors to resolve complex financial issues.

The core principles of our approach to building and preserving our clients' wealth are:

### Lifetime Wealth Planning

#### The Advice You Deserve

Putting sophisticated planning tools and expert advice to work for you, we help you make well-informed investment decisions.

### Our Best Thinking

#### Centrally Managed Investments

To give you direct access to our best thinking, we've structured our business around centralized research and investment management, with integrated wealth planning.

### Customized Portfolios

#### Attention to Your Details

Your particular circumstances guide the way we manage your money, as we tailor portfolios to your goals, income needs, tax situation and tolerance for risk.

### Tax-Aware Investing

#### Keeping More of What You Earn

To help you keep more of what your investments earn, we employ tax management strategies in multiple ways.

### Keeping You Informed

#### Communication Works Both Ways

When you're well-informed about the strategies we pursue, you're more secure. And the more we understand you, the better we can tailor solutions just for you.

### A Legacy of Trust

#### Commitment to Individuals, Families and Their Causes

When you entrust Bernstein to serve as your investment manager, you become part of a proud tradition of integrity, trust and financial success.

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1345 Avenue of the Americas  
New York, NY 10105  
212.486.5800

[www.bernstein.com](http://www.bernstein.com)