



The Education Committee of

# Greenwich Roundtable

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2011

IN THIS ISSUE

Operational Complexities

Volatility

Leverage

Liquidity

Is It Worth It?

## BEST PRACTICES IN ALTERNATIVE INVESTING: MANAGING COMPLEXITY



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*The Research Council enables the Greenwich Roundtable to host the broadest range of investigation that serves the interests of the limited partners and investors. This group wishes to help investors document the allocation process. Their business activities serve as an example to all of their sincere desire to educate investors and of their belief in our mission. Members of the Research Council not only provide no-strings funding but they have also assisted the members of our Education Committee.*

## ABOUT THE GREENWICH ROUNDTABLE

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The Greenwich Roundtable, Inc. is a not-for-profit research and educational organization located in Greenwich, Connecticut, for investors who allocate capital to alternative investments. It is operated in the spirit of an intellectual cooperative for the alternative investment community. Mostly, its 150 members are institutional and private investors, who collectively control \$2.2 trillion in assets.

The purpose of the Greenwich Roundtable is to discuss and provide current, cutting-edge information on non-traditional investing. Our mission is to reveal the essence of both trusted and new investing styles and to create a code of best practices for the alternative investor.

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*The Education Committee has been working as a group of altruistic investors who contributed their time and worked to raise professional standards. The final result is intended to demystify alternative investing and to bring about greater understanding. Investing in alternatives is not well documented. The Education Committee is chartered to conduct original research and develop best practices from the investors' point of view.*



## ACKNOWLEDGEMENTS

Once again, I am truly humbled by the commitment of so many friends and investors. We were a team of volunteers operating at its best.

It would be difficult not to acknowledge first, Rusty Olson, our sage editor who has now completed three groundbreaking Best Practices white papers. Rusty wove together the collective wisdom of scores of knowledgeable experts into one voice. Along the way he weighed that wisdom against the crucible of nearly 40 years of institutional investing experience. His instincts, his investor's perspective were invaluable.

Mark Silverstein, co-chairman of the Education Committee, provided the leadership in creating this white paper. This was his second Best Practices project and his practical common sense approach was only exceeded by his humility and good-natured cooperativeness.

Ed Barksdale, co-chairman, weighed in with decades of wisdom. His steady leadership has truly helped us raise the bar in our community.

Ray Gustin's energy and intelligence was amazing. In his third Best Practices project, Ray not only led the research on volatility but also jumped in to help whoever needed it. His ability to articulate the nuance was invaluable.

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We are deeply grateful to the contributors in the original discovery phase—the leading practitioners of our time—who generously shared what they knew. Very often people with this kind of knowledge wish to keep it to themselves.

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Steve McMenamin  
*Executive Director*



## HOW TO READ THIS WHITE PAPER

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How you, the reader, will read this white paper will depend on what level of responsibility and expertise you have, and what you are looking to get out of it.

The pull quotes in the margins might be viewed as a concise summary, but at the risk of oversimplifying concepts that can't readily be encapsulated in a few words.

If you are extremely experienced in the complexity of the volatility, leverage, and liquidity of alternative investments, you might review the headings in each chapter to see if a section might provide something new, thought-provoking, or even challenging.

If you are fairly knowledgeable about alternative investments, you still might want at least to skim each section to see if there are some ideas that lead you to stop and read more carefully, and ask yourself how you stack up against best practices.

If you are new to alternative investments or have not gotten deeply involved personally with them, then you might want to take time to read each chapter thoughtfully.

Throughout this white paper in referring to a person we have, for the sake of convenience, used the masculine pronoun. In all such cases, the *he* is used in the classical sense as shorthand to designate he or she.

Clearly, investing is every bit as much a woman's world as a man's world. But we prefer to avoid the imprecision of modern usage, such as each person does their own thing. And it is unwieldy to repeat each person does his or her own thing. That leaves us with only the classical approach.

“The cost of alternative strategies is the complexity they add. The benefit is the ability to source returns from a broader spectrum of opportunities.”

## COMPLEXITY—INTRODUCTION

“Oh, for the good old days,” might cry the director of an endowment or pension fund, thinking of the era before his fund’s portfolio included the myriad complexities introduced by hedge funds and private equity investments ... and when U.S. securities were less impacted by world events. Certainly alternative investments have made his job infinitely more complex than when his predecessor’s portfolio consisted entirely of listed U.S. stocks and bonds. But the benefit, if well executed, has been a portfolio with better risk-adjusted returns.

This white paper will focus mainly on the complexities inherent in alternative investments. But many of these complexities share roots with the same ones that existed in the simpler days, and they still apply to the more traditional parts of our portfolios today. The use of alternative investments has simply compounded the complexities.

The cost of complicated alternative strategies is the complexity they introduce into the portfolio management process. The benefit has been the ability to source returns from a broader spectrum of opportunities and ultimately to provide the prospect for higher risk-adjusted returns, the holy grail of investing. One goal of this paper is to explain the complexities so that investors are better informed of the risks they are incurring by managing a more sophisticated portfolio.

Complexity can bring benefits, but unnecessary complexity only masks risk and leads to unexpected troubles. The delicate balance to strive for is the minimum level of complexity necessary to obtain the desired portfolio. It is better to have visible complexity that is controllable rather than the appearance of simplicity with uncontrollable complexity underneath.

This paper is divided into five chapters. The first two, Operational Complexities and Volatility, apply to some extent across the portfolio. Chapters 3 and 4, Leverage and Liquidity, apply largely to alternative investments.

The themes underlying this paper are the crucial need:

- to understand the complexity of modern investing, especially with regard to volatility, leverage, and liquidity. In combination, these factors can compound their individual effects.
- to do continuous in-depth monitoring of all our investments, especially hedge funds, and
- to ask ourselves if we have, or can obtain, adequate resources to invest competently in alternative investments, or if we have just been including them because others have used them to improve their returns.

### “Investors”

In this white paper we will use “we” or “investors” as all-encompassing terms to include endowment funds, pension funds, foundations, insurance companies, and private family investors—the limited partners in hedge funds and in private equity funds. These are the investors for whom this paper was written.

“It is better to have visible complexity that is controllable rather than the appearance of simplicity with uncontrollable complexity underneath.”

“The delicate balance to strive for is the minimum level of complexity necessary to obtain the desired portfolio.”



## TABLE OF CONTENTS

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<b>Introduction</b> .....	3
<b>Chapter 1—Operational Complexities</b> .....	6
Reporting to Our Investment Committee and Our Constituents .....	6
Record-keeping for Private Equity .....	6
Asset Allocation .....	7
Rebalancing .....	7
Manager Selection .....	8
Principals and Agents .....	8
Consultants .....	9
Traditional Investment Managers .....	9
Hedge Fund Managers .....	10
Private Equity Funds .....	10
Greater Tax Complexities .....	13
<b>Chapter 2—Volatility</b> .....	14
Valuation .....	14
Levels One to Three .....	14
Investor Due Diligence .....	15
Measuring Volatility .....	15
Standard Deviation .....	16
Drawdowns .....	20
Choosing the Appropriate Measurement Interval .....	21
The Reward of Continuing Due Diligence .....	21
Causes of Volatility .....	22
Correlations .....	24
Estimating Correlations for Hedge Funds .....	25
Volatility of Correlations .....	25
Estimating Correlations for Private Equity .....	28
Dealing with Non-Normal Return Distributions .....	28
Tail Risk Hedging .....	29
Developing a Strategy for Managing Volatility .....	30
Lessons Learned .....	31
Understanding Beta .....	32

## TABLE OF CONTENTS

<b>Chapter 3—Leverage</b> .....	33
Forms of Leverage.....	33
Borrowing.....	33
Derivatives.....	34
Embedded Leverage.....	35
Implications of Leverage.....	35
Uses of Leverage in Hedge Funds.....	35
Evaluating Appropriate Uses of Leverage.....	36
Matching Terms.....	36
Measuring the Leverage of a Hedge Fund.....	37
How to Address Long and Short Positions.....	37
How to Calculate the Size of Positions.....	38
Evaluating Option Prices.....	38
Leverage in Private Equity.....	40
Lessons Learned.....	41
Prime Brokers and Lenders.....	41
Hedge Fund Managers.....	41
Investors.....	41
<b>Chapter 4—Liquidity</b> .....	42
Managing Liquidity.....	43
The Return Premium for Illiquidity.....	44
The Illiquidity Premium for Private Equity.....	48
Liquidity of Hedge Funds.....	49
Hedge Fund Definitions.....	50
Portfolio Liquidity.....	51
Liquidity of Private Equity.....	52
Lessons Learned.....	53
<b>Chapter 5—Is All the Complexity Worth It?</b> .....	54
The Challenges of Alternative Investments.....	54
Has the Added Complexity Been Worth It?.....	55
Institutional Results.....	56
Questions for Investors to Ask Themselves.....	58
<b>Glossary</b> .....	59
<b>Bibliography</b> .....	61

## CHAPTER 1 OPERATIONAL COMPLEXITIES

“Adding private equity (or real estate) investments to our portfolio introduces a new layer of record-keeping requirements.”

“Limit our portfolio benchmarks to only the *liquid* portion of our portfolio, leaving us to evaluate our alternative investments more judgmentally over time.”

The first thing we notice when we begin adding alternative investments to our portfolio is that we can't get a daily portfolio valuation. Often we can't even get a month-ending portfolio valuation until we receive the valuations of our hedge funds, sometimes two to five weeks after the end of the month. Valuations of our private equity investments arrive perhaps two months later, and those private equity valuations are based on a lot of human judgment. We don't really know the true value of a private investment until it is sold.

This chapter will touch on the ways alternative assets impact our governance, our asset allocation, our manager selection, and our principal/agent conflicts.

### REPORTING TO OUR INVESTMENT COMMITTEE AND OUR CONSTITUENTS

Alternative investments delay our routine reports to our investment committee—and they add complexity to how we report as well as how our constituents should read our reports. For example, many of us find it helpful to compare our portfolio's performance with a benchmark—often two benchmarks: (a) our Policy Index, the index returns on our target asset allocation, and (b) our Allocation Index, the index returns on our asset allocation as of the end of the prior quarter. The second benchmark can indicate how our managers, in the aggregate, are performing relative to their individual benchmarks. The difference between the two benchmarks can indicate how much return we have earned (or lost) by deviating from our target asset allocation.

But what benchmark returns do we use for our hedge funds and private equity investments? Hedge fund indexes all have significant caveats attached to them, and they can be questionable benchmarks for our portfolio's particular hedge funds. Reliable quarterly indexes for private equity simply don't exist<sup>1</sup>, so in our reports we have two choices. One choice is to conjure up some quarterly index numbers for each alternative investment, which makes our benchmark comparisons very difficult to interpret. The second choice is more pragmatic. Limit our portfolio benchmarks to only the *liquid* portion of our portfolio, leaving us to evaluate our alternative investments more judgmentally over time.

### RECORD-KEEPING FOR PRIVATE EQUITY

Adding private equity (or real estate) investments to our portfolio introduces a new layer of record-keeping requirements. The time-weighted rates of return we are so accustomed to using for our traditional investments are not applicable to private equity. Because contributions to and payouts from a private equity fund are made at various times over the years, the only relevant rate of return is a cash flow rate of return. For each private equity investment, our custodian must carefully record all cash flows—the date and amount of each contribution and payout—and the IRR (internal rate of return) is calculated on those data.

Each private equity fund will typically report its IRR to date, based on the latest valuation of the fund, but we might benefit by calculating our own IRRs and reconciling them with those reported by the fund, although this might be difficult to do for investors with limited staffs or for their accountants.

<sup>1</sup> A helpful index of returns on private real estate investments is the NCREIF Index (National Council of Real Estate Investment Fiduciaries), but it doesn't begin to show the underlying true volatility in the real estate market.



ASSET ALLOCATION<sup>2</sup>

We understand how important it is to have a well-diversified portfolio, and some of us use efficient frontier algorithms to develop an optimum policy asset allocation. Others use environmental scenario testing to understand and provide for the continuing change in the diverse factors that drive performance. In either case, the exercise begins and ends in complexity, and it's no better than the assumptions we put into it.

With an efficient frontier program, we must enter our assumption for the future annual return, volatility, and correlations for each individual asset class. We know that the 10-year returns and volatility of any given asset class have varied greatly. So our best approach is to run a large number of efficient frontier iterations using Monte Carlo simulations with different return, volatility, and correlation assumptions and try to find an asset allocation that will hold up fairly well under most scenarios. That involves a high level of complexity even in the most traditional range of stock and bond asset classes.

Hedge funds add more complexity to this efficient frontier exercise, because there isn't as much historical data to lean on, and the factors driving performance of hedge funds are changing continuously. The term "hedge fund" encompasses a wide range of strategies with vastly different characteristics that are hard to quantify. Mathematical models are of little help. It's difficult for a mathematical model to reveal strategy drift, to predict a run on a hedge fund because the hedge fund lacked the cash to stay in its investments, or to predict outright fraud exposed by rising margin requirements.

We need to understand outcomes that can't be quantified. This is accomplished through a rigorous intellectual discipline and a deep-dive due diligence process which, taken together, lay a foundation for good judgment.

Private equity doesn't fit well in an efficient frontier exercise because inputs for that exercise have to be denominated in time-weighted returns and annual volatility. Private equity returns, however, are measured in IRRs. Annual volatility of private equity doesn't mean much, given its illiquidity, the nature of its valuations, and the varying amount of assets during the time a private equity fund is being ramped up and down. Thus our target allocations to the various kinds of private equity must necessarily entail a great deal of judgment.

The above practices for asset allocation are not something that can be readily pursued by most of us who are private family investors. Keeping track of the range of managers with similar strategies is too labor intensive and difficult. Often our best approach is to find a network of sophisticated investors with whom we can share information and ideas.

**Rebalancing**

If we target X% of our portfolio to large U.S. stocks, we can move into or out of that allocation immediately, and we can rebalance to that allocation whenever we like. Hedge funds require a lot more effort (complexity) to invest in them—extra due diligence and reviewing partnership agreements, for example. And hedge funds are far harder to rebalance or redeem, as each has different redemption terms that can include a lockup of one to three years and can require six months or more advance notice (assuming the hedge fund doesn't impose a gate to limit redemptions). Even then, for full

“For asset allocation, some investors use efficient frontier algorithms, others use environmental scenario testing. In either case, it's no better than the assumptions upon which it is based.”

“Hedge funds are far harder to rebalance or redeem.”

<sup>2</sup>See *Best Practices in Alternative Investing: Portfolio Construction*, Greenwich Roundtable, 2009, Chapter 2, Diversify, p. 16.

## CHAPTER 1 OPERATIONAL COMPLEXITIES (CONTINUED)

“Estimating how we can reach and maintain our target allocation to private equity adds complexity to our planning.”

redemptions, the wire from the hedge fund is usually only 90–95% of the account value, with the remaining 5–10% held back (and often without interest) until after the next annual audit.

Because managers of hedge funds and private equity view their investors as partners, our interpersonal skills can go a long way to reassure them that there is nothing personal about our redemptions.

Private equity investments are far harder to maintain at our targeted allocation. Once we agree to commit to a private equity fund, it can take three to five years before the fund has called down all of our money, during which time we must be sure always to have cash available for a capital call with a two-week lead time. If we target 5% of our portfolio to a particular kind of private equity, and we want to invest in, say, five or 10 different funds, it can take a good number of years before we can ramp up to about 5%. And trying to stay close to 5% is very difficult. Because private equity funds are distributing profits while we are meeting cash calls from other funds, we have to make commitments to private equity funds that are materially larger than 5% of our portfolio. So depending on the cash flows to and from private equity funds, we can at any point be several percentage points away from our target of 5%. In short, estimating how we can reach and maintain our target allocation adds a great amount of complexity to our planning.

### MANAGER SELECTION

One of our most complex tasks, even with traditional managers, is selecting the best managers for each asset class. We evaluate

track records, but they can be useless unless we can, with confidence, attribute predictive value to them. To make this judgment, we gather detailed information about the manager—such as the uniqueness of its investment strategy, the continuity of its key decision-makers and staff, how long they’ve been doing it, how the managers are compensated, the firm’s culture, the quality of the firm’s risk management, and the amount of money the firm manages and how that has changed over time.

These judgments become even more complex when it comes to selecting hedge fund and private equity managers. The investment strategy of hedge funds can be far more challenging to understand. Understanding comes from a deep familiarity with the mechanics of the capital markets and the personalities that define top-tier funds. With private equity, the fact that we are making a commitment for five to 15 years increases our challenge.

### PRINCIPALS AND AGENTS

Ideally, we would like our consultants and managers to be motivated to do exactly what we would do if we were as competent in their specialty. The truth is that we operate in a world of *principals*<sup>3</sup> (such as our fund) and *agents* (our consultants and managers), and we haven’t found a perfect way to structure their financial motivations so as to be congruent. But we should make every effort to minimize the inevitable differences in our motivations.

To begin with, it is crucial that none of our consultants or managers has any compensation other than the fees that we and similar clients pay. We should also look hard for any other

<sup>3</sup>There is even a principal/agent dichotomy within our own fund—the principal (the institution itself) and the agents (the investment committee, the CIO, and the staff), each of which has its own self-interest that may occasionally be less than fully aligned. Can the staff afford to be as long-term oriented as the institution should be? For example, is the staff sometimes deterred by its own perceived career risk from making its best recommendations to the investment committee? Will the staff be willing to recommend an unusual investment and expect to get a full, open-minded hearing from the committee? Could the staff expect not to get fired if such an investment proved unsuccessful? To best align the staff’s motivations with those of the institution, how should the chief investment officer be compensated—by salary, or salary plus incentive pay? How should incentive pay be calculated? How should members of his staff be compensated?

potential conflicts of interest they may have. Time conflicts, such as heavy client obligations, may divert an undue share of the manager's valuable hours. As principals, our time horizons may be longer than our agent's. For example, being a contrarian requires us, at times, to be alone and wrong for longer than consultants or managers believe they can afford. Ultimately, agents are motivated by earning fees rather than, per se, preserving and growing our capital.

### Consultants

Investors hire consultants for a variety of reasons. Some investors are seeking targeted expertise, while others lean heavily on consultants' recommendations for their asset allocation and manager selection. Others use consultants mainly as an independent pair of eyes on their process.

Consultants are typically paid either a percentage of assets or a flat fee. They live on their reputations of retaining clients. We want the best they can give us. But if they sense that an opportunity may take us outside the norms of other funds, or outside our comfort zone, many consultants are not willing to make the recommendation. The penalty for potentially getting fired is too great a risk—their risk. How do we get our consultants' best? We must make clear what we expect of them, and that we want to hear their best ideas no matter how far outside the box they may be.

Consultants often don't want to spend time researching very small managers, because they seek managers that they can use in many client accounts. Yet some of the best managers are ones who focus only on a small niche and never get into the consultants' universe. Consultants typically exclude new managers because of the consultants' own perceived business risk. In

addition, some consultants have knowledge of some strategies to the exclusion of others. For example, knowledge of commodity trading advisors (CTAs), reinsurance, and global macro strategies is limited to a few specialist consultants. Other consultants avoid these strategies because of the intellectual difficulty involved in developing expertise on those managers and their diversification benefits.

### Traditional Investment Managers

The management fee charged by most managers of listed stocks and bonds is typically a percentage of assets in our account. They are financially motivated to keep raising assets even when it is questionable whether they will be able to sustain their historical alpha with more money and accounts under management. As clients, our complex task is to judge when a manager may be adding more assets than he should.

As an alternative fee structure, a few managers offer clients a choice of either a flat percentage of assets, or say, half the normal fee plus a performance fee. The performance fee, if it's relative to an index, can get quite complex to calculate, especially if there are contributions and withdrawals to and from the account on odd dates. Of course, in a sense, all fees are performance fees, because if the manager underperforms, it may lose its fees.

As agents, managers strive to retain their present clients while attracting others. This motivation often leads many to avoid deviating far from their benchmarks because managers believe most clients become concerned about a manager whose returns at times fall much below benchmark returns. Consequently, if a stock happens to equal 5% of their benchmark index,

“We operate in a world of principals (such as our fund) and agents (our consultants and managers).”

“Being a contrarian requires us, at times, to be alone and wrong for longer than consultants or managers believe they can afford.”

## CHAPTER 1 OPERATIONAL COMPLEXITIES (CONTINUED)

“Managers eating their own cooking is one of the good things about alternative investments.”

“Managers who have most of their net worth in their fund are undiversified personally. They may be susceptible to making a ‘Hail Mary pass’ in a tough situation.”

many managers tend to hold at least 3% of their portfolio in that stock, even if they believe it is far overpriced. That may not be what we as their client would want them to do.

Other concerns we should consider: If the manager manages multiple funds with different objectives, how much of a distraction are the other funds he manages? Has the manager allowed himself to become a media personality? Is he emotionally disciplined? Will he allow himself to admit he’s wrong and submit to public criticism? Is he too busy managing the firm’s business? Has the culture changed after the firm was bought by a larger organization?

### Hedge Fund Managers<sup>4</sup>

The concern about assets under management is also a concern with hedge fund managers. Many of the complexities of hedge funds are outlined in subsequent chapters on volatility, leverage, and liquidity. But we still need to deal with the challenges of the principal/agent relationship.

Hedge funds typically charge 1 to 2% of a client’s account—much higher than a traditional manager—plus an incentive fee, perhaps 15 to 20%, of profits. The incentive fee includes unrealized profits, although a high water mark requires the fund to make up losses before it receives a new incentive fee. Many hedge fund managers are principals as well as agents, as their funds often include a meaningful percentage of their personal wealth—important for us to review in our due diligence. Managers eating their own cooking is one of the good things about alternative investments. But, because managers who have most of their net worth in their fund are undiversified personally, they may be susceptible to making a “Hail Mary pass” in a tough situation.

Despite their incentive fees, hedge fund managers may be tempted to add more assets and clients than they should, as management fees can become a large source of profits for them. Some of the more successful and reputable hedge funds decline further contributions, especially from new clients, and a few hedge funds return assets to their investors when they believe their assets have grown too large to manage with optimum effectiveness.

At times, the incentive fee of hedge fund managers might tempt them to take more risk than we would like, or perhaps to reduce risk to help lock in a large incentive fee. Few hedge funds provide for clawbacks of incentive fees. So if a hedge fund has a very successful year, reaps a large incentive fee, and then goes into a tailspin, the manager keeps the prior incentive fee even if the NAV never recovers to its high water mark or the fund subsequently goes out of business. Not fair to the investor. Detecting the potential for such an event is a challenging part of our due diligence.

Most incentive fees are calculated separately for each investor, but some are based on all investors as a group. Most hedge funds accrue incentive fees monthly and pay them annually or semi-annually. A few do it differently, and it’s important to understand how the fees are calculated.

### Private Equity Funds

If the terms and conditions of hedge funds are complex, they often seem simple relative to terms and conditions of a private equity fund. As investors, our goal is to negotiate terms that align the managers’ financial motivations as closely as possible with ours. That is not always possible, as sometimes a fund’s terms are already

<sup>4</sup> For due diligence on hedge funds, see *Best Practices in Alternative Investments: Due Diligence*, Greenwich Roundtable, 2010, Chapter 2, p. 28.

## CHAPTER 1 OPERATIONAL COMPLEXITIES (CONTINUED)

cast in concrete, and we must either take them or leave them. If we are an early or large investor, sometimes we can effect meaningful changes in terms, and certainly we should try<sup>5</sup>. In any case, we should not commit to an investment unless both we and our attorney are comfortable with the terms.

When reviewing terms, here are some important things to look for:

- During the fund's investment period, management fees are sometimes calculated as a percentage of the investor's commitment. If so, once the fund is fully invested or the investment period has expired, management fees should then be based on the investors' remaining invested capital and should decline over time. Management fees should not be based on market value unless lower than cost.
- The incentive fee should be based on the fund's cash flow rate of return to investors, net of all costs and fees, including UBIT (unrelated business income tax), if any. The IRR should reflect the amount and date of every contribution from and distribution to the investors, and every distribution should be treated the same, whether it results from income, a gain, or a return of capital.
- The incentive fee should be calculated on the whole fund, not on an asset-by-asset basis. We are interested in the performance of the *overall* portfolio, and the manager should be as well. The manager should try to improve the returns of his losers as well as his winners, whereas an asset-by-asset performance fee focuses his attention only on his winners.
- If the incentive fee includes a hurdle rate, the investors should receive all distributions until they have received an internal rate of return equal to the hurdle rate. Thereafter, the general partner should receive no more than 50% of the net profits during the catch-up until he has received his share of cumulative profits. There may be some trade-off between the catch-up rate and a higher hurdle rate.
- Ideally, the incentive fee should be a back-end fee, calculated on the fund's actual return—cash contributed to cash paid out. Payment of an incentive fee should begin only after the program has returned all contributions to the investors.

If a back-ended incentive fee cannot be negotiated, then investors should require a clawback provision that makes the management firm and its individual members responsible for repayment of excess incentive fees in the event that the manager has received an overpayment. The clawback should be for 100% of the overpaid incentive fee, not net of any taxes or other expenses that the management firm or its individual members have incurred. A provision in some agreements calls for the performance fee to be paid every three years, with 25% of each incentive fee payment held back and paid in subsequent years if still earned. An escrow account for accrued performance fees adds further security. Note that, unless otherwise provided, any clawback payment implicitly assumes a 0% discount rate on the investors' overpaid fees.

“As investors, our goal is to negotiate terms that align the managers’ financial motivations as closely as possible with ours.”

“We should not commit to an investment unless both we and our attorney are comfortable with the terms.”

<sup>5</sup> The Institutional Limited Partners Association ([www.ilpa.org](http://www.ilpa.org)), an industry association with more than 200 members managing more than \$1 trillion in assets, has developed a set of proposed guidelines for private capital terms and governance issues that may be helpful during the negotiation of terms.

## CHAPTER 1 OPERATIONAL COMPLEXITIES (CONTINUED)

“Ideally the incentive fee in private equity should be a back-end fee, calculated on the entire fund’s actual return—cash contributed to cash paid out.”

“For full alignment of incentives, the manager’s sole source of income should be the investors’ fees.”

- If the partnership pays for the fund’s organizational expenses, a reasonable cap should be set, and the expense should be deducted from subsequent management fees.
- For full alignment of incentives, the manager’s sole source of income should be the investors’ fees. If the manager should earn additional fee income—such as investment banking fees, breakup fees, property management fees, or fees for serving as director on the boards of investee companies—all these fees should redound to the benefit of the investors. The manager will earn his share of them through his performance fee.

It may be unwise, however, to arrange for such fee income to be treated simply as additional fund income, because most of these fees might constitute UBTI. Funds typically deal with this problem by providing that such fee income shall first offset management fees—current, previous, and future fees—otherwise payable by the fund to the manager. If fee income should exceed fees payable, then the balance of fee income should go to the fund.

This treatment of other fee income minimizes potential conflicts of interest. A manager, in negotiating a private investment, can structure the deal in multiple ways—such as higher fee income and a lower price. By treating all such fees as recommended above, the trade-off becomes irrelevant to the manager, and he focuses only on what represents the best overall deal.

In real estate funds, if fees are paid to the general partner or affiliates for additional services—such as property management, financing, construction development, and transaction or lease brokerage—such fees could potentially dwarf the importance of performance fees and water down their motivational value to the manager, even if the manager’s fees are competitive with third party fees for the same services.

- Preferably, there should not be multiple closings, but multiple closings are often desirable from a practical standpoint. If so, a late investor should not only pay fees from the beginning of the fund but, in addition, should pay interest to the initial investors from the date of the first cash call to the date of the late investor’s contribution, and at a rate of return closer to the fund’s target rate of return, such as LIBOR plus 6% (although there are varied opinions among investors as to what the rate should be).
- Many partnership agreements provide some possibility for making distributions in kind (distributing shares of stock, for example) in lieu of a cash distribution. In such cases, agreements should include the following provisions to protect investor interests:
  - a. Any in-kind distribution should be restricted to freely tradable securities.
  - b. Each investor should have the right to choose between receiving cash or the freely tradable securities, but the general partner should receive his share of such distribution in kind.

## CHAPTER 1 OPERATIONAL COMPLEXITIES (CONTINUED)

- c. For purposes of calculating performance fees, the per-share valuation of an in-kind distribution should be the alternative cash distribution or the immediately realizable value of the securities, net of any transaction and market impact costs.
- Any side letter to one investor should be made available to all other investors.

### GREATER TAX COMPLEXITIES

If we are beginning to invest in alternatives as an individual taxable investor, the initial shock will come at tax-reporting time when we become confronted with K-1 reports from each of our private investments. Each K-1 can potentially require us to report income on multiple locations of our tax return.

Unrelated business taxable income (UBTI) is nothing new, but it can be impacted by the increasing use of LLC (limited liability company) structures by portfolio companies. As pass-through entities, LLCs have reported more UBTI, a concern for non-profits and foundations, which are taxed on UBTI. Quirky tax liabilities can occur at the state level, where UBTI losses in one state can't be offset against UBTI gains in another state.

FASB Accounting Standards Codification 740 (formerly known as FIN 48) is a relatively new requirement that attempts to expose/disclose income tax risks.

Claiming treaty benefits in foreign tax jurisdictions to reduce or avoid tax withholdings on proceeds from liquidations can be a complicated process. With a fund-of-funds, particularly for tax-exempt

investors, these withholdings are sometimes difficult to recoup on behalf of the investors. Effectively connected income (ECI) is subject to withholding tax for foreign investors (even tax-exempts), and so is foreign investment in real property tax (FIRPTA). Withholding on fixed, determinable, annual, periodical income (FDAP) is also required on earnings distributed to foreign investors.

Foreign bank and financial accounts (FBAR) reporting is required annually of all U.S. persons holding, or with signature authority over, foreign financial accounts. The interpretation of the rule is still evolving, and at one time it had investors listing every off-shore private capital fund investment held. The penalties for non-filing are stiff.

Disclosure requirements on tax filings are increasingly detailed and numerous. K-1s issued by private capital funds sometimes lack the detail, or provide differing levels of detail from firm to firm. Specifically, some of the disclosures that have been growing in complexity are Form 926 (transfers of property to foreign corporations), Form 8886 (reportable transactions), PFIC (passive foreign investment company), and 743e (elections relating to transfers of interest).

Increasing sophistication by states in tax collecting, especially where states are cash-strapped, has added to complexities. More state-sourced income is being reported, requiring more state tax filings.

We must have internal staff competent to do these filings, or else rely on outside tax experts. Either way, costs can add up fast.

“If we begin to invest in alternatives as an individual taxable investor, our initial shock will come when the K-1 reports arrive.”

“Disclosure requirements on tax filings are increasingly detailed and numerous.”

## CHAPTER 2 VOLATILITY

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“Volatility is the beginning of complexity, even in the simplest portfolio.”

Too many of us try to simplify risk by defining it as volatility—uncertainty in different markets. But volatility is only one aspect of investment risk. The most fitting definition of risk is the potential for a loss of capital.

Volatility, of course, is the beginning of complexity, even in the simplest portfolio. We need to understand the range of volatility over time, not only for each different asset class and for each individual manager or investment strategy, but also their cumulative impact on the overall portfolio. We need to come to terms with how much volatility we can stomach as individuals and institutions.

The subject of volatility is one of continuous learning, as many of us discovered in painful ways during the market disaster of 2008 and the turbulent summer of 2011. It helps if we gain some understanding of the underlying *causes* of volatility and how those causes change over time. We need to understand that there are tradeoffs in our attempts to dampen volatility. Seeking low volatility may cause us, like the crowd, to sell into a plunging market and give up the opportunity for the long-term returns we might have had.

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### VALUATION

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Volatility, of course, is the change in *market value*. Before getting into measures of volatility, we should understand how market values are established and by whom. Under FASB Accounting Standards Codification 820 (formerly known as FAS 157), all funds must today base valuations

on market value, and they must categorize each asset other than U.S. Treasury bonds by three levels of valuation reliability.

#### Levels One to Three

Level One includes closing bid prices on all listed and other actively-traded securities.

Level Two covers liquid non-listed securities (such as bonds) and less-active markets, where prices are based on assets that are similar to, but not the same as, those that are actively traded. Where there is no less-active market, some observable market data may be considered sufficiently applicable.

Level Three covers assets that are difficult to price because there are no observable prices. Valuation methods employ unobservable inputs that are supported by little or no market activity. Common methods include comparable transaction multiples, comparable trading multiples, and discounted cash flow—methods generally based on International Valuation Standards (IVS 2007).

Historically, private equity used cost or the value of the latest round of financing to determine fair value. But that approach is no longer acceptable.<sup>6</sup> Today GAAP (generally accepted accounting principles) defines fair value as “the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.” (But what if there is no orderly market on the valuation date?)

“We need to understand that there are tradeoffs in our attempts to dampen volatility.”

<sup>6</sup> Venture capital managers still often value an investment at cost for a period of time after acquisition, until the manager can obtain a supportable third-party valuation.



## CHAPTER 2

### VOLATILITY (CONTINUED)

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For valuing private companies, the earnings approach is most widely used. This approach takes into consideration a company's financial condition and operating results, usually operating profits, cash flow, or profits before tax, and applies a relevant multiple based on the manager's judgment, then reduces this amount by the net debt the company carries.

Other valuation approaches include: (a) forward-looking discounted cash flow methodologies, used in limited situations; (b) net asset methodologies, derived mainly from the underlying value of tangible assets rather than performance; and (c) industry-specific benchmarks, such as price per subscriber or other industry norms.

The levels of transparency have added an administrative burden to managers of alternative investments and higher auditing expenses paid by investors, but they have not affected the way managers invest. Many investors are not sure that the increased transparency has helped them all that much. They believe that valuations are now more precise but not materially more accurate.

#### Investor Due Diligence

Investor due diligence on valuation methods is particularly important with respect to hedge funds. Funds that are overly conservative in their valuations allow investors to buy into the fund at favored prices but penalize existing investors and redeemers. On the other hand, funds that value assets too aggressively penalize investors as they enter the fund but give an advantage to redeemers. The impact is particularly significant if the fund includes less liquid assets.

Investors need to understand the manager's valuation approach, the frequency of valuations, and the input of third parties such as administrators, prime brokers, and pricing services. During initial due diligence, investors should review the pricing process, using live examples with the fund's operations managers. Investors should separately interview the fund's administrator, prime brokers, and pricing services to understand the role of each.

Best practice is for net asset values to be computed by the administrator where possible. To the extent that managers are pricing assets to determine the NAV, they should abide by "agreed upon procedures" that have been created in conjunction with and approved by the independent auditor. Those procedures should be tested annually. This process provides comfort to investors that managers are acting appropriately when they price securities. Best practice includes levels of separation, independence, review, and controls to ensure the highest quality valuations. Investors should make sure this process is taking place if pricing is not independent.

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#### MEASURING VOLATILITY

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The first step in understanding volatility is to establish a way to *measure* it. But there is no single measure of volatility that doesn't have crucial caveats.

“The objective of any risk management measure is not to predict future events, but to understand the vulnerabilities that our current portfolio is exposed to.”

“There is no single measure of volatility that doesn't have crucial caveats.”

“Don’t dwell on short-term portfolio moves.”

“At the end of the day, if you don’t contemplate rare events, then you’re not protected.”

### Standard Deviation

Volatility is most often measured by standard deviation—the variability of returns from their average return. Standard deviation is a fundamental building block for measures used in portfolio construction, such as the mean-variance basis of the efficient frontier, the Sharpe Ratio, and the information ratio, and for measures of risk such as value-at-risk and semi-variance.

Users of all of these measures should understand the key assumptions built into the use of the standard deviation. These assumptions include the following:

- Returns are normally distributed symmetrically around the mean return. This implies that two different patterns of return can show the same nominal volatility.
- The return for any given time period is independent of returns for any other time period. This implies, for example, that one month’s return is unaffected by any prior month’s returns.
- Standard deviation is calculated for a specific interval, and we must judge how applicable that measure may be for other time periods.

Each of the above assumptions can lead us astray.

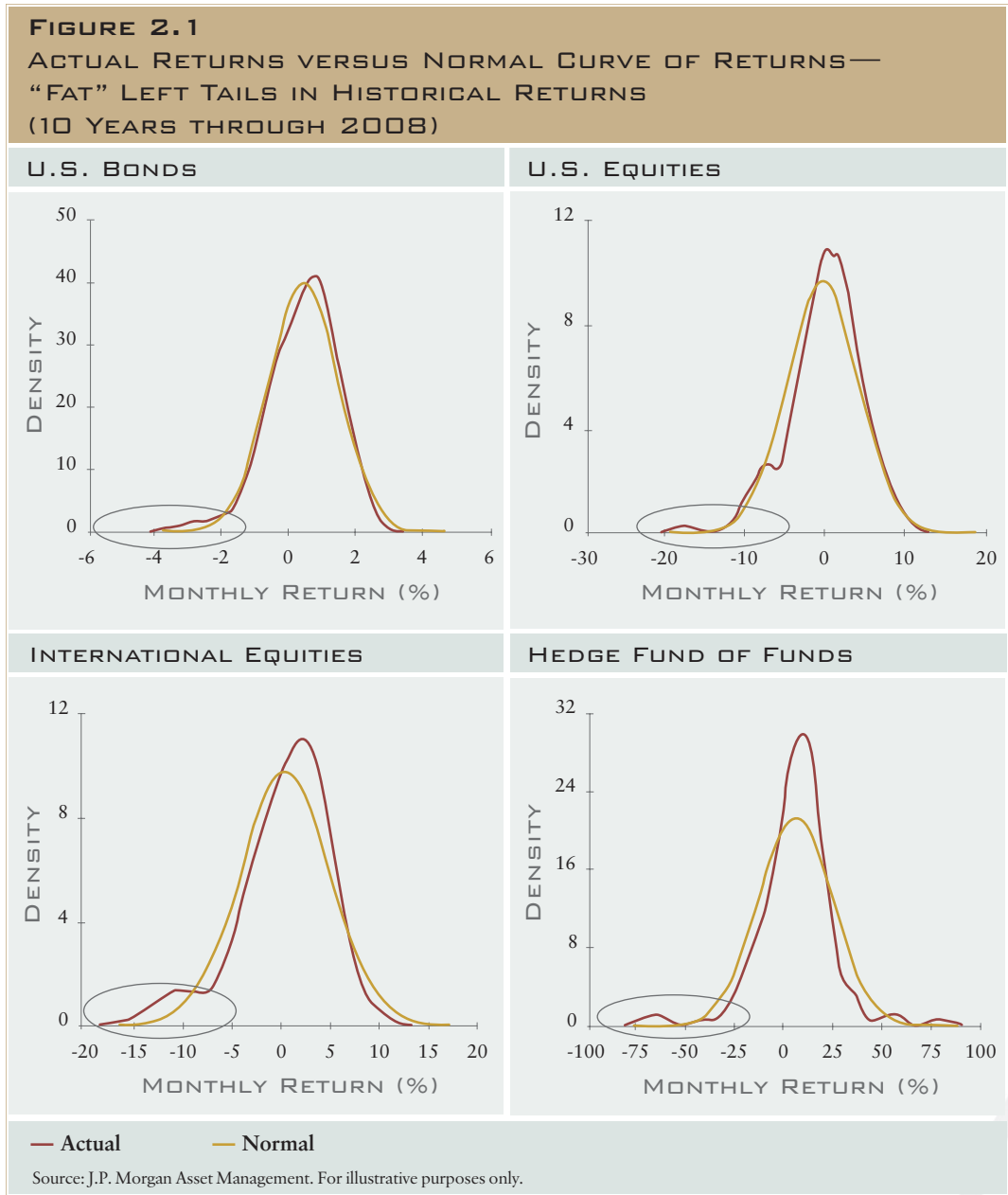
Assumption That Returns Are Normally Distributed—the assumption that there are as many deviations of return at each range above the mean as below. Actual investment returns have generally been characterized by fat left tails—infrequent, strongly negative returns that are much more severe than predicted by the standard deviation, the “black swans” described by Nasim Taleb.<sup>7</sup> This is well illustrated in Figure 2.1 by J.P. Morgan’s analysis of four broad markets over the 10 years ending in 2008.

The black swan of 2008 was not a one-time event. Witness in Figure 2.2, on page 18, the explosions of rolling 30-day volatility of stock returns between 1900 and 2010.

Assumption of Independence. Standard deviation understates volatility if the returns for individual months (or other intervals) are serially correlated, compounding their volatility over longer intervals. While some investors assume each day’s prices are independent of the prior day, other investors believe in path dependency. This means that the price of a security tomorrow will be somewhat dependent on the events and pricing action of the prior days. This perspective can be supported by the evidence of trending in prices. What people decide today can be dependent on what others decided yesterday, and prices follow suit. Returns on public equity as well as private equity and certain hedge funds tend to be loosely correlated with prior periods’ returns.

<sup>7</sup> Nasim Taleb, *The Black Swan: The Impact of the Highly Improbable*, Random House, 2007.

CHAPTER 2  
VOLATILITY (CONTINUED)

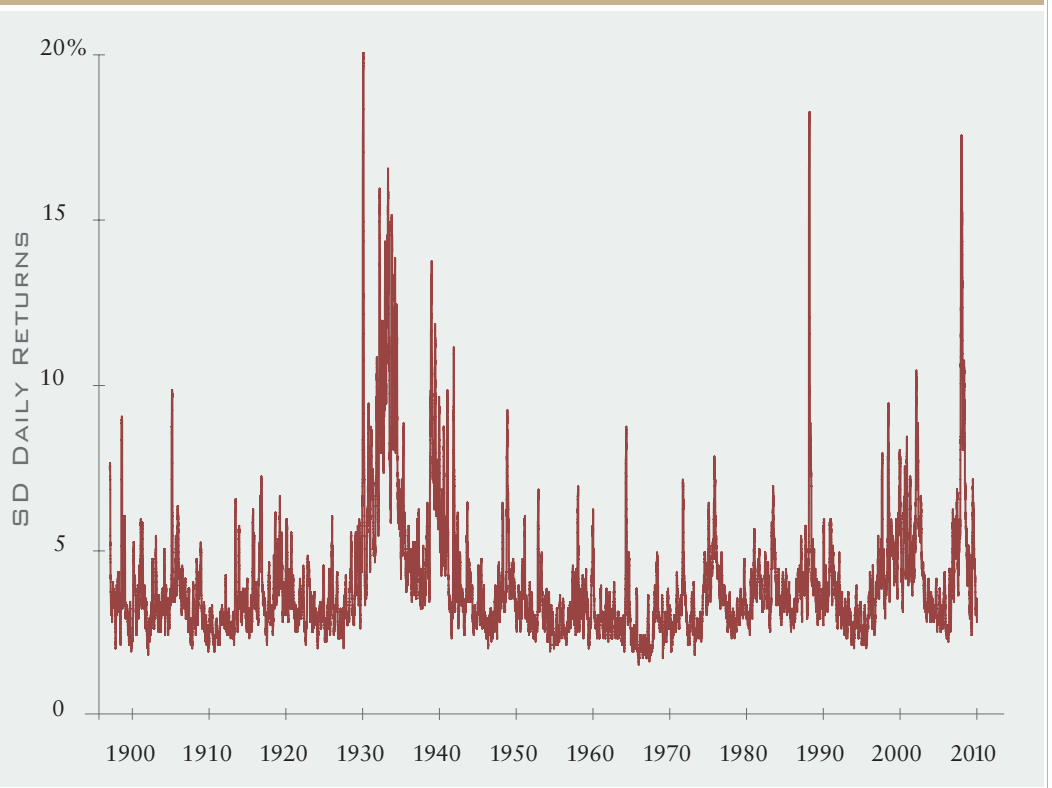


“Investment returns have generally been characterized by fat left tails—infrequent negative returns that might be considered black swans.”

“The standard deviation can overstate or understate volatility.”

CHAPTER 2  
VOLATILITY (CONTINUED)

**FIGURE 2.2**  
ROLLING 30-DAY STANDARD DEVIATION OF DAILY STOCK  
RETURNS (1900-2010)



Source: Greenwich Roundtable

On the other hand, the standard deviation may overstate volatility if the returns for individual periods have a tendency to revert to the mean. This sometimes can happen with interest rate arbitrage strategies, for example.

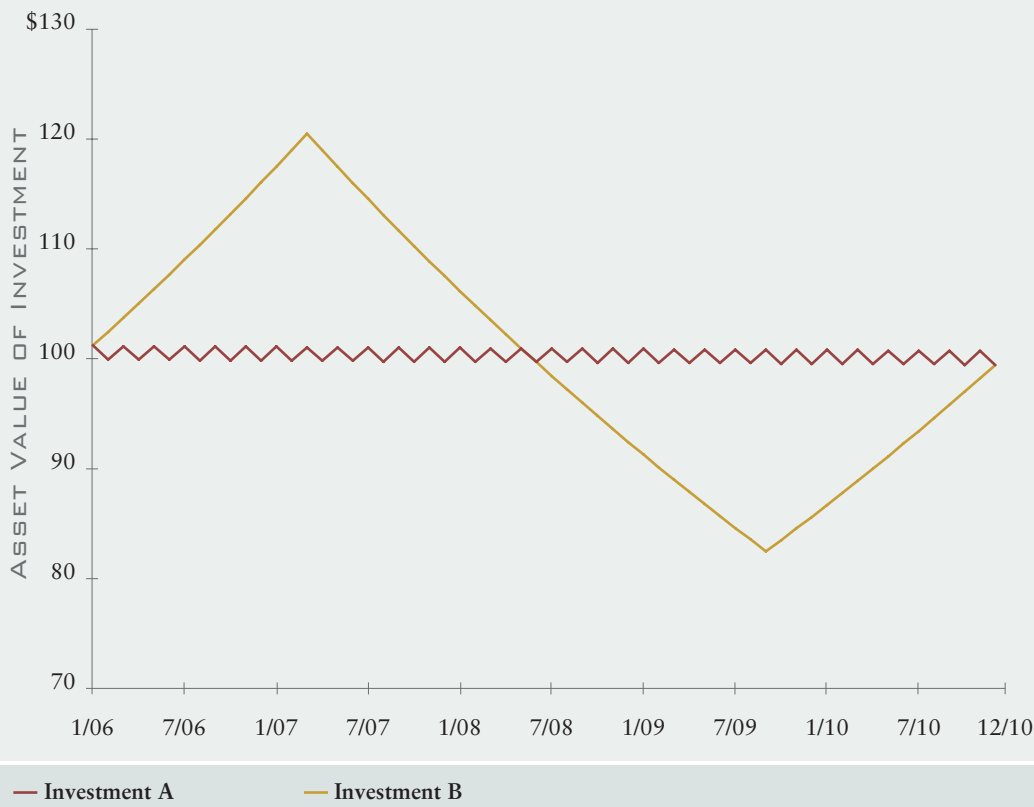
The difference can be starkly illustrated by two investments—A and B—each of \$100. Over a period of 60 months, investment A gains 1.25% one month and drops 1.25% the next month. Investment B is up 1.25% each month for the first 15 months, down 1.25% for each of the next 30 months, before recovering by 1.25% per month for the next 15 months. Asset values are shown in Figure 2.3.

“Serially correlated negative returns can magnify losses.”

“We learn geology the morning after the earthquake.”

—Ralph Waldo Emerson

**FIGURE 2.3**  
TWO CASH FLOWS WITH THE SAME STANDARD DEVIATION BUT  
DIFFERENT DRAWDOWNS (JANUARY 2006-DECEMBER 2010)



Source: Courtesy of Ray Gustin IV

Asset values of investment A (in red) ranged between \$101.25 and \$99.53, while those of B (in gold) rose to \$120.48 and ended up at \$99.53.

Both investments had the same annual return of -0.09%, the same annualized standard deviation of monthly returns of 4.4% and, given the same return and standard deviation, both A and B had the same Sharpe Ratio. The difference is in the path of investment A's returns, which ultimately resulted in a meaningful *drawdown*.

The biggest drawdown in A was a drop from \$101.25 to \$99.53, or -1.7%, while B had a drawdown from \$120.48 down to \$82.61, or -31.4%. Serially correlated negative returns can magnify losses.

In evaluating managers, we would do well to review both monthly annualized returns and rolling returns. Computing rolling returns can help to offset the problem of compounding or mean-reverting returns. But rolling 12-month

“Two investments with the same standard deviation, return, and Sharpe Ratio can have dramatically different drawdowns.”

CHAPTER 2  
VOLATILITY (CONTINUED)

“Our point of view is the ulcer index—drawdowns. You don’t care about volatility and standard deviations. You care about losing money.”

“When uncertainty increases, managers naturally begin to rethink the size and direction of their bets.”

returns, have the detraction of serially underweighting the first and last 12 months of any measurement interval that is longer than one year.

Applicability to Only a Specific Interval. Standard deviation can reflect volatility *only* for the particular interval being measured. We can all too readily assume that volatility, as estimated using the standard deviation or other measures, is roughly the same over different intervals. This is often far from the case, as we see when we make calculations over multiple intervals. Volatility, while often serially correlated over shorter intervals, changes over longer periods, particularly during times of heightened uncertainty.

For example, Table 2.1 shows the average standard deviations for six security indexes over four successive 5-year intervals.

The average standard deviation of the S&P 500 went from 10% in 1991-95 to 21% in 2006-10. The volatility of NAREIT—a measure of real estate investment trusts—was 12% for the

interval 2001-05 but jumped to 25% for the interval 2006-10. The high-yield index went from 10% or less in 1991-2005 to 19% in 2006-10. And the RJ/CRB Commodity Index went from 11% or less in 1991-2005 to 23% in 2006-10. Intervals of placid volatility can lead investors to greatly underestimate the future volatility of a security or market.

**Drawdowns**

Which of us is concerned about upside volatility? Well, sometimes we all should be. A spike to a fund’s upside can be the symptom of an undiversified portfolio, a significant change in strategy, or a “Hail Mary pass.”

Downside volatility is what most of us focus on. A drawdown is the peak-to-trough decline in a fund’s value as a percent of the peak. As noted earlier, two investments with the same standard deviation can have dramatically different drawdowns. Successive negative returns can lead to permanent loss if either the manager or we, as the fund investor, decide to sell near the bottom of the drawdown period.

**TABLE 2.1**  
STANDARD DEVIATION OF RETURNS ON SECURITY INDEXES  
OVER SUCCESSIVE 5-YEAR INTERVALS\*

	S&P 500	Russell 2000	FTSE NAREIT	Barclays Hi-Yield	Barclays Aggregate	RJ/CRB Commodity
1991-1995	10%	12%	11%	10%	6%	6%
1996-2000	14	14	17	6	4	10
2001-2005	17	21	12	10	3	11
2006-2010	21	23	25	19	3	23

\*Average of twelve 5-year standard deviations using rolling 12-month returns within six months of December 31 of the beginning year.

Volatility measures that more explicitly deal with downside volatility include *semi-variance* (the portion of the standard deviation that is below the mean, or average, return), and *shortfall risk* (the probability of falling below our target return, or below some other rate of return that we would find painful). The most common measure, however, reflects both the size and frequency of a manager's drawdowns and how long it took the manager to recover those losses. A measure of risk-adjusted performance favored by some investors is the ratio of a manager's annual rate of return to his largest drawdown. This ratio is particularly useful when analyzing managers that employ more volatile strategies.

Our greatest benefit from reviewing drawdowns comes from asking *why* the drawdowns occurred, analyzing how likely it is for them to happen again, and the potential for even greater drawdowns to occur in the future.

The 2008 crisis has made people risk-averse, even more than in prior years, so some managers have become quicker to avoid large drawdowns by reducing the risk of having to sell into illiquid markets. Is this the long-term view investors want them to take? Investors need to understand how their managers are likely to react under various volatility scenarios and urge them to take the long-term view.

### Choosing the Appropriate Measurement Interval

What do we want to learn by measuring volatility? Brokerage firms and managers executing trading-intensive strategies are keenly interested in daily and intra-day volatility. An investment manager who uses leverage is also concerned with short-term volatility, in order to maintain enough ready liquidity to meet any potential mark-to-market margin calls.

As long-term investors, we might logically lean on different measures of volatility, ones less concerned with the short term. Arguably, we should be concerned mainly with volatility over three to five-year intervals. But our institutional funds must give detailed reports to our constituents at least once a year, so we must be concerned with at least annual volatility. Also, our stakeholders will want to be informed of the impact of particularly severe short-term volatility and how it may be impacting our managers' strategies. Volatility calculated on *annualized monthly* returns might then be appropriate, especially since hedge fund managers report their NAVs monthly. But over long intervals, as a check on the impact of compounding or mean-reverting monthly returns, it is useful to calculate the standard deviation of rolling 12-month returns.

### The Reward of Continuing Due Diligence

Spiking volatility of monthly returns, even on the upside, can be a red flag to investors who are monitoring their managers carefully. A painful example involves the collapse of Amaranth Advisors in 2006. Amaranth's monthly NAVs were often up 1 to 2% per month from 2001

“Our greatest benefit from reviewing drawdowns comes from asking *why* the drawdowns occurred.”

“Principals must internalize the long-term horizons with which they should be investing and make sure their agents understand them.”

## CHAPTER 2 VOLATILITY (CONTINUED)

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“Dealing with the long term in the face of volatility is emotionally, physically, and psychologically extremely hard.”

“Many investors don’t diversify enough, they trade too much, pay high fees, and time their investments poorly as they chase past returns.”

through the summer of 2005. Then in August of 2005, its NAV jumped by 4% followed by another 6% in September. From November through January its NAV jumped by a further 3, 4, and 5%. By then, an investor could have noticed that the standard deviation of returns for rolling 12 months had risen well above normal—suggesting a significant change in investment approach or portfolio risk. What was going on?

Amaranth had generated great profits by investing heavily in natural gas futures, accounting for its impressive returns. Investors might have viewed this as a clue that Amaranth was changing its strategy, sharply increasing the riskiness of its portfolio, and in an area in which it had no proven expertise. There was time for investors to get out if they dug beneath the surface and became sufficiently concerned. Those that didn’t suffered. The following September Amaranth suspended the fund, resulting in one of the largest hedge fund collapses in history.

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### CAUSES OF VOLATILITY

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There are many reasons for market volatility—changes in expected economic growth or inflation, over-reaction to news flows, accelerated trading activity, contraction of sell-side balance sheets, and fear and greed, among others. External triggers of volatility include events such as financial crises, natural disasters, or war.

Modern portfolio theory assumes that markets are fully efficient, with security prices reflecting all available information. However, security prices in the real world reflect more complex factors. Empirical market data doesn’t fit rational models, in part because different investors have different utility curves. The “efficient” price for one investor is not necessarily the same as for another at a given point in time. For example, a security’s price may rationally be a “buy” for a value or long-term investor, and a “sell” for a growth or short-term investor.

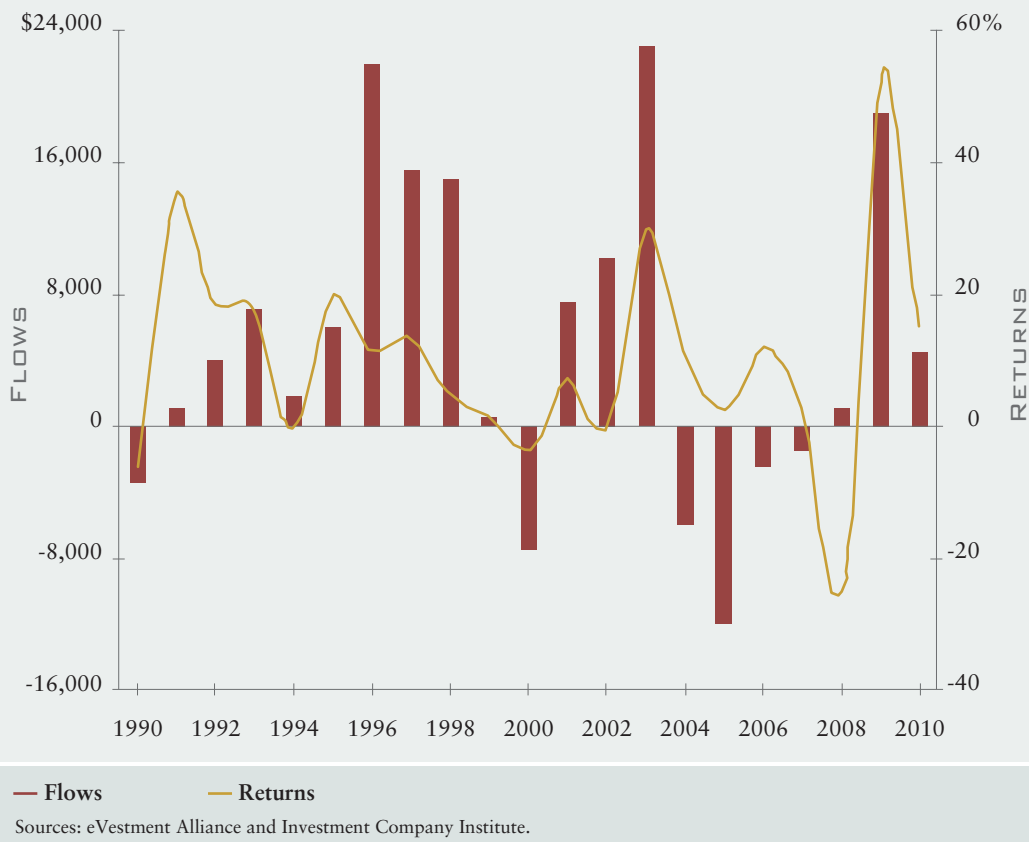
Behavioral finance posits that investor emotion is a primary factor in determining security prices. Human nature typically makes us feel worse from the pain of an investment loss than from the joy of an equivalent investment gain. Investors are driven by emotion, and they extrapolate good and bad news too far into the future. The herd mentality can take over, as investors bid up the price of hot stocks or hot sectors as they did in 2000, and sell beyond reason in a crashing market such as occurred in 2008.

The growing literature in behavioral finance suggests that many investors, especially less sophisticated ones, do not fare well investing in stocks or mutual funds, as they let emotions guide their decisions. They don’t diversify enough, they trade too much, pay high fees, and time their investments poorly as they chase past investment returns.



CHAPTER 2  
VOLATILITY (CONTINUED)

**FIGURE 2.4**  
PERFORMANCE OF HIGH-YIELD BOND MUTUAL FUNDS,  
AND CASH FLOWS TO AND FROM THOSE FUNDS (1990–2010)



For example, net cash flows into the new high-yield bond mutual fund market were relatively modest from 1990 to 2003. However, Figure 2.4 shows that strong results for high yield bonds in 2003 led to record net inflows. Then a drop in returns over the next two years saw net fund liquidations. Net inflows picked up again after a +53% return in 2009.

This mentality of chasing recent returns may account for the value premium, whereby value stocks have over time produced higher average risk-adjusted returns than growth stocks.

“Investors are driven by emotion, and they extrapolate good and bad news too far into the future.”

## CHAPTER 2 VOLATILITY (CONTINUED)

### CORRELATIONS

Closely related to the subject of volatility is that of correlation—the relationship between the performance of one asset, strategy, or asset class with that of another asset, strategy, or asset class.

By far the greatest risk in virtually all of our portfolios is the risk of the stock market, which impacts either directly or indirectly most of the investments in our portfolio. Correlations can be a powerful factor in the construction of any portfolio, and many of us aren't taking as much advantage of low correlations as we might.

In any conventional stock/bond portfolio, correlations are at the heart of the efficient frontier. The efficient frontier is the asset allocation that will gain the most from the lack of full correlation among the various asset classes and thereby provide the highest expected return at any expected standard deviation. The concept remains as valid today as ever, although the benefit is weaker, because over the last 10 years, all equity asset classes have become increasingly correlated, recently .9 or higher.

(This is not to discourage investors from diversifying traditional assets by the usual classes of U.S. large and small, non-U.S., and emerging markets. Over multi-year intervals, there have been wide disparities of returns despite rising correlations. For example, in the six years 2002-07, EAFE outperformed the S&P 500 by nearly 9 percentage points per year, and from 2008-10 the S&P outperformed EAFE by nearly 4 points per year.)

The only traditional asset class that has a low correlation with equities is fixed income, which of course has lower expected returns. Rebalancing a traditional portfolio to increase the allocation of fixed income has the long-term effect of rebalancing toward a lower expected portfolio return (and lower volatility).

Some investors try to avoid these lower returns by weighting their fixed income toward credit risk—through lower rated bonds. But that reduces the diversification benefit from fixed income, as credit risk has a higher correlation with the stock market.

A few investors, mainly pension funds, get their fixed income exposure through portable alpha. They buy Treasury futures, and instead of investing the underlying cash in T-bills, they invest much of it in higher-return strategies that have relatively low correlation with equities. Of course, this is a form of leverage. But many are comfortable with this as long as the strategies maintain their low correlation and the total portfolio risk is within its policy limit.

Alternative investments include a wide range of hedge funds and private equity funds that have greatly broadened our opportunities in constructing a portfolio. A key characteristic of many of these strategies is that they offer somewhat lower correlations with the stock market, which represents the lion's share of all risks in most portfolios.

“Many of us aren't taking as much advantage of low correlations as we might.”

### Estimating Correlations for Hedge Funds

Because each hedge fund is unique, estimating a correlation with equities and other investments adds a great deal of complexity to portfolio construction. One approach is to make an intuitive estimate based on hedge funds with similar kinds of strategies. A more quantitative approach is as follows:

Record all monthly returns of the fund since its inception and calculate the correlation of annualized monthly returns with those of a global equity index. An additional approach that adjusts for the compounding or mean-reverting of monthly returns is to calculate the corresponding correlation of rolling 12-month returns. Attributing high credibility to the resulting correlations, however, can be dangerous. Only a minority of hedge funds have records longer than seven or eight years, hardly enough to provide solid predictive value even if we think the manager has been playing the same game all along. A further complication is that the mandate for hedge funds is more flexible than for traditional strategies, so correlations for most hedge funds tend to be less stable.

With respect to our hedge fund portfolio, we want to collect managers and strategies that are different from one another, and more important, as uncorrelated as possible with the stock market. Then we must ask, based on how managers' styles and relevant markets have changed, how much, if any, predictive value should we attribute to these correlations? Is it worth carrying out these quantitative analyses? It can be worthwhile if we view the correlations with a healthy dose of skepticism.

The reason this effort can be worthwhile is because the average correlation of our hedge fund portfolio with equities is primarily what

determines its diversification benefit. A hedge fund portfolio that has an average correlation with the stock market that's less than .3 will provide much more diversification value than a portfolio of .7 or .8. It is hard, however, to build a hedge fund portfolio with an average correlation lower than .3, especially one with attractive returns.

If we find a promising hedge fund that we believe will have little or no correlation with equities, we should not be intimidated if it's very volatile. A fund that has no correlation with equities adds very little volatility to our overall portfolio. Indeed, if such a fund offers a choice of reasonable volatilities, we should probably opt for the one with the highest volatility. Three categories of funds that can provide near zero correlations with equities are managed futures, reinsurance, and sometimes global macro.

As for hedge funds that have a high correlation with equities, they may not be candidates for our hedge fund or "absolute return" portfolio. But if we expect such a hedge fund to earn higher net risk-adjusted returns than our traditional equity managers, then we might well want to add that hedge fund to our equity portfolio.

### Volatility of Correlations

We all seek to minimize the cross-correlations of our investment strategies and gain the most from the efficient frontier. But from time to time, as in 1987, 1998, 2008, and 2011, the correlations of all asset classes suddenly zoom toward one. When liquidity dries up in the market, everyone heads for safe-haven assets such as cash or Treasuries, and woe-betide those investors who lack staying power, as Long-Term Capital Management learned in 1998—a lesson many fund managers had to re-learn 10 years later.

“Many believed ‘diversification failed’ during the financial crisis. We think that the implementation of diversification failed, not diversification itself.”

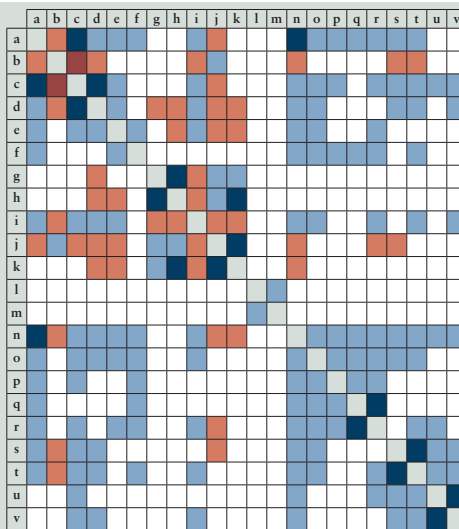
“We want to collect managers and strategies that are different from one another, and more important, as uncorrelated as possible with the stock market.”

## CHAPTER 2 VOLATILITY (CONTINUED)

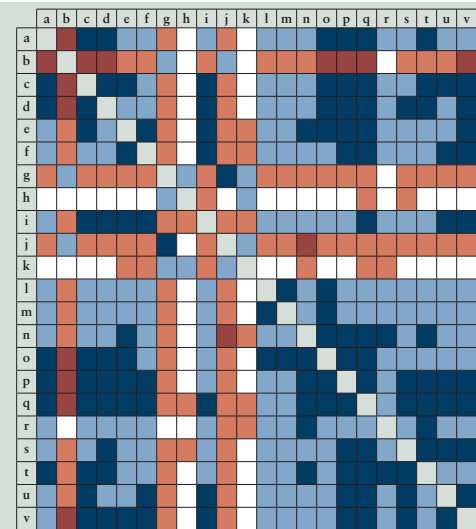
“Correlations matter, and we must expect most assets to converge near one when many investors seek to reduce risk at the same time.”

**FIGURE 2.5  
CORRELATION MATRIX\***

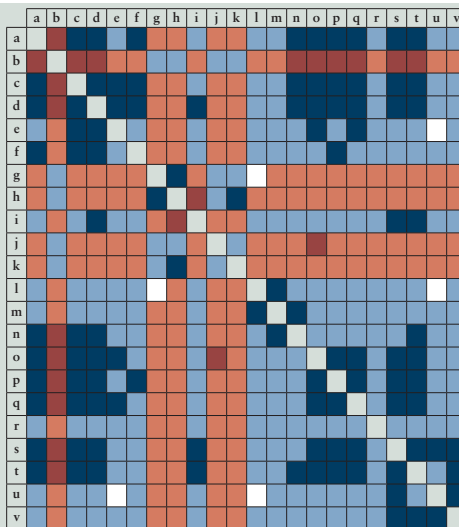
JANUARY 2007



10 DAYS AFTER LEHMAN COLLAPSE



MAY 2011



■ Strong positive correlation (.7 to 1)      ■ Weak negative correlation (-.31 to -.69)  
■ Weak positive correlation (.31 to .69)      ■ Strong negative correlation (-.7 to -1)  
■ Insignificant correlation (.3 to -.3)

Correlations are based on 104 weekly observations, with 50% of the weight given to the final eight weeks.  
\*Courtesy of BlackRock

- a S&P 500 Index
- b VIX Implied Volatility – 30-day Expected Volatility of S&P 500
- c DAX 30 – German Stock Index
- d FTSE 100 – United Kingdom Stock Index
- e Nikkei 225 – Japanese Stock Index
- f TWSE 50 – Taiwanese Stock Index
- g US Treasury 2-Year
- h US Treasury 10-Year
- i J.P. Morgan Emerging Market Bond Index Global
- j German 2-Year Bunds
- k German 10-Year Bunds
- l S&P GSCI
- m Dow Jones-UBS Commodity Total Return Index
- n HFRX Global HF
- o Macquarie Global Infrastructure Index (USD)
- p Dow Jones Global Select Real Estate
- q Dow Jones Private Equity (USD)
- r S&P Leveraged Loan Index
- s Dow Jones CDS North America Investment Grade 5-Year Index
- t Dow Jones CDS North America High Yield 5-Year Index
- u ITRAXX European CDS 5-Year Index
- v ITRAXX European CDS Crossover (Sub-Investment Grade Credit) 5-Year Index

CHAPTER 2  
VOLATILITY (CONTINUED)

Figure 2.5 is a graphic picture of how so many asset classes zoomed toward one in September 2008 and again in May 2011. Correlations tend to rise during period of heightened downward volatility.

The moral is, when our analyses are based partly on correlations, we need to understand how those correlations can change.

Aside from such singular events, correlations themselves are volatile. Markets often change “regimes”—periods of steady, low volatility during trending economic growth, or periods of dramatic volatility, characterized by negative economic or other surprises. Regime changes

alter the correlations among asset classes. Negative regimes magnify the risk of equities, as investors become increasingly risk-averse.

In Table 2.2 we see the vast difference in cross-correlations among four diverse security indexes over three successive five-year intervals.

The correlation between the S&P 500 and commodities went from -.74 in 1996–2000 to +.63 in 2006–10. The S&P’s correlation with corporate bonds was negative in 1996–2000. It then became sharply more negative in 2001–05, and finally turned positive in 2006–10. And the S&P’s correlation with REITs went from

“We can use scenario analysis to understand the effect on the portfolio of changes in key economic factors.”

**TABLE 2.2**  
CORRELATIONS OF CALENDAR-YEAR RETURNS  
OVER 5-YEAR INTERVALS (1996–2010)\*

	Stocks	Real Estate	Bonds	Commodities
<b>1996–2000</b>				
S&P 500 Index	1.00			
NAREIT Equity REIT Index	-.35	1.00		
Barclays Aggregate Bond Index	-.30	.20	1.00	
Dow Jones-UBS Commodity Index	-.74	.63	-.22	1.00
<b>2001–2005</b>				
S&P 500 Index	1.00			
NAREIT Equity REIT Index	.91	1.00		
Barclays Aggregate Bond Index	-.81	-.58	1.00	
Dow Jones-UBS Commodity Index	.12	-.04	-.56	1.00
<b>2006–2010</b>				
S&P 500 Index	1.00			
NAREIT Equity REIT Index	.89	1.00		
Barclays Aggregate Bond Index	.18	-.18	1.00	
Dow Jones-UBS Commodity Index	.63	.23	.52	1.00

\*The correlations are based on five calendar-year returns in order to offset any compounding or mean-reversion of monthly returns. The result is that the correlations are based on only five data points, so they should be viewed as only rough approximations.

“When our analyses are based partly on correlations, we need to understand how those correlations can change.”

## CHAPTER 2 VOLATILITY (CONTINUED)

“For long-term investors, short-term volatility that is mean-reverting can be irrelevant, or may even represent an opportunity.”

negative in 1996-2000 to highly positive over the next 10 years. The correlation between corporate bonds and commodities was negative in 1996-2000, became more negative in 2001-2005, and then turned meaningfully positive in the next five years.

What should we assume going forward?

### Estimating Correlations for Private Equity

Estimating the correlation of private equity funds with the stock market in a quantitative way is essentially meaningless, because comparative return data is simply not available. Yet, despite its illiquidity, we add private equity to our portfolio because of its diversification value. We simply have to estimate a fund's correlation with the stock market *intuitively*.

We know that venture capital, distressed securities, and buyout funds are all impacted by the vicissitudes of the stock market, and we should view their probable underlying correlations accordingly. Correlations for REITs with equities can give us some initial feel for the underlying correlations for private real estate. The correlation of oil and gas prices with the stock market will give us some starting point for estimating the correlation with equities for private energy funds. And we might look to corresponding correlations of metals prices for help with mining funds and global saw log prices for timber funds.

### DEALING WITH NON-NORMAL RETURN DISTRIBUTIONS<sup>8</sup>

How do we contend with volatility that is changing rapidly, and with diversification protection that erodes when we need it most? One time-honored method is to stick to a strategic asset allocation and to ride out the storm. For long-term investors, short-term volatility that is mean-reverting can be irrelevant or may even represent an opportunity to deploy additional capital. But institutions must report to their constituents at least annually, and disappointing annual returns for a pension fund can force its sponsors to make unexpectedly high contributions.

Therefore, many of us find it helpful to employ additional measures of volatility, including analysis of returns through non-normal probability distributions and non-linear correlation matrices. Typically these approaches are combined with Monte Carlo simulations that show a wide range of possible portfolio outcomes. When incorporated into risk budgets, these probability distributions often yield higher estimates of possible losses than would be indicated through the use of normally distributed returns. Such volatility estimates can result in fewer downside surprises. But none fully solves the problem of the black swan. The worst disasters we could imagine are typically events that haven't happened before. How can we build into our assumptions events that have never happened before? It can help sometimes if we sit quietly and think—what is it that we don't know? What could possibly go wrong?

<sup>8</sup> See *Best Practices in Alternative Investing: Portfolio Construction*, Greenwich Roundtable, 2009, Chapter 3, pp. 43-44.

Another technique, scenario analysis, takes investors' current portfolios and applies the stresses of prior extreme market events, such as the equity market crash of October 1987 or the month following the Lehman Brothers failure in 2008. These models capture the historical tendency for volatility to jump suddenly and then gradually return to normal levels, as the models seek to quantify the changing interaction of assets under such periods of prior market stress. To some extent, however, these approaches reproduce market movements from prior eras that don't translate well to current conditions. For example, today's portfolios with hedge funds and private investments include a wide range of securities with historical trading data going back only a few years.

We also can use scenario analysis to understand the effect on the portfolio of changes in key economic factors during different economic regimes. By analyzing the key risk factors that impact the portfolio, an investor can assess the possible impact of escalating inflation, slowing economic growth, or major currency shifts. For example, with interest rates so low today, fixed income cannot provide the benefit it has in the past 10, 20, or 30 years. Each market scenario yields a different distribution of expected returns based on how investments have responded statistically to changing economic influences in the past. Understanding the current economic environment can provide a better idea of left-tail risk.

### Tail Risk Hedging

Tail events are unpredictable, and their probabilities are not measurable. There are several ways we can hedge them. A direct way is to short futures against our equity portfolio, but that can result in negating the exposure that we wanted in the first place.

Another way is to buy puts on the market when they are far out of the money. But puts tend to be expensive, even when their dollar price seems low. If we buy a put that is 20% out of the money, the market has to go down more than 20% before we get the desired protection. That hedging approach may not be of much interest to a long-term investor, but it might to an investor that needs to keep volatility low at all times. An institution that has to make payments every year must decide whether to hedge or to suffer potential losses, and then if the losses continue, to perhaps change its policy.

A third approach is to hedge a combination of instruments against events that the world sees as relatively low probability but that could potentially cause a great deal of market stress. For example, we could take a contrary position to what people think about China or Japan, or about the default of a highly rated country's sovereign debt. Five years ago we might have looked at subprime mortgages and realized that if something happened there, it would trigger a domino effect that could lead to widespread panic. But because in 2006 few thought it could happen, we could have bought a hedge cheaply at that time.

“By analyzing the key risk factors that impact the portfolio, an investor can assess the possible impact of escalating inflation, slowing economic growth or major currency shifts.”

“Correlations themselves are volatile, as markets often change regimes.”

## CHAPTER 2 VOLATILITY (CONTINUED)

“When we believe a macro situation that the market generally supports is unsustainable, we can sometimes buy an inexpensive hedge.”

When we believe a macro situation that the market generally supports is unsustainable, we can buy an inexpensive hedge. If we're right, the rest of our portfolio will decline in the adverse market environment, but we will make money on the hedge. The key is to find instruments that are far out of favor so we don't have to pay much for the hedge. Some investors don't view these opportunities as hedges but rather as a source of alpha.

Several firms market “tail risk funds” or will construct a tail risk account for a specific investor. Such a portfolio would typically lose consistently under positive market conditions but generate substantial gains during a market correction. Of course, the manager would have to rebalance the tail risk portfolio as market conditions and liquidity change.

Buying portfolio insurance in such manners as discussed above worked during the 2008 crisis, but many people believe it leads long term to significantly lower portfolio returns. One way to reduce tail risk involves a combination of five approaches in portfolio construction and risk management:<sup>9</sup>

- Diversify by risk-adjusted assets, not just by assets. That can mean leveraging lower-volatility assets, such as fixed income classes, to the same volatility as equities.
- Actively manage portfolio volatility by, for example, forecasting equity volatility based on the prior three months. This may be effective because the monthly volatility of assets is serially correlated.

- Embrace alternative investment strategies that have a low correlation with equity markets.
- Take advantage of low-beta stocks, as a portfolio of low-beta stocks has roughly the same return as the overall market.
- Implement a systematic risk management plan, from a simple stop loss to a more complex drawdown control system. This can prevent investors from having to sell near the bottom of the market.

### DEVELOPING A STRATEGY FOR MANAGING VOLATILITY

Most investors manage their portfolios based on a target asset allocation, rebalancing periodically to that allocation. That approach helps them maintain a constant level of risk if the risks of each asset class remain relatively constant. This, however, is not the case. Most asset classes contain indirect exposure to equity risk, which remains dormant until extreme market moves, when correlations converge to one. It has been shown that equity risk contributes 97% of the volatility in a traditional 60/40 portfolio of U.S. assets.<sup>10</sup> Thus rebalancing to a target asset allocation after such a market correction can compound our losses if the market continues to decline.

Alternative approaches have gained ground in recent years. Leading investors identify the risk factors in their portfolio—equity, interest rate, yield curve, credit spread, inflation, commodity, and changes in liquidity—and construct their portfolio around a target aggregate risk level. Then as the risk they perceive in each of these factors rises and falls, investors rebalance their

<sup>9</sup> “Chasing Your Own Tail (Risk): Five Alternatives to the High Cost of Tail-Hedging,” Adam Berger, Lars Nielsen, and Daniel Villalon of AQR Capital Management, Summer 2011.

<sup>10</sup> Vineer Bhansali, “Beyond Risk Parity” (Journal of Investing), Spring 2011



## CHAPTER 2

### VOLATILITY (CONTINUED)

portfolios to maintain their target aggregate risk level. Correlations across risk factors have been lower than correlations among asset classes and have tended to be more robust than asset class correlations to shifts in market regime.<sup>11</sup>

A further strategy is to treat volatility as an *opportunity*. When correlations converge toward one, many assets and strategies are priced well below fair value. Identifying which particular assets and strategies these are provides the opportunity for possible future gains.

We need to embrace volatility. Markets are volatile and becoming more so. We can't realistically expect to create portfolios that are not volatile. How can our portfolio be invested in volatile markets without that volatility showing up on the bottom line? Innovative investors are successfully collecting higher volatility strategies that are uncorrelated.

#### LESSONS LEARNED

Institutional investors learned a number of lessons—often the hard way—from the extreme volatility across many asset classes during 2008-09. Lessons include the following:

- Correlations matter, and we must expect most assets to converge near one when many investors seek to reduce risk at the same time. In addition, correlations vary through time, and we must continue to try to understand the changing relationships across our portfolios.
- Investors should develop a flexible approach to managing volatility. In many cases, investors have been motivated to sell by changes in valuation rather than changes in investment fundamentals. The rapid recovery of many markets after the 2008 crisis shows that we should not overreact to short periods of volatility. In 2008 and its aftermath many investors benefitted from the volatility, as they were able to buy solid long-term assets at reduced prices
- During good times we should view volatility as an opportunity—a chance to rebalance our portfolios to capture gains in strong sectors and the most profitable hedge fund strategies, and to take advantage of buying opportunities in other sectors and strategies.
- Fat tailed events occur much more frequently than traditional measures of volatility would lead us to expect. We need to apply more sophisticated measures of volatility to our portfolios—including other quantitative as well as qualitative assessments of risk. And we need to think about what could go wrong.

“We need to accept volatility. We can't realistically expect to create portfolios that are not volatile.”

“Investors identify the risk factors in their portfolio and construct their portfolios around a target aggregate risk level.”

<sup>11</sup> Sebastian Page and Mark Taborsky, “The Myth of Diversification: Risk factors vs. Asset Classes,” PIMCO, September 2010.

“Let volatility work for you. Uncertainty creates periods of opportunity.”

“Only buy something you’d be perfectly happy to hold if the market shut down for ten years.”

—Warren Buffett

### UNDERSTANDING BETA

Beta is a measure of the sensitivity of the covariance of a portfolio or an individual security with that of a particular index (often but not always the S&P 500)—a measure of its non-diversifiable risk or systematic risk. It is a helpful term that at times is not adequately understood.

Beta is actually part of a regression equation that relates two series of historical returns and forces the relationship into beta and two other factors:

- Alpha is the incremental return (plus or minus) that the fund has earned on a beta-adjusted basis relative to the index, and is often regarded as a measure of manager skill.
- Standard error is the residual of the equation—an indication of how well alpha and beta fit the regression, a kind of measure of confidence.

Beta, because it is a relative variance measure, has some of the same limitations as standard deviation. It also has the limitation of a one-size-fits-all regression equation. Even so, beta can be a helpful measure if we remember to specify what index we are using for comparison. A fund’s beta relative to the Russell 2000 might be somewhat different from its beta relative to the S&P 500.

Many of us use alpha very loosely to mean the *absolute* incremental return of a fund relative to its benchmark index, whereas strictly speaking, alpha is the fund’s *beta-adjusted* incremental return.

A final question: In all the ways we hear alpha and beta applied, how often have we heard the value of the *standard error*?

## CHAPTER 3 LEVERAGE

Leverage, to some a scary word, is part of our everyday life. We use leverage to buy homes and cars. Companies typically have a capital structure ranging from 25/75 debt-to-equity (debt being 33% of equity) to an extreme of 80/20 (debt being 400% of equity). Yet many of us think of a typical portfolio of public equities to be unlevered. Financial firms often operate with much higher leverage, ranging from 8 to 12 times equity for U.S. banks and 10 to 20 for brokerage firms.

Leverage has become increasingly pervasive in society, beginning with home loans and cascading to all kinds of consumer debt. In private investments, high levels of leverage came to a violent end in 2008 as the leverage became unsustainable and the value of underlying assets tumbled. At this point the private sector started to de-lever, and the government took on more leverage. Now government debt has reached such high levels that governments will have to progressively reduce their reliance on debt in the years ahead.

Leverage combined with volatility compounds the effect of each. One measure of risk is the product of leverage and volatility.

This chapter discusses how leverage applies to investors, especially investors in hedge funds. To begin with, leverage is not a proxy for risk. It either amplifies or dampens volatility. It can reduce risk if used as a hedge. By itself, leverage is inherently neither good nor bad. When used sensibly, it gives us the flexibility to accomplish a lot more than we could do otherwise. What matters is that the levels of borrowing are appropriate for a given strategy, and that both managers and investors impose proper limits and controls.

Leverage is a key tool for many hedge funds and private equity funds. In the first half of 2011 hedge funds averaged 110% of their net asset value (10% leveraged).<sup>12</sup> Half averaged gross assets between 100 and 200% of net asset value, while about one-third used no leverage at all.

### FORMS OF LEVERAGE

Hedge funds create leverage in a variety of ways, each with different implications and degrees of transparency.

#### Borrowing

Borrowing is the most straightforward approach to finance leverage. A fund can borrow in a number of ways. The most common are margin-based financing through a prime broker, and repurchase agreements (repos). A significant difference between these two sources is the commitment term of the financing. Repo is a short-term collateralized loan. It is typically an overnight arrangement (but sometimes up to 6 months), with no guarantee that the financing will be available when the repo expires. With leverage via a prime broker, there will be more certainty that arrangements will be available if the broker has agreed to a committed facility—a minimum time to maintain the loan.

“Leverage combined with volatility compounds the effect of each.”

“Leverage is not a proxy for risk. It either amplifies or dampens volatility.”

<sup>12</sup> Hedge Fund Research

## CHAPTER 3 LEVERAGE (CONTINUED)

“**D**erivatives are commonly used to provide leverage, although less explicitly than outright borrowing.”

“**A** particularly difficult task for investors is quantifying the exposure that derivatives provide.”

A fund can also borrow individual securities, as it does when it intends to sell them short. Selling short adds leverage, but it usually lowers volatility by reducing the portfolio’s exposure to the market.

Some managers of credit funds have used CDOs (collateralized debt obligations) as an effective form of completely matched financing. For example, the manager of a fund arranges the issuance of a low-leverage CDO for a group of bonds that he wants to buy in his portfolio. He then uses the proceeds from the sale of the CDOs to buy the bonds. Because the CDOs mature at the same time as the bonds, the fund is assured of financing at a known cost. Since 2008 this has become more difficult, as the market for CDOs has declined, but it may return as investors realize that quality CDOs performed well.

### Derivatives

Derivatives are commonly used to provide leverage, although less explicitly than outright borrowing. Most derivatives can be lumped into two main categories: (a) futures, forwards, and swaps, and (b) options. All such derivatives allow the manager to benefit (hopefully) from opportunities he could not access with traditional assets and thereby to create a more efficient portfolio.

Futures, forwards, and swaps add leverage, but they may increase or decrease the portfolio’s risk depending on whether the manager buys them or sells them, and their correlation with other assets in his portfolio.

Futures are generally traded on an exchange, typically in a standard contract form. They allow the manager to buy or sell a specific amount of a security index fund, foreign exchange, or commodity such as oil or corn, at a predetermined date and price. The buyer must put up a small amount of T-bills as margin, which changes daily depending upon the change in price of the underlying asset.

Forward contracts operate much like futures except without the need for margin, and are used for foreign exchange and mortgage-backed securities. They are done with a specific counterparty. Differences are settled on the maturity date.

Swaps are an agreement between two counterparties whereby, until a specific maturity date, one party agrees to swap one set of cash flows for another. Swaps add leverage to a fund unless the fund holds cash equal to the notional value (the value of the underlying assets of the swap), which is rarely the case.

A call option gives the option buyer the right, but not the obligation, to buy an asset from the option seller at a particular price (the strike price) by a specific date. The buyer’s maximum loss is the price of the option. A put option gives the buyer the right, but not the obligation, to sell an asset to the option seller at a strike price by a specific date.

A particularly difficult task for investors is quantifying their exposure from derivatives.

### Embedded Leverage

The least explicit form of leverage is embedded in the individual security itself, such as a common stock or mezzanine debt in a highly levered company, or equity in a CDO, or through a levered ETF (exchange trade fund). This is the most difficult source of leverage to measure.

### IMPLICATIONS OF LEVERAGE

Increased Exposure. The most obvious implication of long leverage is that the fund now owns assets, or exposure to assets, that are greater than the fund's net asset value. This increases the fund's sensitivity (and risk) to fluctuations in the price of its assets.

Margin Calls. When assets are purchased on margin or with collateral, additional margin or collateral must be provided as the asset price moves against the fund. Inability to find the cash to meet these margin calls is a common cause of fund failures.

Loss of Sources of Leverage. No provider of leverage is obligated to continue providing it. The provider can stop at the end of any short-term obligation, and the borrower will have to find another source for its leverage. The reliability of a fund's sources of leverage is another key factor for investors to evaluate.

Importance of Cash Management. The management of portfolio liquidity is crucial for the successful use of leverage. To meet margin calls or loan maturities, managers must maintain enough readily accessible sources of cash, even in an illiquid market.

### USES OF LEVERAGE IN HEDGE FUNDS

Leverage is especially a key to certain hedge fund strategies. Fixed income arbitrage, if managed well, can provide a return of 2 to 3% per year—too low to be interesting. But if levered four or five times, the return can become competitive with equities and thereby be a valuable source of diversification to a portfolio that is more equity oriented.

Managers can dampen portfolio risk by buying a put option or selling short—thereby reducing the portfolio's net exposure to equities or foreign currency. Hedging is a way to control the portfolio's risk and also profit from an astute selection of securities to sell short.

Leverage, of course, adds the cost of interest, through either direct payments or indirect costs built into derivatives. Meaningful additional costs of managing liquidity include those for extra staffing and infrastructure as well as for the retention of adequate liquidity to meet inevitable margin calls in difficult markets. Additional expected returns must exceed the sum of these costs to justify the use of leverage.

“The least explicit form of leverage is embedded in the individual security itself, such as a common stock or mezzanine debt in a highly levered company.”

“Inability to find the cash to meet margin calls is a common cause of fund failures.”

## CHAPTER 3 LEVERAGE (CONTINUED)

### EVALUATING APPROPRIATE USES OF LEVERAGE

We need to consider three aspects of the leverage of our manager's portfolio.

**Quantity.** Is the amount of leverage relative to our manager's net assets, and the resulting interest cost and increase in market risk, appropriate for our manager's strategy and for the current market environment?

**Quality.** How assured is the manager of being able to retain his leverage under changing market conditions? Under what circumstances can lenders withdraw financing, raise interest rates, and change collateral terms? Are terms of the leverage unchangeable for a given period of time, typically three months? Is there a hidden trigger in the loan facility that would allow the lender to call the loan or even seize the assets? Is it a non-recourse loan?

Many hedge fund financing agreements include provisions that allow the prime broker to increase margin requirements and interest rates as well as other terms when returns or the portfolio's net asset value falls below specified levels. When a financing facility terminates, will the manager be assured of being able to replace it? In the downturn of 2008, as many managers sold assets to meet redemption requests, prime brokers stepped in and took control, putting many funds out of business.

**Liquidity.** Does the manager have enough cash to meet margin calls in falling markets, to meet the natural flow of transactions, and to take advantage of new opportunities? How well does the liquidity of the leverage financing match the liquidity that the fund offers its investors?

#### Matching Terms

The amount that prime brokers lend against a fund's assets varies over time, as it is determined by the risk, market volatility, and liquidity of the assets, as well as the lender's appetite for risk. For example, a company's bonds are usually considered less risky than its stocks. But because equities are more liquid than bank loans, some lenders might finance a higher portion of the stock's market value.

Hedge fund managers should match the terms of their financing to the nature of the assets in their portfolio, in the same way that the funds' redemption terms should match the liquidity of its portfolio. Less liquid assets such as bank loans or high yield bonds should be financed with longer-term borrowing that corresponds to the time required to sell down the portfolio in a difficult market.

Overleveraging *liquid* securities can cause painful losses but generally does not result in the closing of the fund. Excess leverage with *illiquid* assets is more dangerous since the risk is difficult to quantify. A fund can easily get trapped in a stressed and crowded market, where there are few buyers. With each downward spike in the market cycle, hard-to-price assets are marked down further, leading to forced liquidations, massive losses, and an abrupt end for some funds.

“Hedge fund managers should match the terms of their financing to the nature of the assets in their portfolio.”

“Excess leverage with *illiquid* assets is particularly dangerous, since the risk is difficult to quantify.”

CHAPTER 3  
LEVERAGE (CONTINUED)

**TABLE 3.1**  
TYPICAL LEVERAGE\* USED BY VARIOUS STRATEGIES

Long Only		Distressed Debt	Long-Short Equity	Event Driven	Convertible Arbitrage	Global Macro	Fixed Income Arbitrage
Equity <sup>†</sup>	Bonds <sup>‡</sup>						
1.0	1.0	1.0-1.5	1.5-3.0	1.5-4.0	2.0-4.0	3.0-7.0+	2.0-10.0
Annualized Return, May 2007-May 2011							
0.9%	8.5%	4.9%	3.8%	3.9%	5.1%	6.6%	6.2%

\* Long Only Assets/Net Assets  
<sup>†</sup> S&P 500  
<sup>‡</sup> Barclays Aggregate Bond Index

Appropriate degrees of leverage vary dramatically among hedge fund strategies. Table 3.1 is a table comparing different strategies and common levels of leverage applied to each.

Although hedge funds typically employ leverage—sometimes a lot of it—their return streams are not necessarily that volatile, especially when compared with the unlevered returns of equities. When appropriately leveraged, investments in many lower-return asset classes and styles can provide returns and volatilities that are similar to those of unleveraged equities. This technique gives managers the opportunity to achieve broader diversification with different asset classes that have attractive leveraged returns.

**MEASURING THE LEVERAGE OF A HEDGE FUND**

Leverage is typically measured as a percentage of a fund's NAV. While this may seem straightforward, there is much complexity in understanding what underlies these aggregate figures.

**How to Address Long and Short Positions**

When a fund has both longs and shorts, leverage may be quoted as Long, Short, Net, or Gross. We need more than one of these measures, but one may be more relevant than others, depending upon the fund's investment strategy.

With a long/short equity fund, a review of both net and gross leverage usually provides a fairly complete picture. *Net* exposure is equal to longs (other than cash) *minus* shorts, as a percentage of NAV. This shows the fund's sensitivity to movements in the overall market, provided the correlation between longs and shorts roughly offset one another. *Gross* exposure—the value of longs *plus* shorts as a percentage of NAV—provides a sense of the fund's leverage if the longs and shorts are not well correlated.

In more complex arbitrage strategies, a fund invests both long and short in similar assets to extract value from relative moves. For example, convertible arbitrage funds buy convertible bonds and short the underlying equity of the security. These securities are closely related to each other, and a manager typically

“At a 33x leverage, a three percent fall in prices can wipe out 100 percent of the equity.”

“Although hedge funds typically employ leverage—sometimes a lot of it—their return streams are not necessarily that volatile, especially when compared with the unlevered returns of equity.”

## CHAPTER 3 LEVERAGE (CONTINUED)

“Different measures can give different understandings of leverage.”

“Market value measures are often sufficient to calculate leverage. But when derivatives are present, market values aren’t enough.”

employs significant leverage. Gross leverage for this strategy will overestimate the risk associated with leverage, while net leverage will underestimate it. A convertible fund generally reports its long leverage to give investors a sense of the fund’s current aggressiveness.

Through derivatives, some funds take both long and short positions in a single company. For example, a fund may purchase two bonds with different maturities or different positions in a firm’s capital structure. As the fund doubles the size of its longs and shorts, the net position may remain static while the gross position quadruples. The key takeaway is that knowledge of multiple measures, and of a hedge fund’s strategy, are required to estimate the fund’s effective leverage.

### How to Calculate the Size of Positions

In the absence of derivatives, market value is sufficient to calculate position sizes. But when derivatives are present, market value isn’t enough.

Swaps and futures usually have a market value of zero when they are initiated. As prices move, so does the market value. A short position may have a positive market value, but that is not an indication of the fund’s effective exposure. When dealing with derivatives, we must focus on the notional value—the size of the swap or futures contract.

The value of credit default swaps (CDSs) is often presented in transparency reports as the value of the mark-to-market unrealized gain or loss,

### EVALUATING OPTION PRICES\*

Greek letters represent the consensus of the marketplace as to how the price of an option will react to changes in certain variables.

*Delta* is the amount that an option price is expected to move based on a \$1 change in the underlying stock.

*Gamma* is the percentage by which delta will change based on a \$1 change in the stock price.

*Theta* is the amount that the price of calls and puts will decrease (at least in theory) for a one-day change in the time to expiration.

*Vega*<sup>†</sup> is the amount that call and put prices will change, in theory, for a corresponding one-point change in implied volatility. Vega does not have any effect on the intrinsic value of options; it only affects the time value of an option’s price.

*Rho* is the amount that an option value will change in theory based on a one percentage-point change in interest rates.

\* <http://www.optionsplaybook.com/options-introduction/option-greeks/>

† The editors recognize that vega is not actually a Greek letter.



## CHAPTER 3 LEVERAGE (CONTINUED)

not the notional value. But notional exposure should also be provided. Purchased CDSs provide protection for the potential default of a particular bond or issuer. At maturity, the worst case for the buyer of protection is loss of all the cash flows he paid to protect the bond, while for the seller of protection the worst case is having to pay the par value of the bond. During its life the valuation of the swap will move in line with credit spread changes of the underlying bond.

The market value of option contracts can also be quite misleading. With these investments, market value represents the current value of the option premium. Hedge funds often state options as delta-equivalent exposure, which translates the option into terms of the underlying asset. For an equity option, hedge funds value the position as shares of the underlying stock. A change of one cent in the stock's price will affect the value of the delta-equivalent exposure by the same amount as the change in the option premium. This is an effective measure for options, because it shows the exposure of a purchased put option much the same as that of a short stock position.

Further complications can result from positions designed to offset foreign exchange and interest rate exposures. Hedging a euro-denominated security with a forward contract should not increase the portfolio's leverage. Funds will typically omit these kinds of positions from the leverage calculation.

Risk-based leverage measures are also helpful, both with strategies that employ derivatives and with those that don't. These measures can take many forms, as complicated as a value-at-risk measure or as simple as a beta-adjusted measure.

Different measures of position size give dramatically different leverage calculations. Consider the simplified example in Table 3.2, on the following page, where a fund has hypothetically bought a single equity that has a market value equal to twice the fund's NAV. This particular equity has a beta of 0.5 to the S&P 500. The fund has also purchased a one-month at-the-money put option on the S&P 500 with a notional value equal to its NAV.

When used in tandem, this variety of values reveals a more complete picture of leverage and the risk associated with it.

Most hedge funds report their gross and net leverage figures at the end of each month. These can be misleading if we don't know the average beta of the longs and shorts. Funds should be pressed to provide concrete information about the options they hold and the risks they carry.

The suitability of a hedge fund's leverage—our key concern—also depends on the terms of the financing, and how well the duration and reliability of the financing match the nature of the leverage used, all in the context of the fund's balance sheet. Ultimately, we need to make an informed judgment.

Comparing the leverage of different funds is hard to do because different investment strategies make different use of leverage. Some borrow modest amounts, while others—such as global macro—carry high gross leverage. Also, it is difficult to learn much from combining leverage measures from all of our hedge funds into a single figure for our overall portfolio.

“Gross and net leverage figures for a hedge fund can be misleading if we don't know the average beta of the longs and shorts.”

“Comparing the leverage of different funds is hard to do because different investment strategies make different use of leverage.”

CHAPTER 3  
LEVERAGE (CONTINUED)

“Risk defined purely as volatility doesn’t take into account leverage and correlation.”

“Analyzing how each fund’s leverage and risk have changed from month to month provides a practical basis for a conversation with the manager.”



**TABLE 3.2**  
MEASURING THE LEVERAGE OF A HEDGE FUND

	Long	Short	Net	Gross
Market Value	200%	2%	202%	202%
Notional	200%	-100%	100%	300%
Delta Equivalent	200%	-54%	146%	254%
Beta-Adjusted	100%	-54%	46%	154%

Further leverage is hidden in the portfolio, created without borrowing a dollar, because investing in a highly leveraged company is a form of portfolio leverage. A portfolio of highly leveraged equities or mezzanine slices of junior debt will exhibit the volatility of a highly leveraged portfolio of normal equities.

Evaluating the amount of leverage in macro and CTA strategies is particularly complex, because such managers often take sizable directional bets in diverse markets—currencies, fixed income, equities, and commodities. Calculating the net leverage of a portfolio in such disparate markets is a major challenge.

Analyzing how each fund’s leverage and risk have changed from month to month provides a practical basis for a conversation with the manager. What made the numbers change? Is the fund taking more risk, or different kinds of risks? How much fluctuation in leverage should we normally expect between reporting periods? By asking these questions, we can get a qualitative view of that manager’s leverage to help us determine whether his leverage is appropriate for his strategy. We need to understand how our managers approach both *explicit* and *implicit* leverage.

LEVERAGE IN PRIVATE EQUITY

Leverage was particularly damaging to buyout, real estate, and other forms of private equity funds in the 2008 crisis. Many portfolio companies or properties that had borrowed money found that their lenders were unwilling to renew their maturing loans and no one else was willing to replace them. In some cases this caused distressed selling and foreclosure of many properties. Many loans that were made without a “no recourse” clause were particularly devastating.

The leverage by portfolio companies can no longer be influenced by investors once those investors have entered a private equity fund, except perhaps through its advisory committee. Investors may understand a fund’s planned leverage, yet all too often the sources and terms are not fully discussed and agreed upon. Thus before entering a private equity fund, due diligence should include a thorough understanding of a fund’s intended amount, sources, and terms of leverage.

## CHAPTER 3

### LEVERAGE (CONTINUED)

#### LESSONS LEARNED

The financial crisis of 2008 inflicted great losses as it brought many hedge funds and banks to an end. Many investors ignored the potential severity of unexpected volatility compounded by leverage and reduced liquidity. Lenders, managers, and investors all learned valuable lessons.

#### Prime Brokers and Lenders

One thing that led to the buildup of leverage going into 2008 was that lenders were willing to lend at such low interest rates. Given that, the required return for financed investments could be low as well. Lenders have since raised the cost of borrowing and are imposing a wider range of fees on collateral. A share of IBM stock carries entirely different risk from a high yield bond, and today the cost of borrowing against assets is more rational relative to an asset's risk.

#### Hedge Fund Managers

Hedge fund managers are more aware of the limits in their investment strategies, particularly liquidity under stress. If a fund is leveraged 2 to 1, the manager has to sell twice as much when a market declines just to keep the same buffer of equity capital. Leverage is now comparatively modest as a result of increased borrowing costs and uncertainty across global markets. Hedge fund managers are currently more careful about managing within an appropriate level of risk for their strategies.

Managers also are more aware of the contingencies in their agreements with lenders. Just as investors were surprised in 2008 and 2009 when managers suspended redemptions for the first time, managers were surprised when their credit lines were reduced or withdrawn as losses or redemptions hit NAV triggers in prime broker agreements.

Prior to 2008, only large managers had prime broker agreements with multiple firms. But today even smaller funds are diversifying their sources of financing. In the event of a crisis, they might need to quickly relocate their securities and collateral from a counterparty that is troubled to one that is safe. Institutional investors are also demanding that protection, as they have become more aware of counterparty risk.

#### Investors

Many managers believe that investors' heightened focus on operations and leverage has helped to improve the hedge fund industry.

Investors have emphasized greater quality of leverage in their managers' portfolios—the stability of their borrowing sources and the likely behavior of the lenders. In reviewing a prospective hedge fund (or deciding whether to retain one), investors' due diligence on the fund's operations, counterparties, and leverage is as important as on the fund's investment track record.

Investors' maintenance of adequate liquidity in their portfolios, including cash reserves, is a key concern that will be discussed in the next chapter.

“In 2008 many investors ignored the potential severity of unexpected volatility compounded by leverage and reduced liquidity.”

“Lower leverage will allow you to survive the downturns.”

## CHAPTER 4 LIQUIDITY

Liquidity is the ability to convert an asset into cash in an orderly manner, at a fair price, and within a desired time frame. At times, the liquidity of an asset can change quickly.

If our portfolio consists entirely of listed stocks, bonds, and mutual funds, managing liquidity is relatively straightforward. If we suddenly need cash that exceeds our money market holdings, our worst liquidity event is having to sell some stocks or bonds in a down market. The inclusion of hedge funds, private equity, and less liquid segments of the bond market adds a great amount of complexity to the liquidity of a portfolio.

The subject of liquidity is not addressed in modern portfolio theory, which implicitly assumes that all assets can be bought and sold freely. The subject has not been extensively studied by financial academics, and investment practitioners don't all agree on how liquidity should be measured.

Spiking volatility can reduce liquidity, and when liquidity dries up, it tends to drive up volatility—potentially a vicious circle. Otherwise, liquidity and volatility are separate aspects of risk. For example, listed equities are among the most liquid assets in our portfolio, but they are also one of the most volatile. Treasury bonds are also highly liquid but typically not volatile. On the other hand, bank loans are somewhat illiquid, but their prices can be volatile.

The liquidity of a security is driven by numerous factors: the volume of trading, the numbers of buyers and sellers, the availability of pricing, the amount of information about that security, investor confidence in the quality of that information, the integrity of counterparties, and investor psychology.

In market crises, the freedom of capital to flow throughout global markets can drain liquidity from markets that are not directly affected. Liquidity can also be seasonal, as summer vacations can reduce the amount of trading and thereby reduce liquidity. Enthusiasm for a new year of performance can increase liquidity in January and February. Thus liquidity is dynamic, and in our portfolio construction and management we need to base our planning on the likely *boundaries* of liquidity.

Bid/ask spreads as a percentage of price are often viewed as a measure of liquidity. For example, large cap stocks have a much narrower spread than smaller cap stocks. Hence an investor in small stocks accepts less liquidity than if he invested in large stocks. Figure 4.1 shows that even for the most liquid stocks, spreads can triple in market crises such as in 2008. It also shows how much more liquid large stocks are than small stocks.

Liquidity has also been impacted by unintended consequences of the Dodd/Frank legislation. For example, prior to Dodd/Frank, investment banks committed significant capital to market making and taking market risk. As a result of Dodd/Frank, the banks were required to reduce their capital allocated to proprietary trading. Therefore when an investor wants to sell, banks make fewer bids, which results in somewhat reduced liquidity.

“The subject of liquidity is not addressed in modern portfolio theory, which implicitly assumes that all assets can be bought and sold freely.”

“In our portfolio construction and management we need to base our planning on the likely *boundaries* of liquidity.”

CHAPTER 4  
LIQUIDITY (CONTINUED)

MANAGING LIQUIDITY

The broad use today of hedge funds and private illiquid investments creates an urgent need for investors to maintain an up-to-date analysis of their liquidity—a major increase in complexity.

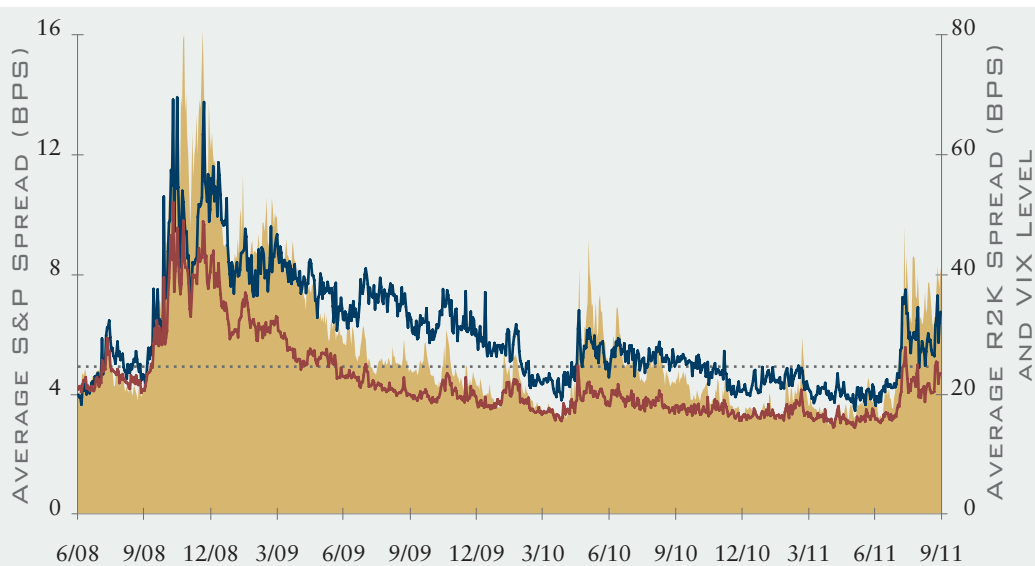
Managing the liquidity of our portfolio begins with estimating amounts and timing of the cash requirements of our sponsoring organization, such as benefits to be paid to retirees, income counted on by colleges and universities, grants to be made by a foundation, or obligations of private individual investors. We must also be prepared to meet unexpected calls for cash from our sponsor organizations.

We must also have cash for requirements within our portfolio—for sporadic cash calls from private investments to which we are committed, for unpredictable margin or marks-to-market, and for settling forwards, futures, or swaps.

Once we project our cash requirements, we then analyze our *sources* of cash. Among them are expected contributions from our sponsors as well as payouts from our private investments, whose timing is particularly difficult to forecast. Prior to 2008 such payouts covered a major portion of cash calls from newer private investment commitments. But during the financial crisis of 2008 payouts dropped off sharply when

“Managing the liquidity of our portfolio begins with estimating amounts and timing of our cash requirements.”

FIGURE 4.1  
EQUITY BID/ASKED SPREADS, S&P 500 AND RUSSELL 2000  
VERSUS VIX\* (6/2008-9/2011)



“If we are not prepared for black swan markets, we may be forced to sell assets into an illiquid market at temporarily depressed prices.”

## CHAPTER 4

### LIQUIDITY (CONTINUED)

“If we plan for materially more liquidity than we need, we can hurt our expected returns.”

“An illiquid asset means we can't change our mind, so we should expect from it a materially higher return than from something where we can change our mind.”

they were needed most, while cash calls from newer private investments continued apace. Cash flows from private investments have since increased, but our planning has to allow for such disappointing shortfalls.

With this as background we must determine our requirements for liquidity, and that's not a simple matter. We want to be sure we can make all payments on time without fail. But if we maintain materially more liquidity than we need, we can reduce our expected returns, because if we invest wisely, we should earn higher returns due to the risk premium on less liquid investments.

Many of us establish the minimum percentage of our investments that we must keep in each category of liquidity, such as:

- Overnight
- Less than a week
- Monthly
- Less than 6 months
- Between 6 to 15 months<sup>13</sup>
- More than 15 months

Our minimum liquidity requirements, which might be called our liquidity budget, are an important decision that should be reviewed with our investment committee.

At least quarterly many investors prepare a liquidity spreadsheet listing each of our investment programs. We then insert the percentage of the portfolio for each program in the respective column for each category of liquidity, such as those above. We then compare the total at the bottom of each column with our approved minimums to make sure we have adequate liquidity.

Question: Should we plan the liquidity requirements of our investments on the basis of a normal market, or a crisis market from which liquidity is drained (as in 2008)? If we are too conservative with our liquidity requirements we will suffer opportunity cost. But if we are not prepared for black swan markets, we may be forced to sell assets into illiquid markets at artificially depressed prices. Where is the proper balance? That is a challenging question for each of us to decide.

#### THE RETURN PREMIUM FOR ILLIQUIDITY

Investment theory and practice both dictate that less liquid assets should deliver a premium return over investments in readily marketable public securities. That is one of the reasons why, over long intervals, a micro stock index should earn, and has earned, a higher return than the S&P 500.

When we invest in a hedge fund, we generally forfeit liquidity for a period of three months to three years. And private equity investments often require commitments of 10 years or more, including promises to fund future capital calls at unspecified times.

An *illiquid* asset means we can't change our mind about owning it, so we should expect from it a materially higher return than from something where we can change our mind. Especially in today's world, as cycles of change have speeded up, investors truly need a reward for illiquidity. Some observers believe that the risk-adjusted premiums earned on illiquid investments are insufficient. Often we are faced with multiple ways to access an opportunity.

<sup>13</sup> Why 15 months? If a hedge fund allows redemptions only at year end and requires 90 days advance notice, then a redemption request in October cannot be honored until nearly 15 months thereafter.

CHAPTER 4  
LIQUIDITY (CONTINUED)

**TABLE 4.1**  
COMPARATIVE RETURNS ON LIQUID AND  
HEDGE FUND INVESTMENTS

Annual Rates of Return and Standard Deviations		1996-2000	2001-2005	2006-2010
S&P 500	Annual Return	18.3%	0.5%	2.3%
	Standard Deviation*	14.9	17.7	22.1
Barclays Aggregate Bond Index	Annual Return	6.5%	5.9%	5.8%
	Standard Deviation*	4.5	2.9	0.9
MSCI Emerging Markets	Annual Return	-4.2%	19.1%	12.8%
	Standard Deviation*	35.1	23.4	43.1
Hedge Funds: HFRI Weighted Composite†	Annual Return		7.0%	3.3%
	Standard Deviation*		7.7	15.0

\*Standard deviations of five calendar-year returns

†HFRI's universe includes over 2,000 diverse hedge funds but may suffer from some survivor bias and voluntary reporting bias.

Unless we expect the less liquid alternative to offer a materially higher risk-adjusted return, we should opt for the more liquid (and less complex) solution.

What is an appropriate return premium on a less liquid investment? Some investors may be pleased with a hedge fund that matches expected returns from the public market with half the volatility. But for a private equity opportunity, they might expect 5 percentage points more than from public markets, although any such rule of thumb needs to be adjusted for expected risk. Some investors divide extra returns into three components: the skill of the manager, leverage or other additional risk, and the true illiquidity premium.

Historically, the size of the illiquidity premium has depended on the time interval being measured, as shown in Table 4.1. During a bull market such as 1996-2000, hedge funds cannot be expected to keep pace with equities.

But hedge funds outperformed equities in 2001-05, when hedge funds were able to counter challenging markets with active strategies. The next five years through 2010 reflect the impact of the mortgage debacle.

The annual returns in Table 4.1 are *means*—“the average depth of the river.” Returns of active managers in long-only fixed income and listed equities tend over long intervals to cluster close to their means. Their top and bottom quartiles are probably included within 100 and 200 basis points, respectively. Alternative investments, however, vary greatly among managers, even in the same strategies. Among hedge funds, for example, the distance between the top and bottom performance deciles for 2008 was 103 percentage points (ranging from +41% to -62%). Even in the calmer year of 2010 the span was 58 percentage points (from +43% to -15%).

“Unless we expect the less liquid alternative to offer a materially higher risk-adjusted return, we should opt for the more liquid solution.”

“Using historical data as precedent is misleading, and it is definitely misleading when you get into a secular change in the market.”

CHAPTER 4  
LIQUIDITY (CONTINUED)

“During a crisis, hedge fund investors should assume that their entire portfolio becomes illiquid.”

“Although illiquidity should carry a premium return, it often does not.”

Returns on private equity fell with all other markets in the financial crisis, but over time private equity has delivered higher returns than public markets. Over the last 10-year interval the median return among buyout and venture capital funds was less than the median for public equities. In turn, median public equity managers underperformed median bond managers.

Although illiquidity *should* carry a premium return, it often doesn't. It depends heavily on the interval and the particular manager of an alternative investment. Of paramount importance is the competence of the director of investments in selecting managers. Manager selection is crucial for all alternative assets, and particularly for managers of buyout or venture capital funds. Spreads between quartiles of those private equity funds over the last 10 years are shown in Table 4.2.

A specific example of the difference between liquid (public equities) and illiquid (private equity) can be seen in real estate investing. Can investors do as well investing in real estate through the public equity markets via real estate investment trusts (REITs) as with private investments in real estate? Table 4.3 compares

the returns of NAREIT, a REIT equity index, with those of NCREIF's National Property Index, an index of private equity real estate.

If we compare returns of the two indexes over the last 14 or 15 years (see the boxed returns in Table 4.3), we could conclude that highly liquid REITs have provided about the same long-term rate of return as private real estate. But there is no free lunch. For the full 20-year interval, the standard deviation of public REITs was 20% compared with 9% for private equity real estate.

Our selection of one over the other for our portfolio depends on the risks we want and how we measure volatility. The true mark-to-market volatility and risk-adjusted returns are not obvious for either asset. NAREIT returns are greatly affected by the stock market, and NCREIF returns are based on appraisals, which can be slow in adjusting to market conditions.

Ultimately, when choosing strategies, we must decide if the expected risk-adjusted return is worth the illiquidity associated with that strategy. Taking the more liquid choice, even if the return is modestly lower, can sometimes be the most effective course because it allows

**TABLE 4.2**  
SPREADS BETWEEN TOP, MEDIAN AND BOTTOM QUARTILES  
(2001-2010)

Asset Class	Universe <sup>†</sup>	Spread by Quartile*	
		1st to Median	1st to 4th
Private Equity	VE Buyout Universe	22.1%	37.4%
Venture Capital	VE Venture Universe	19.1	36.9

\* 1st quartile = Top 25th percentile, 4th quartile = Bottom 25th percentile

<sup>†</sup>ThomsonOne.com Private Equity: Time-weighted returns based on 253 buyout funds and 606 venture funds. Data is collected from private funds willing to share data and therefore may not be fully representative.



CHAPTER 4  
LIQUIDITY (CONTINUED)

**TABLE 4.3**  
NET ANNUAL TOTAL RETURN OF NAREIT INDEX VERSUS  
NCREIF INDEX (1991-2010)

		FROM START OF																			
		'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10
TO END OF	'10	5	3	2	1	1	1	-1	-1	2	3	2	2	3	-1	-2	0	-4	5	31	15
	'09	4	2	1	0	0	0	-2	-2	1	2	1	1	1	-3	-4	-4	-9	1	45	
	'08	2	0	-2	-3	-3	-4	-6	-7	-4	-3	-4	-6	-7	-13	-17	-19	-32	-31		
	'07	5	2	1	0	0	0	-3	-3	1	3	1	0	1	-5	-9	-10	-32			
	'06	7	5	4	3	3	3	1	0	5	9	8	8	11	6	5	18				
	'05	7	4	3	2	2	1	-1	-2	3	7	6	6	9	-1	-8					
	'04	8	5	4	2	3	2	0	-1	5	10	9	10	18	7						
	'03	8	5	3	2	3	2	-1	-2	5	11	10	11	28							
	'02	6	3	1	-1	0	-1	-5	-7	0	6	-2	-3								
	'01	7	4	-2	0	0	-1	-6	-9	-1	10	7									
	'00	7	3	1	-1	-1	-3	-9	-13	-2	14										
	'99	6	2	-1	-4	-4	-7	-16	-25	-16											
	'98	9	5	-2	-1	0	-3	-15	-34												
	'97	16	12	10	8	13	15	6													
	'96	18	13	11	9	16	25														
	'95	16	10	7	2	8															
	'94	18	11	7	-3																
'93	26	19	18																		
'92	30	19																			
'91	41																				
Higher return for NAREIT							Lower return than for NCREIF NPI														
ACTUAL																					
NAREIT	36	15	20	3	15	35	20	-18	-5	26	14	4	37	32	12	35	-16	-38	28	28	
NCREIF	-6	-4	1	6	8	10	14	16	11	12	7	7	9	24	20	17	16	-6	-17	13	

Figures represent the annualized returns of the NAREIT index (public market) minus the NCREIF NPI (private market).

“Ultimately, when choosing strategies, we must decide if the expected risk-adjusted return is worth the illiquidity associated with that strategy.”

## CHAPTER 4

### LIQUIDITY (CONTINUED)

“Not all managers drawn by high fees to manage hedge funds are among the best. Distinguishing among them is our challenge.”

“Many investors don’t adequately consider reinvestment risk when evaluating opportunities in private equity.”

portfolio rebalancing and *flexibility*—the opportunity to make future adjustments under different market conditions.

On the other hand, there are times when we find a particularly promising manager whom we can access only by way of a hedge fund. Some of the best investment managers are attracted by the more lucrative fees of managing a hedge fund. In that case, it can be worthwhile to accept the illiquidity of a hedge fund. But, of course, not all those drawn by the high fees to manage hedge funds are among the best! Distinguishing among them is our challenge.

#### The Illiquidity Premium for Private Equity

After a private equity investment has made its last payout, how can we know what kind of an illiquidity premium, if any, we have received?

If a private equity fund was invested in venture capital or buyout, the alternative traditional investment might have been the Russell 2000, a microcap index, or even a NASDAQ index fund. We might then prepare a “what if” account. What if on each date when we made a contribution to the private equity fund we had instead purchased the relevant index fund? And on each date we received a payout from the private equity fund, what if we had sold an equal amount of the index fund? The difference in value at the end would suggest whether we received an adequate illiquidity premium.

If, for example, the private equity fund was a real estate fund, a NAREIT index fund would be appropriate for the “what if” account.

Many investors don’t adequately consider *reinvestment risk* when evaluating opportunities in private equity. Reinvestment risk typically entails (a) capital calls occurring more often when markets are weaker, when our alternative uses of cash may be more attractive, and (b) payouts occurring more often when markets are stronger, when our alternative uses of cash may be less attractive.<sup>14</sup> Of course, a private equity manager will sell when he believes it is the opportune moment. But historically, payouts have been weaker when investors were most in need of cash.

For example, distributions to private equity investors amounted to about \$350 billion in both 2006 and 2007—not quite enough to cover calls for capital for those years, but they provided much of the needed cash. In 2008, however, distributions totaled just \$127 billion versus capital calls of \$401 billion, forcing investors to find the needed cash elsewhere, just as values in most other asset classes were collapsing. Distributions improved in 2009 but still left investors scrambling to cover a cash shortfall of about \$110 billion.<sup>15</sup> Of course, the recipients of distributions were not all the same ones who were faced with capital calls, but the aggregate statistics tell the story.

Private real estate saw a similar drop-off in distributions during the market debacle. Distributions to the NCREIF universe of open-ended core real estate funds climbed steadily in the years preceding the financial crisis, reaching \$6.3 billion in 2007 and \$8.3 billion in 2008 (equal to 8% and 12%, respectively, of the funds’ equity). In 2009, however, distributions fell to \$2.0 billion, just 4.2% of equity.<sup>16</sup> It may have been good for investors that real estate managers avoided selling at the bottom, but private equity does reduce flexibility.

<sup>14</sup> The March 2009 working paper, “Private Equity and Liquidity Risk,” by Francesco Franzoni, Eric Nowak, and Ludovic Phalippoutries, tries expressly to account for reinvestment risk in assessing returns on private equity investments.

<sup>15</sup> Prequin.

<sup>16</sup> LaSalle.

LIQUIDITY OF HEDGE FUNDS

Many of us categorize hedge funds among the liquid portions of our portfolio to the extent that we can redeem from them within a year or so. Almost by definition, however, liquidity is limited in hedge funds. Each hedge fund specifies its redemption terms—on what dates (barring gates) we can redeem. Some allow redemptions quarterly, some annually or less often, and each fund specifies the required advance notice, often three months. We must be familiar with the Hedge Fund Definitions on the next page.

How assured can we be that we can redeem our money when we request it? Do some LPs have special liquidity terms via a side letter? What are the fund's provisions for a gate? How do we know we can redeem without the risk of the hedge fund erecting a gate?

Some funds have limited each investor to redeeming a given percentage of its investment at any one time, reducing the potential impact of redemptions by a small number of large investors. A few hedge funds require lockups of up to three years from the investor's contribution date. These provisions help to spread the fund's potential redemptions over time and minimize the amount that can be redeemed on any one date.

A number of hedge funds have been willing to grant fee concessions, typically to larger investors, in exchange for longer redemption terms, although the move is not yet widespread.

For some funds that have lockups of two or three years, investors may have special rights to redeem 10 or 15% of their investments per year without penalty. Other funds have added the option of more frequent redemptions combined with penalties. All penalties are paid to the fund, not the manager. With such "investor-level gates," investors know how much they can withdraw over a given time period. Managers benefit from knowing the maximum redemptions they are likely to face at any one time.

Some people believe that more frequent redemption provisions might allow investors to become a more stable capital base. They believe if a fund that offers more frequent redemptions goes through a slow patch in performance, investors might be more likely to stick with that fund, knowing that if the fund doesn't turn around, they'll be able to get out soon, and they won't have to make decisions at the wrong time with too little information. Frequent redemption windows, however, work only for liquid strategies.

We must always be concerned about the possibility of large redemptions causing the fund to sell its most liquid assets and leaving remaining investors with a fund of less liquid assets. Understanding the stability of an investor base is helpful information. Long lockups can help to create fund stability, but they can create instability when a lockup finally ends.

How has the manager dealt with redemptions in prior difficult times? Has the manager been fair to all investors? Has he ever suspended redemptions?

“In a crisis everything is liquidity driven. There's no need to practice security analysis. Sentiment is driving security prices. Not fundamentals.”

“I'm watching liquidity very closely. Redemptions by limited partners can affect the ability to stay invested.”

“Almost by definition, liquidity is limited in hedge funds. Each hedge fund specifies its redemption terms.”

“Long lockups can help create fund stability, but they can create instability when a lockup finally ends.”

#### HEDGE FUND DEFINITIONS

**Gates** Hedge funds generally grant annual (or more frequent) redemptions, but that’s not an ironclad promise. The terms of many hedge funds include a gate—a provision that if redemptions exceed the gate (often X to Y% of the fund’s net assets), the manager may scale back redemptions pro rata until the next scheduled redemption date. In a market crisis, the manager can postpone all redemptions.

**Side Pockets** Some hedge funds invest in assets that are either illiquid or difficult to price, such as real estate, investments in private companies, or PIPES (private investments in public equity). The manager should place any such investment in a *side pocket*, which is excluded from a fund’s net asset value and forms essentially a separate private equity fund, where performance fees are calculated separately. A side pocket is limited to investors at the time the asset was purchased. Each participant receives payouts whenever the side pocket generates income or sale proceeds.

When an investor makes its first contribution, most hedge funds that use side pockets ask whether that investor wishes to participate. Only those who agree are included in side pocket investments. Since 2008, many funds now give their investors an annual election to participate.

**SPVs (Special Purpose Vehicles, or separate side pockets)** Over time it is possible for liquid investments to become illiquid or difficult to price. When that happens, the hedge fund manager should move the asset into an SPV, which operates the same as a side pocket, applicable to all who happened to be investors at the time the SPV was established.

**Liquidating Trust** If a hedge fund should face a high level of redemptions or terminate, the fund may form a Liquidating Trust, and its assets will be sold over time by the hedge fund manager or a designee. Cash received by the trust is paid out to participants, and no further assets may be purchased.

Side pockets, SPVs, and Liquidating Trusts are similar in that participants cannot redeem from them. Assets will be held until they can be sold at a reasonable price, and proceeds will be paid out to participants.

Our best protection is making sure that the fund's underlying investments are consistent with the fund's liquidity provisions for investors. Redemption provisions are meaningless if they are not well matched by the liquidity of the fund's investment strategy. This is a key area that we need to monitor continuously.

### Portfolio Liquidity

Before we commit to, or continue to retain, a hedge fund in our portfolio, we need to understand the fund's investment strategy and how consistent it is with the fund's liquidity terms for investors. We need to evaluate potential liquidity problems in times of market stress. For example:

- Liquidity of the Fund's Strategy and Underlying Assets. How much cash can the fund raise fairly quickly? Are most of the assets ones that can be readily sold at current prices, or are many assets ones that would need to be dribbled into the market? Are there some assets whose liquidity has changed such that the manager should move them into an SPV?
- State of the Market and Potential Changes. Does the portfolio include assets whose liquidity would change drastically in a financial crisis?
- Leverage. How much leverage is built into the portfolio? What is the likelihood that there may suddenly be large margin calls, causing a squeeze on liquidity?
- Financing Terms With Lenders. If the fund borrows money for investments, what are the financing terms? Do the terms limit the manager's ability to liquidate part of the

fund's positions? When must the loan be repaid? Can it be called? How easy will it be to roll over the loan?

We should be concerned if any one of these above factors is out of proportion. Consider several different types of mismatches:

- A hedge fund that invests in a liquid strategy, such as global macro or long/short equity might reasonably offer its investors redemptions on 90 days' notice, or even 30 days. Individual positions in listed securities or derivatives can be sold quickly without disturbing the markets.

But a manager of a distressed debt strategy, asked to meet redemptions of, say, 25% of assets, might need at least six months to sell enough of the portfolio without impairing the value of the positions in the process. He would need still more time if the reason investors are redeeming is a falling market.

- Funds of hedge funds add another layer of complexity. Managers of funds of funds are limited partners in a large number of hedge funds, sharing the same challenges we share as investors. In a difficult market those funds that offer investors monthly redemptions might have trouble liquidating large holdings of the underlying hedge funds and might restrict or refuse redemptions. As investors in a fund of funds, we need to gain confidence that the redemption terms of its 20 to 30 underlying hedge funds are realistically consistent with the redemption terms that it offers.

“Redemption provisions are meaningless if they are not well matched by the liquidity of the fund's investment strategy.”

“As a liquidity provider, we have nothing to offer except capital, so we want to invest when there's no capital.”

## CHAPTER 4

### LIQUIDITY (CONTINUED)

A hedge fund would help investors with their due diligence if it provided a table each quarter showing the percentage of its current NAV that is next eligible for redemption. For example:

12%	June 30
15	December 31
20	Next June
25	Next December 31
28	After next December 31
100%	

Alternatively, investors might periodically ask the hedge fund for this table as part of their due diligence and also ask the hedge fund what percentage of the fund's assets are currently requested for redemption. The investor might then consider how consistent the hedge fund's investor liquidity schedule is with the liquidity of the fund's underlying portfolio. None of the above can provide us with ironclad assurances. But this kind of information can help us avoid the worst liquidity problems with hedge funds.

Some investors try to protect themselves from the risk of a gate by applying prior to the advance-notice date to redeem all or a large portion of their assets. Then, if there is no rush to redeem by other investors, they cancel their redemption request just before the redemption date. Such a ploy complicates cash management for the hedge fund, so some hedge funds don't allow cancellation of redemption requests.

The hardest part of preparing a liquidity analysis for our overall portfolio is identifying the liquidity of our hedge funds. For each hedge fund, we need to divide our current valuation among two redemption dates. This is because, for a full redemption, a hedge fund typically pays out only 90 to 95% of its NAV on the redemption date, and the remaining 5 or 10% (generally kept uninvested) is delayed until the subsequent annual audit. The audit, of course, could be as much as 15 months after the redemption date. We must also make the best estimates we can of payouts from the side pockets, SPVs, and liquidating trusts of each hedge fund.

Finally, we should allow an additional margin of liquidity in our portfolio to provide for illiquid markets—occasions when we might not be able to redeem all that we would like on the dates we want it.

#### LIQUIDITY OF PRIVATE EQUITY

It is true that illiquid assets can be sold on the secondary market, but investors who are willing and qualified to buy them have historically been relatively few. Establishing a fair value for an illiquid investment can be difficult, because private investments lack the flow of information and comparable pricing of public markets.

The financial crisis in 2008 triggered an evolution in the secondary market, as investors and even general partners can now buy and sell shares in their funds. Transactions reached a high of \$20 billion in 2010, and in the first half of 2011 alone they totaled \$14 billion.

“With a fund of hedge funds, we need to gain confidence that the fund's redemption terms are consistent with those of its underlying hedge funds.”

“Be well-diversified and liquid. Focusing on a particular idea or asset class severely handcuffs your ability to shift gears and take a different route.”

## CHAPTER 4

### LIQUIDITY (CONTINUED)

Average high bids exceeded 100% of net asset value in 2006, but since 2003 they have more typically ranged between 70 and 90% of NAV. Average high bids reached a low of about 40% in the first half of 2009 but more recently, in the first half of 2011, they averaged 87%.<sup>17</sup> Secondaries are now a mainstream market, as funds of secondaries have become a popular way for investors to obtain a diversified portfolio of private equity.

#### LESSONS LEARNED

Prior to 2008, all too few investors followed the recommendations made in this chapter of creating and updating liquidity analyses of their hedge funds and portfolios. As a result, many suffered losses and costly liquidity squeezes. Today, many investors are studying their portfolio liquidity more carefully through cash flow calendars that project the upstream needs of their organizations. They are mapping the sources of liquidity they can count on from their portfolios, taking into account managers' notice periods and varying redemption terms.

Some investors extend the exercise to include the differing sources and needs of cash in normal and stressed market scenarios. Stressed scenarios would imply lower gift levels to endowments, lower private equity distributions, and continuing capital calls from private equity commitments. These steps are providing investors with a better understanding of what choices they can make.

Investors are also looking more closely at the composition of their managers' portfolios, evaluating how quickly positions can be converted to cash, and reconciling the liquidity of a hedge fund's portfolio with the redemption terms it offers.

Liquidity is dynamic. It changes as markets change. This calls for ongoing due diligence and manager monitoring, including stress tests and the use of projections with ample wiggle room.

Many investors are carefully reviewing the liquidity of their allocations to alternative assets and evaluating whether they can realistically expect a sufficient return premium for their illiquidity. But few investors are moving out of illiquid strategies. Instead, investors are shifting to funds of higher quality in terms of fund governance and transparency. And they are doing much more diligent analysis of their portfolio's liquidity.

At the manager level, there has been a material increase in cash reserves in order to meet redemption requests, to offset the fund's inability to sell illiquid and semi-liquid assets, and to take advantage of new opportunities.

“Liquidity is dynamic. It changes as markets change. This calls for ongoing due diligence and manager monitoring.”

“E”xtending your time horizon is no guarantee for better returns.”

<sup>17</sup> “Secondary Pricing Trends & Analysis,” July 2011, Cogent Partners.

## CHAPTER 5 IS ALL THE COMPLEXITY WORTH IT?

### THE CHALLENGES OF ALTERNATIVE INVESTMENTS

The disappointing losses suffered by investors during the 2008 credit crisis and its aftermath have raised questions about the validity of alternative investments. Were our expectations appropriate?

The alternative investment process can be described as follows:

- Assemble a broadly diversified portfolio using the full range of investments, including both traditional and alternative investments (hedge funds and private illiquid funds).
- Focus on opportunities with good prospective risk-adjusted returns that have low cross-correlations of returns.
- Form a portfolio within an acceptable level of overall risk and liquidity.

This approach remains as valid as ever, but not the way it's been implemented. The approach has been called the endowment model because endowments were among the first to increase their allocations to alternative investments to gain the risk/return characteristics and diversification benefits that those investments are intended to deliver.<sup>18</sup> The losses in 2008 by investors who included alternative assets in their portfolios were typically somewhat lower than losses by traditional portfolios. But alternative investments generally failed to provide the protection expected of them, and they caused some investors serious liquidity problems that are not over yet. Why?

Implementation suffered two key shortcomings, both tied up in the complexity of alternative investments:

- The way investors judged the volatility of their alternative investments, and how they estimated the correlations of those investments with the stock market, the credit market, and one another.
- The way investors estimated the liquidity of their hedge funds and the cash flows from their illiquid investments—and the liquidity of their overall portfolios—especially in the event of a market crisis.

What are the remedies? Investors (and their consultants and managers) must do a more thorough job of due diligence before they select their investments. And given the shifting nature of alternative investments, investors must remain vigilant in monitoring their managers and in making periodic decisions as to whether to retain them. Investors must work to improve the way they:

- Estimate the actual and expected worst-case volatility and correlations of each of their portfolio investments, especially their alternative investments, using qualitative judgments as well as historic quantitative methods.
- Determine whether there are potential market scenarios in which their overall portfolio would deliver greater losses than their constituents can live with.

“Given the shifting nature of alternative investments, investors must remain vigilant in monitoring their managers.”

“In 2008 investors suffered two shortcomings in their alternative investments—the way they judged volatility and the way they estimated liquidity.”

<sup>18</sup> Ray Gustin and Russell Olson, “Overcoming Challenges in Investment Approach of the ‘Endowment Model,’” *Pensions & Investments*, July 26, 2010.



## CHAPTER 5

### IS ALL THE COMPLEXITY WORTH IT? (CONTINUED)

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- Estimate the liquidity of their hedge fund investments, especially in the event of a market crisis, and limit their investments only to those funds whose liquidity to investors is consistent with the liquidity of their portfolios.
- Evaluate the appropriateness of the amount and duration of the leverage used by the managers of their alternative investments.
- Plan reliable sources of cash to meet payout requirements, including investors' capital commitments to fund private illiquid investments.

Sponsors of alternative investments also need to make changes.

- The prices of all underlying positions should be supported by independent market-based quotes.
- Fund managers should place any positions they cannot sell in a timely manner at a reasonable price into a segregated account—a side pocket for new investments or an SPV for an existing investment—then actively manage that account until they can sell those positions at a reasonable price. Instead of side pockets, managers should consider establishing a new fund when investing in less liquid investments.
- All funds should maintain multiple counterparty relationships for trading and custody. Funds that in 2008 concentrated their brokerage with Lehman Brothers are still trying to determine what portion of their assets they can recover.

The above steps would not have eliminated the pain investors experienced in the unprecedented credit crisis of 2008. But they would have mitigated some of the pain. We have witnessed some growing pains in the implementation of alternative investments, but with steps such as those above, the combination of traditional and alternative investments can continue to be an effective portfolio management approach.

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#### HAS THE ADDED COMPLEXITY BEEN WORTH IT?

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With all the complexity of alternative investments discussed in this white paper, one must ask, “Is it worth it?”

The answer might depend on who is answering the question. Each individual reader might best answer the question for himself. A basis of comparison might be with “the good old days,” when the commonly accepted benchmark for an endowment fund was 60% S&P 500, and 40% Barclays (formerly Lehman) Aggregate bond index. A benchmark like that for past years is shown in Table 5.1 on the following page.

“Whether it’s worth it depends on who is answering the question. Each individual needs to answer the question for himself.”

CHAPTER 5  
IS ALL THE COMPLEXITY WORTH IT? (CONTINUED)

“Results for the decades ahead are almost assuredly going to look much different.”

**TABLE 5.1**  
RATES OF RETURN AND VOLATILITIES

	S&P 500	Barclays Aggregate	60% S&P/ 40% Barclays Aggregate*	Hedge Funds†
<b>ANNUAL NOMINAL RETURN</b>				
2001-2010 (last 10 years)	1.4%	5.8%	3.2%	6.9%
1996-2010 (last 15 years)	6.8	6.0	6.5	9.5
1976-2010 (since Aggregate Index began)	11.2	8.3	10.0	
<b>VOLATILITY</b>				
2001-2010 (last 10 years)	20.1%	2.2%	11.7%	10.7%
1996-2010 (last 15 years)	20.0	3.2	11.9	11.3
1976-2010 (since Aggregate Index began)	16.8	6.9	11.2	

\*60/40 allocations assume rebalancing at every year end  
†HFRI Fund Weighted Composite Index

From the beginning of 1976, when the Lehman Aggregate bond index was begun, to the end of 2010, a portfolio consisting entirely of the S&P 500 index provided about 1% per year higher return than the 60/40 allocation, at the cost of about 5½% higher volatility. Results of the allocation were helped because of the low long-term correlations between stocks and bonds, which over the 35-year interval was .28.

But the results are heavily influenced by the fact that there has been a bull market in bonds since 1981, unlike anything previously seen. Results for the decades ahead are almost assuredly going to look much different because we are starting from a point of historically low yields.

As shown in the final column of Table 5.1, hedge fund returns were materially higher than the traditional 60/40 portfolio. But hiring the right hedge fund managers would have been the challenge.

**Institutional Results**

It would be helpful to compare the returns of college endowments with the above figures, but colleges report their returns on the basis of a June 30 fiscal year. Over the 10 years from July 2000 through June 2010, the return of 60/40 S&P 500/Barclays Aggregate was 2.0%.

## CHAPTER 5

### IS ALL THE COMPLEXITY WORTH IT? (CONTINUED)

By comparison, the NACUBO-Commonfund Study of Endowments, which includes educational institutions with endowments greater than \$25 million, reported the results for the 10 years ended June 30, 2010, in Table 5.2.

Endowments over \$1 billion earned 2½% per year more than the smallest endowments.

Larger endowment funds, particularly those associated with leading universities, have been leaders in allocating assets to alternative investments. The median allocation by funds over \$1 billion in 2010 was 60%, compared to only 17% for funds in the \$25-50 million size range. The larger funds have the advantage of size and more robust internal resources to address the complexities outlined in this white paper. And they have access to investments—particularly in the private equity area—that may not be available to smaller institutions.

Their ability to invest so competently in alternatives has provided a substantial premium over returns earned by smaller funds, especially given the long term effect of compounding at these higher rates of return.

The premium for larger institutions shown in Table 5.2 demonstrates that it can be clearly “worth the trouble” to deal with the complexity of alternative investments. It’s an open question, of course, as to whether alternatives will provide premium returns for the next one or two decades. If one believes the answer is “yes” or “probably”, the challenge for smaller institutions is how to gain the capabilities of larger institutions.

One approach is to build internal staff capability. Information on alternatives is far more available today than in the past. The staffs of larger endowments have provided excellent

“Investors need to understand that if they wish to outperform their peers, they must leave the comfort of the crowd.”

—Peter Bernstein

**TABLE 5.2**  
INVESTMENT RETURNS OF COLLEGE ENDOWMENTS

Endowment Size	2010 Allocation to Alternatives	Median Returns for Intervals Ending June 2010		
		5 Years	10 Years	20 Years
\$25-50M	17%	3.2%	3.3%	8.0%
50-100M	24	3.2	3.5	8.1
100-500M	35	3.8	3.7	8.6
500M-1B	45	4.2	4.1	9.0
>1B	60	5.7	5.8	10.3
NUMBER OF INSTITUTIONS		536	435	250

Sources: National Association of College and University Business Officers and Commonfund Institute, 2010 NACUBO-Commonfund Study of Endowments, February 2011; and National Association of College and University Business Officers, NACUBO Endowment Study, various years. Reproduced by permission of the National Association of College and University Business Officers.

## CHAPTER 5

### IS ALL THE COMPLEXITY WORTH IT? (CONTINUED)

“Can we realistically gain access to top-tier managers, many of whom are closed or consider new investors by invitation only?”

“Would we be willing to risk investing in a great new idea where little capital has yet been invested?”

training grounds for junior staff members who are eager to step up to greater responsibilities. External resources are also available today that weren't available 10 or 20 years ago, including much greater expertise among consultants as well as the availability of managers who will take responsibility for all or a specific segment of an institution's portfolio.

#### Questions for Investors to Ask Themselves

- Have we added value to our fund by our use of alternative investments?
  - Is whatever value we have added, net of the cost of any added staff time, worth the added complexity we have incurred?
  - Is our board and staff sophisticated enough to invest in alternative investments?
  - Are we in danger of obsolescence—relying on instruments, processes, or technology that worked well in the past but may no longer be applicable in today's market? If we have gotten comfortable, that may be a sign of obsolescence.
  - Can we afford to hire the staff necessary to invest responsibly in alternatives?
  - Do we have access to first-class deal flow? Can we realistically gain access to top-tier managers, many of whom are closed or consider new investors by invitation only?
- If we rely on our consultant, is he sophisticated enough and adequately staffed to enable us to invest productively in alternatives?
  - Would we be willing to risk investing in a great new idea where little capital has been invested, in which few if any others have yet invested or share our conviction—the kind of opportunities that have been among the biggest winners for the largest endowment funds?

\* \* \*

Investing in today's market is clearly a complex challenge. Contributing to the complexity are market volatility, leverage, and liquidity. Do we have the necessary resources to meet these challenges?

## GLOSSARY

**Asset class** A category of assets, such as large U.S. stocks, high-yield bonds, commodities, mortgage-backed securities, etc.

**Bank loan** A loan by a bank to a corporation. The originating bank often sells these loans to other banks and investors, including hedge funds and private equity funds.

**Barclays Aggregate** An index of the broad high-grade U.S. fixed income market. The index was originated by Lehman Brothers in 1976.

**Benchmark** A hypothetical portfolio, often composed of market indexes, used for comparison purposes.

**Black swan** A rare high-impact event that is beyond the realm of normal expectations in history, science, finance and technology (from Nassim Taleb's book *The Black Swan*).

**Capital call** A mandatory call for cash to be contributed to a private equity fund, based on the investor's commitment to that fund.

**Cash flow rate of return** Same as IRR (the internal rate of return).

**CDO** Collateralized debt obligation: a type of structured asset-backed security (ABS) with multiple "tranches" that are issued by special purpose entities and collateralized by debt obligations including bonds and loans. Each tranche has a different level of seniority.

**CDS** Credit default swap: similar to a traditional insurance policy, as it obliges the seller of the CDS to compensate the buyer in the event of loan default for the par amount of the swap, in return for regular premium payments that are related to the credit spread for the respective underlying company or investment.

**CIO** The chief investment officer for an endowment, pension fund, foundation, or insurance company.

**Collateral** Assets pledged in support of a loan or derivative obligation.

**Cross-correlation** Correlations among asset classes, strategies, or funds with one another.

**CTA** Commodity trading advisor, a regulatory term referring to those registered to trade futures. Also a term used to describe futures-trading strategies that use technical analysis and mathematical models.

**Derivatives** Contracts between two parties, such as futures, options, and swaps, which derive their value from a particular security or index.

**Distressed debt** Securities of companies or government entities that are either already in default, under bankruptcy protection, or in distress and heading toward such a condition.

**Dodd/Frank legislation** A 2010 financial regulatory reform act born after the 2008 credit crisis and intended to strengthen financial institutions and curb abuses.

**Due diligence** Research an investor should do before deciding to make an investment and subsequently on a continuing basis for deciding to retain that investment.

**Efficient frontier** A concept in modern portfolio theory for combining assets to form a portfolio that has the best possible expected level of return for any given level of risk.

“While gates may be unpalatable, they probably have saved investors considerable capital during times of extreme market stress.”

“Ultimately, when choosing strategies, we must decide if the expected risk-adjusted return is worth the illiquidity.”

“Alpha means that you risk being wrong, being alone, and having much higher volatility. If you’re not lonely, you’re probably not a contrarian.”

— Peter Bernstein

“The Fed has not accounted for the complexity of activity.”

—Henry Kauffman  
September 2006

**Event driven strategy** A strategy that seeks to exploit pricing inefficiencies that may occur before or after a corporate event, such as a bankruptcy, merger, acquisition, or spinoff.

**Fixed income arbitrage** An arbitrage strategy that seeks to exploit pricing inefficiencies between two fixed income securities.

**Futures** Derivatives, usually exchange traded, that allow the investor to buy or sell a specific amount of a security index fund, foreign exchange, or commodity such as oil or corn, at a predetermined date and price.

**Global macro** A top-down worldwide investment strategy, mainly through use of derivatives trading the full range of investment vehicles, such as currencies, equity markets, and interest rates, based on market and economic trends, government policies, and other broad systemic factors.

**Gross assets** The notional sum of all long and short investments held by a fund.

**Hail Mary pass** In American football, a very long forward pass made in desperation with only a small chance of success, especially at or near the end of a game.

**High yield bonds** Bonds with a rating below BBB-/Baa3, typically yielding more than investment grade bonds.

**Incentive fee** A performance-based fee that is proportional to the success of an investment program.

**IRR** Internal rate of return, the rate of return based on all the cash flows into and out of an investment.

**Liquid/liquidity** A liquid asset is one that can be converted into cash when needed in an orderly manner, at a fair price, and within a desired time frame. Liquidity is the extent to which an asset or portfolio is liquid.

**Listed securities** Securities listed for trading on an exchange.

**Long/short strategy** Paired positions of investments that an investor or fund owns, or derivatives through which it has a derived value in assets (long positions), and investments that the investor or fund has borrowed and sold (short positions).

**Macro** See global macro.

**LP** Limited partner.

**Mean-reverting** An asset class or portfolio is mean reverting if its upward volatility tends to be followed by downward volatility toward its mean (average) return over time.

**Mean/variance** The relationship between the mean (average) return of an asset or portfolio and its standard deviation over time.

**Mezzanine debt** Subordinated debt that represents a claim on a company’s assets which is senior to preferred and common shares and junior to senior and senior/subordinated debt. Mezzanine debt is often packaged with equity warrants.

**Monte Carlo simulations** Typically a large number of simulations of investment scenarios that rely on repeated random sampling to compute expected outcomes (returns).

**NAV** Net asset value.

**Prime broker** A prime broker provides a centralized securities clearing facility for a hedge fund. The hedge fund's collateral requirements are typically netted across all deals handled by the prime broker.

**Redemption** The action of redeeming an investment from a hedge fund.

**Regime** The changing risk factors of the investment market.

**Sharpe Ratio** A measure, developed by Dr. William F. Sharpe, that is an investment's rate of return in excess of the risk-free rate, divided by the investment's standard deviation.

**SPV** Special purpose vehicles, such as a sub-fund of a hedge fund for assets that were not illiquid when the hedge fund purchased them but that have become illiquid or difficult to price.

**Strategy** A method or style of investing.

**Swap** An agreement between two counterparties whereby, until a specific maturity date, one party agrees to swap one set of cash flows for another, typically a fixed rate versus a floating rate.

**Transparency** The degree of openness of a fund that allows insight into the securities in the portfolio, including derivatives.

**UBTI** Unrelated business taxable income (see page 12).

**UBIT** Unrelated business income tax.

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“Sometimes people associate activity with results. Sometimes the hard work is sitting on your hands.”

“To be a good risk manager, one must have a good imagination.”



EDUCATION COMMITTEE	OFFICERS	BOARD OF TRUSTEES
<b>Edgar W. Barksdale</b> Federal Street Partners <i>Co-Chairman</i>	<b>Stephen McMenamin</b> Executive Director	<b>Edgar W. Barksdale</b> Federal Street Partners
<b>Ray Gustin IV</b> Drake Capital Advisors LLC <i>Section Leader: Volatility</i>	<b>Connie Sledge</b> Director	<b>Mary L. Cahill</b> Emory Investment Management
<b>Tom Lenehan</b> Rockefeller University	<b>Douglas M. Perkins</b> Treasurer	<b>Rian Dartnell</b> Granite Associates
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